

# The interaction of *just* with modified scalar predicates<sup>1</sup>

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**Abstract.** It remains an open question whether the range of uses associated with the English particle *just* can be analyzed uniformly. Much previous literature has focused on the exclusive uses of *just* with relatively little attention paid to its non-exclusive uses. We provide an analysis for the approximative use of *just*, which occurs with modified scalar predicates in sentences like *Mary is just taller than John* or *Mary is just as tall as John*. We argue that this use of *just* has two effects: (1) it conveys that its prejacent is true at a maximal level of precision, and (2) it conveys that its prejacent is not true at any lower level of precision that would make a stronger claim. On this analysis, the approximative use of *just* is similar to the exclusive use in that the effect in both cases is that stronger alternatives to the prejacent are ruled out.

**Keywords:** exclusives, approximators, precisification, degree semantics, gradability.

## 1. Introduction

Much of the previous research on *just* in the formal semantics literature (e.g. Horn, 2000; Grosz, 2012; Coppock and Beaver, 2014) has focused on its exclusive uses, such as those shown in (1). Exclusives include particles like *only*, *merely*, and *exclusively* and convey that nothing “other than” or “more than” the proposition they combine with is true.

- (1) a. This is **just/only** for fun.  
      ‘This is for fun and nothing else.’  
      b. John is **just/only** a graduate student.  
      ‘John is a graduate student and nothing more.’  
      (Coppock and Beaver, 2014)

However, as has been pointed out in the descriptive literature (e.g. König, 1991: 121–124; Traugott, 1988: 129–132), *just* exhibits a much wider range of uses than other exclusives. For example, *just* has emphatic uses, which Beltrama (2018) has analyzed as involving reference to metalinguistic alternatives (2). Wiegand (2018) describes a class of uses that she labels as “unexplanatory” *just*, in which *just* conveys that the prejacent came about without a clear, known reason (3).<sup>2</sup>

- (2) Emphatic:  
      The food was **just** amazing!  
      (Beltrama, 2018)

- (3) Unexplanatory:

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<sup>2</sup>A reviewer points out the use of *just* with reason modifiers, as in (i).

(i) Every time I thought about breaking up my heart **just** broke because of the kids.

This seems to us to be a kind of emphatic use of *just*. This sentence makes reference to the extreme upper portion of a scale, as breaking is among the worst things that could happen to the speaker’s heart. *Just* seems to have a strengthening effect similar to its effect in (2).

I was sitting there and the lamp **just** broke!  
(Wiegand, 2018)

In this paper, we focus on the use of *just* with scalar predicates where it does not uniformly give rise to upper-bounding exclusive-like inferences. In these uses, *just* can be more accurately said to convey exactness or nearness. The examples shown in (4)–(5) illustrate the sort of inferences that are of interest here. All example sentences in this paper are taken from the Corpus of Contemporary American English (Davies, 2008) unless indicated otherwise.

- (4) Miniature amaryllis are apt to be **just** as tall as hybrid amaryllis.  
 ~> Miniature amaryllis are as tall as hybrid amaryllis at the highest level of precision.
- (5) Fafen, the daughter **just** older than Siri, had done the family duty and become a monk.  
 ~> Fafen is slightly older than Siri.

To borrow Sauerland and Stateva’s (2011) terminology for expressions that make vague assertions more or less precise, we will call this use of *just* “approximative”. We argue here that in its approximative use, *just* uniformly has two effects: (1) it conveys that its prejacent is true at a high level of precision, and (2) it conveys that its prejacent is not true at any lower level of precision that would make a stronger claim. Both these inferences are analyzed as being part of the assertoric or truth-conditional component of *just*, which leads to differences in interactions with contextual expectations from what is observed with a more standard exclusive like *only*. Although the analysis, as it stands, does not explicitly unify the exclusive and approximative uses of *just*, it does reveal a similarity between them, namely that both rule out stronger alternatives to the prejacent.

Section 2 summarizes key ideas in the literature on exclusives, focusing on analyses formulated within the Question Under Discussion framework (Roberts, 2012). In Section 3, we present data on the behavior of approximative *just* and describe the inferences that arise when it occurs in equative and comparative constructions. A formal analysis of the meaning of approximative *just* is presented in Section 4 before concluding in Section 5.

## 2. Background

### 2.1. Exclusives

At least since Beaver and Clark (2008), exclusives have been analyzed as placing an upper bound on the viable answers to a question salient in the context. What characterizes this approach is that potential answers to the salient question (labeled the Current Question or CQ) are ordered from weak to strong, either relative to an entailment scale (stronger propositions entail weaker propositions) or through some pragmatically based scale, such as a scale of importance or newsworthiness.<sup>3</sup> The intuition with expressions such as *only* is that they contain a positive

<sup>3</sup>The CQ, even if not explicitly uttered, can be inferred from the placement of prosodic prominence in a declarative utterance. The idea is that prosodically prominent constituents bear the information-structural property of focus. The presence of focus evokes a set of alternatives that may be generated by replacing the prosodically prominent element with other expressions that denote objects of the same type (Rooth, 1985). A declarative assertion is taken to be *congruent* to the CQ if the set of focus alternatives is identical to the denotation of the CQ. It is because an assertion is presupposed to be congruent to the CQ, that listeners can infer the CQ from the placement of prosodic prominence (Roberts, 1996). Examples of inferences about the CQ (adapted from Beaver and Clark, 2008) are shown in (i).

and a negative component. On the one hand, they convey that the prejacent is the strongest true alternative answer to the CQ. On the other hand, they have a downtoning function, indicating that the prejacent is not the strongest answer that might be expected in the utterance context. Beaver and Clark (2008) model this intuition by integrating ideas from Rooth's (1985, 1992) Alternative Semantics and the question based model of discourse developed in Roberts (1996).

On Beaver and Clark's (2008) analysis, the discourse function of *only* is to comment that its prejacent is weaker than expected on a contextually salient scale. This contextual expectation is reflected in *only*'s presupposition that there is a true answer to the CQ among the alternatives that is at least as strong as the prejacent. *Only*'s truth-conditional component states that the prejacent is the strongest true answer to the CQ. An example is shown in (6).

- (6) CQ: Who did Mary invite to the party?  
 a. Mary only invited [John and Mike]<sub>F</sub>.  
     → Mary invited at least John and Mike. Presupposed content  
     → Mary invited at most John and Mike. Asserted content  
 (Coppock and Beaver, 2014)

The complement-exclusion readings of *only* above can be obtained in the scalar framework by ranking alternative answers as a boolean lattice. In this case, the salient scale is an entailment scale, which means that a proposition  $p$  is at least as strong as a proposition  $q$  if and only if  $p$  entails  $q$ . The “at most” inference in (6) rules out all alternatives stronger than the prejacent, which amounts to entailing that Mary did not invite anyone other than John and Mike. Assume, for example, that the only salient individuals are Mary, John, Mike, and Frank. The proposition *Mary invited John, Mike, and Frank* entails the proposition *Mary invited John and Mike*. The former is therefore stronger than the latter, so (6a) entails that *Mary invited John, Mike, and Frank* is false. The boolean lattice in Figure 1 ranks propositions that are stronger answers above the answers they are stronger than and thus expresses the upper-bounding inference associated with the use of *only*. Answers that (6a) rules out are crossed out.

