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MARIA EUGENIA MANGIALAVORI RASIA*

**COLORS IN THE LEXICON-SYNTAX-SEMANTICS INTERFACE.
CHANGE-OF-COLOR VERBS, LEXICAL ASPECTUAL CLASSES
AND MEASURING-OUT MACHINERY**

Abstract

Questo articolo combina dati analitici e di corpora al fine di esplorare le estensioni di una conosciuta correlazione positiva tra le strutture scalari aperte/chiuso (ad esempio, Hay et al. 1999) e la delimitazione aspettuale in aggettivi e verbi nella lingua italiana. In particolare, analizzeremo la rappresentazione linguistica dei colori in italiano secondo parametri lessicali e grammaticali. Si osservano due fatti principali. In primo luogo, la evidenza empirica indica che l'aspetto lessico (Aktionsart) di questi verbi e aggettivi—telicità, congiuntamente a altre proprietà eventive e il conseguente comportamento: resultatività, possibilità di doppia portata [double scope] per operatori negativi/parziali, ambiguità fra letture ripetitivi/restitutive—possono essere previsti per i verbi italiani su questa base. Questo comportamento è in contrasto con altri verbi, apparentemente simili, associati invece a scale aperte, dove un omomorfismo Grado/Evento determina un evento di cambio di stato omogeneo e atelico. In conseguenza, i verbi di colore possono essere proposti come esempio di proprietà consistentemente (lessicalmente) associata a una scala delimitata in Italiano. In secondo luogo, una alternativa chiave contribuita per i colori, la scelta tra una percezione olistica/non-olistica dell'oggetto affettato per il cambio descritto dal verbo, spiega occorrenze altrimenti inaspettati e mostra il ruolo cruciale di diverse relazioni semantiche relative a la grammatica (struttura argomentale) nella applicazione della correlazione osservata.

Parole chiave: colore, scala, verbi deaggettivali, telicità, cambio di stato, oggetto affettato.

This work combines corpus and analytic data with a view to explore the extensions of a well-known positive correlation between open/closed scalar structures associated to properties (e.g. Hay et al. 1999) and aspectual

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boundedness in Italian adjectives and deadjectival verbs. On these grounds, we aim at gaining better understanding of grammatical and lexical facts bearing on the linguistic representation of colors in this language. Two major facts are observed. First, corpus and analytic evidence shows that color verbs and adjectives can be argued to be lexically associated to bounded scalar structures in Italian. Telicity and further aspectual properties (along with the consequent behavior: resultativity, double scope for negative/partial adjuncts, relevant ambiguity between repetitive/ restitutive readings) are correctly predicted on this basis. This behavior contrasts with the patterns shown by semantically similar verbs associated, instead, to open scales, where a Degree-Event Homomorphism models a homogeneous, atelic change-of-state [COS] event. Second, a specific alternative allowed by color introduces an important variable. In particular, the choice between a holistic and a non-holistic representation of the affected object undergoing the change of state denoted by the verb accommodates otherwise unexpected occurrences and uncovers the crucial role of grammar (argument structure relations) in the application of the observed correlation.

Keywords: color, scale, deadjectival verbs, telicity, change-of-state, affected object.

1. General Introduction. Color and grammar

In principle, it is true that there are many, many ways to be red, white or yellow and that the subject is still open to debate. The general issue is not uncontroversial, especially when wider semantic problems like possible interpretations (cf. Kennedy & McNally 2010¹), vagueness (e.g. Kennedy 2007), truth-conditional variation (e.g. Hansen 2011), subjectivity (Hansen & Chemla 2015), possible ways of fixing a standard (e.g. McNally 2011), context sensitivity (e.g. Kennedy & McNally 2005,

¹ In very broad terms, these authors propose that color adjectives are ambiguous between a gradable and non-gradable interpretation, which would in turn make their scalar specification less than clear. However, this does not undermine a considerable body of literature and tests indicating that this is not necessarily so. Just to give one example, Husband (2010) tests disambiguation by overt degree modifiers (acceptable with gradable adjectives and degraded with non-gradable predicates) and shows that color adjectives behave as expected (i.e., even when disambiguated with a degree morpheme, they do not license an existential interpretation of its subject).

Hansen & Chemla 2013), intervention of conceptual semantics and extralinguistic context (e.g. Kearns 2007 i.a.) etc. take part in the debate.

With this myriad of factors bearing on the proper linguistic classification of color—especially, regarding the main factor at stake: that is, the type of property scale concerned—, one might perhaps expect inaccurate results, granularity or variability in experimental and/or analytical studies, even in a same subject's judgments. However, in the practice, the situation may prove to be pretty much the opposite. In fact, clearer pictures are possible, for instance, if we circumscribe the analysis to those factors proving relevant to the lexicon-semantics-syntax interface; but also, and especially, as long as we focus our study in those parameters that prove empirically and systematically decisive in predicting the behavior of color-based predicates, especially in verbs which, in contrast to adjectives, have received considerably less attention in the literature. On these grounds, color-denoting vocabulary items can eventually be argued to represent one of the clearest cases of association to a type of scale structure—one of the most prominent variables behind aspectual verb classes identified so far—as long as the right parameters are singled out.

So, even if discussion on the semantic implications of color is far from being settled, there are grammatical facets of the problem that can be reliably deployed in predicting verbal behavior, more importantly, taken as probes into wider lexical-syntactic phenomena affecting the relation between property-denoting elements—of which color-denoting roots are very special members—and the formal properties of the words (verbs, adjectives) containing them. More importantly, these phenomena can shed light on major empirical patterns shared by different languages and can be properly constrained into relevant generalizations about how an event is construed—i.e., into the relation between properties like colors and predicates built from them.

Scale structure, in particular, has been proved a key factor in ascertaining the formal implications of property-denoting roots² and

² Given that the scale structure involved is presumably part of the semantic burden of the root—or else of the property denoted by it, according to the view taken on the

predicates. In this light, a central goal of this paper is to establish which variables in scale structure, among those available for color, are significant to those aspects of meaning having a direct correlation in the behavior of the verb; especially regarding possible occurrences, combinations and affinities with different (aspectually relevant) constituents of the clause, including arguments as well as adjuncts and modifiers. In particular, our focus in this paper is on working out, first, whether the scale structure of color predicates involves (or not) specifications about widely studied parameters such as absolute standard values and minimal/maximal/medium scalar thresholds supplying relevant event endpoints; second, if different measurement parameters for the event can be established; and, third, if factors other than scale structure can intervene in the aspectual setup of a deadjectival verb—and, more specifically, what that tells us about the general aspectual properties and behavior of adjectives and verbs involving color.

To this aim, we will proceed to an empirically-grounded analysis of the Aktionsart properties of color verbs and adjectives. To that end, we will conduct a careful examination of analytic tests on corpus data³. First, we will deal with an essential division that has been extensively involved in the study of color adjectives in the literature. We refer to the

semantics-lexicon interface—, at least to the extent that it is derivable from the possible values of the measure function that the adjective denotes.

In our case, ascription of the divergence to the lexical root [√] is encouraged by the relevant consistencies but also to important discrepancies between adjectival and verbal predicates building on a same property-denoting root. In concrete, there are strong technical and empirical reasons not to pursue an analysis of verbs such as those involving colors as derivatives from adjectives. In the specific case of verbs, four specific facts support our take on the matter: (i) the verbs to be analyzed (the verbal correlates of ((2)a-b)) share the same derivational constituents; (ii) the selection of alternating affixes (-in/-a/ø) is not relevant; (iii) neither is categorial type whereby the root is regularly realized (actually, the split is also reflected by denominal verbs, cf. Hale & Keyser 2002, Harley 2005); (iv) argument structure realization patterns do not correlate with the division either: both (2)a and (2)b comprise verbs entering the causative alternation, as well as (only) transitive and (only) ergative verbs. For a detailed exposition, cf. Author (2013, 2014, 2015).

³ All throughout the paper specific tests indicated in the literature for the particular aspectual/eventive parameters at stake will be performed on data extracted from post-tagged corpus databases like CORIS/CODIS (www.corpora.ficlit.unibo.it), CLIPS (www.clips.unina.it), CoLFIS (Corpus e Lessico di Frequenza dell'Italiano Scritto).

distinction between open vs. closed scales (that is, scale boundedness), along with certain connections that can be established with relativity of the standard (absolute vs. relative) ((based on patterns that go back to Bolinger 1972 *i.a.*; cf. also Kennedy & McNally 2007 on deverbal adjectives). On this basis, we will argue that, at least as far as verbal behavior is concerned, color can be seen to conform to those proposals where color is classified by featuring an absolute standard fixing a default scale boundary (i.e., a closed-scaled property).

Next, we will turn to quirky occurrences apparently challenging the proposed relation and introduce a further variable that eventually helps accommodating these unexpected cases. Sporadic constructions apparently involving no natural threshold (i.e. not behaving as expected for closed scales) as well as others involving (unexpected) boundaries (i.e. telic predicates out of open-scaled properties) can be provided with a natural explanation as soon as two different representations of property scale are considered. In particular, the division between a quantitative and a qualitative representation of the color scale can prove extremely useful in handling otherwise unexpected behaviors, but especially if combined with a finer analysis of closed-scales types and the postulation of a medium-degree standard. Besides, these variables will be seen to uncover connections with two central patterns to be analyzed in this paper drawn from argumental relations and, in the long run, reveal interesting extensions and alternatives in the ways in which lexicon, semantics and, syntax interact in the determination of aspect.

In particular, this will allow us to establish a parallel with the way in which different arguments determine the aspectual contour the (event yielded by the) verb hosting them. In concrete, we will propose that this should not be seen as an indication of a variable typology (i.e., that color may be eventually associated either with closed or open scales) but rather of the fact that semantics does not exhaust the problem and that syntax participates and in different ways—both configurationally and compositionally.

Now, in order to get started, we must provide a general backdrop. Therefore, a few general considerations about color, its formal

implications and its place among comparable property-denoting elements are in order.

2. Color and scales. Two main types drawn by boundedness.

In theory, several different structural characteristics of a property scale could be important, including whether the scale structure associated with a given property is finite (i.e., has boundaries drawn by minimal or maximal elements) or not, and in case it does, whether those boundaries can be surpassed, or not. We may also consider whether proper ascription of the property at stake corresponds to the achievement of a lowest, medium or maximal degree in the scale, and if the standard rests on a comparison class (i.e., a relative standard) or is rather an absolute value, either set by default on lexically-encoded information or fixed by a conventional rule (McNally 2011). By the same token, we may wonder whether gradability is possible or not. Or if the standard shows significant context sensitivity or not, and so forth. In any event, it is also clear that elucidating the full range of structural variation in scales that natural languages are sensitive to would require an empirical investigation that goes beyond the scope of a single paper.

So, with a view to narrowing down alternatives and loose ends, we will delimit our study by focusing on two variables among those available in dealing with the topic of color. In particular, we will focus on two parameters that have been widely studied before in the classification of adjectives (cf. Hay et al. 1999, Kennedy & McNally 2005 i.a.), under the assumption that relevant connections can be established between verbal and adjectival predicates formed on the basis of color-denoting roots.

First, we will address the parameter whereby a scale is either open or closed and the that this may have on the behavior of the predicates derived. This choice is not arbitrary; rather, it relies on a significant body of literature (see Cruse 1986, Hay 1998, Hay, Kennedy & Levin 1999, Kennedy & McNally 1999, Paradis 2001 i.a.) acknowledging its direct participation in the problem at stake. As a second step, we will consider two different dimensions according to which the standard or threshold is established.

2.1. First step: scale boundedness, adjectives, and verbs.

In particular, there is by now a considerable body of literature arguing that various linguistic phenomena are sensitive to whether the scale associated with the adjective is either open or closed—i.e. whether it comprises maximal and minimal values in the domain of the corresponding measure function, or whether it lack such values altogether. More specifically, the distinction between open and closed scales—i.e., working under the simplest assumption about possible scale structures according to boundedness⁴—has been widely pointed out as the source of the difference between different types of predicates building on property-denoting roots, colors included (Cruse 1980, 1986, Bierwisch 1989, Paradis 1997, Rotstein & Winter 2004, Kennedy & McNally 2005 *i.a.*).

