Comparing contextual shifts in partial/total predication and plural non-maximality[1]

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Abstract. We investigate a potential analogy between the varying quantificational strength of partial/total predicates and plural predication. Using the predicates *wet* and *dry* as a case study, we ask whether partial/total adjectives show a property characteristic of plurals, namely homogeneity effects. As far as part quantification is concerned, these predicates do exhibit homogeneity. But for degree quantification, a new contrast emerges between partial and total predicates: only partial predicates show homogeneity.

Keywords: partial/total predicates, homogeneity, non-maximality, vagueness and imprecision, exhaustivity

1. Introduction

In many adjectival antonym pairs, one predicate tends to get a weaker interpretation than the other. We refer to the predicates whose preferred interpretation is weak/existential as PARTIAL and to those whose preferred interpretation is strong/universal as TOTAL (Yoon 1996, Krifka 1996, Gajewski 2005, a.o.). This paper presents a case study of this contrast focusing on the antonym pair *wet* and *dry*; the former is partial (weak out of the blue) while the latter is total (strong out of the blue):

(1) a. The table is wet. — PARTIAL predicate
≈ 'Some part of the table is wet to some degree.' — WEAK construal
b. The table is dry. — TOTAL predicate
≈ 'No part of the table is wet to any degree.' — STRONG construal

As highlighted by the paraphrases in (1), there are two dimensions along which *wet* is weaker than *dry*. The first is what we call the MEREOLOGICAL dimension. The observation is that in (1) *wet* means that *some part* of the table is wet, while *dry* means that *all parts* are dry (see e.g. Yoon 1996, Krifka 1996). The second dimension is what we call the DEPTH dimension. The observation is that in (1a), the wet parts of the table only have to be wet to *some* extent (they could be anywhere from moist to covered in a thick layer of liquid), while in (1b), *dry* requires the dry parts to be just about fully dry (see e.g. Kennedy and McNally 2005, Kennedy 2007).

It has been observed that the weak or strong semantics of at least some partial predicates is not purely lexical; it can be overridden by context (see e.g. Krifka 1996, Kennedy and McNally 2005, Kennedy 2007). Such contextual shifts in meaning have quite naturally been compared with NON-MAXIMALITY, a form of contextual weakness in plural predication (see e.g. Krifka 1996, Yoon 1996, Burnett 2017, Feinmann 2020, Amiraz 2020). Indeed, definite plurals stan-

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dardly have universal quantificational force, but in certain contexts, they can be interpreted much more weakly. We will elaborate on these contexts in due time.

(2) The children sang.
   a. out of the blue: 'All or almost all of the children sang.'
   b. in certain contexts: 'Some of the children sang.'

However, most previous work investigating this analogy (e.g., Krifka 1996, Gajewski 2005, Burnett 2017) does not look at the mereological and depth dimensions separately, and does not investigate whether partial/total predicates show other hallmarks of plural predication (except for Feinmann 2020, 2022 and Amiraz 2020, which we discuss later). In particular, plural predication is known to show HOMOGENEITY effects, whereby positive sentences display universal quantification in their truth conditions, negative sentences display negated existential quantification, and both positive and negative sentences are UNDEFINED rather than FALSE in non-homogeneous cases (e.g., Fodor 1970, Löbner 2000, Schwarzschild 1994, Križ 2015):

(3) a. $[\![\text{The children sang}]\!] = \begin{cases} 1, \text{ if all of the children sang;} \\ 0, \text{ if none of the children sang;} \\ \#, \text{ otherwise (for our purposes: some but not all sang)} \end{cases}$

   b. $[\![\text{The children didn't sing}]\!] = \begin{cases} 1, \text{ if none of the children sang;} \\ 0, \text{ if all of the children sang;} \\ \#, \text{ otherwise} \end{cases}$

Therefore, our research question is whether both dimensions of the partial/total contrast involve the same kind of context-dependency as plural predication. We will show that, in the mereological dimension, the behavior of partial/total predicates is indeed analogous with plurals. However, in the depth dimension, the analogy holds only for partial predicates (*wet*, but not *dry*). Specifically, certain contexts bring out homogeneity effects (read: undefinedness for non-homogeneous cases) for *wet*, but *dry* resists such undefinedness. The fact that, on the depth dimension, total but not partial predicates refuse a truth-value gap constitutes a new empirical claim about the partial/total distinction.

This paper is organized as follows. In section 2, we motivate the existence of the mereological and depth dimensions, and then show that the partial/total contrast is context-dependent. We also show why it is initially tempting to understand this along the same lines as the context-dependency observed with plurals. In section 3, we show that on the mereological dimension, total and partial predicates pattern with plural predication, and sketch a unified account of both phenomena within the alternative-based framework of Križ and Spector (2021). However, in section 4, we show that this account cannot be extended to the depth dimension; it would work for partial predicates, but not total ones, because the latter resist truth-value gaps. In section 5, we provide some additional motivation for this newfound contrast between partial and total predicates, namely that they interact differently with the phrase *in a certain sense*. Section 6 concludes; an appendix elaborates on why this contrast between *wet* and *dry* is also a challenge for another recent theory of homogeneity, namely the exhaustivity account by Bar-Lev (2021).

2. Some observations on dimensions and context-dependency

In this section, we first motivate empirically the distinction between the mereological and depth dimensions among partial/total predicates; they cannot be reduced to a single holistic scale. Then, we show that in both dimensions the varying strength of partial/total predicates is context-dependent, rather than lexical. Finally, we make an analogy between the behaviour of these predicates and plurals; the analogy suggests that the varying strength of such predication (singular and plural) has a common cause.

We have already described partial and total predicates like *wet* and *dry* as differing in strength along two dimensions, the mereological and depth dimensions.[2] The distinction between these two dimensions is well motivated empirically. First, the dimensions can be targeted separately by proportional quantifiers like *half* (see Kennedy and McNally 2005). Indeed, for *wet*/*dry*, such quantifiers can target either the amount of surface covered by liquid, as in (4a), or the degree of wetness of each subatomic part, as in (4b).

(4) The table is half wet. ✓MEREOLOGICAL, ✓DEPTH
   a. MEREOLOGICAL CONSTRUAL: 'Half the table is wet; the rest is dry.'
   b. DEPTH CONSTRUAL: 'All of the table has a (uniform) degree of wetness halfway along the wetness scale.'

