A first look at *pu*-Result Clauses in Greek[*]

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Περίληψη

Η παρούσα εργασία εστιάζει στις δευτερεύουσες αποτελεσματικές προτάσεις της Νέας Ελληνικής που εισάγονται με το «που». Μέσα από την εξέταση των ιδιοτήτων και των χαρακτηριστικών των προτάσεων αυτών, εντοπίζονται δύο είδη. Το πρώτο είδος εμφανίζει χαρακτηριστικά αναφορικών προτάσεων, ενώ το δεύτερο διαθέτει μόνο μια αποτελεσματική ερμηνεία. Οι ποσοτικοί/ποιοτικοί τελεστές που εντοπίζονται στην κύρια πρόταση λειτουργούν αποκλειστικά ως «ενισχυτές» της σημασίας αιτίου-αποτελέσματος. Η παρούσα εργασία παρουσιάζει το θέμα και θέτει τον προβληματισμό αναφορικά με την κατεύθυνση της ανάλυσης που ενοποιεί τις αναφορικές και τις αποτελεσματικές προτάσεις.

Λέξεις-κλειδιά: αποτελεσματικές προτάσεις, αναφορικές προτάσεις, ενισχυτής, συμπληρωματικός δείκτης

1   Introduction: Overview of Result Clauses

While some subordinate clauses have been extensively studied in the literature, (e.g. relative and complement clauses), others, mainly adverbials, have not received equal attention. In this paper, the focus will be on a specific type of adverbial clauses, namely Result Clauses (ReCs) introduced by the complementizer *pu* in Greek.

Generally, a ReC is a subordinate clause that expresses the outcome, or the consequence(s) of the event described in the main clause. ReCs are introduced by *pu* 'that'[1] or *oste* 'so that' (Mackridge 1985:256, Holton et al. 2012:561). The current discussion will focus on *pu*-clauses as the distribution of *oste*-clauses differs. The main clause typically contains intensifiers, i.e. quantitative or qualitative words/phrases such as *tosos/tosi/toso* "so much/many", *tetjios/tetjia/tetjio* "of such a kind" (Mackridge 1985:256, Holton et *al.* 2012:561), as shown in (1):

(1) Ο Γιάννης έκανε   τόσα λάθη   *(που) κανείς δεν τον   εμπιστεύεται.
    the John   made-3s so   mistakes that   nobody not him-cl trust-3s
'John made so many errors (that) nobody trusts him (anymore).'

In (1) above, the ReC is introduced with *pu* and follows the main clause. In the main clause, the quantitative word *tosa* is followed by the NP *laθi* that it modifies. The presence of *pu*, unlike 'that' in the English translation, is obligatory, otherwise the result is ungrammatical (Holton et. *al* 2004:228). In this sentence, one can blame the number of mistakes that John has performed (cause) for the aroused untrustworthiness (result) determined by the *pu*-subordinate clause. In this sense, ReCs convey a causal-resultative relation.

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[1] Except ReCs, *pu* is the complementizer that introduces, among others, relative and complement clauses.

Meier (2001:268, 2003:97) on the other hand, argues that ReCs involve some sort of comparison between two values, namely, the degree/amount of mistakes on the one hand, and the untrustworthiness on the other. According to her analysis, the quantitative word has the distribution of degree operators (2001:268) and is responsible for the comparative interpretation.

With respect to the distribution of the antecedent intensifier, it can modify a number of different categories: an overt NP, as in (2), a VP, as in (3), or an AP, as in (4) (see Holton et *al.* 2004: 227-228) appearing in any structural position (cf. Rijkhoek 1998:98-99).

(2) Έφαγε *τόσες/τέτοιες καραμέλες* που τον   πόνεσε η κοιλιά του.
    ate-3s so/such candies   that him-cl hurt-3s the stomach his-cl
'Kostas ate so many/such candies that his stomach hurt.'

(3) *Χόρεψα   τόσο/*τέτοιο* που πόνεσαν τα πόδια μου.
    danced-1s so/such   that hurt-3pl the feet mine
'I danced so much that my legs hurt.'