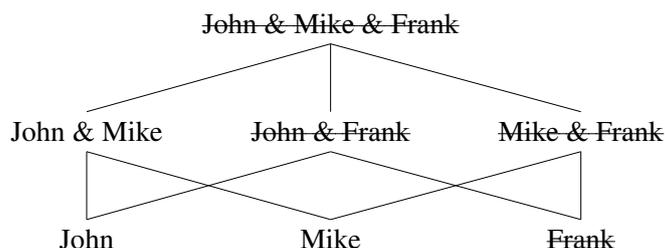


Figure 1: Answers to the CQ ruled out by *only* (Coppock and Beaver, 2014)

As Beaver and Clark argue, it is demonstrable that the “at least” inference is presuppositional by carrying out the standard tests for presupposition (embedding the sentence containing the trigger under entailment-canceling operators):

- (i) a. Sandy feeds [Fido]<sub>F</sub> Nutrapup.  
     CQ: Who does Sandy feed Nutrapup?  
 b. Sandy feeds Fido [Nutrapup]<sub>F</sub>.  
     CQ: What does Sandy feed Fido?

- (7) a. Mary didn't only invite [John and Mike]<sub>F</sub>.  $\rightsquigarrow$  Mary invited at least John and Mike.  
 b. Did Mary only invite [John and Mike]<sub>F</sub>?  $\rightsquigarrow$  Mary invited at least John and Mike.  
 c. Mary may have only invited [John and Mike]<sub>F</sub>.  $\rightsquigarrow$  Mary invited at least John and Mike.

To account for this and other data, Coppock and Beaver (2014), building on Beaver and Clark (2008), define two focus-sensitive operators MIN and MAX shown in (8) and (9). MIN corresponds to the “at least” inference: Given a prejacent proposition  $p$ ,  $\text{MIN}_S(p)$  is true in a world  $w$  if there is an answer  $p'$  to the CQ that is true in  $w$  and at least as strong as  $p$  on the scale  $\geq_S$ . MAX accounts for the upper-bounding “at most” inference: Given a prejacent proposition  $p$ ,  $\text{MAX}_S(p)$  is true in a world  $w$  if every true answer  $p'$  to the CQ is no stronger than  $p$ .

$$(8) \quad \text{MIN}_S(p) = \lambda w. \exists p' \in \text{CQ}_S[p'(w) \wedge p' \geq_S p]$$

$$(9) \quad \text{MAX}_S(p) = \lambda w. \forall p' \in \text{CQ}_S[p'(w) \rightarrow p \geq_S p']$$

An exclusive particle like *only* can now be assigned the meaning in (10).<sup>4</sup> According to (10), for any prejacent  $p$  and information state  $S$ , a declarative utterance of the form *only p* presupposes that there is a true answer to the  $\text{CQ}_S$  at least as strong as  $p$  and asserts that no true answer to the  $\text{CQ}_S$  is stronger than  $p$ .

$$(10) \quad \llbracket \text{only} \rrbracket^S = \lambda p. \lambda w : \text{MIN}_S(p)(w). \text{MAX}_S(p)(w)$$

## 2.2. Degree semantics

The interaction of the exclusive expression *just* with equative and comparative constructions in Section 3.1 and Section 3.2 relies on standard assumptions about the semantics of gradable adjectives and degree morphology. We adopt Kennedy's (2001) treatment of degrees as intervals on a scale, where each positive degree is represented by a closed interval from zero to a point on a scale, while each negative degree is represented by an interval from a point on the scale to infinity. Gradable adjectives denote functions that take a degree and an individual and return true if the maximum degree to which the individual has the property associated with the adjective is the given degree. Measure phrases like *11 years* or *5 feet* denote functions that take a gradable adjective and an individual and return true if the individual has the property denoted by the adjective to a degree greater than or equal to a particular value (Kennedy and McNally, 2005). An example derivation of the meaning of *five feet tall* within this framework is shown in (11), where  $G$  is a gradable adjective,  $x$  is an individual, and  $d$  is a degree.

- (11) a.  $\llbracket \text{tall} \rrbracket = \lambda d \lambda x [\text{tall}(x) = d]$   
 b.  $\llbracket \text{five feet} \rrbracket = \lambda G_{\langle d, \langle e, t \rangle \rangle} \lambda x. \exists d [d \geq \text{five-feet} \wedge G(d)(x)]$   
 c.  $\llbracket \text{five feet tall} \rrbracket = \llbracket \text{five feet} \rrbracket (\llbracket \text{tall} \rrbracket) = \lambda x. \exists d [d \geq \text{five-feet} \wedge \text{tall}(d)(x)]$

Kennedy and McNally's (2005) lexical entries for the English equative and comparative markers are in (12). Comparatives convey that one individual has a property to a greater or lesser degree than another individual, while equatives convey that one individual has a property to at least as high a degree as another individual.

- (12) a.  $\llbracket \text{er/more than } d_c \rrbracket = \lambda G \lambda x. \exists d [d > d_c \wedge G(d)(x)]$

<sup>4</sup>The proposition between the colon and period corresponds to the presuppositional content associated with the expression, as in the notation of Heim and Kratzer (1998).

- b.  $\llbracket \text{less than } d_c \rrbracket = \lambda G \lambda x. \exists d [d < d_c \wedge G(d)(x)]$   
 c.  $\llbracket \text{as as } d_c \rrbracket = \lambda G \lambda x. \exists d [d \geq d_c \wedge G(d)(x)]$

### 2.3. Imprecision and vagueness

Scalar expressions are often used imprecisely, which is to say that they are permissible in contexts in which they are false on their strictest interpretation. For example, in many contexts (13) is an appropriate description of Mary's height even if Mary is slightly shorter than five feet, perhaps four feet eleven and a half inches. What counts as 'five feet' thus depends on the context, and tiny differences in height are often irrelevant for the purposes of ordinary conversation.

(13) Mary is five feet tall. (Constructed example)

Lasersohn (1999) argues that utterances used imprecisely are false yet "pragmatically permissible" because they are "close enough" to the truth for practical purposes." On this account, (13) is, strictly speaking, false if Mary is even one nanometer shorter than five feet. In fact, a sufficiently precise measuring instrument will find that no one is exactly five feet tall, so every utterance of (13) is false *a priori*. This view has met with objections (e.g. van Rooij, 2011; Solt, 2014) on the grounds that it takes a deeply counterintuitive position, rendering virtually any utterance involving numerals as false. For this reason, we will assume that permissible imprecise utterances are in fact true relative to coarse-grained scales.

