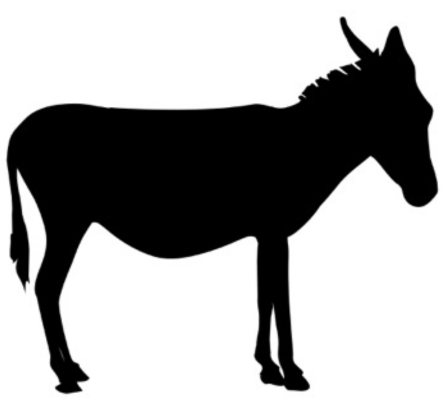
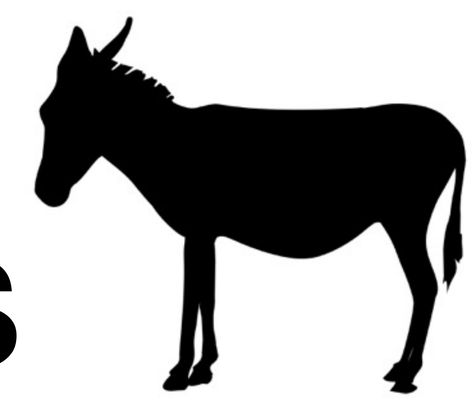


Homogeneity in donkey sentences



Lucas Champollion
New York University
champollion@nyu.edu

Most semanticists who see a donkey sentence write about it.

- For insights and examples, I am indebted to Barker 96, Bäuerle and Egli 86, Brasoveanu 08, Brogaard 07, Chierchia 95, Dekker 93, Francez 09, Gawron, Nerbonne, and Peters 92, Geurts 02, Heim 82, Heim 90, Kadmon 90, Kamp 91, Kanazawa 94, Krifka 96, Lappin and Francez 94, Rooth 87, van Rooy 03, Schubert and Pelletier 89, von Fintel 94, Yoon 94, Yoon 96 and others

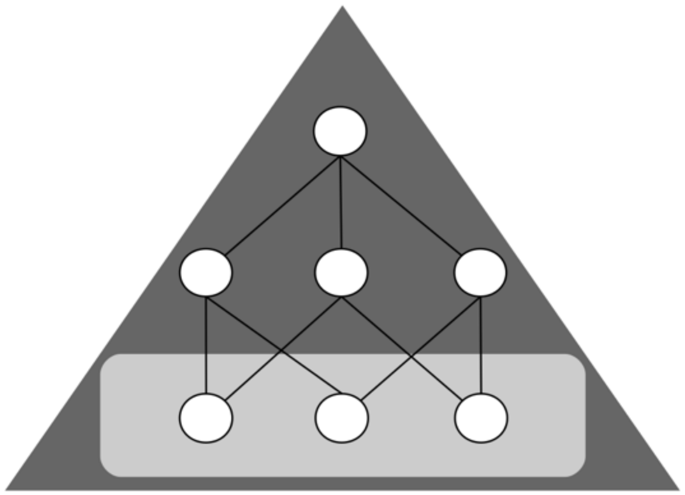
An old idea: plural definites ≈ donkey pronouns

- **Löbner 00**: homogeneity in plural definites
  The books are/aren't in Dutch ≈ All/None of them are

- **Yoon 96, Krifka 96**: similarity to donkey sentences

  The windows are shut/open ≈ All/Some are
  *Everyone with a window keeps **it** shut/open ≈ all/one*

  Core idea: Sum-based analysis: [[it]] = [[the windows]]



The parallel isn't in the semantics

- **Kanazawa 01** deploys a battery of tests to show that the donkey pronoun "**it**" cannot refer to sums

  Every donkey-owner gathers the donkeys at night
  **Every farmer who owns a donkey gathers it at night*

  So if [[the windows]] is a sum, [[**it**]]≠ [[the windows]]!

This talk: putting the parallel into the pragmatics

- **Malamud 12, Križ 15**: pragmatics of plural definites

  Core idea: semantics produces truth-value gaps in mixed cases; pragmatics fills gaps with truth or falsity

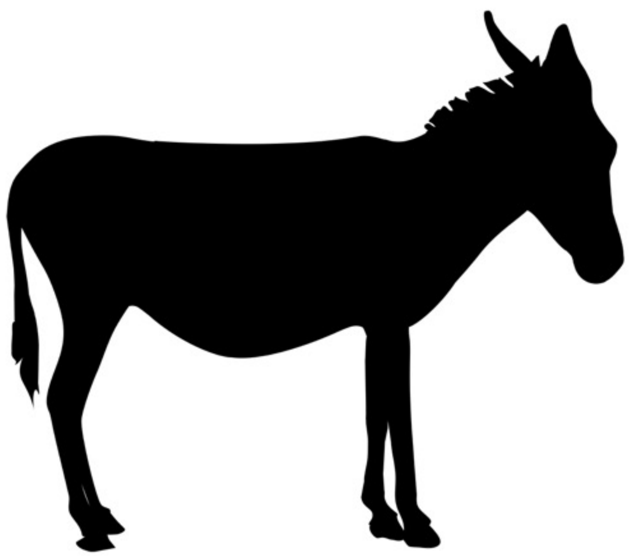
- **This talk:** donkey sentences are *pragmatically* similar to plural definites

  Pragmatics: a straightforward application of Križ 15
  Semantics: plural compositional DRT (Brasoveanu 08)
  “Look Ma, no sums!”

