

ADJECTIVE ORDERS IN ENGLISH AND ROMANIAN: AN EXPERIMENTAL INVESTIGATION

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Abstract: The paper investigates experimentally the order of adjectives in British English and Romanian through Likert acceptability judgments. We focus on three categories of adjectives (Quality, Size, Color) and all their possible combinations in both languages. We show that there is a rigid ordering of adjectives in British English, i.e. the adjectival combinations of Quality-Size (*beautiful big family*), Quality-Color (*special blue flowers*), Size-Color (*tiny blue butterfly*) are natural for native English speakers, but the reverse adjectival orders Size-Quality (*little special girl*), Color-Quality (*blue special flowers*), Color-Size (*blue tiny butterfly*) were judged to be unnatural. In contrast, we found that in Romanian, a language where adjectives typically occur post-nominally, adjectives are more freely ordered, as the orders Size-Quality, Color-Quality, Color-Size were judged by participants as equally natural as the reverse adjective orders Quality-Size, Quality-Color, and Size-Color, e.g. the Color-Size order *fluture albastru mititel*, lit. ‘butterfly blue tiny’ was judged as equally natural by participants as the reverse Size-Color adjective order *fluture mititel albastru*, lit. ‘butterfly tiny blue’.

Keywords: General Adjective Hierarchy, AOR, Roll-up, mirror image, English, Romanian

1. Introduction

The current study investigates the cross-linguistic universality of the hierarchy QUALITY > SIZE > COLOR, which is part of the General Adjective Hierarchy QUALITY > SIZE > SHAPE > COLOR > PROVENANCE (Dixon 1982, Sproat & Shih 1991, Cinque 1994, 2005, 2010, Scontras et al. 2017, Scott 2002). We look at whether adult native British English speakers order adjectives in accordance with the General Adjective Hierarchy, as well as whether adult native Romanian Speakers order adjectives as a mirror of the General Adjective Hierarchy or if they are more prone to a freer usage of adjectives.

Our study is organized as follows: we first present a review of some of the most important theories about the order of adjectives (Dixon 1982, Sproat & Shih 1991, Cinque 1994, Scott 2002, Cinque 2005, 2010, Scontras et al. 2017,). We consider the adjective ordering restrictions in English in syntactic accounts such Roll Up (Cinque 1994, 1995, 2010) and adjunction theories (Kremers 2003, Abels & Neeleman 2010), semantic-pragmatic accounts such as Scontras et al.’s (2017) analysis of subjectivity or Hewings’ (2004) analysis of evaluative and non-evaluative adjectives. Regarding adjective ordering restrictions in Romance, we investigate whether they are ordered as a mirror of English from different points of view (Cinque 2010, Leivada & Westergaard 2019, Cornilescu & Nicolae 2016, or Cornilescu & Cosma 2019).

Section 3 presents an experiment we conducted on native speakers of British English and Romanian in order to determine which order of adjectives is favored in both languages and the relationship between them (whether the order in Romanian is identical

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to the order in British English, whether it is a mirror image of the order in British English, or whether it is variable).

The current paper focuses on three categories of adjectives (Quality, Size, Color) and explores all their combinatorial possibilities both in English and in Romanian, see (1) and (2). These categories are commonly used in language to provide detailed descriptions and are considered fundamental in many linguistic frameworks. By exploring the combinatorial possibilities of these specific categories, we can gain insights into the patterns and structures of adjective usage in both English and Romanian.

(1) Examples of combinations of adjectives tested in English:

- a. Quality-Color
My grandma loves special blue flowers.
- b. Color-Quality
My grandma loves blue special flowers.
- c. Quality-Size
This bracelet is for a special little girl.
- d. Size-Quality
This bracelet is for a little special girl.
- e. Size-Color
I saw a tiny blue butterfly in the garden this morning.
- f. Color-Size
I saw a blue tiny butterfly in the garden this morning.

(2) Examples of combinations of adjectives tested in Romanian:

- a. Quality-Color
Bunica mea iubește florile speciale albastre.
grandma my loves flowers-the special blue
'My grandma loves blue special flowers.'
- b. Color-Quality
Bunica mea iubește florile albastre speciale.
grandma my loves flowers-the blue special
'My grandma loves special blue flowers.'
- c. Quality-Size
Sara are o familie frumoasă mare.
Sarah has a family beautiful big
'Sarah has a big beautiful family.'
- d. Size-Quality
Sara are o familie mare frumoasă
Sarah has a family big beautiful
'Sarah has a beautiful big family.'
- e. Size-Color
Am văzut un fluture albastru mititel în grădină de dimineață
have seen a butterfly blue little in garden of morning
'I saw a blue tiny butterfly in the garden this morning.'

f. Color-Size

Am văzut un fluture mititel albastru în grădină de dimineață
 have seen a butterfly tiny blue in garden DE morning
 ‘I saw a blue tiny butterfly in the garden this morning.’

2. Background on the order of adjectives

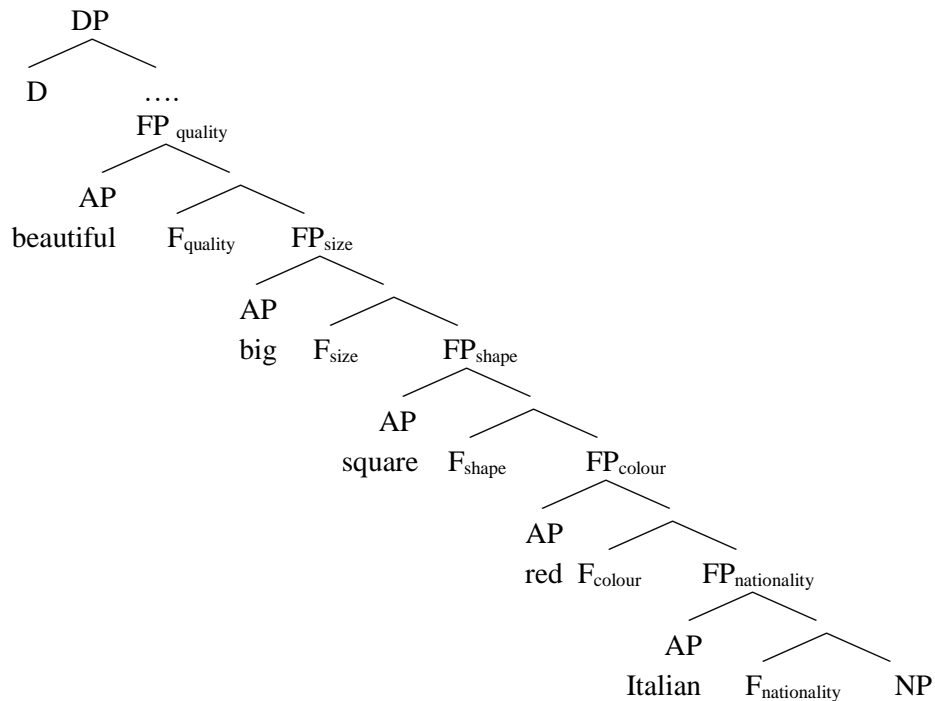
Many studies have investigated adjective ordering restrictions in English (e.g., Dixon 1982, Sproat & Shih 1991, Cinque 1994, Scott 2002, Cinque 2005, 2010, Scontras et al. 2017). The general consensus is that adjectives are ordered depending upon various parameters related to the type of properties they encode. For example, in a structure such as *beautiful big blue eyes*, the adjective *beautiful* specifies QUALITY, the adjective *big* specifies SIZE, and the adjective *blue* specifies COLOR. The QUALITY adjective precedes the SIZE adjective, which precedes the COLOR adjective. The QUALITY > SIZE > COLOR ordering is part of a larger hierarchy of cognitive dimensions, as proposed by multiple authors in the literature on adjectives:

- (i) Dixon (1982): VALUE > DIMENSION > PHYSICAL PROPERTY > SPEED > HUMAN PROPENSITY > AGE > COLOR (Bleotu & Roeper 2021)
- (ii) Sproat & Shih (1991): QUALITY > SIZE > SHAPE > COLOR > PROVENANCE
- (iii) Scott (2002): SUBJECTIVE COMMENT > SIZE > LENGTH > HEIGHT > SPEED > WIDTH > WEIGHT > TEMPERATURE > AGE > SHAPE > COLOR > NATIONALITY/ORIGIN > MATERIAL
- (iv) Scontras et al. (2017): SUBJECTIVE > NON-SUBJECTIVE

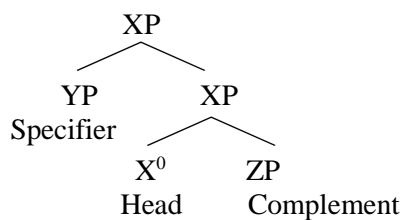
2.1 Adjective ordering restrictions in English

Adjective ordering restrictions have received multiple explanations in the literature. According to syntactic accounts such as the Roll-Up cartographic account (Cinque 1994, 1995, 2010) or the Adjunction account (Kremers 2003, Abels & Neeleman 2010), adjectives occur in a certain fixed syntactic order in English (3). While both the cartographic and the adjunction account assume a particular order of adjectives, the two accounts differ in how they treat this order. The cartographic account assumes that, in the extended nominal projection, the base position of the modifiers is before the noun. This assumption is in consonance with the Linear Correspondence Axiom (Kayne 1994), according to which the universal order is Specifier > Head > Complement (4).

(3)



(4)



In contrast, the adjunction approach assumes that both the adjective-noun order and the noun-adjective order are basic, and that the availability of a certain order depends on how the parameter is set in a certain language. In some languages, adjectives are placed before nouns, while in others, they are placed after nouns.

As most Germanic languages, English generally displays an adjective-noun order. An exception to this order is represented by heavy adjectives, i.e., adjectives with complements/adjuncts, which only occur postnominally (Cinque 1994, see 5).

- (5)
- a. *a man proud
 - b. the man proud of his son
 - c. *the proud of his soon man
 - d. a man bruised and battered
 - e. a steak just right

Cinque (1994) discusses multiple differences between prenominal and postnominal adjectives in English (see Table 1), which seem to support the idea that all English postnominal adjectives have the status of reduced relative clauses.

Table 1. Prenominal versus Postnominal adjectives

Differences	Prenominal order	Postnominal order
Scope	A prenominal adjective is under the scope of the prenominal adjective to its left: <i>rotten in a fake rotten antique</i> (the rotten status of the antique may be fake).	A postnominal adjective with a complement/ adjunct is no longer under the scope of the prenominal adjective to its left: <i>a fake antique rotten with age</i> (the property of being rotten is seen as an asserted property of the fake antique, see Sadler & Douglas 1994)
Speaker commitment to the property	In prenominal position, a non-intersective adjective suspends the speaker's commitment to the most adequate attribution of the term to a specific individual: <i>alleged in The alleged murderer was deported.</i>	An adjective with a sentential complement in postnominal position becomes intersective (Williams 1994): <i>The murderer alleged to have killed his own parents was deported.</i>
Pre-/post-nominal order	Non-predicative adjectives can only appear prenominally.	Even if non-predicative adjectives take a complement/an adjunct, they cannot appear postnominally. Only predicative adjectives can appear postnominally: <i>*What is their reason main in importance?</i> (What is their main reason?) (Larson & Marusic 2004)

One aspect which is relevant for ordering adjectives pre- or postnominally is the semantic class of the adjectives. Even before Cinque, Siegel (1976, 1979) assumed the following classification of adjectives: postnominal or absolute adjectives and prenominal or relative adjectives. Siegel (1976, 1979) labels the postnominal adjective absolute because the meaning of the noun which is modified by the adjective is not bound to the meaning of the adjective itself. Absolute adjectives are derived from a predicative source. An illustrative example is the adjective *asleep*, which, in a context such as (6), can be assumed to be a reduced relative clause (7):

- (6) the person asleep
 (7) the person that is asleep

Moreover, Siegel (1976, 1979) labels the prenominal adjectives “relative” because their meaning is dependent on the meaning of the noun. In contrast to the first category, “relative” adjectives cannot occur in predicative position. They do not behave like absolute adjectives: they are not predicative but attributive – see the example with *veteran* in (8):

- (8) a. this veteran soldier
 b. *This soldier is veteran.

In addition to these two main classes, there is another class of ambiguous adjectives, which can be interpreted either as absolute or relative adjectives in different

contexts. An example of an ambiguous adjective would be *beautiful*. In a context such as (9a), where it means ‘beautiful as an individual’, it is an absolute adjective, while in contexts such (9b), where it means ‘beautiful as a dancer’, it is a relative adjective. *Beautiful* is similar in this respect to scalar adjectives such as *big* and *tall* (Cinque 2010):

- (9) a. beautiful person
b. beautiful dancer

Building on previous research (see Kamp & Partee 1995), Cinque (2010) discusses two classes of adjectives: intersective adjectives and non-intersective adjectives. The term “intersective” refers to the operation of intersection between two different classes: the noun class and the adjective class. For instance, in the sequence *red animals*, we can notice the intersection between the class of *red* entities and the class of *animals*:

- (10) $[[\text{red animals}]] = [[\text{red}]] \cap [[\text{animals}]]$

The class of non-intersective adjectives denotes properties that depend on the noun they modify. Non-intersective adjectives can be subsective or intensional (Kamp & Partee 1995, Panayidou 2013). Subsective adjectives represent a type of adjective that modify the noun by narrowing down its meaning or specifying a particular subset within the broader category. These adjectives provide additional information about the noun without changing its basic meaning. Subsective adjectives are similar to intersective adjectives, are predicative, while intensional adjectives are not predicative.

- (11) Subsective
a. The room is big.
b. $[\text{big room}] \subseteq [\text{room}]$
- (12) Intensional
a. *The president is former.
b. $[\text{former president}] = [\text{former}] \cap [\text{president}]$
 $[\text{former president}] \subseteq [\text{president}]$

In addition, another dimension that is relevant for the ordering of adjectives is evaluation, which Huston & Thompson (2000) define in terms of feelings, judgments, or viewpoints about something. Evaluative adjectives (such as *good*) involve a subjective (emotional) bias, whereas non-evaluative adjectives (such as *related to*) lack such a bias. Interestingly, most evaluative adjectives tend to be prenominal in English. Huston & Thompson (2000) discuss three functions of evaluation: expressing an opinion, maintaining relationships, and organizing discourse. (Huston & Thompson 2000). On pragmatic grounds, Hewings (2004) argued that evaluative adjectives fall into eight categories: interest (*interesting, tedious*), suitability (*good, odd*), comprehensibility (*clear, confusing*), accuracy (*true, wrong*), importance (*useful, meaningless*), sufficiency (*sufficient, small*), praiseworthiness (*impressive, disappointed*) and perceptiveness (*sophisticated, unaware*). Since evaluation changes the perception of the nominal

referent, an evaluative component sometimes results in a prenominal position of the adjectives even in languages where adjectives are generally postnominal:

- (13) frumosa fată (Romanian)
 beautiful girl
 ‘the beautiful girl’

The semantic class of the adjective and the viewpoint they convey may affect adjective orders: evaluative adjectives tend to scope over the noun and other adjectives.

The importance of semantics and pragmatics for ordering adjectives has even led to the idea that such orders can be explained on other grounds than syntax. Scontras et al. (2017) propose that subjectivity is the main factor which predicts adjective ordering preferences. Scontras et al. (2017) conducted an experiment to investigate which adjective order is preferred by English native speakers in adjective-adjective-noun sequences (14).

- (14) the small brown chair vs. the brown small chair

The authors find that English native speakers have strong ordering preferences: they prefer to place certain adjectives further away from the noun than others. For instance, in (14), participants prefer to place the color adjective *brown* closer to the noun than the size adjective *small* (*the small brown chair*).