The dimensions can also be isolated in various ways. For example, pseudopartitives cannot quantify along the depth dimension (5a). Moreover, some partial/total pairs like *open*/*closed* lack the mereological dimension entirely (5b).

(5) a. Half of the table is wet. ✓MEREOLOGICAL, *DEPTH
   b. (i) The window is half open. *MEREOLOGICAL, ✓DEPTH
   (ii) #Half of the window is open. *MEREOLOGICAL, *DEPTH

We therefore assume that these dimensions are not reducible to a single scale.

In both dimensions, the weak–strong contrast between partial and total predicates is not purely lexical. In some contexts *wet* shifts to a strong interpretation, and *dry* shift to a weak one. We see this in (6), where *dry* and *not wet* mean 'not fully wet' rather than 'not wet at all.'

(6) SCENARIO: *A beached whale needs to be kept as wet as possible to survive, but*
   a. MEREOLOGICAL: *. . . some of its body parts are dry.*
   b. DEPTH: *. . . its entire skin is no longer maximally wet.*
   The whale is not wet. / The whale is dry. TRUE in (6a) and (6b)

This contextual shift holds regardless of whether the scenario is set up to target the mereological dimension (6a) or the depth dimension (6b).

The shift in the strength of *wet* and *dry* occurs due to differences in the conversational goal, modelled through a QUESTION UNDER DISCUSSION (QUD). The predicate *wet* is strong, and *dry* weak, if the conversational goal targets the distinction between 'maximally wet' and 'not

[2]See e.g. Kennedy and McNally 2005 on dimensions. The degree semantics literature has drawn attention to another sense in which predicates can be 'multidimensional' (e.g., Sassoon 2013). Indeed, a predicate may be sensitive to an open-ended set of many different scales that is determined by non-linguistic knowledge. For instance, the semantics of *healthy* and *sick* arguably involves distinct scales for many different aspects of physical and mental health. We will not be concerned with such predicates in this paper.

maximally wet'—rather than the distinction between 'maximally dry' and 'not maximally dry.' In (6), the conversational goal is to keep the whale maximally wet; all parts should be wet, and the wet parts should be wet to the highest degree. Thus, what matters is the distinction between full wetness and non-full wetness.

This raises the question, of course, of why *wet* and *dry* have different construals out of the blue. After all, out of the blue, the QUD is not clear; how do speakers know which strength to assign to these adjectives, and why do speakers seem to agree that *wet* is weak and *dry* is strong? Presumably, even when the sentences are presented without context, speakers accommodate a QUD for which the difference between 'fully dry' and 'not fully dry' is what matters, because in most everyday contexts, one wants things to be dry. Consider again our original example (1), repeated in (7). This is an out-of-the-blue sentence about a table; one very naturally assumes that the goal would be for the table to be fully dry. Since this accommodated QUD leads to the relevant distinction being whether the table is fully dry or not fully dry, any degree of wetness counts as 'wet'; so *dry* is strong and *wet* is weak in this case.

(7) a. The table is wet. ≈ 'Some part of the table is wet to some degree.'
b. The table is dry. ≈ 'No part of the table is wet to any degree.'

As such, we take the weak and strong meanings of 'partial' and 'total' predicates to be the result of particular QUDs. This means that the terms 'partial' and 'total' are misleading. Still, we will keep using them as labels for the adjectival antonyms based on the meanings each adjective has out of the blue.

The QUD-dependency of these predicates has a parallel elsewhere in language, namely in the quantificational force of plural predication (e.g., Krifka 1996, Malamud 2012, Križ 2015). In positive sentences, plurals typically receive a universal interpretation out of the blue (8a). Unsurprisingly, one also observes universal quantification in contexts where what matters is whether the predicate is true of all relevant individuals or just some of them (8b).

(8) a. [*out of the blue*] The children sang.
≈ 'All of the children sang.'
b. SCENARIO: *All the children under discussion will be tested on their singing.*
A: Are the children practicing?
B: Yes, the children are singing.
≈ 'All of the children are singing.'

But certain contexts can lead to weaker meanings for plurals, including existential ones; this has been called 'non-maximality.'[3]

(9) NON-MAXIMALITY
A: Did you sleep well last night?
B: Alas, the children sang all night.
≈ 'At least some of the children sang.'

Given the context in (9), B's answer is felicitous if only three out of ten children sang, for example; the truth conditions are existential. Intuitively, this is because in (9), it does not

[3]The term 'non-maximality' is sometimes used to refer to 'near-universal' construals that involve a small handful of exceptions. In this paper, we focus exclusively on the instances of non-maximality that are outright existential.

matter for B's sleep whether all or only some of the children sang.

The fact that the QUD mediates whether plural predication is interpreted as universal (8b) or existential (9) constitutes an empirical parallel between plurals and partial/total predicates. Another such parallel is that, when partial adjectives are predicated of pluralities, they tend to receive a non-maximal interpretation out of the blue in addition to being weak at the atomic level (10a), in contrast to total predicates (10b) (e.g., Krifka 1996, Yoon 1996).

(10) a. The tables are wet. ≈ 'At least some of the tables are at least partly wet.'
b. The tables are dry. ≈ 'All of the tables are entirely dry.'

As such, one might want a single explanation for when plurals and partial/total predicates are weak or strong. To see how seriously the parallel should be taken, we now turn to another property of plural predication, namely homogeneity—the lack of truth value (in many discourse contexts) in situations where a predicate holds of some but not all members of a plurality. We will show that, from the perspective of homogeneity, partial/total predicates behave like plurals in the mereological dimension, but diverge from plurals in the depth dimension.

3. The mereological dimension: partial/total predicates pattern with plurals

In this section, we show that partial/total predicates display a homogeneity effect (truth-value gap) in the mereological dimension. We then show how Križ and Spector's (2021) theory of homogeneity and non-maximality, made for plurals, can be extended to account for it. The empirical contrasts we will find between total predicates and plurals (sections 4 and 5) do not hinge on a particular theory, however, and we will discuss an alternative theory in appendix A.

