Experimental Data on Romanian Double Object Constructions

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Abstract

The goal of this paper is to present the results of an experiment we carried out on Romanian ditransitive constructions and to put forth evidence in favour of a unified analysis of these configurations. Numerous studies on Romance paralleling accounts on English have assumed structural differences between ditransitive configurations with clitic doubled indirect objects and their non-doubled counterparts, grouping the former sequences with Double Object Constructions (DOC) and the latter with Prepositional Datives (Demonte 1995, Cuervo 2003, Diaconescu and Rivero 2007 a.o.). Against such approaches, we will argue that the distinction between the so-called DOCs and Prepositional Datives finds no support in Romanian and that Romanian ditransitives instantiate the DOC configuration irrespective of whether they carry Clitic Doubling (CD) or not. Supporting this claim, the results of our experiment show that the two objects in the Romanian ditransitive construction have symmetrical binding potential and roughly equal privileges with respect to binding phenomena. In line with Pineda (2012, 2013 a.o.) for Spanish, we will thus defend the view that Romanian ditransitives instantiate the DOC configuration.

1. Aim of the paper

The analysis of ditransitive configurations has vacillated between two accounts: the alternative projection account and the derivational account. The alternative projection account was first proposed for English by Pesetsky (1995) and it is founded on the existence of assumed systematic differences between the prepositional Dative and the Double Object Construction (DOC). The two configurations are argued to be independent one of the other in the sense that one does not derive from the other. According to the derivational account, on the other hand, one of the constructions is syntactically derived from the other.

In the Romance domain (see Demonte 1995, Cuervo 2003, among many), including Romanian (Diaconescu and Rivero 2007, D&R from now on), a distinction has been set up between the cliticless construction, assimilated to the prepositional to-Dative of English and the CD construction, which is assimilated to the English DOC. In this description, the Romance DOC is viewed as an applicative construction and the clitic is interpreted as a spell-out of the applicative head.

This paper is devoted to the study of ditransitive configurations in Romanian and presents some new experimental data arguing against the purported existence of two configurations i.e., a DOC and a Prepositional Dative in this language. We will thus argue that a unified analysis of ditransitive constructions is more appropriate for Romanian (see also Pineda 2012, 2013 a.o.) and refute the claim

2 Some supporters of this account espouse the view that the DOC is derived from the Prepositional Dative (Larson 1988, 1990, Baker 1988, 1997 den Dikken 1995, Ormazabal & Romero 2010, 2012 a.o.), while others claim that the Prepositional is derived from the DOC (Dryer 1987, Aoun & Li 1989 a.o.).
according to which Romanian ditransitives with a clitic doubled dative object correspond to DOCs, while their non-doubled counterparts correspond to the so-called Prepositional dative constructions, contra D&R (2007). More specifically, we will defend the view that Romanian ditransitives instantiate the DOC configuration irrespective of whether they carry Clitic Doubling (CD) or not.

The rest of the paper is structured as follows: we will start by presenting the main claims put forth in D&R’s (2007) alternative projection account in section 2; in section 3, we will turn to describing our experiment on Romanian ditransitive constructions: its motivation, the design, results, evaluation. Section 4 will briefly extend upon the main conclusions of this experiment.

2. Background: Diaconescu and Rivero

In their pioneering paper, D&R (2007), in turn inspired by Cuervo (2003), following Pylkkänen (2002) make the following important points.

Firstly, in Romanian, the Goal may be an inflectional dative, as well as a PP, introduced by la ‘at, to’. Dative Goals and Prepositional Goals (la + Acc DP) share their syntactic and interpretative properties, but differ stylistically, in as much as Goal datives belong to standard Romanian, while PP Goals are restricted to popular or dialectal speech, even though they are standardly used with certain DPs. In choosing between the dative and the prepositional construction the animacy hierarchy may have an important role to play: DPs higher in the animacy hierarchy prefer the dative while DPs with a low position in the hierarchy prefer the prepositional construction.