Scontras et al. (2017, 2019) further investigate whether subjectivity can predict adjective ordering preferences. As argued by Scontras et al. (2019), subjectivity may encompass a variety of notions such as vagueness (brown by which standard?), evaluativity (wonderful according to whom?), or relativity/context dependence (small compared to what?). They measured subjectivity by asking participants to answer a question about how subjective a certain adjective was. Additionally, they relied on faultless disagreement (see Kölbl 2004, MacFarlane 2014): they asked participants whether two speakers could both be right while producing conflicting descriptions (one who uttered *That apple is old*, and one who uttered *That apple is not old*). Depending on the adjective class, speakers may disagree upon an ordinary set of things which are picked out by a certain given adjective. Scontras et al. (2017, 2019) concluded that there is a high correlation between the subjectivity scores and the faultless disagreement measure, and that adjective subjectivity predicts adjective ordering preferences: less subjective adjectives are preferred linearly closer to the nouns they modify. Importantly, they also argue that the hierarchical structure of nominal modification is the main reason for subjectivity predicting adjective ordering preferences: adjectives that are linearly closer to the modified noun compose with the noun before adjectives that are farther away (Figure 1).

- (15) *the small brown cardboard box* → *cardboard* is less subjective than *brown* or *small* → *cardboard* is preferred closer to the noun. (Scontras et al. 2017)

They also treat adjectival modification as syntactic adjunction:

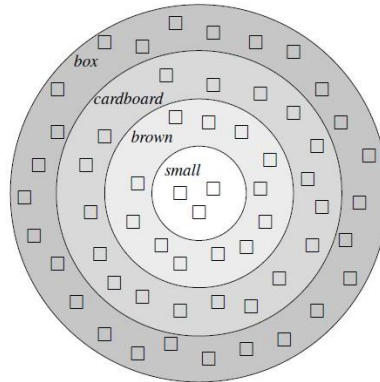


Figure 1. Restrictive modification in *small brown cardboard box*. (Scontras et al. 2019)

Thus, adjective ordering preferences in English have received syntactic explanations (in terms of cartographic accounts or adjunction), as well as semantic-pragmatic explications (in terms of evaluative or subjective properties). Scontras et al. (2019) even propose a mixed approach, arguing that the differences in terms of subjectivity between adjectives have a grammatical source, and derive from how adjectives are merged: adjectives which are first merged to the noun are more objective, while adjectives which are merged later are more subjective.

Additionally, adjective orders preferences in English may also be affected by recursive uses of adjectives, such as *small big mushrooms* (see Foucault et al. 2022), picking a subset of a set. While *small green mushrooms* may refer to mushrooms which are both small and green (either a subset of small mushrooms from a set of green mushrooms, or a subset of green mushrooms from a set of small mushrooms), in a recursive context, *small green mushrooms* can only refer to *small mushrooms* from a set of *green mushrooms*.

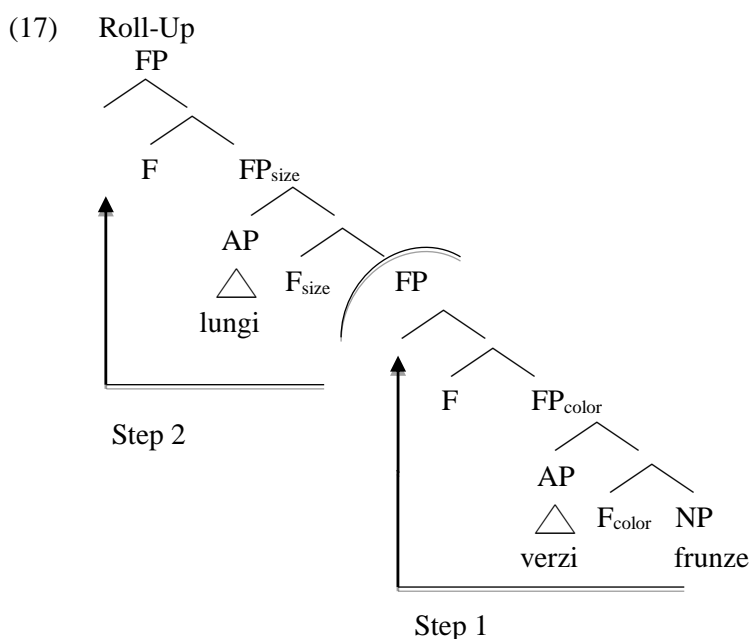
2.2. Adjective ordering restrictions in Romanian: The mirror image?

In order to have a complete picture of adjective ordering restrictions, it is important to extend the study and investigate the order of adjectives in Romance languages such as Romanian, a language where the very existence of adjective orders has been under debate. On the one hand, Cinque (2010) argues that there is a fixed order of adjectives cross-linguistically, and that Romance is the mirror order of English. On the other hand, Leivada & Westergaard (2019) and Trainin & Shetreet (2021) argue that some languages have a more flexible order, failing to mirror English. Romanian, which we focus on in the current study, would qualify as such a flexible language, according to Cornilescu & Cosma (2019), Cornilescu & Giurgea (2013) and Cornilescu & Nicolae (2016). We discuss these different perspectives in detail below.

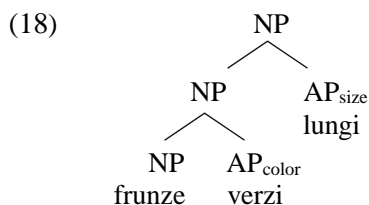
One claim about adjective orders in Romance (Romanian included) has been that they represent a mirror of English. While in English, adjectives occur to the left of the noun, in Romanian, adjectives occur to the right of the noun:

- (16) frunze verzi lungi
 leaves green long
 ‘long green leaves’

Cinque (1994, 1995, 2002) derives this order via a set of movement operations from the basic order of adjectives, which corresponds to the English order. For instance, in (17), the NP moves to an outer specifier, the Specifier of FP_{color} (Step 1), then the newly formed FP containing FP_{color} moves further moves to the outer specifier of the projection hosting FP_{size} (Step 2).



An alternative way to capture adjective orders in Romanian is by relying on Adjunction theory (Kremers 2003, Abels & Neeleman 2010). According to this view, adjectives are not heads but XPs adjoined to the left of the noun (in languages with prenominal adjectives like English) or to the right of the noun (in languages with postnominal adjectives like Romanian).



Interestingly, multiple studies disagree with the idea that adjectives observe a fixed, strict, rigid ordering in Romanian or other languages. This makes the Adjunction

view a more adequate account for Romanian, given the fact that adjuncts can be added freely in any order. Leivada & Westergaard (2019) argue that universal adjectival hierarchies are not innately wired. Their claim is based on experimental research conducted on monolingual Standard Greek native speakers (N = 140) and bidialectal speakers of Standard Greek and Cypriot (N = 30). Leivada & Westergaard (2019) collected two types of responses: (i) acceptability judgments on a 3-point Likert scale with the options “correct”, “neither correct nor wrong”, and “wrong”, and (ii) reaction times. They tested sentences containing congruent/incongruent sequences of two adjectives for combinations of (i) size and nationality adjectives, (ii) color and shape adjectives, and (iii) subjective comment and material adjectives. (19) exemplifies congruent/incongruent orders for combinations of color and shape adjectives.

- (19) a. I bought a square black table. (congruent order)
 b. I bought a black square table. (incongruent order)

The experimental findings led Leivada & Westergaard (2019) to the following conclusions: firstly, from the participants’ point of view, both types of orders (congruent/incongruent) are evaluated as ‘correct’; secondly, while, contrary to expectations based on previous literature that there should be difference in processing between unmarked and marked orders, incongruent orders did not take longer to process. Leivada & Westergaard (2019)’s study thus suggests that there may not be a rigid, fixed universal hierarchy for adjective orderings, and that adjectives may occur more freely (in Greek and other languages). Interestingly though, the authors did find a ‘distance’ effect, namely, the further apart two adjectival classes along the proposed hierarchy (SUBJECTIVE COMMENT > EVIDENTIAL > SIZE > LENGTH > HEIGHT > SPEED > DEPTH > WIDTH > TEMPERATURE > WETNESS > AGE > SHAPE > COLOR > NATIONALITY/ORIGIN > MATERIAL, see Scott 2002), the bigger the difference between incongruent and congruent orders in acceptability terms. This suggests that, while adjectival order may be freer than in English, there may be a sensitivity to certain properties, such as subjectivity, for instance.

