

DISTINGUISHING HOMOGENEITY FROM VAGUENESS

Diego Feinmann

Institut Jean Nicod, Département d'Etudes Cognitives, ENS, EHESS, CNRS, PSL Research University

Abstract The question of whether the gappiness associated with vague sentences is of the same kind as the gappiness associated with homogenous sentences has been raised but not settled. In this article, I set out to fill this gap. To begin with, I examine the arguments that have been given for and against assimilating homogeneity to the phenomenon of vagueness (and contend that none of these arguments, neither the positive nor the negative ones, are conclusive). Next, I present three linguistic tests in which homogeneous and vague sentences come apart very clearly, namely, the disagreement test (§ 3.1), the epistemic test (§ 3.2), and the ‘I’m not sure’ test (§ 3.3). On the basis of these results, I conclude that homogeneity is best understood as a phenomenon of its own and not as a manifestation of vagueness.*

1 Introduction

The application of a predicate to a plurality (as denoted by a definite plural) creates an extension gap, an observation that dates back to Fodor (1970). Consider, for example, (1).

(1) Context: There are 10 books on the table; pointing at them, Jane utters...

a. John wrote the books.

True iff John wrote all the books.

False iff John didn't write any of the books.

b. John didn't write the books.

True iff John didn't write any of the books.

False iff John wrote all the books.

It is clear that (1)a is true in a situation in which John wrote all the books and false in a situation in which John didn't write any of the books; it also clear that (1)b, its negation, is true in a situation in which John didn't write any of the books and false in a situation in which John wrote all of them: but what about situations in which John wrote some but not all the books? (1)a and (1)b, as it happens, are judged to be neither true nor false in such situations. For example, take a situation in which John wrote half of the (relevant) books: (1)a is not true (cf. ‘John wrote some of the books’, which is clearly true in that situation),

* This paper has benefited considerably from the comments and helpful suggestions of Benjamin Spector, Manuel Križ, Moshe E. Bar-Lev, Emmanuel Chemla, Paul Egré, Daniel Rothschild, and Matthew Mandelkern.

Grant acknowledgments: The research leading to these results received funding from the European Research Council, ERC Grant Agreement N° 788077–Orisem (PI: Schlenker) and from ANR-19-CE28-0004 (ProbaSem). Research was conducted at the Département d'Etudes Cognitives, École Normale Supérieure - PSL Research University. The Département d'Etudes Cognitives is supported by grants ANR-17-EURE-0017 FrontCog and ANR-10-IDEX-0001-02 PSL.

but it is not false either (cf. ‘John wrote all the books’, which is clearly false in that situation); likewise, (1)b is not false (cf. ‘John didn’t write any of the books’, which is clearly false in that situation), but it isn’t true either (cf. ‘John didn’t write all the books’, which is clearly true in that situation).

Attempts have been made to assimilate homogeneity to other gappy phenomena: presupposition (e.g. Löbner 2000, Gajewski 2005), on the one hand, and vagueness, on the other (e.g. Spector 2012a; cf. Scha 1981).¹ In recent years, it has been shown—conclusively, I believe—that homogeneity, as a phenomenon, is unrelated to presupposition (e.g. Spector 2013; Zehr 2014; Križ 2015, 2016; Križ and Chemla 2015; Cremers, Križ, and Chemla 2017).² The issue of whether homogeneity is the same kind of phenomenon as vagueness, by contrast, remains unsettled.

This article has a modest goal: to show that vagueness and homogeneity, despite surface similarities, are (very) different phenomena. The structure of the article is as follows: first, I discuss the main empirical reflexes of homogeneous sentences (§ 1.1); second, I examine arguments for and against identifying homogeneity with vagueness (§ 2); finally, I present three (new) linguistic tests that indicate that homogeneity is not a manifestation of vagueness but a phenomenon of its own (§ 3).

1.1 Homogeneity

As mentioned, the application of a predicate to a plurality (as denoted by a definite plural) creates an extension gap—see example (1). Definite plurals, it should be noted, are ‘hidden’ in a number of constructions, such as possessive and demonstrative plural NPs, as illustrated in (2).

- (2) a. John wrote those books. (= John wrote the books over there.)
 b. John rode her horses. (= John rode the horses that she owns.)

(2)a and (2)b, naturally, also exhibit an extension gap.

Sentences such as (1)a-b and (2)a-b are said to have the *homogeneity* property: the name homogeneity is meant to reflect the fact that the predicate (in this case, the derived unary predicate *John wrote*) is neither true nor false of a plurality (in this case, *the books*) if it is true of some of the parts of the plurality and false

¹ With less focus on homogeneity, a parallel between vague predicates and plurals has also been suggested by Burnett (2012).

