word count: 2923

Highs and Lows in English Attachment

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Abstract

Grillo & Costa (2014) claim that Relative-Clause attachment ambiguity resolution is largely determined by whether or not a Pseudo-Relative (PR) interpretation is available. PR-availability, however, covaries with the semantics of the main predicate (e.g., perceptual vs. stative). Experiment 1 assesses whether this predicate distinction alone can account for prior attachment results by testing a non-PR language, English. We found low attachment independent of predicate type, though predicate type had a minor modulatory role. Experiment 2 shows that English, traditionally classified as Low Attachment, can demonstrate High Attachment in the presence of a globally ambiguous Small-Clause/(reduced) Relative-Clause environment. These results support a grammatical account of previous effects and provide novel evidence for the parser's preference of a Small-Clause over a Restrictive interpretation, cross-linguistically.

Keywords: Sentence Processing, Parsing Universals, Attachment Preferences, Relative Clauses, Pseudo Relative Small Clauses.

1. Introduction

Since Cuetos & Mitchell's (1988) seminal work, several studies have demonstrated a cross-linguistic asymmetry in Relative Clause (RC) attachment preferences in complex NPs of the type illustrated in (1): speakers of English, Basque and Romanian (among others) show an overall Low Attachment (LA) preference, while speakers of e.g. Spanish, Dutch and Serbo-Croatian demonstrate a High Attachment (HA) preference.[1]

(1) a. John saw [$_{DP1}$ the $_{NP}$ maid$_1$ of [$_{DP2}$ the actress$_2$ [$_{CP}$ that$_2$ was$_2$ standing on the balcony]]]
b. Juan vio [$_{DP}$ la [$_{NP}$ criada$_1$ de la actriz$_2$] [$_{CP}$ que$_1$ estaba$_1$ en el balcón]]
c. Juan vio [$_{PR}$ [la criada$_1$ de la actriz$_2$] [que$_{1/*2}$ estaba$_{1/*2}$ en el balcón]]

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[1] See Fernández (2003); Grillo & Costa (2014) for discussion of this vast literature.

These cross-linguistic attachment data have generated much concern. Variation in parsing preference not rooted in grammatical differences has detrimental consequences for theories of parsing and acquisition discussed in Fodor (1998a,b).

Several accounts for these results have, thus, been proposed with each capturing some essential aspect of the phenomenon but not its entirety. These include i. assuming modification by RCs, along with other non-primary relations, are parsed using a variety of non-structural principles (Gilboy et al., 1995) (ii) differences in frequency of exposure to HA vs. LA structures (Mitchell & Cuetos, 1991); (iii) parametrization of parsing principles (Gibson et al., 1996), (iv) cross-linguistic differences in prosody (Fodor, 2002); and (v) cross-linguistic differences in the relativizing element (Hemforth et al., 1998). More recently, Hemforth et al. (2015) argued that cross-linguistic differences are more limited in scope than initially presumed and further are largely dependent on independent grammatical properties of the languages under scrutiny. Similarly, Grillo (2012) and Grillo & Costa (2014) discuss a particular grammatical variable that might help in further cleaning up the remaining variability: PR-availability.

Grillo (2012) and Grillo & Costa (2014) identified a confound in the RC attachment literature: an asymmetric availability of Pseudo-Relatives (PR) across languages and structures. The PR is string identical to a RC, making it the perfect imposter to hide this confound for so many years. Although they are surface identical, PRs and RCs differ from each other structurally and interpretively. RCs (2-a) modify Noun-Phrases (NPs) and denote properties of entities, while PRs (2-b) are either complements or adjuncts of Verb-Phrases (VPs) and denote events, much like English eventive Small-Clauses (SC) in (2-c).

(2) a. Ho visto [$_{DP}$ il [$_{NP}$ ragazzo [$_{CP}$ che correva.]]]
Have.I seen the boy that run.IMPF.
'I saw the boy that ran.' RC-parse

b. Ho visto [$_{PR}$ [il ragazzo] [che correva.]]
Have.I seen the boy that ran.
'I saw the boy running.' PR-parse

c. I saw [$_{SC}$ the boy running].

Grillo & Costa observe a tight correspondence between PR-availability and attachment preference where HA is observed when PRs are available and LA when only RCs are available.

