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A Unified Morphosyntactic Analysis of Reduplication as Inclusion

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Abstract

This paper proposes a unified analysis of reduplication as the lexical spell-out of a relational *part–whole/inclusion* predicate (⊆) in morphosyntax. Adopting the framework of Manzini and colleagues, we argue that reduplicative morphology—across diverse languages and domains—encodes a subset relation, whereby an event, individual, or property is interpreted as included in a larger set or continuum of similar instances. We bring evidence from a range of typologically diverse languages (Tagalog, Bikol, Malay, Fulfulde, Italian, and sign languages) to show that reduplication correlates with *non-maximality*: plural number (members of a set), distributivity (individuals/events taken one by one), iterative aspect (sub-events in a larger event), and evaluative attenuation or intensification (a degree as part of a scale). The analysis is developed in a formal syntactic representation where reduplication is triggered by an elementary inclusion operator (⊆) at the X or XP level. We show that a single semantic primitive (⊆) can account for the varied meanings of reduplication in nominal, verbal, and adjectival domains. We discuss the implications of this unified approach, suggesting that reduplication is not a mere iconic or phonological process, but rather the surface reflex of a fundamental grammatical operation of inclusion.

Keywords: reduplication; morphology–syntax interface; number; aspect; evaluative morphology

1. Introduction

Reduplication—the systematic repetition of phonological material within a word—is a well-known morphological phenomenon with a remarkably broad cross-linguistic distribution. Classic observations (e.g., Sapir, 1921, cf. Moravcsik, 1978) note that reduplication often iconically conveys *"distribution, plurality, repetition, customary activity, increase of size, added intensity, continuance"*. Indeed, languages around the world employ reduplication for a wide array of functions: from pluralizing nouns, to marking verbal aspect (iterative, continuative, etc.), to deriving evaluative or expressive meanings (diminutives, intensifiers, etc.). This functional diversity has led many linguists to describe reduplication in primarily *descriptive* or *iconic* terms—as a morphological device that "imitates" increased quantity or intensity by doubling form. However, a central claim of this paper is that beneath the surface diversity of reduplicative patterns lies a *deep syntactic and semantic uniformity*. We propose that reduplication uniformly spells out an elementary predicate of inclusion (⊆) in the morphosyntax, following the theoretical framework of Manzini and Savoia (2011, 2018) and Franco (2024), who argue that many grammatical formatives (case markers, number

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inflections, etc.) instantiate basic relational meanings like *part-of* or *subset*. In other words, we claim that when a language repeats a stem (fully or partially), the syntax is introducing a semantic operator that signals *"X is part of a larger set of X"*. The apparent myriad uses of reduplication all converge on this notion of *non-maximality* or *partitive* inclusion.

To illustrate the intuition, consider a few examples. In Malay, *rumah* means "house," and the reduplicated form *rumah-rumah* means "houses"—conceptually, "house" as an element of the set of houses. In Tagalog, *araw* means "day," and *araw-araw* means "every day" (day by day)—a single day included within the recurring sequence of days. In Bikol (Philippines), *apat~apat* (four~four) means "four each" (distributively), conveying that *four* is to be taken as part of each subset in a distribution. Across these cases, reduplication signals that the base meaning should be interpreted as a subset of a larger set of similar instances, rather than a single, exhaustive instance.

The goal of this paper is to formalize this insight and provide a comprehensive argument that reduplication = lexicalization of an inclusion relation, that we will notate as ($\subseteq$) in morphosyntax. We do so by drawing on data from a variety of languages and domains (nominal, verbal, adjectival) and by adopting the theoretical machinery of the Manzini and colleagues' model of elementary predicates. In this model, functional elements (like number or case markers) are understood as expressing basic relational semantics such as part–whole relations. We will show that analyzing reduplicative morphemes in the same way not only accounts for their meanings, but also explains certain cross-linguistic regularities and restrictions on reduplication.

The structure of the paper is as follows. In Section 2, we provide a brief literature review of reduplication, covering typological surveys and previous theoretical analyses, as well as an introduction to the Manzini et al. framework on inclusion predicates in grammar. Section 3 outlines our methodology, including the languages surveyed and the criteria for analyzing reduplication in each. Sections 4–6 form the core of the analysis: Section 4 examines reduplication in nominal domains (plurality, collectives, distributives, etc.), Section 5 looks at verbal reduplication (iterative aspect, habituality, attenuation of action), and Section 6 considers evaluative and expressive reduplication (diminutives, intensification, and related phenomena). In each of these sections, we present representative data, highlight the interpretative commonalities, and propose a morphosyntactic derivation using the ($\subseteq$) operator. We also integrate sign language data (principally from American Sign Language and Italian Sign Language) in relevant sections, as sign languages make prolific use of reduplicative movements for plural and aspect, providing additional support for our analysis. Section 7 provides formal syntactic representations of how the inclusion operator is embedded in structures for different categories. In Section 8, we address potential counterexamples and alternative accounts, specifically exact-repetition phenomena (Contrastive Focus Reduplication/Lexical Cloning, cf. Ghomeshi et al., 2004 and the following literature). Section 9 concludes with a summary and future directions. Through this exploration, we aim to demonstrate that what might appear to be a purely morphological copying process is in fact grounded in the same semantic building blocks that underlie case, agreement, and other morphosyntactic phenomena. Unifying reduplication under the umbrella of an inclusion predicate yields a tighter theoretical economy (one primitive for many grammatical contexts). Our approach echoes the view by Manzini and Savoia (2011) that *lexical and functional categories share a common conceptual space*, and that distinctions between them are a matter of syntactic configuration rather than completely distinct semantic content.

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2. Background

2.1. Typological and Formal Studies of Reduplication

Reduplication has been extensively documented in the descriptive and typological literature. Rubino (2005) provides a worldwide overview of reduplicative constructions, cataloging their formal types and functions. According to Rubino, reduplication can be classified by form into full reduplication (repeating an entire stem or word) and partial reduplication (copying only a part of the base, such as an initial CV syllable or root segment). These formal types are illustrated with examples from Austronesian languages. Consider in (1) a case of full reduplication and in (2) a case of partial reduplication:

(1) Tausug
dayang-dayang 'princess' from *dayang* 'madam' (full word reduplication)
(2) Pangasinan
totóo 'people' from *too* 'man' (CV- reduplication for plural).

Partial reduplication is noted to take many shapes (C-, CV-, CVC-, etc.) and may involve fixed segments or allomorphy. Rubino also distinguishes productive grammatical reduplication from lexicalized reduplication, noting that some languages have words that synchronically appear reduplicated but carry idiosyncratic meanings (e.g., Indonesian *mata-mata* 'spy', literally 'eye-eye').

Functionally, reduplication is quite versatile. Rubino (2005) lists a wide range of semantic functions associated with reduplicative morphemes: plural number, distributivity, collectivity, verbal aspect (iterative, continuative, inchoative, etc.), diminution (attenuation of meaning), intensification, and others such as reciprocity and adjectival degree. Often, the same reduplicative pattern can have seemingly opposite effects depending on context—for instance, Ilocano CVC- reduplication on nouns indicates variety or distribution (*sáb-sabong* "various flowers"), but on numerals it can mean limitation (*wal-walo* "only eight"). Despite this multiplicity, scholars (Inkelas, 2005; Gil, 2005) have long observed that a core idea of "more of the same" tends to underlie many of these meanings, aligning with an iconic motivation: repeating the form indicates an *increase in quantity*, *frequency*, *or intensity* of the base meaning. For instance, plural reduplication clearly iconically suggests "more than one", and iterative reduplication suggests "doing it again (and again)". This iconicity hypothesis (see Haiman, 1980) has been influential in functionalist accounts of reduplication and remains a useful intuitive guide. However, purely iconic explanations struggle to capture why reduplication in some contexts yields *diminution or attenuation* (seemingly "less" of something, e.g., "a little bit X") rather than "more"—a point noted by Rubino and exemplified by cases like the one in (3):

(3) Malagasy
mi-petraka "to sit" vs.
mi-petra-petraka "to sit about, sit for a short while" (attenuated action).

Any unified account of reduplication's semantics must therefore be nuanced enough to handle both *augmented* and *diminished* interpretations. On the theoretical side, earlier generative analyses of reduplication often treated it as a morphophonological rule or template (e.g., Marantz, 1982; McCarthy & Prince, 1995). These accounts focus on *how* a segmental string is copied and altered (e.g., with fixed segments or truncation), positing a special RED morpheme that gets phonologically realized by copying adjacent material. While successful in modeling the form of reduplication, such approaches typically leave the *meaning* of reduplication as an arbitrary or stipulated association (e.g., a feature [PL] that triggers copying).

