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Correspondence Theory and Phonological Blending in French

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1 Introduction

Though less productive than rival word-formation processes like compounding and affixation, blending is still a rich source of neologisms in French (Galisson & Lerat 1987; Clas 1980). Despite this productivity, however, blends are often seen by scholars as unpredictable, uninteresting, or both. In his work on morphological productivity in English, Bauer (1988: 39) states that "in most cases…the new word is created from parts of two other words, with no apparent principles guiding the way in which the two original words are mutilated", expressing the sentiment that blending is not only irregular, but also unnatural (i.e. extragrammatical). Taken collectively, the more thorough analyses of blends are something of a mixed bag as well: some focus on their derivation and structure (Algeo 1977; Ruá 2004), others on their usage (Gries 2004), and still others on their place in the grammar (Bat-El 1996; Kubozono 1990). Of these studies, only a few have treated blends as a regular phonological process, and only Bat-El (1996; 2012) has offered a rigorous account of their formation within the framework of Optimality Theory (Prince & Smolensky 1993). The analysis below picks up where Bat-El's (2012) analysis of Hebrew blends leaves off, using Correspondence Theory and a bundle of segmental constraints to deal with this phenomenon as it pertains to French. More specifically, it shows that blending is the result of a single output standing in correspondence with two or more other outputs, and that we do not need to refer to prosodic information, which is crucial in accounts of blending in languages with lexical stress like English, to account for the process in French. The analysis also differs from previous studies in that it locates blending exclusively within the phonology, leaving its morphological and semantic characteristics to be handled by other processes in the grammar.

2 Previous research

2.1 Foundational characteristics

Before considering the formal approaches to blending that have been developed in OT, and especially before presenting my own analysis, it is helpful to review the basic characteristics of the process. In his study on blend structure and coordination in English, Kelly (1998) informally defines blends as words that are formed by "snipping components from existing words and stitching components together either by simple concatenation or through concatenation with overlap of shared phonological segments", a definition that, despite some debate in the literature over the precise limits of blending (Algeo 1977), will be used here as a good descriptive foundation for our discussion. Blends themselves appear in many different semantic and pragmatic contexts, ranging from slang to technical jargon, and have in some cases undergone semantic drift, such that the meaning of the blend is markedly different from the meaning of a non-subtractive phrase formed from the same bases; *brunch*, which has been borrowed from English into French and is more than the simple combination of breakfast and lunch foods, is a good example of the latter. A basic, but important question we must answer, then, is how blending is different from other word-formation processes like compounding and affixation, which previous studies have suggested share its theoretical domain (i.e. they all operate in the lexicon). First, and perhaps most crucially, blending does not have access to the morphological structure of the base elements, meaning both that blending as a process must be purely phonological and that the blends themselves have no regular morphological

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SHS Web of Conferences 8 (2014)
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structure. Evidence of this generalization is seen in blends with simplex bases, like *clur* ← *clair* + *sur*, as well as those with complex bases, like *oridphone* ← *ordinateur* + *téléphone*, where suffixes are clipped from the right edge of the leftmost base element, presumably for prosodic reasons, despite still contributing to the semantic structure of the blend. This characteristic is vital in two ways. First, it strengthens the argument that blends can be elegantly accounted for in OT, which has been successfully applied to a wide variety of phonological phenomena, including suprasegmental phonology, which is the main concern of this paper. Second, it excludes a large number of formations from the analysis, such as acronyms and clippings, that would otherwise be difficult to explain because of their sensitivity to not only the morphological but also the orthographical composition of their base. While these formations do have some characteristics in common with blends, the overarching claim here is that they are phonologically irregular, whereas blends are not.

The other main characteristic of blends is that they never contain segments not in at least one of the base elements: deletion and overlapping are acceptable, and in fact are preferred, but epenthesis is strictly prohibited. This second characteristic may seem obvious—the word blend itself implies the output should be a mixture only of some predetermined set of inputs—but it nonetheless has important ramifications for this study in that it implies the blending mechanism may not access material (phonological or otherwise) not directly contained by the input to the bases. Thus, any strategies for repairing markedness violations resulting from the juxtaposition of the base elements must stem from either deletion or metathesis, although the latter only appears to be used for literary or stylistic effect.

While the data examined in this paper come exclusively from French, blends have been documented in a wide variety of modern languages, including English, German (MacKay 1973), Japanese (Kubozono 1989), and Modern Hebrew (Bat-El 1996). Because of the genetic variety of these languages, the primary goal of this analysis is to develop an account for blending that relies as much as possible on already-established phonological constraints so as to avoid introducing ones which could be considered language-specific or ad-hoc. This goal is worth mentioning here because a number of studies have proposed constraints specific to blending—Bat-El's (1996) DESIGNATED IDENTICAL SEGMENT constraint is a good example—that do not otherwise factor into the given language's phonology. The strategy pursued below runs somewhat opposite to the spirit of these approaches, taking as its starting point the assumption that blending is not extragrammatical, but rather that it is the result of natural phonological processes and can thus be sufficiently described by appealing only to the structure of the given language's prosodic hierarchy and its relevant constraints. Trommer & Zimmerman (2010) also take this position (i.e. that blending is regular), but they motivate blending by means of templatic affixation, which, while technically implementable, leaves a number of important theoretical questions unanswered. These are addressed in Section 2.4, and an alternative solution is posed in Section 3.