² On the presuppositional analysis, the sentence ‘John read the books’, for example, would be taken to presuppose that either all or none of the books were read by John.

of others—that is, if the plurality of books is not *homogeneous* with respect to the property of having been written by John.

Not all predicates, when applied to a plurality, induce gappiness, however. For example, *numerous* and *few in number* (also *heavy* and *light* in their collective readings) do not. Consider (3), for example.

(3) The students are numerous.

If (3) were to be homogenous, that would mean that if (3) is true, *numerous* cannot be false of any subgroup of the students, which is of course absurd. In the light of cases such as (3), Križ (2015, 2019) has argued that homogeneity should be characterised as a property of lexical predicates, rather than as a property of definite plural NPs. In this chapter, I will refrain from endorsing any particular view on the question of why, and at which level, homogeneity originates, and will limit myself to speak of homogeneity as a property of sentences: homogenous sentences are those that exhibit the kind of gappiness that (1) and (2) exhibit.

The addition of *all* to a definite plural NP has the effect of removing homogeneity, an observation that dates back to Löbner (2000). This is illustrated in (4) below.

- (4) a. John wrote all the books.
True if John wrote all the books.
False if John didn't write all the books.
b. John didn't write all the books.
True if John didn't write all the books.
False if John wrote all the books.

All quantifiers, in fact, have this effect: indeed, none of the sentences in (5) have an extension gap. *All* happens to be special, as Križ (2015) points out, in that the removal of homogeneity appears to be its sole semantic contribution.

- (5) a. John wrote some of the books.
b. John wrote most of the books.
c. John wrote (exactly / at least) three of the books.

Homogeneity, it should be noted, can be observed in a number of domains, and not just in the individual domain. Habitual sentences, for example, which arguably involve reference to plural events, also exhibit the homogeneity property, which can be removed by the introduction of *always*, as illustrated in (6).

- (6) a. John reads the newspaper on Sundays.
True iff John always reads the newspaper on Sundays.
False iff John never reads the newspaper on Sundays.
(Unclear otherwise.)
- b. John *always* reads the newspaper on Sundays.
True if John always reads the newspaper on Sundays.
False if John doesn't always read the newspaper on Sundays.

Indeed, if John reads the newspaper only two Sundays per month, (6)a is neither true nor false; (6)b, by contrast, is false in such a case.

2 Homogeneity as vagueness

Vague predicates (e.g. *tall*, *heap*, *rich*, etc.) lack sharp boundaries; consider, for example, the predicate *tall*: there does not seem to be a fact of the matter as to how tall a person has to be in order to count as *tall* (as opposed to *not tall*). There are, of course, clearly *tall* and clearly *not tall* individuals: however, there does not seem to be a precise cut off point between the heights of those who are *tall* and the heights of those who aren't, a condition that persists even if the adjective is combined with a PP that overtly specifies the relevant comparison class (*tall for a British adult male*, in the same way as *tall*, lacks sharp boundaries). A related feature of these predicates is that they admit so-called 'borderline cases'—namely, things such that one is not sure whether the predicate applies to them irrespective of how much knowledge one has about their properties otherwise (e.g. one may be unsure whether the predicate *tall for a British adult male* applies to James despite knowing that James is exactly 1.79m). Vagueness is often discussed as being a lexical phenomenon (e.g. the extension of *tall* is vague); sentences that contain vague terms, however, are also vague: the sentence 'his cousin is *tall*', by virtue of having a vague constituent, is vague (i.e. it lacks a sharp truth-falsity boundary and there are cases relative to which one is bound to hesitate whether it is true or false).³

What does it mean to say that homogeneity is a manifestation of vagueness? It amounts to claiming that the perceived gappiness or undefinedness of (7)a-b is of the same kind as the perceived gappiness or undefinedness of (8)a-b.

³ For a collection of classic essays of vagueness, see Keefe and Smith (1999); for a recent survey, see Egré and Klindinst (2011).

(7) BORDERLINE CASE⁴

Context: James is 1.79m.

- a. James is tall (for a British adult male).
- b. James isn't tall (for a British adult male).

(8) HOMOGENEITY VIOLATION

Context: Half of the books on the shelf are red and half are blue.

- a. The books on the shelf are red.
- b. The books on the shelf aren't red.

In the subsequent sections, I often talk about the ‘vagueness gap’, by which I mean the set of situations relative to which a vague sentence is judged to be neither true nor false (i.e. the set of borderline cases). Likewise, I use the expression ‘homogeneity gap’ to refer to the set of situations relative to which an unquantified plural sentence is judged to be neither true nor false (for example, in (8), the set of situations in which some but not all the books on the shelf are red). I want to stress that I use these terms in a purely descriptive way: whether the gappiness exhibited by vague sentences, on the one hand, and homogeneous sentences, on the other, should be modelled by positing a truth-value gap in the semantics is a controversial issue.⁵ I will not be addressing *that* issue here, at least not directly: the main concern of this article is to establish whether homogeneity is a manifestation of vagueness or a phenomenon of its own.