Interestingly, on these grounds two adjectives semantically similar like *bianco* [white] and *chiaro* [light]

(1)—at least in the sense that they both convey properties related to pigmentation, color shades, etc.—can be shown to involve important differences.

- (1) a. In certi momenti della giornata il puntino diventa **maggiormente** {rosso/#brillante}
 in certain moments of-the day the dot-DIM becomes mostly red bright
 ‘In certain moments of the day the dot becomes mostly red/#bright’
- b. Questo residuo insolubile è **pressoché** {bianco/#chiaro}.
 this residue insoluble is quite white light
 ‘This insoluble residue is almost white/#light’

⁴ Of course, scale boundedness involves finer-grained distinctions. Basically, a scale may have neither a minimal nor maximal element, but if it does comprise boundaries, the scenario is not unanimous, for presence of one scale boundary does not necessarily involve presence of the other. In other words, a bounded scale may have maximal and minimal elements, but it may also minimal but no maximal element, or it may have a maximal but no minimal element. Nevertheless, these further alternatives are not relevant to the property under scrutiny here. Hence, we will continue under the simplest distinction, which is the contrast drawn between predicates built on open property scales and those comprising bounded intervals, as seems to be the case for color. Eventually, we will introduce a finer distinction (minimum/medium/maximal standard) that seems to fare better in accommodating the aspectual behavior of the verbs under study and drawing clearer differences between bounded scales.

- c. Vero è che questa sorte di formaggio resta **alquanto** {bianco/chiaro}
 true is that this sort of cheese remains rather white light
 ‘It is true that this kind of cheese remains rather {white/#light}’
- d. Tutte le pagine di wikia risultano con sfondo **totalmente** {nero/#scuro}.
 all the pages of wikia result.PL with background totally black dark
 ‘All wikia pages come up with a totally black/#dark background’.
- e. Un hamburger **completamente** {rosso/#multicolore}.
 a burger completely red multicolor
 ‘A completely red/#multicolor burger’
- f. Un limone **perfettamente** {giallo/#colorito}
 a lemon perfectly yellow colorful
 ‘A perfectly yellow/#colorful lemon’

Notably, they display important differences in how they accommodate aspectually relevant adjuncts. This type of distributional pattern lends further empirical support to the differentiation of two natural classes of adjectives determined by how they accommodate degree modifiers (Hay et al. 1999 *i.m.a*). Specifically, as a natural consequence of scale boundedness, adjectives involving properties with maximal and/or minimal values (2b) are expected to pick out proportional and maximality modifiers (cf. 3b). In turn (contextual sensitivity aside), adjectives associated to scales with open intervals (i.e. that do not feature maximal/minimal values) like those in (2a) are normally out—or, at least, odd—in these contexts, as (3b) shows. In the same manner, gradability (4) can be alternatively related to the use of scale openness/closedness in expanding relevant contrasts within these two predicate classes (cf. Paradis 2001 *i.a.*)

- (2) a. grosso, alto, lungo, largo, dolce, chiaro, scuro, colorito, brillante, oleoso
 thick, tall, long, wide, sweet, light, dark, colourful, bright, oily
- b. aperto, chiuso, pieno, macchiato, rosso, giallo, nero, bianco, verde, grigio
 open, closed, full, spotted, red, yellow, black, white, green, gray
- (3) a. {#perfettamente/#completamente/#quasi/ #pressoché} chiaro, scuro, brillante, colorito, multicolore
 {perfectly completely almost nearly light, dark
 bright, colorful, multicolor

- b. {a metà/ perfettamente /completamente/quasi/presoché} bianco, rosso,
nero, giallo
{halfway perfectly completely almost nearly} white, red,
black, yellow
- (4) {molto/troppo/abbastanza/un po'} scuro, chiaro, brillante, #bianco,
#nero, #verde, #rosso, #grigio.
Very too enough a little dark light bright white
black green red gray

Interestingly enough, note that color adjectives pattern rather differently from other hue-denoting adjectives, like *chiaro* [light], *scuro* [dark], *brillante* [bright] across all these alternatives. In this sense, the specific case of the Italian root $\sqrt{\text{scur[o]}}$ shows a much clearer situation that its English counterpart, *dark*, at least according to some considerations raised in the literature (cf. Kearns 2007)⁵.

Now, in explaining these patterns—and especially with (1) in mind—, a logical connection with the way motion and space figure in natural languages arises, and one that will make particular sense at the end of the paper.

In principle, the reason why the adjectives in 0b —among which we find color— can be argued to involve closed scales follows from essential requirements for calculating total and intermediate degrees on a measure function, which, in principle, is supplied by the property scale. If the scale associated with adjectives that accept modifiers of the kind of *presoché* [almost], *alquanto* [quite] or *quasi* [almost]⁶ lacked salient scalar boundaries, it would be impossible to calculate the difference between

⁵ Specifically, Kearns (2007(52)) addresses divergent patterns shown by *dark* to argue that its shifting classification (as a closed scale in some cases, and as an open scale in others) is indicative of a scalar boundary encoded in the root and not picked up by the derived (adjectival) form. Accordingly, the verb *dark* alternates between telic and atelic readings. Yet, the patterns addressed also involve factors which need to be strictly separated from lexical/syntactic encoding and which, in our view, expose a telicity that is clearly determined outside grammar and the lexicon. As here we are concerned with the grammatical/lexical problem, we will consider those cases unaffected by external or subsequent determinations.

⁶ It is true that 'a metà' is not so easily accommodated by color adjectives, at least without forcing a specific quantitative reading. We will address this specific circumstance next, along with the fact that verbs derived from colors find no problem in accommodating this adverb either.

the situation expressed and the relevant value on the interval that needs to be reached for proper ascription of the property. Accordingly, we assume that only colors, hue or shades associated with bounded ranges make it possible to calculate distance with respect to a salient point in the scale, and thus identify the point targeted by adverbs of this sort. Similarly, maximality modifiers such as *perfettamente* [perfectly] and *completamente* [completely]—which are to be logically related to event boundedness and telicity afterwards—can be handled as long as the property scale involved comprises a closed interval; that is, a quantized (i.e., a finite) scalar extent that needs to be covered in order to deliver completion or totality. Hence, the property standard sets a value that serves as natural event endpoint; that is, the terminus that needs to be reached for the event to count as completed. Even if the association of closed scales to a maximal degree or standard is a complex issue demanding clarifications—to be presented next—, it can still be noted that this situation draws a visible contrast with the properties denoted by adjectives of the type represented in 0a, such as *dark*. Arguably, the fact that they fail to accommodate adjuncts targeting either a medial or a maximal degree is seen as an indication of these adjectives involving properties associated with open scales⁷. Conversely, we can build on empirical evidence contributed by affinity with adjuncts like *perfettamente*, *pressoché*, *alquanto*, to assume that color adjectives 0 are associated with closed intervals or bounded scales.⁸

Now, the logical question to ask is whether these well-known differences in adjectival predication are also relevant to other morphosyntactic realizations of the same lexical root. In other words, whether those aspects of meaning drawing two natural classes of adjectives also affect other categories and are actually cross-categorical.

In a nutshell, the expectation goes as follows: if color adjectives involve maximum/minimum values ([+m]scales, in our terms) and

⁷ Leaving aside the potential ascription of a maximal degree to some originally open-scaled properties due to contextual factors (cf. Kearns 2007 on adjectives like *cold*).

⁸ This characterization agrees, in general terms, with semantic studies (see McNally 2011, Kennedy & McNally 2005) and experimental studies (Clapp 2012, Hansen & Chemla 2015) on color adjectives.

absolute standards (Clapp 2012, McNally 2011 *i.a.*), then the verbs derived—in the classical sense of ‘deadjectival verb’—shall denote properties with corresponding aspectual characteristics. More precisely, given the behavior exposed above, it is not unreasonable to expect verbs to feature this scalar upper boundary which, consequently, allows completion (and, hence, telicity) under the relevant conditions. This relation is expected to hold at least according to the widely-studied correlation between scale boundedness (+[max] scales) and absolute standards, and, in turn, with event boundedness (Hay et al. 1999). In fact, even if we refused to accept the relation between absolute standards and scale closedness (Kennedy 2007 *i.a.* for analytic data, Syrett et al. 2010 for an experimental argumentation), the same results should follow.

Two main observations converge here. On the one hand, if the distribution conforms a long-defended (cor)relation between the aspectual implications of the property-denoting root and those of the designated event. Specifically, as the property-denoting root supplies a scale along which the progression of the event can be estimated, and scale structure positively correlates with the aspectual setup of the event, a root-to-event homomorphic relation obtains⁹. As a natural consequence of this relation, predicates building on closed-scaled properties (i.e. involving [+m]√) shall show a visible affinity with adjuncts targeting either a partial or a total completion of the designated event (made available, precisely, by the bounded scale), which, in turn, should not be so easily accommodated by events rendered by verbs involving open property scales (correspondingly mapped by the [-m]√ lying at their heart). On the other hand, if the inverse relation holds, it is another long-held insight—the analysis of color as a paradigmatic case of closed scales—that would find additional support.

As a matter of fact, both predictions are born out, as verbs in 0b are typically expected to handle adjuncts like *a metà* or *totalmente* 0b, due

⁹ A similar (root/event) homomorphic relation is analyzed in works from the syntactic (constructional) camp (e.g. Harley 2005) and from semantic works on different constructions (see Wechsler 2005). From this point, we will refer to this homomorphism as Root-Event Homomorphism [REH].

to the presence of a salient degree or standard against which both an intermediate stage in the process and completion can be calculated. In turn, verbs that might seem similar in the denotation of a COS related with shades and tonalities, though crucially diverging by featuring an open scale, like *schiarire* [lighten], *scurire* [darken] or *impallidire* [pale] 0a, do not. Interestingly enough, the fact that color verbs allow degree modifier like *pressoché* [nearly] 0 is particularly compelling, inasmuch as the modifier makes the salient scale boundary stand out. Besides, compatibility with non-completion adverbs in general, but especially *quasi* [almost], is particularly relevant in this respect, given the finer distinctions that it allows for. More precisely, compatibility with *almost*-type adjuncts can be expected not only as long as a closed interval is involved, but also as long as a non-minimal boundary degree in the scale can be identified and, hence, surpassing of zero-degree along with non-completion can be estimated. This draws a relevant difference with predicates like *chiaro/schiarito* which, under normal conditions¹⁰, do not involve a reference point (interval boundary) against which partial completion could be estimated¹¹. A

¹⁰ From now on, this expression is referred to the fact that the behavior of this type of predicates can eventually vary as the result of context sensitivity and the possibility of scale delimitation by (either linguistic or non-linguistic) context (cf. Kearns 2007). Here we leave this matter and related non-grammatical issues (e.g. coercion) aside and rather focus on the core problem at stake.

¹¹ Indeed, the distribution and interpretive effects of *almost* has been extensively used in developing adjectival typologies. For instance, Cruse (1986), Yoon (1996) and Rotstein & Winter (2004) offer a classification that differentiates between total-partial (dry-moist, clean-dirty, straight-bent/curved, smooth-rough, complete-incomplete) and relative scales, which reject *almost* (*long, short, expensive, cheap*). Yet, this does not predict the behavior of the second member of the total/partial pair (almost dry/*moist). Instead, Kennedy (2007) proposes a three-fold classification to accommodate partial scales, under the claim that *almost* is allowed if a standard is drawn by context (see also Kennedy and McNally 1999, Hay et al. 1999, Kennedy 2005), thus drawing the following typology:

1. Total scales: standard value is fixed on zero degree on a closed interval.
2. Partial scales: standard value's default is zero degree on an open interval (ultimately overridden by context, thus giving a closed interval).
3. Relative scales: lacks a default standard (open interval).

However, in our view, scale boundedness and relativity of the standard can be related thought they should remain logically separated. Quite apart from that, the terminology is not convenient, given that 'total scales' can sporadically allow surpassing of the

second important observation allowed by these adjuncts will be presented in the next (sub)section.