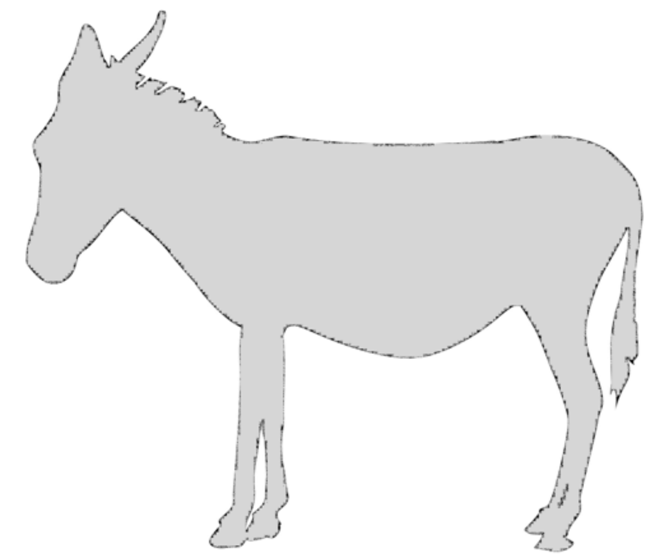
Goals of this talk

- Predict how context disambiguates donkey sentences
    - by building on a pragmatic account of how context disambiguates plural definites (e.g.Križ 15)
- Compositionally derive the semantic ambiguity
    - by using a trivalent dynamic plural logic to serve up truth-value gaps to the pragmatics (following a suggestion in Kanazawa 94)