2.1 Parallelisms between vagueness and homogeneity (Križ 2015; Cremers, Križ, and Chemla 2017)

Križ (2015, 2016) and Cremers, Križ, and Chemla (2017) observe similarities between homogeneity and vagueness. In what follows, I introduce the relevant observations, and argue that, in and of themselves, they do not make a strong case for unification.

To begin with, Križ (2015) notes that, in cases in which a speaker uses a vague sentence to describe a ‘borderline case’ situation, its interlocutor has the option, as shown in (9), to say *weeell*, as if trying to decide whether to count the utterance as true or not; as illustrated in (10), the same discursive strategy is possible in the event of a homogeneity violation.

⁴ If, according to the reader’s intuition, (7)a-b aren’t neither-true-nor-false in the stipulated context (but rather feel either true or false), then the example should be modified (by changing James’s height and/or nationality) to obtain the intended effect.

⁵ For example, to model the behaviour of unquantified plural sentences, Križ (2015) uses a trivalent semantics (Strong Kleene logic). In contrast, approaches such as Bar-Lev (2018) and Križ and Spector (2020), although different from each other in important respects, do not rely on a trivalent semantics and propose to derive the perceived gappiness of these sentences by pragmatic means.

(9) Context: James is borderline tall.

John: a. James is tall.

Jane: b. Weeell... (sort of).

(10) Context: James wrote half of the books.

John: a. James wrote the books.

Jane: b. Weeell... (most of them).

Though suggestive, I don't think that the parallelism between (9) and (10) indicates that that homogeneity is a kind of vagueness; if it did, then one would be forced to conclude that hyperbole is also a kind of vagueness, for example. Indeed, a hyperbolic utterance can also be challenged with a hesitant *weeell...*

(11) Context: John and Jane went to see a stand-up comedy show. The show wasn't good: very few people were actually laughing. When leaving the theater, they bumped into their friend Cruz.

Cruz: a. Hey guys, how was the show? I was thinking of getting tickets for tomorrow.

John: b. Not good. *Nobody was laughing*.

Jane: c. Weeell... (a few people were).

It seems that *weeell...* can be used to challenge an utterance whose truth is questionable in one way or another. (9)b and (10)b are both questionable, that much is clear. However, it would be premature to conclude, given (11)b-c, that (9)b and (10)b are questionable for the same reason.

Križ also notes that '*definitely* functions very much like *all* in that it modifies a vague adjective so that it becomes simply false of a borderline case' (Križ 2015: 41). In § 1.1, I have discussed *all* and how its application removes homogeneity; in (12), I illustrate the phenomenon that Križ describes:

(12) Context: It is common ground that James is (exactly) 1.79m tall.

a. James is tall (for a British adult male).

b. James is *definitely* tall (for a British adult male).

In the context stipulated, an utterance of (12)a is neither likely to be judged true nor is it likely to be judged false; (12)b, by contrast, is likely to be judged false in the very same context. *Prima facie*, then, *definitely* may be thought of as having a function analogous to that of *all* (i.e. a 'gap removal' function). In § 3.2, I will show that *definitely* doesn't function like *all* in crucial respects: in fact, I will argue that a closer look at the semantic behaviour of these two words suggests rather strongly that vagueness and homogeneity are different phenomena—and not the reverse.

Yet another parallelism between homogeneity and vagueness has been reported in Cremers, Križ, and Chemla (2017). In this experimental study, participants were asked, after having been presented with a ‘gappy’ sentence (i.e. a homogenous, presuppositional or vague sentence), to assign a probability to the sentence being true given a certain situation. Notably, relative to ‘gap situations’, vague and homogeneous sentences behaved consistently alike (and patterned differently from presuppositional sentences). This result, though suggestive, doesn’t settle the question of whether vagueness and homogeneity are the same phenomenon: it is entirely possible that two different phenomena behave alike by some measure or other.

2.2 Križ’s (2015, 2016) arguments against subsuming homogeneity under vagueness

2.2.1 The sorites paradox

One of the distinctive features of vague predicates is that they can be used to trigger (fallacious) soritical reasoning; consider (13), for example.

- (13)
- a. If John has \$5 million, then ‘John is *rich*’ is true.
 - b. If John doesn’t have any money, then ‘John is *rich*’ is false.
 - c. If John having \$ n makes ‘John is *rich*’ true, then John having \$ $n - 1$ also makes ‘John is *rich*’ true.