- (5) a. ingrossare, allungare, allargare, addolcire, schiarire, scurire, imbellire, impallidire
thicken, lengthen, widen, sweeten, lighten, darken, embellish, pale
- b. aprire, chiudere, piene, macchiare, arrossire, ingiallire, annerire, sbiancare, inverdire, ingrigire
open, close, fill, spot, redden, turn yellow, blacken, whiten, turn green, turn grey
- (6) a. schiarire, scurire, impallidire {#ametà/ #maggiormente/ #completamente/ #perfettamente}
lighten, darken, pale {halfway mostly completely perfectly
- b. sbiancare, arrossire, annerire {ametà/ maggiormente/ completamente/ perfettamente}.
whiten, redden, blacken {halfway mostly completely perfectly
- (7) Pressoché / quasi {sbiancato/#schiarito}.
Nearly almost whitened lightened
'Nearly/almost whitened/#lightened'

Moreover, the presence of a scale boundary and its correlation with telicity defended here also matches the fact that neither *sbiancare* nor *annerire* tolerate progression beyond a point in the scale; in principle, the color standard sets an event endpoint that can be met but not surpassed. By contrast, *scurire* and *schiarire* turn out natural under the same conditions (presumably out of involving scale structures with open (property degree) intervals and, hence, further progression (and a higher degree of the property) is always possible).

Finally, the standard test used in the literature in the diagnosis of verbal telicity shows a distribution which nicely dovetails with the

maximal standard and comparison (x is cleaner than Y). Instead, we will offer another scalar typology, using boundedness as single parameter. This three-folded typology goes beyond previous (binary) accounts of bounded scales (cf. Kennedy & McNally 2005) by building on the identification of a non-minimal, non-maximal value setting the relevant scalar threshold.

patterns obtained so far. Note that the open-scaled COS verb (e.g. *schiarire*) are natural with framing adverbials (0b), which is normally considered an indication of verbal¹² atelicity, whereas the closed-scaled COS (e.g. *sbianchire*) correctly handles the endpoint adverbial (0a).

- (8) Si {#anneriva / #sbiancava / scuriva / schiariva} sempre di più
 SI blacken.PIMP whiten.PIMP darken.PIMP lighten.PIMP always of more
 'It always turned too #black/#white/dark/light'
- (9) a. La candeggina sbianca i tessuti {*?per ore/in una ora}
 the bleach whitens the fabrics for hours in an hour
 'The bleach makes the fabrics lighters (*?for hours/in an hour)'
- b. La candeggina schiarisce i tessuti {per ore/#in una ora}¹³
 the bleach lightens the fabrics (for hours/#in an hour)
 'The bleach lightens the fabrics (for hours/#in an hour)'

Additional aspectual parameters and precisions are still to be drawn. For the moment, we can close this (sub)section by observing that, overall, data consistently suggests that the correlation between scale boundedness and aspectual closure, widely pointed out in the literature, can be easily extended to Italian verbs building on color roots with the expected results. In particular, distribution of totality and maximality modifiers serves as an excellent introduction into the correlation at stake, since verbs like those comprised in 0—which can be presented as the verbal alternatives to the adjectives in 0—show cross-cut behavior patterns, just as adjectives showed contrasting patterns also following from the distinction between scales comprising or lacking scale boundaries. In this sense, aspectual patterns contributed by verbs denoting (change of) color 0 can be arguably connected with the patterns seen in adjectival predicates regarding

¹² In truth, as noted since Dowty (1991), these adverbials are extensively used for telicity distinctions, though they can also blur these contrasts if lexical and compositional aspect are not carefully differentiated—which is the reason why we emphasize the verbal (or, lexical, in the sense of lexical aspect or *Aktionsart*) nature of the telicity at issue. Nevertheless, we will not limit ourselves to this diagnostic; rather, we will provide further analytic evidence (e.g. imperfective entailments, Subinterval property) reaffirming the (cor)relation proposed.

¹³ Leaving contextually-bounded readings of the *chiaro/schiarire* scale aside. See n. 10.

aspectual closure and its correspondence with scale closeness (recall 0-0)¹⁴. From here, their aspectual classification as inherently telic verbs follows naturally. In turn, the distribution of proportional and non-completion modifiers like *pressochè* suggests a specific type of scale boundedness with special implications to be elaborated further.

However, before we turn to that matter, there are other consequences of scale closure deserving attention. As just anticipated, aspectual/eventive consequences of scale boundedness do not end in mere aspectual endpointedness (telicity, so to speak), as classically assumed in the literature. Further specific tests for telicity not only provide results nicely dovetailing with these observations but also point out more relevant ways in which verbs building on different property-scale structures differ.

2.2. When scale boundedness results in something else: Resultativity and DEH

Further empirical evidence in support of the linguistic relevance of scale boundedness comes from entailment patterns observed in adjectives.

Leaving truth condition evaluations aside, it has been often noted that adjectival predicates bear different entailment patterns according to the association of an absolute vs. a relative standard (cf. Cruse 1980, Rotstein & Winter 2004, Demonte 2012; Kennedy & McNally 2005; Kennedy 2007, *i.a.*). Yet, what is less often noted is that they also differ as to the entailment patterns that can eventually be related to event boundaries—which can be subsequently connected to important eventive differences displayed by the verbs at the table. One such possible pattern is the one sketchily phrased in 0.

- (10)a. Token_1 is (more) P(+), though Token_1 is not necessarily included in the set of tokens defined by P(+).
 b. Token_1 is P(+), then Token_1 is necessarily a member of the P(+) class.

¹⁴ However, a proviso is in order here, for property scales involve variables (e.g. contextual fixation of standard as maximal vs. minimal value) making this test not as reliable as desired. In fact, this is precisely the main impetus behind the further tests and analysis to be presented next.

This kind of distinction figures in various argumentations and analysis in the literature in relation to how standards for each property are fixed. Here, we will make use of this particular distinction to explain empirical differences between scalar types. In particular, we want to entertain the idea that the basic opposition represented by 0 can be analyzed in terms of boundedness, independent of relative fixation of standards, and be deployed as a formalization of eventive differences between verbs featuring diverse scale types. On these grounds, the circumstance represented by 0b would be interpreted in relation to those cases where a scalar value or interval is identified as the relevant cut-off point for proper ascription. Put simply, the idea is that certain property scales comprise, in their semantic specification, a value that 'stands out' by functioning as a standard of membership, such that entities whose property degree meet the standard fall within the set of entities truthfully designated by that property; conversely, entities not meeting this requirement fall in the negative region of the scale. By contrast, other property scales—arguably, open-range properties—do not allow for proper identification of a default salient degree or cut-off point, as natural consequence of the structural properties of the scale. As a result, some entities exist for which we cannot say whether they feature the property or not in terms of set-classification given by a systematic cut-off point; instead, a mere non-zero requirement—that is, bearing a minimum degree of the designated property—suffices. Moreover, lack of an identifiable (relevant) point in the scale often determines that there are no clear boundaries between the positive and negative regions of the scale; in consequence, a change along this property may occur, without this implying that the object lands, as a result, on the positive region of the scale. In other words, by implying this non-zero requirement, any increase in the property scale suffices for the change (designated by the verb) to count as occurred; however, this does not necessarily mean that the object is now a proper representative of a clear-cut class, but rather that it has changed in any degree along the scale.

For instance, *scuro* [dark] involves, as a consequence of its scalar openness, not a default standard that needs to be met or surpassed, but rather a non-zero property degree for a positive ascription. This means that for proper or truthful ascription, any degree of *scurezza* [dark]ness, even the most minimal one, will do and no set-membership is required or expected as a result (0a). Accordingly, the process designated by *scurire* counts as completed even if the increase was the minimum possible (let us say, just a centesimal degree along the scale of darkness), and it as a result the object is only required to bear a higher degree of darkness, as (0b) shows. Thereby, denying that the adjective applies is compatible with a successful completion of the event (0b) and the situation is thus properly defined by (0a).

- (11)a. Il cielo è scuro [ma non è propriamente scuro]
 'The sky is dark [but it is not really dark though].
 b. Il cielo si è scurito [ma non è propriamente scuro] (cf. =>Il cielo è più scuro)
 'The sky darkened' [but it is not dark though] (The sky is darker
 [than it was an hour ago])

Anyhow, this comes out as a significant difference with color adjectives. For instance, in the case of *nero* [black], the degree of property involved for a truthful ascription of the positive form of the adjective determines set-classification (i.e., the circumstance depicted by 0b). In consequence, truthful ascription of the property involves an extent that forbids the negative implication (0a) and raises a visible polarity as a consequence of the resulting set-membership 0. Notably, as noted above, a negative form of the *scuro* [dark] type of property involves zero degree of that property—i.e., if the sky is not *scuro* [dark], it has zero *scurezza* [dark]ness in it. This is in stark contrast with color scales, inasmuch as the negative form of a color adjectival predicate involves not a zero degree but rather an insufficient one for set-classification: a same sky can bear a little amount of gray (imagine a gray, cloudy area on a black sky) without that making it a *gray sky*. In order to be truthfully described as *gray* instead, a required degree of *grayness* is necessary, which, in turn, would determine its classification in a different set—the universe of gray items—; otherwise the object keeps being defined as *black* and thus belonging to the set of

items properly defined as black. Further, set-classification or membership determines a polarity 0 not quite paralleled by open-scaled properties; yet, it is also true that contrasts of this sort are not that robust and might be subject to debate. Yet, important insights can still be derived regarding the eventive characteristics of the COS event yielded in each case, to be presented next. For the moment, these considerations allow us to introduce a finer-grained distinction among the different ways in which a scale can be bounded.

- (12)a. Il cielo è nero #[ma non è propriamente nero]
'The sky is black #[but it is not really black though]'
- b. Il cielo si è annerito #[ma non è propriamente nero] (cf. => Il cielo è più nero)
'The sky blackened #[but it is not really black though]' 'The sky is more black'
- (13)a. Il cielo non è scuro #[ma piuttosto fosco]
'The sky is not dark #[but rather dull]'
- b. Il cielo non è nero #[ma piuttosto grigio scuro]
'The sky is not black [but rather dark grey]'

To be more specific, bounded scales are normally classified on a binary basis determined by either minimal or maximal values on the scale. That is, a scale can be bounded at a lower point in the scale (lower closed scales) or at the upper point (upper closed scales, cf. Kennedy & McNally 2005).

Now, the indication about color requiring a significant degree to be reached, and consequent set-membership this is important because it reveals a crucial structural difference with a minimum-standard, which some closed (i.e., lower closed scales) share with open scales (cf. Wechsler 2005, Kennedy & McNally 2005). Take, for instance a lower closed scale representative, such as *sporco* [dirty]. Since this property is normally related to a scale with a salient threshold set at a minimum degree, any degree of dirtiness will do for truthful ascription—for instance, a drop of spilled coffee on a blanket counts for the blanket be regarded as *sporca* [dirty]. In general terms, this matches the requirement posed by open scales and translates in a capacity to accommodate degree

modifiers targeting this minimum requirement (0a). By contrast, the amount of *blackness* involved in *cielo nero* [black sky] must be far more than non-zero—recall the example of the slightly clouded black sky—; otherwise, that is, if the amount of black is just the minimum (over zero), the object would be designated by another color, normally the one that predominates (cf. McNally 2011). This requirement explains the felicity of modifiers that pick out the non-minimal point in the scale needing to be reached (0b). Besides, if only a minimum degree standard were required for colors, then we would be left with no logical or principled way to explain the contradiction noticed in (0b), which, we argue, follows from set-membership drawn by this non-minimum requirement.