(1) a. Mi se pare că vorbesc la pereți.
   Me. DAT refl.3rd.p.sg. seems that speak.1st.p.sg. to walls
   ‘I feel as if I were talking to the walls.’

   b. *Mi se pare ca vorbesc peretilor.
      Me. DAT refl.3rd.p.sg. seems that speak.1st.p.sg. walls.DAT
      ‘I feel as if I were talking to the walls.’

What is peculiar to Romanian, given the equivalence of the dative and the prepositional construction, is that at least sometimes it does not distinguish between caused movement and caused possession.

(2) a. A dat covrigii unor copii vs. ??unor câini
   Has.3rd.p.sg. given pretzels.the some.DAT children vs. ?? some.DAT dogs
   vs. *unor cămine
   vs. *some.DAT hostels
   ‘He has given the pretzels to some children/some dogs/some hostels.’

   b. A dat covrigii la niște copii. vs. la niște câini
      Has.3rd.p.sg. given pretzels.the to some children vs. to some dogs
      vs. la niște câmine
      vs. *to some hostels
      ‘He has given the pretzels to some children/some dogs/some hostels’
A second common syntactic property of the dative/prepositional construction is that both types of Goals show free word-order with respect to the Theme.

(3) a. Mihaela scrie o scrisoare Mariei/la Maria.
Mihaela writes a letter Mary.Dat/ to Mary.

b. Mihaela scrie Mariei/ (?) la Maria o scrisoare.
Mihaela writes Mary.Dat/to Mary a letter.
‘Mihaela is writing a letter to Mary.’

The most relevant property of the Romanian prepositional goals is that, despite their prepositional form, they allow clitic doubling. Given this, D&R suggest that, at least in clitic doubled constructions, la is a case-marker rather than a lexical preposition with descriptive content, so that the status of the la phrase is that of a DP rather than a PP.

(4) Profesorul le- a vorbit studenților/ la studenți.
professor.the they.Dat.Cl has spoken students.Dat/ to students.
‘The professor spoke to the students.’

This view is confirmed by the occurrence of la-PPs in the Dativus Comodi/Incomodi of unergative verbs, where its interpretation is Beneficiary, not Experiencer, an interpretation normally expressed by the preposition pentru, ‘for’, not la ‘at, to’. Significantly, in this construction, the clitic is obligatory to convey the Beneficiary interpretation; in its absence, the la-PP is interpreted as a location, as shown by the contrast between (5) a and b.

(5) a. I am muncit patronului/la patron pe puțini bani.
he.Dat.cl have worked employer.the.Dat/at employer on little money
‘I worked for the employer for little money’

b. Am muncit pentru patron/la patron.
‘I worked for the employer/ at the employer.

We assume the same position on the similarity of the PP Goal and the Dative Goal in Romanian and discuss only Dative Goals from here on.

Starting with Demonte (1995) if not earlier, researchers on Romance languages, like English, dispose of two readings in the Theme-Goal construction: the caused movement reading which does not show clitic doubling and is the analogue of the English prepositional dative construction and a caused possession reading where the dative must be clitic doubled, the structure being the analogue of the English Double Object Construction. The clitic is interpreted as the head of the Applicative projection that introduced the Goal.

In agreement with Cuervo (2003), D&R (2007) assume that the DOC interpretation is characteristically associated with a configuration where the Goal c-commands the Theme, a configuration which determines the well-known binding and scope asymmetries first discussed in Barss & Lasnik (1986). They further claim that these properties hold whenever the Goal is clitic doubled and
the Theme is not. Hence they conclude that, in Romanian, DOC interpretations require doubling by the
clitic. In implementing this view, the two authors adopt an alternative projection account, proposing (A)
and (B) below as alternative configurations (see also Anagnostopoulou 2005 or Georgala 2011).