(4) Το μάθημα ήταν   *τόσο/*τέτοιο βαρετό*   που μερικοί μαθητές κοιμήθηκαν.
    the lecture was-3s so/such boring   that some students   fell-asleep-3pl
'The lecture was so boring that some students fell asleep.'

The quantitative word *tosos* can modify all three aforementioned categories, whereas the qualitative word *tetjios* can only modify a NP (see (2)-(4)).

Moving to the embedded ReC, this occurs after the clause that contains its intensifier (see (2)-(4) and (5a)), as the ungrammaticality of (5b-c) shows.

(5a) Η Μαρία είπε   ότι ήρθαν   τόσοι θεατές στην εκδήλωση *που*
    the Mary said-3s   that came-3pl so spectators to-the event   that
    γέμισε   η αίθουσα.
    filled-3s   the room
'Mary said that so many spectators attended the event that the room was full.'

(5b) **Που αγόρασε αυτοκίνητο* ο Κώστας κέρδισε τόσα χρήματα.
    that bought-3s car   the Kostas won-3s so money
'*That he bought a car Kostas won so much money.'

(5c) *Ο Κώστας *που αγόρασε   αυτοκίνητο* κέρδισε τόσα χρήματα.
    the Kostas   that bought-3s car   won-3s so money
'*Kostas that he bought a car won so much money.'

If the ReC is absent, the structure becomes ungrammatical (unless the intensifier is stressed). Something else must follow that could work as the outcome of that clause, providing a cause-result or a comparison (in Meier's 2001, 2003 terms) association.

(6) *Έκανε τόσα λάθη.
    made-3s so   mistakes
'He has done so many errors.'

Additionally, ReCs allows for split antecedents, as in (7), and constitute islands for extraction, as in (8) (Rijkhoek 1998:169-171).

(7) *Τόσα παιδιά έγραψαν   τόσα ποιήματα που ο καθηγητής χάρηκε.*
    so students   wrote-3pl so poems   that the professor was-delighted-3s
'So many students wrote so many poems that the professor was delighted.'

(8) *$T\iota_i$ ο Κώστας κέρδισε τόσα χρήματα που αγόρασε t_i;
    $what_i$ the Kostas won-3s so   money   that bought-3s
'*$What_i$ Kostas won so much money that bought t_i?'

In (7), the ReC is associated with both antecedents in subject and object position for a cause-result relation to arise. In (8), the wh-phrase cannot be extracted out of the *pu*-ReC (cf. Ross 1967). If the *wh*-phrase, which is the argument of the embedded predicate, stays in-situ the construction is grammatical (see Vlachos's (2012) account for *wh*-in-situ).

    In this section, I surveyed some of the main properties of ReCs. The paper is organized as follows: in section 2, I give the theoretical background on ReCs. In section 3, I introduce and review some apparently problematic data of ReCs introduced by *pu*, when the degree intensifier (DI) modifies an NP (3.1) and when the former is absent (3.2). It will be shown that two types of *pu*-ReCs can be identified: a RC one with a resultative reading and a ReC. Section 4 suggests a tentative analysis that can capture the two types. Section 5 concludes the discussion.

2   Background

Due to the close dependency between the ReC and the DI and the emerging resultative meaning, several analyses have treated their relation as an instance of selection (Abney 1987, White 1997; 2005, Meier 2003 etc.). ReCs have been analyzed as complements of the DI in the main clause.
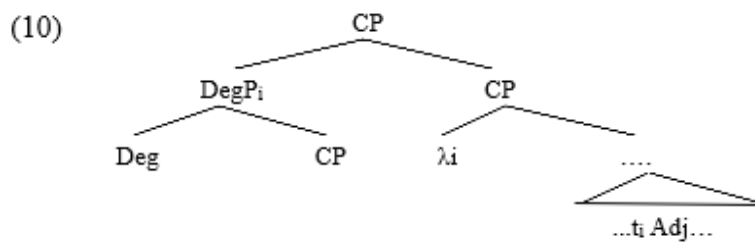
    White (1997, 2005), building on Abney's (1987) idea, assumes a Larsonian-style degree phrase (DegP) to account for AP ReC in English. He argues that the degree head projects a DegP and directly selects two categories (White 1997: 10), the AP and the ReC, placing one in the Specifier (AP) and the other (ReC) in the complement position in the lower shell. Thus, the whole ReC is a complement of the intensifier. The structure involves raising of Deg and adjunction to a higher position, deriving the order DI-AP. The derivation of (1), following White (1997:10), is the one in (9).