- (14)a. Il cielo è appena/leggermente {sporco/#nero}
 ‘The sky is slightly/slightly dirty/#black’
 b. Il cielo è esattamente {#sporco/nero}
 ‘The sky is fairly #dirty/black’
 (15)a. Il cielo è scuro [ma anche fosco]
 ‘The sky is dark [but it is turbid]’
 b. Il cielo è blu #[ma è anche grigio]
 ‘The sky is blue [#but it is also gray]’

On the other hand, the type of scale boundary seen in colors is visibly different from the case of maximal standard (upper closed) scales like the one involved in *trasparente* [*transparent, see-through*], where a non-maximal positive degree is not enough for proper ascription of the property, as with *sporco* [dirty]; but, in addition, only a maximal degree suffices for truthful ascription and/or satisfactory change along the scale. This means that, for upper closed scales, property ascription is incompatible with partial change (0c). In contrast, color verbs allow truthful ascription of the property and deliver complete changes without requiring that a maximal value or extent is reached, a property shared with both open scales (0b) and minimally-bounded (lower closed) scales (0b). Of course, this does not mean that colors can be classified along with properties with a scale boundary set at a minimum-degree, especially in light of the relevant differences illustrated in 0-0; and, in turn, the non-zero requirement shared by

minimally-bonded and open scales does not mean that they fall in the same class either, among other things because the scale boundary keeps being crucial, notably, to deliver telic events and allow completion (0b), which is not possible on open scales by default (0a).

- (16)a. Il cielo è scuro [ma non è (#completamente) scuro] OPEN SCALE
 ‘The sky is dark [but it is not (#completely) dark]’
- b. Il cielo è sporco [ma non è completamente sporco] BOUNDARY AT
 MINIMUM DEG.
 ‘The sky is dirty [but it not completely dirty]’
- c. Il cielo è blu [ma non è completamente blu] BOUNDARY AT
 MEDIAL DEG.
 ‘The sky is blue [but it not completely blue]’
- d. Il cielo è trasparente #[ma non è completamente trasparente] BOUNDARY
 AT MAXIMUM DEG.
 ‘The sky is transparent #[but it is not completely transparent]’

These essential differences can be also tracked in verbs and, in fact, explain important eventive contrasts. On the one hand, for verbs of the type we are concerned with here, color verbs, scale boundedness reflects in the fact that undergoing the event involves ascription of the corresponding property. As a consequence, negation of the designated state (if the event has been completed) delivers a contradiction (0b). On the face of it, this circumstance is shared by bounded scales in general, including lower closed (0b) and upper closed scales (0b); and, in turn, draws an important difference with hue-denoting roots featuring open scales (0b).

On the other hand, the medial boundary featured by color forms determines that the change count as completed, even if a non-maximal degree or completion have been achieved (0a). This circumstance is shared with lower closed scales (0a), thus reflecting the similarity shown by the corresponding adjectives (recall 0b-c); and, at the same time, marks an important differences with upper closed scales, in which case the natural endpoint of the event necessarily coincides with saturation (0a).

- (17)a. La candeggina ha schiarito i tessuti #[ma non completamente]
 OPEN SCALE
 'The bleach has made the fabrics lighter #[but not completely] (cf. Hay et al 1999)
- b. La candeggina ha schiarito i tessuti [ma non sono chiari]
 'The bleach has made the fabrics lighter [but they are not light (though)] (cf. Kearns 2007)
- (18)a. La candeggina ha sporcato i tessuti [ma non completamente]
 BOUNDARY AT MINIMUM DEG.
 'The bleach has made the fabrics dirty(#er) [but not completely]
- b. La candeggina ha sporcato i tessuti #[ma non sono sporchi]
 'The bleach has turned the fabrics white #[but they are not white (though)]
- (19)a. La candeggina ha sbiancato i tessuti [ma non completamente]
 BOUNDARY AT MEDIAL DEG.
 'The bleach has made the fabrics lighter [but not completely]
- b. La candeggina ha sbiancato i tessuti #[ma non sono bianchi]
 'The bleach has turned the fabrics white #[but they are not white (though)]
- (20)a. La candeggina ha pulito i tessuti [ma non completamente]
 BOUNDARY AT MAXIMUM DEG.
 'The bleach has made the fabrics clean(#er) [but not completely]
- b. La candeggina ha sbiancato i tessuti #[ma non sono bianchi]
 'The bleach has turned the fabrics white #[but they are not white (though)]

To recap, the special type of scale structure displayed by color forms reflects in property ascription (and consequent set-classification) but at the same time with a crucial difference between event endpoint and maximality. In this light, the entailments proposed in 0, which might seem debatable at some point, pin down the eventive consequences of a medial scale closure in colors at the same time that they illustrate the major contrast with verbs and adjectives on hue-denoting roots associated to an open scale. Thus, the essential circumstance depicted by (0a) defines a distinctive entailment delivered by verbs building on open-scaled hue roots across its different occurrences 0. In turn, the circumstance represented by (0b) reflects in a general pattern seen in colors, as can be seen in corpus data like 0.

- (21)a. La camomilla mi ha schiarito i capelli [ma non sono ancora chiari].
 The chamomile I.DAT has lighten the hair.PL but not are yet clear
 ‘Chamomile has made my hair fairer, but it is not fair though’
- b. Grosse nubi avevano scurito il cielo [ma non era scuro]
 great clouds had.PL darkened the sky but it is not dark
 ‘Great clouds darkened the sky, but it wasn’t dark though’
- (22)a. I capelli si sono sbiancati [#ma non sono bianchi]
 the.PL hair.PL SI are whitened but not are white
 ‘The hair turned white, [#but it is not white]’
- b. L’oro si è annerito (affatto) [#ma non è nero]
 the-gold SI is blackened at all but not is black
 ‘The gold is (completely) blackened [#but it’s not black]’
- c. Improvvisamente, i semafori arrossirono [#ma non erano rossi]
 unexpectedly the.PL light turn-red-PST but not were red
 ‘Suddenly, the traffic lights turned red [#but they weren’t red]’

These differences cutting across hue-denoting verbs leads us to at least two different and valuable analytic observations.

For one thing, a crucial difference would be that transition from zero-degree of the property to a standard degree (or, rather, to either medium or near-maximal) in color predicates constitutes an identifiable shift logically involving some kind of threshold (i.e. a standard). This is in contrast with the type of (undistinguishable) transition between degrees in an open scale (i.e., with no such thresholds) such as the one involved in *scurire* or *schiarire*. In consequence, the mapping of these two different (scale) structures reflects into different temporal structures for the corresponding transition (i.e. the verbal predicate rendered on such basis). Informally speaking, by implying this identifiable shift (i.e., involving a cut-off point), the verb is associated with a transitional structure that describes both progress (interval of duration of the event) and a culmination (at the end of each such interval, the degree attained is within the set of degrees associated with the positive form of the corresponding adjective). Then, if a given standard value specifies such a set, culmination equals to landing in the positive area of the property scale. By contrast, scales lacking such thresholds—we used the case of *dark* and *light* for the ease of exposition—reflect into an

unthresholded transition, where the interval rendered by event progression extends along a homogeneous, positive area of the scale—which, in addition, may have already begun in the positive area of the scale. We will focus on the specific implications of non-homogeneity next (Section 0); for the moment, what is important is that no natural ‘transition’ or cut-off point are involved and ascription of the property denoted by the adjectival predicate is not dependent on completion. This basic difference, which can be regarded as a resultative entailment—arguably holding only for color and bounded roots—is exemplified in (23).

- (23)a. La candeggina ha schiarito i tessuti \Rightarrow I tessuti sono chiari OPEN SCALE
 ‘The bleach has made the fabrics turn lighter’ \Rightarrow ‘The fabrics are lighter’
 b. La candeggina ha sbiancato i tessuti \Rightarrow I tessuti sono bianchi
 BOUNDED SCALE
 ‘The bleach has made the fabrics turn white’ \Rightarrow ‘The fabrics are white’

On the other hand, this resultative entailment marks another important difference in eventive terms. Interestingly enough, negative operators (not) and partial modifiers (prototypically, *almost*), long used in the diagnosis of telicity (since Dowty 1979), make such contrasts visible.

According to the general wisdom, for certain verbs (paradigmatically, telic complex events [accomplishments]) negative and partial operators are ambiguous between a counterfactual interpretation (i.e. a case where somebody had the intention to start the event, but the event never begun) and a scalar or incomplete interpretation (i.e., a case where the event began but the natural endpoint was not reached). Instead, in other verbs (atelic transitional events [activities] and also simple (punctual) telic events [achievements]), the second alternative is not available: the only interpretation possible is the counterfactual reading.

Interestingly enough, for COS verbs involving color, double scope seems to be enabled, indicating a complex telic structure. This means that operators like *no* [not] or *quasi/pressoché* [almost] have a choice: they can scope either over the event *per se* (i.e., the transition towards the required standard of color or cut-off point); alternatively, they can

also scope over the natural endpoint of the event, which coincides with set-classification; that is, over the result of the completed event which, as seen above, involves property ascription. As a consequence, two readings are allowed by color verbs (0b): one in which somebody had the intention to start the event, and didn't, thus the object experiences no change at all; and one where the event begun but the natural endpoint was not reached, although some change might be involved. In general, this eventive complexity marks a further difference with other COS verbs featuring hue-denoting roots. More specifically, verbs of the type of *schiarire* [lighten] or *scurire* [darken]—that is, those associated to open scalar ranges—only seem to have one reading under negation: the one in which the event was about to begin but never did. Now, given the non-zero requirement holding for open scales, according to which the most minimal change counts (over-zero), a counterfactual reading implies that the object experiences no change at all (0a).

OPEN SCALE

- 0a. Non (si) {schiarì / scurì / impallidì}
 Not (SI) lightened darkened paled
 'It didn't get lighter/darker/paler' [Counterfactual interpretation]
- b. Non (si) {sbiancò / arrosì / annerì / inverdì} BOUNDARY
 AT MEDIAL DEG.
 Not (SI) whitened reddened blackened turn.green. PST
 'It didn't turn white/red/black/green' [Counterfactual interpretation]
 'It didn't get [any] whiter/redder/blacker/greener' [Scalar/Incomplete Interpretation]

What is important here is that resultativity is not just a problem of meaning, but rather a structural problem for the grammatical representation of eventivity, either semantically or syntactically speaking. In other words, double scope can only be possible as long as there are two candidates for the operator to scope on, and this can only be explained in structural terms. From a semantic perspective, the structural ambiguity seen above—i.e., between an incomplete and a counterfactual reading—requires two different eventive components or subevents: the process and the result. If pushed further, the resultative

entailment delivered by color verbs can be argued to involve a richer descriptive content in its semantic representation, as it would include both the path traversed as the COS event progresses but also a final location, the expected resulting state, which is allegedly represented by the natural endpoint set in the scale determining property ascription. In turn, if represented (or encoded) in the syntax of the VP, this relative complexity would involve two different projections, regardless of the specific way in which the relation between eventive structure (semantics) and (lexical) syntax is seen (see Ramchand 2008, Borer 2005, Ritter & Rosen 1998 for different views on the matter; see Wechsler 2005 for a specific discussion on complex resultatives).

Anyway, as we are mainly concerned with semantics here, we want to close the section by pointing out three major consequences that follow.

First, according to these results, we will interpret the capacity of delivering structural ambiguity (i.e., operator double scope) as an indication of a relative structural complexity in color verbs. The idea about an event structure being relatively complex is in contrast to the simpler structure assumed for other COS verbs building on hue roots—specifically, those associated to open scalar structures—, which do not allow for such an ambiguity and are constrained to a single (counterfactual) reading under negation.

Second, the case presented by COS verbs on open-scaled hue roots lends further support to the claim that COS is not necessarily telic; but rather, is compatible with lack of default temporal bound. In principle, this creates a problem for the uniform classification of COS verbs, especially deadjectivals, as accomplishment verbs, requiring a careful revision. Given the specific approach taken here, the inherent atelicity of some hue verbs is a non-configurational result; that is, a mere consequence of (the semantic specification supplied by the) lexical root. As the hue-denoting root, as supplier of the relevant scalar structure, contributes an open-range scale, then the COS progressing along such an open range is consequently atelic—that is, its progress does not involve a natural endpoint—and, hence, does not involve a proper accomplishment event, but rather a non-finite progression which can be

measured along the scale supplied by the root. This specific situation will be fleshed out next.