Because the analysis below uses a relatively restricted set of constraints to capture blending effects in OT, it relies on a few key theoretical assumptions to explain how the process relates to other word-formation processes and the grammar as a whole. The first assumption is that blending must be treated as a kind of OO-Correspondence, owing to its sensitivity to prosodic information, especially syllable structure and stress assignment, that is unavailable in the input (i.e. in the underlying representations of the bases). The second assumption is that the semantic, syntactic, and pragmatic characteristics of blends are effectively unrelated to their phonological characteristics, meaning that while any words may be blended, the semantic interpretability of the output depends on requirements external to the blending process, for example what categorial combinations the language allows. This point is crucial to not only because it reduces the number of constraints needed to account for the data, but also because it reduces the language-specificity of the analysis, thus making it more cross-linguistically flexible. The third assumption is that segmental overlapping neither drives blending nor exists in the strict sense of multiple segments in the input associating with a single segment in the output. Rather, the appearance of overlapping results from segments in the output making recoverable, but not being explicitly linked with (i.e. autosegmentally) multiple segments in the input—in other words, overlapping is a phonological illusion. This final suggestion contradicts most treatments of blending in the literature, but as will be

SHS Web of Conferences 8 (2014)
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shown in Section 3, we can achieve overlapping effects through the interaction of CONTIGUITY and MAX constraints, so there is no reason to make it an explicit part of the analysis.

2.2 Blending and the grammar

Many previous studies treat blending as a special type of word-formation closely related but not quite identical to both compounding (Piñeros 2003) and coordination (Kelly 1998). Compared to these processes, however, blending is relatively unproductive: in English, for example, only 484 of the approximately 285,000 nouns, verbs, adjectives, and adverbs listed in the *Oxford English Dictionary* are blends (OED Online). Granted, blends, clippings, and other subtractive word formations are often used in informal discourse as slang or nonce-words (Algeo 1977), which might put them at a disadvantage for being recorded in dictionaries; nonetheless, this fact, coupled with the basic desire to keep morphological theory as streamlined as possible, is motivation enough to question blending's status as a derivational process of the same scope and stature as compounding and affixation. Most contemporary research (e.g. Bat-El 1996 and Bat-El & Cohen 2012) follows this line of thinking, suggesting that prosodic factors like syllable structure and word stress, and not the semantic or morphosyntactic contents of the base forms, are the driving forces behind the process. By extension, the implication is thus that blending comprises two separate processes: one morphosyntactic, which selects, arranges, and inflects lexemes according to the established categorical restrictions of the language; and one phonological, which performs some set of prosodic and segmental operations on the outputs of the first process to produce a subtractive formation whereby both are ideally (though not necessarily) recognizable. Because this second process is unique to blending—the first is simply regular word formation and spell-out—it is the focus of the OT analysis in Section 3. However, in order to make the distinction between the two as clear as possible, the remainder of this section will address the issues of categorial combination and lexical ordering.

2.3 Categorial restrictions

Despite the suggestion above that blending might not be derivational, there are still patterns in the categorical structure of blends that must be explained—in French, for example, they may be formed from two nouns or a noun and its modifying adjective, but never from a preposition and a noun. Interestingly, words belonging to functional categories also do not appear in blends, possibly providing further evidence in support of their phonological separation from words belonging to lexical categories (Selkirk 2003). Both Algeo (1977) and Lopez-Rúa (2004) discuss these patterns in detail, outlining the various possible categorical combinations for blends and other subtractive formations, which are summarized as they apply to French in (1).

(1) (a) Noun-Noun (NN): *progiciel* ← *produit* + *logiciel*
(b) Verb-Noun (VN): *brugnoler* ← *brûler* + *bagnoles*
(c) Verb-Verb (VV): *dégrigoler* ← *dégringoler* + *rigoler*
(d) Adjective-Noun (AN): *vréalité* ← *réalité* + *vraie*
(e) Adjective-Adjective (AA): *franglais* ← *français* + *anglais*

Studies that treat blending as a word-formation process alongside compounding and affixation have developed a number of ways to account for these patterns. For example, Piñeros (2003) suggests that the blending mechanism gathers two free morphemes from the lexicon, and then combines the resulting "two morphological words to form a new lexeme". Likewise, Janda (1986), which Piñeros takes as the starting point for his analysis of Spanish blends, suggests that the process is driven by phonemic sharing whereby a single segment may associate with multiple morphemes, providing an autosegmental explanation for the

SHS Web of Conferences 8 (2014)
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apparent overlap in blends like *émoiteur* ← *émoi* + *moiteur*, which have one switch point, and even those like *démocrassie* ← *démocratie* + *crasse*, which have two. Neither study discusses the categorial restrictions on the selection of free morphemes, however, nor do they provide a theoretical mechanism for implementing them. Nonetheless, these unanswered questions are beneficial in that they reveal an important point regarding this particular aspect of blending, namely that the set of possible categorial combinations for a blend contains only those syntactic juxtapositions attested elsewhere in the language and, crucially, no others; in other words, a blend can only combine lexemes that could also be combined by another (presumably non-subtractive) derivational process. The question that follows this generalization, then, is this: why should we posit two processes to account for one categorical output? Although a thorough answer to this question would necessarily deal with the nature of redundancy in grammar and is beyond the scope of this paper, the argument presented below is that a satisfying account of blending is more easily obtained by attributing its morphological characteristics to external processes (e.g. the derivational mechanisms mentioned above) and dealing only with its phonological characteristics than by attempting to deal with both sets of characteristics at once.

