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Conjunction/Disjunction-Negation Scope Interaction under VP Ellipsis/Substitution and Stripping*

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ABSTRACT

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This paper investigates scope interaction between negative elements and syndetic coordination in both anaphoric and non-anaphoric contexts. Specifically, we will go over how negation and coordinated constituents interact and yield relevant interpretation in anaphoric contexts such as VP ellipsis, substitution and Stripping, and non-anaphoric contexts. Based on the readings obtained in a variety of contexts, we reach the following three generalizations. [1] When a coordinated phrase is included in VP ellipsis or substitution, negation in this VP ellipsis/substitution preferentially yields a 'neither' reading. [2] Negation in Stripping contexts directly denies the meaning of the coordinators. [3] VPs in negative anaphoric contexts preserve the identical parallel scope when the preceding clausal negation preferentially produces a 'not both' reading in combination with conjunction; the preceding and the following negative clauses unmarkedly give rise to a 'neither' reading in the presence of disjunction. These generalizations suggest that De Morgan's laws do not account for natural languages as they do work for propositional logic (cf. Gribanova 2013, Krivochen 2019).

1. Introduction

Zamparelli (2019: 164) notes that as in (1), conjunction 'and' (more exactly speaking, a conjoined element composed of two conjuncts) in English can take either scope with respect to (clause-external) negation (in some languages like Japanese and Hungarian, wide scope of a coordinate conjunction over negation is obligatory; see Szabolcsi and Haddican (2004)).

(1) Here you are not allowed to [sing] and [stamp your feet].

    a. . . . but you are allowed to do one without the other. $\neg > \wedge$

    b. ≡ you are not allowed to sing and you are not allowed to stump your feet. $\wedge > \neg$

Likewise, disjunction can also participate in scope interactions (Larson 1985, Rooth and Partee 1982 among others). (2) illustrates the two scopes with negation:

(2) Mary didn't take algebra or logic.

    a. ≡ she took neither algebra nor logic. $\neg > \vee$

    b. ≡ she didn't take algebra, or she didn't take logic. $\vee > \neg$

Note that the wide scope of conjunction 'and' or disjunction 'or' cannot be obtained simply by raising 'and' or 'or' to the left periphery of the sentence: it is assumed that the two conjuncts (i.e., a conjoined/disjoined element combined together by 'and' or 'or') are optionally raised to the scope-taking position.

Given this background, this paper investigates scope interactions of conjunction or disjunction with negation in contexts of VP ellipsis/substitution and Stripping. In this investigation, the first antecedent sentence/clause is combined with the second sentence/clause involving VP ellipsis/substitution and Stripping either by the copulative/additive conjunction 'and' or the adversative conjunction 'but'. Thus, the focus of the investigation will be to examine and explicate how such factors as both VP ellipsis/substitution or Stripping, and copulative/additive or adversative conjunctions come into play to give rise to different patterns of scope interaction between conjunction/disjunction and negation. Section 2 examines scope interaction(s) of conjunction with negation in sentences involving intra/extraclausal negation, imperative negation, and a denial. Section 3 examines and investigates the corresponding scope interaction in contexts of VP ellipsis/substitution or Stripping where a conjoined element is part of elided/replaced VP or stripped part. Section 4 and 5 each examines and investigates the scope interaction(s) between disjunction and negation in non-anaphoric contexts and anaphoric contexts such as ellipsis/substitution/Stripping. Section 6 wraps up with a conclusion.

2. Scope Interaction between Conjunction and Negation in Non-anaphoric Contexts

For the interaction between conjunction/disjunction and negation, de Morgan's law is relevant:

(3) a. ¬ (p ∧ q) = ¬ p ∨ ¬ q

   b. ¬ (p ∨ q) = ¬ p ∧ ¬ q

What the two parts of de Morgan's law in (3a) and (3b) prescribe is that "not (p and q)" yields the reading of "not p or not q", while "not (p or q)" yields the reading of "not p and not q". Let's call the first one the 'not both' reading, and the latter the 'neither' reading.