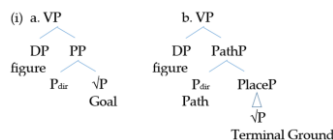
Third, this structural difference between verbs featuring open and bounded hue scales has cross-categorical significance, as it also shows up in the corresponding adjectival predicates (cf. 0 and 0 above)¹⁵.

Finally, (fourth), the patterns introduced in this specific subsection are of interest regarding the predictive power of PsEH. To be more specific, analytic and corpus data indicates that not only telicity but also resultativity can be predicted by the recruitment a bounded scalar structure (i.e., scale boundedness) by the hue-denoting lexical root. Notably, verbs with color roots display not only telic but also

¹⁵ Alternatively, the ambiguity allowed by color can be argued to stem from the availability of two distinct scales that can be targeted by the adjunct. On one reading, *not/almost* are targeting the property scale that is (lexically) encoded in the lexical root (i.e., the red/black/white-ness scale). On this reading, a predication like (0b) is true as long as the degree to which the object is white, red, black is not the required (according to the designated threshold). There is also a second reading, where *half* is targeting a quantity-based scale that is provided by the path described by the COS verb; in other words, it scopes over the progression rendered by the root when derived as (conflated into) a verbal predicate involving a transitional event. In the case of *schiarire* and *scurire*, the root cannot be scoped because it encodes an open scale. Crucially, this does not invalidate the asymmetry just postulated, since scalar open/closedness is not necessarily exhausted by a featural difference, but actually involves a structural one as well (cf. Terminal coincidence, in a Hale & Keyserian sense, or even a Path+Place structure for configurations involving a terminal ground).

If we keep the parallel with motion that initially supported these considerations (cf. §0), then counterfactual interpretation—shared by both telic and atelic DVs—is about negation scoping over the transitional component of the COS (i.e., fictive or abstract motion of the Figure along the scale provided by the root, which in turn explains the fact that event progression can be measured by degree of the relevant property in gradable scales; i.e. the EDH to be presented next). By contrast, scalar or incomplete interpretation is given by the operator having scope over the implied resulting state. In such case, the property associated to the lexical root is necessarily interpreted as Terminal Ground.

Bottom line, atelic, non-resultative COS would presumably involve a structure like ((i)a) whereas telic, resultative (and hence, more complex) COS events would be structurally more like ((i)b). For a detailed and principled exposition of these proposed structures, cf. Author (2015).



resultative entailments. This creates a key difference with morphosyntactically identical verbs built on comparable hue-denoting roots like *schiarire* or *scurire*, which deliver atelic, non-resultative behavior. Empirically, the use of negative and partiality modifiers supports this relation, allows relevant connections with adjectival predicates and, moreover, provides important insights into the type of threshold involved in colors (medium standard) on which we will elaborate further on later.

2.3. Two different homomorphisms and Subinterval Property.

So, as we anticipated, resultativity lines up with telicity regarding eventive properties following from scale boundedness. Fortunately, another relevant relation is still to be drawn, which concerns the possibility of delivering atelic and telic COS verbs with different semantic implications. On these grounds, two different measure relations determined by the root-to-event homomorphism can be distinguished. More importantly, these two relations can be easily derived from the patterns just observed.

As we exposed above, DVs of the *lighten/darken* type do not bear a result implication (recall 0a). This is important because, structurally, there is admittedly a single component (the progress/process component). As the natural event endpoint, consequently overlapping with the result state, is not included in the default semantic representation, progression is therefore not measured by (distance from) an expected endstate. In consequence, scale openness translates in these verbs into a never-ending progression, involving a type of Degree-to-Event Homomorphism [DEH]. More specifically, as the measuring function cannot be established in relation (i.e., by distance or proximity) to a default endpoint set by the property scale, and, at the same time, in contrast to bounded-scaled COS, any (non-zero) increase counts as a proper COS, these verbs can be thus argued to involve a correlation or homomorphism—that is, an ordering-preserving function—between the ordered set of degrees comprised in the property scale and the unfolding of the event along this axis.

This means that homomorphism models the progress of an atelic, non-resultative and homogeneous event which can be consequently measured by the increasing or decreasing degree or extent to which some property truthfully applies to the object by undergoing the designated COS (0a). As the event advances, so does the amount of the property (expressed by the root) which is ascribed to the affected entity. In practical terms, given the example in (0a), the more lightening process is involved, the lighter the fabrics will be. Needless to say, DEH is logically facilitated by gradability, a property which is in principle not shown by colors (recall 0, but with some exceptions, see Mangialavori 2015 but also McNally 2011). Anyhow, this suggests a link between gradability and scalar unboundedness deserving further exploration. For present purposes, it suffices to say that DEH crucially concurs with two properties diagnosed in this paper by PSEH: (non) resultativity and homogeneity. Note that, on the one hand, for verbs allowing DEH transition does not necessarily involve the attainment of the property denoted by the root (0a) and, secondly, a degree-to-event homomorphism is possible inasmuch as any subpart of the event is properly defined by the event (i.e., any tiny segment of *scurire* [darken] represents a proper *scurire* [darkening] event).

This introduces an important difference with color verbs concerning the way in which the scale-to-event relation is modeled. In principle, the difference at stake is that COS on bounded (hue) scales involves proper ascription of the corresponding state only as a result of event completion—that is, resultativity—and an event that only applies to the final point of the progression—i.e., a non-homogeneous event. Therefore, instead of a DEH, the relevant measure function involved in verbs like *sbiancare*, *annerire*, *arrossire*, *inverdire*, etc. is rather held between the unfolding of the event and its natural endpoint, which coincides with the achievement of a state. To this result, an identifiable cut-off point in the relevant scale, allegedly lacking in hue-denoting roots like *scuro* [dark], is crucially required. Put differently, proper COS along a bounded hue scale is only achieved at the end of the transition, at the point where progression meets the salient threshold in the property scale. As a consequence, the default scalar boundary serves as the reference location

(e.g., a terminal ground) against which the event is measured. Consequently, degree modifiers are accommodated in terms of distance to or coincidence with this relevant scalar threshold instead of measuring positive degrees on an incremental scale. In the practice, this explains the contrast in the type of non-completion adverb tolerated, as consequence of the variables presented above. So, on the one hand, the two different situations described here account for a major and long-studied empirical pattern, corroborated above for Italian verbs.

On the other hand, the distinction is important because presents a valuable connection with a much more reliable property related to verbal telicity, also known as the Subinterval Property (since Bennet & Partee 1972).

According to this variable, only atelic events apply to all the subparts of the interval along which the event holds; by contrast, telic verbs only hold to the final subinterval (the endpoint) or, better, to the point that overlaps with the end of the interval. Just to give one example, according to our prediction, open-scaled properties like *chiaro* or *scuro* shall deliver atelic verbs and, hence, any subinterval of the lightening or darkening processes would be properly described by the events denoted by '*schiarire*' and '*scurire*', respectively. By contrast, for color COS verbs, the event has been successfully undergone (only) if the designated state is achieved; hence, it is only the last step in the whitening or blackening process that would be properly described as *sbiancare* and *annerire*. Informally, this entails that, for example, if somebody is darkening something, or that something is undergoing a darkening process for a time interval, then at each subinterval of this time there was a darkening event. In turn, if somebody is whitening something, or that something is undergoing a whitening process for a certain time, then no subinterval of this temporal span defines a whitening event, except for the last one (i.e., that where the *whiten[ed]* state is attained), as (25) illustrates.

- 25) a. La camomilla schiarì i capelli.
 the chamomile lightened the.PL hair.PL
 'Chamomile made the hair lighter' \implies For every subinterval of *schiarì*
 [lightened], the event denoted by *schiarire* [lighten] applies.

- b. La camomilla sbiancò i capelli.
 the chamomile whitened the.PL hair.PL
 ‘Chamomile turned the hair white’ \neq => The event denoted by *sbiancare*
 [whiten] applies only to the final step

For practical purposes, this main difference between telic and non-telic verbs is some times more easily pin down by the *imperfective paradox*. Summarizing greatly, what is assumed here is that the progressive (imperfective) form of a verb, if atelic, implies the event; by contrast, the progressive (imperfective) form of a telic verb does not imply that the event took place—only completion counts for the event to be properly regarded as having taken place 0. In the case of deadjectival verbs 0, it has been widely pointed out that open scaled-verbs, there is an imperfective *paradox* going on (Declerck 1979, Bertinetto and Squartini 1995, Hay 1998, Hay et al. 1999, Kearns 2007 *i.a.*). Thus, if the analogy holds, then color verbs 0 keep patterning with prototypical closed-scaled DVs 0 and, hence, keep being associated to telic, resultative events also according to both the Subinterval Property and imperfective implications.

- (26)a. Mary was running \Rightarrow Mary run
 b. Mary was running a mile \neq => Mary run a mile
 (27)a. John was dirtying the room \Rightarrow John dirtied the room
 b. John was cleaning the room \neq => John cleaned the room¹⁶
 (28)a. I capelli si stavano schiarendo \Rightarrow I capelli schiarirono (sono ancora chiari)
 b. I capelli si stavano sbiancando \neq => I capelli sbiancarono (\neq => sono ancora bianchi)

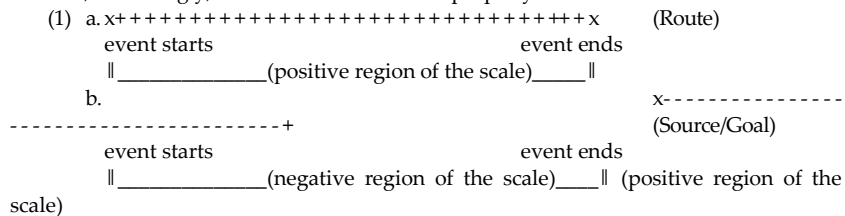
As summarized by the DEH, in the COS type of event involved by *scurire* or *schiarire* the object (i.e., the Figure or theme argument) changes by degrees along a scale that is homomorphic to the event. As minimal degrees of change (increasing or decreasing) along the scale count as the event having taken place, then the property scale correlates with each

¹⁶ Cf. Winter (2006) for ways in which contextual information can interfere the atelicity of open scales.

subpart of the event. Therefore, a basic property of the paths onto which open scales are mapped when delivered as COS predicates is that they are coextensive with the event: the property can be measured along all the path, even in the first tiniest fragment of transition. By contrast, for color COS, the property is mapped as Terminal Ground: only total transition lands the figure in the area of the scale associated with the positive form of the property. Progress is thus not calculated by property degree but by distance with respect to the corresponding endstate (i.e., the area in the scale associated with the positive form of the adjective); in consequence, lack of Subinterval property follows (and nicely dovetails with the lack of DEH suggested above).¹⁷

Finally, another subtle but relevant difference—which can also be derived from the asymmetry in structural complexity just pointed out—is contributed by adverbs of repetition. Note that verbs of the type of *schiarire*—hence, according to our hypothesis, open-scaled verbs—allow a repetitive reading when combined with adverbs like *nuovamente* [again], as expected for atelic verbs. This contrasts with the ambiguity between a repetitive and a restitutive reading allowed by *sbiancare*, which is, in turn, another traditional indicator of telicity (cf. e.g. von Stechow 1996, Beavers 2011:209 *i.a.*) 0. Technical controversy aside, what is clear is that a restitutive reading can only be rendered as long as a natural threshold is comprised in the scale.

¹⁷ From here, different observations could follow. For instance, if we abide by the widely suggested analysis of COS in terms of (abstract/fictive) motion, then in one case the property scale is mapped onto a path that is coextensive with the event and also inherently unbounded—though potentially *boundable* by different mechanisms, to which we will briefly turn later. In the other, the property is rather mapped as Terminal Ground; accordingly, no EDH nor Subinterval property arise.