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Some semantic-oriented studies have attempted to formalize the meaning of reduplication. For instance, Gil (1994) and others working in the framework of semantic typology have argued that reduplication often corresponds to *universal or exhaustive quantification* ("totality") in certain languages, or to *genericity*. The notion of pluractionality in the verbal domain, studied by Cusic (1981) and later by Lasersohn (1995), encompasses reduplication as one strategy to convey repeated or distributed events. These works introduce formal semantic operators (like *ITER* for iteration or *DIST* for distributivity) that could be seen as the semantic counterpart of reduplication. Pluractional analyses, for example, might assign a meaning to reduplication on verbs as something like (4), encoding a plural event made of multiple sub-events, each satisfying P.

(4) λP_{event}.λe. $\exists e_1,\ldots,e_n$ [$P(e_i)$ & $e = e_1 \oplus \ldots \oplus e_n$ & $n > 1$]

Such approaches move us closer to a unified meaning, but they often remain specific to one domain (e.g., only events or only individuals). What has been missing is a single semantic principle that can underlie all uses of reduplication across categories. This is where the present paper intervenes, by introducing a framework that already posits a general semantic primitive—the subset (⊆) relation—and applies it to various grammatical phenomena. We assume that reduplication introduces an inclusion relation with an underspecified selection parameter (choice function over a contextually salient superset). Pragmatics fixes (i) the relevant superset/domain (kinds, events, degrees), (ii) the dimension along which inclusion is computed (cardinality, temporal segmentation, degree scale), and (iii) a contextual standard/threshold. We show that different readings (plural vs. distributive vs. attenuative/intensive) arise from different resolutions of these parameters, not from distinct lexical meanings of reduplication.

2.2. Elementary Inclusion Predicates

Manzini and Savoia (2011) argue that many morphological categories traditionally seen as distinct (case, number, etc.) actually instantiate a small set of elementary predicates that have content like *location*, *possession*, *part–whole*, etc. In their lexicalist view, morphemes (whether we call them "lexical" or "functional") are sound–meaning pairings that may occupy different syntactic positions but ultimately draw from a common semantic repertoire. A striking proposal by Manzini and Savoia is that plural number and genitive case share an underlying semantics of partitive inclusion. Specifically, they observe widespread syncretisms where a single morpheme marks both plural and genitive (e.g., in many Indo-European languages, a genitive singular ending is identical to a nominative plural ending). They explain this by positing that both plural *-s* (for example) and the genitive *'s*/*of* express the same basic relation ⊆ (a subset relation). When this inclusion predicate takes a nominal restrictor (NP in its scope), it yields a plural interpretation ("an individual that is part of the set of all X"). When it takes an entire proposition or clause in its scope (or a nominal property of an event), it yields a possessive/genitive interpretation (the possessor is the whole that includes the possessed part). In sum, plural = 'member ⊆ set', genitive = 'part ⊆ whole' in their analysis.

Subsequent works by Manzini, Franco, and colleagues have extended this reasoning to other cases and prepositions. François et al. (2015) and Manzini and Franco (2016), Manzini et al. (2020) argue that the dative case (and equivalents like English *to*) also encodes inclusion—essentially a possessional inclusion where the goal/recipient is the whole that comes to include the theme. The dative clitic in Romance, for example, is analyzed not as an applicative introducing a new theta-role, but as an elementary predicate meaning ⊆ that relates two arguments (theme ⊆ recipient). This approach dissolves the boundary between cases and adpositions, treating them as formatives inserting predicate

content into the syntactic structure. Crucially, Franco and Manzini (2017) introduce various formal notation for these predicates, using (⊆) for inclusion and (⊇) for its reverse, used for, e.g., instrumental *with*, meaning the instrument is a whole that includes the action's effect. In Franco (2024), this line of thought is taken further. Franco proposes that a limited set of such elementary relations (inclusion ⊆, its inverse ⊇, and perhaps others like coincidence/intersection ∩, cf. Rugna & Franco, 2022) underlie a great many grammatical constructions across languages. Through a number of case studies, Franco shows that what may seem like disparate phenomena—oblique case marking, possessive linkers, even certain serial verb constructions—all instantiate the *inclusion relator* in one way or another. This provides a highly parsimonious view: instead of a different semantic rule for each use (plural, genitive, dative, etc.), the grammar reuses the same fundamental ingredient in multiple configurations. One appealing aspect of this framework is that it naturally predicts *syncretism and multi-functionality*. If one morpheme can serve as both a plural marker and a possessive marker (as in some languages), it is because that morpheme simply spells out (⊆) and the syntactic context disambiguates its effect (NP-level yields plurality; DP/possessor position yields a possessive). The framework also aligns with semantic notions like "zonal inclusion" (Belvin & den Dikken, 1997)—meaning inclusion in a broad, not-strictly-set-theoretic, sense. For example, English *have* can be seen as indicating that the subject includes the object in its zone (possession, part–whole, attribute-holder, etc.).

While this model was developed largely on the basis of case and agreement morphology in Romance and other languages, its architects explicitly suggest that it can go *"beyond categories"*—that is, the same inclusion predicate could be at work in domains like aspect or derivation. Manzini and Lorusso (2022), for instance, apply elementary predicates to the analysis of Italian progressive periphrases, arguing that the progressive auxiliary encodes an inclusion of the utterance tense in the larger time frame of the event (essentially the subinterval property)—a view compatible with classic semantic analyses of the progressive (Dowty, 1979; Landman, 1992; Higginbotham, 2009). Thus, there is growing evidence that inclusion-based semantics might underlie even aspectual operators.

Our proposal, in a nutshell, is to apply this inclusion predicate analysis to reduplication. In doing so, we treat reduplication as just another species of morphological marking (like a plural suffix or a case clitic) that can realize the (⊆) operator. This means we are shifting away from treating reduplication as a special, *sui generis* process. Instead, we say: languages have an inclusion operator in their syntactic inventory; some languages choose to realize that operator as a separate morpheme (e.g., a suffix *-ba* for plural), while others realize it by doubling the root. The choice of "doubling" vs. "affix" is a morphophonological detail—the semantics remains the same. This approach finds a precedent in work by Inkelas and Zoll (2005), who argued that reduplication is not a single mechanism but the result of various morphological constructions where doubling happens to occur. Our contribution is to specify the semantic content of one such common construction.

Notably, analyzing reduplication as (⊆) immediately predicts that reduplication should occur precisely in those contexts where a part–whole or non-maximal interpretation is needed. As we will see in the next sections, this prediction is borne out: languages overwhelmingly use reduplication for plural-like or iterative-like meanings (the prototypical domain of ⊆ relations), and far less commonly for meanings that imply *totality* or *exact uniqueness*. Even the seemingly paradoxical cases (like "only eight" meaning for Ilocano numeral reduplication) can be viewed as having an underlying subset semantics (in that case, *eight is the only subset taken into account, excluding any larger number*—see Section 4.1).[1]

In summary, the elementary predicates' framework provides us with three key ideas we will leverage: (a) inclusion (⊆) is a semantic primitive in grammar that can be realized in different morphosyntactic positions (within NP -> plural, within VP -> imperfective

aspect, gerunds, etc.); (b) the distinction between "functional" morphemes and "content" words is not absolute; both can host these elementary predicates. Therefore, a root being doubled does not preclude a functional/grammatical semantics—the doubling could itself indicate a functional/grammatical operator present; (c) syncretism and multi-functionality are expected: one mechanism (like reduplication) might serve multiple purposes if those purposes share the $\subseteq$ semantics.

In addition to 'canonical' reduplication, languages also exhibit 'contrastive' reduplication (termed Lexical Cloning or Contrastive Focus Reduplication; see Ghomeshi et al., 2004; Horn, 2018; Milosavljević, 2024, inter alia). These constructions typically yield prototypicality/"real X" readings or exhaustification effects and it will be discussed explicitly in Section 8.

Having established the theoretical foundation, we now turn to our methodology and data, before presenting the analysis in detail.

3. Methodological Issues

We draw data from a diverse set of languages to illustrate the cross-domain nature of reduplication. These include Austronesian languages (Tagalog, Bikol, Malay/Indonesian) known for productive reduplication, an Atlantic–Congo language (Fulfulde/Fula) with both full and partial reduplication, Romance (Italian), and additionally, sign languages (ASL and LIS). This sample is chosen to cover different language families and morphological types, as well as different modalities (spoken vs. signed), to show the broad applicability of the inclusion analysis.

One methodological consideration is that sign languages express reduplication in a visual–manual modality, often by repeating a sign in space, by using an arc movement to indicate plurality or by reduplicating through the non-dominant hand. We treat these as equivalent to spoken language reduplication for our purposes.[2]

We deliberately focus on productive reduplication that has clear grammatical or semantic function. We set aside purely lexicalized doubles (e.g., Malay *labah-labah* "spider" is historically from reduplication but synchronically just a single noun, meaning that it is not transparently 'spider-spider'). We also set aside "echo-word" constructions and irreversible binomials (like English *hubba hubba* or Hindi rhyming compounds), which are often considered a form of reduplication but have specialized pragmatic meanings beyond our current scope (though see Section 6 for a brief mention of expressive reduplication). Our concern is with patterns that native speakers productively use to convey grammatical contrasts.