The first part of de Morgan's law in (3a) dictates that "not (p and q)" yields the reading of "not p or not q", but not "not p and not q", namely, the 'neither' reading. If English conforms to this law, (4) should have the interpretation of (5a), but not of (5b).

(4) John didn't put the dishes in the cupboard and the towels in the closet.

(5) a. John didn't put the dishes in the cupboard or did not put the towels in the closet.
   b. John didn't put the dishes in the cupboard and did not put the towels in the closet.

According to Szabolcsi and Haddican (2004), an out-of-the-blue utterance of the sentence of the type in (4) is readily interpreted as (5a), but it is difficult to interpret as (5b). This suggests that English conforms to the first part of de Morgan's law. Note that Szabolcsi and Haddican (ibid.) emphasize the availability of the 'not both' reading to (4) uttered in an out-of-the-blue context and without any emphatic stress, though some contexts and stress patterns interfere with scope interpretations of conjunction with negation.

We can test the available reading(s) of the interaction between conjunction and negation using the following sentence uttered immediately after sentences such as (5).[1]

(6) a. John didn't put the utensils in the drawer, either.
   b. John only put the dishes in the cupboard.

If (6a) can follow (4), the 'neither' reading obtains. On the other hand, if (6b) follows it, the 'not both' reading obtains. Thus, when (4) is uttered without any previous discourse and with neutral intonation, it is felicitously followed not by (6b), but by (6a).

In addition to intraclausal negation in (4), we also examine the scope interaction of conjunction with extraclausal negation in (7a-b), imperative negation in (8), and denial in (9) (cf. Muromatsu 2007).

(7) a. I do not think John put the dishes in the cupboard and the towels in the closet.
   b. It is not the case that John put the dishes in the cupboard and the towels in the closet.
(8) Don't put the dishes in the cupboard and the towels in the closet.
(9) A: John put the dishes in the cupboard and the towels in the closet!
   B: Wrong! John DIDn't put the dishes in the cupboard and the towels in the closet.

In (7a-b) with the interaction between conjunction and extraclausal negation, the strongly favored reading is the

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[1] In collecting available readings of the sentences tested for this paper, we were helped by the two native speakers who are linguists and teaching at college-level in Korea; Professor Yoongoo Philip Jung at Seoul National University of Education and Professor Michael Barrie at Sogang University.

'not both' interpretation. Thus, uttered without any previous discourse and with neutral intonation, the sentences in (7a) and (7b) can be followed by those in (10a) and (10b), respectively.

(10) a. I think (that) John only put the dishes in the cupboard.
     b. It is the case that John only put the dishes in the cupboard.

Likewise, in (8) with the interaction between conjunction and negation in imperatives, the strongly preferred reading is the 'not both' interpretation. This can also be verified by the fact that (8) can be followed by (11):

(11) Only put the dishes in the cupboard.

In addition, (9) illustrates the interaction of conjunction with a denial (i.e., "Wrong!" in (9B)), which Szabolcsi (2004) takes to be a special case of negation. In (9B), the response 'Wrong' is construed as 'the other speaker's statement made in (9A) is incorrect.' The readings available to (9B) are both a 'not both' and a 'neither' reading.[2]

3. Conjunction−Negation Scope Interaction in Anaphoric Contexts

We now examine the scope interaction between conjunction and negation in contexts of VP ellipsis/substitution and Stripping. In (12), the conjoined element and the main verb are deleted as part of VP ellipsis in the adversative conjunction 'but' after the positive statement made in the first conjunct clause. The reading available in both (12a) with intraclausal negation and (12b) with extraclausal negation is a 'neither' interpretation.[3]

(12) a. John put the dishes in the cupboard and the towels in the closet, but Mary didn't.
     b. I think John put the dishes in the cupboard and the towels in the closet, but I don't think that Bill did [$_{VP}$ e].[4]

In the case of Stripping, which we assume to involve vP coordination (Johnson 1996, 2003), (13a) with intraclausal negation has a 'neither' interpretation. On the other hand, (13b) with extraclausal negation has a 'not both' interpretation as well as a 'neither' interpretation.

