



Length affects the positioning of French attributive adjectives – Evidence from perception and production

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Abstract

This paper investigates the placement of a set of French attributive adjectives within noun phrases, characterized by flexible pre- and postnominal positioning without altering interpretation. We examine the effect of the prosodic factor length (in number of syllables), predicting a preference for short-before-long ordering. In addition, we explore prosodic cues inside the noun phrases. Two studies were conducted: a forced-choice task using written material and an elicited production task employing spoken material. The material manipulates the relative length of adjectives and nouns (longer, equally long or shorter adjectives) and their position (prenominal or postnominal). In the elicited production task participants combined two sentences (eliciting adjectives and nouns separately) to create adjective-noun pairs without being primed for one order.

Results suggest a preference for the short-before-long ordering in both perception and production. Additionally, the production data highlights that adjectives attain the highest F0 peak regardless of position, with different patterns for the F0 peaks of prenominal adjectives. These findings emphasize the impact of prosodic length on adjective placement in both perception and production and the alignment of F0 peaks within the noun phrases.

Index Terms: French, Word order, Prosody

1. Introduction

Within the group of French attributive adjectives, there is a subgroup of adjectives that allow prenominal and postnominal positioning. No apparent semantic differences are associated with the position of the adjective, as shown in (1) below.

- (1) a. un charmant garçon
a charming boy
'a charming boy'
- b. un garçon charmant
a boy charming
'a charming boy'
- [1, p. 289]

In accordance with previous research on the effect of length on the order of constituents and words at the utterance-level showing a preference for a short-before-long ordering [2], [3], [4], [5], [6], we postulate that elements within the noun phrase (NP) are likewise prone to occur in order of increasing length. Consequently, we predict that, inside the same NP, adjectives that are shorter than the nouns are preferred to appear in prenominal position. The postnominal position will be preferred for adjectives that are longer than the nouns. Assuming a general preference for adjective-noun pairs to occur in order of increasing length, this preference should manifest in both perception and production.

Two studies were run to examine the impact of length on position in speech perception and speech production: a written forced-choice task and a spoken elicited production task.

2. Background

2.1. Adjective word order in French

In French, the postnominal position is generally considered to be the canonical position for attributive adjectives [1], [7], [8]. Monosyllabic and frequently occurring adjectives, however, are generally preferred in prenominal position [1], [7], [8]. A general dichotomy is claimed in adjective positioning: adjectives either exclusively permit one position (see (2) for prenominal and (3) for postnominal, where '*' indicates ungrammaticality) or they are variable in both positions, see (4).

- (2) a. une première victoire
a first victory
'a first victory'
- b.* une victoire première
a victory first
- (3) a.* une espagnole princesse
a Spanish princess
princesse espagnole
- b. une princesse espagnole
a princess Spanish
'a Spanish princess'
- (4) a. un gros fumeur
a big smoker
'a heavy smoker'
- b. un fumeur gros
a smoker big
'a fat smoker'

It has been hypothesized that the shift in position is primarily a semantic phenomenon; prenominal adjectives are said to modify specific internal elements of the noun, while postnominal ones attribute a property to the noun as a whole, one that is not attributable to its sub-components [9], [10], see (4). This perspective suggests a systematic divergence in meaning between the prenominal and postnominal versions of the same adjective. Nevertheless, this generalization does not seem to cover the whole paradigm as there exists a group of adjectives that can freely select their position without resulting in distinct interpretations, see (1) [1], [11]. In contrast to the general bias for postnominal positioning, corpus data indicates a tendency for adjectives that can be placed in either position to be primarily prenominal [1].