3.1. Homogeneity effects in the mereological dimension

Following recent work (Križ 2015, Bar-Lev 2021, Feinmann 2020, Križ and Spector 2021), we take non-maximality to have a common source with homogeneity. A common argument for collapsing non-maximality and homogeneity is that they both disappear with *all*:

(11) All the children sang.
⇒ no homogeneity: the sentence is simply false in a non-homogeneous situation
⇒ no non-maximality: the sentence is only true/felicitous if every child sang

If the varying strength of partial/total predicates has the same underlying cause as the varying strength and truth-value gaps observed with plurals, then partial/total predicates should also show truth-value gaps in the right environment. Whatever generates undefinedness in plural predication would also, in the right circumstances, generate it for partial/total predicates.[4]

We address this prediction for the mereological dimension in this section,[5] turning to the depth dimension in section 4. The mereological dimension is more akin to plurals than the depth

[4]This prediction could be avoided on Feinmann's (2020) proposal that partial/total predicates underlyingly give rise to truth-value gaps, which are not intuited due to a second form of context-dependency. But as shown below and in Feinmann 2022, truth-value gaps with partial/total predicates *are* in fact intuited in the right contexts.

[5]See Löbner 2000, Spector 2013, Križ 2015, and Amiraz 2020 on other predicates that do not come in partial/total pairs but have a mereological dimension and show homogeneity.

dimension, as it makes reference to material parts rather than to degrees. Thus, naively, it is the one where we most expect to find correspondences between partial/total and plural predication.

To see if the prediction holds, let's begin by identifying a type of scenario that reliably gives rise to homogeneity effects in plural predication. One possibility is to set up a QUD where it matters exactly which parts of the plurality satisfy the predicate, as in (12):

(12) SCENARIO: *A and B need to varnish ten tables. For each table, A must spray it with water, and then B can start varnishing it. At present, half of the tables are wet.*
B: How are the tables looking? A: #They're wet / not wet yet.

The crucial property of the scenario in (12) is that the implicit QUD is *which tables* can be varnished; thus, for each individual table x, the proposition that x is wet is relevant.

Turning now to subatomic parts, we likewise need a scenario where, for several subatomic parts x of the individual that *wet* applies to, the proposition that x is wet is relevant (and likewise for *dry*). Two contexts of this kind, modelled on (12), are given in (13). Scenario (13b) is somewhat more 'plural-like' as it makes a finite number of discrete subparts of the table relevant.

(13) a. SCENARIO 1: *A and B need to varnish a huge table. A must spray it with water; once some part of it is wet, B can varnish that part. At present, half the table is wet.*
b. SCENARIO 2: *A and B need to varnish a huge table that consists of four sections. They have decided that A will spray each section with water and, as soon as A is done with a section, B will varnish that section. At present, two of the sections are completely wet; the other two are completely dry.*

B: How is the table looking?
A: #It's wet / not wet (yet).
A′: #It's dry / not dry (anymore).

As expected on the prediction described above, both *wet* and *dry* show homogeneity effects in both scenarios.

3.2. An account of homogeneity in the mereological dimension

Given the observation of homogeneity with partial/total predicates, we now introduce Križ and Spector's (2021) account of plural homogeneity (12) and extend it to the subatomic case (13).

For Križ and Spector (2021), definite plural sentences introduce alternatives that quantify existentially over different sets of subpluralities. For concreteness, we take their system to generate a set of alternatives as the semantic value of a sentence (at least if the sentence involves a plural) (15). Each alternative means that in a certain upward-closed set[6] of subpluralities of the tables, at least one individual (whether an atom or a sum) satisfies the starred predicate ***wet** (14), i.e., at least one individual in the set consists of atomic parts all of which are wet.

(14) $*\mathbf{wet}_w(x) = 1$ iff $\forall y[y \leq x \wedge y \text{ is atomic} \rightarrow \mathbf{wet}_w(y)]$

(15) $[\![\text{The tables are wet}]\!]^w = \{\lambda w'.\exists x[U(x) \wedge *\mathbf{wet}_{w'}(x)]$
$: U$ is a nonempty upward-closed subset of $\{y : *\mathbf{table}_w(y)\}\}$

[6] An upward-closed subset of a set R is a set $U \subseteq R$ such that for any $x, y \in R$, if $x \in U$ and $x \leq y$, then $y \in U$.

The truth conditions in a given discourse context arise from the conjunction of the subset of these alternatives that are STRONGLY RELEVANT. Alternatives are strongly relevant iff they identify the same set of worlds as a given subset of the partition cells of the QUD:

(16) **Strong relevance:** Given a partition Q, an alternative p is STRONGLY RELEVANT if there is a nonempty subset $R \subset Q$ of partition cells such that $p = \bigcup R$.

The falsity conditions of a sentence with multiple strongly relevant alternatives are derived analogously, by conjoining the falsity conditions of the strongly relevant alternatives:

(17) Given a sentence ϕ containing a plural and a QUD Q:
a. ϕ is TRUE in w w.r.t. Q iff $\forall p \in [\![\phi]\!]^w [p$ strongly relevant to $Q \rightarrow p(w) = 1]$
b. ϕ is FALSE in w w.r.t. Q iff $\forall p \in [\![\phi]\!]^w [p$ strongly relevant to $Q \rightarrow p(w) = 0]$

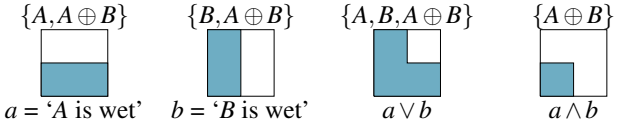
When some but not all strongly relevant alternatives are true, the sentence lacks a truth-value.

Let's first see how this works in an out-of-the-blue context for plural predication with *wet*. Assume that $[\![\text{the tables}]\!]^w = A \oplus B$, so that $\{y : *\textbf{table}_w(y)\} = \{A, B, A \oplus B\}$.

(18) [*out of the blue*] The tables are wet.

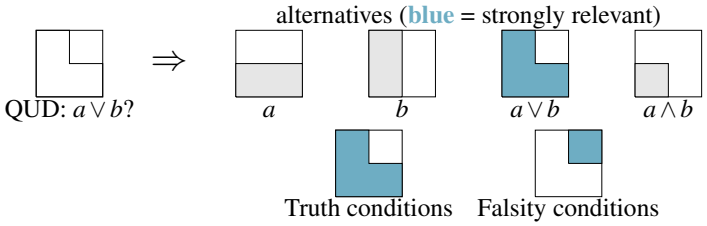
For each subset there is an alternative of (18), which says that *some* element of the subset satisfies ***wet**. This is shown in (19), with the subsets above the squares and the corresponding alternatives below. Given that *wet* is distributive, 'A or $A \oplus B$ is wet' is equivalent to 'A is wet.'