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[2] (9B) as an answer to (9A) is paraphrased as follows: "That is incorrect. John didn't do both. He put either the dishes in the cupboard or the towels in the closet, or neither." Thus, a denial is taken to be an instance of corrective/contrastive negation, whose notion we will return to below.

[3] One of the anonymous reviewers for this journal asks whether the generalization made on negation-conjunction/disjunction scope interaction in VP ellipsis also holds in Pseudogapping apparently similar to it, as in (i):

(i) John cooked [spaghetti and pizza], but he didn't [risotto and ravioli].

This issue is outside of the scope of this paper and left for future investigation.

[4] (12a) and (12b) are interpretation-wise paraphrased as follows: (12a) = John did both, but Mary did neither; (12b) = I think John did both, but I think Bill did neither.

(13) a. John put the dishes in the cupboard and the towels in the closet, but not Mary [e].

b. Father thinks John put the dishes in the cupboard and the towels in the closet, but not Mother [e].[5]

Unlike (12) and (13) with the adversative conjunction 'but', (14) has copulative/additive conjunction 'and'. Involving VP ellipsis in the second negative sentence in relation to the first negative sentence, (14a) with intraclausal negation and (14b) with extraclausal negation both preferentially have a 'not both' reading.

(14) a. John didn't put the dishes in the cupboard and the towels in the closet. And Mary didn't [$_{VP}$ e], either.

b. Father doesn't think John put the dishes in the cupboard and the towels in the closet. And Mother doesn't [$_{VP}$ e], either.[6]

Likewise, involving Stripping in the second sentence, (15a) with intraclausal negation and (15b) with extraclausal negation both preferentially have a 'not both' reading. As the first negative sentence favors a 'not both' reading, so does the second one have the parallel reading.

(15) a. John didn't put the dishes in the cupboard and the towels in the closet. ?And (probably) not Mary, either.

b. Father doesn't think John put the dishes in the cupboard and the towels in the closet. ?And (probably) not Mother, either.

It is to be noted, in addition, that deep VP anaphora like 'do it' (Hankamer and Sag 1976) exhibits the same pattern of conjunction-negation scope interactions as VP ellipsis. Corresponding to (12a-b), the first clauses in (16a-b) have a positive statement made in the first conjunct clause, and the second ones after the adversative conjunction 'but' make a negative statement and involve 'do it' substitution for the VP. They only allow a 'neither' reading.

(16) a. John put the dishes in the cupboard and the towels in the closet, but Mary didn't do it.

b. I think John put the dishes in the cupboard and the towels in the closet, but I don't think that Bill did it.[7]

Corresponding to (14a-b) that have VP ellipsis, (17a-b) have 'do it' or 'so' anaphora in the second sentence in relation to the first sentence; the first and the second conjunct sentences are negative. In a parallel fashion as those in (13a-b), the second sentences in (17a-b) preferentially allow a 'not both' reading.

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[5] (13a) and (13b) are interpretation-wise paraphrased as follows: (13a) = John did both, but Mary did neither; (13b) = Father think John did both, but Mother does not think John did both. [= Mother thinks John did [neither] or John did [one of the two but not both]].

[6] (14a) and (14b) are interpretation-wise paraphrased as follows: (14a) = John did [one of the two but not both], and Mary also did [one of the two but not both]; (14b) = Father doesn't think John did both [= Father thinks John did [one of the two but not both], and Mother also thinks alike [the same as Father]].

[7] (16a) and (16b) are interpretation-wise paraphrased as follows: (16a) = John did both, but Mary did neither; (16b) = I think John did both, but I think Bill did neither.