2.2. Effect of prosody on word order

Earlier research in a variety of typologically diverse languages has repeatedly found prosody to affect word order at the level of the utterance [12], [13], [14], [15], [16], [17]. Especially length has been shown to affect the order of constituents at the

sentence-level [3], [6], [18] and words at the phrase level [2] in several languages. Whereas SOV languages like Persian or Japanese prefer constituents to appear in long-before-short ordering [18], [19], SVO languages like French and English have been shown to prefer short-before-long ordering [4], [5]. Most of the above-mentioned studies are concerned with linearization at the sentence level, there are hardly any systematic studies concerning the ordering inside the NP, but as a pilot study see [20].

2.3. Research question

Given the evidence for French to favor constituents in order of increasing length, the question emerges whether this principle is reflected inside the NP, too. Unlike previous research examining all adjectives independent of their positional behavior [1], [7], [8], the current study exclusively investigates adjectives belonging to the group of adjectives that can occur in prenominal and postnominal position with no apparent change of interpretation (1). This unrestricted positioning allows for the consideration of prosodic factors to affect the position. We investigate whether relative length affects the positioning of these attributive adjectives. A set of 24 adjectives is equally divided into adjectives consisting of two, three and four syllables. We predict that French adjective-noun pairs are preferred that occur in order of increasing length, both in perception and production.

3. Perception

In order to examine the possible perceptual preference for the positioning of adjectives, a forced choice task was designed using the PennController for Internet Based Experiments [21] and carried out online. We conducted an acceptability judgment task based on the premise that perceptions of acceptability are commonly assumed to emerge automatically during sentence comprehension [22]. The choice for a forced-choice task was driven by the observation that such tasks are explicitly designed to discern variations between conditions and are generally considered the most robust in terms of statistical power [22]. Moreover, this direct comparison between conditions aligns best with speech production, that represents a binary choice when evaluating pairwise phenomena [23].

3.1. Participants

Overall, 89 participants (mean age = 33,4; 41f, 47m, 1d) completed the task. They were recruited using Prolific (www.prolific.com). We used Prolific filters to only test participants speaking European varieties of French without hearing or speaking disorders, whose earliest language in life was French and who indicated they had no second native language. Participants received an equivalent of 2€ for participation via Prolific.

3.2. Material

The material consists of 24 experimental items, each containing a distinct adjective. The set of adjectives consists of six adjectives originally investigated in [20], six adjectives added to this original set by [24], and twelve additional adjectives that were added to the present study. Their even pre- and postnominal occurrence was confirmed through a corpus investigation. These adjectives are presented in three different length configurations with respect to the noun: the adjectives were either longer, shorter or as long as the nouns. In items containing longer adjectives, nouns are monosyllabic. In items including shorter adjectives, nouns consist of two more syllables than the

adjectives. As a baseline, we included a condition in which adjectives and nouns consist of the same number of syllables. Each of these adjectives appeared in prenominal and postnominal position, see Table 1.

Table 1: Example of an experimental item across conditions, syllables divided by dots

Condition	Example		
prenominal longer A	un	a.gré.able	gîte
	a	pleasant	shelter
postnominal longer A	un	gîte	a.gré.able
	a	shelter	pleasant
prenominal equal A	une	a.gré.able	ran.don.née
	a	pleasant	hike
postnominal equal A	une	ran.don.née	a.gré.able
	a	hike	pleasant
prenominal shorter A	une	a.gré.able	con.vi.via.li.té
	a	pleasant	conviviality
postnominal shorter A	une	con.vi.via.li.té	a.gré.able
	a	conviviality	pleasant

All experimental items were embedded in structurally identical sentences: the subject is a proper noun; a transitive verb is used in *passé composé* followed by a direct object that represents the target NP. This NP is introduced by an indefinite determiner. The object NP is followed by a temporal or spatial attribute prepositional phrase (PP), see (5) for an example. The experimental items are completed by 48 filler items consisting of high, mid and low grammaticality fillers and preceded by three practice items.

- (5) Léna a apprécié un gîte agréable à la campagne.
'Lena enjoyed a pleasant shelter in the country.'