Further, they propose that, all else being equal, PRs are preferred by the parser over RCs for their simpler structure and interpretive properties. This proposal, dubbed the *PR-first Hypothesis* is supported by the reanalysis of previous findings and by novel results from languages that allow PRs (see below).

The current study is the first to test this account in a non PR-language, English, across two experiments, in order to: (1) address an alternative account based on the pragmatics of the predicates that allow PRs, and upon failing to support such a pragmatic account we then (2) test the generalizability and cross-linguistic nature of the grammatical claims made by PR-first in turning English, typically a LA language, into a HA language through SC-availability (grammatically similar to PRs). First we will elaborate on the relation between PRs and RCs to appreciate the PR-first account and an inherent confound that the current account faces.

1.1. PRs vs. RCs and a confound in PR-first

PRs report the direct perception of an event (*a girl running* while the RC reading denotes the perception of an individual (*the unique girl that ran*). For this reason, PRs need licensing

via predicates that can take events as their complements, e.g. (semi)perceptual predicates, both verbal (see, hear, record) and nominal: (image of, picture of). Stative/relational predicates (live with, be married to), and entity-denoting nominal (house/car of) ones, can only select for entities/NPs, and thus do not license PRs or eventive SCs, but are perfectly acceptable with NPs modified by an RC.[2]

When the RC-reading is forced using an animate pronoun to refer to the complement of (3-a) (*chi/who*), the sentence is naturally ambiguous and attachment to both NPs is allowed. Importantly, however, when the PR-reading is forced using an inanimate pronoun (*ciò/what*) to refer to the embedded event (3-b), High Attachment is obligatory, as the ungrammaticality of '*by himself*' well illustrates.

(3) a. Chi ho visto è la figlia del postino che corre da solo. RC/*PR
'Who I saw is the daughter of the postman that runs by himself/herself.'

b. Ciò$_i$ che ho visto è [la figlia del postino che correva da sola/*da solo] .$_i$ PR/*RC
'What I saw is the daughter of the postman running by herself/*by himself.'

On these bases, Grillo (2012) and Grillo & Costa (2014) proposed that LA is observed with RC-only readings and HA is observed in languages and structures that allow for a PR reading.[3].

Support for this generalization comes from both reanalysis of previous results from the RC-attachment literature, which shows an almost perfect correspondence between PR-availability and these expected attachment preferences, and from novel experiments which directly manipulate PR-availability in a number of PR-languages including Italian (Grillo & Costa, 2014), French (Grillo et al., 2014), Greek (Grillo & Spathas, 2014) and European Portuguese (Fernandes, 2012; Grillo et al., 2012; Tomaz et al., 2014; Grillo et al., 2013).

Furthermore, to explain this generalization, Grillo and Costa propose the *PR-first Hypothesis*: *everything else being equal, PRs are preferred by the parser because they are both structurally and interpretively simpler than RCs*. Structurally, PRs (being SCs) have an impoverished internal structure when compared to RCs: Tense, e.g., is anaphoric in PRs but deictic in RCs. Interpretively, PRs provide information relevant to the matrix event (i.e. what is perceived), and are thus preferred following *Relativized Relevance* (Frazier, 1990; Traxler & Frazier, 2008). Moreover, PRs carry fewer unsupported presuppositions than RCs, as they do not require a contrast set (Crain & Steedman, 1985; Altmann & Steedman, 1988).

PR-first, however, suffers from a confound in its own right: the effects could be due to the predicate semantics which completely covaries with PR-availability. That is event-taking predicates are required for the ambiguous RC/PR parse, but entity-taking predicates are used to force the RC-only parse. PR-predicates may simply favour HA for reasons of plausibility. Consider the extreme case of the PR-verb '*interrupt*' in "*John interrupted the maid of the actress that was talking*, which has a clear HA bias (the person interrupted was reasonably also the person who was talking). To control for this, a proper test of *PR-first* requires testing a language that does *not* allow PRs (e.g. English) with the same predicate contrast. A semantic/pragmatic account would predict the manipulation to produce the same attachment distinctions in English as has been observed in PR-languages: HA with perceptual predicates, LA with stative predicates.

[2] Cinque (1992) discusses restrictions that apply to PRs but not RCs, including: i. PRs are only allowed with embedded subjects; ii. have to match the Tense specification of the matrix; iii. must denote an ongoing event or a stage level predicate.