(17) a. John didn't put the dishes in the cupboard and the towels in the closet. And Mary didn't do it, either.

b. Father doesn't think John put the dishes in the cupboard and the towels in the closet. And Mother doesn't think so, either.[8]

We now turn to examine conjunction-negation interaction under VP ellipsis and Stripping in dialogue contexts in the mode of Gribanova's (2013) and Landau's (2021) study of Russian. In (18) and (20), the first question is answered by the positive answer particle 'yes', which is in turn followed by the adversative conjunction 'but' and the clause involving VP ellipsis or Stripping. In (18A), the clause involving VP ellipsis preferentially allows a 'neither' interpretation. Note that in contrast to this clause involving VP ellipsis, the corresponding non-ellipsis clause in (19A) allows a 'not both' reading.

(18) Q: Did John put the dishes in the cupboard and the towels in the closet?
    A: Yes, but Mary didn't.[9]

(19) Q: Did John put the dishes in the cupboard and the towels in the closet?
    A: Yes, but Mary didn't put the dishes in the cupboard and the towels in the closet.

By contrast, unlike the VP ellipsis-containing clause in (18A), the clause involving Stripping in (20A) is ambiguously interpreted, allowing both a 'neither' and a 'not both' interpretation:

(20) Q: Did John put the dishes in the cupboard and the towels in the closet?
    A: Yes, but not Mary.[10]

We turn to (21A) and (22A), which have the negative answer particle 'no', followed by the copulative/additive conjunction 'and' and the clause involving VP ellipsis or Stripping. In these cases, the scope parallelism is at work. Since the clause after 'no' preferentially allows a 'neither' reading, the negative answer particle has the parallel reading.

(21) Q: Did John put the dishes in the cupboard and the towels in the closet?
    A: No, and Mary didn't, either.[11]

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[8] (17a) and (17b) are interpretation-wise paraphrased as follows: (17a) = John did [one of the two but not both], and Mary did [one of the two but not both]. [=Mary didn't do exactly what John didn't do. In other words, the reading should be consistent]; (17b) = Father doesn't think that John did both; [= Father thinks John did [one of the two but not both], and Mother also thinks alike [the same as Father].

[9] (18A) is interpretation-wise paraphrased as follows: (18A) = Yes, John did both, but Mary did neither. (Focus on "and" in the question might yield "And maybe Mary did just one of the two.)

[10] (20A) is interpretation-wise paraphrased as follows: (20A) = Yes, John did both, but Mary did neither or just one of the two.

[11] (21A) is interpretation-wise paraphrased as follows: (21A) = John did neither or maybe one of them (the latter with focus on "and" in the question). However, with "didn't either" in the second conjunct, "Mary did neither" reading is forced. Therefore, (21A) = No, John did neither, and Mary did neither.

(22) Q: Did John the dishes in the cupboard and the towels in the closet?
     A: No. ?/?²Not Mary, either.[12]

An array of interpretations involving scope interaction between conjunction and negation in contexts of VP ellipsis and 'do it'/'so' substitution are summarized below.

(23) A. The second post-'but' VP-ellipsis/'do it'-substitution clauses with intra/extra-clausal negation after the first positive clauses preferentially allow a 'neither' interpretation.
     B. After introducing the first positive clauses, the second post-'but' Stripping clauses with intraclausal negation only allows a 'neither' interpretation, while those with extraclausal negation allow either a 'neither' or a 'not both' interpretation.
     C. When the preceding sentences/clauses contain negation and a conjoined element, the following negative sentences/clauses containing VP-ellipsis/'do it'/'so'-substitution after the copulative/additive conjunction 'and' preferentially allow a 'not both' interpretation in a scopally fashion as the preceding ones.

Some comments are in order concerning (23A-C). First, regarding (23C), just as the first negative sentence is preferentially interpreted with a 'not both' interpretation, the second sentence is interpreted in a parallel fashion. More specifically, dictated by scope parallelism (Sag 1976, Rooth 1992, Fiengo and May 1994, Fox 2000, Fox and Lasnik 2003, Fox and Pesetsky 2005, Hartman 2011, Griffiths and Liptak 2014, and Barker 2013), since the first sentence preferentially has a 'not both' reading, the second sentence has the same reading; however, when the first markedly has a 'neither' reading, the second sentence has the same reading. Recall that in English, conjunction markedly interacts scopally with negation at LF in the first negative sentence of (14a-b), (15a-b), and (17a-b), producing ambiguous readings, though the 'not both' reading reflecting the surface order is favored. The parallel scope relation obtains in the second sentence of these cases, as expected.