With these preliminaries established, we proceed to the analysis of reduplication in different domains, starting with the nominal domain, where its connection to plurality and distributivity will become evident.

4. Reduplication in the Nominal Domain

In nominal contexts, reduplication most frequently corresponds to plurality or distributivity—classic partitive notions. By duplicating a noun, languages indicate either plural number (more than one of the entity) or a distributive reading (entities considered individually or in groups). Sometimes, nominal reduplication can also yield diminutive or pejorative effects (e.g., implying something is an exemplar of X in a non-standard way, cf. Grandi, 2007; Savoia et al., 2017; Franco et al., 2020), which we will argue still ties back to inclusion (an element that is *just a part* of the prototypical X category).

4.1. Plurality via Full Reduplication

A straightforward use of reduplication for nominal plurality is found in Malay/Indonesian and many related Austronesian languages. Malay has an optional plural marking strategy where a noun is repeated. For example, (5) shows a simple case:

(5) Malay (Austronesian)—Plural Noun via Reduplication
orang orang
person RED
"people" (lit. "person-person", plural of *orang* "person")

Here, *orang-orang* means "persons" or "people". Semantically, *orang-orang* denotes a plurality of individuals of the type *orang*. Under our analysis, a plural head ($\subseteq$) combines with the NP *orang*, and Malay spells this out by copying the NP rather than providing a separate plural morpheme. The meaning is thus "x is a person and x is one of (a set of) persons".

This use is productive: any count noun in Malay can be reduplicated to indicate plural. It is often said that reduplication in Malay plural nouns is not obligatory (unlike, say, English plural -s), but when used, it can stress that something involves many kinds or instances. For instance, *budak-budak* in (6).

(6) Malay—Reduplicated Noun in Context

(Para)	budak-budak	sedang	bermain	di	taman.
(det.PL)	child~RED	IPFV	play	in	park

"(The) children are playing in the park."

As illustrated in (6), Malay also allows a quantifier *para* for human plural collectives; the example shows that *budak-budak* by itself can convey plurality (with or without *para*). The interpretation of *budak-budak* is simply the plural of *budak*. There is no sense of diminution here—it is a regular plural. In our terms, the noun's referent is understood as a sum of individuals, each of which is a *budak*. From our viewpoint, the inclusion predicate ($\subseteq$) ensures that each atomic part of the plural group is of the type *budak*, i.e., each child is a member of the set of children.

Full reduplication is a pattern consistently employed by sign languages (cf. Fischer, 1973; Pfau & Steinbach, 2005). For example, in Italian Sign Language (LIS) (Branchini & Mantovan, 2020), three different strategies of pluralization of nominals are available.

(1) Reduplication with dislocation: the movement of the sign for the noun is repeated and displaced within the signing space (Branchini & Mantovan, 2020, p. 424) as HOUSE in (7).[3]

(7) a. HOUSE
b. HOUSE++
'Houses'

(2) Simultaneous reduplication by the non-dominant hand: one handed signs can be articulated as two-handed signs in order to convey plurality (Branchini & Mantovan, 2020, p. 425) as PERSON in (8).

(8) a. PERSON
b. dom: PERSON++
n-dom: PERSON++
'People'

(3) Reduplication without dislocation: plurality is conveyed by reduplicating the movement of the sign, which, however, does not change position within the signing space as HOUR in (9).

(9) a. HOUR
b. HOUR++
'Hours'

The availability of the pluralization above depends, as described by Branchini and Mantovan (2020) on the class of nouns: 'Nouns in LIS can be divided into two classes: nouns articulated in the signing space belong to the class of inflectional nouns; nouns articulated close or on the signer's body are comprised into the class of invariable nouns (Branchini & Mantovan, 2020, p. 422)'. As for the nouns in the signing spaces, other mechanisms are also available, such as numerals, quantifiers or classifiers. However, they can sometimes be invariant and the verbs reduplicate to also convey a plural marking for the nominals selected by the verb (Section 5).

4.1.1. Distributive "Each" Readings

In some languages, a reduplicated noun (or numeral) takes on a distributive meaning akin to English "each X" or "X by X". Bikol, a Philippine language closely related to Tagalog, illustrates this quite well. Full reduplication in Bikol is used with numerals to indicate a distributive reading. Example (10) shows a reduplicated numeral:

(10) Bikol (Austronesian)—Numeral Reduplication for Distributive

apatapat	ang	lapis	sa	kámot	nindó.
fourRED	DET	pencil	in	hand	3PL.POSS

"They hold four pencils each in their hands." (lit. "four~four pencils in their hands")

In (10), *apat~apat* "four~four" means "four each". The sentence implies each of them has four pencils. The reduplicated numeral thus distributes the quantity across the plural subject, in the sense that it does not apply to them as a whole.[4] This can be analyzed as the numeral *apat* combined with an inclusion operator that ranges over *situations or subsets* of pencils. Essentially, we can assume that *apat~apat* specifies that for each relevant person (each hand of theirs), the number of pencils included is four. Bikol, in this case, uses full reduplication on the numeral; an alternative strategy in Bikol (and Tagalog) is to use a separate distributive marker like *tag-*, but the reduplication here directly encodes it.

Another example from Bikol (Mattes, 2014, p. 379) uses noun reduplication: *haróng-haróng* could be used to mean "house by house" (going to each house). In general, Philippine languages allow this iterative/distributive sense via reduplication. Tagalog, for instance, has *bahay-bahay* (house~house), meaning "each and every house (in the neighborhood, etc.)" or "house after house" (e.g., in a context like "They searched *house after house* for the missing child.") (cf. Rubino, 2005). This pattern is not a quirk of Austronesian languages. The Fula language Fulfulde, spoken in Central Africa, provides other examples of this productive pattern (11).

(11) Fulfulde (Fula)
gooto gooto—"one by one (each one)"

4.1.2. Associative Plural and Genericity

Reduplication on nouns can also indicate a sense of "and the like" or variety. For example, Tagalog uses interrogative reduplication: *ano-ano* "what-what" to mean "what things (plural)" (cf. Rubino, 2005), and *saan-saan* "where-where" to mean "various places". This is essentially plurality applied to non-specific or interrogative pronouns. It again conveys "members of the set of X" rather than a single X.

Another subtle use is the so-called associative plural (found in some Austronesian and Austroasiatic languages), e.g., Ilocano *Káted~Káted* (name~name) might mean "Kated and her group/kin" (though Ilocano typically uses *da* enclitic for that). While not strictly simple reduplication, these hint that doubling can signal "X and company"—which fits an inclusion pattern (X is included in a larger group containing X, cf. Mauri & Sansò, 2019, 2023; Mauri, 2017; Franco et al., 2020; Franco & Rugna, 2024).

4.1.3. Diminutive or Pejorative Nuances

Some languages use reduplication to indicate that something is *an exemplar of its kind but not the real or primary thing*. For instance, in Nez Perce (Sahaptian, USA), reduplication of a noun can form what looks like a diminutive or special variety, e.g., *xó·myac* "mischievous child" vs. *xoyámacxó·myac* "little mischievous child". Similarly, Yokuts (Penutian, California) has *k'ohis* "buttocks" vs. *k'o-k'ohis* "one with large buttocks" (Newman, 1944, *apud* Rubino)—here, the reduplication ironically *augments* the meaning (big X). In both cases, reduplication is modifying the noun in an evaluative way. If we interpret these via the inclusion relator, based on insights from Savoia et al. (2017, 2018), we can say that the reduplicated form refers to an individual that is within the set of X *but* deviates in some manner—either a smaller instance (diminutive) or an exaggerated instance (augmentative). In other words, the reduplication can intensify *or* attenuate, but crucially, it is marking that the referent is "not a single prototypical X, but one of a class of altered X's". This aligns with Belvin and den Dikken's "zonal inclusion"—the idea that something can be in the zone of X without being a central example of X.[5]

4.2. Reduplication as Inclusion in the Nominal Domain

We observe that all the examples we have listed involve an interpretation where the referent is *not a single, isolated instance*: (1) whether it is straightforward plurality (Malay, LIS), (2) explicit distributivity (Bikol, Fulfulde), or (3) a kind of type intensification/attenuation, the common thread is that reduplication signals inclusion of the noun's referent in a set (or spectrum) of referents of that type. As for the intensification/attenuation reading, even in Italian examples (often in colloquial speech) like "*questo è vino vino*" ("this is authentic wine", lit 'this is wine wine') meaning *real, authentic wine* can be seen as saying "wine that is truly in the set of wines"—effectively intensifying the noun by implying it fully qualifies as wine. These nuances are pragmatic but crucially hinge on the notion of category membership.[6]

From the perspective of our theoretical proposal, the $\subseteq$ operator in the nominal domain takes an NP denotation (a set of individuals of type X) and returns a property true of any individual that is a subset (or member) of that set, with a particular morphosyntactic interpretation. Normally, an individual can only be a subset of a set of individuals if we consider singleton vs. group. In effect, $\subseteq$ applied to NP yields something like a plural or group-forming operator (akin to Link's (1983) interpretation). Reduplication, then, is one way to signal this: by pronouncing two copies of the noun, the language iconically indicates the presence of at least two individuals, matching the semantics of $\subseteq$ that requires more than one element (for a plural interpretation). So far, we proposed that reduplication introduces an inclusion relation ($\subseteq$) over sets of individuals.