(A) \( \text{Theme \ c\-commands \ Goal} \)
\[ \text{VoiceP[DP}_{\text{Agent}} \ \text{Voice}[\text{vP} [\text{PP_{Theme}} \ P \ \text{DP}_{\text{Goal}}]]] \]

(B) \( \text{Goal \ c\-commands \ Theme} \) (clitic doubling, DOC)
\[ \text{VoiceP[DP}_{\text{Agent}} \ \text{Voice}[\text{vP} [\text{ApplP} \ \text{DP}_{\text{Goal}} [\text{cl}_{\text{Appl}}] \ [\text{VP V DP}_{\text{Theme}}]]]] \]

In the first case (A), the Goal phrase is the complement of a Preposition, null in the case of dative
Goals or overtly realized as \( \text{la} \) for PP Goals. The Theme sits in the preposition’s specifier, c-
commanding the Goal. The Dative is inherently case licensed at merge. DOC readings should not occur
in this structure, which is not an applicative construction.

In the second configuration (B), the Goal merges in the \textit{specifier of an ApplP}, while the Theme
occupies the lower complement position. The Appl head \textit{spells out as the clitic} pronoun; therefore, in
this interpretation \textit{DOC readings depend on clitic doubling} since the higher Goal is introduced by the
clitic, which is the Appl head.

From a descriptive perspective, what the analysis is saying is that the Dative is interpreted either
in a low position, where it is c-commanded by Theme, or in a high position (subject), in which case it c-
commands the Theme. Doubling is unavailable in the low position where the Dative is analyzed as a PP,
\textit{while it is obligatory in the high position}.

The analysis proposed by D&R (2007) makes clear strong predictions: According to (A), the
direct object can bind the indirect object whether it has a clitic on it or not (DO > bare IO). According to
(B), the indirect object in a higher position is always doubled and will always naturally bind the DO
projected in the lower complement position (IO (+cl) > DO).

The following configurations are not derivable and should be ungrammatical: \( \text{DO>IO (+clitic)} \)
which is against (A) and \( \text{IO (without a clitic) > DO (+/- clitic)} \).

In theory, the following patterns are possible, taking into account that either object occupies a
lower or a higher position and either object may be doubled:

(6) \( A: \text{DO (+cl)} > \text{IO (+cl)} \)
\( B: \text{DO (+cl)} > \text{IO} \)
\( C: \text{DO} > \text{IO (+cl)} \)
\( D: \text{DO} > \text{IO} \)
\( E: \text{IO (+cl)} > \text{DO (+cl)} \)
\( F: \text{IO} > \text{DO (+cl)} \)
\( G: \text{IO (+cl)} > \text{DO} \)
\( H: \text{IO} > \text{DO} \)

D&R find grammatical the following three of them:

(7) \( \text{DO (+cl)} > \text{IO} \quad \text{(B)} \)
\( \text{DO} > \text{IO} \quad \text{(D)} \)
\( \text{IO (+cl)} > \text{DO} \quad \text{(G)} \)
They find ungrammatical the following patterns which are actually underivable in their analysis:

(8) \( \text{DO} > \text{IO (+cl)} \) \( \text{(C)} \)
     \( \text{IO} > \text{DO} \) \( \text{(H)} \)
     \( \text{IO} > \text{DO (+cl)} \) \( \text{(F)} \)

Nothing is mentioned or follows regarding structures where both objects are doubled:

(9) \( \text{DO (+cl)} > \text{IO (+cl)} \) \( \text{(A)} \)
    \( \text{IO (+cl)} > \text{DO (+cl)} \) \( \text{(E)} \)

The following examples under (10) from D&R are argued to show that, while a clitic doubled IO may bind the anaphor in a DO, a DO may not bind the anaphor in a clitic doubled IO:

\( \text{IO (+cl)} > \text{DO (anaphor)} \) \text{ vs. } \( \text{IO (+cl, anaphor)} > \text{DO} \)

(10) a. *Ion i-a descris fetei, pe ea înșăși.
    Ion her.Dat-has described girl.Dat pe she herself
    ‘John described the girl herself.’

b. * Ion i-a descris ei înseși fata.
    Ion her.Dat-has described her.Dat herself girl.the
    ‘John described herself the girl.’