[3] Provided that other factors (e.g. prosody, referentiality, referential properties of C) are controlled for (Altmann et al., 1998)

PR-first would predict a qualitatively different effect, namely the endurance of a LA preference across manipulation in non-PR languages. This was tested in Experiment 1.

2. Experiment 1: Testing verb-type effects in English

30 monolingual British English speakers participated in a timed questionnaire using Linger (http://tedlab. mit.edu/dr/Linger). All participants gave their informed consent before taking part in the experiment. The materials and methods were adapted from Grillo & Costa (2014) and are listed in the Appendix.

Materials and Design : 24 sets of target sentences (4) were constructed, in a 2(*PredicateType*: SC-compatible vs. RC-only)*2(*Environment*: Verbal vs. Nominal) design with 48 unrelated fillers. The complex NP+RC was kept identical across conditions. Contrasting Verbal and Nominal predicates, replicates design features of previous studies by Fernandes (2012) and Grillo et al. (2012), and allows for a better evaluation of SC-availability across syntactic positions.

(4) **Stimuli**

a. SC PREDICATE, VERBAL
Mark observed the friend of the politician that was cooking.

b. SC PREDICATE, NOMINAL
The scene of the friend of the politician that was cooking is long.

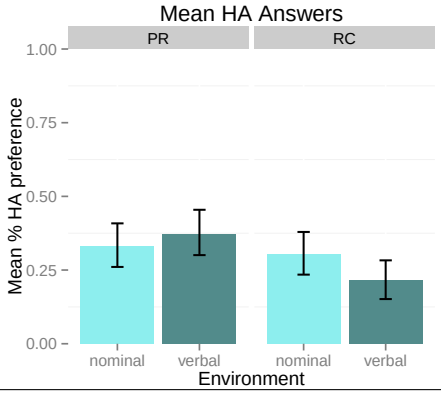
c. RC-ONLY PREDICATE, VERBAL
Mark is engaged to the friend of politician that was cooking.

d. RC-ONLY PREDICATE, NOMINAL
The boat of the friend of the politician that was cooking is long.

2.0.1. Analysis

Attachment A mixed effects model was computed on the attachment preferences, with Predicate Type and Environment as fixed factors and Subject and Item as random factors, random slopes were fit for fixed effects and their interactions. The data showed a highly significant effect of predicate-type (p<.001), with more HA preferences for event-taking than entity-taking predicates. There was no effect of environment (p=.6) and no interaction (p=.2).

PR NP	PR VP	RC NP	RC VP
32.5	37.2	28.4	19.5

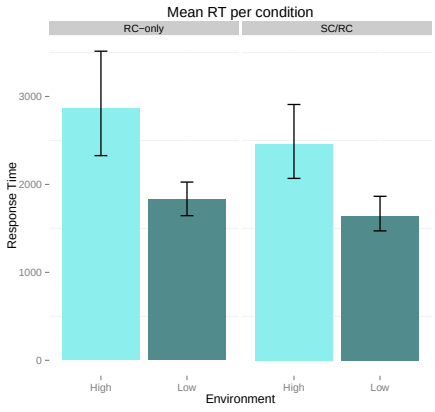


contrast	coefficient	SE	z-value	p
Predicate Type	0.7387	0.2183	3.384	0.000714 ***

Response Times (RTs) Analysis of RTs revealed a significant effect of Attachment: RTs were significantly shorter for LA choices than HA choices across all conditions (t=-3.49). No other effects or interactions were significant.

Table 1: Mean RT per Condition

PR	RC
3508.281	4041.976



contrast	Estimate	SE	t-value
PR vs. RC	0.092282	0.026429	-3.49

Discussion Crucially, despite the boost in HA with the event-taking predicates, overall LA was still observed, as predicted by *PR-first* and in contrast to what observed in Italian and other PR-languages. The strong LA preference with the entity-taking predicates (82%), on the other hand, matches results in Italian (76%) with the same predicates (Grillo & Costa, 2014).

The stronger HA-preference with event-taking predicates might be due to both plausibility effects discussed above and the local availability of a SC-analysis. Up until '*that*', (4-a) is perfectly compatible with an SC continuation (5-a) and thus locally ambiguous between an SC and

an NP-complement analysis. Hence, the parser might temporary treat NP1 as a potential subject of a clausal complement, with the results of giving it a structural prominence that might affect attachment even in languages lacking PRs, such as English.[4] This would explain the relatively strong percentage of HA preferences (≈ 35%, similar to previous results from the literature) with eventive-taking predicates.