According to Cornilescu & Giurgea (2013), Cornilescu & Nicolae (2016), and Cornilescu & Cosma (2019), adjectives are freely ordered in Romanian as well. However, adjectival order is nevertheless sensitive to various factors (Brăescu 2011), such as the semantic class of the adjective and the relative position of the adjective with respect to the head. Regarding the semantic class of the adjective, there is a tendency for taxonomic adjectives to precede qualifying ones in postnominal position. Regarding the position of the adjective relative to the head, we find that adjectives normally follow the head given that Romanian is a head-initial language. Interestingly, prenominal adjectives yield a special interpretation in virtue of their peripheral position.

Recent work by Bleotu & Roeper (2021a, b, 2022a, b) shows that the order of adjectives in Romanian is not necessarily free but it can be constrained by set-subset considerations, just as in English (see Foucault et al. 2022, also Bleotu et al. 2023a, b). While adjectives occur freely by default, in a context where native Romanian speakers (both adults and 4- and 5-year-olds) have to identify a subset of objects within a set of objects by means of adjectives, they will merge the Set adjective first and only afterwards

merge the Subset adjective onto the N Set combination. The tendency to map the closest adjective to a Set interpretation and the adjective further away with a Subset interpretation manifests in comprehension as well:

- (20) florile mari mici
 flower big small
 ‘the small big flowers’

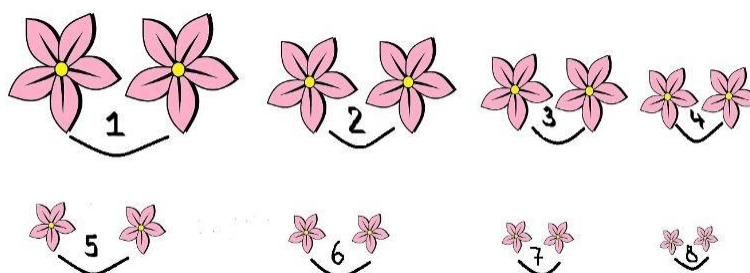
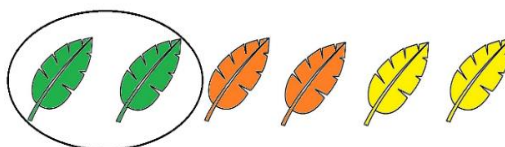


Figure 2. Items used in Bleotu & Roeper (2021a, b)

Interestingly, the Recursive Set-Subset Constraint, as Bleotu & Roeper (2022a, b) refer to it, is stronger than the cognitive preference to place more objective adjectives closer to the noun than more subjective ones: if participants want to identify a subset of green leaves among a set of long leaves, they will prefer an order which places the color adjective closer to the noun than the size adjective:

- (21) “Let’s look at these leaves! They are all long. Some are green, some are orange, and some are yellow.”



The circled leaves are:

- | | | |
|---------------------|----|----------------------|
| frunze verzi lungi | or | frunze lungi verzi |
| leaves green long | | leaves long green |
| ‘long green leaves’ | | ‘green long leaves?’ |

To sum up, adjective ordering restrictions in English have received various accounts: syntactic accounts in terms of Roll-uP (Cinque 2010) and adjunction theories (Kremers 2003, Abels & Neeleman 2010); semantic accounts such as Scontras’s (2007) analysis of subjectivity; and pragmatic accounts, differentiating between evaluative and non-evaluative adjectives (Hewings 2004). On the other side, adjective ordering restrictions in Romanian have been argued to be either a mirror order of English (as in

Cinque 2010) or a freer, more flexible order (Cornilescu & Giurgea 2013, Cornilescu & Nicolae 2016, Cornilescu & Cosma 2019).

3. The experiment

We investigate experimentally whether British English native speakers and Romanian native speakers prefer certain adjectival orders over others for adjectives expressing quality, size, and color.

3.1. Assumptions

In our investigation, we rely on the important distinction between linear order, the order in which adjectives surface in a given language, and hierarchical order, the order in which adjectives are merged in the structure (Panayidou 2013). Even if the linear and hierarchical orders may coincide sometimes, they may differ in other situations. The test case we are probing into is the order of adjectives in Romanian versus English. According to Cinque (2010), the Romanian language is the mirror image of English. If we assume this proposal is on the right track, then, although the hierarchy of adjectives stays the same, the linear order of the modifiers will differ, reflecting a mirror order of the English one.

- (22) English
- a. Shape > Colour > Nationality > N Hierarchical order
a round green Victorian diamond
 - b. Shape > Colour > Nationality > N Linear order
a round green Victorian diamond
- (23) Romanian
- a. Shape > Colour > Nationality > N Hierarchical order
*un rotund verde victorian diamant
a round green Victorian diamond
*‘a round green Victorian diamond’
 - b. N > Nationality > Colour > Shape Linear order
un diamant victorian verde rotund
a diamond Victorian green round
‘a round green Victorian diamond’

3.2. Aim

We investigate whether the order of adjectives QUALITY > SIZE > COLOR is fixed by looking at native speakers of British English and Romanian. The General Adjective Hierarchy has been argued to involve a multitude of different types of adjectives (Quality, Size, Shape, Colour, Provenance, a.o.). Given that it is very hard to expose participants to so many orders involving so many different adjective types, we limit ourselves to testing the order QUALITY > SIZE > COLOR. On the other hand, the

experiment hopes to offer an interesting comparison between English and Romanian regarding Cinque's (2010) Mirror Theory, according to which Romanian adjective order is a mirror image of English.

3.3. Participants

60 adult participants (30 native British English Speakers and 30 native Romanian Speakers) took part in the experiment. Age-wise, participants range between 19 and 57 years old. Gender-wise, the group answering the English version of the test is gender-balanced, showing an equal number of male and female participants, while in the Romanian version of the test, 70% of the participants are female. No participants identified as gender-neutral or other. Language-wise, British English speakers and Romanian speakers master other languages than their native language at different levels: English (for Romanian speakers), Spanish, Italian, German, French. While we are aware that the second or third language may potentially influence the speakers' adjective ordering preferences, depending on the level of mastery, we did not explore this factor, and we choose to leave such an investigation for the future.

3.4. Methodology and materials

The experiment was conducted in two versions: an English and a corresponding Romanian version. Participants had to read sentences such as (24) and (25) and rate them for acceptability on a Likert scale from 1 ("absolutely wrong") to 5 ("absolutely right"):

- (24) a. Sarah has a beautiful big family.
 b. Susan has a big beautiful family.
- (25) a. Sara are o familie frumoasă mare.
 Sara has a family beautiful big.
 'Sara has a big beautiful/beautiful big family.'
 b. Sara are o familie mare frumoasă.
 Sara has a family big beautiful.
 'Sara has a beautiful big/big beautiful family.'

We investigated 6 possible combinations of two adjectives expressing Quality, Size and Color: combinations which are considered in line with the General Adjectival Hierarchy Quality > Size > Color (congruent orders)

- (i) Quality-Size
- (ii) Quality-Color
- (iii) Size-Color

combinations which are considered not in line with the General Adjectival Hierarchy Quality > Size > Color (incongruent orders)

- (iv) *Size-Quality
- (v) *Color-Size
- (vi) *Color-Quality

We tested four adjectives per each category (Quality, Size, Color), as detailed in Table 2.

Table 2. Adjective categories and items

Quality	Size	Color
beautiful	big	red
ugly	little	blue
horrible	huge	yellow
special	tiny	green

This led to 16 combinations per adjective order, and, overall, to 96 combinations (see Table 3).