- (29)a. La candeggina schiarì i tessuti nuovamente.
 the bleach lightened the.PL tissue.PL again
 ‘The bleach made the fabrics lighter once more’ [Repetitive reading]
- b. La candeggina sbiancò i tessuti nuovamente.
 the bleach whitened the.PL fabric.PL again
 ‘The bleach turned the fabrics white once more’ [Repetitive reading]
 ‘The bleach turned the fabrics (back to) white (again)’ [Restitutive reading]

2.4. *Partial summary: eventive differences following from scale structure in DVs.*

A brief overview of main aspectual diagnostics indicates that the long defended (and also debated) relation between scale structure and aspectual closure finds a key parameter in boundedness. But also, and more importantly, that color presents surprisingly reliable patterns in this respect.

Basically, color roots consistently pattern with closed scales in the delivery of telic verbs, as expected according to REH. However, further analytic evidence shows that the aspectual properties that can be derived from scale boundedness do not end in mere telicity, so to speak. Among other things, verbs involving color-denoting roots show a resultative semantics, a double scope for negation and a resistance to negative implications not necessarily allowed by verbs involving an open-scaled change of nuance/pigmentation—a difference that can be presented as a cross-categorical cross-cut if related to entailment patterns originally analyzed in adjectival predicates. This coincides with a relevant ambiguity between a repetitive and a restitutive reading, typically expected from telic verbs. Accordingly, color COS DVs also seem to lack Subinterval Property and render non-homogeneous events. In short, according to our results what differentiates color-based DVs from verbs of the type of *scurire* or *schiarire* is that the property is **only but necessarily** ascribed to the object as a result of event completion. Finally, they involve a correlation between the unfolding of the event and the attainment of a result state which contrasts sharply with the DEH seen in open-scaled COS (e.g. *schiarire un po’* [lighten a little]).

All in all, this type of analytical data can be deployed as favorable evidence linking colors to closed (property) scales, thus contributing to settle down the debate about the semantic ontology of color, at least according to the typologies that prove grammatically/lexically relevant.

3. Unexpected cases and an alternative: quantitative vs. qualitative representation of color.

According to what has been exposed in the previous section, REH holds for color DVs judging from the variable contributed by scale boundedness. Summarizing greatly, as expected for closed-scaled properties, color DVs like *sbianchire*, *arrossire*, etc. easily accommodate maximality modifiers and give resultative, non-homogeneous predicates lacking Subinterval Property. By contrast, otherwise similar verbs like *scurire* or *schiarire* give atelic, homogeneous predicates and consequently fail to accommodate totality modifiers, logically associated with closed intervals.

Now, with this in mind, let us turn to 0-0.

- 30) a. Tonno, se è troppo rosso non mangiarlo.
tuna if is too red not eat-it.ACC
'Tuna, do not consume if it is too red'
- b. Vittima di razzismo perché troppo bianco
victim of racism because too white
'Victim of racism for being too white'
- c. Il sale rameico è **appena verde**
the salt cupric is barely green
'Cupric salt is slightly green'
- (31)a. Lo vidi **sbiancare appena**.
it.ACC saw whiten barely
'I saw it turn slightly white'
- b. L'unico problema potrebbe essere non avere **annerito abbastanza**
the-only problem could be not have blackened enough
'The only problem could be not having blackened enough'
- c. Questa **arrossì eccessivamente**.
This.FEM reddened excessively
'This one became excessively red'

- d. Il maledetto canale **annerì ancor più** e si arricchì di pestilenze
 the cursed canal blackened even more and SI enriched of pestilences
 'The damned canal turned even blacker and got full of pestilent stuff'
- e. È sbiancato, ma **non mai tanto**.
 is whitened but not ever much
 'It has whitened, but not that much'
- (32)a. L'unico suggerimento che posso darti è di schiarire **totalmente** tutta la peluria.
 the-only advise that I-can give-you is of lighten totally all the
 peach fuzz
 'The only piece of advice I can give you is to totally lighten all the
 peach fuzz'
- b. Schiarire **totalmente** i capelli, dalle punte alle radici.
 lighten totally the.PL hair, from-the tips to-the roots
 'To lighten totally the hair, from the end to the root'.
- c. Il cartoncino è **perfettamente** piano e **completamente** scurito in tutto lo spessore.
 the cardboard.DIM is perfectly flat and completely
 darkened in all the width
 'The cardboard is perfectly even and completely darkened in all its width'
- d. Tutto il vetro pian pianino si è **completamente** scurito fino ad arrivare quasi alla fine.
 all the glass little little-DIM SI is completely darkened until to arrive
 almost to-the end
 'The whole glass turned dark little by little, until reaching the border of
 the glass'

Of course, if we already consented to accommodate color predicates as closed scales—especially ones allowing maximal/partial adjuncts (recall 0b) and rejecting overcompletion 0—then occurrences like 0 and 0 may come as an unwelcome surprise. Actually, we have to admit that, conceptually, the combination with intensive modifiers like *troppo* [too], *appena* [barely] 0 with color adjectives somehow makes sense and, although not frequent, seems ultimately possible. In any event, this circumstance calls for a stark differentiation between what is conceptually perceived and what is linguistically (lexical/grammatically) relevant. Conceptually speaking, colors (specifically in the case of white) are actually perceived as gradable properties: experimental data shows that magnesium oxide is commonly taken as a standard white,

"whiteness" is measured by the degree of approach to this standard (cf. Brewster & Mc Adam 1979 *i.a.*). However, none of this is linguistically relevant. But other differences are.

In the specific case of verbs, for one thing, adjuncts like *appena* and *abbastanza* [enough] (0c, 0a-b) should not be allowed, at least according to either non-gradability or to the lack of Subevent property displayed above and the existence of a cut-off point in the scale. More importantly, adverbs like *eccessivamente* [excessively] or *ancor(a) più* [even more] (0c-d) are clearly not expected on a closed-scale basis on two grounds. First, because colors proved to handle maximality/completion modifiers in relation to resultativity, hence suggesting that a cut-off point is met in ascription of the property (see 0b); secondly, because the event should be concluded as soon as the required degree (maximal) is achieved and progression beyond that point should not be possible—rather, the only threshold that can be surpassed is the medium one thus allowing non-maximal degree to concur with resultativity (0a)¹⁸. In this sense, 0e suggests that in certain circumstances an object can have undergone the color-change process without this resulting in proper ascription of the designated color (i.e. apparently, something can *whiten* without necessarily becoming *white*) and that, moreover, the resulting property is graded (*tanto [that much]*) in the way typically expected for open (gradable) scales giving homogeneous events (recall 0 above). On the other hand, and oddly enough, verbs involving an open scale apparently succeed in accommodating totality modifiers 0, which logically undermines the difference defended so far.

So, the logical question we may ask is if REH fails here of it is some other variable involved.

Now, if we want to defend the claim that scale structure (and, more specifically, scale boundedness) is a reliable parameter in predicting the aspectual behavior of property-denoting predicates, then we need to introduce a concomitant parameter, logically separable from boundedness.

¹⁸ This, in fact, being one of the most relevant differences between sheer boundedness and telicity (cf. Author 2015).

In particular, we need to acknowledge that two distinct scalar readings are possible with property scales like the one introduced by color. What is interesting is not only that, if correct, we would be providing evidence in favor of the linguistic (grammatical) relevance of this distinction; more importantly, this difference would readily handle the problematic data like 0-0, thus dispensing us with the need to abandon the REH.

3.1. Essential description

Informally speaking, this variable can be summarized under the claim that a *quantitative* reading of property extent corresponds to those cases where the color is measured against a scale of how much of an object is of a particular color. In such case, the specific nuance of the designated color is irrelevant; what matters is that the color at stake can be identified as predominant in the object—by way of example, recall the observations about *cielo blu* [*blue sky*] offered above (cf. 00). In turn, in the *qualitative* reading the scale measures not a part/whole relation, as the quantitative scale does, but rather how closely the object's color approximates or diverges from a standard or prototype (Kennedy & McNally, 2010:91 *i.a.*).

Crucially, the contrasts rendered by these two variables are not only about possible interpretations, but also (lexico)grammatically visible and involve interesting effects as a result of interaction with other constituents¹⁹. Just to give one example, the typology of adjuncts appearing with the corresponding verbs can be quite telling. For instance, adverbs most frequently combined with color DVs 0—according to corpus queries in Romance languages like Italian and Spanish, as well as non-Romance such as English—may endorse one reading, the other or both. More specifically, adverbs like *debolmente* [weakly] (and probably also *a sufficienza* [enough]) endorse a qualitative reading—being not that close yet or having just reached the required level of color according to the standard, respectively. In turn, adjuncts like *gradualmente* normally favor a quantitative reading,

¹⁹ And, hence, the problem is not just about possible readings but about the interaction between semantics and syntax (i.e. constructional semantics).

as long as gradual progression is measured by focusing on the part/whole relation of object surface being covered by or turned to the designated color. Others, like *facilmente* and *improvvisamente* do not help to disambiguate between the quantitative and the qualitative scale—yet, they are not trivial, since the first can be deployed in the analysis of the internal structure of the VP (more on this later) whereas the second indicates an aspectual contour (natural endpoint) to be logically connected with telicity.

- (33) {ennegrecer/blanquear/enrojecer} fácilmente, súbitamente, débilmente,
 gradualmente, suficientemente
 {annerire/sbiancare/arrossire} facilmente, improvvisamente,
 debolmente, gradualmente, a sufficienza
 {blacken/whiten/redden} easily, suddenly, weakly,
 gradually, sufficiently

So, how is this implemented in our data? Let's deal first with the quantitative view.

3.2. Quantitative representation of color and medium-threshold.

Taking the description just introduced to the domain of color, this parameter would essentially be about proportions of pigmented surface in the extent of a given object: for something to count as *being of a* certain color, that color has to quantitatively *predominate* in the object. Accordingly, a physically measurable 'cut-off' point that distinguishes blue, red, white or black objects from non-blue, non-red *etc.* is established by predominance according to a part/whole relation in the (extension of the) object.

However, the implementation of this parameter involves certain theoretical discrepancies. The dispute is not about relativity of the standard, nor boundedness itself; in fact, most works on color scalar structure concur in putting quantitative reading of color on a par with (absolute) closed scales (cf. Clapp 2012, McNally 2011). Rather, what is not completely settled is the type of closed interval—minimum, medium, or maximal standard—that this prevalence requirement involves.

Although some experimental data might have been used to put forward minimum absolute standards (Clapp 2012), (cf. Hansen & Chemla 2015), other works show diverging results indicating that color may fall in any of these three patterns (absolute+low, absolute+high or absolute+medium threshold) and even support the findings contributed by analytic work (e.g. McNally 2011) in favor of a medium-degree threshold.

Let's deal with the minimum-standard hypothesis first. If color adjectives squared with absolute, minimum standard (as Clapp 2012 suggests), then they should behave as (minimum²⁰) standard absolute properties like *spotted*, *bent*, *dirty*, *sick* *visible*, *wet*. Now, we may want to bear in mind that for paradigmatic absolute minimum-degree properties a minimum amount (of, say, spots on the object's surface for the typical case of *spotted*) suffices for the latter to be properly regarded as positively involving this property. Truthful predication only requires having the property in question to the smallest possible degree (only one spot will do), and denying that the adjective applies is incompatible with having any degree of the property in question. However, as we suggested above, this is not precisely the type of implication involved in either adjectival or verbal color predication, and a quantitative representation of the scale helps making this clearer.

At least according to the data introduced so far, an object can bear a (minimal) amount of blue without that being enough to be properly classified as a blue token. In practical terms, there can be blue areas in the sky—remember the gapped cloudy sky—without that making it a blue sky. As McNally (2011) among others suggests, a certain amount, at least, higher than the amount of surface covered by another color, must be affected. This is precisely what, theoretically speaking,

²⁰ Leaving aside eventual interpersonal variability regarding the area of the scale where the standard is located, and other non-linguistically relevant variables (e.g. optics and the way color is perceived by each eye, etc.), eventual variations are not as significant for verbal behavior as one might expect. Overall, experimental (e.g. Hansen & Chemla 2015) and analytic studies indicate that the quantitative reading of color eventually falls into three patterns, determined by the corresponding combination of absolute property (as opposed to relative properties) with either low, high or medium values in the scale. Even if results are not consistent, a noticeable preference for the first option (i.e., absolute property with a minimal value) is usually reported.

predominance is about and what, empirically speaking, data like 0 can be deployed to corroborate—and, in turn, what further experimental results also suggest²¹. The difference with minimum-standard property scales stems precisely from the predominance requirement: in practical terms, for something to count as having a certain color, a non-zero amount is not sufficient (i.e., predominance involves a requirement over the 50%). In this light, the exclusion noted in 0 is naturally accommodated: the object is properly designated by the predominant color; hence, designation via another (non-predominant) hue necessarily fails for object identification or set-classification.