I will use this convention in my pictures

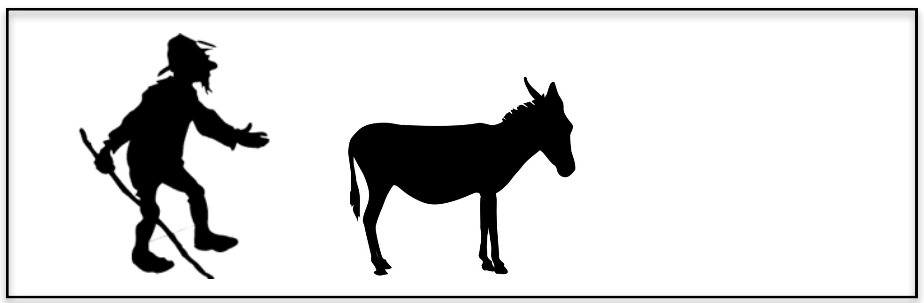


Entities in the denotation of the VP will be shown in **black**

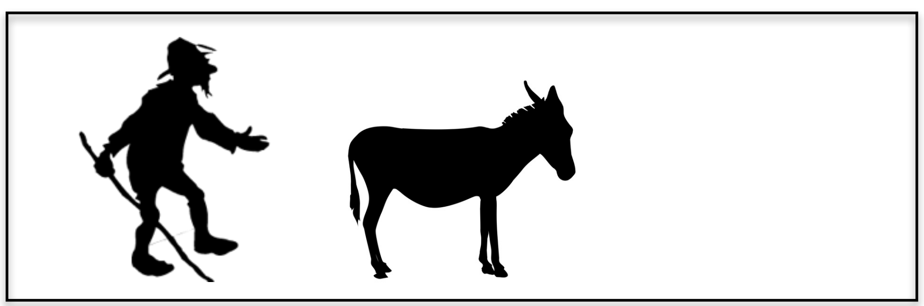


Entities not in the denotation of the VP, in **grey**

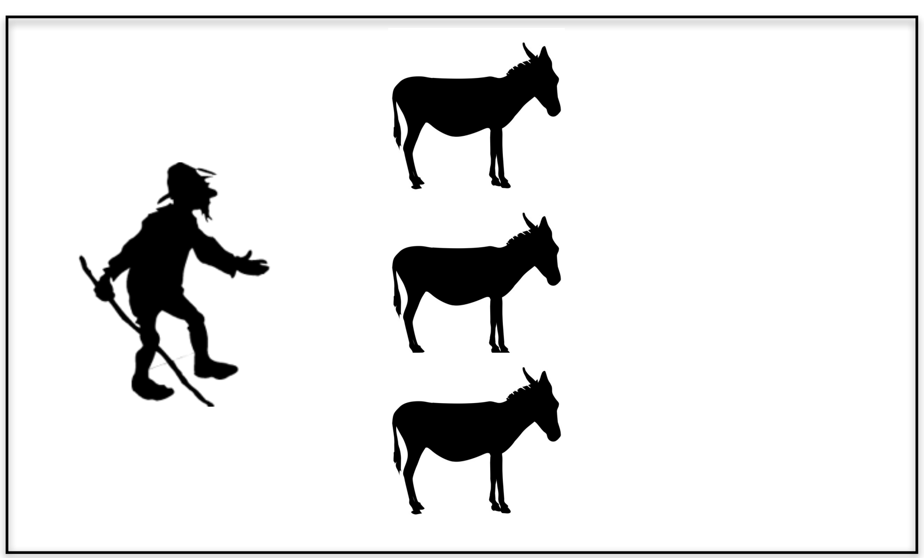
Every farmer who owns a donkey beats it



Jake beats his donkey



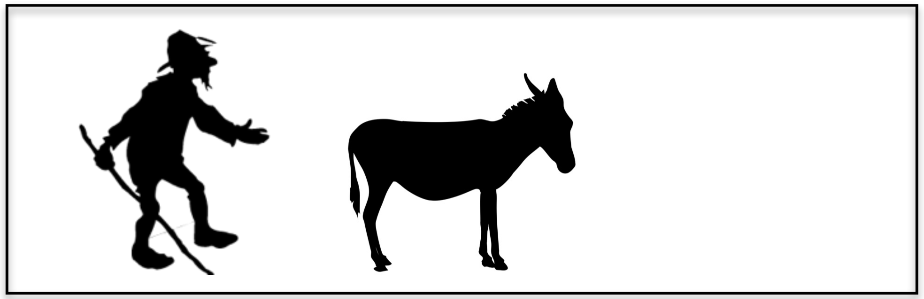
George beats his donkey



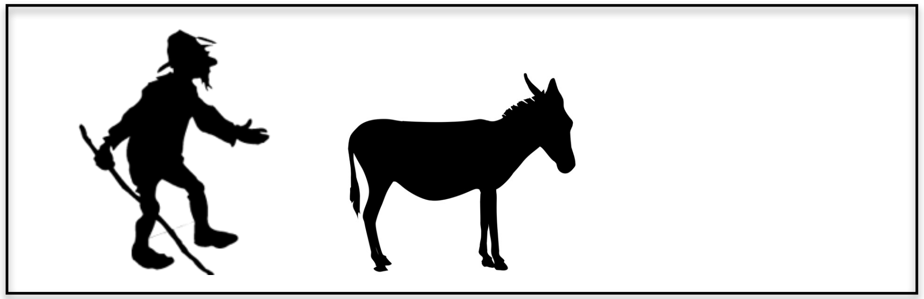
Giles beats all of his donkeys

Every farmer who owns a donkey beats it

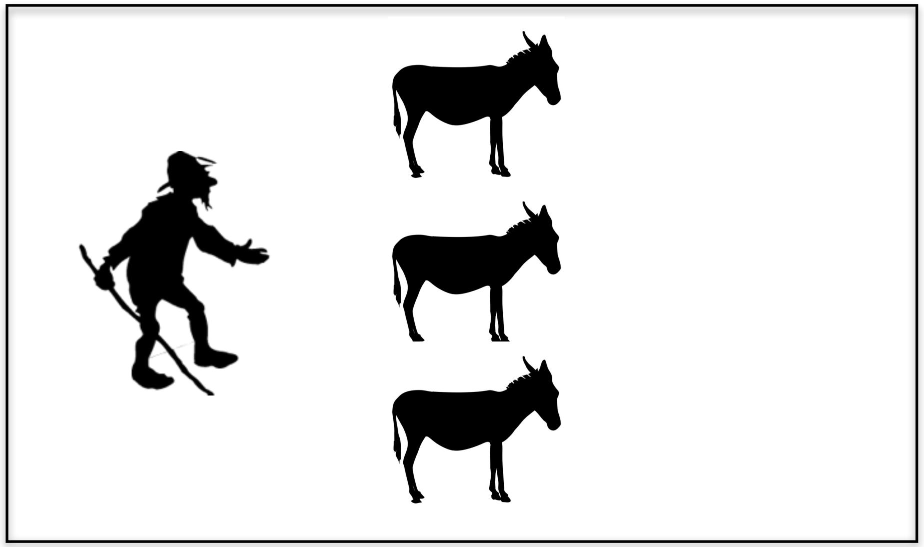
clearly true!