Table 3. Adjectival combinations tested experimentally

Quality-Size	*Size-Quality	Size-Color	*Color-Size	Quality-Color	*Color-Quality
beautiful big	big beautiful	big red	red-big	beautiful red	red beautiful
beautiful little	little beautiful	big blue	blue big	beautiful blue	blue beautiful
beautiful huge	huge beautiful	big yellow	yellow big	beautiful yellow	yellow beautiful
beautiful tiny	yiny beautiful	big green	green big	beautiful green	green beautiful
ugly big	big ugly	little red	red little	ugly red	red ugly
ugly little	little ugly	little blue	blue little	ugly blue	blue ugly
ugly huge	huge ugly	little yellow	yellow little	ugly yellow	yellow ugly
ugly tiny	tiny ugly	little green	green little	ugly green	green ugly
horrible big	big horrible	huge red	red huge	horrible red	red horrible
horrible little	little horrible	huge blue	blue huge	horrible blue	blue horrible
horrible huge	huge horrible	huge yellow	yellow huge	horrible yellow	yellow horrible
horrible tiny	tiny horrible	huge green	green huge	horrible green	green horrible
special big	big special	tiny red	red tiny	special red	red special
special little	little special	tiny blue	blue tiny	special blue	blue special
special huge	huge special	tiny yellow	yellow tiny	special yellow	yellow special
special tiny	tiny special	tiny green	green tiny	special green	green special

We combined these test items with 16 filler sentences of varying degrees of acceptability, such as (26) or (27):

- (26) *The boys are comming to the meeting.
 (27) *Vroiam să te invit la dans.
 wanted SBJV you invite to dance
 ‘I wanted to invite you to dance.’

3.5. Predictions

Given previous findings from the literature (Scontras et al. 2017, 2019), native English speakers are expected to give answers in accordance with the General Adjective Hierarchy Quality > Size > Color (see Table 4):

Table 4. Expected answers for native English speakers

Category	Expected answer
Quality-Size	5
Quality-Color	5
Size-Color	5
Size-Quality	1
Color-Size	1
Color-Quality	1

As far as native Romanian speakers are concerned, given the discussions in the literature (Cinque 1994, 1995, 2002, 2010 vs. Cornilescu & Giurgea 2013), Cornilescu & Nicolae 2016, Cornilescu & Cosma 2019), we may expect one of the two possibilities: the first one would be that Romanian speakers would rate as acceptable the mirror order of English, and the second one would be that they would be more flexible in their rating, and they would find any order natural (see Table 5). Their rating of naturalness would in this case vary between 3 and 5.

Table 5. Answers expected for native Romanian speakers

Category	Expected answer 1	Expected answer 2
Quality-Size	1	3-5
Quality Color	1	3-5
Size-Color	1	3-5
Size Quality	5	3-5
Color-Size	5	3-5
Color-Quality	5	3-5

3.6 Results

3.6.1 Results for British English

Native British English speakers were expected to observe the General Adjective Hierarchy Quality > Size > Color according to both syntactic and cognitive accounts.

A look at the individual results (see Table 6, Figure 3) reveals that all English speakers rate congruent orders (Quality-Color, Quality-Size, Size-Color) with the maximum rating 5, while they rate incongruent orders (Color-Quality, Color-Size, Size-Quality) mostly with ratings lower than 2.5 (24 out of 30 participants for Color-Quality, 20 out of 30 speakers for Size-Quality, 22 out of 30 speakers for Color-Size).

Table 6. Average across all conditions for native English speakers

Quality-Color	Color-Quality	Quality-Size	Size-Quality	Size-Color	Color-Size
4.05	2.14	4.32	2.22	3.97	2.30

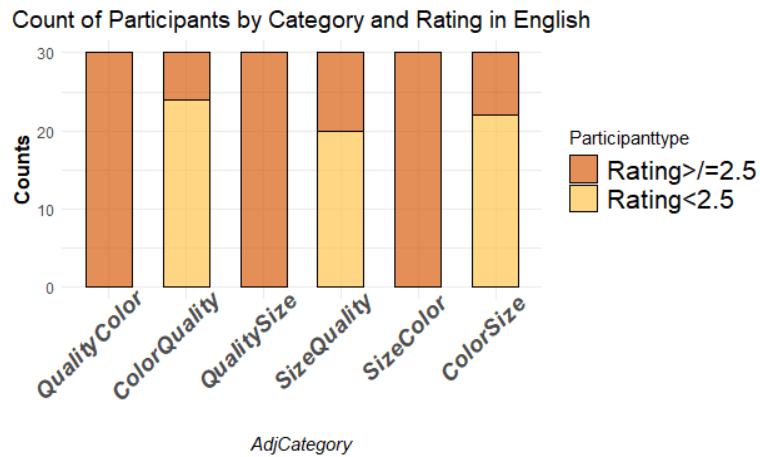


Figure 3. Count of English participants by Category and Rating

As can be seen in Figure 3 and Table 7, when participants evaluate sentences such as those in (28), the answers tend to vary between 3 and 5 on the Likert scale, where 5 means ‘absolutely right’. On the other hand, when participants evaluate sentences such as those in (29), the answers tend to range between 1 and 3 on the Likert scale, where 1 means ‘absolutely wrong’.

- (28) a. Quality-Size
Sarah has a beautiful big family.
- b. Quality-Color
He offered me a beautiful red rose.
- c. Size-Color
Don’t press the big red button!
- (29) a. Size-Quality
Sarah has a big beautiful family.
- b. Color-Quality
He offered me a red beautiful rose.
- c. Color-Size
Don’t press the red big button!

Table 7. Average per condition for each native English Speaker

Participants	Quality- Color	Color- Quality	Quality- Size	Size- Quality	Color- Size	Size- Color
A1	4.38	2.19	4.81	1.56	1.88	4.50
A2	3.38	1.63	4.13	1.31	1.88	3.69
A3	5.00	1.13	5.00	1.38	1.25	4.75
A4	4.00	3.06	4.19	2.31	2.38	3.44
A5	2.75	3.00	2.94	2.56	3.00	2.69
A6	4.06	4.00	4.13	3.88	4.06	4.06
A7	3.56	2.00	3.50	1.94	2.31	3.75
A8	3.75	2.88	4.25	2.81	2.44	3.88
A9	3.88	2.06	4.19	1.94	1.88	4.00
A10	4.69	2.06	4.38	2.81	1.50	3.44
A11	4.00	2.31	4.13	2.13	2.13	3.88
A12	4.06	1.94	4.31	2.13	1.69	3.69
A13	3.19	3.13	3.00	3.31	2.44	3.38
A14	4.00	1.81	4.63	1.81	2.13	3.63
A15	3.63	2.38	3.63	3.00	1.56	3.31
A16	3.19	3.25	3.44	3.19	3.19	3.25
A17	4.38	1.56	4.69	1.81	2.31	4.63
A18	3.38	1.94	4.13	2.31	2.56	3.50
A19	4.38	1.50	4.56	1.75	2.19	3.94
A20	4.69	1.63	5.00	1.81	2.13	4.13
A21	4.31	1.88	4.75	2.06	1.75	4.25
A22	3.44	2.38	4.06	2.69	2.88	3.69
A23	3.88	2.06	4.44	1.81	2.75	4.56
A24	4.44	1.81	4.75	2.13	2.50	4.63
A25	3.81	1.88	5.00	2.13	3.06	4.63
A26	4.69	1.19	5.00	1.56	1.94	4.63
A27	4.88	1.94	4.81	2.31	2.75	4.75
A28	4.31	1.88	4.81	2.06	2.63	4.31
A29	4.88	1.63	4.69	1.69	2.25	4.88
A30	4.56	2.13	4.19	2.25	1.63	3.69

Based on Figure 3, Tables 5, 6 and 7, there seems to be a considerable difference between mean ratings for congruent orders (Quality-Size/Quality-Color/Size-Color) and mean ratings for incongruent orders in English (Size- Quality/Color-Size/Color-Quality).

Out of 30 participants, 80% rated congruent orders higher than 3 and incongruent orders lower than 3. This is in line with our expectations.

