# Agreement in Nominal Right Node Raising: an experimental approach

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**Intro:** Recent work has begun looking into the agreement patterns on the noun when it's shared by two singular DPs in the nominal right node raising constructions (NRNR), e.g. *this tall and that short student(*s)* (Harizanov & Gribanova 2015; Shen 2016; Belk & Neeleman 2018). The current study uses the forced choice task and the Likert scale task to experimentally probe the licensing conditions of the singular and the plural marking on the shared N in such constructions. Then I compare the results with the existing claims especially Shen (2016) and Belk & Neeleman (2018), and show that neither account predicts the full range of results. I discuss possible reasons for the discrepancy.

**Background:** NRNR involves two conjoined DPs with a shared nominal as in (1). When both of the DPs are singular, the number marking on the shared nominal, the *pivot*, varies both within and across languages. Within a language, the number marking on the pivot has been shown to be sensitive to the remnants in the sharing DPs, the *sources*. Shen (2016) observes that in a set of languages including English the pivot can only be singular when the sources agree with the pivot like the demonstratives (1) but can only be plural when the sources do not agree with the pivot like the possessor DPs (2). Adjectives in English in (3) present a special case, despite the lack of agreement on the sources, only the singular pivot is allowed. Shen (2016) uses this pattern to argue that the English adjectives covertly agree with the modified nouns in the syntax. Based on these licensing restrictions of the pivots in NRNR, Shen (2016, 2017) proposes a multi-dominance analysis for the singular pivots and a conjoined specifier analysis for the plural pivots.

(1)  a.  This and that *student* are a couple.  b.  *This and that *students* are a couple.

(2)  a.  *John's and Mary's *student* are a couple.
     b.  John's and Mary's *students* are a couple.

(3)  a.  John's tall and Mary's short *student* are a couple.
     b.  *John's tall and Mary's short *students* are a couple.

Shen's analysis makes the following three predictions: 1. the sources that show agreement with the pivot noun only license singular pivots, e.g. demonstratives, numerals, indefinite articles; 2. the sources that do not show agreement only license plural pivots, e.g. possessor DPs; 3. sources containing adjectives can license the singular pivot despite the lack of overt agreement, e.g. possessor DP+adjectives *John's tall and Mary's short student*, definite article+adjectives *the tall and the short student*.

**Experiments** The current study uses two experimental methods to probe these predictions regarding number markings on the pivot in NRNR in English. **Experiment 1** is a forced choice task. The participants were asked to choose the more natural one from two minimally different sentences. Each list contains two control items and one test item. The test item consists of two sentences involving NRNR, one with a singular pivot and the other with a plural pivot as in (1)-(3). 11 different sources were included. Predicates like *are a couple* were used to restrict the total reference of the conjoined DPs to two individuals, which entails that each of the conjoined DPs is singular. This is crucial for sources like possessor DP + adjective in (3) and definite article + adjective in (4), given that the subjects with plural pivots in (3b) and (4b) are well formed when used with predicates that are applicable to more than 2 individuals, e.g. *know each other*.

(4)  a.  The tall and the short *student* are a couple.
     b.  *The tall and the short *students* are a couple.

A total of 528 native speakers participated. Each source was done by 48 participants. The experiment was conducted on Amazon Mechanical Turk.

Representative results of Experiment 1 are shown in Table 1. Two of the three predictions from Shen 2016 are confirmed: 1. the sources that show agreement only license singular pivots as is seen in the dem.non,

dem.adj, num.adj, and ind.adj conditions; 2. the sources that do not show agreement only license plural pivots as is seen in the pos.non condition. The third prediction, however, is not confirmed. Shen's theory predicts that sources containing adjectives such as def.adj and pos.adj only license singular pivots because of the covert agreement between the adjectives and the pivot noun. As is shown in Table 1, however, pos.adj doesn't show a preference either way and dem.adj shows a significant preference towards the plural target.