3.3. Procedure

Participants were shown two written sentences on the screen. The sentences only differed with regard to the position of the adjective; there was a prenominal and a postnominal version. The order of presentation of both versions was randomized. Participants were asked to choose their preferred sentence by clicking on it. The experimental items were displayed in Latin Square design, order was pseudo-randomized. Experimental items were presented in a 2x3 design resulting in six conditions that manipulate the relative length of adjective and noun and the position of the adjective.

3.4. Data processing

The data was analyzed in R [25]. We calculated the proportion of the selected position in terms of the distinct conditions. Additionally, we fitted a generalized linear mixed effects model (using lme4 [26]) to ascertain the effect of relative length (adjective shorter than the noun or longer than the noun, versus the baseline condition in which adjective and noun are equally long) on the binomial dependent variable (position of the adjective coded as 0 for postnominal position, 1 for prenominal position). Subject and Item were included as random intercepts. (Including random slopes for the factor of interest lead to unrealistically high correlations (>.9) in the random effects structure of the model.)

3.5. Results

Figure 1 displays the proportion of the selected position per relative length configuration. It illustrates the preference for postnominal adjectives across conditions. For sentences with longer adjectives, the postnominal position was favored in 75.4% of cases, while sentences with shorter adjectives showed a preference for postnominal placement in only 54.2% of cases. In the baseline condition (equalA), where adjectives and nouns were of equal length, the postnominal position was chosen in 59% of cases. Correspondingly, relative length significantly affects the position of the adjective within French NPs: compared to the baseline condition (noun and adjective equally long), significantly more postnominal versions were chosen when the adjective was longer than the noun ($\beta=-1.15$, $SE=0.144$, $z=-7.95$, $p<0.001$); conversely, significantly more prenominal versions were chosen when the adjective was shorter than the noun ($\beta=.3$, $SE=0.133$, $z=2.255$, $p=0.0242$).

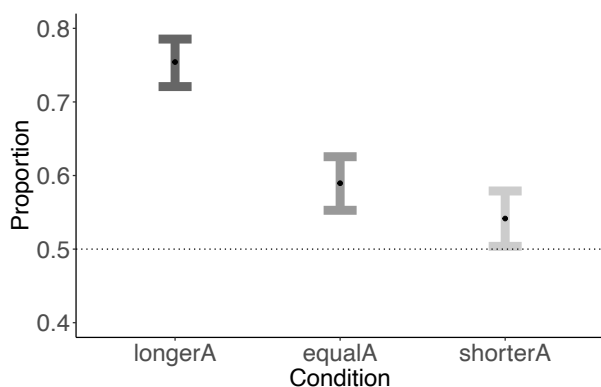


Figure 1: *Proportion of postnominal position broken down by condition*

4. Production

The production of adjective-noun pairs was tested by means of an elicited production task. The decision to opt for this method was motivated by the necessity to tightly control the material generated by participants [27]. We aimed to ensure that participants produced the precise adjective-noun pairs required without specifying its linearization. Therefore, we elicited the noun and the adjective separately.

4.1. Participants

Overall, 59 participants (mean age = 26,4; 52f, 7m) performed the task in October 2023. They were all members of the Université de Lorraine in Nancy, France. Participants received 8€ for participation. For preliminary data analysis, so far six participants (mean age = 20,8; 6f) are examined. All six participants were native monolingual speakers of French, who grew up in France, with no hearing or speaking disorders.

4.2. Material

The material consists of 24 experimental items manipulating the relative length of adjective and noun and the position of the adjective, see Table 2. We used the same adjectives as in the first experiment. For four adjectives, the nouns had to be changed compared to the first experiment in order to allow for the predicative use of the adjective in the prompted sentences. In addition, we simplified the verbs used in the prompted sentences in order to make it easier for the participants to correctly

recall and produce the entire sentence. The experimental items were completed by 24 filler items that are designed to distract from the goal of the task.