2.4 Ordering the elements

Similar to the problem of accounting for the categorical tendencies in blending, an account of the process must also explain both how and why the base forms are linearly ordered before undergoing segmental and prosodic alteration. Kubozono (1990) and Bat-El (1996) accomplish this by giving the bases numerical labels (e.g. BE_1, BE_2, etc.), but they do not explain why the bases were ordered the way they were to begin with; the impression is that the order was back-derived from the order of the elemental phonological substrings in the output, which is perhaps more arbitrary than we might like. In many cases, this problem can be avoided by appealing to either the semantic content or the argument structure of the unblended construction, considering that the constituency ordering for some blends, such as *courriel* ← *courrier* + *électronique*, is both syntactically and semantically intuitive (i.e. *électronique* clearly modifies *courrier* and must therefore be situated at the end of the phrase). Yet, for many Noun-noun (NN) and adjective-adjective (AA) blends lacking a clear semantic head, where the base elements contribute equally to the meaning of the blended form, this argument is less appealing. For example, there is no reason to assume a particular ordering of the bases in *éléphapotame* ← *éléphant* + *hippopotame*, *animot* ← *animal* + *mot*, or *objeu* ← *objet* + *jeu*: because they have a semantic construction similar to that of copulative compounds, where the meaning of the derived form is approximately equal to the sum of its parts, there is no logical way to specify which element must come first, either in the derivation or the eventual output. This ambiguity poses a problem for the current accounts of blending in that they rely on the order of the base elements to determine not only segmental anchoring at the left and right edges of the blend, but also, and perhaps more importantly, its preferred prosodic structure, which itself is extremely important in determining how much material from the bases will eventually surface. Head-based theories like that of Bat-El & Cohen (2012) resolve this ambiguity by proposing that the length of the base elements may also influence their potential selection as the head of the blend, with preference being given to either the longer or shorter base, depending on both its length and stress pattern relative to that of the blend.

Trommer & Zimmerman (2010) propose such an alternative by suggesting that blending is driven by a form of templatic affixation. Under their analysis, one of the base forms functions as the prosodic head for the blend, and the blending process is then the "result of a constraint forcing all material in a morphologically complex word to be dominated by head-prosody." Although this model captures the prosodic compression of the base forms particularly well, it leaves a few questions unanswered. First, the morphosemantic content of a blending affix, if such a thing exists, would be very difficult to pin down, considering that the semantic relationship between the base words of a blend is exactly the same as the relationship between the same two words when combined in a non-subtractive derivational environment. For example, the blends in (2) are semantically equivalent to their respective compounds, as are the adjective-noun blends in (3) to their corresponding to adjunct-modified noun phrases.

(2) (a) *clur* ← *clair* + *sûr*

(b) *alicament* ← *aliment* + *medicament*

(c) *pourriel* ← *poubelle* + *courriel*

(d) *adulescent* ← *adulte* + *adolescent*

(3) (a) *célibattante* ← *célibataire battante*

(b) *informatique* ← *information automatique*

(c) *vréalité* ← *vraie réalité*

Second, why should the target template for blending be variable, when the targets for other morphological processes, like reduplication and truncation, are not? Although templates may vary in size within a single language, they are generally consistent within the domain of a single word-formation rule. For example, the reduplicative progressive prefix in Ilokano is always a heavy syllable (McCarthy & Prince 1986), and shortened nicknames in German are always well-formed trochaic feet (Ito & Mester 1997). Even in cases where there is noticeable variation in the prosodic structure of a single morpheme, like that of the truncated hypocoristic in Japanese, we can still make do with a single template, admitting, as Mester (1990) suggests, that such a template may function not only as a prosodic target for the output, but also as a prosodic delimiter for the input. Following this generalization, if blending is indeed a templatic process, then we should expect the preferred prosodic structure for each blend to converge toward a single, standard structure. However, this is decidedly not the case in French, where blends are always at least as long as their shortest base element but preferably no longer than the longest.

(4) Variable size of French blends

(a) *clur* ← *clair* + *sûr*

(b) *bobo* ← *bourgeois* + *bohème*

(c) *clavardage* ← *clavier* + *bavardage*

Although Prosodic Morphology does support the generalization that any prosodic constituent may be a target for morphological processes, it does not support the more specific claim that templates may vary widely in size, so that even if we admit that the general template for blending is the prosodic word, as Trommer & Zimmerman suggest, we cannot immediately explain the structural variation exemplified by the data in (4) using its framework alone. The potential solution of allowing blending to be a-templatic also would not work, since similar processes invariably make some semantic or syntactic change to the base, whereas blending does not. Even full reduplication, which McCarthy (1993) notes is an "almost trivial case of a-templatic prosodic morphology" in that there are no apparent restrictions on the shape of the reduplicant, carries with it some syntactic information, having been documented as marking features like aspect (Gafos 1998) and the plural (McCarthy 1993).