Many authors (see e.g. van Rooij, 2011; Solt, 2014; Sauerland and Stateva, 2011; Lewis, 1979) have taken imprecision to be a kind of vagueness. Sauerland and Stateva (2011) argue that imprecision, which they term "scalar vagueness" needs to be distinguished from another kind of vagueness, "epistemic vagueness". Intuitively, the difference between them is that the possible denotations of scalarly vague expressions (like *five feet* or *6 o'clock*) seem to be clustered around some "core concept" (the exact length of five feet and the precise time 6 o'clock, respectively), whereas epistemically vague expressions (like *tall* or *heap*) do not seem to have such a core concept. This distinction is linguistically relevant because it has consequences for the distribution of approximators. For example, the approximators *exactly*, *approximately*, *completely*, and *more or less* reduce scalar vagueness, but they do not combine with epistemically vague expressions. Expressions like *definitely* and *maybe*, on the other hand, can be used to reduce epistemic vagueness.<sup>5</sup> We show in the next section that approximative uses of *just* occur only with scalarly vague expressions.

How much deviation a scalarly vague expression tolerates depends on the level of precision relative to which it is interpreted. Following Krifka (2007), Sauerland and Stateva (2011) use

<sup>5</sup>The constructed sentences in (i) and (ii) provide examples of the two kinds of vagueness and some approximators that Sauerland and Stateva (2011) claim interact with them. The sentences in (i) exhibit scalar vagueness, while the sentences in (ii) exhibit epistemic vagueness. The expressions in bold are approximators.

- (i) Scalar approximators  
 a. Mary is **exactly/precisely/approximately** five feet tall.  
 b. The glass is **completely/more or less** full.  
 (ii) Epistemic approximators  
 a. John is **definitely/certainly** tall.  
 b. John is tall-**ish**.

the notion of scale granularity to represent precision. Granularity is analagous to the markings on a ruler; if the markings are closer together, more precise measurements are possible. Thus if small measurements are relevant to a conversation, a fine scale granularity is used. If more imprecision is to be tolerated, a coarser scale granularity is used. Scalar approximators are one means that speakers can use to signal what granularity should be used to interpret an utterance. According to Sauerland and Stateva, fixing the scale granularity eliminates scalar vagueness, but it has no effect on epistemic vagueness. This is why scalar approximators do not combine with epistemically vague expressions.

Sauerland and Stateva (2011) formalize levels of precision by introducing granularity functions as contextual parameters of interpretation to which truth is relativized. We will also take this approach, but we defer the formal details to section 4.

### 3. Data

The approximative use of *just* occurs with a range of modified and unmodified scalar predicates. (They also occur with certain other expressions, but we will leave those aside for now. See Section 5 for examples.) In out of the blue contexts, *just* is typically focused on its approximative use. This helps to distinguish the approximative use from the exclusive one, in which some constituent in the syntactic scope of *just* receives prosodic prominence and is understood to be focused. In the examples that follow, we will use [...]F to mark focus.

#### 3.1. Equatives

When *just* combines with equative constructions, it can yield a reading that is not available to exclusives. This non-exclusive reading is brought out in the (a) sentences in (14) and (15). They become infelicitous if *just* is replaced by *only*, as shown in the (b) sentences.

- (14) a. More and more evidence shows that relatively simple changes in lifestyle can have a big impact on your blood pressure—in many cases, **just** as big as popping a pill.  
 b. #... in many cases, **only** as big as popping a pill.
- (15) a. Many gardeners are finding the new selections of miniature amaryllis more to their liking. ... However, don't be misled by the word "miniature." The blossoms are smaller and have longer, more trumpet-shaped blooms than the flat, flared faces of hybrid bulbs, but the stalks are apt to be **just** as tall.  
 b. #... but the stalks are apt to be **only** as tall.

(14b) and (15b) are infelicitous because the expectation-lowering function of *only* is incompatible with actual expectations in the discourse context. In (14), the assertion that "more and more evidence" shows that simple changes can have a big impact suggests that this impact is larger than expected (if it were expected, so much evidence would not be needed to demonstrate it). In (14b), however, the use of *only* conveys that the impact is weaker than what might be expected in context – leading to a contradiction. Similarly, in (15), the stalks of miniature amaryllis are expected to be *shorter* than those of hybrid amaryllis (given the term 'miniature amaryllis'), but in fact the stalks of miniature amaryllis are as tall as those of hybrid amaryllis. What is expected is thus weaker than what the fact of the matter is but the use of *only* in (15b) conveys that the expectation in the context is stronger relative to the facts.

The felicity of (14a) and (15a) points to a clear contrast between the way in which the particles *just* and *only* interact with contextual expectations. Whereas *only* obligatorily conveys that its prejacent is a weaker alternative than what is expected in the discourse context (leading to infelicity when contextual expectations are weak), *just* can felicitously combine with a prejacent that is a stronger alternative than what is expected in the discourse context.

Another crucial difference between *only* and *just* in (14)–(15) is that *only* enforces an upper bound on the scale associated with the predicate, but *just* does not. (14b) entails that the impact of simple lifestyle changes is no greater than the impact of popping a pill. In contrast, we would not judge (14a) to be false if the impact of simple lifestyle changes is greater (possibly vastly so) than the impact of popping a pill. We would likewise not judge (15a) to be false if the stalks of miniature amaryllis are, in fact, even taller than those of hybrid amaryllis. These intuitions are consistent with the fact that (14a) and (15a) can be followed up with *if not bigger* and *if not taller*, respectively:

- (16) a. Changes in lifestyle can have a big impact on your blood pressure—**just** as big as popping a pill, if not bigger.  
 b. The stalks of miniature amaryllis are apt to be **just** as tall as those of hybrid amaryllis, if not taller.

As expected, the approximative reading of *just* is disambiguable from the exclusive reading by the placement of prosodic prominence. Exclusive readings typically result when an element within the syntactic scope of *just* is focused, as shown in (17). When used as an exclusive, *just* is typically interchangeable with *only*. The approximative reading is available when *just* itself is in focus, as shown in (18).