(19)



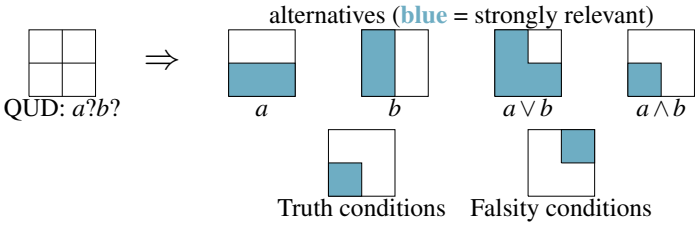
Which of these alternatives are strongly relevant (and therefore end up being conjoined) in a given context? Assuming that in an out-of-the-blue context, we tend to be interested in whether all the tables under discussion are dry, a natural QUD is 'Is any table wet?'. Given this QUD, the only strongly relevant alternative is the existential:

(20)



Since there is only one strongly relevant alternative, it ends up as the meaning of the sentence. Thus, (18) has an existential construal and no homogeneity effect with this particular QUD. On the other hand, in a context like (12), where the implicit QUD is 'For each table x, is x wet?,' there are now multiple strongly relevant alternatives about different subsets of the tables:

(21)



The truth/falsity conditions of the sentence in this context are obtained by conjoining the truth/falsity conditions of all the alternatives. This leads to a universal construal in positive sentences, and to a homogeneity effect: if only some of the tables are wet, (18) is neither true nor false, since only some of its strongly relevant alternatives are true.

Let us now return to singular predication with *wet*/*dry* and the homogeneity effect in (13), to see how it can be captured on Križ and Spector's approach. First, we need a working lexical entry for partial/total predicates; for now, we focus on *wet* and put aside the depth dimension. In (22), we encode the alternative-triggering nature of *wet* (necessary for Križ and Spector's approach) in its lexical entry.

(22) a. $[\![\text{wet}]\!]^w = \lambda y.\{\lambda w'.\exists x[U(x) \wedge \mathbf{wet}^{\forall}_{w'}(x)] : U \text{ is an upward-closed subset of } \{x : x \leq y\}\}$

b. $\mathbf{wet}^{\forall}_{w}(x) = 1$ iff every relevant part of x is wet in w

Given this lexical entry, when *wet* composes with a singular argument, the resulting phrase's alternatives arise compositionally from functional application:

(23) $[\![\text{The table is wet}]\!]^w =$
$\{\lambda w'.\exists x[U(x) \wedge \mathbf{wet}^{\forall}_{w'}(x)] : U \text{ is an upward-closed subset of } \{x : x \leq [\![\text{the table}]\!]^w\}\}$

With this alternative set, we can obtain contextual shifts between weak and strong interpretations in the mereological dimension. The weak construal of *wet* out of the blue is due to an existential QUD (there is no lexical asymmetry between *wet* and *dry*):

(24) [*out of the blue*] The table is wet.
⇒ QUD: 'Does any part of the table need to be dried?' / 'Is any part of the table wet?'

Given this QUD, only the weak alternative in (25) (where the domain of $\exists$ contains all parts of the table, rather than all parts of a particular part of the table) is strongly relevant.

(25) $\lambda w'.\exists x[U(x) \wedge \mathbf{wet}^{\forall}_{w'}(x)]$, where $U = \{y : y \leq [\![\text{the table}]\!]^w\}$

The other alternatives are too informative to be strongly relevant, because they do not exactly correspond to any cell, or set of cells, in the partition of worlds induced by the QUD. Thus, given that there is only one strongly relevant alternative and it is existential, we obtain existential truth conditions with no truth-value gap. (24) is correctly predicted to be true rather than undefined if the table is partly wet and partly dry.

Next, let's consider scenario (13), about which we suggested that the QUD is something like 'Which parts of the table are wet?'. Given this QUD, for any set U of parts of the table, the proposition that some part in U is wet is strongly relevant. In other words, all of the alternatives

in (23) are strongly relevant. The truth/falsity conditions are therefore derived by conjoining the truth/falsity conditions of all these alternatives, with the following result:

(26) a. *The table is wet* is TRUE in w iff $\mathbf{wet}^{\forall}_{w}(\llbracket\text{the table}\rrbracket^{w})$
b. *The table is wet* is FALSE in w iff $\neg\exists x[x \leq \llbracket\text{the table}\rrbracket^{w} \wedge \mathbf{wet}^{\forall}_{w}(x)]$

Križ and Spector's framework also makes it possible to derive strong truth conditions without homogeneity, as in the stranded-whale scenario (6). There, the QUD does not distinguish between the whale being partly wet and not wet at all, so the universal alternative (27) is the only strongly relevant one. Therefore, it alone determines the truth and falsity conditions.

(27) $\lambda w'.\exists x[U(x) \wedge \mathbf{wet}^{\forall}_{w'}(x)]$, where $U = \{\llbracket\text{the whale}\rrbracket^{w}\}$

Since U is a singleton containing the part of the whale corresponding to the entire whale, and given the universal meaning of the constant $\mathbf{wet}^{\forall}_{w}$, this means that the whale is entirely wet.

In sum, Križ and Spector's framework can be extended to account for the context-dependency of *wet*/*dry* in the mereological dimension, correctly predicting homogeneity effects when they are observed.

4. The depth dimension: total and partial predicates diverge

We have seen that the context-dependency of *wet*/*dry* in the mereological dimension patterns with non-maximality in plural predication. We now turn to the variable strength of these predicates on the depth dimension. Both scenarios in (28) control for part-quantification, but *wet*/*dry* are still interpreted as having variable strength as a result of the QUD. Indeed, in (28a), the salient QUD is 'Is the whale maximally wet?,' and *not wet* and *dry* are interpreted as meaning 'not maximally wet'; but in (28b), the salient QUD is 'Is the shirt wet to any (noticeable) degree?,' and these predicates mean 'not wet to any degree.'

(28) a. SCENARIO: *A beached whale needs to be kept as wet as possible to survive, but its entire skin is no longer maximally wet, just slightly moist.*
The whale is not wet./The whale is dry. TRUE
b. SCENARIO: *A T-shirt is drying and is still slightly moist throughout, so it should not be worn yet.*
#The T-shirt is not wet./The T-shirt is dry. NOT TRUE

This lends plausibility to the idea that the depth dimension involves the same mechanism determining relative strength as in the mereological dimension and plural non-maximality.