As for (23A-B), the adversative conjunction 'but' serves as a cue for reversing the sentential polarity or correcting (the denotation of) the conjunctive relation at issue from the first positive clause to the second negative clause. In sentences such as (12a-b), (16a-b) and (19A), the second conjunct clause with intra/extra-clausal negation but with a conjoined element included in VP ellipsis/substitution only allows a 'neither' interpretation. The scope interpretation available to these sentences reflects Szabolcsi and Haddican's (2004) observation that "the 'neither' reading is most natural with packages (i.e., stereotypical pairs) and in cases where there is a contextual expectation for the predicate to hold of both conjuncts." In these sentences, the first conjunct clause as a positive statement provides a context that the two VP conjuncts − that is, [[put the dishes in the cupboard] and [(put) the towels in the closet]] − hold true. Since negation in the post-'but' second conjunct clause negates this statement made in the first conjunct clause,[13] only what we get in the former clause is the 'neither' interpretation.

On the other hand, there is a difference between VP ellipsis and Stripping in light of interaction between conjunction and negation. Unlike in VP ellipsis in (12a-b), intraclausal negation differs from extraclausal negation in Striping: the former only allows a 'neither' reading in the parallel fashion with VP ellipsis, while the latter

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[12] (22A) is interpretation-wise paraphrased as follows: (22A) = John did neither or maybe one of them (the latter with focus on "and" in the question). However, with "didn't either" in the second conjunct, "Mary did neither" reading is forced. Therefore, (22A) = No, John did neither. Mary did neither.

[13] Szabolcsi and Haddican (2004) note that in the absence of phonological focus, a Boolean conjunction like 'and' in English shifts to a plurality-denoting interpretation in the definite domain. Within the scope of negation, the `neither' reading follows from the standardly assumed Homogeneity presupposition of distributive predication applied to a plurality.

allows both a 'neither' reading and a 'not both' reading. We repeat (13a-b) as (24a-b), where Stripping is derived via ATB movement of the two conjunct VPs to the VP-external periphery (Johnson, 1996/2003):

(24) a. John [ᵥₚ put the dishes in the cupboard and the towels in the closet] [[ᵥₚ e], but not Mary [ᵥₚ e]].

　　 b. Father [ᵥₚ thinks John put the dishes in the cupboard and the towels in the closet] [[ᵥₚ e], but not Mother [ᵥₚ e]].

The question to be answered is why (24b) with Stripping is differentiated from (12b) with VP ellipsis. It is worth noting, first, that VP ellipsis and Stripping differ in the type of negation in the second clause after the adversative conjunction 'but': negation with the former is a typical sentential polarity-denoting one, whereas negation with the latter is a corrective/contrastive one (Martins 2020, McCawley 1991, Wu (2021) among others).[14] With the distinction between two types of negation in mind, we now suspect that the two occurrences of the same VP in the Stripping context of (24b) are interpreted differently from the two independent VPs in the VP ellipsis context of (12b). In the case of the latter, the definite plural interpretation for the conjoined element of the two VP conjuncts − that is, [[put the dishes in the cupboard] and [(put) the towels in the closet]] − is confirmed after the first conjunct clause; the same is true of the conjoined element of the two VP conjuncts in (24a). By contrast, in the case of the former, the definite plural interpretation of the conjoined phrase inside the attitude verb like 'think' is not; thus, the conjoined element is not necessarily interpreted as a definite plural, which accounts for its ambiguous interpretation: either a 'neither' or a 'not both' interpretation.

4. Scope Interaction between Disjunction and Negation in Non-anaphoric Contexts

Recall (3b) for the interaction between disjunction and negation, where according to the second part of De Morgan's law, "not (p or q)" yields the reading of "not p and not q". (3b) is repeated as (25):

(25) ¬ (p ∨ q) = ¬ p ∧ ¬ q

Rooth and Partee (1982) and Larson (1985) note that disjunction can also participate in scope interaction with negation, as in (26):

(26) Mary didn't take (either) algebra or logic.