Jake beats his donkey



George beats his donkey



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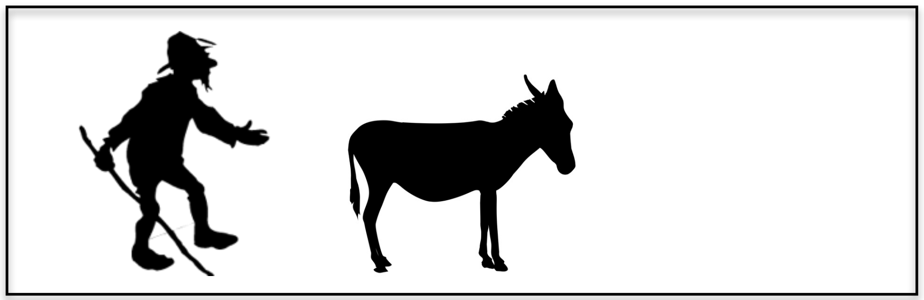
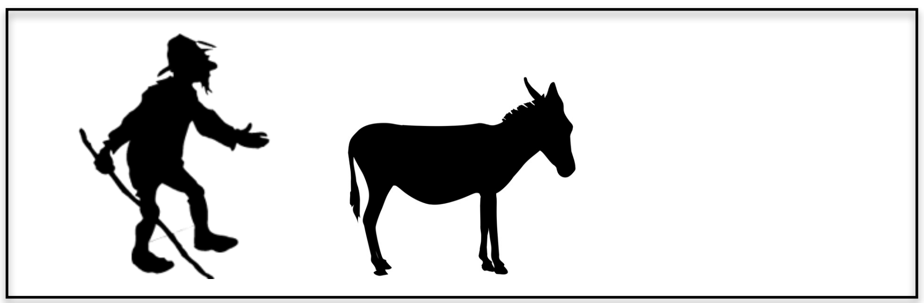
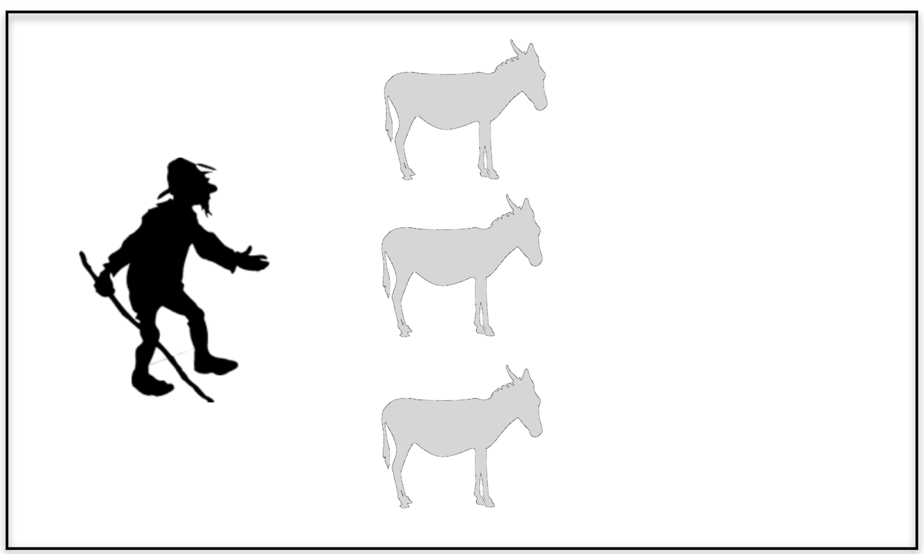


Jake beats his donkey



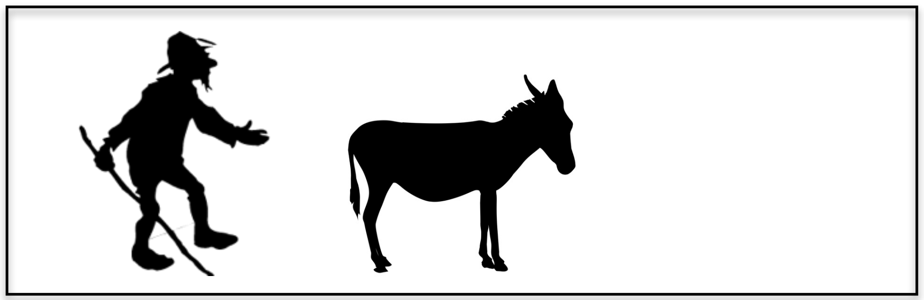
George beats his donkey



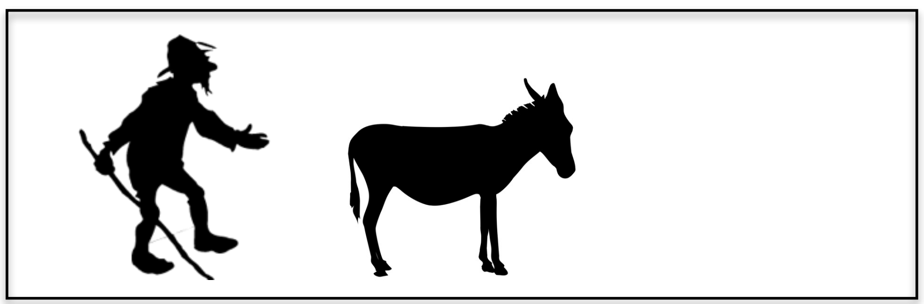
Giles beats *none* of his donkeys

Every farmer who owns a donkey beats it

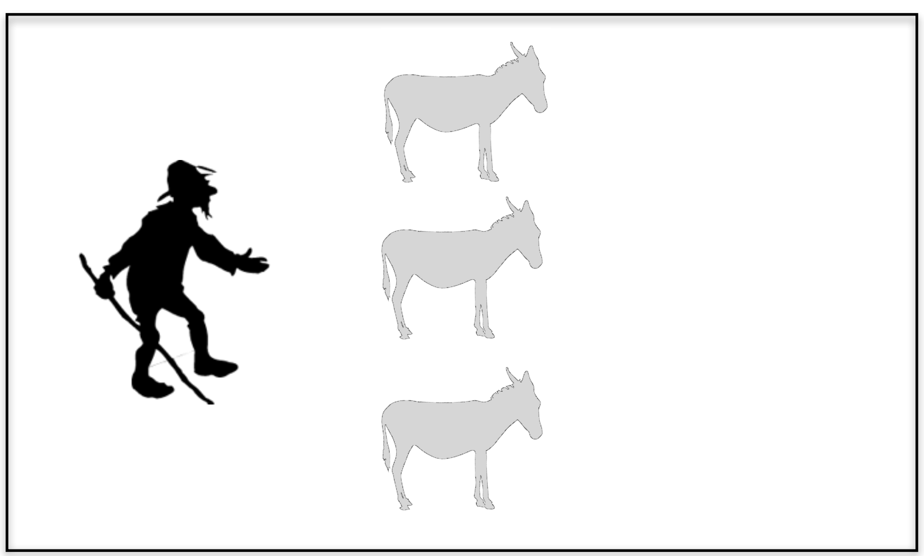
clearly false!