(9)
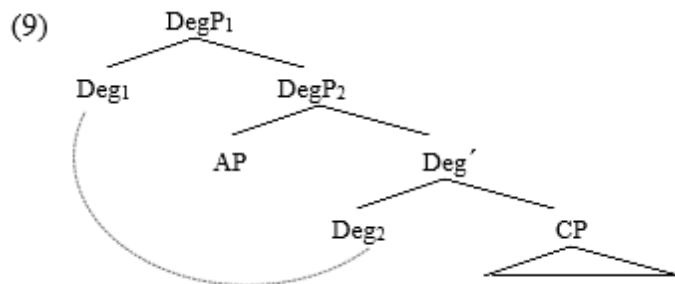
    A similar analysis is proposed by Meier (2001, 2003), based on formal semantics though. She argues that the ReC is semantically a comparative. The degree word is a quantifier that introduces a comparative meaning between two extents (2003:71, 97).
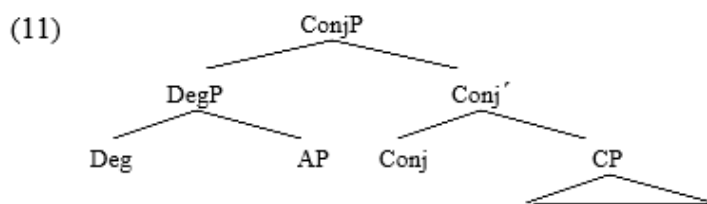
Thus, a sentence like (4) would be interpreted as "the maximum extent *e* such that the lecture is *e*-boring is greater than or equal to minimum extent *e** of boredom, such that if the lecture is *e** boring, the students can have fallen asleep" (2003:88, 97). The function of the degree word is to combine the ReC with an extent predicate in the main clause. The ReC supplies the consequent containing an implicit modal, and the predicate supplies the antecedent bearing an incomplete conditional (2003: 71, 97). In other words, the degree word "makes the incomplete conditional complete" and "it introduces a suitable comparison relation" (Meier 2003:87).

In Meier's analysis, the ReC is base-generated as a complement of the degree word (2003:77, 83), and it then undergoes right extraposition (2003:77). At LF, it reconstructs and the whole DegP raises to adjoin to CP, as an instance of Quantifier raising, leaving a trace in its base position (2003:77, 82, 85). The relevant structure, leaving out technicalities, is the following (Meier 2001:273, 2003:81, 87):

(10)

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                          CP
                  ┌───────┴───────┐
              DegP_i              CP
            ┌───┴───┐         ┌───┴───────┐
          Deg       CP       λi            ....
                                        ┌──────────┐
                                        └──────────┘
                                         ...t_i Adj...
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Meier (2003: 85-86) assumes that the main clause is an open proposition and that a *λ*-operator, being index sensitive, is introduced at the *that*-level. Variables in the embedded clause that share the same index with the index of the degree phrase dominating it, get bound by *λ*-abstraction. Through this process an extent predicate is created from the open proposition denoted by the main clause.

Rijkhoek's (1998) proposal dispenses with the extraposition analysis. She suggests that ReCs are not complements to a Deg head but are licensed as second conjuncts in an asymmetric conjunction structure, as in (11) (p. 123). The Conj-head selects the subordinate clause and enters into a specifier-head agreement relation with the DegP (cf. Rijkhoek 1998:125).