- (17) Exclusive use of *just*: Upper bound enforced  
 a. Changes in lifestyle can have **just/only** [as]<sub>F</sub> big an impact as popping a pill (# if not bigger).  
 → Changes in lifestyle can have at least as big an impact as popping a pill.  
 → Changes in lifestyle can have at most as big an impact as popping a pill.  
 b. Miniature amaryllis are apt to be **just/only** [as]<sub>F</sub> tall as hybrid amaryllis (# if not taller).  
 → Miniature amaryllis are apt to be at least as tall as hybrid amaryllis.  
 → Miniature amaryllis are apt to be at most as tall as those of hybrid amaryllis.
- (18) Approximative use of *just*: No upper bound enforced  
 a. Changes in lifestyle can have [**just**]<sub>F</sub> as big an impact as popping a pill (if not bigger).  
 → Changes in lifestyle can have at least as big an impact as popping a pill.  
 ↗ Changes in lifestyle can have at most as big an impact as popping a pill.  
 b. The stalks of miniature amaryllis are apt to [**just**]<sub>F</sub> as tall as those of hybrid amaryllis (if not taller).  
 → Miniature amaryllis are apt to be at least as tall as hybrid amaryllis.  
 ↗ Miniature amaryllis are apt to be at most as tall as those of hybrid amaryllis.

Instead of enforcing an upper bound, *just* in (14a), (15a), and (18a) appears to *raise* the lower bound conventionally established by the equative construction. We suggest that this effect

comes about because the use of *just* serves to increase the standard of precision in the discourse context. For example, uttering *Miniature amaryllis are as tall as hybrid amaryllis* might be permissible in a context where miniature amaryllis are actually slightly shorter than hybrid amaryllis, as long as the difference in heights is small enough to ignore for the purposes of the discourse. The use of *just* in this case conveys that even on a maximally fine-grained scale, miniature amaryllis are at least as tall as hybrid amaryllis – thus maximally reducing the difference in height that may be ignored.

To see that equative constructions do in fact tolerate imprecise uses, consider (19). After the speaker asserts that miniature amaryllis are as tall as hybrid amaryllis in (19a), they can increase the standard of precision in (19b) and assert that miniature amaryllis are not as tall as hybrid amaryllis at that new standard. The utterances do not contradict each other because they are interpreted with respect to different scale granularities.

- (19) a. Miniature amaryllis are as tall as hybrid amaryllis.  
 b. More precisely, miniature amaryllis are on average half a centimeter shorter than hybrid amaryllis.

In contrast, if the speaker asserts that miniature amaryllis are *just* as tall as hybrid amaryllis, then further precisification is problematic. The utterance in (20a) is already interpreted at the highest permissible level of precision, so the speaker seems to be contradicting their previous utterance by uttering (20b).

- (20) a. Miniature amaryllis are **just** as tall as hybrid amaryllis.  
 b. #More precisely, miniature amaryllis are on average half a centimeter shorter than hybrid amaryllis.

### 3.2. Comparatives

*Just* is also used as an approximator in comparative constructions. In this case, *just* is roughly paraphrasable with *slightly*. Examples are given in (21), (22), and (23). In (21), Fafen is slightly older than Siri. In (22), the camera is slightly bigger than a card deck. In (23), Samantha is slightly over 5 feet tall.

- (21) Fafen, the daughter [**just**]<sub>F</sub> older than Siri, had done the family duty and become a monk.  
 (22) The camera was a plastic but weighty box [**just**]<sub>F</sub> bigger than a card deck.  
 (23) At 11, Samantha is [**just**]<sub>F</sub> over 5 feet tall and has wavy black hair.

In contrast to its behavior with equatives, *just* does enforce a truth-conditional upper bound on the relevant scale when it combines with comparatives. The non-cancellability of the upper bounds in (21)–(23) is evidenced by the oddness of the utterances in (24).

- (24) a. #Fafen is **just** older than Siri, if not much older.  
 b. #The camera was **just** bigger than a card deck, if not much bigger.  
 c. #Samantha is **just** over 5 feet tall, if not way over.

By contrast, placing focus on *Siri*, *a card deck*, or *5 feet tall* yields exclusive readings which are also available to *only*. On these readings, (25) says that Fafen is older than Siri but no taller

salient person, (26) says that the camera was bigger than a card deck but no other salient thing, and (27) conveys that Samantha's height is not over any contextually salient height greater than five feet.

- (25) Fafen, the daughter **just/only** older than [Siri]<sub>F</sub>, had done the family duty and become a monk.
- (26) The camera was a plastic but weighty box **just/only** bigger than [a card deck]<sub>F</sub>.
- (27) At 11, Samantha is **just/only** over [5 feet tall]<sub>F</sub> and has wavy black hair.

Both (21)–(23) and (25)–(27) place an upper bound on the relevant property. However, while *just* interacts directly with the scales lexicalized by the adjectives in (21)–(23), *only* interacts with an entailment scale generated by varying the focused constituent in the sentence. Furthermore, the approximative use of *just* in (21)–(23) differs from the exclusive use in that it does not comment on the strength of its prejacent relative to a contextually salient expectation. (25), for example, conveys that Fafen was expected to be older than someone other than Siri, but (21) does not convey any such expectation.

In both the equative constructions in (18) and the comparative constructions in (21)–(23), the prejacent is true at a high level of precision. (18a) conveys that changes in lifestyle have as big an impact as popping a pill when the impact is measured on a very fine-grained scale, and (18b) conveys that miniature amaryllis are as tall as hybrid amaryllis when their heights are measured on a very fine-grained scale. Similarly, a fine-grained scale is able to detect the small differences in age, weight, and height conveyed by (21)–(23).

However, *just* cannot be effecting precisification when it occurs in comparative constructions because, as has been pointed out by Sauerland and Stateva (2011: f.n. 2) and Solt (2014), comparatives cannot be used loosely. For example, Solt (2014) observes that round numerical expressions must be interpreted precisely when they are embedded in comparative statements. But we note that even in the absence of numerical expressions, statements of comparison cannot involve a loose interpretation of the standard of comparison. This is illustrated in (28): (28b) is infelicitous as a follow-up to (28a) because (28a) is incompatible with Fafen being younger than Siri by any amount.

- (28) a. Fafen is older than Siri.  
b. #More precisely, she's one day younger than Siri.

Further evidence that comparatives are never interpreted loosely is the fact that *roughly speaking* cannot be used to introduce a comparative: Although (29a) is acceptable, (29b) is not.

- (29) a. Strictly speaking, Fafen is older than Siri.  
b. #Roughly speaking, Fafen is older than Siri.

It is unsurprising that comparatives have this property because if they could be used loosely, then their meaning would be indistinguishable from the meaning of equatives. For example, if *Fafen is older than Siri* were permissible both in contexts where Fafen is slightly younger than or as old as Siri and contexts where Fafen is older than Siri, then it would have the same meaning as *Fafen is as old as Siri*, which is also permissible in precisely those contexts.

This raises the question of what it means to interpret a comparative at different levels of pre-

cision. According to Solt (2014), comparatives are completely insensitive to granularity level. She claims, for example, that the sentence *The rope is fifty meters long* is true at any granularity level if the rope is longer than fifty meters by any amount. However, this assumption predicts that if Fafen is only very slightly older than Siri, then at a coarse granularity level the contradictory propositions in (30) can be true simultaneously. This is undesirable because there is surely no context in which one could assert both (30a) and (30b) at the same level of precision.