(27) a. ≡ She took neither algebra nor logic.　　　　　　　　　¬　>　∨

　　 b. ≡ Either she didn't take algebra, or she didn't take logic.　　∨　>　¬

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[14] Corrective negation is well attested in the following sentences involving 'not . . . but' correlative, taken from McCawley (1991: 190. ex. 4):

(i) a. John drank not coffee but tea. (basic form)
　 b. John drank tea, not coffee. (reverse form)
　 c. John didn't drink coffee but tea. (anchored form)
　 d. John didn't drink coffee, he drank tea. (basic expanded form)
　 e. John drank tea, he didn't drink coffee. (reverse expanded form)

(26) is ambiguous between the two readings in (27), strongly preferring (27a); (27a) is the 'neither' reading in compliance with De Morgan's law in (25).

Likewise, a disjoined element involving apparently non-constituent coordination interacts with intraclausal negation in (28), whose strongly favored interpretation also is a 'neither' reading.

(28) John didn't put the book on the desk or the notebook on the chair.

In a parallel fashion, scope interaction between disjunction and extraclausal negation in (29a-b) or negation in imperatives in (30) preferentially yields a 'neither' interpretation (cf. Muromatsu, 2005):

(29) a. I do not think John put the book on the desk or the notebook on the chair.
    b. It is not the case that John put the book on the desk or the notebook on the chair.
(30) Don't put the book on the desk or the notebook on the chair.

The analogous 'neither' reading also arises in the environment of denial such as (31B), which denies the statement made in (31A). By default, the denial of a disjunction yields a 'neither' reading, but in a marked situation with phonological focus on the disjunction in (31A), a 'both' reading is available.

(31) A. John put the book on the desk or the notebook on the chair!
    B. Wrong! John DIDn't put the book on the desk or the notebook on the chair.[15]

In sum, disjunction with negation preferentially gives rise to a 'neither' reading in compliance with the second part of De Morgan's law, regardless of the types of negation such as intraclausal negation, extraclausal negation, imperative negation, and a denial.

5. Disjunction−Negation Scope Interaction in Anaphoric Contexts

We now turn to disjunction-negation scope interaction under VP ellipsis/substitution and Stripping. In a parallel fashion to conjunction-negation scope interaction under VP ellipsis, disjunction-negation scope interaction under ellipsis also engenders a 'neither' reading, regardless of whether negation occurs clause-internally in (32a) or externally in (32b). In these sentences, the first clause makes a positive statement, and the VP-ellipsis-containing second clause after the adversative connective 'but' makes a negative statement.

(32) a. John put the book on the desk or the notebook on the chair, but Mary didn't.
    b. I think John put the book on the desk or the notebook on the chair, but I don't think that Bill did.[16]

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[15] Like that in (9B), the denial in (31B) as an answer to (31A) is paraphrased as follows: "That is incorrect. John didn't do one of the two. He put neither the book on the desk nor the notebook on the chair, or did both." Recall that the denial in (31B) is taken to be an instance of corrective/contrastive negation.

[16] (32a) and (32b) are interpretation-wise paraphrased as follows: (32a) = John did [not both but one], but Mary did neither; (32b) = John did [not both but one], but Bill did neither.

By contrast, disjunction-negation scope interaction under Stripping as in (33a-b) with the positive first clause and the negative second clause not only gives rise to a 'neither' reading, but also a 'both' reading.

(33) a. John put the book on the desk or the notebook on the chair, but not Mary.
   b. Father thinks John closed the door or the window, but not Mother.[17]

When both the first and the second clauses that are combined by the coordinating conjunction 'and' are negative, disjunction-negation scope interaction under VP ellipsis yields ambiguous interpretations, with the 'neither' interpretation strongly preferred.