Trommer & Zimmerman solve this problem by proposing that the prosodic target for any given blend is not a generalized prosodic template, like a heavy syllable or foot, but rather that it corresponds to the shape of one of the base elements (see Bat-El & Cohen 2012 for a similar analysis). By viewing each blend as an instance of localized, ad-hoc templatic creation and then affixation, this suggestion accounts for the variation in the size of blends, but it creates another problem in the process: how do we know which of the base elements will be the head of the blend? As mentioned earlier, the relationship between the root words in many blends makes labeling one of them the semantic or syntactic head easy; that a *motel* is a kind of *hôtel*, for instance, and not a kind of *moteur* is uncontroversial, as is the headedness of blends like *adhocratie* ← *ad-hoc* + *bureaucratie* and *lézardent* ← *lézard* + *incandescent*. Some blends,

SHS Web of Conferences 8 (2014)
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however, have no clear semantic head (i.e. they are exocentric), whereas others have two (5), making the decision much more difficult, if not arbitrary.

(5) (a) *proêmes* > *prose* + *poême*

(b) *foultitude* > *foule* + *multitude*

(c) *ordiphone* > *ordinateur* + *téléphone*

Moreover, if blending does rely on head designation, then we are also faced with the difficulty that, at least for some pairs of base elements, changing the head (and thus the prosodic target) would drastically change the shape of blend; following Kelly (1998), making *foule* the head in (5b), for instance, would yield either *moule* or *mule* instead of *foultitude*. The fact that blends commonly combine words with multiple shared segments and similar prosodic structures (Algeo 1977) obscures this issue in that, owing to the interaction between the segmental and prosodic constraints discussed below, choosing one head over another often has no impact on the phonological makeup of the output (i.e., the output in both cases is the same). Nonetheless, (5b) clearly shows that the base elements may indeed be prosodically dissimilar, so that if one of them is to determine the ultimate prosodic shape of the blend, there must be a less stipulative way of deciding which one it will be, other than by making the choice in retrospect and simply marking whichever base is closest in shape to the blend itself as the head.

An alternative to this analysis is to abandon the idea of head-driven prosodic domination and adopt one in which the base elements influence the shape of the blend equally, relying instead on constraint interaction to process the prosodic information in the input and produce an output that is both maximally faithful and minimally marked. This alternative also has the added benefit of dealing more elegantly with the variability of ordering in the base elements. For many languages, including English (see e.g. Bat-El & Cohen 2012), the order of the bases in the blend is the same as their order in a compound or phrase. In French, however, the ordering is more flexible, with the base elements in phrases like *vréalité* ← *la vraie réalité* and *milichien* ← *un chien militaire* switching positions in the blend. The analysis below accounts for this flexibility by assuming that the base elements have no underlying order; rather, the blend correspond simultaneously with both of them, which each require from it the same level of structural faithfulness.

3 Blending in OT

3.1 A note on the corpus

To the author's knowledge, there is no exhaustive record of attested blends in French. Even in English, a language for which numerous dictionaries of nonce words, slang, and jargon exist, it is difficult to estimate how many blends are in contemporary usage. To cite the number given in Part 2 of this paper as evidence, the *OED* online, which contains nearly 300,000 entries, cites only 484 of them as having been formed by blending. More challenging perhaps is the fact that many blends common in contemporary speech and writing are omitted from records like the *OED*—words like *sext*, *Bennifer*, and *fugly*, for example, which are attested in a number of large digital corpora (see e.g. Davies 2008), are left out entirely. Because this problem seems to have extended itself to French, the examples used in this paper were gathered from relatively informal online sources, including Wikipedia, but were checked by native speakers of French at the author's home institution to ensure their grammaticality. The resulting dataset comprised approximatley 100 blends of varying categorial and phonological structure.

SHS Web of Conferences 8 (2014)
DOI 10.1051/shsconf/20140801194

3.2 Defining the input

Although some characteristics of blends, like prosodic compression, can be captured in OO-Correspondence, early studies (e.g. Bat-El 1996) suggested some cannot. One way of schematizing the previous accounts of blending is to imagine the process at the intersection of input and output correspondence:

Input: /Lex_1Lex_2/

↕

Base$_1$ ↔ **B**lend ↔ **B**ase$_2$

The key assumptions behind this kind of model are that the input for a blend, like the input for a compound, is a string of lexemes, and that the output for this string corresponds simultaneously with some number of other outputs (for the sake of illustration, the model above uses two, although this number is in principle unlimited), allowing the blend to make use of prosodic information like foot structure and stress that are not normally considered to be present in the input. A clear problem with this account is that the lexemes in the input must be ordered before being evaluated by the IO constraints, which for the reasons mentioned above does not work as cleanly for French as it does for English. A more tenable model, then, would be one that does away with the input entirely and relies solely on correspondence between outputs to produce the blend, like the one here:

Base$_1$ ↔ **B**lend ↔ **B**ase$_2$

Adopting this model has a number of benefits. First, as mentioned above, it makes no suppositions about the precise ordering of the base elements (the subscript numbering above simply denotes that the bases are distinct outputs, not that they occur in any specific order). Second, it locates blending entirely at the level of the output, giving it access to post-lexical prosodic features like stress that are non-contrastive and thus not present at the level of the input in French.