3.6.1. Results for Romanian

The answers provided by native Romanian speakers were expected to either reflect a mirror order of English version, or to show a more flexible adjective order. We find that native Romanian speakers tended to consider all orders acceptable (both congruent and incongruent), as shown in Table 8:

Table 8. Average across all conditions for native Romanian speakers

Quality-Color	Color-Quality	Quality-Size	Size-Quality	Size-Color	Color-Size
3.18	3.50	2.98	3.61	3.29	3.55

A look at the individual results (see Figure 4, Table 9) reveals that most of the Romanian speakers rate as acceptable both congruent orders (Quality-Color, Quality-Size, Size-Color) and incongruent orders (Color-Quality, Color-Size, Size-Quality), giving ratings higher than 2.5 (28 out of 30 participants for Color-Quality, 27 out of 30 speakers for Size-Quality, 25 out of 30 speakers for Color-Size).

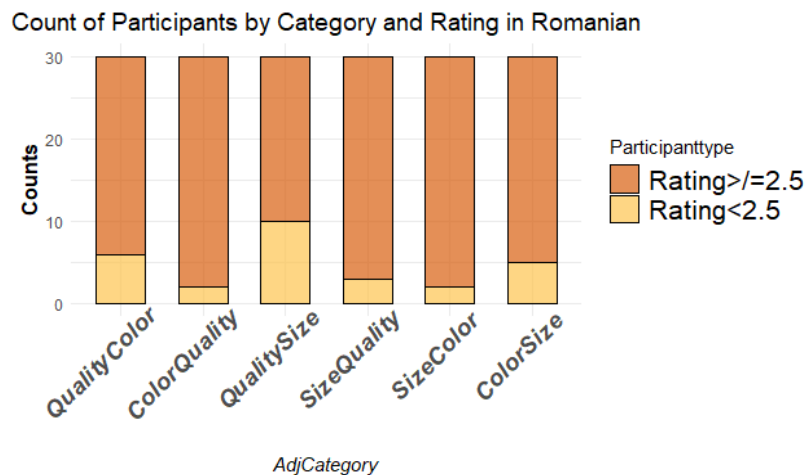


Figure 4. Count of Romanian participants by Category and Rating

Table 9. Average per condition for each native Romanian speaker

Participants	Quality-Size	Colour-Quality	Size-Colour	Size-Quality	Colour-Size	Quality-Colour
B1	2.06	2.81	2.56	3.56	4.00	3.50
B2	3.56	4.06	3.63	4.13	4.50	3.56
B3	1.06	1.06	1.13	1.19	1.06	1.13
B4	2.13	3.56	2.38	4.81	3.94	1.94

Participants	Quality-Size	Colour-Quality	Size-Colour	Size-Quality	Colour-Size	Quality-Colour
B5	3.31	4.31	3.94	3.69	4.38	3.31
B6	2.63	5.00	2.75	3.88	3.69	1.63
B7	1.69	2.75	3.38	4.81	3.38	3.63
B8	3.75	3.88	4.00	3.94	4.13	4.06
B9	1.56	1.31	1.38	1.13	1.31	1.25
B10	4.25	3.69	4.06	3.19	3.63	4.13
B11	2.75	3.56	4.38	4.44	4.00	3.00
B12	5.00	5.00	5.00	5.00	5.00	5.00
B13	2.19	2.56	2.56	2.38	2.50	2.94
B14	2.63	3.19	2.94	3.13	3.75	3.13
B15	4.25	3.88	4.19	3.56	3.75	4.13
B16	1.75	4.44	3.56	4.00	3.31	1.56
B17	5.00	5.00	5.00	4.94	5.00	5.00
B18	2.13	3.63	3.50	3.75	3.94	2.88
B19	3.56	4.00	4.00	4.06	3.88	3.88
B20	2.38	3.94	2.81	3.38	3.44	2.75
B21	2.88	3.00	2.44	3.13	2.63	2.75
B22	3.94	4.13	4.50	4.31	4.56	4.06
B23	1.94	2.50	2.56	4.19	4.50	4.50
B24	2.88	3.00	2.44	3.13	2.63	2.75
B25	4.00	3.81	3.69	3.69	4.00	3.88
B26	3.63	3.56	3.06	3.69	3.19	2.75
B27	2.94	3.69	3.00	2.88	3.19	2.44
B28	3.00	3.63	3.88	3.81	3.75	3.88
B29	3.19	3.13	2.88	3.00	2.63	2.88
B30	3.38	2.94	3.06	3.63	2.94	3.00

It is very hard to determine what the “correct” order of categories is according to participants because there is a lot of variation in their answers, unlike in English. Some of the native Romanian participants rate a certain order as being completely wrong (i.e. Quality-Size receives a rating of 1.06 from one participant), while others rate the same category as being absolutely right (Quality-Size receives a rating of 5.00). Nevertheless, most of the responses range between 3 and 4 for all orders.

When participants evaluate sentences such as those in (30), their answers tend to vary between 2 and 4 on the Likert scale (1 means ‘absolutely wrong’, 5 means

‘absolutely right’). Moreover, the answers are almost equal to those in (31). The general average per each category is around 3.

- (30) a. Quality-Size
Sara are o familie frumoasă mare.
Sara has a family beautiful big
‘Sarah has a big beautiful family.’
- b. Quality-Color
Mi- a oferit un trandafir frumos roșu.
to me has offered a rose beautiful red
‘He/she offered me a red beautiful rose.’
- c. Size-Color
Nu apăsa butonul mare roșu!
not press button big red
‘Don’t press the red big button!’
- (31) a. Size-Quality:
Sara are o familie mare frumoasă.
Sara has a family big beautiful
‘Sarah has a beautiful big family.’
- b. Color-Quality:
Mi- a oferit un trandafir roșu frumos.
to me has offered a rose red beautiful
‘He/she offered me a beautiful red rose.’
- c. Color-Size:
Nu apăsa butonul roșu mare!
not press button-the red big
‘Don’t press the big red button!’

3.6.2. Comparing the results for British English and Romanian

We find that British English speakers have stronger preferences for the ordering Quality > Size > Color, while Romanian speakers seem to accept all orders of adjectives (see Figure 5), with only a slight preference for the mirror orders Color-Quality, Size-Quality, and Color-Size.

We analyzed the results using R-4.0.5 (2021). We computed a linear regression model to compare the Ratings depending on Order (Color-Size, Size-Color, Quality-Color, Color-Quality, Quality-Size, Size-Quality) and Language Group (British English, Romanian). We found significant effects per Group ($\beta = 1.345$, $SE = 0.08$, $Z = 15.69$, $p < .01$), the orders Color-Size ($\beta = 1.89$, $SE = 0.08$, $Z = 22.114$, $p < .01$), Quality-Color ($\beta = 1.89$, $SE = 0.08$, $Z = 22.11$, $p < .01$), Quality-Size ($\beta = 2.16$, $SE = 0.08$, $Z = 25.226$, $p < .01$), Size-Color ($\beta = 1.81$, $SE = 0.08$, $Z = 21.143$, $p < .01$), as well as the interaction between Group and the order Quality-Color ($\beta = -2.22$, $SE = 0.121$, $Z = -18.319$, $p < .01$), the interaction between Group and the order Quality-Size ($\beta = -2.683$, $SE = 0.121$, $Z = -22.13$, $p < .01$), and the interaction between Group and the order Size-Color

($\beta = -2.025$, $SE = 0.121$, $Z = -16.703$, $p < .01$). We then applied an ANOVA and found a significant effect for Group ($F = 26.93$, $p < .01$), Order ($F = 89.65$, $p < .01$), as well as an interaction between Group and Order ($F = 220.78$, $p < .01$). We proceeded to do a post-hoc Tukey analysis, and we found significant effects for the order Size-Color in English vs. Size Color in Romanian ($p < .01$), for the order Color-Size in English vs. Color-Size in Romanian ($p < .01$), for the order Quality-Color in English vs. Quality-Color in Romanian ($p < .01$), for the order Color-Quality in English vs. Color-Quality in Romanian ($p < .01$), for the order Quality-Size in English vs. Quality-Size in Romanian ($p < .01$), and for the order Size-Quality in English vs. Size-Quality in Romanian ($p < .01$).