| sources | example | singular (count %) | plural (count / %) | total | prediction | P-value | predicted? |
|---------|---------|---------------------|--------------------|-------|------------|---------|------------|
| dem.non | this and that N | 44 / 91.7% | 4 / 8.3% | 48 | singular | **1.514e-09** | yes |
| dem.adj | this tall and that short N | 43 / 89.6% | 5 / 10.4% | 48 | singular | **1.368e-08** | yes |
| num.adj | one tall and one short N | 44 / 91.7% | 4 / 8.3% | 48 | singular | **1.514e-09** | yes |
| ind.adj | a tall and a short N | 45 / 93.8% | 3 / 6.2% | 48 | singular | **1.313e-10** | yes |
| pos.non | John's and Mary's N | 4 / 8.3% | 44 / 91.7% | 48 | plural | **1.514e-09** | yes |
| pos.adj | J's tall and M's short N | 18 / 37.5% | 30 / 62.5% | 48 | singular | .1114 | no |
| def.adj | the tall and the short N | 11 / 22.9% | 37 / 77.1% | 48 | singular | **.0002** | no |

Table 1: Results for Experiment 1

The unexpected patterns could result from two confounds: 1. participants did not pay attention to the interpretation restricted by predicates like *are a couple*, 2. the plural marker on the verb biased the participants against the singular when the sources do not show number marking: *the tall and the short <u>student are</u>*. To avoid these confounds, **Experiment 2**, also a forced choice task, made the following modifications: an image depicting the scenario is added to each item so the intended interpretation is more salient; only verbs that do not show number agreement are used e.g. *came*. As is shown in Table 2, pos.adj now shows a significant preference toward the singular pivot as is predicted, while the patterns in ind.adj and pos.non remain the same (also predicted). This shows that the unexpected pattern in Exp. 1 was partly due to the confounds.

| sources | singular (count / % ) | plural (count / % ) | total | prediction | p-value | predicted? |
|---------|------------------------|----------------------|-------|------------|---------|------------|
| ind.adj | 45 / 97.8% | 1 / 2.2% | 46 | singular | **1.336e-12** | yes |
| pos.non | 9 / 20% | 36 / 80% | 45 | plural | **6.575e-05** | yes |
| pos.adj | 32 / 74.4% | 11 / 25.6% | 43 | singular | **.0019** | yes |
| def.adj | 22 / 53.7% | 19 / 46.3% | 41 | singular | .7552 | no |

Table 2: Results for Experiment 2

However, the results show that even with the modification the def.adj condition does not show a significant preference toward the singular pivot, contrary to the prediction. I postulate that a subset of the participants dropped the 2nd definite article which is functionally superfluous as in (5). This processing related error enabled the phrase to refer to 2 individuals (the duality reading).

(5)     the tall and **the** short *students* (# duality) → the tall and ~~**the**~~ short *students* (OK duality)

The forced choice task in Exp 1-2 reveals relative preference between two types of pivots. To test the absolute acceptability of the pivots, **Experiment 3** asks the participants to rate the sentences with singular and plural pivots on a 1-7 scale. Table 3 shows the representative results. As is predicted, only the singular pivot is acceptable under sources showing agreement e.g. ind.adj. Only the plural pivot is acceptable under sources like pos.adj which does not show agreement. Pos.adj and def.adj did not show significant differences between the singular and the plural pivot, similar to Exp. 1.

| **sources** | singular mean | plural mean | predicted? | **sources** | singular mean | plural mean | predicted? |
|-------------|---------------|-------------|------------|-------------|---------------|-------------|------------|
| **ind.adj** | 6.33 | 2.13 | yes | **pos.adj** | 4.21 | 3.79 | marginal |
| **pos.non** | 2.33 | 6.46 | yes | **def.adj** | 4.25 | 5.25 | no |

Table 3: Results for Experiment 3

**Selected References**

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