Jake beats his donkey

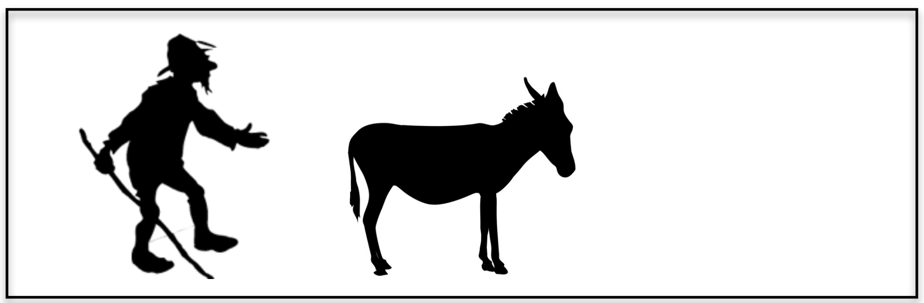


George beats his donkey

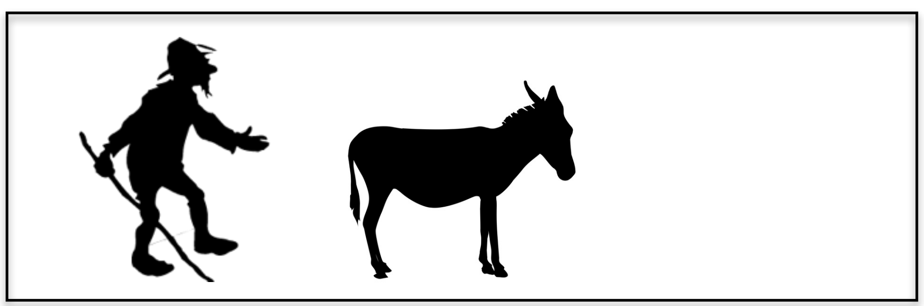


Giles beats *none* of his donkeys

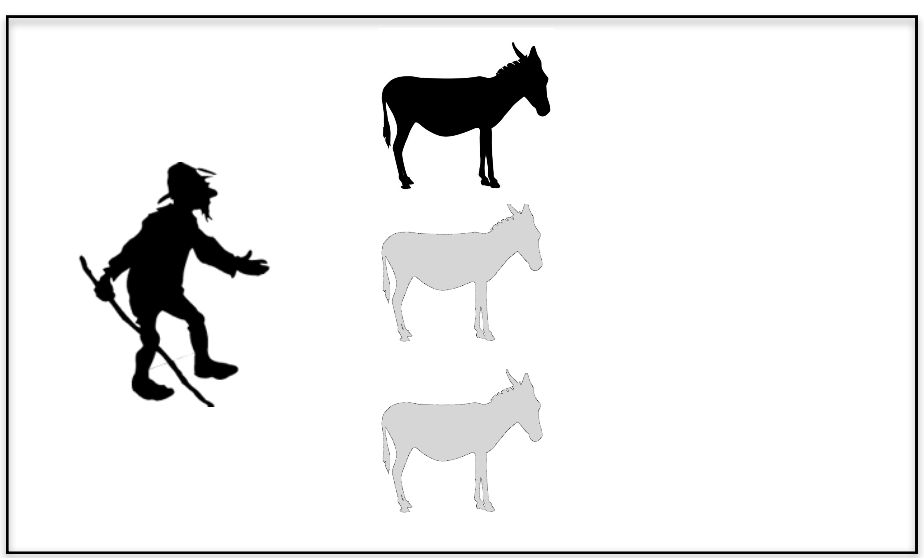
Every farmer who owns a donkey beats it



Jake beats his donkey



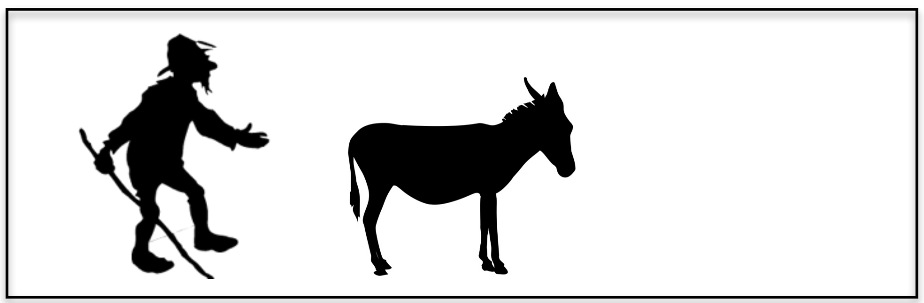
George beats his donkey



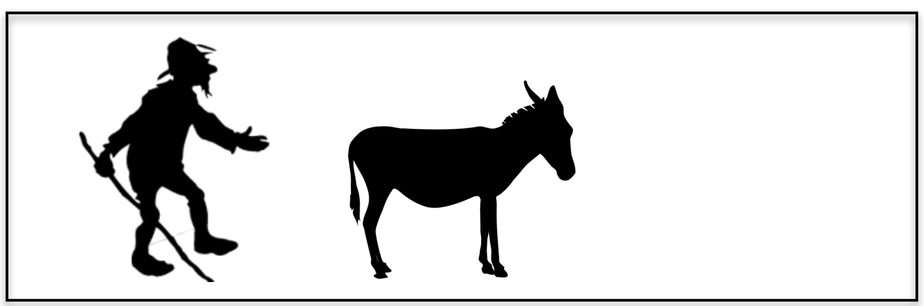
Giles beats *only one* of his donkeys

Every farmer who owns a donkey beats it

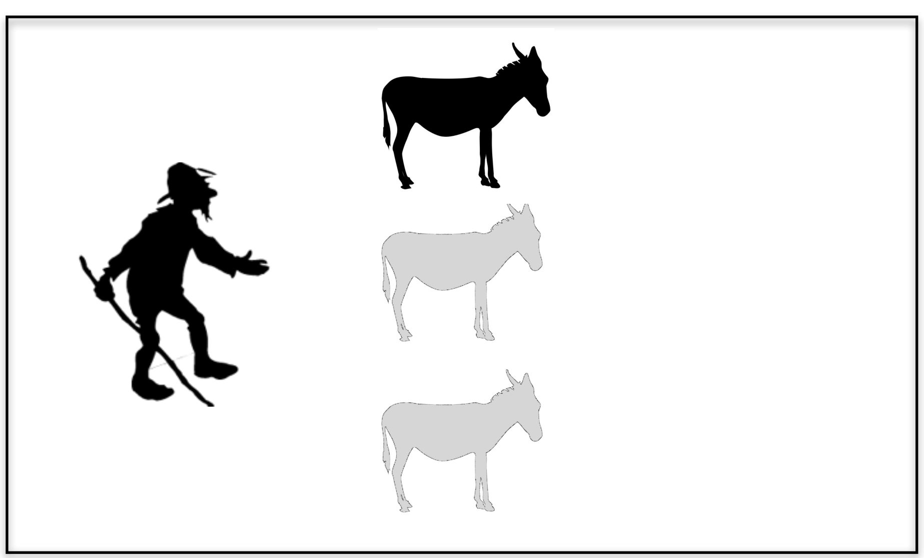
not so clear!



Jake beats his donkey



George beats his donkey



Giles beats *only one* of his donkeys

Every farmer who owns a donkey beats it

not so clear!