3.3 Core constraints

The most basic requirement of the blending process is that the final output constitute a single prosodic word, regardless of how many base elements it comprises. That the output should contain at least one prosodic word is expected; that it should constitute only one, however, is crucial in defining the prosodic limits of the output. Therefore, the constraint in (7) is proposed, and is suggested to be undominated with regards to blending.

(6) PRWD: The output must be a single prosodic word.

Inputs containing multiple prosodic words undergo stress reassignment to become blends, while those containing only one are simply passed through the evaluator and unchanged in the output. Just as importantly, we also need a constraint that ensures the blend retains at least one segment from each of the base elements. Because there are a few ways of doing this, it is helpful to begin by reviewing the constraint presented in (7), which was proposed by Bat-El (1996) to account for this same phenomenon in Hebrew blends.

(7) MINCONTRIB: Each prosodic word must contribute a minimum of one segment to the blend.

SHS Web of Conferences 8 (2014)
DOI 10.1051/shsconf/20140801194

Bat-El's decision to include (10) in her analysis is motivated by the need to have some way of preventing the blend from being phonologically identical to any of the base elements; without appealing to anti-faithfulness, the only way of doing this seems to be requiring outright that the blend contain at least part of each. The question remains, though, of whether it is possible to account for segmental faithfulness in blending without relying on a process-specific constraint like MINCONTRIB to push the base elements into the output. Before answering this question, we should consider the blend in (8), which has some interesting segmental characteristics despite being prosodically well-formed.

(8) (a) *ridicoculiser* ← *ridiculiser* + *cocu*

Although the blend was invented by Edmond Rostand and might thus be considered a product more of his linguistic creativity than of the grammar itself—a number of scholars (see e.g. Schultink 1969 and Bauer 1983) maintain that for a process to be productive in the morphological sense, its neologisms must be coined unintentionally, which is probably not the case in this and the other examples cited in this paper—it nonetheless conforms to the prosodic requirements of blending mentioned above. What makes it somewhat unusual, though, is that its base elements are joined by more than one phoneme boundary: syllables from the first base surround the two syllables from the second, a relatively rare structure among blends. The reason for this apparent irregularity is that instead of prioritizing contiguity over segmental faithfulness, which is suggested below to be the most common general constraint ranking, the blend in (8) exemplifies the reverse, where maximizing material from the base elements has dominated the preference for joining them at a single switch point; for the sake of comparison, the alternative outputs for the bases in (8) are given in (9).

(9) (a) *ridicocu* ← *ridiculiser* + *cocu*
(b) *coculiser* ← *ridiculiser* + *cocu*

What the blend in (8) does better than the blend in (9), then, is squeeze more segmental material from each of the bases into output, which we can straightforwardly account for by appealing to a basic faithfulness constraint like MAX-OO (Kager 1999). If such a constraint is active during the formation of the blends in (8), then it must also be active during the formation of the ones in (9), and the difference between the segmental content of the outputs should be attributable to its position in the hierarchy relative to any constraints requiring contiguity.

Introducing a general MAX constraint raises an interesting question : should it operate between the input and the blend, between the blend and the bases, or both? As an IO constraint, which is how segmental faithfulness constraints are typically implemented, MAX would push segments from both bases into the blend equally, since the input, at least in the model proposed above, is a uniform string of segments and cannot be parsed to associate with either of the bases individually. As an OO constraint, however, MAX would apply to the separate correspondence relations between the blend and each of the bases, creating the same equal push as MAX-IO, but with the added advantage of penalizing candidates that do not include segments from both the bases. For this reason, this option is implemented here, and is introduced in (10) as a bundle of constraints linking the blend to each of its corresponding outputs (sub-n notation is used to formalize the notion that the number of bases is flexible, if not theoretically unlimited).

(10) MAX-BASE$_N$BLEND: Each segment of a **B**ase$_N$ must correspond to a segment in the **B**lend

The second question introducing such a constraint raises is whether it is strong enough to force segmental material from both bases into the blend; in other words, can Bat-El's MINCONTRIB be replaced by a bundle of MAX-BB constraints? We can answer this question by considering the data in (11), which list some possible ungrammatical outputs for the blends *magnifigue*, *chirurgent*, and *clur*.

(11) (a) *magnifique* + *figue* → *magnifigue, *magnigue*, **migue, *figue*
(b) *chirurgie* + *urgent* → *chirurgent*, **churgent*, **chirgent*, **urgie*, **chigie*
(c) *clair* + *sûr* → *clur*, **clair*

In these examples, the grammatical outputs include more segments from the bases than the ungrammatical outputs, which is a generalization we can clearly capture with a constraint like the one proposed in (10). However, where MAX fails, and where a constraint like MINCONTRIB succeeds, is in preventing the ungrammatical output in (11c) from surfacing. As shown by the tableau in (12), both forms incur equal violations of their respective MAX-BB constraints, which because of the correspondence relation between the bases and the blend must be unranked with respect to each other. Thus, the candidates tie, and we are left without a good answer to the question of why the one with segments from both bases should win out over the candidate with those only from one.