In this section, we address a prediction of this idea: given the right QUD, the depth dimension of partial/total predicates should give rise to homogeneity effects. We begin by discussing *wet* on the depth dimension and showing it displays homogeneity. Then, we show how Križ and Spector's approach can explain these data. Finally, we turn to *dry* to contrast it with *wet*. In particular, *dry* does not have a homogeneity effect on the depth dimension.[7]

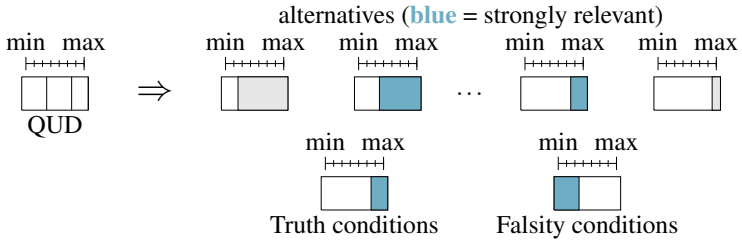
[7]Kennedy (2007) makes a related claim: in the unidimensional partial/total pair *open*/*closed*, *open* is context-dependent while *closed* is not. In contrast, our claim is that in the bidimensional pair *wet* and *dry*, both predicates are context-dependent; what they differ in is that only the partial *wet* displays homogeneity in both dimensions. Kennedy's claim is compatible with ours, since we are discussing predicates with different dimensions.

4.1. *wet* shows homogeneity on the depth dimension

Križ and Spector's theory generates a homogeneity effect whenever more than one alternative is strongly relevant. If it is correct to extend this theory to the depth dimension, homogeneity effects are predicted to be observable when the QUD makes multiple thresholds on a scale relevant. That is, if the QUD partitions the wetness scale into more than two intervals, *wet* should be neither true nor false if its argument has a degree of wetness in neither the lowest nor the highest interval. In (29), we provide a scenario of exactly this kind; the intervals and the predicted homogeneity effect are illustrated in (30).

(29) SCENARIO: *A special fan uses a wet filter to cool the air. If the filter is wet at 80–100% capacity, the fan works well. If it's at 30–80% wetness, the fan will still cool the room somewhat but noticeably less so. If it's under 30%, the fan switches off. B is not in the room cooled by the fan and only has epistemic access to the state of the fan.*
A: How cool is the room?
B: The filter is wet. (≈ it's 80–100% wet)
B′: The filter is not wet. (≈ it's 0–30% wet)

(30) Prediction of the homogeneity approach for *The filter is wet* in scenario (29)



As it turns out, (29) behaves exactly as predicted by extending Križ and Spector's approach to the depth dimension: the degree scale is partitioned into the three intervals [0%, 30%), [30%, 80%) and [80%, 100%], and neither of the answers in (29) is true if the filter is wet to a degree in the intermediate interval. Thus, with the right scenario, we observe a homogeneity effect in the depth dimension.[8]

A natural question arising at this point is whether this effect is specific to *wet* or more general. The latter is suggested by the work of Feinmann (2022) on homogeneity effects induced by the partial predicate *open*. This predicate lacks a mereological dimension, so any homogeneity effect occurs in the depth dimension. Feinmann notes that in scenario (31), neither a positive nor a negative sentence with *open* is straightforwardly true.

[8]Compared to the mereological dimension, it is harder to elicit a clear homogeneity effect in the depth dimension. Consider (i), a variant of our table-varnishing scenario (13a). The amount of varnish must match the amount of water, so the exact degree of wetness should matter for B's purposes; (i) makes every degree of wetness relevant.

(i) SCENARIO: *A and B need to varnish a table. A must spray it with water and B with varnish in equal amounts. A has added half of the water it will need in total.*
B: How is the table looking?
A: a: #It's dry / not wet.
b. It's wet / not dry.

One expects all the sentences in (i) to be infelicitous, contrary to fact. Perhaps scenario (i) gives rise to an existential QUD ('Can I work on the table?'); but why this happens only in the depth dimension is unclear.

(31) SCENARIO: *A horse is trying to get through a door opened at an angle of 15°. We wonder whether the horse will make it through the door without touching the frame.*
#The door is open. / #The door is not open. (adapted from Feinmann 2022)

We suggest that the reason for this effect might be that the scenario implicitly makes three intervals on the openness scale salient. At the extremes are the interval where the door is so closed that the horse cannot pass, and the interval where it is so open that it can pass without touching the frame. In between is an interval where the door is open enough that the horse is able to pass through by nudging it open. 15° falls in this intermediate interval, and for this reason leads to undefinedness, much like with *wet* in (29).

4.2. Extending Križ and Spector's framework to degree predication

We now turn to the formal details of extending Križ and Spector's (2021) theory to the depth dimension. A degree scale for wetness is defined in (32):

(32) **Wetness scale** $S_{wet} = (D_{wet}, \leq_{wet}, F_{wet})$ where:
- a. D_{wet} is the set of degrees of wetness;
- b. $\leq_{wet}$ is a linear ordering on D_{wet}, which we assume to have a maximum ('completely wet') and a minimum ('not wet at all');
- c. F_{wet} is a measure function mapping a world w and individual x to a degree in D_{wet}.

Recall that we are modelling the mereological and depth dimensions as two aspects of a single lexical meaning of *wet*/*dry*, rather than distinct readings. The alternatives introduced by *wet*/*dry* must therefore vary along both dimensions. Simplifying somewhat, each alternative of *wet* should say that the argument must have a relevant part that is wet at least to a certain degree d, while each alternative of *dry* says the argument must have a relevant part that is wet at most to a certain degree d.[9] We formalize this by taking each alternative to depend on two parameters: an upward-closed set U of relevant parts of its arguments, and a parameter that determines how the wetness scale is partitioned. We model the latter parameter as a PARTITION FUNCTION—a mapping from scalar orderings to partitions into intervals, as defined in (33a). (33b) defines the equivalence relation of being in the same partition class.

(33) a. A PARTITION FUNCTION P maps any scale $(D, \leq, F)$ to a partition of D into at least two sets that are convex[10] with regard to $\leq$.
b. Given a partition function P and a scale S, we write $d \sim_{P(S)} d'$ iff d and d' are in the same cell of $P(S)$.

Each of the alternatives for *wet* in (34a) is based on an upward-closed set U of parts of the individual argument and a partition function P, and says that there is a part in the set U whose degree of wetness is in the same partition class as the scale maximum according to P.[11] Similarly, each of the alternatives for *dry* in (34b) requires its argument to have a part in the set U whose degree of wetness is in the same partition class as the scale minimum given P.