- (30) a. Fafen is older than Siri.  
b. Siri is as old as Fafen.

To avoid this contradiction, we assume that if the difference between Fafen and Siri's ages is less than the grain size of the scale granularity, then (30a) is false. This is a reasonable assumption because the scale granularity is meant to represent the smallest relevant measurement at a level of precision. If the difference in their heights is small enough to be irrelevant, (30a) should be false at that level of precision.

It follows, crucially, that comparative statements make stronger claims whenever they are interpreted at lower levels of precision: If a coarse-grained scale can detect that Fafen is older than Siri, then any finer-grained scale can, too. Examples (21)–(23) seem to convey that their prejacentes are true at a high level of precision, but not at any *lower* level of precision. This amounts to ruling out alternatives that are stronger than the prejacent on an entailment scale, which is quite similar to the function of the MAX component of exclusive *just*.

For the equatives in Section 3.1, this entailment relationship was reversed: If two entities count as equal according to a fine-grained scale, they will also count as equal according to a coarser-grained scale. That is, if a fine-grained scale can detect that Fafen and Siri are equivalent with respect to age, then any coarser-grained scale can, too. So equative statements will make stronger claims at *higher* levels of precision. In conveying that their prejacentes are true at the highest level of precision, (14a) and (15a) also convey that their prejacentes are true at every lower level of precision.

### 3.3. Status of the inferences

To summarize, *just* has two effects when it combines with modified scalar predicates in its approximative use: (1) It conveys that its prejacent is true at a high level of precision, and (2) it conveys that its prejacent is false at any lower level of precision that would make a stronger claim. We will refer to effect (1) as the positive meaning component and effect (2) as the negative meaning component. With comparative constructions, the use of *just* leads to the inference that the prejacent is true *only* at a high level of precision and *not* at lower levels of precision. With equative constructions, the higher the level of precision at which the prejacent is interpreted the stronger the claim, so effect (2) is uninformative and *just* conveys that the prejacent is true at a high level of precision (as well as at any lower level).

The question now is, what is the status of the positive and negative meaning components associated with *just*? We propose that it is reasonable to consider both to be part of the at-issue, asserted meaning of *just*.<sup>6</sup> However, it is possible that either or both components are part of

<sup>6</sup>We already showed in (24) that the negative component is not cancellable, which suggests that it is not a conversational implicature.

what is presupposed by *just*. If the positive component is presupposed, *just* would be similar to *only*, following the treatment in Beaver and Clark (2008) and Velleman et al. (2013). If the negative component were presupposed, *just* would be similar to cleft constructions. Velleman et al. (2013) propose that the cleft operator, in contrast to exclusive *only*, presupposes, rather than asserts, that there is no stronger true answer among the alternatives than the prejacent. The survival of an implication when the prejacent is embedded under negation is the best known test for its presuppositional status. The data in (31) and (32) provide evidence that both the positive and the negative component are part of the at-issue content of the base sentence and thus targeted by negation. Embedding a sentence containing approximative *just* under negation implies that the prejacent fails to hold at a high level of precision or that it is not false at all lower levels of precision that effect a stronger claim – that is, the prejacent is true at some lower level of precision.

- (31) Embedding under negation (comparative)
- a. It is not the case that Fafen is **just** older than Siri →
  - b. “Fafen is older than Siri” is not true at a high level of precision. OR  
“Fafen is older than Siri” is not false at every lower level of precision that would make a stronger claim (in other words, she is significantly older than Siri).
- (32) Embedding under negation (equative)
- a. It is not the case that Fafen is **just** as old as Siri →
  - b. “Fafen is as old as Siri” is not true at a high level of precision. OR  
“Fafen is as old as Siri” is not false at every lower level of precision that would make a stronger claim (in other words, she is significantly younger than Siri).

Further, Beaver and Clark (2008: 275–276) use the fact that reason clauses and emotive factive clauses can only target at-issue content to argue that the positive component of an exclusive is presupposed, while the negative component is asserted. These same tests can be applied to the approximative use of *just*. For instance, consider the constructed examples in (33) in a context where a water park requires that water slide riders be at least 5 feet tall, and the legal driving age is 16. In (33a), *because* targets the positive component: Samantha is allowed to ride the water slide because she is over five feet tall. In (33b), *because* targets the negative component: Samantha is prohibited from driving not because she is over eleven, but rather because her age is close to eleven, and therefore she is too young.

- (33) a. Samantha is allowed to ride the water slide because she is **just** over five feet tall.  
→ Samantha is allowed to ride the water slide because she is over five feet tall.  
(positive component targeted)
- b. Samantha is prohibited from driving because she is **just** over eleven years old.  
→ Samantha is prohibited from driving because her age is close to eleven. (negative component targeted)

Likewise, the emotive factive clauses in (34) can target either component: (34) can convey either that the speaker was surprised that the camera was bigger than a card deck, or that the speaker was surprised that the camera was close to the size of a card deck.

- (34) I was surprised that the camera was **just** bigger than a card deck.  
→ I was surprised that the camera was bigger than a card deck.

or

→ I was surprised that the camera was only slightly bigger than a card deck.

Another piece of evidence that both meaning components are asserted is that an interlocutor can contradict either component, as shown in (35). Both (35a) and (35b) are quite natural and do not require backtracking. This suggests that both components are at-issue.

- (35) Fafen is **just** taller than Siri.  
 a. No she's not, she's shorter than Siri.  
 b. No she's not, she's much taller than Siri.

Taken together, the data in (31)–(35) provide strong evidence that both meaning components are at-issue rather than presupposed. This is one way in which the approximative use of *just* differs from the exclusive use, which presupposes that an alternative at least as strong as the prejacent is true.

### 3.4. How *just* interacts with expectations

According to Beaver and Clark (2008), the discourse function of exclusives is to lower a contextually salient expectation. For example, (36a) yields an inference that Mary was expected to invite more people than John and Mike.

- (36) CQ: Who did Mary invite to the party?  
 a. Mary only invited [John and Mike]<sub>F</sub>.  
 ~→ Mary was expected to invite other people besides John and Mike.

This expectation is related to the MIN presupposition that at least the prejacent is true. We have argued in 3.3 that the approximative use of *just* does not carry any such presupposition. In light of that, this use would not be expected to yield any inference about contextual expectations. This does indeed appear to be true for the comparative examples presented in section 3.2, such as the one reproduced in (37).

- (37) a. Fafen is **just** older than Siri.  
 ↗ Fafen is expected to be much older than Siri.  
 ↗ Fafen is expected to be younger than Siri.