In either case, what is relevant is that color is undisputedly placed as the counterpart of other prototypical cases of absolute closed-scaled properties: those requiring the crossing of a maximal degree threshold overlapping with the positive area of the scale. One paradigmatic example of this class is *full*, in which case it is the level determined by a maximum degree (the upper boundary of the extent scale) that must be achieved (cf. Kennedy & McNally 2005, Syrett 2007 for analytic and experimental evidence respectively). Here, truthful application of the adjectival predicate entails having the property in question to a maximal degree (cf. McNally 2011:4). In consequence, whereas something needs to have at least some spot to be *spotted* (minimum-standard), or needs to have a predominance of any shade of red to be properly identified as a *red thing* (medium-standard), the glass needs to be *completely* filled to be properly regarded as a *full glass* (maximal-standard). Even if hard to pin down empirically, note that the lack of a maximal boundary in colors draws a difference with maximal-extent adjectives like *pieno* [full] in accommodating adverbs that stress this completive reading 0. Actually, a better proof of this non-maximal standard was already suggested by data like 0, where non-maximality does not hinder resultativity (for which predominance is required), in sheer contrast to 0. In any event, and more importantly, the standard does not need to be fixed by or in relation to the context; so, once this necessary

²¹ Experimental work currently in progress on native Italian speakers especially focusing on identifying the quantitative threshold associated to *predominance* in each subject.

(medium) amount of color is met, then the color adjective behaves like an absolute adjective²²

- (34)a. Il bicchiere è perfettamente {pieno/chiuso/asciutto/#grigio/#blu/#rosso}
 ‘The glass is perfectly {full/closed/dry/#grey/#blue/#red}’
 b. Il cielo è perfettamente {limpido/scoperto/#blu/#nero/#grigio}
 ‘The sky is perfectly {clear/unclouded/#blue/#black/#grey}’

To recap, even if there ultimately are different shades and degrees of *red*, *white* or *black*; nevertheless, for practical purposes what counts is the fact that a given threshold (i.e. a point in a scale) must be crossed (most predominantly, a medium one) in order for the color to be quantitatively ascribed to an object. And, anyhow, this normally leads to a telic event.

Quite apart from this, another prominent fact at sight is that a quantitative reading endorses a telic sense by providing a delimited extension to be affected by the designated event. Apparently this holds even for open-scaled DVs (recall 0); accordingly, quantitative representation can be ultimately involved in a telic use of originally atelic verbs. Note that in these apparently offending cases adjuncts are recruited in order to guarantee an interpretation whereby the COS predicate is affecting a delimited surface. In other words, quantitative reading seems to be involved in these cases apparently escaping REH.

We will elaborate on this next. Yet, there are other facts we need to highlight first, basically related to frequency and productivity. On the one hand, a closer look on corpus data shows that occurrences such as those represented in 0-0 above are existent, though surprisingly scarce. And, in fact, combinations of verbs like *scurire* and *schiarire* with partial adjuncts (e.g. *pressochè*, *quasi*) even if conceptually possible, show no results in corpus search. On the other hand, quantitative representation of color can be safely related to telicity, regardless of not involving a qualitative cut-off point. Even a feeble shade of the color at stake is satisfactory, as long as the object is only required to meet (equal or

²² In truth, the postulation of a medium standard is not part of a general consensus. Just to give one example, Kennedy and McNally (2005) work under the classical view, assuming that there are only two possible standards: either the maximal or the minimal non-zero value on the scale.

exceed) more-than-a minimum amount of *red(ish)*—or *white(ish)*, or *black(ish)*—area to be admitted in the already populated—and not necessarily homogeneous—set of things or entities that can be properly regarded as *white*, *red* or *black* (correspondingly). In other words, achievement of the standard is drawn regardless of how (on which level of the qualitative property scale) the relevant threshold is drawn.

It is precisely that loose end—the discussion about the potential heterogeneity of the set of things that can be quantitatively regarded as *red*, *white* or *black*—that leads us to the second variable involved.

3.3. Qualitative representation of color

If analyzed qualitatively, a color scale is precisely about proximity to the prototypical tint/ton of red, yellow, etc.; no difference being made as to the amount of surface affected.

Yet, this does not necessarily involve a different type of standard. A medium-degree threshold is also what counts here; what changes, though, is the parameter whereby this medium degree is measured. The qualitative medium-standard for color corresponds to proximity to a 'center' in the color scale picked out by the standard or prototype (Kennedy & McNally, 2010:91)²³. As a matter of fact, experimental tests using extreme white in assessing whiteness grading also favor a medium-standard. In particular, contrary to the other observed arrangements, experiments show that better correlation is obtained with an "intermediate" whiteness standard than with magnesium oxide (i.e., what they consider a 'white' object), thus suggesting that

²³ On an experimental account, finer-grained precisions are not usually achieved. Practically speaking, the "qualitative" reading of color adjectives has been convincingly shown to differ from both minimum degree and relative standard property scales, but finer-grained patterns beyond that point are far from clear. In our interest, what is relevant is that, as far as aspectual/eventive behavior is concerned, is that a threshold is still drawn and needs to be crossed for the predicate to properly apply to the object, and property ascription is not relative either. On the other hand, it is interesting to note that corpus data suggests that the qualitative scalar view of color, is context dependent (be it grammatical, be it conceptual), whereas absolute adjectives have standards that are encoded in the lexical unit (i.e., P^v) (either at the maximal or minimal degree threshold).

the observers were accustomed to grade on the basis of a more yellowish standard such as "intermediate" or even "natural paper white." (cf. Brewster & Mc Adam 1979).

In the practice, this second measurement variable allowed by color seems particularly convenient to accommodate cases flying in the face of the REH such as those in 0.

Even if colors have been regarded as solid prototypes of absolute scales in the literature (cf. Clapp 2010)—which is somehow convenient, given the strong relation between closed scales and absolute standards—, other studies point that involvement of a qualitative scale leads the property to behave more like relative properties, in the sense that there are variations introduced by differences in comparison class to which measurement can be sensitive to (see Kennedy & McNally 2010:92). For instance, a relative standard might be claimed to be involved in cases like (0a), where *troppo rosso* [too red] can be explained as exceeding the standard red hue for tuna fish; or even in the case of (0b) where the person being described as *too white* may involve an excessive degree in comparison with other representatives of how *white* is understood when applied to a given human group/class. However, things are less clear for (0c) where no comparison is necessarily involved—in any case, the only comparison at stake is the expected: the one between the shade of green noted in the salt and the prototype standard of *green*. That is, an absolute standard.

Therefore, on closer examination, we should better assume that color can ultimately be understood as a relative standard if subject to certain conditions (e.g. if coerced); otherwise, certain gradability is triggered though independent from (linguistic) context, in relation to the specific hue conceived as standard for that color. That is, we may link the color standard to a certain comparison class; yet we do not necessarily need this comparison in order to describe an object as *too red*, as 0 shows—not at least in the way we need it for *too tall, long, wide, etc.* In any event, eventual gradability (not to be confused with relativity) is not a lexical, grammatical nor even linguistic fact, but rather a conceptual circumstance (i.e., color involves gradable shades, tones, and tints according to word

knowledge or encyclopedic/conceptual knowledge). Empirically, the linguistically-relevant fact is that the standard does not depend contextual determinations (although it might be affected by it) –at least, as prototypical relative properties are—and the absolute standard will be preferred over a standard which is determined contextually.

- (35)a. Il mare sembra appena bianco sotto i colpi de' remi.
the sea seems almost white under the strokes of oars
'The sea looks slightly white under the strokes of the oars'
- b. Nerastro: alquanto nero.
blackish almost black
'Nerastro [blackish]: almost black'
- c. Quel cielo assai blu, assai rosso di tramonto.
that sky very blue very red of sunset
'That sky highly blue, highly red with the sunset'
- d. Vetro trasparente, leggermente verde
'Clear glass, slightly green'

On the other hand, the location in the scale (i.e. property degree) continues to be measured in relation to a (medium) standard. Therefore, the medium standard can be barely met (*appena, abbastanza*) or even surpassed (*eccessivamente, troppo*) without this being a problem. In consequence, a qualitative representation of the color scale can handle the quirky behavior of color predicates in 0 and 0 above, no recourse to context sensitivity being made.

In this respect, even works taking different views on the relativity of the standard in the qualitative use admit that judgments are significantly consistent as to the quantitative reading. Specifically, what these works suggest (cf. McNally 2011) is that a fixed standard for the quantitative reading makes it sound like an absolute adjective, albeit one where the standard is not anchored by the minimum or maximum degree on the scale and, at the same time, does not display the context sensitivity necessarily involved in relative standard scales and entailment patterns. In this sense, even if postulation of a medium-degree standard is not a typical choice in the literature, it proves particularly important in accommodating cases like 0-0. In particular,

the well-known relation between absolute standards and closed scales (formulated as the Interpretive Economy account in Kennedy 2007), as developed, does not predict the existence of adjectives whose standards behave as if they were absolute without being endpoints on a scale—and, hence, allowing the standard to be surpassed. Therefore, the clarification that would be needed is related to the observation that degree thresholds (standards) are fundamentally different from degrees which are not at the endpoints of scales.

Yet, medium standards continue to be as crucial in delimiting the aspectual contour of the predicate as minimal or maximal ones. In fact, association with a medium standard, regardless of this threshold being drawn on a quantitative or qualitative scale, consistently reflects in unanimous behavior for the major part of the corpus data. In fact, note that explicitly-induced qualitative reading of the scale associated with color consistently show compatibility with totality modifiers 0—even for adjectives— and a repetitive vs. restitutive ambiguity 0; which add up to the compatibility with endpoint adverbials (for X time) and consequent incompatibility (or, at least, oddity) with framing adverbials (for X time) 0, as expected for telic.

- (36)a. Questo colore non è {propriamente/completamente/totalmente/*abbastanza} rosso, ma arancio.
 this color not is properly completely totally enough
 red but orange
 ‘This color is not {completely red/totally red/*red properly/*red enough}, but orange’
- b. Il lavaggio con il limone e sale fino sbianca {completamente/perfettamente} il bucato, rimuovendo l’antiestetico alone grigio.
 the washing with the lemon and salt fine whitens completely perfectly the laundry, removing the-un-aesthetic hue grey
 ‘Washing with lemon and salt whitens the laundry, removing the unattractive grey shade’
- (37)a. Così lo si reimmerge nei carboni ardenti, fino a farlo diventare nuovamente rosso
 So lo SI re-immerses in-the.PL coals burning until to make-it become again red
 ‘This way it is (re)submerged in burning coal, until it gets red again’

- b. La candeggina sbiancò nuovamente i sanitari di porcellana, portandoli al colore originale.
the bleach whitened again the sanitary.PL of porcelain, taking-them to-the color original
'The bleach whitened the sanitary, taking it back to its original color'
- (38) La candeggina sbianca i tessuti {*per ore / in una ora} [portandoli al colore originale]
the bleach whitens the fabric.PL for hours in an hour taking-them to-the color original
'The bleach whitens the fabrics (*for/in) an hour, taking them back to their original color'

Therefore, these examples should not necessarily be understood as an indication about the qualitative representation being less prominent or not defective—i.e., assuming that this variant must be somehow (contextually) induced. Rather, the generalization that can be safely drawn is about scale closedness: in the practice, and even if eventually a gradable-like behavior is consented, a qualitative reading of the scale onto which the event is mapped also reflects in a telic predication. This is exactly what keeps differentiating colors from open scales, even in its qualitative use. In fact, the absence of such thresholds in the open scale explains the fact that a standard must be contextually (semantically and syntactically) provided for an open-scaled DV in order to eventually allow a telic construction somehow paralleling the case made by the qualitative threshold involved in color—and, interestingly enough, color (i.e. a color-denoting noun) is usually recruited to that end 0.