(13)c, the conditional premise, enables one to infer that if John has no money, then ‘John is rich’ is true, which contradicts (13)b.

If homogeneity was just a symptom of vagueness, then the sentence ‘the kids got excellent grades’ (which is homogenous) should lead to the sorites paradox. Consider (14), for example.

- (14)
- a. If all the kids got excellent grades, then ‘the kids got excellent grades’ is true.
 - b. If none of the kids got excellent grades, then ‘the kids got excellent grades’ is false.
 - c. If n kids getting excellent grades makes ‘the kids got excellent grades’ true, then $n - 1$ kids getting excellent grades also makes ‘the kids got excellent grades’ true.

One has no issue in accepting the conditional premise for ‘John is rich’ in (13)c; (14)c, by contrast, is harder; indeed, imagine that there are 10 kids, 9 got excellent grades and 1 got poor grades... is ‘the kids got excellent grades’ true? I don’t think it is—nor does Križ (2015). However, as Križ (2015) remarks, if (14)c is read with some special context in mind, it becomes more attractive: this ‘special’ context would be one in which, for current purposes, it is irrelevant whether all or most of the children got excellent grades. Indeed, in that kind of context, definite plural sentences (but not their universally quantified counterparts) are known to tolerate exceptions—a phenomenon that goes by the name of non-maximality (Brisson 1998;

Malamud 2012; Križ 2015).⁶ Hence, the sorites-based argument aimed at distinguishing homogeneity from vagueness ends up being rather subtle: a canonical vague sentence (such as ‘John is *rich*’ or ‘this is a *heap* of sand’) can reliably be used to generate a sorites paradox; a definite plural sentence, by contrast, is less effective at inducing soritical reasoning and, when it does, it appears to require, unlike a canonical vague sentence, some help from context.

Though a good argument, I suspect that someone who thinks that homogeneity should be subsumed under the umbrella of vagueness is unlikely to find it conclusive: after all, as noted, it does not seem *impossible* to induce soritical reasoning with a homogenous plural sentence.

2.2.2 Borderline contradictions

It has been shown that speakers accept sentences of the form ‘*x* is neither *P* nor not *P*’—where *P* is a vague predicate—as descriptions of borderline cases of *P* (because of this, these sentences are sometimes referred to as ‘borderline contradictions’; see Ripley (2011), Alxatib and Pelletier (2011), and Egré and Zehr (2018), among others). This isn’t too surprising: (15)a and (15)c, at least intuitively, have the readings in (15)b and (15)d, respectively.⁷

- (15) a. John is neither tall nor not tall.
 b. \approx John is borderline tall (i.e. neither clearly tall nor clearly not tall).
 c. Bakewell is neither a city nor not a city.

⁶ (i) illustrates the phenomenon of non-maximality:

(i) Context: There are 10 kids in Jane’s class: if 7 or more kids get excellent grades, then Jane (the teacher) will take the whole class to the cinema. John, another teacher, asks Jane:

- a. Will you take your class to the cinema?
b. Yes, the kids got excellent grades.
c. Yes, all the kids got excellent grades.

The standard observation is that if John were to find out that only 8 kids in Jane’s class got excellent grades, he wouldn’t accuse Jane to have said something false: because of this, (i)b is said to ‘tolerate exceptions’ or give rise to a non-maximal interpretation. This contrasts with (i)c, (i)b’s universally quantified (non-homogeneous) counterpart, which only admits a maximal or universal interpretation.

Like Križ (2015, 2016), I believe that non-maximal interpretations are not a side-effect of semantic vagueness (or a side-effect of homogeneity, if one happens to think that homogeneity is just vagueness) but the result of a *pragmatic* mechanism that homogenous sentences (but not their non-homogenous counterparts) are sensitive to—see Feinmann (2020: Ch. III) for discussion on this point.

⁷ What is more surprising is that these sentences, which are contradictions in classical logic, have the readings that they have. A recent attempt to make sense of these data involves positing the existence of a silent *definitely* operator (Egré and Zehr 2018) or something akin to a local accommodation operator (Spector 2012b, 2016). It is worth noting that speakers also accept sentences of the form ‘*x* is *P* and not *P*’ (where *P* is a vague predicate) as descriptions of borderline cases, though to a lesser extent than sentences of the form ‘*x* is neither *P* nor not *P*’ (e.g. Egré and Zehr 2018).

d. \approx Bakewell is a borderline case of city (i.e. neither clearly a city nor clearly not a city).

As Križ (2015, 2016) notes, nothing of the kind is possible with pluralities that are mixed with respect to a predicate, as shown in (16).