"Mixed scenario" ≈

someone doesn't treat all his donkeys the same way

- Intuitions "vacillate" (Heim 82)
- "I am simply not sure" (Rooth 87)

- Barker 96 suggests certain donkey sentences presuppose that the scenario isn't mixed

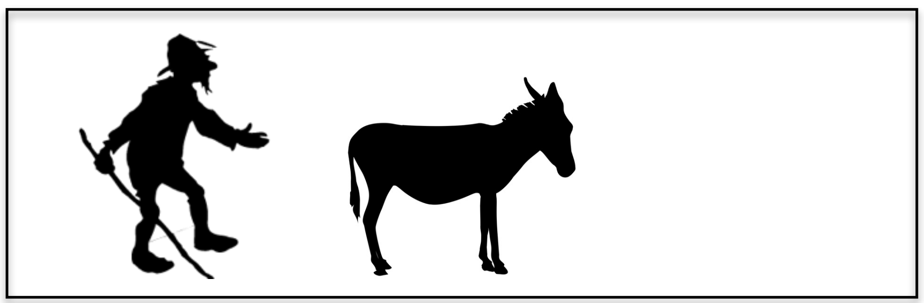
Giles beats *only one* of his donkeys

But in many mixed scenarios, intuitions are clear…

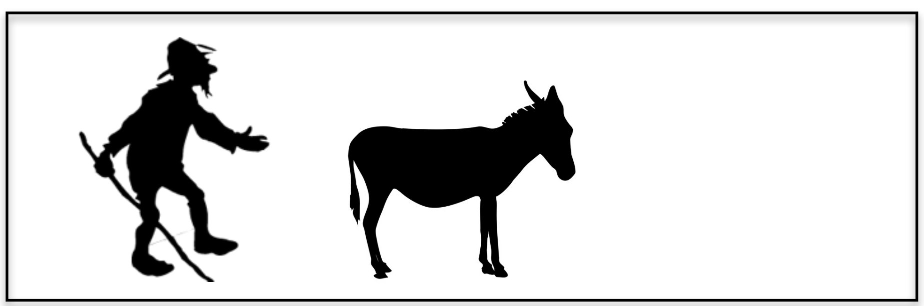
The farmers of Ithaca, N.Y., are stressed out. They fight constantly with each other. Eventually, they decide to go to the local psychotherapist. Her recommendation is that every farmer who has a donkey should beat it, and channel his aggressiveness in this way.