[9] The definitions to be given in the main text will also permit intervals that do not contain the threshold d.
[10] A set S is convex relative to an ordering if, whenever $x, z \in S$, so is any y ordered in between x and z.
[11] This approach makes analogous the alternatives introduced for the depth and mereological dimensions; the alternatives for the mereological dimensions involve convex sets too, because every upward-closed set of parts is convex with regard to the parthood relation.

(34) a. $[\![\text{wet}]\!]^w = \lambda x.\{\lambda w.[\exists y \in U.F_{wet}(w,y) \sim_{P(S_{wet})} \max(\leq_{wet})]$
: U is an upward-closed subset of $\{y : y \leq x\} \wedge P$ is a partition function$\}$

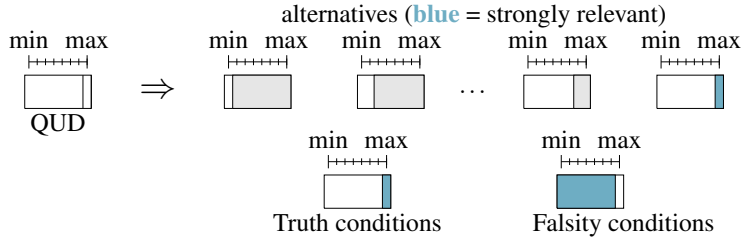
b. $[\![\text{dry}]\!]^w = \lambda x.\{\lambda w.[\exists y \in U.F_{wet}(w,y) \sim_{P(S_{wet})} \min(\leq_{wet})]$
: U is an upward-closed subset of $\{y : y \leq x\} \wedge P$ is a partition function$\}$

(35) a. $[\![\text{The whale is wet}]\!]^w = \{\lambda w'.[\exists y \in U.F_{wet}(w',y) \sim_{P(S_{wet})} \max(\leq_{wet})]$
: U is an upward-closed subset of $\{y : y \leq [\![\text{the whale}]\!]^w\}$
$\wedge P$ is a partition function$\}$

b. $[\![\text{The whale is dry}]\!]^w = \{\lambda w'.[\exists y \in U.F_{wet}(w',y) \sim_{P(S_{wet})} \min(\leq_{wet})]$
: U is an upward-closed subset of $\{y : y \leq [\![\text{the whale}]\!]^w\}$
$\wedge P$ is a partition function$\}$

Consider first the predictions of this system for the contrast between the homogeneity-less scenarios in (28a) and (28b). Since these scenarios stipulate that all relevant parts of the individual in question are wet to the same degree, we may simplify things by ignoring variation between alternatives along the mereological dimension, and pretend that each partition of the wetness scale corresponds to a unique alternative. The alternatives of *The whale is wet*, given this simplification, are schematized in (36). Each alternative requires the whale's degree of wetness to be in some interval containing the scale maximum. But given the QUD 'Is the whale maximally wet?,' only the strongest alternative, which requires the whale to be wet to the maximum degree, is strongly relevant. As such, it alone determines the truth and falsity conditions.

(36) Truth and falsity conditions given the QUD 'Is the whale maximally wet?'



In contrast, if the QUD is 'Is the T-shirt wet to some degree?,' the only strongly relevant alternative is the one that puts all degrees except for the scale minimum in the same partition class.

The crucial property of the fan scenario in (29) that sets it apart from these contexts, then, is that two different thresholds on the wetness scale—30% and 80%—are relevant for the salient QUD. As a consequence, there are two strongly relevant alternatives:

(37) Strongly relevant alternatives for *The filter is wet*:
a. $\lambda w'.[F_{wet}(w', [\![\text{the filter}]\!]^w) \geq 30\%]$
b. $\lambda w'.[F_{wet}(w', [\![\text{the filter}]\!]^w) \geq 80\%]$

The predicted truth conditions of the sentence correspond to the conjunction of these alternatives, which is equivalent to the stronger alternative in (37b). The falsity conditions correspond to the conjunction of their negations, which is equivalent to the negation of the weaker alternative in (37a). In sum, the system successfully generates the truth-value gap shown in (30).

4.3. *dry* does not show homogeneity on the depth dimension

What we have seen so far is that on the depth dimension, the partial predicate *wet* shows a homogeneity effect, as expected on the extension of Križ and Spector's approach to homogeneity to the depth dimension. We now turn to the central empirical contribution of this paper, which is to observe that the total adjective *dry* does *not* display a homogeneity effect—even in the exact same scenario. Indeed, our fan scenario gives rise to a non-homogeneous interpretation of *dry*. In (38), the scenario and B/B′ are repeated from (29).

(38) SCENARIO: *A special fan uses a wet filter to cool the air. If the filter is wet at 80–100% capacity, the fan works well. If it's at 30–80% wetness, the fan will still cool the room somewhat but noticeably less so. If it's under 30%, the fan switches off. B is not in the room cooled by the fan and only has epistemic access to the state of the fan.*

A:	How cool is the room?	
B:	The filter is wet.	(≈ it's 80–100% wet)
B′:	The filter is not wet.	(≈ it's 0–30% wet)
B″:	The filter is dry.	(≈ it's 0–30% wet)
B‴:	The filter is not dry.	(≈ it's 30–100% wet)

The salient interpretation of *The filter is not dry* in this scenario is that the filter's degree of wetness is 'not in the lowest interval,' rather than in the highest interval. If the filter is, say, 50% wet, the sentence is straightforwardly true (although underinformative). This is unexpected given that there are two strongly relevant alternatives:

(39) Strongly relevant alternatives for *The filter is dry*:
a. $\lambda w'.[F_{wet}(w', [\![\text{the filter}]\!]^w) < 30\%]$
b. $\lambda w'.[F_{wet}(w', [\![\text{the filter}]\!]^w) < 80\%]$

In sum, an asymmetry between *wet* and *dry* emerges once we control for any effects of the mereological dimension and generate a context in which the QUD is sensitive to multiple degree thresholds. Whereas the behavior of *wet* closely follows the predictions of theories relating non-maximality to homogeneity, this is not the case for *dry*.