(11)

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                      ConjP
              ┌─────────┴─────────┐
            DegP                 Conj′
          ┌───┴───┐         ┌─────┴─────┐
        Deg       AP       Conj          CP
                                     ┌─────────┐
                                     └─────────┘
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As we show below, these approaches do not fully account for the Greek resultative *pu*-clauses. In the following section, we present the Greek resultatives.

3   The properties of *pu*-ReCs

In this section, I introduce some puzzling data about *pu*-ReCs with and without a DI modifying an NP. Surveying their properties, I argue that we can identify two kinds of constructions: a RC which involves a resultative reading (Type I) and a resultative clause (Type II). In both cases, a modification relation exists between the main and the

subordinate clause whose cause-result relation is conditioned by the presence or the absence of the DI.

3.1 pu-ReC with DI

Let us consider the sentence in (12): the main clause contains the qualitative word *tetjia* modifying the noun *laθi*, followed by a *pu*-clause.

(12) Έκανε   τέτοια λάθη   που κανείς δεν τον   εμπιστεύεται.
    made-3s such mistakes that nobody not him-cl trusts-3s
'He made such mistakes that nobody trusts him.'

The main clause with the *tetjia*-intensifier supplies the cause and the subordinate *pu*-clause its outcome. What the ReC modifies is the properties of the mistakes performed and not the event of doing something. If the latter were true, then, we would expect a predicate modification in (13).

(13) Έφαγε τόσο που τον πόνεσε το στομάχι του.
    ate-3s so   that him hurt-3s the stomach his
'(He) ate so (much) that his stomach hurt.'

In (13), what is modified is the extent of the properties of the verb (predicate), i.e., it was the extent/manner of eating, not the eating activity itself that led to stomach pain.

Moving to the example in (14), this one also looks like a typical ReC, but differs from (12), in that there is a gap inside the subordinate clause which refers back to the noun *laθi* (mistakes) in the main clause. This NP is the head of the embedded clause, i.e. the antecedent of the subject gap.

(14) Έκανε   τέτοια λάθη   που _ οδήγησαν στην απόλυσή του.
    made-3s such mistakes that   led-3pl   to-the dismissal his-cl
'He made such mistakes that led to his dismissal.'

This structure is reminiscent of a RC structure.[2] A RC is a clausal modifier that relates to a nominal constituent, the antecedent which is found in the main clause. The antecedent binds a variable inside the RC. This nominal is the head of the relative and the RC is its modifier. These properties are met in (14). There is a gap in subject position in the *pu*-clause which takes a nominal as its antecedent. Anticipating the discussion that follows, we identify the gap in (14) as a *pro* subject, and not as a copy.

Unlike typical RCs, this RC does have a resultative reading. The reading we get is that the kind of *x* (mistakes) *y* performed are such that have led to *y*'s dismissal. As we will see in the next subsection, this resultative interpretation is due to the intensifier which is involved (cf. (17b) and (18b) in section 3.2).

What we have seen so far is that the *pu*-clause in (14) can be defined as a subcase of the RCs whose resultative meaning arises from the intensifier.[3] A better way to

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[2] If *pu* is replaced by the relative pronoun, a pure RC occurs. Another clause should be added, that will qualify as the true result of the main clause. This fact shows that *pu*, has some additional features beyond the ones shared with the relative pronoun, indicating an expanded modification function.
[3] Such a construction is reminiscent of Carlson's (1977) approach to amount relatives being ambiguous between a relative and a degree reading.

illustrate the relativization involved is with a *pu*-clause that has a variable in object position, as in (15):

(15) Αγόρασε   τέτοιες τσάντες που   *(τις)   πλήρωσε ακριβά.
      bought-3s   such bags   that them-cl paid-3s expensive
'(She) bought such bags that she paid a lot of money (for them).'

The variable has the nominal *tsandes* as its antecedent. Interestingly, the variable does not correspond to a gap but to a resumptive clitic that shares the same φ-features with its antecedent. If the pronoun is omitted the result is ungrammatical.[4] A resultative interpretation is also found in this structure. The main clause describes the cause and the subordinate its outcome. On the same reasoning, we take the subject gap in (14) to be a *pro* subject, consistent with the pro-drop property of Greek.