credited by Chierchia 95 to Paolo Casalegno

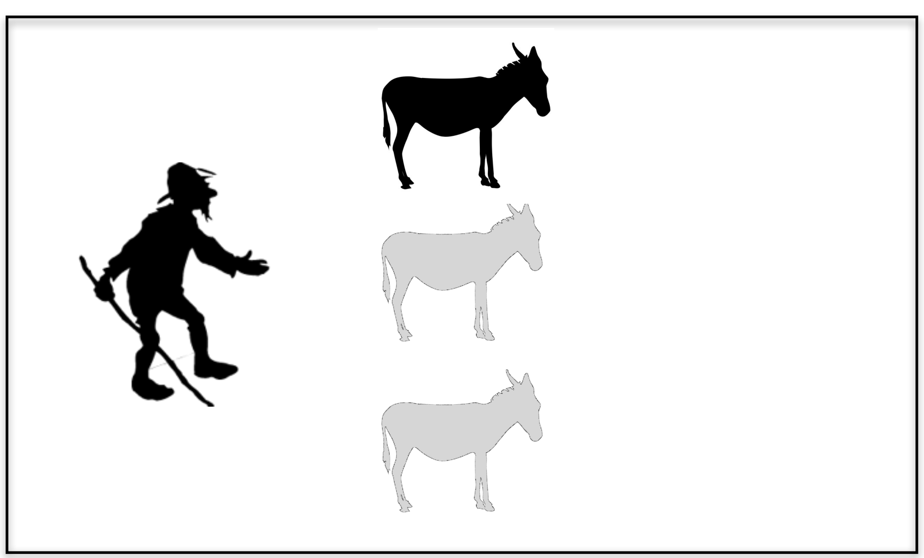
Every farmer who owns a donkey beats it



Jake beats his donkey



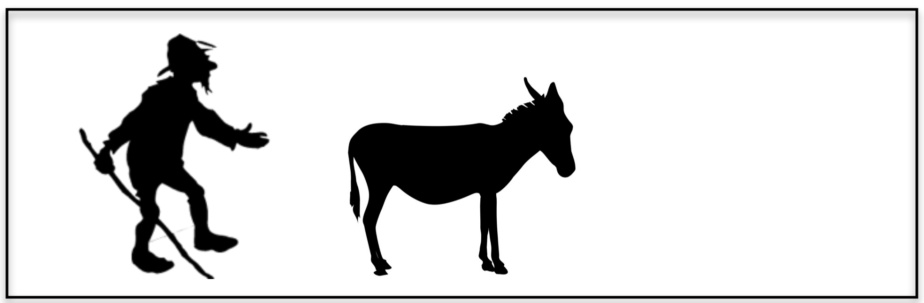
George beats his donkey



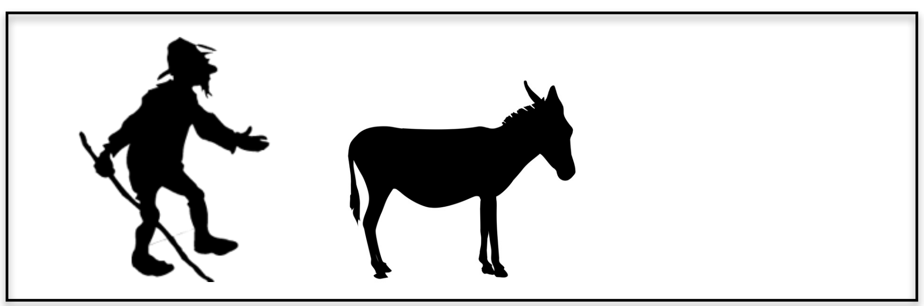
Giles beats *only one* of his donkeys

Every farmer who owns a donkey beats it

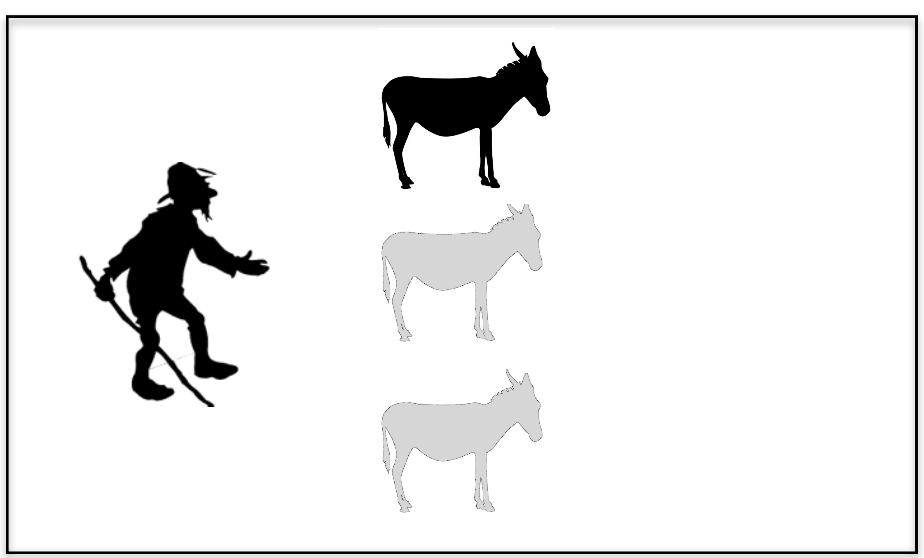
clearly true this time!