D&R (2007): 25, p. 27

Furthermore, a non-doubled IO is said not to be able to bind the anaphor within a DO, while a DO may bind the anaphor in a bare IO (11):

\( \text{IO} > \text{DO (anaphor)} \) \text{ vs. } \( \text{IO (anaphor)} > \text{DO} \)

(11) a. * Ion a descris fetei, pe ea înșăși.
    Ion has described girl.Dat pe her herself
    ‘John described the girl herself.’

b. Ion a descris ei înseși fata,
    Ion has described her.Dat herself girl.the
    ‘John described herself the girl.’


Possessive are argued to go along the same lines: while a clitic doubled IO may bind the possessive, a DO may not bind the possessive within a doubled IO (12):

\( \text{IO (+cl)} > \text{DO (possessive)} \) \text{ vs. } \( \text{IO (+cl, possessive)} > \text{DO} \)
Finally, a bare IO may not bind the possessor within a DO, while the DO may bind the possessor with the bare IO (13):

**IO > DO (possessive) vs. IO (possessive) > DO**

(13) a. *? Am dat muncitorului, ceul său,.
    Have.I given worker.Dat cheque his
    ‘I have given the worker his cheque’

b. Poliția a dat tatălui său, copilul pierdut,.
    Police.the has given father.Dat him.Dat child lost
    ‘The Police has given the father his lost child’

D&R: 30, p. 33

As shown above, the account put forth by D&R makes a number of the predictions with repec to the grammaticality of certain ditransitive configurations. Some of the predictions in D&R (2007) seemed problematic to us as native speakers. In order to test these predictions we designed an experiment meant to shed light on the degree of grammaticality/acceptability of the 8 ditransitive constructions. The basic tenets of this experiment will be extended upon in section 3.

3. The experiment: testing the predictions in Diaconescu and Rivero

3.1. Motivation for our experiment

The examination of the data suggests that, while the Dative is clearly interpreted in a low or in a high position with respect to the Theme, the presence of the clitic does not change the interpretation of the construction with respect to properties which depend on a c-command configuration, specifically, binding of anaphors and possessives.\(^3\) We have systematically compared clitic doubled and non-clitic doubled direct objects (DO)/indirect objects (IO), examining the interpretation of all eight constructions in (6).

\[\text{………..} \]

\(^3\) We have put aside scope phenomena since in Romanian scope is determined by the inherent structure of the DP rather than by the c-command configuration as extensively shown in Tigău (2010). In other words, scope is not configurational in Romanian.
3.2. Design of experiment

We have conducted the experiment within a formal design framework. There are many debates on the distinction between formal and informal design of experiments. Schütze and Spouse (2013) list 5 major respects in which typical informal linguistic judgment gathering tends to differ from standard practice in psychology:

1. relatively few speakers (fewer than ten),
2. linguists themselves as the participants,
3. relatively impoverished response options (such as just “acceptable,” “unacceptable,” and perhaps “marginal”),
4. relatively few tokens of the structures of interest,
5. relatively unsystematic data analysis.

We have opted for a formal design of the experiment, addressing the five points in the following manner:

1. The number of participants in the experiment was 79, a number that permits sound statistical measurements.
2. No linguist was part of the experiment, only undergraduate students, from 3 different sections.
3. The response options were yes / no for grammaticality and four grades (A, ±A, ± I, I) for acceptability.
4. We have included in the survey at least four lexicalizations per each syntactic structure, in an effort to minimize the contribution of particular lexical items to the results.
5. Data analysis was performed by standard statistical tests in R.

In the first stage of the experiment, we made a pilot study on 49 undergraduate students of University of Bucharest, to check whether (random) factors like the lexical choice or register influence grammaticality / acceptability judgements. Indeed, sentences that used a less familiar, because formal or slightly obsolete vocabulary got lower scores than those that included a vocabulary which we expected to be familiar to the subjects. We have pruned the data for such unwanted effects.

The second stage of the experiment included 39 philology students.

We organized the data into two groups, corresponding to binding asymmetries in binding with possessors (ability of an object to bind a possessor in the other object), with a subgroup with non-merking, and in binding with anaphors (ability of an object to bind an anaphor in the other object). Additionally, we introduced arbitrary ungrammatical sentences. We obtained thus a total of 38 sentences for binding with possessors, 12 sentences with inanimate DOs (impossible pe-marking) and 8 for binding with anaphors.