The case in which the approximative use of *just* does appear to license an inference about expectations is the equative case. The equative construction in (38), for example, suggests that miniature amaryllis are expected to be shorter than hybrid amaryllis, and this is indeed the expectation set up by the context given in (15a). Note that rather than lowering an expectation as exclusive *only* does, the effect of *just* in (38) is to raise an expectation.

- (38) Miniature amaryllis are **just** as tall as hybrid amaryllis.  
 ~→ Miniature amaryllis are expected to be shorter than hybrid amaryllis.

This interaction with expectations make sentences like (38) most natural as answers to biased polar questions. In (15a), for example, the CQ that the final clause answers would be like the one in (39), which is most appropriate if the asker doubts that miniature amaryllis are as tall as hybrid amaryllis (given that they are miniature versions of the original).

- (39) CQ: Are miniature amaryllis really as tall as hybrid amaryllis?

A: Yes, miniature amaryllis are [just]<sub>F</sub> as tall as hybrid amaryllis.

Equative constructions with *just* make good answers to biased questions because of *just*'s precisifying effect. If the asker doubts that miniature amaryllis are as tall as hybrid amaryllis, then they will consider their bias confirmed if miniature amaryllis count as shorter than hybrid amaryllis at any level of precision (i.e. if they are shorter by any amount). In order to overcome the addressee's bias, then, the speaker asserts that miniature amaryllis are at least as tall as hybrid amaryllis at a high level of precision. Space constraints prevent us from demonstrating that this interaction with contextual expectations is not derived from the conventionalized meaning of *just* and we leave this for further exploration.

#### 4. Analysis

In order to provide a meaning for *just* that captures its sensitivity to levels of precision, it is necessary to formalize the notion of precision. One path would be to use Lasersohn's (1999) notion of pragmatic halos.<sup>7</sup> One might then attempt to explain the behavior of *just* in terms of pragmatic halos. Sentences like *Fafen is just older than Siri*, in which *just* conveys that the prejacent is true at a high level of precision, could be accounted for if we take *just* to be a precisifier that contracts the pragmatic halo. The problem is that, as we showed in Section 3, these constructions, although they do depend on an appropriate level of precision for their interpretation, can never be used loosely.

A more fruitful approach is to conceive of levels of precision as scale granularities. A granular scale is divided into intervals whose width is a fixed grain size, and the points within each interval are not distinguishable from one another. A fine scale granularity results in precise measurements because points that are very close together can be distinguished from one another, while a coarse scale granularity results in less precise measurements. For example, on a distance scale with a grain size of one foot, all the distances from half a foot to one and a half feet are indistinguishable, so they are all referred to as "one foot". We will assume that the scale granularity with respect to which an utterance is interpreted represents the smallest measurement that is relevant for the purposes of the discourse at the moment of utterance.

Sauerland and Stateva (2011) propose that truth is evaluated relative to scale granularity. For example, at a granularity with a grain size of one foot, the utterance *Mary is 5 five feet tall* is true (not just pragmatically permissible) in every world where Mary's height is between 4'6" and 5'6". On the other hand, if the grain size is two inches, then *Mary is 5 feet tall* is true only in those worlds where Mary's height is between 4'11" and 5'1". The idea is that the utterance context makes available a set of scale granularities (Sauerland and Stateva, 2011; Power and Williams, 2012), and an utterance is interpreted using a granularity level chosen from that set. For example, rounder numerals are interpreted less precisely (Krifka, 2007), and the choice of granularity can also be influenced by approximators (Sauerland and Stateva, 2011), degree

<sup>7</sup>According to Lasersohn, an expression's pragmatic halo is a set consisting of objects that differ from the expression's denotation only in ways that are "pragmatically ignorable in context", including the denotation itself. The pragmatic halo of a sentence is built up compositionally from the halos of its parts, and a sentence is assertable in a context if some proposition in its pragmatic halo is true. For example, the sentence *Mary is five feet tall* would be assertable in a context where Mary is four feet eleven inches tall just in case the proposition denoted by *Mary is four feet eleven inches tall* is a member of the pragmatic halo of *Mary is five feet tall*. On this account, the effect of approximators is to shrink or expand the pragmatic halo. Thus *Mary is exactly five feet tall* has a smaller pragmatic halo than *Mary is five feet tall*, and *Mary is approximately five feet tall* has a larger one.

modifiers (Sassoon and Zevakhina, 2012), and approximating number pairs (Solt, 2015).

Sauerland and Stateva (2011) formalize granularity by introducing granularity functions, which partition a scale  $S$  into equally-sized intervals by mapping each point on the scale to an interval that contains it. So at a coarse scale granularity, a granularity function might map 5 meters to the interval [4.5 m, 5.5 m]. They postulate that a granularity function  $\gamma$  for a scale  $S$  has the properties in (40). (40a) says that  $\gamma$  maps every point on  $S$  to a set that contains it, (40b) ensures that all of these sets are intervals, and (40c) ensures they all have the same size. The operators  $\max$  and  $\min$  return the maximum and minimum points of an interval respectively.

- (40) a.  $\forall s \in S : s \in \gamma(s)$   
 b.  $\forall s \in S : \gamma(s)$  is an interval<sup>8</sup>  
 c.  $\forall s, s' \in S : \max(\gamma(s)) - \min(\gamma(s)) = \max(\gamma(s')) - \min(\gamma(s'))$   
 (Sauerland and Stateva, 2011)

Sauerland and Stateva also provide the following definition: A granularity function  $\gamma$  is finer than  $\gamma'$  if:

$$(41) \quad \forall s \in S : \max(\gamma(s)) - \min(\gamma(s)) < \max(\gamma'(s)) - \min(\gamma'(s))$$

Gyarmathy (2017) prefers to use suprema rather than endpoints in statements like (40c) and (41) in order to remain agnostic about which endpoints are contained by the intervals in the range of granularity functions. We will follow this suggestion and use  $\inf$  and  $\sup$  rather than  $\min$  and  $\max$ .

We assume that any expression that denotes a non-endpoint degree on its strictest reading always refers to an interval whose midpoint is that degree. In other words, given a linguistic expression  $D$  denoting a non-endpoint degree  $d$  (such as *five feet* or *12 years*) and a context  $C$  such that the smallest relevant interval size is  $\varepsilon$ , there is a granularity function  $g$  such that the interpretation of  $D$  in  $C$  is given by (42).

$$(42) \quad \llbracket D \rrbracket = \gamma(d) = (d - \varepsilon, d + \varepsilon)$$

Therefore, for convenience we will define the granularity level  $g$  as the function given in (43), where  $d$  is any degree on the scale,  $\varepsilon$  is the smallest relevant interval size, and  $\min(S)$  and  $\max(S)$  are the minimum and maximum degrees on the scale (if they exist).<sup>9</sup> The properties in (40) hold for granularity levels, but granularity levels, unlike granularity functions, do not define a partition on the scale.