(34) a. John didn't put the book on the desk or the notebook on the chair. And Mary didn't, either.
   b. Father doesn't think John put the book on the desk or the notebook on the chair. And Mother doesn't, either.[18]

In addition to VP ellipsis, we also examine disjunction-negation scope interaction in contexts of deep anaphora 'do it' and clausal anaphora 'so' in (35) and (36). In an analogous way to (32), the interaction of disjunction with intraclausal or extraclausal negation yields a 'neither' reading in contexts of VP 'do it' substitution as in (35a-b).

(35) a. John put the book on the desk or the notebook on the chair, but Mary didn't do it.
   b. I think John put the book on the desk or the notebook on the chair, but I don't think that Bill did   it.

Likewise, in a parallel fashion to (34), (36a) with 'do it' substitution or (36b) with clausal 'so' substitution allows ambiguous interpretations, with the 'neither' interpretation strongly favored.

(36) a. John didn't put the book on the desk or the notebook on the chair. And Mary didn't do it, either.
   b. Father doesn't think John put the book on the desk or the notebook on the chair. And Mother doesn't think so, either.

As for disjunction-negation interaction under VP ellipsis or Stripping in dialogue contexts in the mode of Gribanova's (2013) and Landau's (2021) study of Russian, in (37) and (38) the response to the question starts with the positive answer particle, which is followed by the adversative conjunction 'but'. The next clause involving VP ellipsis in (37A) tends to allow a 'neither' interpretation, while that involving Stripping in (38) is ambiguously interpreted, allowing either a 'neither' or a 'both' reading.

(37) Q: Did John put the book on the table or the notebook on the chair?
   A: Yes, but Mary didn't.[19]

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[17] (33a) and (33b) are interpretation-wise paraphrased as follows: (33a) = John did [not both but one], but Mary did not do so [= Mary may have done neither or perhaps both]; (33b) = Father thinks that John did [not both but one], but Mother does not think so. [= Mother thinks John did neither or perhaps both].

[18] (34a) and (34b) are interpretation-wise paraphrased as follows: the preferential reading of (34a) = John did neither, and Mary did neither as well; that of (34b) = Father thinks John did neither, and Mother also thinks likewise.

[19] (37A) = Yes, John did one of the two; Mary did neither.

(38) Q: Did John put the book on the table or the notebook on the chair?
　　A: Yes, but not Mary.[20]

On the other hand, in (39) and (40) the response to the question starts with the negative answer particle 'no', followed by the second clause with/without the copulative/additive conjunction 'and'. The clause involving VP ellipsis in (39) and the one involving Stripping in (40) preferentially have a 'neither' reading.

(39) Q: Did John put the book on the table or the notebook on the chair?
　　A: No, and Mary didn't, either.[21]
(40) Q: Did John put the book on the table or the notebook on the chair?
　　A: No. Not Mary, either.[22]

The emerging generalizations on disjunction-negation scope interaction under VP ellipsis & substitution and Stripping are as follows:

(41) A. The post-'but' VP-ellipsis/'do it'-substitution clauses with intra/extra-clausal negation tend to allow a 'neither' interpretation when preceded by the positive clause.
　　B. The post-'but' Stripping clauses with intra/extra-clausal negation allow either a 'neither' or a 'both' interpretation when preceded by the positive clause.
　　C. When the negative clauses contain a disjoined element and are followed by the copulative/additive conjunction 'and', the subsequent negative clauses containing VP-ellipsis/'do it'/'so'-substitution strongly favor a 'neither' interpretation in a scopally parallel fashion to the preceding ones.

Let us start with a comment on (41C). In accordance with the parallelism requirement dictated by the copulative/additive conjunction 'and', when disjunction-negation scope interaction obtains in the first negative sentence/clause, the parallel scope interaction obtains in the second negative sentence/clause involving VP ellipsis/substitution. That is, since the first negative sentence/clause preferentially allows either a 'neither' interpretation, the second negative sentence/clause has the parallel scope interpretation. Note that in these cases, the strongly favored interpretation is a 'neither' reading, like the cases not involving VP ellipsis/substitution.