Table 2: *Example of an experimental item across conditions, syllables divided by dots*

Condition	Example		
longer A	un	ex.cel.lent	coach
	an	excellent	coach
equal A	un	ex.cel.lent	mu.si.cien
	an	excellent	musician
shorter A	un	ex.cel.lent	in.for.ma.ti.cien
	an	excellent	computer specialist

4.3. Procedure

Participants were instructed to listen to short audio files that were recorded by two native speakers (one male, one female). These audio files consisted of two sentences, which served as a prompt. Participants were asked to summarize the sentences in one sentence. The speakers were instructed to record themselves speaking as naturally as possible. In order to make sure that participants would use the correct adjective, the adjectives were each displayed on a screen. To familiarize participants with the method, they first completed six practice items. The first of the prompted sentences consists of the subject, the verb and the object of the target sentence followed by a PP. The second sentence contains the adjective in predicative use. Participants would, for example, listen to (6a.) in order to elicit (6b.) or (6c).

- (6) a. On a un coach dans notre équipe. Il est excellent.
'We have a coach in our team. He is excellent.'
- b. On a un excellent coach dans notre équipe.
'We have an excellent coach in our team.'
- c. On a un coach excellent dans notre équipe.
'We have an excellent coach in our team.'

The experimental items were presented in Latin Square design with pseudo-randomized order. The items were presented in the same 2x3 design as the previous experiment manipulating the relative length of adjective and noun and the placement of the adjective. Each participant was recorded individually using a Røde Lavalier microphone and a Zoom H4n Pro recorder in an office space at the CNRS research institute ATILF in Nancy.

4.4. Data processing

Our data consists of 144 sentences (3 conditions x 8 items x 6 participants). The audio files were cut using Praat [28] in order to only keep sentences including the items in the file. Using the BAS Web Services of LMU Munich [29], we created TextGrids. These were annotated for sentence, word and syllable level, we added a specific tier for the adjective-noun pairs that was annotated for the position of the adjective and the length in syllables for each element. The annotated data were then analyzed using ProsodyPro [30]. To analyze the F0 contours of the adjective-noun, we calculated the F0 for ten points in each element. Statistical analysis was done using R [25]. The proportions for the selected position were calculated in terms of the distinct conditions.

4.5. Results

Figure 2 displays the positional preferences based on relative length configurations. Notably, participants consistently favored postnominal adjective placement across all conditions. The most pronounced difference between prenominal and postnominal positioning emerged with longer adjectives, where the postnominal position was chosen in 73.3% of cases, compared to 51.2% for shorter adjectives and 58.9% for the baseline condition (equalA). Significant differences were found between all three condition pairs (longerA - shorterA: $p < 0.001$, $\chi^2 = 91.03$, $df = 1$; equalA - shorterA: $p < 0.001$, $\chi^2 = 10.41$, $df = 1$; and equalA - longerA: $p < 0.001$, $\chi^2 = 41.91$, $df = 1$). Proportions tests also revealed significant differences between prenominal and postnominal positioning for longer ($p < 0.001$, $\chi^2 = 195.07$, $df = 1$) and equally long adjectives ($p < 0.001$, $\chi^2 = 28.09$, $df = 1$).

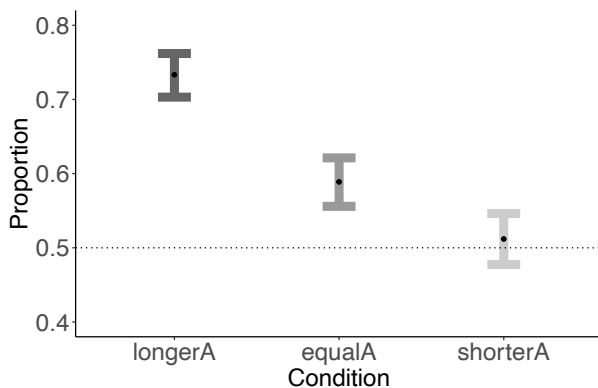


Figure 2: *Proportion of postnominal position broken down by condition*

Figure 3 shows F0 contours for each condition and adjective positioning. Across all six conditions, adjectives consistently reach the highest F0 peak. Notably, the contours vary depending on the position: prenominal adjectives exhibit an initial rise and, additionally, a final rise on the noun. In postnominal NPs the nouns display both an initial and a final rise, while adjectives exhibit a final rise.