Each subject saw all sentences exactly one time. Each sentence had to be judged one at a time, without going back or skipping.

Each questionnaire was printed separately and presented the sentences in a different random order. This was accomplished by entering the sentences into a spread-sheet program (Excel), adding a column of random numbers on the left (using the program's built-in random number generating function), and then ordering both columns by the random numbers. Randomization is a standard technique used to insure that the conditions in one run neither depend on the conditions of the previous run, nor predict the conditions in the subsequent runs.
For each sentence, the subject had to perform a yes/no task for grammaticality and a 4-scale graded task for acceptability (fully acceptable, more or less acceptable, rather unacceptable but still interpretable, and completely unacceptable, uninterpretable).

The instructions and the important distinction grammatical / acceptable were explained beforehand.

### 3.3 Results of experiment

We summarize the results of the experiment in table 1. The first column represents a code of the sentence. The codes from 1 to 4 represent the 4 different lexicalizations for the experiment with binding with possessors. Codes N, O and P represent the codes for the experiment with binding with anaphors. The last codes, Q, R and S represent the codes for binding with (non) pe-marking. The rest of the columns are occupied by the 8 syntactic constructions. The numbers at the intersection of one line and one row represent the number of grammaticality/ungrammaticality judgements for that particular sentence. Note that sum of the grammaticality and ungrammaticality judgements is always 39, for any particular syntactic structure and lexicalization, since there are 39 participants to the experiment. We also give the total of grammaticality/ungrammaticality judgments for all lexicalization on each column.

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Table 1. Summary of experimental results

For **binding with possessives**, we used a factorial design with 3 factors involved: the binding order of DO and IO, the presence or absence of the clitic on the DO and on the IO. These three factors involved resulted in the 8 exhaustive combinations of syntactic constructions, given in (6).

For each of these constructions, we have included into the experiment 4 different lexicalizations, meaning 4 sentences that differ in the choice of words, but have the same syntactic structure. We
graphically depict in figures 1 to 4 the raw frequencies of grammaticality judgments for the 4 lexicalizations. On the horizontal axis we can see the 8 syntactic structures from (6). The red boxes represent the number of grammatical judgments, while the blue ones represent the number of ungrammatical judgments. As it can be seen, there are some important differences in grammaticality judgments between the 4 lexicalizations, confirming the expectation that lexicalization matters. One also observes that for each of the 8 structures, there is at least one lexicalization out of 4 that favours grammaticality. Thus, we cannot rule out any of the 8 structures as ungrammatical.

Figure 1. First lexicalization grammaticality judgments for binding with possessors

Figure 2. Second lexicalization grammaticality judgments for binding with possessors

Since we are not interested in lexicalization itself, but rather in the unique syntactic structure that generated the different lexicalizations, we sum up the results for all four different lexicalization in one
graph (figure 5). In figures 6 to 9, we graphically depict the raw frequencies of acceptability judgements. On the horizontal axes, we can see the 8 syntactical structures, while on the vertical axis one represents the number of acceptability judgements. The red boxes represent fully acceptable, the green boxes more or less acceptable, the light blue rather unacceptable but still interpretable and the dark blue completely unacceptable, uninterpretable. Again, as it can be seen in figures 6 to 9, there is variation in acceptability judgements between the four lexicalizations.

![Figure 3. Third lexicalization grammaticality judgments for binding with possessors](image3.png)

![Figure 4. Fourth lexicalization grammaticality judgments for binding with possessors](image4.png)

In figure 10 we represent the total of acceptability judgements for all of the four lexicalizations.
For binding with (non) pe-marking, the motivation was that we observed an important increase in the mean of grammaticality judgments for non pe-marked constructions, compared to pe-marked constructions. In this case, only 4 out of 8 syntactic constructions are possible (DO + clitic is excluded, since it cannot be pe-marked).