Now regarding (40A), unlike a conjoined constituent that is generally construed as a definite plural, a disjoined constituent is construed as an indefinite even after it is mentioned in the first positive clause (Szabolcsi and Haddican 2004). Thus, in (32a-b)/(35a-b) the disjoined constituent takes narrow scope under intraclausal or extraclausal negation, thereby giving rise to a 'neither' interpretation in compliance with the second part of De Morgan's law.

We move on to (40B). Recall that negation in Stripping after the adversative conjunction 'but' is a corrective/contrastive one. Thus, negation in Stripping after the adversative conjunction 'but' directly negates disjunction, thereby giving rise to a 'neither' reading or a 'both' reading. In a default situation, the former reading

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[20] (38A) = Yes, John did one of the two; Mary did neither or maybe both (the latter with focus on 'or').

[21] 'No' in (39A) = No, John did neither or maybe both (the latter with focus on 'or' in the question sentence). However, with "didn't either" in the subsequent conjunct, the 'neither' reading is strongly favored. Therefore (39A) is paraphrased as "No, John did neither, and Mary did neither."

[22] 'No' in (40A) = No, John did neither or maybe both (with focus on 'or' in the question sentence). However, with "didn't either" in the subsequent conjunct, the 'neither' reading is strongly favored. Therefore (40A) is paraphrased as "No, John did neither; Mary did neither."

arises, but in a marked situation with phonological focus on the disjunction in the preceding clause/sentence, the latter reading is available.

6. Conclusion

By examining scope interaction between negation and conjunction/disjunction in non-anaphoric and anaphoric contexts, we have made three claims. First, when a conjoined or disjoined element is included in VP ellipsis/substitution, negation in this VP ellipsis/substitution preferentially gives rise to a 'neither' reading. In the case of disjunction, this reading is consistent with the reading available to the sentence/clause without involving VP ellipsis/substitution, but concerning conjunction, the preferential reading in the non-anaphoric sentence/clause is a 'not both' interpretation. We have accounted for the availability of a 'neither' reading rather than a 'not both' reading, because following Szabolcsi and Haddican's (2004) observation, the 'not both' reading is available when the conjunction bears (phonological) focus. This reading is not available since the conjunction is part of VP ellipsis/substitution resistant to (phonological) focus.

Second, unlike negation in VP ellipsis/substitution, negation in Stripping contexts is not sentential negation but corrective/contrastive negation; its function is to directly deny the meaning of conjunction or disjunction. Thus, in the case of conjunction, a denial of it by corrective/contrastive negation in Stripping by default yields a 'not both' reading, but it can also engender a 'neither' reading. By contrast, in the case of disjunction, a denial of it by corrective/contrastive negation in Stripping unmarkedly results in a 'neither' reading, but it can also beget a 'not both' reading.

Third, when negation with conjunction in the initial clause preferentially produces a 'not both' reading, the second negative clause involving VP ellipsis/substitution or Stripping has the same parallel scope when preceded by the copulative/additive conjunction 'and'. This is the celebrated scope parallelism imposed by the copulative/additive conjunction 'and': the first and the second clause/sentence exhibit parallel features in terms of scope interaction. In the case of conjunction, the first and the second negative clauses/sentences unmarkedly have a 'not both' reading. By contrast, in the case of disjunction, the first and the second negative clauses/sentences unmarkedly have a 'neither' reading. Note that though conjunction/disjunction is not realized in the second clauses involving VP ellipsis/substitution or Stripping, it does not affect scope interpretation in these clauses due to transfer from scope interpretation obtained in the first clauses via scopal parallelism.

In order to see if De Morgan's laws work in natural languages, we have examined diverging scope interactions between negative elements and coordinated constituents in both anaphoric and non-anaphoric contexts. Though work remains, given that we have employed various forms of negators aided with other sentential connectors and tested them in both conjunctive and disjunctive coordinate constructions, we believe that this work is the first step towards the *fine* syntactic and semantic analysis for the relevant constructions. If on the right track, the generalizations we have made further imply that De Morgan's laws do not account for natural languages as they do work for propositional logic (cf. Gribanova 2013, Krivochen 2019).

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