(5) a. Mark observed the friend of the politician cooking.
b. Mark is engaged to the friend of politician cooking.

(5-a), on the other hand, is *globally ambiguous* between a reduced-RC-reading and an SC-reading of '*cooking*. Following the rationale of *PR-first*, we would expect that the effect of global ambiguity in (5-a) to have more enduring effects than that of local ambiguity in (4-a): a clear preference for HA should be observed with (5-a), while an overall LA preference should still be observed with (4-a), as the local ambiguity is resolved. This ambiguity is completely absent with entity taking predicates in (4-b)/(5-b), which only allow a (reduced)-RC-reading of the embedded clause, leading us to predict no difference between them, i.e. a strong LA preference.

To test this, Experiment 2 modified the stimuli from Experiment 1 to be reduced RCs.

2.1. Experiment 2: Testing SC-availability in English

This experiment further verifies the validity of *PR-first* in English, by comparing attachment in globally ambiguous SC/Reduced-RC sentences (i.e., event-taking predicates) with unambiguous Reduced-RCs-only sentences (entity-taking predicates).

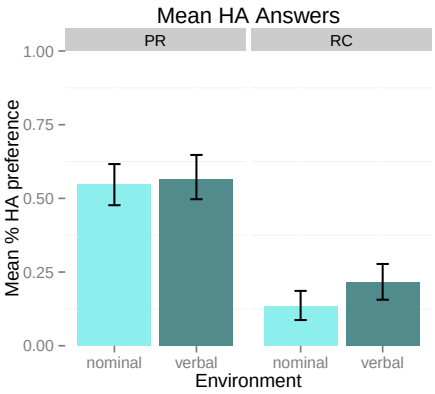
Materials and Design 30 native British-English speakers were tested with stimuli from Experiment 1 with the following change: we removed the complementizer and auxiliary of the relative clause to generate Reduced-RCs or SCs (depending on the predicate present). With event-taking predicates the relevant string (*the x singing*) was globally ambiguous between an SC and a Reduced-RC-parse but only allowed a Reduced-RC reading under entity-taking predicates. We acknowledge that Reduced-RCs might not be the easiest structure to parse, but this cost should be independent of attachment. Contrary to Experiment 1, *PR-first* predicts overall HA with event-taking predicates, but LA with entity-taking predicates. This would be the first evidence that English is a HA language when the grammar is appropriately manipulated.

2.2. Results and Analysis:

Attachment: Same analysis as in Experiment 1 was used. As predicted, we observed a HA preference in SC-compatible contexts (i.e. above 50%), and a strong LA preference in RC-only contexts.

PR NP	PR VP	RC NP	RC VP
56.1	55.5	13.8	21.1

[4]The number of clausal complements allowed in these environments is rather high, particularly in English (Moulton, 2009): i. *John saw Fred cook*; ii. *John saw Fred cooking*; iii. *John saw Fred having children*; iv. *John saw Fred to be a good cook*; v. *John saw that Fred cooked*.



A strongly significant effect of predicate-type (p<.0001) was observed, with greater HA preference for event-taking than entity-taking predicates. There was no significant effect of environment (p=.5) and no interaction between the two factors (p=.3).

contrast	coefficient	SE	z-value	Pr(>| z |)
Predicate Type	2.3894	0.3238	7.380	1.58e-13 ***

Response Time Same Analysis as Experiment 1. The Analysis revealed a significant effect of predicate-type (t=-4.57), a significant effect of attachment (t=-3.72), with shorter RTs for LA than for HA, and a significant interaction between predicate-type and attachment (t=4.51). Analysis of the interaction was due to the effect of attachment (which parallels that of the first experiment) being restricted to unambiguous RCs. There was no significant difference in RTs between HA and LA with SC-compatible predicates.