- (16)
- a. ?? John neither read the books nor didn't read the books.
 - b. \approx John read some but not all the books.
 - c. ?? Neither are the books written by John nor are they not written by John.
 - d. \approx Some but not all the books are written by John.

So here one has an argument against assimilating homogeneity to vagueness: if the 'homogeneity gap' was the same kind of thing as the 'vagueness gap', then (16)a and (16)c would be expected to behave like (15)a and (15)c. This is not the case, however.

I find this argument persuasive.⁸ That said, sentences of the form ' x is neither P nor not P ' are rather unnatural as sentences; and, it seems to me, if homogeneity and vagueness are indeed different phenomena, it should be possible—in fact, desirable—to show this without relying on constructions that, at least from a *stylistic* point of view, are somewhere on the fringes of acceptability.

3 Homogeneity and vagueness aren't the same phenomenon

Križ (2015, 2016) gives us two good reasons to suspect that homogeneity and vagueness are different phenomena: first, definite plural sentences are much less susceptible to soritical reasoning than canonical vague sentences; in addition, atomic definite plural sentences and atomic canonical vague sentences do not behave alike in complex sentences of the form ' x is neither P nor not P '. Križ, however, shies away from concluding, on the basis of these observations, that homogeneity and vagueness are unrelated phenomena and stresses the need for further research in this domain (cf. Križ (2016: 16)); and his wariness is justified, I believe. First, as discussed in § 2.1, there are (at least surface) parallelisms between homogeneity and vagueness. Second, it appears to be possible to induce soritical reasoning with a definite plural sentence (at least in certain contexts). Finally, the argument from borderline contradictions is somewhat undermined by the fact that these sentences are rather unnatural—and unnatural sentences aren't optimal devices for testing linguistic intuitions.

⁸ Križ's (2015, 2016) argument can also be constructed using conjunctions of the form ' x is P and not P ' (see fn. 8)—in fact, he provides both versions of the argument. Here I'm just giving the 'neither/nor' version, the reason for this being two-fold: first, ' x is P and not P ' sentences, as noted in fn. 7, are accepted by speakers but to a lesser extent than ' x is neither P nor not P ' sentences; in addition, it is not at all clear whether ' x is P and not P ' (where P is a vague predicate) has ' x is a borderline case of P ' as a *reading*. For a discussion on the latter point, see Feinmann (2020: Ch. II).

In what follows, I present three new tests in which homogenous and vague sentences come apart dramatically, thus leaving no room for debate: homogeneity and vagueness must be different phenomena.

3.1 The disagreement test

One thing that vague predicates lend themselves to is disagreement (with respect to whether or not they are true of a given entity). For example, I may be inclined to think that someone who owns a nice house (no mortgage) and drives a BMW is a rich person, whereas you may dispute that, and claim that, in order to count as rich, one has to own many properties (one is not enough).

With this in mind, let's consider (17).

- (17) Context: There is a stack of 10 books on the table: John checks the books and learns that 6 have been written by Shakespeare and 4 by Molière.

John: [*pointing at the stack of books*] The books on the table were written by Shakespeare.

Jane: [*after checking the books*] These books weren't written by Shakespeare. (I disagree.)

John: Well, I think many people would be inclined to say that these books were written by Shakespeare.

The exchange above is so outlandish that I can only imagine two lunatics having it; compare with the perfectly natural exchange in (18).

- (18) Context: There's a list that records the heights of some individuals, including James. John reads the list and learns that James is (exactly) 1.79m tall. He tells Jane...

John: James is tall (for a British adult male).

Jane: [*after checking the list and learning that John is 1.79m tall*] No, he isn't. (I disagree.)

John: Well, I think many people would be inclined to say that he is.

Quite clearly, disagreement about what counts (and does not count) as a clear case of a vague predicate is perfectly possible. This is hardly surprising: vague terms lack sharp boundaries and, as a result, speakers are expected to disagree about (and feel compelled to negotiate) where their boundaries should be drawn. What is revealing in the context of this investigation is that disagreement about whether a predicate is true or false of a plurality—when the interlocutors know exactly how many parts of the plurality satisfy the predicate—isn't possible (as shown in (17)): this suggests, quite strongly I believe, that homogenous

sentences have sharp boundaries;⁹ and, if unquantified plural sentences have sharp boundaries, then they surely aren't vague: it is a mistake to think that just because a sentence exhibits an extension gap its semantic boundaries must be vague.

3.2 *All* versus *definitely* (and the epistemic test)

As mentioned in § 2.1, Križ points out that homogeneity and vagueness appear to have a common feature ('*definitely* functions very much like *all* in that it modifies a vague adjective so that it becomes simply false of a borderline case' (Križ 2015: 41)). A closer look at the relevant data, however, exposes that *definitely* and *all* do not function alike. To begin with, the sole semantic purpose of *all* is, arguably, to remove homogeneity: indeed, if a sentence is not homogenous, then the application of *all* to a plural definite NP results in infelicity.