Based on all these quantitative results, we are in a better position to analyze D&R’s prediction, as it follows:

Figure 5. Total grammaticality judgments for binding with possessors

Figure 6. First lexicalization acceptability judgments for binding with possessors
Figure 7. Second lexicalization acceptability judgments for binding with possessors

Figure 8. Third lexicalization acceptability judgments for binding with possessors
Figure 9. Fourth lexicalization acceptability judgments for binding with possessors

![Figure 9](image)

Figure 10. Total of acceptability judgments for binding with possessors

![Figure 10](image)

**Prediction 1:** For the configuration IO (+cl) > DO, D&R claim correctly that a clitic doubled IO may bind a possessor in the DO:

(15) a. În prima zi de școală, directorul are misiunea 
   In first day of school, principal.has mission.the 
   de a le prezenta viitorilor elevi pe învățătorul lor. 
   of to them.Dat present future.Dat pupils pe teacher their 
   ‘On the first day of school, the principal has the mission to introduce their teacher, to the pupils.’
b. Banca îi poate remite deținătorului bunurile sale oferite drept garanție numai după stingerea datoriei. The Bank may return the owner his goods offered as guarantee only after debt extinguishment.

However, column H of table 1 shows a mixed response. The bare direct object cases strikingly confirm the prediction (105 vs. 12). However, the score is reversed when the direct object is pe marked a fact which is not addressed in D&R and which is unexpected (70:86).

**Prediction 2.** For the configuration IO > DO, D&R predict that the undoubled IO is low and could not bind into the direct object. They seem to be confirmed by cases where the DO is pe marked (71 vs. 85). However, their analysis is disconfirmed by the perfect acceptability of sentences where an undoubled indirect object binds a possessor into a bare DP (IO>DO: 103 vs. 12). Again, sentences of the type cliticless IO > DO should not exist under the analysis of D&R.

(16) a. Angajatorii nu au dat încă muncitorilor toate drepturile lor bănești pe luna în curs. The employers haven’t yet given the workers their monetary rights during the current month.

b. Colegii ar trebui să recomande șefului pe noul său angajat, care este foarte muncitor. The employers haven’t yet given the workers their monetary rights during the current month.

**Prediction 3.** The configuration IO > DO (+cl) is equally mysterious under D&R’s analysis. These examples present two puzzles: on the one hand, the IO is a binder in the absence of the clitic (that is in a low position); on the other hand, the DO is clitic doubled i.e., necessarily moves or merges to a position outside the VP. Yet, as our experiment shows, binding of the undoubled IO is still possible (111 vs. 44).

(17) În prima zi de școală, directorul are misiunea de a-l prezenta viitorilor elevi pe învățătorul lor. ‘On the first day of school, the manager has the mission of introducing their teacher to his future pupils.’

**Prediction 4.** The structure DO > IO is also problematic under D&R analyses. Binding by the DO should be possible only when the DO merges in the higher position and the dative gets its locative interpretation. Again, in the simplest structure where both objects are not doubled, the DO > IO configuration gives conflicting results depending on the properties of the DO. Binding into the IO is impossible when the direct object is pe marked (DO>IO 55:101). This is a direct contradiction of the predictions of D&R where this configuration is the prepositional dative configuration and should be
grammatical. Again, results shift when the DO is bare. In this case, binding of the DO into the IO is felicitous (DO>IO: 88:29).

(18) Prin această manevră, concurrentul a reușit
    Through this manoeuvre, contestant.the has managed
    să fure premiul adevăratului său câștigător.
    să steal prize.the true.Dat his winner
    ‘Through this manoeuvre the contestant has managed to steal the prize to its real winner.’

**Prediction 5.** In the case DO (+cl) > IO, where the DO is doubled, ability to bind into the IO is expected and confirmed (DO>IO: 134:22).

(19) Poliția l-a înapoiat pe copilul pierdut pe plajă
    Police.the him-has returned pe child.the lost on beach
    părinților lui, care-l căutau de două zile.
    parents.Dat his, who-him looked for two days
    ‘The police has returned the child lost on the beach to his parents who had been looking for him for two days.’