Table 2: Mean RT per Condition

PR	RC
3508.281	4041.976

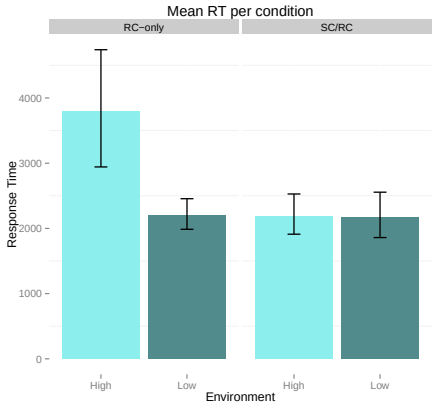


Table 3: Results of linear mixed model fit for RTs. Items and participants were crossed random factors.

contrast	Estimate	SE	t-value
Predicate Type	-0.09584	0.02097	-4.57
Attachment	-0.07816	0.02100	-3.72
Predicate Type*Attachment	0.18952	0.04201	4.51

2.3. Comparing Experiment 1 and 2

In order to provide a statistical test of the greater effect of grammar over predicate semantics, we ran a mixed model logistic regression adding *Experiment* to *Predicate-type* and *Environment* as fixed factors, with random slopes and intercepts fit for the fixed effects.

Attachment Besides a main effect of Predicate Type (p<.001), the analysis indicated both a significant 2way Predicate Type*Experiment interaction (p<.001) and a 3way Predicate-type*Environment*Experiment interaction (p<.05). The 2way interaction is due to a higher proportion of HA in the PR-compatible condition in Experiment 2 than 1. The 3way interaction is due to a significantly higher proportion of HA in the nominal environment in Experiment 1 than 2 in the RC-only condition. This effect might be attributed to the relative length of the RC in the two experiments (longer RCs in Experiment 1 than 2), i.e. as an effect of implicit prosody. It has been demonstrated that longer RCs display a stronger tendency for HA than shorter RCs (Fodor, 2002; Hemforth et al., 2015, among others). Notice, however, that the effect goes in the opposite direction with SC-compatible, event taking predicates. We take this as evidence that *both* Prosody and PR/SC-availability are grammatical factors involved in the resolution of attachment ambiguities.

contrast	coefficient	SE	z-value	Pr(>| z |)
Predicate Type	1.50065	0.18544	8.092	5.85e-16 ***
Predicate Type*Experiment	-1.55802	0.36040	-4.323	1.54e-05 ***
Predicate Type*Environment*Experiment	1.25753	0.56927	2.209	0.0272 *

RT comparison Analysis of the 3way interaction revealed a significant effect of attachment for the RC-only condition across experiments (t=2.22). In other words, the advantage for LA preference is limited to RC-only environments. This is consistent with the proposal that a preference for Local attachment emerges universally once SC availability is controlled for.

contrast	coefficient	SE	t
Predicate Type*Attachment*Experiment	0.14135	0.06378	2.22

3. Discussion

The attachment preference and RT results presented across both Experiment 1 and 2 strongly support the *PR-first Hypothesis*. We showed that, while predicate semantics appears to play a role in attachment, the effect is largely grammatically based, as shown by the greater HA in Experiment 2 than 1 with event-taking predicates when the grammar allows for a SC-analysis. Further, this is supported by the magnitude of the effect of verb-type in Italian (54% more HA with event-taking predicates) vs. English (10.9%). Crucially, manipulating SC-availability leads to a change in overall attachment preferences in English, from LA to HA when available. In Experiment 1 (local ambiguity) this effect is limited and does not derive overall HA, while in Experiment 2 (global ambiguity) the effect is much stronger and leads to overall HA preference. This is the first time that a HA preference was observed in English, a language traditionally

classified as LA. The results advocate a crucial role for syntactic structure above and beyond the semantic plausibility of HA with SC verbs. The RC-only condition further illustrates the strength of locality principles in attachment when SC-availability is controlled for. A strong LA preference (80%, which corresponds to the Italian results in the same environment) emerges in globally unambiguous RC-only contexts in both Experiment 1 and 2. Lastly, SC-availability derived the same attachment effects across both nominal and verbal environments, which further shows the primacy of this factor in determining attachment preferences.

Results from Experiment 2 require that PR-first be framed in more general terms of eventive clauses rather than specific constructions, such as a PR. Likewise, there are no longer HA and LA languages, but grammatical environments that favour HA or LA. Similarly, there are no distinctions in parsing across languages.