We can crucially extend this proposal to *non-prototypical* nominal reduplications listed above since they can be formally analyzed as reflecting subset (or partitive) relations. In essence, the reduplicated form still selects its referent(s) from a (contextually supplied) host set, meaning that the denotation is the domain picked out by the base noun or its context. We support this morphosyntactic claim first by appealing to standard semantic frameworks of plurality and partitivity (Link, 1983; Krifka, 1992; Gillon, 1992; Champollion, 2017, inter alia), and then by showing how each non-canonical interpretation can be recast in terms of inclusion plus relevant contextual parameters that implies a (lexicalized or not) conversational implicature.

Semantic theory has long modeled plural and partitive constructions via set-inclusion relations. In Link's (1983) seminal account, a plural noun denotes the join-semilattice closure of its atomic denotation: for example, if *dog* denotes atomic dogs, then *dogs* denotes all (non-atomic) sums of dogs. In effect, this means that any plural predicate picks out a subset of a larger domain (e.g., the set of all dogs) by forming an arbitrary sum of atomic members. Likewise, formal treatments of partitives explicitly build a subset: an expression like "two of the dogs" denotes the set of two-element sub-sums of the context set {dog_1, dog_2, dog_3}, as illustrated by Barker (1998). More generally, partitives are defined as referring to "a subset or subpart of another referent"—a discourse-antecedent set. Falco and Zamparelli (2020) note that the bare inclusion relation (A⊂B) can be signaled in various nominal ways (e.g., restrictive modifiers); here, we claim that reduplication supplies this role in the nominal domain. Crucially, then, *reduplicated* NPs will still denote individuals or sums that are included in what we may label a 'salient superset' of N, even if the particular aspect of that inclusion is unusual/non prototypical.

This perspective helps to make sense of nominal reduplication with distributive or "scattered" interpretations. For instance, a Tagalog noun X-R (e.g., *bahay-bahay* "house-R"), in context can mean not just "houses" in the straightforward plural sense, but also "houses here and there" or "each house on various occasions" depending on the context. We can formalize this by assuming that a contextually salient set H of houses is given (e.g., "all the houses in town"), and that *bahay-bahay* denotes some sub-collection $S \subseteq H$ rather than H itself. If the intention is distributive (e.g., "each house, singly"), then the predicate introduced by reduplication effectively holds of every atomic member of S. If it is dissipative ("spread-out houses"), we simply assert that there exist houses at distinct locations, but again, those houses form a subset of H. In all cases, the structural meaning is that the referents are part of the larger category: a plurality reading corresponds to picking a possibly large subset, whereas a "not all" or "distributed" reading corresponds to selecting a subpart that does not cover the whole set. In Champollion's (2017) terms, one can view these uses as involving stratified reference with a coarse granularity parameter: the predicate "house(x)" must hold of subparts of the set of houses down to some sized pieces, but not necessarily to indivisible atoms. Thus, even "every house" interpretations remain an inclusion statement (each chosen house is in H), consistent with our framework. The actual interpretation is a matter of pragmatics and goes beyond the syntactic skeleton.

Semantically, one can capture this by treating the reduplicated noun as denoting a set of atomic entities (or sums), all of which satisfy the base noun and together form a subset of some superset provided by context. The inclusion predicate ($\subseteq$) thus holds trivially, e.g., for "house-house" in a distributive sense, ⟦house-house⟧= {e: each atomic part of e is a house & e$\subseteq$ HouseDomain}, or simply $e \in \wp$ (*HouseDomain*).

Importantly, even diminutive or attenuative meanings can be captured by a related idea. In many Austronesian languages, full reduplication of a noun can signal a "small" or "toy" version of that noun. For instance, Hiligaynon *baláy* 'house' → *baláy-baláy* 'toy house (dollhouse)'. At first glance, saying "doll house" still references a house (indeed, a subset

of house-kind): the referent is a house-like object. We can reconcile this with inclusion semantics by viewing reduplication as introducing a scale or measure restriction. Formally, one may posit that there is a contextual size (or completeness) threshold, so that x is in the denotation of *balay-balay* iff x is a house and size(x) < θ, where θ is the normal size of a house. Thus, x belongs to the subset of all houses that are "small." The meaning is still an inclusion—$x \subseteq$ HouseDomain—but the subset is the small-sized portion of it. In this way, the semantic "inclusion predicate" is preserved: the downgraded (diminutive) referent is simply in the "lower" part of the house-domain. This idea aligns with the general semantics of gradable expressions (cf. Kennedy, 2001): a word like *little house* selects an entity x in a subregion of the scale of houses. We view reduplication as implicitly invoking such a scalar context. In practice, semanticists often treat diminutives and attenuatives as context-dependent filters on the noun's denotation; here, that filter happens to pick out a contextual subset. As Mattes (2014) observes for Bikol, the "same" reduplicated form can yield both plural/augmentative and diminutive readings, suggesting that the underlying operator is flexible: it means "some larger/multiple amount or a fraction/smaller amount of quantity". In our terms, the unique operator always asserts *subsethood*, and contextual factors (size scales, number senses, intensity, etc.) determine *which* subset is chosen: the choice can be lexicalized or rely on the pragmatic context that supports an implicature.

In terms of inclusion, both "more" and "less" referent quantity cases pick out some subset or sub-multiplicity of the potential referents. François (2004) captures this via a notion of *fragmentation*: one view is that reduplication encodes a concept as a *set of fragments*. A diminutive reading provides a conceptual parameterization of the subset choice; different partitions of the same domain yield different readings. The fragment view meshes with subset semantics: the fragments themselves are parts (subsets) of the whole referent concept. In practice, we implement this idea by allowing reduplication to quantize the noun's domain at different granularities. If the granularity is "one fragment," we get "a small piece of X" (subset); if it is "all fragments," we get "the whole group of X's."/ "a big instance of X".

We assume that reduplication, like plural morphology, introduces no hard presupposition of "not all". Instead, it says "some amount from this set" and context may allow it to be maximal. In fact, if the superset is taken as "the category of X," then even maximal inclusion (all houses) still satisfies $\subseteq$. A possible concern is why a *single* small object should count as a subset at all. We handle that by treating the "house-like" (dollhouse) object as belonging to a conceptual superset that includes miniature instances. That is, the base "house" term is understood broadly enough to include toy houses as conceivable members (common in noun semantics to allow contextual domain shift). Then, *balay-balay* chooses an element of that broadened domain which has extra smallness. Alternatively, one could say reduplication introduces an implicit noun-part meaning ("part of a house"), then treat "dollhouse" as literally "a part or piece that looks like a house" (a subset of the parts of prototypical house), as in the discussion in Savoia et al. (2017). Either way, we maintain $\subseteq$: the referent is a house-part, hence a subset of a notional *whole* house.

The other crucial issue is *scalar grading* and context: specifying the correct subset necessarily requires pragmatic inference. We assume reduplication provides the structure (subset via inclusion) and leaves the size or number of the subset open, to be fixed by discourse or world knowledge. In a word, the abstract predicate "Plurality" is actually the plurality under consideration. The particular plurality we refer to (its cardinality or measure) is resolved by the context or by additional modifiers.[7]

In sum, by viewing nominal reduplication through the lens of partitivity and inclusion, we find that even attenuative and distributive interpretations conform to a common core: the reduplicated form denotes some subset of the larger conceptual domain. As Link (1983)

and Kennedy (2007) show, plural and mass predicates denote (joins of) atomic entities (cf. Chierchia, 1998, 2010); adding reduplication simply constrains that join to a particular subset. This insight aligns with Gillon's (1992) observations on count/mass noun semantics and with Krifka's (1992) account of measure NPs as thresholding a set. Thus, the inclusion-based analysis provides a unified formal handle on diverse reduplicative effects: at bottom, every reduplicated noun form can be interpreted as "a part/subpart of *something* N," where *something* is the relevant superset (e.g., "all houses," "the house prototype," or "the typical house size").[8]

Now, we turn to the verbal domain, where we will see a very analogous pattern: reduplication indicates an event is part of a larger eventive structure that can be divided into sub-events (the counterpart to plural for actions).