(12) Tableau for *clur* ← *clair*+ *sûr*

/klɛʀ₁+syʀ₂/	MAX-BB₁	MAX-BB₂
a. klyʀ	*!*	*
b. klɛʀ		**!

MINCONTRIB avoids this ambiguity by placing a restriction on both bases simultaneously, correctly predicting that the winning candidate should be one containing segments from each, as shown in (13).

(13)

/ klɛʀ₁+syʀ₂/	MINCONTRIB
a. ☞klyr	
b. klɛʀ	*!

However, our analysis would be more economical if we could avoid appealing to this constraint entirely, since it is specific to blending and feels somewhat ad-hoc. One alternative could be to propose that the first and last segments of the blend must be anchored to their correspodning segments in the bases, which when combined with the MAX constraint in (10) would achieve a similar effect : either the blend will anchor an edge to a corresponding edge in each base, or it will anchor both edges to those in a single base and incorporate segments from the other between them. Anchoring constraints are already a widely accepted feature of OT (see Kager 1999 for a basic overview), so this would be an appealing solution. The problem with relying on MAX constraints to push segments from the bases into the blend, however, is that they do not impose the same restriction on the blend as MINCONTRIB that the output must crucially contain material from *both* bases and not just one. Again, the data in (12) make this distinction clear : a blend containing only segments from one of the bases performs just as well when compared by our pair of MAX as a blend containing segments from both of them. Even with an anchoring constraint requiring the blend to copy its edges from the bases, which is introduced below and is indeed vital to the blending process, the MAX constraints are still unable to produce a winning candidate that preserves segments from both of them.

Another alternative to using a blend-specific constraint like MINCONTRIB would be to use a generalized faithfulness constraint like REALIZE-MORPHEME, proposed by Itô & Mester (1998) to account for certain markedness phenomena in Japanese, which could potentially achieve the same effect by forcing each base

SHS Web of Conferences 8 (2014)
DOI 10.1051/shsconf/20140801194

element to surface in the output. However, the justification for such a move is not clear, not only because one of the core claims being made here is that blending does not have access to the morphological structure of the bases, but also because the underlying morphemes do not always surface in the output as well-formed prosodic constituents (e.g. in *clur*, where *clair* is represented by only an onset). A constraint like REALIZE-PROSODIC-WORD or REALIZE-SYLLABLE would need to be gradient, then, to avoid banning outputs containing base contributions smaller than the mora, and it would also need to allow segments with no prosodic weight (i.e. onsets) to represent prosodic constituents in the output, both of which would undermine the established structure of the prosodic hierarchy. Because it operates on the level of the segment and makes no reference to prosodic domains, Bat-El's original constraint MINCONTRIB avoids these problems entirely and is therefore a better fit for a phonologically-motivated analysis of blending. Because of these reasons, the solution proposed here is to continue using MINCONTRIB, but with the very minor suggestion that reclassifying it as a REALIZE constraint would be worth consindering for the sake of streamlining blending terminology and making it seem like less of a fringe phonological phenomenon.

3.4 Anchoring, linearity, and contiguity

A major issue in developing a formal account of blending is deciding how the base elements should be ordered before undergoing constraint evaluation. As with the issue of uniqueness discussed above, there seem to be a number of interesting ways to solve this problem. One approach is to assume that the elements are arranged by the speaker (either arbitrarily or otherwise) beforehand, and that this order is preserved in the blend; this, in fact, is the analysis proposed by Kubozono (1990) and supported by Bat-El (1996), who both numbered the base elements in the inputs to their tableaux. A similar approach to ordering the segments is simply to anchor the segments at the right and left edges of the blend to the corresponding edges of the corresponding outputs, ensuring, for example, that the first half of a base does not end up as the second half of the blend. These constraints are formalized in (15) and are simply intended as a way of rendering Kubozono's analysis in OT.

(14) (a) ANCHOR-BASEBLEND (R,R): Anchor the rightmost segment of the blend to the rightmost segment of a base
(b) ANCHOR-BASEBLEND (L, L): Anchor the leftmost segment of the blend to the leftmost segment of a base

The motivation for including two constraints instead of one is to prevent the ungrammatical forms in (16) from surfacing, capturing the theoretical distinction posited above between phonological blends and subtractive word formations that allow correspondence between medial segments in the input and final segments in the output, like the abbreviations in (17). It is important to note, however, that these forms would be derivable in the OT analysis presented here by allowing the left anchoring constraint to dominate the right one instead of ranking them equally.

(15) (a) *Folksonomie*, **Foltax* ← *folk* + *taxonomie*
(b) *gamelliorer*, **ameliorgam* ← *gamelle* + *améliorer*
(16) (a) *modem* ← *modulateur* + *démodulateur*
(b) *cyborg* ← *organisme* + *cybernétique*

Likewise, the motivation for anchoring segments and not higher-order prosodic constituents like the syllable or foot is that because some base elements contribute only an onset to the blend, the anchoring mechanism must be able to target something smaller than the syllable; otherwise, successful candidates like *clur* would never surface because the conditions for anchoring would be unmet.