In summary, we set out to test predictions of the PR-first Hypothesis in a non-PR language, English. We tested full and reduced RCs, manipulating SC-availability via predicate properties generating globally and locally ambiguous contexts. Our results show that attachment preferences are not language dependent, but rely heavily on (universal) grammatical factors, such as the availability of eventive clausal readings (among other universal factors such as prosody and referentiality).

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Appendix A. Experimental Items

List of stimuli for Experiment 1 and 2, material in parentheses (*that was*) was omitted in Experiment II. Mean % of HA is indicated for each item.

Sentences	*Experiment 1/2*
1. a. Jim saw the son of the doctor (that was) having dinner.	55.5/75
b. The picture of the son of the doctor (that was) having dinner is old.	16.6/71.4
c. Jim shares the house with the son of the doctor (that was) having dinner.	16.6/12.5
d. The car of the son of the doctor (that was) having dinner is old.	28.5/14.2
2. a. Kelly heard the grandma of the girl (that was) screaming.	14.2/71.4
b. the sound of the grandma of the girl (that was) screaming is annoying.	22.2/50
c. Kelly works with the grandma of the girl (that was) screaming.	16.6/0
d. The comb of the grandma of the girl (that was) screaming is black.	0/12.5
3. a. John heard the teacher of the boy (that was) singing.	16.6/75
b. The film of the teacher of the boy (that was) singing is of low quality.	28.5/14.2
c. John runs with the teacher of the boy (that was) singing.	0/25
d. The jacket of the teacher of the boy (that was) singing is red.	0/0
4. a. The writer watched the aunt of the girl (that was) jumping.	16.6/71.4
b. The drawing of the aunt of the girl (that was) jumping is pretty.	16.6/12.5
c. The writer is married to the aunt of the girl (that was) jumping.	0/28.5
d. The house of the aunt of the girl (that was) jumping is pretty.	11.1/0
5. a. Mary listened to the daughter of the policeman (that was) talking.	55.5/50
b. The recording of the daughter of the policeman (that was) talking is funny.	33.3/57.1
c. Mary is employed by the daughter of policeman (that was) talking.	0/12.5
d. The dog of the daughter of the policeman (that was) talking is funny.	42.8/0
6. a. Mark observed the friend of the politician (that was) cooking.	42.8/28.5
b. The scene of the friend of the politician (that was) cooking is long.	33.3/62.5
c. Mark is engaged to the friend of politician (that was) cooking.	16.6/14.2
d. The boat of the friend of the politician (that was) cooking is long.	16.6/0
7. a. Jane caught the maid of the actress (that was) stealing.	50/87.5
b. The sight of the maid of the actress (that was) stealing is horrible.	42.8/100
c. Jane trains with the maid of the actress (that was) stealing.	11.1/25
d. The scarf of the maid of the actress (that was) stealing is horrible.	33.3/14.2
8. a. The lawyer caught the chauffeur of the neighbour (that was) swimming.	16.6/71.4
b. The video of the chauffeur of the neighbour (that was) swimming is boring.	0/62.5
c. The lawyer exercises with the chauffeur of neighbour (that was) swimming.	14.2/28.5
d. The dog of the chauffeur of the neighbour (that was) swimming is smelly.	66.6/12.5
9. a. David observed the son of the maid (that was) exercising.	44.4/62.5
b. The footage of the son of the maid (that was) exercising is missing.	33.3/71.4
c. Mary is divorced from the son of the maid (that was) exercising.	16.6/12.5
d. The wallet of the son of the maid (that was) exercising is missing.	57.1/14.2
10. a. Alan observed the nephew of the nurse (that was) eating.	28.5/42.8
b. The image of the nephew of the nurse that eating is amusing.	77.7/75
c. Alan relates to the nephew of the nurse that eating.	33.3/14.2
d. The life of the nephew of the nurse (that was) eating is amusing.	16.6/25

11. a. Peter photographed the co-worker of the butcher (that was) running. 33.3/25
    b. The sound of the co-worker of the butcher (that was) running is disturbing. 57.1/85.7
    c. Peter trains with the co-worker of the butcher (that was) running. 44.4/0
    d. The moustache of the co-worker of the butcher (that was) running is disturbing. 50/14.2

12. a. Kate looked at the friend of the judge (that was) driving. 50/57.1
    b. The recollection of the friend of the judge (that was) driving is fuzzy. 33.3/25
    c. Kate is engaged to the friend of the judge (that was) driving. 14.2/14.2
    d. The hair of the friend of the judge (that was) driving is fuzzy. 44.4/25