**Prediction 6.** For the configuration DO > IO (+cl), it should be impossible for the DO to bind into the doubled IO, since in this case the IO should be high, while the DO should be low. This prediction is confirmed if the DO is *pe* marked, though the results are rather inconclusive (DO>IO (+cl): 69:87), but the score is completely reversed for bare DO which surprisingly can bind into a clitic doubled IO (91:26). This is a direct disconfirmation of the predictions above.

(20) Banca le-a retrocedat casele proprietarilor lor de drept.
    Bank.the the.-has returned houses.the owners.Dat their of right
    ‘The bank returned the houses to their rightful owners.’

We have not said anything about structures where both objects are doubled. They present a problem that we will consider in future research. If both clitics have overt doubles, sentences have close (inconclusive) scores (DO(+cl)> IO (+cl): 80:76; IO (+cl)> DO (+cl): 89:67). The interest of such sentences is that when both objects are cliticized, but not doubled, sentences are perfect and probably easy.

### 3.4. Evaluation

Even if all necessary controls are applied, a certain amount of variance will remain in the experimental data. This variance could either be due to chance and other external factors, or could result from an experimental manipulation, i.e., from a factor that the experiment is meant to investigate. In the latter case, the effect (e.g., a difference in acceptability judgements) is significant, in the former case is not. The only way of determining the significance of an effect is by performing statistical tests on the data (Keller, 1999).
In this study, we have chosen, for the evaluation of the experiment, to use linear fixed effects models for multi-factor experiments and two-sample t-tests for single factor experiments.

In the following, we present the evaluation of the three types of data that we collected: for binding with possessives, binding with anaphors and for pe-marking.

To test the significance of data for binding with possessors, we constructed a linear fixed effects model of grammaticality judgments, as a function of the three factors, run on each of the four lexicalizations and on their total.

The results were mixed. One can observe on the figures (2) and (4) above, that lexicalizations 2 and 4 received better (more conclusive) scores than 1 and 3. This was confirmed by the linear model outputs.

A nice result is obtained for the 4th lexicalization, for which the model was significant, with the following parameters: multiple R-squared = 0.9404, adjusted R-squared = 0.8956 and p-value = 0.006536. Multiple R-squared and adjusted R-squared are close to 1, indicating that the data is accounted for close to 90% by the combination of the three factors. The p-value indicates that the probability that the observed effects are due to chance is close to 0 (0.006536).

For the binding with anaphora, one can see on the frequency graphics of grammaticality and acceptability for the 4 lexicalizations of binding with anaphora, presented in in figures 11 and 12, that all of them received high grammaticality / acceptability score.

To test the significance of these data, we employed the same linear model, both for grammaticality and acceptability judgments, against ungrammatical pairs, with the same lexical choice.

For the grammaticality judgments, the model was highly significant, as we can see in the following print from the R interface:

```
lm(formula = SentenceType ~ G + NG, data = d)

Estimate  Std. Error  t value     Pr(>|t|)
(Inter) 1.834998   0.507998   3.612   0.0153 *
G 0.009666   0.013735   0.704   0.5130
NG -0.027119  0.013009 -2.085   0.0915 .
```

Multiple R-squared: 0.9671, Adjusted R-squared: 0.9539
F-statistic: 73.4 on 2 and 5 DF, p-value: 0.0001969

For the acceptability judgements, the model was also highly significant, as we can see in the following print from the R interface:

```
lm(formula = SentenceType ~ A + lessA + moreI + I, data=d)

Estimate      Std. Error t value     Pr(>|t|)
(Inter) 0.441758   0.183582   2.406 0.07385 .
A 0.036807   0.007821   4.706 0.00927 **
± A 0.056951  0.018783   3.032 0.03870 *
± I 0.030389  0.027760   1.095 0.33514
I NA NA NA NA
```