5. Reduplication in the Verbal Domain

Reduplication in verbal contexts is commonly associated with aspectual meanings: iteration (repetition of an event), continuation or prolongation, habitual or customary action, and sometimes distribution over time or participants (pluractionality). In simple terms, verbal reduplication often means "doing X again and/or for a while". From our viewpoint, this is the event-domain mirror of nominal plurality. Instead of multiple individuals, we have multiple sub-events in which the event structure can be split. Our claim is that the same inclusion predicate ($\subseteq$) is at work: the event described by the reduplicated verb is *included in* a larger event or series of events of the same type (cf. Manzini & Lorusso, 2022; Franco & Lorusso, 2020; Lorusso, 2024).

5.1. Iterative/Habitual Aspect

A prototypical example comes from Tagalog. Tagalog marks grammatical aspect, and one strategy for the *incomplete (progressive/habitual)* aspect is partial reduplication of the verb root. For instance, the verb *lakad* "walk" in Tagalog can appear as *lakad-lakad* or with a CV-reduplication in certain forms, to indicate walking around or walking repeatedly. Example (12) shows a Tagalog verb with reduplication:

(12) Tagalog (Austronesian)—Iterative/Habitual Action

Nag-lakad-lakad	ang	bata	sa	plaza.
PST.AV-walk~RED	DET	child	in	plaza

"The child walked around/went strolling in the plaza."
(Naglakad-lakad: walked here and there)

In (12), *naglakad-lakad* uses the prefix *nag-* (marking Actor Voice past) and reduplicates the root *lakad*. The meaning is not just "walked" (which would be *naglakad*) but something like "walked around, walked without a fixed direction, or took a walk (leisurely)". This indicates an extended or repeated action—essentially, the walking event consists of multiple walking steps or segments, not a single bounded trajectory. The inclusion perspective sees *lakad-lakad* as an event that is a superset of smaller walking events (each step or each short walk).

Bikol shows a similar pattern: *nag-ngi~ngirit* (from root *ngirit* "to laugh") means "laughing" (imperfective). The reduplication of *ngirit* to *ngi~ngirit* (repeating *ngi*) combined with the prefix *nag-* yields an ongoing/incomplete aspect of laughing. Thus, *nagngingirit* describes someone who is in the midst of laughing, or repeatedly laughing. The part–whole relation here is temporal: a laughing event is composed of smaller phases (perhaps individual chuckles), so an ongoing laugh includes those chuckles as parts.

Many other Austronesian languages exhibit this, e.g., Ilocano *ag-basbasa* "is reading" (from *basa* "read") with CVC reduplication, and Indonesian colloquial *jalan-jalan* "to stroll"

(lit. walk~walk, also "to go out for a walk" as a leisure activity) (cf. Rubino, 2005). In Jamaican Creole English, interestingly, we see similar use: *taak-taak* "talk continuously (cf. Mufwene, 1983). The ubiquity of this pattern across unrelated languages (Philippines, Caribbean Creole, etc.) suggests a common semantic motivation: repeating the verb suggests repeating or prolonging the action.

5.2. Continuative/Durative Aspect

Beyond discrete iteration, reduplication can signal a continuous or ongoing action without clear iteration boundaries. Some Muskogean languages do this by lengthening or gemination (which is essentially a form of reduplication at the sub-syllabic level), as with Alabama *potooli* "touch" vs. *pottooli* "touching each other (coming together)". Here, insertion of an extra consonant (tt) functions like reduplication, giving an imperfective sense. Similarly, Tillamook (Salish) uses full reduplication for the inchoative aspect (starting to do something).

In our terms, these mark that an event is not a single whole but contains an initial part that is representative of a larger event to come (inchoative), or that the event is spread over time (durative). Both imply that the event time is an interval that can be segmented into subintervals still describable by the predicate (the classic *subinterval property* of imperfectives; Landman, 1992).

5.3. Pluractional Distribution over Participants

Verbal reduplication sometimes encodes that an action is done to or by each member of a group. In Fulfulde, for example, the phrase *gooto gooto* "one by one", which we have introduced in (11), can modify a verb to indicate that participants do something individually or sequentially. Fulfulde verbs themselves can reduplicate to show iterative meaning (e.g., *yi'ude* "to hit" vs. *yi'u-yi'ude* "to hit repeatedly"). The *gooto gooto* example from Fulfulde given as a distributive plural in (11) can also be seen as an adverbial usage meaning "individually". It likely originates from the word *go'o* "one" reduplicated, analogous to how English might say "one by one" (Rubino, 2005).

5.4. Valence and Aktionsart Changes

In some languages, reduplication can affect transitivity or aktionsart. For instance, Tagalog has forms like *sulat-sulat* (write~write), which can mean "to write something here and there" or even "to correspond (write letters to each other)" depending on context—sometimes acquiring a reciprocal sense. Sranan (an English-based creole) is documented to have three types of verbal reduplication with different stress patterns indicating (a) diminutive/pejorative action, (b) augmentative action, and (c) iterative action, respectively, distinguished by which copy gets the main stress (cf. Adamson & Smith, 2003; Mattes, 2014). Consider the example in (13).

(13) Sranan
a. *férfi~férfi* (parallel stress) "paint a bit"
b. *ferfi~férfi* (stress on second) "paint too much"
c. *férfi~ferfi* (stress on first) "paint repeatedly".

While the one in (13) seems to be an exotic case, it shows that reduplication can interact with aspect and intensity finely. Still, all three Sranan meanings involve inclusion: part of an action (paint a bit = one part of painting), an excessive action (paint too much = going beyond, but from stacking too many sub-actions), or repeated action (paint repeatedly = multiple painting sub-events).[9]

5.5. The Predicational Core of Reduplicated Forms in the Verbal Domain

Across these examples, reduplication uniformly correlates with an interpretation of an event as *non-singular*: either multi-phase, multi-occasion, or multi-participant. In formal semantic terms, if a verb's usual denotation is a set of events of type E, reduplication triggers a mapping to the set of events *e* such that e can be divided into at least two sub-events, each of which is in E (or e is a sum of events in E). This is exactly the subinterval property for atelic situations (for time-based partition) or plural event semantics for iterative readings. Our claim is that the syntactic presence of an ($\subseteq$) operator at the verbal level yields this kind of denotation, and languages signal that by reduplication.

One might wonder: could some of these meanings also be achieved by a separate morpheme (like an adverb "repeatedly")? Yes, languages differ on the way multiple (sub) events are represented. Various devices can be used to express the repetition of events in time, such as adverbials, morphological markers or syntactic constructions; Lasersohn (1995) refers to all these devices as *pluractional markers.* Languages often have more than one device. For example, Tagalog speakers can say *lakad nang lakad* ("walk and walk") to mean continually walking—effectively using a coordinator to repeat the verb in sequence, which is a syntactic reduplication strategy. The existence of such phrasal idioms shows that the concept is part of speakers' interpretive repertoire regardless of morphological method. What reduplication does is grammaticalize it into a bound form.

We have seen that verbal reduplication frequently yields *iterative* or *habitual* readings by treating an atomic event as part of a larger event sum. In semantic terms, verbs denote sets of events, and an iterative reduplicated verb requires that the described event be contained in ($\subseteq$) a plural or repetitive event. Intuitively, a reduplicated verb like "run-run" asserts that there are multiple run-events (or one event consisting of multiple runs) rather than a single atomic run. This aligns with classical event semantics (e.g., Krifka, 1992; Landman, 1992), in which events form cumulative lattices: if two events e_1 and e_2 satisfy the base verb, their sum $e_1 \oplus e_2$ also satisfies it. Pluractional morphology ensures such plurality. For example, Henderson (2017) notes that fully reduplicated verbs yield *pluractional* interpretations that "rule out single-event scenarios". In other words, the base event must be non-maximal—it is strictly a part of a larger composite event. Habitual readings arise similarly, as multiple instances of an event over time. Thus, in our inclusion-based view, a reduplicated verb V implies the representation in (14), ensuring the event e is included in a bigger event E ($\subseteq$), i.e., a non-maximal plural event:

(14) $\exists E[\text{Sum}(E) \wedge e \subseteq E \wedge \forall e' \in \text{atoms}(E): V(e')]$

Sign languages provide clear evidence for this pattern. In American Sign Language (ASL), repeating a verb sign expresses iteration or continuation. For instance, the sign JUMP when repeated (JUMP++) means "to jump repeatedly". Similarly, repeated signs like LOOK-AT or PLAY denote doing the action again and again. The semantics is that the single (atomic) action e is embedded in a larger repetitive event. In all these cases, the $\subseteq$ relation holds: the actual event referenced by the verb is not maximal but included in a sum of sub-events. This formalizes the iterative/habitual aspect: the reduplicated verb forces a plural event structure, capturing that the action happens multiple times or over an extended period. By contrast, the base (non-reduplicated) verb would allow a single, atomic event. In sum, verbal reduplication can be seen as a kind of event-inclusion operator, consistent with the overall proposal that reduplication signals a non-maximal interpretation ($\subseteq$).