13. a. Lily imagined the friend of the flower girl (that was) working. 22.2/62.5
    b. The noise of the friend of the flower girl (that was) working is unbearable. 16.6/71.4
    c. Lily parties with the friend of the flower girl (that was) working. 0/12.5
    d. The toothache of the friend of the flower girl (that was) working is unbearable. 14.2/28.5

14. a. Rachel dreamt of the friend of the brother (that was) drinking. 14.2/14.2
    b. The scene of the friend of the brother (that was) drinking is sad. 55.5/37.5
    c. Rachel is married to the friend of the brother (that was) drinking. 16.6/14.2
    d. The office of the friend of the brother (that was) drinking messy. 16.6/12.5

15. a. David drew the grandson of the woman (that was) smoking. 0/12.5
    b. The depiction of the grandson of the woman (that was) smoking is ugly. 14.2/42.8
    c. David is employed by the grandson of woman (that was) smoking. 11.1/0
    d. The watch of the grandson of the woman (that was) smoking is ugly. 16.6/0

16. a. Phillip filmed the agent of the player (that was) snoring. 66.6/71.4
    b. The sound of the agent of the player (that was) snoring is terrible. 66.6/50
    c. Phillip hangs out with the agent of the player (that was) snoring. 42.8/42.8
    d. The t-shirt of the agent of the player (that was) snoring is terrible. 33.3/12.5

17. a. The fireman recorded the cousin of the lawyer (that was) whistling. 55.5/75
    b. The portrayal of the cousin of the lawyer (that was) whistling is lovely. 50/57.1
    c. The fireman is employed by the cousin of the lawyer (that was) whistling. 33.3/87.5
    d. The smile of the cousin of the lawyer (that was) whistling is lovely. 14.2/28.5

18. a. Bob glanced at the friend of the shoemaker (that was) dancing. 42.8/28.5
    b. The energy of the friend of the shoemaker (that was) dancing is amazing. 44.4/37.5
    c. Bob is engaged to the friend of the shoemaker (that was) dancing. 50/14.2
    d. The pool of the friend of the shoemaker (that was) dancing is amazing. 0/12.5

19. a. Sally photographed the stepson of the nurse (that was) studying. 33.3/62.5
    b. The idea of the stepson of the nurse (that was) studying is surprising. 28.5/71.4
    c. Sally collaborates with the stepson of the nurse (that was) studying. 55.5/12.5
    d. The advice of the stepson of the nurse (that was) studying is surprising. 50/14.2

20. a. The singer watched the brother of the CEO (that was) bleeding. 50/85.7
    b. The memory of the brother of the CEO (that was) bleeding is uncomfortable. 16.6/37.5
    c. The singer studies with the brother of the CEO (that was) bleeding. 42.8/14.2
    d. The couch of the brother of the CEO (that was) bleeding is uncomfortable. 44.4/25

21. a. The policeman filmed the friend of the sister (that was) sewing. 55.5/50
    b. The vision of the friend of the sister (that was) sewing is boring. 33.3/57.1
    c. The policeman is married to the friend of the sister (that was) sewing. 0/25
    d. The work of the friend of the sister (that was) sewing is boring. 42.8/14.2

22. a. The architect imagined the sister of the colleague (that was) dancing. 28.5/42.8
    b. The sight of the sister of the colleague (that was) dancing is extraordinary. 66.6/75
    c. The architect is divorced from the sister of the colleague (that was) dancing. 16.6/28.5
    d. The mansion of the sister of the colleague (that was) dancing is extraordinary. 0/25

23. a. David saw the teacher of the friend (that was) driving. 0/50
    b. The film of the teacher of the friend (that was) driving is disturbing. 14.2/42.8
    c. David parties with the teacher of the friend (that was) driving. 33.3/37.5
    d. The book of the teacher of the friend (that was) driving is disturbing. 16.6/28.5

24. a. The neighbour listened to the son of the doorman (that was) singing. 33.3/71.4
    b. The video of the son of the doorman (that was) singing is awful. 33.3/75
    c. The neighbour attends university with the son of the doorman (that was) singing. 28.5/28.5
    d. The car of the son of the doorman (that was) singing is ugly. 44.4/0