- (19) a. The students are numerous.
b. # *All* the students are numerous.

Definitely, by contrast, can felicitously modify a non-vague predicate, as illustrated in (20) below, which indicates that its core function cannot be that of removing vagueness.

- (20) a. The number 11 is prime.
b. The number 11 is *definitely* prime.

Definitely, it seems to me, works as a general indicator of epistemic certainty, like *certainly*, *clearly*, or *undoubtedly*. These epistemic adverbs, when combined with a vague predicate, have the observable effect of pushing at least some of the predicate's borderline cases into its negative extension, as shown in (12); however, as (20)b indicates, this appears to be a side-effect of these adverbs rather than their *raison d'être*.¹⁰

Though epistemic adverbs such as *definitely* have a vagueness-trimming effect, it would be incorrect to say that they remove vagueness; as it has long been noted, 'the vagueness of a vague predicate is ineradicable' (Dummett 1959: 344). This is another difference between homogeneity and vagueness: the former can effectively be removed (for example, by the application of *all* or other quantifiers); the latter can, via the application of an epistemic adverb such as *definitely*, be eradicated at some level (for example, the borderline cases of *tall for a British adult male* may be pushed into the predicate's negative extension) but

⁹ To be clear: a homogenous sentence may lack sharp boundaries by virtue of containing a vague predicate such as *tall*, *heap*, or *mountain*: the point is that 'being homogenous' does not entail (unlike 'being vague') 'a lack of sharp boundaries.'

¹⁰ Unless, of course, someone wanted to claim that *definitely* is ambiguous between a marker of epistemic certainty and a vagueness-trimming operator. I see no evidence whatsoever for such a claim.

cannot be eradicated at all levels: indeed, the complex predicate *definitely tall for a British adult male* is vague: there isn't a fact of the matter as to how tall someone has to be in order to count (or not to count) as *definitely tall for a British adult male*. Another way of making this point is to say that, whereas higher-order vagueness is a thing, there does not appear to be such a thing as higher-order homogeneity.¹¹

Let's now introduce the epistemic test; as noted, *definitely*, if applied to a vague predicate, although it does not remove vagueness, has, as shown in (12), a vagueness-trimming effect: if homogeneity was vagueness, then *definitely* (or other markers of epistemic certainty) should have comparable effects on the homogeneity gap. This, however, isn't true, as shown in (21).

- (21) Context: There is a stack of 10 books on the table: it is common ground that 6 have been written by Shakespeare and 4 by Molière.
- a. The books on the table were written by Shakespeare.
 - b. The books on the table were *definitely/clearly* written by Shakespeare.
 - c. All the books on the table were written by Shakespeare.

Indeed, both (21)a and (21)b, in the stipulated context, are neither true nor false; (21)c, by contrast, is false. One may worry that this test presupposes that the locus of homogeneity is the predicate *written by Shakespeare* (an assumption that isn't uncontentious; see Križ (2019) for discussion on this point). However, the same point can be made with *it is uncontroversial that*, which, like *definitely* or *clearly*, is a marker of epistemic certainty but, unlike these adverbs, can only be applied to whole sentences. Consider (22) and (23) below.

- (22) Context: It is common ground that James is (exactly) 1.79m tall.
- a. James is tall (for a British adult male).
 - b. *It is uncontroversial that* James is tall (for a British adult male).
 - c. James is *definitely* tall (for a British adult male).
- (23) Context: There is a stack of 10 books on the table: it is common ground that 6 have been written by Shakespeare and 4 by Molière.
- a. The books on the table were written by Shakespeare.
 - b. *It is uncontroversial that* the books on the table were written by Shakespeare.
 - c. All the books on the table were written by Shakespeare.

¹¹ For discussions on higher-order vagueness, see Sainsbury (1991), Williamson (1999), and Keefe (2000), among others.

(22)a (= (12)a), as noted in § 2.1, is likely to have a distinct neither-true-nor-false flavour in the stipulated context; (22)b, by contrast, in the same way as (22)c, is likely to be judged false in the very same context. Notably, *it is uncontroversial that* doesn't seem to interact in any way with the homogeneity gap: indeed, both (23)a and (23)b are neither true nor false in the stipulated context, whereas (23)c is clearly false.

It can thus be concluded that the indication of epistemic certainty, which, as discussed, interacts with the phenomenon of vagueness, does absolutely nothing to homogeneity. This suggests, quite strongly I think, that vagueness and homogeneity aren't the same phenomenon.