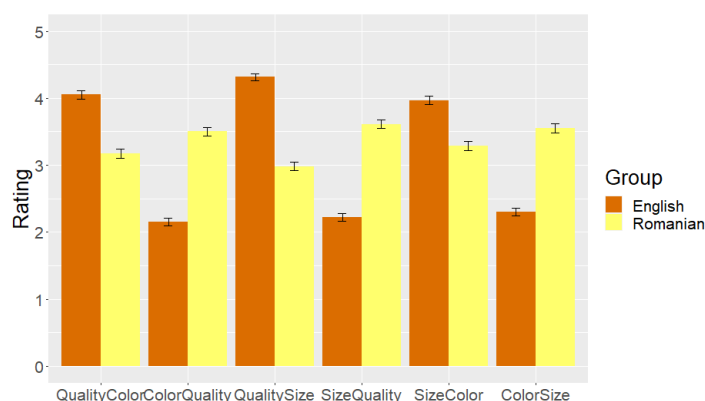


Figure 5. Rating given by participants by adjectival order and language group

We also found significant effects for the orders Size Color vs. Color Size in English ($p < .01$), for Quality Quality-Color vs. Color-Quality in English ($p < .01$), for Quality-Color vs. Color-Quality in Romanian ($p < .01$) and in English ($p < .01$), for the orders Quality-Size vs. Size-Quality in English ($p < .01$), for the orders Quality-Size vs. Size-Quality in Romanian ($p < .01$).

Importantly, we also found significant effects for the order Size-Color in English vs. the mirror order Color-Size in Romanian ($p < .01$), for the order Color-Size in English vs. the mirror Size-Color in Romanian ($p < .01$), for the order Quality-Color in English vs. the mirror Color-Quality in Romanian ($p < .01$), for the order Color-Quality in English vs. the mirror Quality-Color in Romanian ($p < .01$), for the order Quality-Size in English vs. the mirror Size-Quality in Romanian ($p < .01$), and for the order Size-Quality in English vs. the mirror Quality-Size in Romanian ($p < .01$).

4. Discussion

Comparing the results of the two experiments per adjective order, we notice a striking contrast between English and Romanian. Overall, the English results suggest the existence the General Adjective Hierarchy Quality > Size > Color: participants seem to consistently prefer orders where Quality adjectives are placed above/before Size, as well

as Color adjectives, and Size adjectives are placed above/before Color adjectives. The Romanian results suggest more similar ratings for sentences containing N Size Color, N Size Quality, and N Color Quality sequences and sentences containing N Color Size, N Quality Size, and N Quality Color sequences than in English.

The comparison between Quality-Size and Size-Quality shows that the Quality-Size order (the average = 4.32) seems more natural to native English speakers than the Size-Quality order (the average = 2.21). That being said, sentences like (32) are rated by participants as correct, and sentences like (33) are rated as wrong. In comparison to English, the Romanian sentence varies between 3 (Quality-Size) and 3.61 (Size-Quality), indicating a medium rating and, consequently, a freer order. Therefore, sentences like (35) are rated almost the same as sentences like (34):

- (32) She is a beautiful little girl.
 (33) She is a little beautiful girl.
 (34) E o fată micuță frumoasă.
 is a girl little beautiful
 ‘She is a beautiful little girl.’
 (35) E o fată frumoasă micuță
 is a girl beautiful little
 ‘She is a little beautiful girl.’

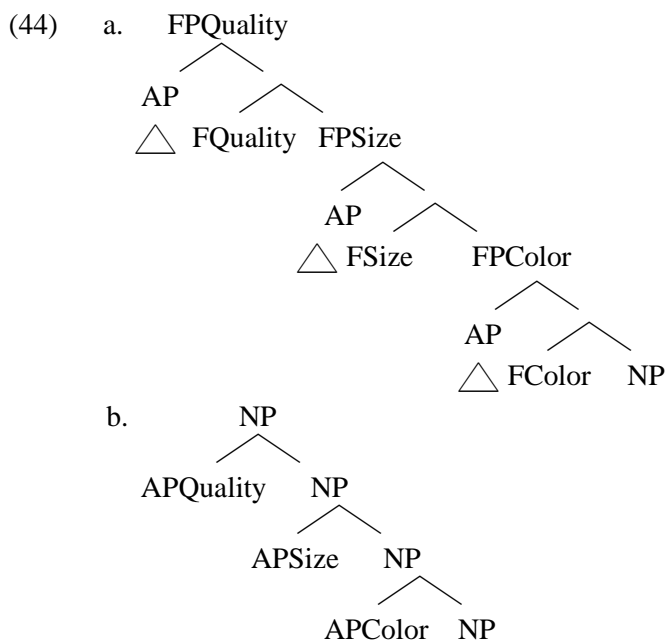
The comparison of the Quality-Color/Color-Quality order shows that Quality-Color order (the average = 4.05) sounds more natural to native English people than the Color-Quality order (the average = 2.14). Thus, sentences like (36) are rated by the participants as correct, and sentences like (37) are rated as wrong. The Romanian sentence varies between 3.18 (Quality-Color) and 3.50 (Color-Quality), suggesting a free order. This means that sentences like (38) are rated almost the same as sentences like (39), where the order of adjectives is the reverse of (37):

- (36) Luis bought a beautiful blue car for his dad.
 (37) Luis bought a blue beautiful car for his dad.
 (38) Luis i- a cumpărat tatălui său o mașină albastră frumoasă.
 Luis to him has bought dad his a car blue beautiful
 ‘Luis bought a beautiful blue car for his dad.’
 (39) Luis i- a cumpărat tatălui său o mașină frumoasă albastră.
 Luis to him has bought dad his a car beautiful blue
 ‘Luis bought a blue beautiful car for his dad.’

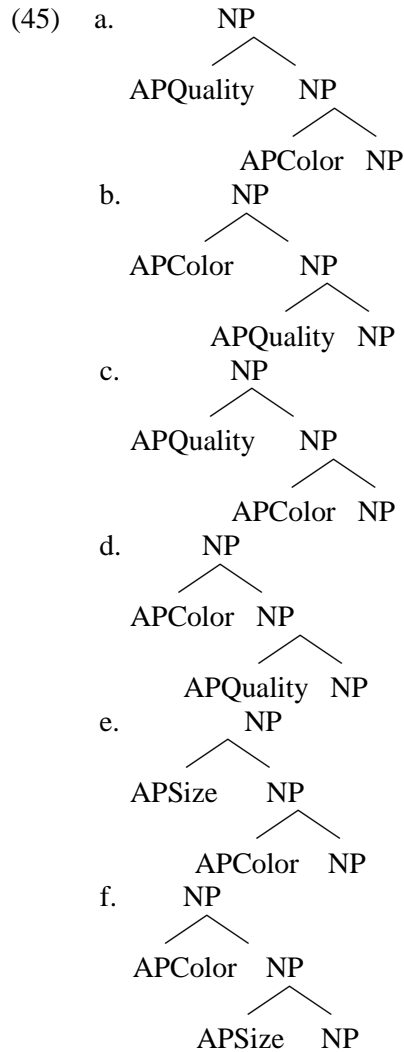
The comparison of the Size-Color/Color-Size category shows that Size-Color order (the average = 3.98) sounds more natural to native English people than the Color-Size order (the average = 2.30). Thus, sentences like (40) are rated by the participants as correct, and sentences like (41) are rated as wrong. In comparison to the English version, the Romanian one varies between 3.29 (Size-Color) and 3.55 (Color-Size) indicating a medium answer and a free order. Thus, sentences like (42) are rated almost the same as sentences like (43):

- (40) Can you give me the big blue bottle, please?
- (41) Can you give me the blue big bottle, please?
- (42) Poți să îmi dai sticla albastră mare te rog?
can SBJV to me give bottle-the blue big you beg
'Can you give me the big blue bottle, please?'
- (43) Poți să îmi dai sticla mare albastră te rog
Can SBJV to me give bottle-the big blue you beg
'Can you give me the big blue bottle, please?'

The hierarchy QUALITY > SIZE > COLOR holds for native English speakers. The experiment shows that the adjectival combinations of Quality-Size/Quality-Color/ Size-Color are natural for native English speakers, who rated them as expected (between 4 and 5). The reverse order (Size-Quality/Color-Quality/Color-Size) of the adjectives was judged wrong by the speakers and it was rated as we expected (between 1 and 2.5). The source of this general hierarchy could be cartographic syntax (Cinque 1994, 2005, 2010) – see (44a), ordered adjunction – see (44b) or subjectivity (Scontras et al. 2017, 2019).