In the analysis of Manzini et al. (2017) and Manzini and Lorusso (2022), additionally, progressives like '*John is reading'* imply an inclusion relation between the utterance time

expressed by the tense morphology of the stay/be auxiliary, and the embedded event as suggested in Landman's (1992) semantics for PROG. Landman (1992)'s proposal for the progressive, which he summarizes as the Part-of Proposal, can be sketched as follows: "E, the set of events, is ordered by two relations: a relation of 'part-of' and a relation of 'stage-of' [...] a stage of an event is a special sort of part of that event" (Landman, 1992, p. 22). For example, 'Mary is crossing the street' is true if some actual event realizes enough of the type of events of Mary's crossing the street (Landman, 1992, p. 22). So, the reduplicated structures described above share with the progressive an inclusion relation; the difference is that while progressives imply a point (represented by the inflection of the stay/be auxiliaries) within the event structure of the verb, reduplication implies a n+1 point within the event structure of the reduplicated verbs. However, it is logically possible that with the reduplication with achievement verbs such as *arrive* (with no internal unfolding of the event), either the durative/iterative reading is unavailable or it may coincide with the progressive interpretation (cf. Franco & Lorusso, 2020).

Before moving on, it is worth noting an interesting boundary case: reciprocal actions. Some languages (like those in the Oceanic family) use reduplication along with other morphology to indicate reciprocal or mutual actions (which involve each participant doing something to each other) (cf. Rubino, 2005). A reciprocal event can be seen as a special case of plural sub-events—e.g., A hits B and B hits A, two sub-events make the whole. If reduplication is part of marking reciprocity (often with extra affixes), that too falls under the inclusion umbrella: each sub-event (A→B and B→A) is part of the overall event. However, since reciprocals usually require additional semantic machinery (like pairing of participants), we will not focus on them here.

6. Reduplication in Evaluative and Expressive Domains

In addition to nouns and verbs, reduplication frequently appears with adjectives, adverbs, and other modifiers to indicate degree or evaluative meaning. This can include intensification ("very X"), attenuation or diminution ("somewhat X, rather X"), or simply emphasis. These uses are sometimes called *expressive reduplication*, as they add expressive flavor rather than changing core argument structure or tense. Nonetheless, we argue that even these can be subsumed under the inclusion analysis: it is a property or *degree* that is being considered as a part of a larger *scale* or category.

Intensifiers ("very X"): Many languages double an adjective or adverb to intensify it. We saw an example in Italian: *piano piano* "very softly". Another example in Italian is *bella bella* (literally "pretty pretty") to mean "truly pretty" or sometimes "pretty in every way". In colloquial Italian, one might say *è bella bella* (she is pretty-pretty) to emphasize the degree of beauty. Similarly, *presto presto!* "quick quick!" can serve as an urgent encouragement to hurry up.[10]

In Malay/Indonesian, adjective reduplication can indicate intensity or diversity of degree. For instance, *besar-besar* can mean "very big (pl.)" or "each is big" depending on context (it might also mean "big ones" with plural reading).

Lampung (Austronesian, Sumatra) is reported to use reduplication to signal different degrees: *balak-balak* "very large", *xa-xabay* "somewhat afraid". The first is intensifying, the second attenuating. Both are achieved via reduplication, and presumably, the context tells whether it is higher-degree or lower-degree.

This mirrors, in some respects, the Sranan case mentioned earlier, where accent placement distinguished *too much* vs. *a bit*. In languages that do not mark it by stress, the interpretation can be context-dependent. How can the same reduplication mean "very X" in some cases and "rather X" in others? At first glance they are opposites, but under an 'inclusion' view, they are actually similar: in both, the base property X is not taken in an

absolute sense, but *relative to a range*. For "very X", one might say the actual degree is an accumulation of X on top of X—effectively, X plus more X (hence above the normal). For "somewhat X", perhaps the idea is to indicate a measure that is X but only X in part—i.e., take the scale of X-ness and include a smaller segment of it (cf. the discussion in Savoia et al., 2018; Franco et al., 2020). In technical terms, one could model intensification as sum (x + x) and attenuation as subset (x ∈ X but not whole X). Both involve inclusion: the intense version includes multiple instances of the property (hitting the extreme), the attenuated includes a partial instance.

We already discussed nominal diminutives earlier. Often, the difference between a "diminutive" reading and an "intensive" reading for reduplication is pragmatical. Bikol provides an interesting example where the same reduplicated form can be interpreted in two opposite ways. Mattes (2014, p. 80) notes that *halóy~halóy* in Bikol was found with two meanings: (a) "little time (short while)" and (b) "long time (ages)", in different texts. The form is the same. So why such different meanings? This shows the inherent ambiguity of a *bare doubling*—it signals the "non-default degree" of the property (time length in this case) but whether it is high or low can be inferred from context or world knowledge.

Sign languages also double adjectives or adverbs for intensity. For example, to sign "VERY-BIG" in ASL, one might either use a specific modifier sign or perform the sign for "BIG" with a repeated, larger motion (sometimes described as a reduplication with exaggeration). This shows that even gradable visual signs can use repetition to convey "more". The spatial modality often iconically maps intensity to size or speed of movement; repetition often conveys plurality or continuity, but in adjectives, it can also convey "a lot of that quality." (cf. Brentari, 1996).

Thus, while the surface effect varies, the underlying pattern seems to be *scalar inclusion*. Notably, in Italian, *così così* (literally "so so"), a reduplication of *così* (thus/so) is an idiom for "average, neither good nor bad". It is a way of saying the thing in question is *within the so-so range*—again, an inclusion of the result within an intermediate set, not at an extreme.

Adjectival reduplication manipulates the denotation on an underlying scale. Graded adjectives are standardly analyzed as measure functions from individuals to degrees on a scalar dimension (e.g., *big* maps an object to its height). Degree morphology (comparatives, intensifiers, etc.) then imposes conditions on these degrees. We propose that reduplication acts like a degree-morpheme: it narrows the set of degrees, effectively picking a subset of the adjective's scale. For example, if the base adjective *big* denotes all degrees $\geq \theta$ (the contextually set big-standard), then big–big could denote degrees $\geq \theta'$, with $\theta' > \theta$. Thus, the reduplicated form quantifies over a subset of the original scale (here, the upper portion), yielding an intensified reading. Conversely, an attenuative reduplication could be modeled by requiring a degree just above the minimal threshold of the scale, i.e., a subset near the bottom of the scale (cf. Kennedy & McNally, 2005). In each case, the relation is again $\subseteq$, where the degree of the object is contained within a narrower set of degrees allowed by the base adjective and lexically encoded via reduplication.[11]

In short, adjectival reduplication can be formalized as degree inclusion. The reduplicated form denotes a degree *d* such that *d* belongs to the appropriate subset of the scale (for intensifiers, the top portion) of the adjective's dimension. Thus, just as with verbs, reduplication of adjectives signals a non-maximal interpretation via a subset relation over degrees. Reduplication effectively contributes an additional scalar constraint, carving out a portion of the adjective's scale (e.g., the upper or lower end) in which the object's degree must lie, consistent with the $\subseteq$-based analysis.

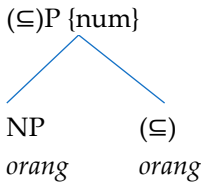
7. Morphosyntactic Representation of Reduplication as Inclusion (⊆)

Having surveyed nominal, verbal, and adjectival reduplication, we find a unifying semantic core—in every case, reduplication invokes a non-atomic interpretation: an individual as a member of a plurality, an event as one of a series or part of a larger event, a property as one degree on a scale of intensity. This strongly supports an analysis where reduplication is the spell-out of an operator requiring a part–whole relation.

In this section, we provide a morphosyntactic representation of how reduplication is implemented in the grammar. The key idea is that there is a dedicated head (let us call it Pred ⊆) that can attach in different positions: in the nominal projection, verbal projection, or adjectival projection. This head carries the semantics of a subset relation. When this head is present, the morphology of some languages realizes it by copying the material of its complement.

We present simplified tree diagrams for the three main domains (nominal, verbal, adjectival) to clarify our model. Let us consider nominal reduplication first. We posit a structure like [NumP [NP . . . N . . .] [Num ⊆]] where Num (number head) is an inclusion predicate. The NP is the base noun. The Num head might be phonologically null or weak, and triggers copying of NP at PF (phonological form).