As with *wet*, the question arises whether this effect is specific to the lexical item *dry* or reflects a broader generalization. Again, the discussion of *open*/*closed* by Feinmann (2022) provides a point of comparison. Our judgment is that in Feinmann's scenario, *closed* targets the lowest of the three partition classes without a homogeneity gap. If so, the total predicate *closed* patterns with *dry* in being insensitive to the intermediate partition class.[12]

(40) SCENARIO: *A horse is trying to get through a door opened at an angle of 15°. We wonder whether the horse will make it through the door without touching the frame.*
The door is not closed. / #The door is closed. (adapted from Feinmann 2022)

This suggests that the asymmetry is not a lexical idiosyncrasy of the predicates *wet* and *dry*, but reflects a general contrast between partial and total predicates.

[12]There are some scenarios in which even *closed* exhibits a truth-value gap—for instance, in some contexts, a door open at an angle of just 2° might count as neither *closed* nor *not closed*. However, these cases always involve degrees that are very close to the scale minimum (i.e., full closure).

5. Elaborating on the new contrast between total and partial predicates

The fact that we find an asymmetry between *wet* and *dry* even in this very controlled setting casts doubt on the idea that the perceived partial/total asymmetries all reduce to non-semantic facts about QUDs. Reducing the partial/total asymmetry to the QUD seems correct for the mereological dimension, but not for the depth dimension. On the latter, both *wet* and *dry* are context-dependent (recall the beached-whale scenario (6), where *dry* shifts to meaning 'not maximally wet' on the depth dimension), but their context-dependency is apparently not the same, since only *wet* has a homogeneity effect. On Križ and Spector's approach, this means that *wet* introduces alternatives that vary both in the choice of the relevant parts and the way the scale is partitioned, but the alternatives of *dry* vary only along the mereological dimension.

In this section, we first give additional empirical motivation for a general difference between *wet* and *dry* as part of a general observation that there are at least two kinds of context-dependency in language, then suggest a way to make sense of this distinction.

5.1. 'In a certain sense': motivation for two types of context-dependency

As noted by Lewis (1970), context-dependency can often be targeted by shifters like *in a certain sense*. This is shown in (41a) for standards of comparison and in (41b) for polysemy.

(41) a. SCENARIO: *John is tall compared to the general population, but not compared to the other people on his sports team.*
John is tall, but in a certain sense he isn't.

b. SCENARIO: *Anne was born and raised in France, but is no longer a French citizen.*
Anne is French, but in a certain sense she isn't.

In both cases, there is a particular construal of *tall* or *French* that makes the first conjunct maximally relevant to the QUD, but *in a certain sense* allows us to shift to a different construal for the second conjunct. This shift saves the sentences in (41) from being contradictions.

Not all context-dependent phenomena can shift via *in a certain sense*, however. This includes non-maximality. While the sentence in (42) could have a coherent reading involving two distinct senses of *singing*, it cannot mean that some but not all of the children are singing (see Križ 2015 and Feinmann 2020 for related observations).

(42) SCENARIO: *Some of the children are clearly singing. The others are not doing anything comparable to singing.*
#The children are singing, but in a certain sense they aren't.

If the context-dependency of *wet* and *dry* patterns with plural non-maximality, such predicates should not be shiftable via *in a certain sense*. But in fact, on the depth dimension, they differ: *wet* patterns with plural non-maximality (42), while *dry* patterns with *tall* and *French* (41):

(43) a. SCENARIO: *A T-shirt counts as wet (throughout), but is not maximally wet.*
#The T-shirt is wet, but in a certain sense it isn't.

b. SCENARIO: *A T-shirt counts as dry (throughout) for present purposes but is slightly moist.*
The T-shirt is dry, but in a certain sense it isn't.

In sum, the depth dimension of *wet* has two non-trivial properties in common with plural predication and the mereological dimension: it is susceptible to homogeneity effects in certain contexts, and it is insensitive to shifters like *in a certain sense*. But the depth dimension of *dry* does not pattern with *wet* or plurals on either of these diagnostics.

5.2. Two different types of context dependency

Apparently, there are (at least) two ways that the values of contextual parameters can be determined (cf. Križ and Spector 2021: section 3.5). The first, call it ALTERNATIVE-BASED VALUATION, is involved in plural predication; this is valuation through the conjunction of sentential alternatives varying in the value of a given contextual parameter. All such alternatives that are 'strongly relevant' to the QUD are conjoined, resulting in the context-dependent truth conditions (Križ and Spector 2021). The second, call it PRAGMATIC VALUATION, involves accommodating a particular value for a given parameter without the presence of alternatives. Indeed, it is standard to view certain context-dependent values (such as values of domain-restriction variables, or standards of comparison for predicates like *tall*) as being fed directly to the interpretation module rather than being computed semantically through a set of alternatives.

In light of this, we suggest that *wet* and *dry* contrast on the depth dimension because the former involves alternative-based valuation, while the latter involves pragmatic valuation. The lexical entry of *wet* introduces alternatives that vary in the choice of a partition function (44a), while *dry* is sensitive to a contextually provided partition function provided as a parameter P of the semantic interpretation function (44b).

(44) a. $[\![\text{wet}]\!]^w = \lambda x.\{\lambda w.[\exists y \in U.F_{wet}(w,y) \sim_{P(S_{wet})} \max(\leq_{wet})]$
: U is an upward-closed subset of $\{y : y \leq x\} \wedge P$ is a partition function$\}$

b. $[\![\text{dry}]\!]^{w,P} = \lambda x.\{\lambda w.[\exists y \in U.F_{wet}(w,y) \sim_{P(S_{wet})} \min(\leq_{wet})]$
: U is an upward-closed subset of $\{y : y \leq x\}\}$

Of course, (44b) still introduces alternatives, but these vary along the mereological dimension only. The alternatives in (44b) do not vary in the partition functions, while those in (44a) do.

If the partition-function parameter of *dry* is selected pragmatically rather than being derived from alternatives, why does the QUD still influence the interpretation of *dry*, as in the beached-whale example (6b)? This effect might come about indirectly. When interpreting an utterance of *The whale is dry*, the listener will assume that the speaker is following the Gricean cooperative principle, in particular the maxim of Relevance (Grice 1975). They will therefore accommodate a value for the partition-function parameter P in (44) under which the sentence communicates a proposition relevant to the QUD. If the QUD is 'Is the whale maximally wet?,' a partition of the wetness scale that puts maximal and non-maximal degrees of wetness into the same partition class would give rise to a construal that is irrelevant to this question. Therefore, P is chosen in such a way that the partition of the wetness scale distinguishes between maximal and non-maximal degrees.