<sup>8</sup>Sauerland and Stateva (2011) actually posit that  $\gamma(s)$  is convex, rather than requiring it to be an interval. They restrict themselves to considering closed scales because open scales may have logarithmic granularity (Hobbs and Kreinovich, 2006). A subset of a closed scale is convex if and only if it is an interval, so their requirement that  $\gamma(s)$  is convex for all  $s$  implies that  $\gamma(s)$  is an interval for their purposes. We assume here that  $\gamma(s)$  has the interval property for all  $s$  in order to ensure that  $\gamma(s)$  is also an interval when  $S$  is open. For the purposes of this paper, we will set aside the issue of whether open scales have logarithmic granularity.

<sup>9</sup>Note that this definition of granularity levels is different from the one given by Gyarmathy (2017). She defines a granularity level as the set of all granularity functions with a given grain size. If  $\Gamma$  is one of Gyarmathy's granularity levels with grain size  $\varepsilon$ , then the granularity level  $g$  that we define in (43) is given by  $g(d) = \{d' : \exists \gamma \in \Gamma [d' \in \gamma(d)]\}$ .

$$(43) \quad g(d) = \begin{cases} (d - \varepsilon, d + \varepsilon) & d \text{ is not an endpoint} \\ (d, d + \varepsilon) & d = \min(S) \\ (d - \varepsilon, d) & d = \max(S) \end{cases}$$

We propose (44) as the meaning of *just* in its approximative uses. In (44),  $g_{\text{finest}}$  is the finest granularity level with respect to which the prejacent can be interpreted in the utterance context (though not necessarily the finest granularity available in the context),  $\mathcal{G}$  is the set of granularity levels no finer than  $g_{\text{finest}}$ ,  $p^g(w)$  means that the proposition  $p$  is true with respect to  $g$  in world  $w$ , and  $\geq_S$  is an entailment strength ranking. The first conjunct says that the prejacent is true relative to  $g_{\text{finest}}$ , and the second conjunct says that the prejacent is not true at any coarser granularity level that would make a stronger claim.

$$(44) \quad \llbracket \text{just} \rrbracket = \lambda p \lambda w. p^{g_{\text{finest}}}(w) \wedge \forall g \in \mathcal{G} [p^g(w) \rightarrow p^{g_{\text{finest}}} \geq_S p^g]^{10}$$

$g_{\text{finest}}$  is one of the available granularity levels under consideration in the context, but not necessarily the finest one. Rather, it is the finest granularity level with respect to which the prejacent in particular can be interpreted in the utterance context. The value of  $g_{\text{finest}}$  is affected by a variety of pragmatic factors, and it is dependent on both the lexical content of the prejacent and properties of the context.

At least three contextual factors are relevant for the determination of  $g_{\text{finest}}$ , and future work may identify others. One factor is **the magnitude of the measured quantities**. Larger quantities tend to make coarser granularity levels available and make finer granularity levels irrelevant. For example, *Fafen is just older than Siri* has a slightly different meaning depending on how old Fafen and Siri are. If they are adults, it likely conveys that their ages are within a year or two of each other. If they are babies, it probably conveys that their ages are within weeks or months of each other. Another factor that bears on the value of  $g_{\text{finest}}$  is **the amount of measurement error permitted in the context**. Utterances in contexts that require greater precision have finer values of  $g_{\text{finest}}$ . For instance, the utterance *The rod is just over one foot long* may have a more precise interpretation in a context where the rod is going to be used for a science experiment than in one where the rod is going to be used for a more everyday purpose. Finally, the value of  $g_{\text{finest}}$  is also affected by **the roundness of numerals in the prejacent**. The roundness of a numeral depends on the scale system conventionally applied to the subject matter (Krifka, 2007). Hence six inches is a fairly round length in the US measurement system, while 30 minutes is a fairly round amount of time. Krifka observes that rounder numerals are typically interpreted more loosely. The expression *30 minutes*, for example, evokes a granular scale with 30-minute increments, so it denotes roughly the interval from 15 minutes to 45 minutes. By contrast, *45 minutes* evokes a scale with 15-minute increments, so it denotes roughly the interval from 37.5 minutes to 52.5 minutes. Likewise, round numerals in the prejacent of *just* tend to result in coarser values of  $g_{\text{finest}}$ . Thus *just over 31 minutes* conveys greater proximity to 31 minutes than *just over 30 minutes* does to 30 minutes.

#### 4.1. Equatives

To account for how equative constructions are relativized to granularity level, we adopt with slight modification Kennedy and McNally's (2005) meaning for equative morphology. This

<sup>10</sup>For *just*'s approximative use,  $\geq_S$  is an entailment scale, so  $p^{g_{\text{finest}}} \geq_S p^g$  is equivalent to  $\forall w [p^{g_{\text{finest}}}(w) \rightarrow p^g(w)]$ .

meaning is similar to the equative meaning given in (12c), but the degree  $d_c$  is replaced by the infimum of the interval  $g(d_c)$ .<sup>11</sup> The derivation of the meaning of *Miniature amaryllis are as tall as hybrid amaryllis* is shown in (46), where  $\mathbf{d}_{\mathbf{HA}}$  is the degree of height of hybrid amaryllis. “MA” and “HA” abbreviate “miniature amaryllis” and “hybrid amaryllis”, respectively.

$$(45) \quad \llbracket \text{as ... as } d_c \rrbracket^g = \lambda G \lambda x. \exists d [d > \inf(g(d_c)) \wedge G(d)(x)]$$

$$(46) \quad \begin{aligned} \text{a.} \quad & \llbracket \text{as tall as HA} \rrbracket^g = \llbracket \text{as ... as HA} \rrbracket^g(\llbracket \text{tall} \rrbracket) = \lambda x. \exists d [d > \inf(g(\mathbf{d}_{\mathbf{HA}})) \wedge \mathbf{tall}(d)(x)] \\ \text{b.} \quad & \llbracket \text{MA are as tall as HA} \rrbracket^g \\ & = \llbracket \text{as tall as HA} \rrbracket^g(\llbracket \text{MA} \rrbracket) \\ & = \exists d [d > \inf(g(\mathbf{d}_{\mathbf{HA}})) \wedge \mathbf{tall}(d)(\mathbf{MA})] \\ & = \exists d [d > (\mathbf{d}_{\mathbf{HA}} - \varepsilon) \wedge \mathbf{tall}(d)(\mathbf{MA})] \end{aligned}$$