    Consider next the example in (16):

(16) Αγόρασε τέτοιες τσάντες που την   ζηλεύουν οι φίλες της.
      bought-3s such bags   that her-cl envy-3pl the friends her
'(She) bought such bags that that her friends are jealous of her.'

Note here that the clitic *tin* in the *pu*-clause, refers not to the bags but to the person that bought them. As such it does not agree with the antecedent (the NP *tsandes*). Thus, its antecedent is not and cannot be the NP. Instead, it is the extent of buying bags described in the main clause, which gives rise to the result reading.

    In this section, two types of *pu*-ReC were identified. The first type is a RC (Type I) while the second is a ReC (Type II). In either case, the embedded clause has a resultative reading. In the next section, we will see that resultativity in Type I is an implicature arising from the presence of the intensifier. This interpretation is uplifted if the intensifier is removed.

3.2 The pu-ReC without DI

A diagnostic that can be used in order to show that a subtype of *pu*-ReCs is a RC and that the resultative interpretation comes from the intensifier (see Meier 2003: 71 for similar observation) is via using a predicative expression in the subordinate clause whose reference is ambiguous between an individual and an event.

    The expression *plirono akriva* is ambiguous. It may refer either to something that I have bought and was expensive -thus I paid a lot of money to acquire it (reading one)- or it may refer to an event ('buying') whose consequences I regret (as an idiomatic reading) (reading two). So, this expression is associated either with an individual or an event. This fact is better illustrated by using the appropriate object clitic. When referring to an individual, an agreeing clitic is used, as in (17). When referring to an event, the neuter clitic *to* is used, as in (18).

(17a) Αγόρασε τόσες τσάντες που_ τις   πλήρωσε ακριβά.
(17b) Αγόρασε   τσάντες που_ τις   πλήρωσε ακριβά.
      bought-3s so/Ø bags   that them-cl paid-3s   expensive
'(She) bought (so many) bags that she paid a lot of money (for them).'

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[4] Resumptive clitics are also obligatory with indirect object relativization and are preferable in non-restrictive RC (cf. Alexopoulou 2006).

Consider (17a): the clitic *tis* refers to an individual, the NP *tsandes* in the main clause; the *φ*-features of the NP and the clitic agree. The subordinate clause is a RC whose head is the NP. The resultative meaning emerges from the presence of the quantitative intensifier *toses* in the main clause. On the other hand, in (17b) the NP intensifier is missing. The clitic *tis* still gets its reference from the NP *tsandes*, as they agree. A RC construction arises but the resultative meaning is no more available. There seems to be no cause-result reading between the two sentences. This shows that the resultative reading is due to the presence of the intensifier.

Moving to the example in (18a), where the expression *plirono akriva* has the idiomatic reading, the clitic *to* does not refer to and does not agree with the NP *tsandes*.

(18a) Αγόρασε   τόσες τσάντες που το   πλήρωσε ακριβά.
(18b) *Αγόρασε   τσάντες που το   πλήρωσε ακριβά.
     bought.3s so/Ø   bags   that it.cl payed.3s dearly
'(She) bought so many bags that she regretted it.'

The clitic *to* in (18) refers to the extent of the bag-buying event described in the main clause (and not to the event itself; see (12)-(13)). The resultative reading, though, still emerges in (18a). The buyer faces the consequences of purchasing a big number of bags. On the other hand, in the absence of an intensifier in the main clause in (18b), no cause-result relation exists, and the sentence becomes ungrammatical. As the ReC modifies the extent of the event, the absence of the intensifier that supplies that extent yields ungrammaticality.