Of course, encoding the distinction between *wet* and *dry* in the lexicon, as in (44), is a stipulation that does not predict that partial/total predicates as a class behave like *wet* and *dry*. If we are right in thinking that they do, a less lexical account is needed; we leave this for future work.

6. Conclusion

In this paper, we have considered whether the varying strength of partial/total predicates (based on the case study of *wet* and *dry*), in both the mereological and depth dimensions, should be derived through the same mechanism as the varying strength of plural predication. With plurals, the standard in recent work has been to take homogeneity and non-maximality to have a common cause; analyzing weak construals for partial/total predicates as due to the same mechanism as plural non-maximality therefore predicts that homogeneity effects should be observed with partial/total predicates too, just like with plurals. We showed that, in looking for homogeneity with such predicates, a novel contrast between partial and total adjectives surfaces: on the depth dimension, while the partial *wet* displays homogeneity, the total *dry* does not. We tentatively suggested to capture this contrast by positing an alternatives-based context-dependency for the mereological dimension and the depth dimension of the partial predicate *wet* (à la Križ and Spector 2021), in contrast to the depth dimension of the total predicate *dry*, where context-dependency is captured through parameter valuation.

A. Considering an exhaustification-based alternative to Križ and Spector (2021)

We end this paper by discussing a less stipulative approach to the *wet*/*dry* contrast. The basic idea is to define *dry* as the negation of *wet*, and to take advantage of Bar-Lev's (2021) theory of homogeneity and non-maximality, where negated expressions, by design, do not show non-maximality. This would capture the contrast between *wet* and *dry*. Does this approach work?

Let's start with a brief overview of Bar-Lev's theory. He assigns an existential basic meaning to definite plurals and attributes the universal default construal in (45) to the strengthening operator Exh (e.g., Bar-Lev and Fox 2020). For (45), the alternatives Exh operates over are generated by narrowing the domain of children (45b). In particular, for every child x, the proposition that x sang is an alternative.

(45) $[_{\beta}$ Exh $[_{\alpha}$ the children sang$]]$

a. Basic meaning of α: $\approx$ 'Some of the children in the domain D sang.'

b. Alternatives of α: $\approx$ 'Some of the children in the domain D' sang.' (for every $D' \subseteq D$)
$\approx$ 'All the children in the domain D sang.'

While Exh standardly negates alternatives, Bar-Lev (2021) argues that this does not happen in (45) because none of the alternatives in (45b) is 'innocently excludable' (Bar-Lev and Fox 2020), i.e., there is no overlap between the sets of alternatives that can be excluded while remaining consistent with (45a). Under his assumptions, alternatives that are not innocently excluded are 'included,' i.e., asserted to be true jointly with the prejacent (if this does not lead to inconsistency). The default interpretation is therefore the conjunction of all the alternatives, which amounts to the universal construal in (46):

(46) Meaning of β in (45): $\approx$ 'All the children in the domain D sang.'

Non-maximality obtains if some of the alternatives are not asserted because they are not relevant to the contextual QUD.

Crucially, this QUD-dependent strengthening does not take place in negated plural sentences like (47). The alternatives in (47b) are entailed by the basic meaning in (47a), so that Exh is either absent or has no effect.

(47) [$_\beta$ Exh [$_\alpha$ not [the children sang]]]
  a. Basic meaning of α: $\approx$ 'None of the children in the domain D sang.'
  b. Alternatives of α: $\approx$ 'None of the children in the domain D' sang.' (for every $D' \subseteq D$)

On this approach, the standard form of non-maximality is therefore limited to non-negated plural sentences; any cases of non-maximality in negative sentences must have a different cause.

Paillé (2022) proposes to derive truth-value gaps in plural predication by assuming that Exh affects truth conditions but not falsity conditions (following work by Bassi et al. 2021). If so, since Exh has no effect in negated plural sentences, only non-negated plural sentences would be predicted to show truth-value gaps (see Augurzky et al. 2022 for relevant data). Against this background, it seems appealing to hypothesize that *wet*-predications are like non-negated plural sentences and *dry*-predications are like negated plural sentences, and that this is at the root of the homogeneity asymmetry between *wet* and *dry*. In effect, we could claim that *dry* is syntactically composed of *wet* and negation ('not wet'; see e.g. Büring 2007 and Heim 2008 on such decompositions).

This can explain that *dry* has no homogeneity effect in the depth dimension. But does it successfully derive that *wet* does have one? In a nutshell, no, because the alternatives for *wet* on this analysis will be totally ordered by entailment, and Exh will therefore exclude them rather than including them. To see this, we need to make an assumption about the basic meaning and the alternative set of *wet*. We assume that each alternative says that the degree of wetness is at least in a certain partition class of the contextually salient partition of the scale S_{wet}. For our fan example in (29), where the scale is partitioned into the three intervals in (48a), this gives rise to the two non-trivial alternatives in (48c) for the LF in (48).

(48) [in scenario (29)]: Exh [the filter is wet]
  a. Salient partition $P(S_{wet})$ of the scale: $[0\%, 30\%), [30\%, 80\%), [80\%, 100\%]$
  b. Basic meaning: 'The filter is at least 30% wet.'
  c. Alternatives:
    (i) 'The filter is at least 30% wet.'
    (ii) 'The filter is at least 80% wet.'

This approach therefore makes the LF of *wet*- and *dry*-predications analogous to non-negated and negated plural sentences, respectively—with the expectation of observing homogeneity (and non-maximality) in the former but not the latter. However, it fails to properly strengthen *wet*: the alternative in (48c-ii) can be negated consistently with the prejacent in (48b), and is therefore innocently excludable. Exh, as defined by Bar-Lev and Fox (2020), will assert it to be false rather than true. The predicted behavior of the Exh operator in (48) is the same as in standard scalar implicatures; in scenario (29), *The filter is wet* would mean that the fan's degree of wetness is in the intermediate partition class.[13]

[13]This might be solvable by claiming that the wetness scale is dense, every degree of wetness gives rise to an alternative, and all such alternatives cannot be innocently excluded together because doing so would create incon-

In sum, if both plural and degree predication arise due to Exh, we would expect a principled empirical difference between them due to the different logical relations among the alternatives; they are linearly ordered for degree predication, but not plural predication.

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sistency. But scenarios like (28a), where the interpretation of *wet* is strengthened without a homogeneity effect, suggests that the basic meaning of *wet* can at least sometimes be based on a context-dependent partition of the scale into finitely many classes; it can't be that the wetness scale is dense regardless of context.

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