The meaning in (45) accounts for the fact that equative constructions make stronger claims at higher levels of precision. To see why, consider the interpretations of (46a) with respect to two granularity levels  $g_1$  and  $g_2$  with grain sizes  $\varepsilon_1$  and  $\varepsilon_2$ , respectively. These interpretations are shown in (47). The proposition in (47a) entails (47b) just in case  $\mathbf{d}_{\mathbf{HA}} - \varepsilon_1 \geq \mathbf{d}_{\mathbf{HA}} - \varepsilon_2$ , which is true if and only if  $\varepsilon_1 \leq \varepsilon_2$ . Thus (46b) is stronger at finer granularity levels.

$$(47) \quad \begin{aligned} \text{a.} \quad & \exists d [d > (\mathbf{d}_{\mathbf{HA}} - \varepsilon_1) \wedge \mathbf{tall}(d)(\mathbf{MA})] \\ \text{b.} \quad & \exists d [d > (\mathbf{d}_{\mathbf{HA}} - \varepsilon_2) \wedge \mathbf{tall}(d)(\mathbf{MA})] \end{aligned}$$

Therefore, of all the granularity levels in  $\mathcal{G}$ ,  $g_{\text{finest}}$  makes the strongest claim. As a result, when *just* applies to (47b), the second conjunct of (44) is vacuously satisfied. The first conjunct of (44) therefore gives the entire meaning of *Miniature amaryllis are just as tall as hybrid amaryllis*. This is shown in (48), which says that miniature amaryllis are as tall as hybrid amaryllis at the finest permissible granularity level.

$$(48) \quad \llbracket \text{MA are just as tall as HA} \rrbracket = \exists d [d > \inf(g_{\text{finest}}(\mathbf{d}_{\mathbf{HA}})) \wedge \mathbf{tall}(d)(\mathbf{MA})]$$

## 4.2. Comparatives

We propose that the comparative morphology has the meaning in (49), which again is based on the one given by Kennedy and McNally (2005). In contrast to the meaning of the equative morphology, this time the degree  $d_c$  is replaced by the supremum of  $g(d_c)$  rather than the infimum. The derivation of the meaning of *Fafen is older than Siri* is shown in (50), where  $\mathbf{d}_{\mathbf{s}}$  is the degree of age of Siri.

$$(49) \quad \llbracket \text{er/more than } d_c \rrbracket^g = \lambda G \lambda x. \exists d [d > \sup(g(d_c)) \wedge G(d)(x)]$$

$$(50) \quad \begin{aligned} \text{a.} \quad & \llbracket \text{older than Siri} \rrbracket^g = \llbracket \text{er than Siri} \rrbracket^g(\llbracket \text{old} \rrbracket) = \lambda x. \exists d [d > \sup(g(\mathbf{d}_{\mathbf{s}})) \wedge \mathbf{old}(d)(x)] \\ \text{b.} \quad & \llbracket \text{Fafen is older than Siri} \rrbracket^g = \exists d [d > \sup(g(\mathbf{d}_{\mathbf{s}})) \wedge \mathbf{old}(d)(\mathbf{f})] \end{aligned}$$

(49) correctly predicts that comparative constructions make stronger claims at lower levels of precision. To see why, consider below the interpretations of (50a) with respect to the two granularity levels  $g_1$  and  $g_2$ . The proposition in (51b) entails (51a) just in case  $\mathbf{d}_{\mathbf{s}} + \varepsilon_1 \geq \mathbf{d}_{\mathbf{s}} + \varepsilon_2$ , which is true if and only if  $\varepsilon_1 \geq \varepsilon_2$ . Thus (50b) is stronger at coarser granularity levels.

$$(51) \quad \begin{aligned} \text{a.} \quad & \exists d [d > (\mathbf{d}_{\mathbf{s}} + \varepsilon_1) \wedge \mathbf{old}(d)(\mathbf{f})] \\ \text{b.} \quad & \exists d [d > (\mathbf{d}_{\mathbf{s}} + \varepsilon_2) \wedge \mathbf{old}(d)(\mathbf{f})] \end{aligned}$$

<sup>11</sup>We use strict inequality rather than  $\geq$  because only intervals with size strictly less than  $\varepsilon$  are irrelevant.

Therefore, in the case of the comparative,  $g_{\text{finest}}$  makes the weakest claim of all the granularity levels in  $G$ . As a result, when *just* applies to (51b), the second conjunct of (44) says that *Fafen is older than Siri* is false at every granularity level in  $G$  except for  $g_{\text{finest}}$ . The sentence *Fafen is just older than Siri*, therefore, is predicted to mean that Fafen is older than Siri with respect to  $g_{\text{finest}}$ , but not with respect to any coarser granularity level. This means that Fafen's age is  $d_s + \epsilon_{\text{finest}}$ , as desired.

## 5. Conclusion

We have argued for a uniform analysis of the approximative use of *just* when it occurs with comparative and equative constructions. Intuitively, this use of *just* has two effects: (1) It conveys that its prejacent is true at a high level of precision, and (2) it conveys that its prejacent is false at any lower level of precision that would make a stronger claim. We have implemented this in terms of scale granularity, showing that (1) amounts to conveying that the prejacent is true relative to the finest granularity level with which it can be interpreted in the utterance context, and (2) amounts to conveying that the prejacent is not true relative to any coarser granularity level that would make a stronger claim. Comparative constructions make stronger claims at coarser granularity levels, while equatives make stronger claims at finer granularity levels. For the latter, effect (2) is uninformative, while for the former, effect (2) enforces an upper bound on the scale. Analyzing *just* in terms of scale granularity correctly predicts that approximative uses of *just* only occur with expressions whose denotations depend on a granularity parameter. Although this analysis does not unify the approximative and exclusive uses of *just*, it does reveal a connection between them: Effect (2), which corresponds to the second conjunct of (44), is similar to Beaver and Clark's (2008) MAX operator in that it rules out stronger alternatives to the prejacent. A difference between them is that MAX rules out focus alternatives, while the alternatives that approximative *just* considers are distinguished by the granularity level with respect to which they are interpreted. Another difference between these two uses is the status of the positive meaning component. Whereas exclusives presuppose MIN, we have shown that the first conjunct of (44) is asserted. Accordingly, approximative *just* does not exhibit the expectation-lowering effect that Beaver and Clark (2008) argue is the discourse function of exclusives.

The approximative use of *just* occurs with a range of constructions besides the equative and comparative constructions analyzed here. Our analysis should be extendable to account for all approximative occurrences of *just*. For example, *just* can combine with *enough* (e.g., *just wide enough for one person*), certain gradable adjectives (e.g., *just visible in the distance*), and spatial-temporal prepositions (e.g., *just past the farmhouse*) to yield a reading similar to *barely*, just as it does in comparative constructions. It can also combine with *right* (e.g., *The temperature was just right.*) and wh-words (e.g., *I know just how to do it.*) to yield a reading similar to *exactly*. This suggests that in those constructions it behaves as it does in equative constructions, conveying that the prejacent is to be interpreted at the highest level of precision.

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