In the following table we summarize the data discussed in sections 3.1 and 3.2. Two types of *pu*-ReCs were found. The first is a RC construction with a resultative reading emerging from the intensifier, that bears a variable (pronominal) bound by the head of the RC (the antecedent). In the second type, the ReC bears a resultative meaning only. A modification relation exists, as in Type I, but here the *pu*-clause modifies the properties of the main clause event. In both types, the cause-result relation is conditioned by the presence or the absence of the DI.

	with intensifier	*without intensifier*
Type I	*Relative-Resultative reading*	*Relative reading*
Type II	*Resultative reading*	**Resultative reading*

Table 1 | Clause-types

Having identified two types of *pu*-ReCs in Greek, in the next section, we sketch a preliminary analysis, bearing in mind that both types are introduced with *pu*, i.e. the complementizer found in relativization.


4   Towards a proposal

The discussion in section 3 leads us to two options: either there are two different structures for the two types of ReCs, or that despite differences, both types involve the same underlying structure.

In the present paper, I take the latter option. This is due to the fact that both constructions are introduced by the complementizer *pu*. Following Meier (2001, 2003), I will assume that a *λ*-operator is introduced at the level of the complementizer, i.e. *pu* in Greek. This operator is a predicate (Heim and Kratzer 1998). However, unlike Meier, I will assume that *pu* and not the intensifier is the element that mediates between the main and the subordinate clause making their association and the modification relation available. This is similar to what a head-external analysis (HEA) of RC predicts, according to which predication is achieved by the relative pronoun (overt or null in *that*-relatives) (see Chomsky 1977 among others).

The embedded ReC proposition and not the main clause, as Meier (2003: 86) argues, is open containing a variable. *Pu*, being variable sensitive, selects the subordinate clause (cf. Rijkhoek 1998 for the conjP that selects the subordinate) and binds a variable inside it. This variable can either be an individual (e) or an event (E). With respect to the latter, I assume Higginbotham's (1985) approach regarding the *E* position of predicates. If *pu* binds an individual, then a RC arises, justified by the presence of a pronominal inside the ReC. If *pu* binds an event, then a resultative interpretation arises. Thus, *pu* is the element that (partially) determines the type of ReC that will emerge (Type I or II). Note also that the resultative meaning is not a feature associated with *pu*, as it necessarily requires a DI (cf. Meier 2003). If the intensifier is removed, as we saw in section 3.2, the resultative interpretation cannot arise.
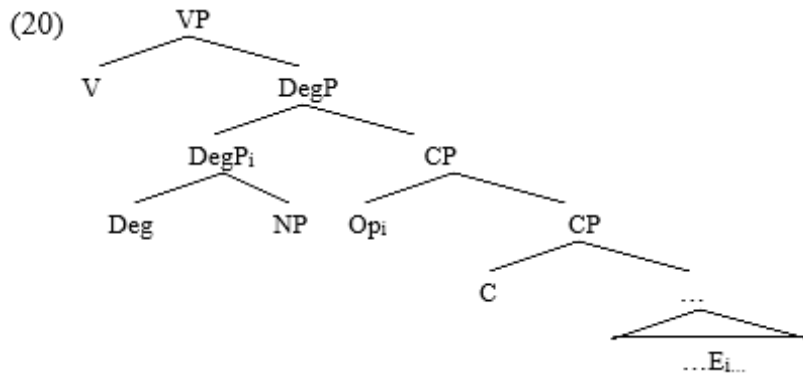
Bearing in mind the above assumptions, the structure that emerges for RC (Type I) is presented in (19). An individual variable is identified by the presence of a (pronominal) variable inside the *pu*-clause. An operator-variable construal arises where the operator, which is *pu,* surfaces at the left periphery of the sentence and binds the variable through Agree. The NP-antecedent is merged afterwards outside the subordinate clause, as complement of the Deg-head. The antecedent is coreferential with the operator that agrees with the variable. The resultative meaning in this structure emerges from the intensifier, appearing external to the CP, above the nominal it modifies.