The tableau in (18) shows these two anchoring constraints at work on the input for the blend *Folksonomie* ← *Folk* + *taxonomie*. Because anchoring is undominated with respect to blending, both constraints must be satisfied for a candidate to surface, which is precisely the case for the candidate in (a); the other candidates all do worse by comparison, with the last one violating both. As mentioned in Section 2.5, we can also see that for both constraints to be satisfied, a candidate must contain at least one segment from both of the bases, showing that they do in fact achieve the same effect as Bat-El's MINCONTRIB constraint.

(17) Ordering and segmental contribution in *Folksonomie*

/fɔk$_1$+tak.so.no.mi$_2$/	ANCHOR-IO (L, L)	ANCHOR-IO (R, R)
a. ☞ fɔk.so.no.mi		
b. fɔk.taks		*
c. no.mi.fɔk	*	
d. mi.fɔk.so	*	*

It is worth noting that although anchoring preserves the edges of either one or both bases, it does not prevent internal metathesis—indeed, a candidate like *faxonomolk* would just as well satisfy the two constraints as the winning candidate in (a). This point is important in that it predicts the grammaticality of blends like *ridicoculiser* where one base is effectively inserted into another, which other models that posit an ordered pair of lexemes in the input, like Bat-El's (1996), do not. Although examples of this kind of pseudo-infixation are relatively rare in French, they do occasionally appear, and so our model of blending must be able to accommodate them.

Descriptively, once the left edge of the blend is in place, we can think of it as being filled out with segments from the base elements. The order of the segments is preserved by the constraint LINEARITY, defined nicely by Kager (1999) and rephrased in (19).

(18) LINEARITY-BASEBLEND: Given a string in a base S_1 and a string in a blend S_2, if S_1 and S_2 are standing in correspondence, then the precedence structure of S_1 is consistent with the precedence structure of S_2 and vice-versa.

An important nuance here is that because LINEARITY works between the blend and its bases and not between the blend and some theoretical input, it can only be violated if the precedence structure of one of the bases is changed in the blend—in other words, the base elements may be blended in any way, as long as the respective order of their individual segments is preserved. We can see evidence of this phenomenon in the tableau in (19), which shows two potential winning candidates with markedly different base-to-base ordering.

(19) Linearity in *chirurgent* ← *chirurgie* + *urgent*

/ʃi.ʀyʀ.ʒi$_{1+}$yʀ.ʒɑ̃$_2$/	LINEARITY-BB$_1$	LINEARITY-BB$_2$
a. ☞ʃi.ʀyʀ.ʒɑ̃		
b. ʀyʀ. ʃi.ʒɑ̃. yʀ	*	*
d. yʀ.ʒi.ʃyʀ.ʒɑ̃	*	
e. ʒɑ̃.ti.ʀyʀ.ʒyʀ		*

SHS Web of Conferences 8 (2014)
DOI 10.1051/shsconf/20140801194

Although the losing candidates are admittedly difficult to imagine ever being pronounced because the base elements are so difficult to recover from the blend, the winning candidates demonstrate the point made above, which is that LINEARITY allows metathesis so long as precedence structure of each base is preserved.

Contiguity also features prominently in blending, but it operates on a much smaller scale than it does in reduplication and other instances of OO-Correspondence. As it applies here, CONTIGUITY-BB, formalized in (23), prefers contiguous segments in the blend to be contiguous in a base.

(20) CONTIGUITY-BASEBLEND(SEG): Two contiguous segments in the blend must also be contiguous in a base

The best candidates, then, are ones where each two-segment string in the blend corresponds to an identically-ordered string in a base, creating a preference for segmental overlap between the bases; these are exemplified by the data in (21a-b). Because not all base pairs have segments in common, this constraint must also be gradient, or candidates including segments from both bases (one of the inviolable requirements of blending) would be excluded if the bases had no segments in common. The blends in (21c-d) demonstrate this point nicely, as they each incur a single violation of the constraint, and we can see from the blend in (e) that multiple violations are indeed possible, depending on its rank relative to MAX-BB.

(21) (a) *adulescent* ← *adulte* + *adolescent*
(b) *informatique* ← *information* + *automatique*
(c) *tapuscrit* ← *taper* + *manuscrit*
(d) *Denglisch* ← *Deutsch* + *Englisch*
(e) *chortle* ← *chuckle* + *snort*

In descriptive terms, the combination of anchoring and contiguity proposed here neatly captures the generalization that the two base elements for a blend should be joined at only one phoneme boundary, which is an essential characteristic of the blending process.

In addition to the general CONTIGUITY constraint proposed above, we also need a more specific one to prevent breaks between the nuclei and codas of syllables in the bases. Although the internal structure of the syllable is under debate (Yip 2003), Kelly (1998) points out that in English, there are no blends where the two base elements have been joined at the boundary between the nucleus and the coda, an observation supported for French by the data gathered for this study. The only way to capture this regularity would seem to be with a faithfulness constraint that specifically preserves the segmental contiguity of the rime, and while CONTIG-BB$_N$(SEG) prefers candidates with only a single switch point, it does not have the localized scope needed to rule out the form in (22). Therefore, the constraint in (23) is proposed and suggested to be undominated with regards to blending.

