Homogeneity inferences, as (1), arise whenever an assertion implies ('∴') a universal positive (**A**) while its denial implies a universal negative (**E**), and not the particular negative (**O**). The letters label the corners of an Aristotelian Square of Oppositions. By *imply* I mean a 'reasonable inference' [11] not a technical notion (implicature). Cross-linguistically, homogeneity inferences are attested in English, Hungarian, Russian, Italian, Serbian, Japanese [12], and in a number of environments [8], including conjunctions, as (2).[1] A sentence ϕ supports homogeneity inferences if, and only if, an utterance of ϕ implies a universal positive **A** (*all, both*) only if an utterance of $\neg\phi$ implies a universal negative **E** (*no, neither*).

Moreover, if ϕ supports homogeneity inferences, neither $\neg\phi$ nor ϕ are acceptable in contexts in which the particular negative is true, as in (3). However, negative particular interpretations can be recovered with proper intonation [12]. Finally, homogeneity effects do not occur if the universal quantifier is overtly expressed.

Existing theories of homogeneity are based on Trivalent logic [7], Ambiguity [9], and Exhaustification [2]. None of them provides an account of homogeneity effects with conjunctions, and the Trivalent and Ambiguity theories fail to account for the data in (3). This is because in these two theories homogeneity is tightly connected with 'non-maximality': the purported compatibility with exceptions of the universal generalization supported by (1a), (2a), and (3a). On my view, following [2], non-maximal readings are pragmatic loose talk that doesn't need to be built into an account of homogeneity, but that is independently necessary as well.

I will describe a state-based bilateral semantics in which two independently plausible assumptions are together responsible for homogeneity effects: (i) rejection is weak, and (ii) vacuous models can be ruled out—it is possible, in other words, to Neglect Zero [1]. These assumptions are parameters that constrain the logic of negation. If rejection is weak and Neglect Zero is enforced, particular negatives (**O** operators) cannot be expressed, but $\forall, \exists, \neg\exists$, as well as $\wedge, \vee, \neg\vee$, behave (almost) as in classical logic. If rejection is strong and formulas can always be vacuously satisfied we obtain classical logic. Assumptions (i) and (ii) are plausible: natural language can express weak rejection [6] and models that verify formulas by means of empty configurations are cognitively demanding [4, 1], hence optionally ruled out.

For illustration, a model $M = \langle W, D, [\![\cdot]\!]^g_w \rangle$ is a non-empty set of possible worlds W, domain D, and interpretation function $[\![\cdot]\!]^g_w$. Truth and falsity are defined in the familiar way by a valuation function $\mathscr{V}_{g_x}(w, \cdot)$ on atomic formulas. To account for the discrepancy between classically valid inferences and homogeneity inferences, I will look at the conditions for assertion rather than truth, assuming that 'assertion aims

[1] Homogeneity has also been linked to conditionals, embedded questions, and free choice [8, 5, 2]. Extensions of the present account to such environments is left to future work.

at more than truth, and inference at more than preserving truth' [11, p. 270]. For atoms, assertion requires unanimity among worlds in a state, whereas a single dissenting voice is enough for rejection. Assertion- and rejection-conditions for complex formulas are defined as in classical logic and as in [1].

$$s, g_x \vDash p \text{ iff for every } w \in s : \mathscr{V}_{g_x}(w, p) = 1$$
$$s, g_x \mathrel{=\!\!|} p \text{ iff } s = \varnothing \text{ or for some } w \in s : \mathscr{V}_{g_x}(w, p) = 0$$

Such a "weak" notion of rejection is a first point of departure with classical logic. The second is the management of empty models. The empty state $s = \varnothing$ allows for the assertion of any p, and the empty domain $D = \varnothing$ for the assertion of any formula whose main operator is $\forall$. In classical logic, assertion may always be so vacuous. In modeling reasonable pragmatic inferences, instead, empty models may be ruled out.

A pair of a state and an assignment is a *zero* of a model M if, and only if, the state s or the domain D are empty. The Zero Z of M is the set of zeros of M. In order to implement Neglect Zero, I introduce a speech act operator, the star $\star$, which modifies illocutionary force by making speech obligatorily non-vacuous. The following two clauses are the atomic case, while non-vacuous assertion and rejection of complex formulas are defined recursively as the case with $\forall$ illustrates.

$$s, g_x \vDash p^\star \text{ iff } \langle s, g_x \rangle \notin \mathrm{Z} \text{ and } s, g_x \vDash p$$
$$s, g_x \mathrel{=\!\!|} p^\star \text{ iff } \langle s, g_x \rangle \notin \mathrm{Z} \text{ and } s, g_x \mathrel{=\!\!|} p$$
$$s, g_x \vDash [\forall x \phi]^\star \text{ iff } s, g_x \vDash \forall x \phi^\star$$
$$s, g_x \mathrel{=\!\!|} [\forall x \phi]^\star \text{ iff } s, g_x \mathrel{=\!\!|} \forall x \phi^\star$$

The star allows us to distinguish between possibly vacuous (non-starred) and obligatorily non-vacuous (starred) speech. In the resulting logic, the following inferences hold under a restriction. Without the star, the classically invalid inferences fail.

$$[\neg \forall x \phi]^\star \vDash [\neg \exists x \phi]^\star \text{ and } [\neg \exists x \phi]^\star \vDash [\neg \forall x \phi]^\star$$
$$[\neg(\phi \wedge \psi)]^\star \vDash [\neg(\phi \vee \psi)]^\star \text{ and } [\neg(\phi \vee \psi)]^\star \vDash [\neg(\phi \wedge \psi)]^\star$$
$$\text{If } s, g_x \vDash [\neg \forall x \phi]^\star \text{ then for every } x : s, g_x \vDash \neg \phi x.$$
$$\text{If } s, g_x \vDash [\neg(\phi \wedge \psi)]^\star \text{ then } s, g_x \vDash \neg \phi \text{ and } s, g_x \vDash \neg \psi.$$

Thus (1) and (2) are the result of weak rejection and obligatorily non-vacuous speech. Moreover, in minimal states that verify contexts such as (3), **A** and **E** formulas are not asserted. By complementing this account with a standard and independently well-established theory of focus projection such as [3], intonation blocks homogeneity inferences. Finally, universal determiners are semantically inert on this account, but their negations are interpreted classically, as **O** operators, due to pragmatic competition. Thus we account for the observations and improve on existing theories.

(1) a. He saw the girls. from [12]
∴ He saw all/both of the girls. (**A**)
b. He didn't see the girls.
∴ He saw none/neither of the girls. (**E**)

(2) a. Mary saw Adam and Bill. from [10]
∴ Mary saw both Adam and Bill. (**A**)
b. Mary didn't see Adam and Bill.
∴ Mary saw neither Adam nor Bill. (**E**)

Context. Some boys are performing *Hamlet* and some are not. (**I** and **O**)

(3) a. ?? The boys are performing *Hamlet*. from [8]
b. ?? The boys aren't performing *Hamlet*.

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