3.3 The 'I'm not sure' test

Vague sentences have borderline cases: there are states of affairs relative to which one isn't sure whether these sentences are true or false. Because of this, it is perfectly acceptable to utter the sequences in (24):

- (24)
- a. I'm not sure whether James is **tall** (for a British adult male). All I can tell you is that he is (exactly) 1.79m.
 - b. I'm not sure whether The Schil is a **mountain**. All I can tell you is that it is (exactly) 1,972 ft height.
 - c. I'm not sure whether **a lot of** people came to Paula's PhD defense. All I can tell you is that there were (exactly) 30 people in the audience.¹²

The opposite result is obtained if the 'I'm not sure' test is applied to a homogeneous sentence: indeed, the sentences in (25) are all (highly) deviant.

- (25)
- a. # I'm not sure whether the books on the table were written by Shakespeare. All I can tell you is that there are 10 books on the table and exactly 6 of them were written by Shakespeare.
 - c. # I'm not sure whether the coins in Mary's piggy bank are ancient Roman coins. All I can tell you is that exactly 2 coins in Mary's piggy bank are (not) ancient Roman coins.
 - b. # I'm not sure whether James reads the newspaper in the morning. All I can tell you is that he reads the newspaper exactly 3 mornings per week.

The 'I'm not sure' test points towards the same conclusion as the disagreement test (see § 3.1): the boundaries of homogenous sentences are sharp; that is, by virtue of knowing the literal meaning of a homogeneous sentence, a speaker also knows, for every situation, whether the sentence is true, false or neither true nor false (provided that the sentence doesn't contain a vague constituent). Indeed, as (25)a shows, if one knows that there are 10 books on the table and exactly 6 of them were written by Shakespeare,

¹² I'm indicating the relevant vague constituent in bold.

then one cannot not know whether it is true that the books on the table were written by Shakespeare: if one knows that there are 10 books on the table and exactly 6 of them were written by Shakespeare, then one also knows (and hence one is certain) that the sentence ‘the books on the table were written by Shakespeare’ is not true (more precisely, one knows that the sentence ‘the books on the table were written by Shakespeare’ is neither true nor false).

Thus, the ‘I’m not sure’ test not only helps to distinguish homogeneity from vagueness: it also suggests a compelling way of thinking about the difference between these two phenomena: vagueness is about *not being sure about whether a sentence is true or false with respect to some state of affairs*; homogeneity, by contrast, is about *being sure that a sentence is neither true nor false with respect to some state of affairs*.

4 Conclusion

Both homogeneity and vagueness are associated with gappiness (i.e. the strong intuition that, with respect to certain situations, a sentence is neither true nor false): however, the homogeneity gap and the vagueness gap are very different from each other. The former isn’t sensitive to linguistic markers of epistemic certainty and, as disclosed by the disagreement test and the ‘I’m not sure’ test, has sharp boundaries (i.e. it is not possible to disagree about where it ‘begins’ and where it ‘ends’ nor is it possible to doubt whether a situation in the homogeneity gap is in fact in the homogeneity gap). The vagueness gap, by contrast, is sensitive to linguistic markers of epistemic certainty and lacks sharp boundaries (there does not seem to be a fact of the matter as to where this gap ‘begins’ and where it ‘ends’): ‘gap’, in fact, feels like the wrong term to describe what looks very much like a gradual shading off from clear to less clear cases.