Multiple R-squared: 0.9778, Adjusted R-squared: 0.9611
F-statistic: 58.68 on 3 and 4 DF, p-value: 0.0009186
To evaluate the statistical significance of the data for binding with (non) pe-marking, we used a t-test of significance for the difference in means between pe-marked sentences and non pe-marked sentences, for only one lexicalization, with its four cases: DO>IO+cl, DO>IO, IO>DO+cl, IO>DO, both for grammaticality and for acceptability. We include in table (2) only the parameters for DO>IO+cl and DO>IO cases, the other being similar. As one sees from the prints of R interface in the table (2), all of these t-tests are statistically significant. Intuitively, the test says that the important difference in mean
between grammaticality and ungrammaticality variables, that favours grammaticality, cannot be due to chance (the probability that this is due to chance is almost 0).

<table>
<thead>
<tr>
<th>Grammaticality</th>
<th>DO&gt;IO-cl</th>
</tr>
</thead>
<tbody>
<tr>
<td>t = -6.1017, df = 69.268, p-value = 5.34e-08</td>
<td></td>
</tr>
<tr>
<td>alternative hypothesis: true difference in means is not equal to 0</td>
<td></td>
</tr>
<tr>
<td>95 percent confidence interval:</td>
<td></td>
</tr>
<tr>
<td>-0.7485226 - 0.3796825</td>
<td></td>
</tr>
<tr>
<td>sample estimates:</td>
<td></td>
</tr>
<tr>
<td>mean of x</td>
<td>mean of y</td>
</tr>
<tr>
<td>0.3076923</td>
<td>0.8717949</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Acceptability</th>
<th>DO&gt;IO</th>
</tr>
</thead>
<tbody>
<tr>
<td>t = -6.0618, df = 75.891, p-value = 4.849e-08</td>
<td></td>
</tr>
<tr>
<td>alternative hypothesis: true difference in means is not equal to 0</td>
<td></td>
</tr>
<tr>
<td>95 percent confidence interval:</td>
<td></td>
</tr>
<tr>
<td>-0.4990657 - 0.2522164</td>
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</tr>
<tr>
<td>sample estimates:</td>
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<tr>
<td>mean of x</td>
<td>mean of y</td>
</tr>
<tr>
<td>0.3561538</td>
<td>0.7317949</td>
</tr>
</tbody>
</table>

Table 2. T-test for the difference in means between pe-marked and non pe-marked sentences

The results put forth by the experiment thus contradict (some of) the predictions in D&R (2007) pointing to a more flexible analysis of the language data. Furthermore, it seems that a unified analysis of ditransitive constructions is more appropriate for Romanian. The claim according to which Romanian ditransitives with a clitic doubled dative object correspond to DOCs, while their non-doubled counterparts correspond to the so-called Prepositional dative constructions should hence be refuted. More specifically, the results of our experiment encourage us to embrace the view that Romanian ditransitives instantiate the DOC configuration irrespective of whether they carry Clitic Doubling (CD) or not.

4. Conclusions of the experiment

The experiment we unfolded enable us to draw the following conclusions: Firstly, an analysis such as the one proposed in D&R (2007), which declares possible only the structures under (A) and (B), i.e. patterns DO (+cl)> IO, DO > IO and IO (+cl) > DO, excludes correct sentences and does not allow for the generation of all grammatical sentences. Consequently, a more ‘flexible’ analysis which could accommodate the data is required.

Secondly, the experiment confirms the symmetrical binding potential of the two objects in the Romanian ditransitive construction. The two objects have approximately equal privileges with respect to binding phenomena. These results point to the fact that there are no structural differences between those ditransitive constructions containing CD and those that do not.
distinctions between the so-called DOCs and Prepositional Datives find no support in Romanian. As it seems, Romanian ditransitives instantiate the DOC configuration, irrespective of whether they carry Clitic Doubling (CD) or not.

Finally, it is necessary to understand the interaction of the binding phenomena considered above with differential object marking so as to correctly exclude differentially object marked arguments in certain configurations.

Acknowledgements: This work was generously supported for all authors by UEFISCDI, PNII-IDPCE-2011-3-0959.

References:


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http://dx.doi.org/10.1075/livy.2.04har