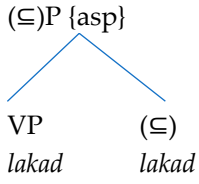
(15)



The Num head, specified as (⊆), combines with NP to form NumP. Because of the semantics of ⊆ (requiring a non-singleton set), the result denotes a plural entity (or a kind-denoting sum, or other flavors of 'division', cf. Borer, 2005; Mathieu, 2012). The morphology in Malay, Indonesian, Tagalog, etc., spells ⊆ not as an affix, but by doubling the NP's phonological material. In English, by contrast, ⊆ is spelled as "-s" (or other plural allomorphs). It is crucial to note that syntactically, we do *not* have two separate NPs or two N heads here; there is only one NP in the structure. The reduplicated surface form arises to lexicalize ⊆.

Now, consider verbal reduplication. We propose an Aspectual head (Asp) carrying (⊆) that attaches immediately above VP, as represented in (16):

(16)



In (16), an Aspectual head with inclusion semantics (⊆) takes a VP complement. The presence of Asp⊆ causes the verb to be reduplicated.

Thus, Asp(⊆) combines with VP to form an AspP (which could then combine with Tense, etc.). The Asp⊆ head ensures that the event described is a part of a larger event or a set of events. Languages like Tagalog realize this by reduplicating part of the verb (*lakad* becomes *lakad-lakad*). Some languages might attach a separate particle instead (e.g., English uses "-ing", Italian uses periphrases for iterative meaning, etc.). The reduplication strategy is simply a different morphological choice.

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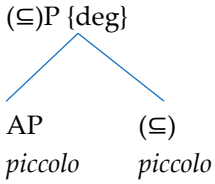
Note that Tagalog's actual grammar is a bit more complex, since the voice marker *nag-* also appears. One could assume that *nag-* sits in a higher Voice or v head, and Asp⊆ is below it. The partial nature of Tagalog reduplication (just CV of the root) can be seen as a phonological constraint—maybe Tagalog does not copy the whole VP, only the first syllable of the head. But the principle is the same.

The semantics of Asp⊆ would be that given a VP property P of events, Asp⊆ yields a property P' such that for an event E to satisfy P', E must consist of multiple sub-events, each of which individually satisfies P (or an event that, if not complete, can be extended—there are different formalizations for iterative vs. continuous, but both involve partitioning the event's runtime or event structure). This is also consistent, as we have already pointed out, with formal accounts of pluractional operators (see Lasersohn, 1995).

A significant test for the inclusion hypothesis is represented by those languages using reduplication to encode the perfect, as in Ancient Greek (e.g., *le-lu-ka* 'I have loosed'). An anonymous reviewer questions how a form associated with 'completed states' aligns with the 'non-maximal' or 'iterative' semantics we have proposed for reduplication in Section 5. Following standard event semantics (e.g., Iatridou et al., 2001; Pancheva, 2003), the Perfect can be assumed to construct a time interval (the Perfect Time Span) that includes the event time (E ⊆ PTS). In our analysis, the reduplicative prefix (*le-*) is the spell-out of the Aspectual head (⊆). This head asserts that the event described by the root is contained within a resultant state. While iterative reduplication (Tagalog) asserts that an event contains multiple sub-events (sub-event ⊆ E), perfect reduplication asserts that a state contains the event (E ⊆ State). This accounts for the 'completed' reading: if an event is properly included in a state, it must be bounded and finished relative to that state. Thus, Ancient Greek provides evidence that reduplication encodes the abstract relation of inclusion, with the specific aspectual *flavor* determined by the temporal arguments being related.[12]

Finally, adjectival/adverbial reduplication can be modeled with a Degree head (Deg or Adv) that has (⊆) semantics, combining with the AP, as shown in (17).

(17)



In (17), the AP has the adjective ("small"). Deg(⊆) takes it, forming DegP. Semantically, Deg⊆ can be thought of as saying "the degree of smallness is included in the set of (contextually relevant) smallness degrees". If it is included as a part of that scale from 0 to maximum smallness, one can interpret that as either "especially small" (approaching the maximal smallness) or "somewhat small" (one instance of smallness). As we have seen, pragmatics then clarifies. This Deg head is analogous to an intensifier like "very" (which, in some theories, is a degree head that takes AP). Indeed, we could say "very" itself encodes a form of inclusion: to say "very tall" is to say "tall to a degree that is high in the set of tall degrees". Some analyses of "very" treat it as a measure function that boosts degree. We acknowledge that treating it as ⊆ is not standard, but it is an intriguing possibility (cf. Savoia et al., 2018). In our view, in languages without a separate word for "very", doubling the adjective is essentially doing the work of "very".

We have now mapped reduplication to a unified syntactic structure: in each case, a functional head with the content ⊆ merges with a lexical projection, and reduplication is the exponence of that head. This satisfies one of our major claims: reduplication is *morphosyntactic* (involving a particular syntactic configuration), not purely phonological

copying. The lexical content being doubled is not doubling itself; it is being doubled by the grammar to morphosyntactically encode inclusion.

A question arises: why would some languages choose the copying strategy at all? One possible answer is iconicity and economy: If the language lacks an easily distinguishable affix for the concept, copying the word is a straightforward way to iconically indicate multiplicity. Over time, this could grammaticalize. In Austronesian, protoforms of CV-reduplication perhaps started as emphatic repetition which became an affix-like process. The inclusion analysis still holds synchronically, but diachronically, the origin is likely iconic iteration in discourse.

Clearly, not every meaning fits reduplication. For instance, you do not typically find reduplication meaning "not X" (negation) or "all X" (universal quantification). Those involve exclusion or totality rather than inclusion of part. This distribution is exactly predicted if reduplication encodes $\subseteq$: it should appear with plural, imperfective, etc., but not with negative or exhaustive meanings. We will target possible counterexamples to this view in the following section.

8. Contrastive Focus Reduplication/Lexical Cloning: Extending the Inclusion Analysis

A central concern raised by an anonymous reviewer is that our discussion did not address Contrastive Focus Reduplication (CFR), also known as Lexical Cloning. These constructions involve exact repetition under contrastive focus (e.g., English "salad-salad", Italian "vino vino") and yield meanings like prototypicality ("real salad"), precisification ("wine in the strict sense"), or also exhaustification effects with quantifiers ("everyone everyone"). We now evaluate CFR explicitly and show that it is fully compatible with our inclusion-based model. CFR is cross-categorial, targeting nouns, adjectives, verbs, and more (Ghomeshi et al., 2004; Horn, 2018; Bross & Fraser, 2020; Milosavljević, 2024). It is often used in colloquial registers to signal authenticity or emphasis. For example, Italian *bella bella* conveys "truly pretty". Crucially, it is assumed in the literature that these are not independent lexical items but 'repetition effects': the meaning is derived from the relation between the base and its duplicate under focus.

Repetition as Subset Selection

We argue that despite surface differences, CFR meanings can be captured by the same inclusion relation $\subseteq$ used for grammatical reduplication. In "vino vino", the interpretation is that the entity is in the prototypical subset of wine:

(18) $x \in \text{Prot(wine)} \subseteq \text{Wine}$ *"vino vino"*

In other words, the double form picks out the canonical members of the wine set. Similarly, "bella bella" restricts to the top degrees on a beauty scale: the denotation is a restricted upper interval of the degree scale, i.e., an upper subset. Horn (2018) terms this "prototype reinforcement". Thus, CFR semantics involves taking a subset of the usual domain: either a subset of individuals/events (prototypical members) or a subset of degrees (top of the scale). Domain-widening effects (e.g., "EVERYONE-everyone") can likewise be modeled by requiring the quantifier to cover an enlarged base set (again via $\subseteq$). The key point is that CFR does not introduce a new fundamental semantic primitive; it employs inclusion in a focus-sensitive way. We therefore maintain a unified account: the same relational predicate $\subseteq$ underlies both grammatical reduplication and Lexical Cloning. What differs is the interpretive context. Grammatical reduplication applies $\subseteq$ to structured domains (plural individuals, event parts, degree scales), yielding plurality or iterativity. CFR applies $\subseteq$ to contextual domains determined by focus/alternatives

(prototypical sub-worlds, pragmatic domain sets). In both cases, the rule is "select a subset" of the relevant domain. This approach aligns with Milosavljević (2024)'s account of Lexical Cloning via a 'part–whole' relation over situations. Specifically, Milosavljević proposes that Lexical Cloning targets the situational argument (s) of a predicate. Crucially, the underlying semantics is defined by a part–whole relation between situations: the predicate holds in a base situation s, and in an alternative situation s' such that $s \subseteq s'$ (s is a subpart of s'). Under this analysis, the 'exhaustification' of EVERYBODY-everybody is derived from the inclusion relation. The standard, contextually restricted situation (s) is included within the maximal, widened situation (s'). The reduplication signals the expansion from the part (s) to the whole (s'). Similarly, functional cloning in Serbo-Croatian (e.g., NISI-nisi 'didn't-didn't') extends the validity of negation to all possible situations, again relying on the extension from a subset of situations to a superset. Thus, Milosavljević's findings confirm that the ($\subseteq$) operator is cross-categorial, applying not just to entities and events, but to the situational parameters of truth itself. Our account also avoids collapsing CFR into an unrelated mechanism: instead, CFR emerges as a focus-driven specialization of inclusion. Recognizing CFR as subset selection further refines our typology. We predict that grammatical reduplication typically yields non-maximal readings (plurality, iterativity, etc.) because $\subseteq$ picks out multiple parts/individuals, while CFR/Lexical Cloning yields prototypical and exhaustive readings because $\subseteq$ picks out 'privileged' subsets (extreme degrees or centered domains).[13] In sum, CFR/Lexical Cloning should be seen as a 'complementary' phenomenon that confirms the role of inclusion relations.