REFERENCES

- Alxatib, Sam, and Francis Jeffrey Pelletier. 2011. “The Psychology of Vagueness: Borderline Cases and Contradictions.” *Mind & Language* 26 (3): 287–326. <https://doi.org/10.1111/j.1468-0017.2011.01419.x>.
- Bar-Lev, Moshe. 2018. “Free Choice, Homogeneity, and Innocent Inclusion.” PhD Thesis, Hebrew University of Jerusalem.
- Brisson, Christine M. 1998. “Distributivity, Maximality and Floating Quantifiers.” PhD Thesis, Rutgers, The State University of New Jersey.
- Burnett, Heather. 2012. “Vague Determiner Phrases and Distributive Predication.” In *New Directions in Logic, Language and Computation*, edited by Daniel Lassiter and Marija Slavkovic, 175–94. Lecture Notes in Computer Science. Berlin, Heidelberg: Springer. https://doi.org/10.1007/978-3-642-31467-4_12.
- Cremers, Alexandre, Manuel Križ, and Emmanuel Chemla. 2017. “Probability Judgments of Gappy Sentences.” In *Linguistic and Psycholinguistic Approaches on Implicatures and Presuppositions*, edited by Salvatore Pistoia-Reda and Filippo Domaneschi, 111–50. Palgrave Studies in Pragmatics, Language and Cognition. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-319-50696-8_5.
- Dummett, Michael. 1959. “Wittgenstein’s Philosophy of Mathematics.” *The Philosophical Review* 68 (3): 324–48. <https://doi.org/10.2307/2182566>.
- Egré, Paul, and Nathan Klinedinst. 2011. “Introduction: Vagueness and Language Use.” In *Vagueness and Language Use*, edited by Paul Egré and Nathan Klinedinst, 1–21. Palgrave Studies in Pragmatics, Language and Cognition. London: Palgrave Macmillan UK. https://doi.org/10.1057/9780230299313_1.
- Egré, Paul, and Jérémy Zehr. 2018. “Are Gaps Preferred to Gluts? A Closer Look at Borderline Contradictions.” In *The Semantics of Gradability, Vagueness, and Scale Structure: Experimental Perspectives*, edited by Elena Castroviejo, Louise McNally, and Galit Weidman Sassoon, 25–58. Language, Cognition, and Mind. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-319-77791-7_2.
- Feinmann, Diego. 2020. “Lexical Illusions, (Non-)Maximality, and Invisible Gaps.” PhD Thesis, University of Sheffield.
- Fodor, Janet Dean. 1970. “The Linguistic Description of Opaque Contents.” PhD Thesis, MIT.
- Keefe, Rosanna. 2000. *Theories of Vagueness*. Cambridge University Press.
- Keefe, Rosanna, and Peter Smith. 1999. *Vagueness: A Reader*. Bradford Books.
- Križ, Manuel. 2015. “Aspects of Homogeneity in the Semantics of Natural Language.” PhD Thesis, University of Vienna.
- . 2016. “Homogeneity, Non-Maximality, and All.” *Journal of Semantics* 33 (3): 493–539. <https://doi.org/10.1093/jos/ffv006>.
- . 2019. “Homogeneity Effects in Natural Language Semantics.” *Language and Linguistics Compass* 13 (11). <https://onlinelibrary.wiley.com/doi/full/10.1111/lnc3.12350>.
- Križ, Manuel, and Emmanuel Chemla. 2015. “Two Methods to Find Truth-Value Gaps and Their Application to the Projection Problem of Homogeneity.” *Natural Language Semantics* 23 (3): 205–48. <https://doi.org/10.1007/s11050-015-9114-z>.
- Križ, Manuel, and Benjamin Spector. 2020. “Interpreting Plural Predication: Homogeneity and Non-Maximality.” *Linguistics and Philosophy*, November. <https://doi.org/10.1007/s10988-020-09311-w>.
- Löbner, Sebastian. 2000. “Polarity in Natural Language: Predication, Quantification and Negation in Particular and Characterizing Sentences.” *Linguistics and Philosophy* 23 (3): 213–308. <https://doi.org/10.1023/A:1005571202592>.

- Malamud, Sophia A. 2012. “The Meaning of Plural Definites: A Decision-Theoretic Approach.” *Semantics and Pragmatics* 5 (0): 1–58. <https://doi.org/10.3765/sp.5.3>.
- Ripley, David. 2011. “Contradictions at the Borders.” In *Vagueness in Communication*, edited by Rick Nouwen, Robert van Rooij, Uli Sauerland, and Hans-Christian Schmitz, 169–88. Springer Berlin Heidelberg.
- Sainsbury, Mark. 1991. “Is There Higher-Order Vagueness?” *The Philosophical Quarterly* (1950-) 41 (163): 167–82. <https://doi.org/10.2307/2219591>.
- Scha, Remko. 1981. “Distributive, Collective and Cumulative Quantification.” In *Formal Methods in the Study of Language*, edited by J. Groenendijk, T. Janssen, and M. Stokhof, 2:483–512. Amsterdam: Mathematisch Centrum.
- Spector, Benjamin. 2012a. “Plurals, Homogeneity, and Vagueness.” Presented at the Workshop on Semantics, Vienna.
- . 2012b. “Vagueness, (Local) Accommodation, Presupposition and Restrictors.” Course Notes on Trivalent Semantics for Vagueness and Presupposition, Vienna.
- . 2013. “Homogeneity and Plurals: From the Strongest Meaning Hypothesis to Supervaluations.” Presented at Sinn und Bedeutung 18, University of the Basque Country.
- . 2016. “Presupposition (and Vagueness) Projection at the Propositional Level.” ESSLLI 2016 Course notes on Trivalents Logics and Natural Language Meaning.
- Williamson, Timothy. 1999. “On the Structure of Higher-Order Vagueness.” *Mind* 108 (429): 127–43.
- Zehr, Jérémy. 2014. “Vagueness, Presupposition and Truth-Value Judgments.” PhD Thesis, École Normale Supérieure de Paris. <https://tel.archives-ouvertes.fr/tel-01107532>.