(19)
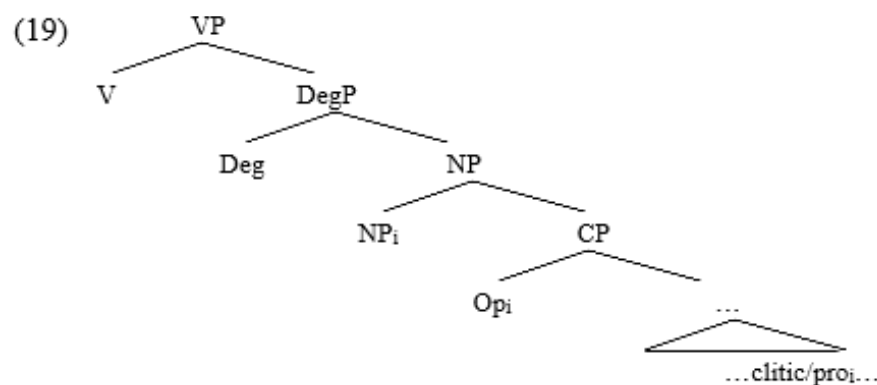
The general idea of this analysis is reminiscent of the HEA as *pu,* just like the empty operator, mediates the relationship between the RC-internal position and the RC head, ensuring that the information about their features are available. It is differentiated, though, from HEA as the operator does not A′-move from a CP-internal position to Spec,CP, as HEA predicts. It is externally-merged there and linked to the variable that it binds.

When there is no indicator in the subordinate clause that can be associated with an individual antecedent, a ReC emerges, as in (20). An operator-variable relation is also

at stake as the operator binds the event position of the embedded proposition.[5] The NP with the intensifier are externally merged. The DegP is coreferential with the operator that binds the variable. Such a configuration allows for a modification to occur. *Pu* modifies the set of properties of the event denoted by the degree relating them at the same time with the proposition *E* it embeds. This modification results to the resultative meaning.

(20)

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                    VP
              ┌──────┴──────┐
              V            DegP
                      ┌──────┴──────┐
                   DegPᵢ            CP
                 ┌───┴───┐      ┌────┴────┐
                Deg     NP    Opᵢ        CP
                                      ┌───┴───┐
                                      C      ...
                                          ┌──────┐
                                          ...Eᵢ...
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The ReC in (20) assumes a HEA as the NP is externally merged, since there is no variable corresponding to an internal constituent (*pro* or an object clitic). Such an analysis can also account for the non-agreeing variables in object positions inside the CP (cf. (16)), as well as idiom expressions (cf. (18a)). The latter case is indicative in that what is bound by the operator in the subordinate is an event-referring (lexicalized neuter) clitic. This clitic is associated through the operator with the amount of event properties modified by the DI. Removing the DI whose properties *pu* modifies, ungrammaticality occurs (cf. (18b)).

The above analysis can also account for islandhood data. RCs are considered islands for extraction (Complex NPs) (Ross 1967). If ReCs are like RC then they fall under the same account, indicating that no displacement can occur in the embedded clause (cf. (8)). They do not disallow though that a dependency can occur (cf. Adger and Ramchand 2005) according to which a variable is base-generated inside the subordinate and is bound by an operator, as the proposed analysis predicts. Also, data from split-antecedents indicate that they cannot be part of the embedded clause (cf. Perlmutter and Ross 1970). Structures like (7) can be predicted from the analysis proposed. The *E*-type variable in the embedded proposition is associated with the denotation of the main clause (the set of event properties), thus with more than one antecedent. Both extent degree modifiers are coreferential with the operator. The same operator binds the embedded *E* variable allowing a modification to occur.

5   Conclusion

Two types of *pu*-ReCs were identified in Greek: one with a relative-resultative reading and another with a resultative reading only. In both cases, the resultative meaning is dependent on the intensifier found in the main clause. In the RC case, *pu* binds a variable in the embedded clause. In the case of result, *pu* binds the embedded proposition and modifies the set of values denoted by the DI. What ReC share with RC

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[5] Such a structure is reminiscent of complement clauses that bear no gap inside the subordinate.

is the fact that they are analyzed through a relativization mechanism. The mechanism is the same, the labelling differs. In each case, the use of *pu* indicates a modification.

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