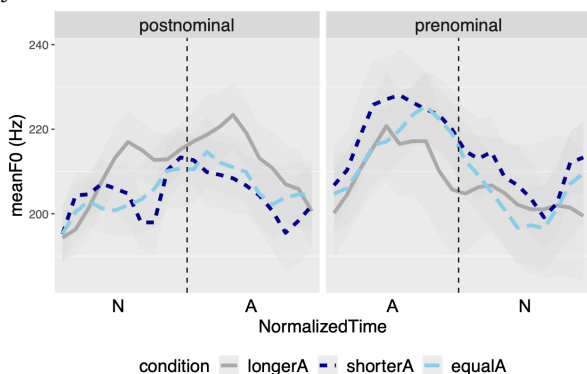


Figure 3: *Mean F0 by condition and position*

5. General discussion

The aim of the current study was to examine the impact of relative length on the placement of a set of attributive adjectives in French. These adjectives allow both prenominal and postnominal positioning without altering interpretation [1], [11]. The study focused on whether adjectives that are shorter than

the nouns tend to occur in prenominal position, while longer adjectives preferably appear postnominally. Despite the generally observed preference for ordering in terms of increasing length [2], [3], [4], [5], [6], it remains yet unclear if this applies to the linearization of elements inside the French NP as well.

Overall our data support the prevailing tendency for French adjectives to canonically appear in postnominal position [1], [7], [8]. In both perception and production, adjectives were predominantly favored in postnominal position across all three conditions. However, this preference was manifested to a different degree across conditions. It is in these different degrees that our results demonstrate that native speakers exhibit sensitivity to the short-before-long principle within French NPs.

In both perception and production, longer adjectives achieved the highest rate in the postnominal position, while shorter adjectives attained the highest rate in prenominal position. The baseline condition lies exactly between both. Whereas longer adjectives displayed a more pronounced preference for one position, the behavior of shorter adjectives was more subtle. Although shorter adjectives were not preferred in prenominal position, they were preposed significantly more frequently than equally long adjectives.

The clear trend observed in both prenominal and postnominal positions where adjective-noun pairs were primarily chosen in order of increasing length, supports a preference for the short-before-long principle in French. Furthermore, it suggests that the short-before-long principle is applicable not only at the sentence level [5], but also at the phrasal level. The consistent observation of this preference in both experiments provides evidence that the short-before-long principle is a general preference in French.

While the length of adjectives and nouns does not impact their phrasing, the F0 contours indicate potential differences in how adjectives and nouns are phrased based on adjective position. Prenominal adjectives appear to be grouped with the noun ([A N] ϕ). However, in noun phrases (NPs) with postnominal adjectives, there appears to be an additional boundary between adjectives and nouns ([[N] ϕ A] ϕ).

6. Conclusion

This paper examines the positioning of a group of French attributive adjectives within noun phrases, marked by their flexibility in both pre- and postnominal placement without affecting interpretation. Our investigation focuses on the influence of the prosodic factor length, particularly the relative length of adjectives and nouns, measured in terms of syllables.

As predicted, our study reveals a discernible impact of relative length on the positioning. Notably, in postnominal position, longer adjectives are favored when modifying nouns, whereas in prenominal position, shorter adjectives are preferred. This lends support to our claim that the short-before-long principle extends to the phrasal level. The robustness of this evidence is emphasized by its manifestation in both spontaneously elicited speech production and forced-choice in perception.

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