9. Conclusions

We have shown that by treating reduplication as an inclusion predicate, we can unify its cross-domain behavior. This suggests that inclusion ($\subseteq$) truly is a fundamental building block in grammar—so fundamental that languages sometimes realize it with one of the most basic iconic acts: repetition. In essence, reduplication demonstrates the cognitive reality of the $\subseteq$ predicate. Speakers across unrelated languages resort to the same strategy (doubling) to express it, indicating that it is a natural concept in language.

This feeds into Manzini and Savoia's (2011) argument that the split between lexical and functional elements is not hard-wired. Reduplication appears on content words (nouns, verbs, adjectives), yet serves a grammatical meaning (plural, aspect, degree). It thus blurs the boundary—exactly as M&S suggest, content roots can have functional predicates applied to them in the lexicon. It is satisfying that we can say: the same content word can be plain or can carry an inclusion relator (by reduplication) and that is akin to adding a functional morpheme. This is a concrete instantiation of their idea using actual language data.

The fact that reduplication is iconic has sometimes led to it being considered outside "core grammar" (as if it is a performance or expressive thing). Our analysis pushes back: iconicity is harnessed by grammar. The inclusion predicate provides a formal backbone, and iconic doubling is the chosen exponent. This demonstrates that iconicity and grammar are not mutually exclusive; rather, iconic operations can be grammaticalized to systematically express abstract relations. This is in line with many recent approaches in cognitive linguistics and typology that see grammar and iconicity as interacting (notably, Haiman, 1985's work on iconicity in syntax). Note that not all reduplication phenomena are covered by the inclusion analysis. There are some outliers, often labeled "non-prototypical reduplication" (Urdze, 2018). For example, onomatopoeic repetitions/ideophones (e.g., English *tick-tock*, *zig-zag*) are phonological patterning with maybe little to do with inclusion (though one could stretch that *zig-zag* path is a combination of zig and zag motions—arguably inclusive of two alternating parts, cf. Franco & Manzini, 2017). Another case is purely lexicalized

doublets (like *bye-bye*, which is just a fixed way to say goodbye, not meaning two goodbyes). These probably arise from pragmatic repetition and get lexicalized, thus losing the productive semantics. Our theory mainly addresses productive, grammatical reduplication.

One might also ask: could inclusion ($\subseteq$) itself be derived from something even more primitive? Some semanticists might say it is essentially the same as the mereological part-of relation used in formal semantics for plurals (Link, 1983). Indeed, $\subseteq$ as we use it is basically the *part-of* relation in a lattice. If that is the case, then reduplication is showing the grammatical manifestation of general mereology in language. That ties into known facts like: mass nouns and plural nouns share properties (cumulative reference)—interestingly, in some languages, not all nouns trigger plural-like reduplication (e.g., Indonesian *pohon-pohon* "trees", but *air* "water" does not need marking because it is inherently mass). This line could be explored: maybe count nouns need an overt $\subseteq$ to be plural, whereas mass nouns are inherently $\subseteq$ (any portion of water is water, so it already has part–whole internally)—hence no reduplication. Such a hypothesis fits our framework and could be explored in future works.

Further analyses are also needed to understand the limits of reduplication with verbs: the aspectual value $\subseteq$ between events may not apply to all verb *aktionsart:* namely, we expect that the lexical aspect of some verb classes (for example, achievement) does not allow productive reduplication due to the aspectual features (either lexical or grammatical aspect) that contrast with the inclusion between subset of events.

We have presented a comprehensive examination of reduplication across languages and argued that a unified morphosyntactic analysis is not only possible but highly explanatory. By treating reduplication as the lexical spell-out of a relational inclusion predicate ($\subseteq$), we can capture the otherwise disparate functions of reduplication—plurality, distributivity, iteration, continuity, intensity, and attenuation.

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Notes

1 Notice that these 'restrictive' readings (e.g., numeral reduplication yielding 'only n') possibly require additional assumptions about scale alternatives and pragmatic strengthening. We postpone a full derivation to future work; crucially, they do not invalidate the claim that reduplication contributes an inclusion-based skeleton.

2 When giving sign language examples, we use glosses in SMALL CAPS (e.g., BOOK++ meaning the sign for "book" repeated multiple times, indicating "books"). The plus signs indicate repeated movement (as is standard in sign language transcription).

3 See note 2 for the gloss in sign languages.

4 Note that we assume that the distributive construal emerges when $\subseteq$ is interpreted over sub-situations (or over partitions of the relevant plurality), yielding 'n for each atomic distributor'. In other words, distributivity is not encoded by a distinct reduplicative meaning, but by the interaction between $\subseteq$ and the distributive architecture of the clause.

5 On these readings, inclusion is clearly best understood as zonal/category inclusion in the sense of Belvin and den Dikken (1997): the reduplicated form selects an element that counts as an X in an enriched domain (including toy-like/exaggerated instances), but is peripheral with respect to a prototype. Formally, the output is a (proper) subset of the contextually given X-domain (toy-Xs $\subset$ Xs; exaggerated-Xs $\subset$ Xs), with the direction of pragmatic strengthening determining whether the selected subset is 'smaller' or 'more extreme'.

[6] This case is likely Contrastive Focus Reduplication rather than morphological reduplication. We will discuss this in Section 8 (cf. Horn, 2018).

[7] Cross-linguistic gaps are expected under competition/blocking. If a language lexicalizes a dedicated operator for distributivity, attenuation, or intensification (affixes, particles, degree heads), reduplication as ⊆ will preferentially realize the remaining contrast (often plural/iterative) and the other readings will be unavailable or pragmatically disfavored. Thus, implicature does not predict 'anything goes': it predicts typological clustering shaped by the inventory of competing morphological strategies.

[8] Notice that nothing prevents that in a given language both plural morphology and reduplication are grammatical strategies active in the nominal domain. Where both are available, reduplication can be treated as an alternative exponent (allomorph) of ⊆, or as realizing a lower division head (cf. Borer, 2005; Mathieu, 2012) distinct from higher counting plural morphology; this predicts subtle interpretive differences rather than pure optionality.

[9] Notice that Sign languages offer a clear parallel in the verbal domain. In ASL and many other sign languages, repeating a verb sign can indicate habitual or frequentative aspect (cf. Pfau & Steinbach, 2005). For instance, a single long, heavy motion of the sign for "STUDY" might mean "to study (once)", whereas performing the sign as smaller, repeated movements ("STUDY++") means "to study habitually or regularly". The repeated sign is an overt, iconic way to show the event happening multiple times. Our inclusion analysis would say the habitual *study* sign denotes an event that is a sum of multiple study events (over different times). Indeed, sign language linguists often analyze such *temporal aspect* marking as indicating a *set of occasions*. Thus, even in the visual modality, the pattern holds: reduplication → plural events.

[10] These repetitions can also be interpreted as Lexical Cloning/Contrastive Focus Reduplication rather than productive numeral reduplication (cf. Section 8).

[11] The derivation of 'diminutive' vs. 'augmentative' readings, questioned by an anonymous reviewer, follows from the interaction of ⊆ with the scalar topology of the base. With Open Scales (adjectives), The inclusion operator partitions the scale and pragmatic principles of 'informativity' typically direct the reading to the upper bound (Intensification), as identifying a subset of high degrees is pragmatically distinct from the positive form. When applied to entities without a grade, the inclusion operator targets part-hood: since a 'part' of an object is smaller than the object, the 'diminutive' reading arises via implicature. This 'Scalar Partitioning Hypothesis' provides the systematic mechanism required to predict interpretation based on the lexical semantics of the base.

[12] Specifically, our analysis possibly reveals a unified typology of verbal reduplication based on the directionality of the inclusion predicate. With *Imperfectives* (as in Tagalog) Reference ⊆ Event, the viewpoint is internal and the event is the 'whole', leading to Iteration/Continuity reading. With *Perfects* (as in Ancient Greek) Event ⊆ Reference/State. Here, the viewpoint is external and the state is the 'whole', leading to Completion/Stativity. We will explore this correlation in future research.

[13] This distinction means our claims (no universal quantifier, no completive sense) mainly apply to the morphologized cases. CFR can produce such effects, but via focus semantics.

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