In contrast, there seems to be no General Adjective Hierarchy for native Romanian speakers. In Romanian, the answers (averaging around 3) are neither in accordance with Cinque’s mirror order, nor with Scontras et al.’s (2017, 2019) theory of subjectivity, but, instead, they seem to indicate a freer adjective order (see 45):



5. Conclusions

In this paper we have provided experimental evidence from native English and Romanian adult speakers that adjectives observe a more fixed ordering English, but not in Romanian. The current findings seem to support the view that adjective orders do not constitute a principle of Universal Grammar but are best treated as a parameter, which may get valued through a rigid ordering in some languages and through a freer order in others.

Data availability

The data and code associated with the paper are available at <https://osf.io/rsj3b/>.

Ethics and consent

The study has been conducted under approval of the Research Ethics Committee in Bucharest (19/17.02.2022), and consent has been obtained from all participants.

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References

- Abels, K., Neeleman, A. 2010. Linear asymmetries and the LCA. *Syntax* 12 (1): 25-74.
- Bleotu, A. C., Foucault, D., Roeper T. 2023a. The Recursive Set-Subset Ordering Principle orders adjectives and relative clauses in visual context. *Proceedings of the Linguistic Society of America* 8 (1): 5535.
- Bleotu, A. C., Foucault, D., Roeper, T. 2023b. *Long short leaves* are 'leaves that are short that are long'. The Recursive Set-Subset Principle orders both adjectives and relative clauses. In L. Fagen, S. G. Quain, S. Reyes & I. Tang (eds.), *Proceedings of the 58th Annual Meeting of the Chicago Linguistic Society*, 13-27. Chicago, IL: Chicago Linguistic Society
- Bleotu, A. C., Roeper, T. 2021a. *Small big flowers* or *small and big flowers*? Simple is better and Roll-Up is too complex for Romanian 5-year-olds. In D. Dionne & L. A. Vidal Covas (eds.), *Proceedings of the 45th annual Boston University Conference on Language Development*, vol. 1, 66-79. Somerville, MA: Cascadilla Press.
- Bleotu, A. C., Roeper, T. 2021b. Roll-Up is too complex for Romanian 5-year-olds. Evidence from recursive adjectives. In *Proceedings of the Linguistic Society of America* 6 (1): 133-143.
- Bleotu, A. C., Roeper, T. 2022a. The recursive set-subset ordering restriction overrides adjective ordering restrictions. Evidence from Romanian 4-year-olds and adults. In Y. Gong & F. Kpogo (eds), *Proceedings of the 46th Annual Boston University Conference on Language Development*, vol. 1: 62-75. Somerville, MA: Cascadilla Press.
- Bleotu, A. C., Roeper T. 2022b. Children are more sensitive to the recursive set-subset ordering than to adjective ordering restrictions. In *Proceedings of the Linguistic Society of America* 7 (1): 5267.
- Brăescu, R. 2011. *Adjectivul în limba română. Sintaxă și semantică*. Bucharest: Editura Universității din București.
- Champollion, L. 2006. A game-theoretic account of adjective ordering restrictions. Ms., University of Pennsylvania.
- Cinque, G. 1994. On the evidence for partial N-movement in the Romance DP. In G. Cinque, J. Koster, J. Y. Pollock, L. Rizzi & R. Zanuttini (eds.), *Paths Towards Universal Grammar. Studies in Honor of Richard S. Kayne*, 85-110. Washington DC: Georgetown University Press.
- Cinque, G. 2005. Deriving Greenberg's universal 20 and its exceptions. *Linguistic Inquiry* 36 (3): 315-332.
- Cinque, G. 2010. *The Syntax of Adjectives. A Comparative Study*. Cambridge, MA: MIT Press.
- Cornilescu, A. & Cosma, R. 2019. Linearization of attributive adjectives in Romanian. *Revue roumaine de linguistique* LXIV (3): 307-323.
- Cornilescu, A. & Giurgea, I. 2013. The adjective. In C. Dobrovie-Sorin & I. Giurgea (eds.), *A Reference Grammar of Romanian*, vol. 1: 355-530. Amsterdam/Philadelphia: John Benjamins.
- Cornilescu, A. & Nicolae, A. 2016. Romanian adjectives at the syntax- semantics interface. *Acta Linguistica Hungarica* 63 (2): 197-240.
- Dixon, R. M. W. 1982. *'Where Have All the Adjectives Gone?' and other Essays in Semantics and Syntax*. Berlin: Mouton de Gruyter.

- Foucault, D., Bleotu, A. C., Lakshmanan, U., Merritt, E., Sybing, R. & Roeper, T. 2022. Relative gradable adjective recursion is more challenging for acquisition than possessive recursion. In *Proceedings of the Linguistic Society of America* 7 (1): 5294.
- Hewings, M. 2004. An ‘important contribution’ or ‘tiresome reading’? A study of evaluation in peer reviews of journal article submissions. *Journal of Applied Linguistics and Professional Practice* 1 (3): 247-274.
- Huston, S. & Thompson, G. (eds.). 2000. *Evaluation in Text Authorial Stance and the Construction of Discourse*. Oxford: Oxford University Press.
- Kamp, H. & Partee, B. 1995. Prototype theory and compositionality. *Cognition* 57: 129-191.
- Kölbel, M. 2004. Faultless disagreement. *Proceedings of the Aristotelian Society* 104 (1): 53-73.
- Kayne, R. S. 1994. *The Antisymmetry of Syntax*. Cambridge, MA: MIT Press.
- Kremers, J. M. 2003. The Arabic Noun Phrase: A Minimalist Perspective. PhD dissertation, Radboud University, Nijmegen.
- Larson, R. K., Marusic, F. 2004. On indefinite pronoun structures with APs: Reply to Kishimoto. *Linguistic Inquiry* 35: 268-287.
- Leivada, E., Westergaard, M. 2019. Universal linguistic hierarchies are not innately wired. Evidence from multiple adjectives. *Peer J* 7: e7438.
- MacFarlane, J. 2014. *Assessment Sensitivity*. Oxford, UK: Clarendon Press.
- Panayidou, F. 2013. (In)flexibility in Adjective Ordering. PhD dissertation, Queen Mary University of London.
- Sadler, L., Douglas, J. A. 1994. Prenominal adjectives and the phrasal/lexical distinction. *Journal of Linguistics* 30: 221-222.
- Scontras, Gr., Degen J., Goodman, N., D. 2017. Subjectivity predicts adjective ordering preferences. *Open Mind: Discoveries in Cognitive Science* 1 (1): 53-65.
- Scontras, Gr., Degen, J., Goodman, N. D. 2019. On the grammatical source of adjective ordering preferences. *Semantics and Pragmatics* 12 (7): 1-24.
- Scott, G. J. 2002. Stacked adjectival modification and the structure of nominal phrases. In G. Cinque (ed.), *Functional Structure in DP and IP*, vol. 1, *The Cartography of Syntactic Structures*, 91-120. Oxford and New York, NY: Oxford University Press.
- Siegel, M. 1976. Capturing the Adjective. PhD dissertation, University of Massachusetts, Amherst.
- Siegel, M. 1979. Measure adjectives in Montague Grammar. In S. Davis & M. Mithun (eds.), *Linguistics, Philosophy, and Montague Grammar*, 223-262. Austin, TX: University of Texas Press.
- Sproat R. & Shih, C. 1991. The cross-linguistic distribution of Adjective Ordering Restrictions. In C. Georgopoulos & R. Ishihara (eds.), *Interdisciplinary Approaches to Language*, 565-593. Dordrecht: Kluwer.
- Trainin, N. & Shetreet, E. 2021. It’s a dotted blue big star: On adjective ordering in a post-nominal language. *Language, Cognition and Neuroscience* 36 (3): 320-341.
- Williams, E. 1994. *Thematic Structure in Syntax*. Cambridge, MA: MIT Press.