(22) (a) **fosonomie* ← *Folk* + *taxonomie*

(23) CONTIG-BASEBLEND$_N$(RIME): A rime copied to the blend must comprise a contiguous string

Generally, this constraint has a relatively small part to play in blending, since many bases are simply stitched together at syllable boundaries. Nonetheless, it is crucial in that no combination of the other segmental constraints can produce its effects, as illustrated by the tableau in (24), where rime contiguity is is crucial in differentiating between the winner (a) and the alternative candidate (b).

(24) Rime contiguity in *folksonomie* ← *Folk* + *taxonomie*

/fɔk$_1$+tak.so.no.mi$_2$/	CONTIG-RIME	ANCHOR	CONTIG-BB	MAX
a. ☞fɔk.so.no.mi				***
b. fɔ.so.no.mi	*!		*	****

3.5 Summary of segmental constraints

The hierarchy of segmental constraints described above is provided in (24) and exemplified in (25) and (26) as the tableaux for *tapuscrit* and *gamelliorer* respectively, where there are two crucial rankings. First, MAX-BB must be dominated by CONTIG-BB(SEG) so that candidates with segmental overlap are preferred over those that simply include more segments from the two bases. Second, CONTIG-BB(SEG) must be dominated by the anchoring and linearity constraints so that segments from one base are not reordered simply because they overlap with those from another. For the sake of simplicity, the constraints have been collapsed in the tableaux below so that violations for both bases are shown in a single column.

(25) Segmental constraint ranking:

PRWD, CONTIG(RIME), ANCHOR, LINEARITY, CONTIG-RIME >> MAX >>CONTIG-BB(SEG)

(26) Tableau for *tapuscrit* > *taper* + *manuscrit*

/ta.pe$_1$+ma.ny.skʀi$_2$/	PR WD	MINCON TRIB	CONTIG-RIME	LIN-BB	ANCHOR-BB	CONTIG-BB(SEG)	MAX-BB
a. ta.skʀi.ma.pe				* !		***	**
b. ☞ ta.py.skʀi						*	***
c. ma.pe						*	****!*** *
d. ta.py					*!	*	********
e. ta.pe# ma.ny.skʀi	*!						
f. ma.ny.ta.pe						*	****!
g. ta.pe		*!					********

(27) Tableau for *gamelliorer* > *gamelle* + *améliorer*

/ga.mɛl$_1$+a.me.ljɔ.ʀe$_2$/	PR WD	MINCON TRIB	CONTIG-RIME	LIN-BB	ANCHOR-BB	CONTIG-BB(SEG)	MAX-BB
a. ga.mɛl#a.me.ljɔ.ʀe	*!					***	***
b. ☞ ga.mɛ.ljɔ.ʀe							***
c. a.mɛl						* !	********
d. ga.me					*!	*	********
e. ga.ʀe.mɛl.ljɔ				* !		***	***

SHS Web of Conferences 8 (2014)
DOI 10.1051/shsconf/20140801194

f. ga.mɛl		*!						********

There are a few notes regarding these tableaux that are worth discussing, and which may provide an interesting direction for future research. In particular, while candidate (25f) loses out to the winner by incurring more violations of MAX, it seems to be malformed in another way : by joining the first half of *manuscrit* to the front of *taper*, a segment, /t/, does not appear left-anchored in the blend as it does in the base. The issue this raises, of course, is with the anchoring constraint proposed in Section 3.4, which requires each edge of the blend to anchor to an edge of a base, but not the edges of a base to anchor to an edge of the blend ; indeed, the latter would be impossible, since the blend itself may only have two edges, and the bases combined comprise at least four. A potential solution to this problem is to propose an edge identity constraint that would require each segment in the blend to be identically specificied for a feature [+/- EDGE] as its corresponding segment in the base, which would not only prevent forms like (25f) from surfacing, but would also capture the anchoring tendencies described above. The clearest issue with this proposal, however, is that to the author's knowledge, a feature like [+/- EDGE] has not been proposed, either for OO-Correspondence, or for the more traditional IO-Correspondence. Nonetheless, there seems to be a clear (if faint) phonological line between subtractive word formation processes that allow this kind of edge identity to be violated, like initialisms (e.g. *cyborg*), and those that do not, like the kind of blending considered in this paper. Further analysis, and most likely a larger dataset, is needed to determine whether this solution is viable, or whether existing constraints like ANCHOR or CONTIGUITY could possibly be amended to account for the ungrammaticality of forms like (25f).

4 Summary

The goal of this paper was to demonstrate that we can elegantly account for phonological blending in French by treating it as a form of Output-to-Output Correspondence. Moreover, although blending is something of a specialized phonological process, we do not need specialized constraints to predict its output, deriving its unique structural characteristics from the interaction of segmental faithfulness constraints between three outputs (the blend and the two bases). This account is also different from those presented for Hebrew (Bat-El 1996) and English (Bat-El & Cohen 2012) in that stress plays no part in determining blend structure; rather, linearity, anchoring, and segmental contiguity interact to produce the eventual output. Future research is needed to determine whether stress faithfulness should be considered a core component of the process, or whether the blended outputs are simply optimized to avoid violating generic prosodic markedness constraints (i.e. *CLASH) in languages where stress is distinctive.

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SHS Web of Conferences 8 (2014)
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