- (39)a. Il legno si è scurito fino a diventare di un plumbeo color prugna.
the wood SI is darkened until to become of a leaden color plum
'The wood has darkened until reaching a leaden plum color'
- b. I capelli sono castani scuri (diciamo biondo scurito fino quasi al nero).
the hair.PL are fair dark say.1PL blonde darkened until almost to-the black
'The hair is dark brown (we say [it is] blonde [which has been] darkened almost into black)'
- c. Ma dopo un po' si è scurito fino ad assumere una colorazione verdognola.
but after a little SI is darkened until to assume a coloring green-ish
'But after a while it darkened until taking on a greenish color'

In sum, even if both readings can be applied to a color adjective or verb, any of them suffices to render aspectual boundedness independent of the other. Specifically, a determined tone of white can predominate in the object (i.e., it can be properly regarded as *white* on a quantitative basis), thus meeting the required (over-medium) quantitative standard; yet, and at the same time, it is possible that this quantitatively predominant tone does not meet the qualitative standard. Hence, the object whitened—it has successfully undergone a whitening process whereby the majority of its surface shows a white(ish) shade—, and, at the same time, it did not— qualitatively, it is not *white enough*. In turn, the object might render a telic sense given by achievement of the medium threshold in color quality, and yet not be a proper representative of the class of objects bearing that color if analyzed quantitatively—which is precisely what is going on in (0e). In consequence, the coexistence of these two alternative representations of the color scale would provide interesting insights in dealing with color-denoting verbs and some quirky occurrences contributed by this variable.

3.4. Event-Object Homomorphism [EOH]

Finally, let us go back to the apparent challenge raised by 0. In our view, these cases receive a natural explanation building on a quantitative representation of the color scale. Moreover, they also point to another relevant relation at the syntax-semantics interface and allow an interesting extension.

In fact, by highlighting the fact that on a quantitative basis COS telicity is about covering a determined surface, with clearly identifiable boundaries, then the logical question to be asked is if event completion can be delivered compositionally.

If quantitative boundedness is about *predominance* in the object, then predominance is necessarily about the object being bounded—i.e., having a bounded extension. Otherwise, just as happened with open scaled COS not being able to accommodate maximality modifiers, the COS event has no identifiable boundary and, therefore, total/partial progression cannot be calculated. And here is where syntax is involved: since a (delimited)

quantity-based scale is based on a (quantizable) part structure of the nominal argument (cf. Winter 2006), object boundedness becomes crucial. In fact, if we reformulate the same examples highlighting the role of the DO in aspectually bounding the event in 0, interesting results obtain.²⁴

- (40)a. L'unico suggerimento che posso darti è di schiarire totalmente *?(tutta la) peluria.
 the-only advise that I-can give-you is of lighten totally peach fuzz
 ?*'The only piece of advice I can give you is to totally lighten peach fuzz'
- b. Schiarire totalmente *?(i) capelli.
 lighten totally the.PL hair
 ?*'To lighten totally hair'
- c. *?(Il) cartoncino è perfettamente piano e completamente scurito (in tutto lo spessore).
 the cardboard.DIM is perfectly flat and completely darkened in all the width
 ?*'Cardboard is perfectly even and completely darkened in all its width'
- d. *?(Tutto il) vetro pian pianino si è completamente scurito (fino ad arrivare quasi alla fine).
 all the glass little little-DIM SI is completely darkened until to arrive almost to-the end
 'The whole glass turned dark little by little until reaching the border of the glass'

Accordingly, if the object is not (morpho)syntactically bounded, the telic use of open-scaled DVs fails (cf 0 vs. 0). In other words, any eventual boundedness contributed by a quantitative scale introduced by the object is crucial, insofar as the scale provided by the lexical root features no boundaries and, hence, cannot impose an aspectual boundary to the event.

A cursory survey on modifiers concurs with this insight. Interestingly, adverbs combined with past perfect forms of originally atelic (i.e., open-scaled) DVs like *scurire* and *schiarire* 0, respectively (ordered by higher to lower frequency), endorse a quantitative

²⁴ Note that the same holds for the apparently gradable use of these verbs (e.g. *Ha schiarito gradualmente *(i) capelli* [It has gradually darkened *(the) hair]).

reading. If this were all that needs to be said, one would be left to assume that as soon as the quantitative reading is guaranteed, then scale boundedness would not be that relevant to render a telic predicate. However, according to corpus data from Spanish and Italian, adverbs normally encouraging a qualitative reading like *ligeramente* [*leggeramente/slightly*] are heavily used as well in telic predicates. What is relevant is that in any event additional reinforcement is still necessary in order to license a telic sense in open-scaled DVs.

- (41)a. lentamente, totalmente, completamente, ligeramente, súbitamente, parcialmente
 b. parcialmente, rápidamente, instantáneamente, gradualmente, completamente, lentamente, débilmente, suficientemente, perfectamente
 a'. lentamente, totalmente, completamente, leggeramente, improvvisamente, parzialmente
 b'. parzialmente, prestamente, subito, progressivamente, completamente, lentamente, debolmente, a sufficienza, perfettamente
 a''. slowly, totally, completely, slightly suddenly partially
 b''. partially quickly, instantly, gradually completely, slowly, faintly enough, perfectly

3.5. Partial summary

So, a bird's eye view on two different representations of the scale associated to colors shows three different senses of completion and, hence, three different homomorphisms. On one (quantitative) view, the object can have less than a medium or medium degree on the scale of *redness*, *yellowness* or *whiteness*; what matters is that the object is completely or at least predominantly *red*, *yellow* or *white* in pigmentation. In this sense, behavior is better predicted on the basis of an absolute property with a medium-degree scale boundary that needs to be surpassed. On the other hand, the object can meet the necessary value on the scale of qualitative *redness*, *yellowness* or *whiteness* but that is not relevant if what is being estimated whether the object meets the standard (medium) degree on the scale of *redness*, *yellowness* or *whiteness* (i.e., if the medium threshold in the scale is being estimated

qualitatively). Even so, in both cases—quantitatively or qualitatively speaking—color predominantly behaves like absolute, closed-scaled property involving a medium degree requirement. On a third view, the quantity-based scale is crucially related to the part structure of the nominal argument. In particular, as the event is measured in relation to the extent of the object, then a bounded object (grammatically realized by a delimited/definite nominal argument) contributes a bounded, fully closed scale. This circumstance eventually allows even open-scaled DVs to render telic constructions via EOH; yet, a key difference arises from the fact that in this case telicity is a property of constructions, whereas in color DVs telicity is a property of the verb, which comprises a natural boundary provided by the scale.

4. Final remarks.

So far, we have been struggling to defend a crucial correlation between two variables involved in predicates rendered by property-denoting roots like those encoding colors: scale structure (specifically, scale boundedness) on the one hand, and aspectual structure (telicity) on the other. In particular, scale boundedness has been shown to reflect in a richer descriptive content and eventive structure (telicity, resultativity, homogeneity) for COS verbs involving color roots, which have been analyzed as scales featuring a relevant (medium) cut-off point ([+m]), according to a number of factors presented along the preceding sections. Following Harley (2005) and Folli & Harley (2006) i.a., we have alluded to this relation in terms of REH—although we could have dubbed it as an Event-Scale Homomorphism in order to leave aside the debate on the morpho-syntactic instantiation of the scale boundaries involved.

Anyhow, on closer look the scenario proves more complex, other syntactic and semantic relations being able to intervene in the aspectual determination of the event, to the point of constraining and even overriding the REH. One of these additional mechanisms is introduced by part/whole relation in the affected object (e.g. EOH). This not a surprise, but rather an expected circumstance according to

the considerable body of literature claiming telicity to be a property of constructions (particularly, verb + object) rather than of verbs themselves.

Of course, these observations are relevant in many levels which, for reasons of space, we cannot elaborate on further and will be left for a subsequent paper. For the moment, we want to focus on the fact that the cross-cut shown by argument structure—at least according to the criteria and tests recruited above—leads to two crucial connections between REH and EOH.

On the one hand, scale boundedness proves to be relevant for verbs in a way that is comparable to unincorporated measuring-out arguments like Goals. That is, as long as the scale is mapped onto a path, then the semantic role of the color-denoting component (the lexical root, we argue) is to establish the temporal/aspectual endpoint of the event. Of course, this depends directly on the type of scale involved: if the (deadjectival) verb builds on a property-denoting root associated to an unthresholded scale, then this element will not be able to delimit the transition and thus measure out the event (and, accordingly, render resultativity, non-homogeneity and the subsequent aspectual and eventive properties that we have shown follow from scale boundedness in these cases). This draws a crucial difference between change-of-tonality predicates such as *scurire/schiarire* and the specific case of color, arguably associated to thresholded scales—with a cut-off point set at a medium or over-minimum standard—in which case then scale boundedness straightforwardly reflects in event boundedness.

On the other hand, in a quantitative representation of color (hue, tone, shade) scales, the event can get measured by delimiting the affected object. Hence, another semantic and syntactic schema (EOH) comes up, eventually also allowing telic predications out of open-scaled DVs.

These divergences are especially relevant regarding the possibility to argue in favor of the relation we proposed in the beginning of the paper (Section 2) between aspect boundedness in predicates built on property-denoting roots, measurement and motion/space. In this light, the

correlation at stake and the crucial distinction brought about by COS verbs involving color/tonalities could be placed within an ampler frame, connected to the way telicity is determined in events involving directed paths. *Mutatis mutandis*—if we consent to analyze COS as (abstract) motion (i.e., as involving a transition and, hence, a directed path)—then we can present these facts as expected, according to the observations presented in the first section about how completion/partiality is measured. To be more specific, the case made by change-of-color verbs would involve a semantic and syntactic schema paralleling the case of unincorporated measure-out arguments in motion verbs—i.e., in those cases where it is the Goal rather than the Object the one imputing a boundary to the event (e.g. *roll *(to the park) in X time*). In turn, change-of-tonality verbs, building on open scales, can eventually render telic predicates by means of a further machinery, contributed by a different argumental (i.e., syntactic and semantic) relation. In this case, a quantitative representation of the property scale is crucial, precisely by allowing a relevant homomorphism between the unfolding of the event and the part structure of the affected object. Therefore, the predicate rendered is telic regardless of involving an open-scaled property-denoting root, simply because there is another relation involved and the element measuring-out the event, in this case, is the internal object (i.e. the theme).

In this sense, an ultimate observation that could be derived is that only REH can be properly regarded as a case of measure-out internal to the structure of the verb, even if a compositional (l-syntactic) view is adopted, inasmuch as the element exerting this (bounding) effect is the lexical root. On the contrary, the case of telic predicates rendered via EOH not only represents an indisputable instance of compositional aspect, but actually involves no crucial differences between color and other (transitive/ergative) verbs and the massive amount of work developed since Tenny (1985, 1992, 1994, 1995, 2000) and many others²⁵.

²⁵ In essence, we refer the widely-known claims, bearing not on a specific grammar but on universal relations, about the direct internal argument of a verb being the only

In summary, our results reinforce, in part, the larger claim held by previous work on deadjectival verbs by showing that the scalar structure of property-denoting roots is largely relevant to the semantic structure of the predicative lexical element (V, A) containing it. Yet, we also add empirical evidence suggesting that this is not a defective or general phenomenon, but rather one possible scenario and that finer considerations, like the involvement of a medium-threshold, crucially combined with the availability of a two-folded interpretation of the property scale (quantitative/qualitative representations) in color predicates also determines relevant patterns. In this respect, additional data showed that there is a bigger picture, which is more complex but, nonetheless, reliably predictable as long as the adequate parameters and variables are considered.

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overt argument which can 'measure out the event', unless it is motion or change which 'measures out the event' over time (i.e., when a Goal element can participate in aspectual structure by providing a terminus for the event described by the verb, which causes the event to be delimited).

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