Jake beats his donkey

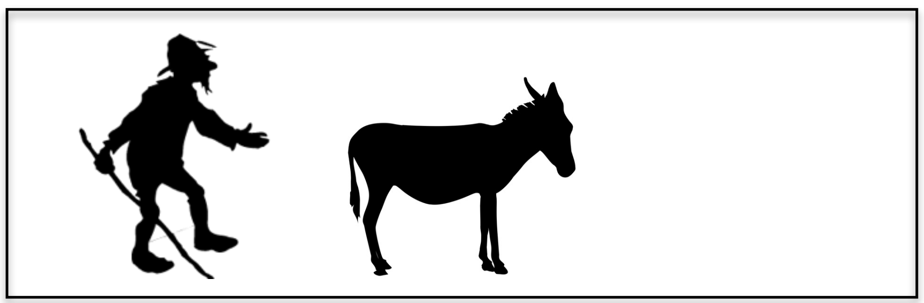


George beats his donkey

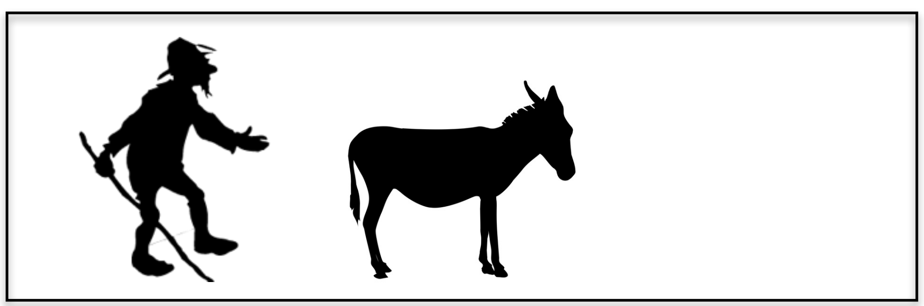


Giles beats *only one* of his donkeys

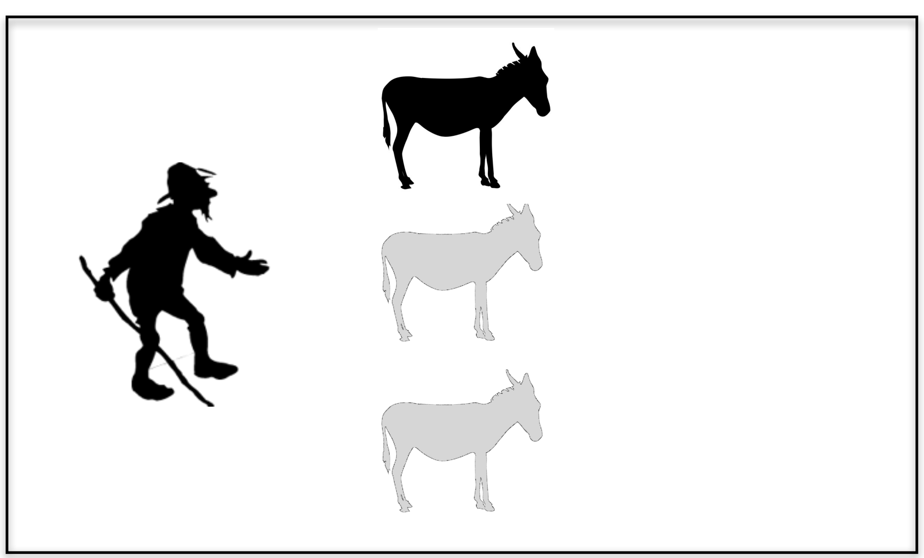
Every farmer who owns a donkey reports it to the IRS



Jake reports his donkey



George reports his donkey

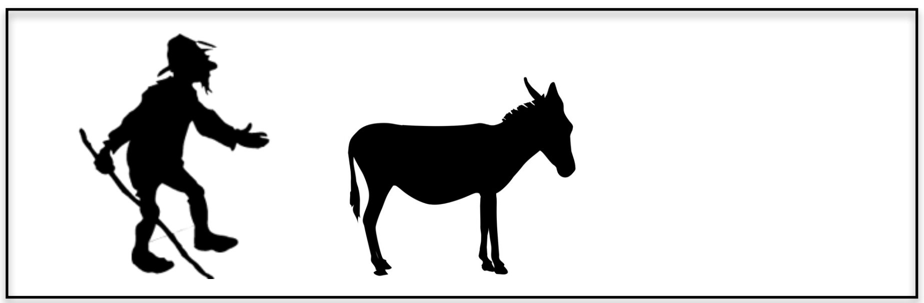


Giles reports *only one* of his donkeys

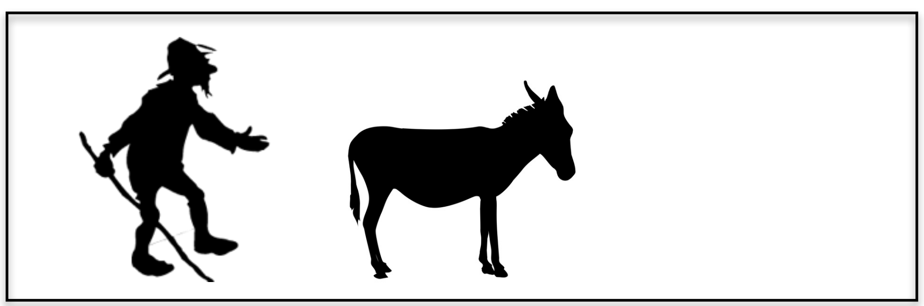
Every farmer who owns a donkey reports it to the IRS

clearly false

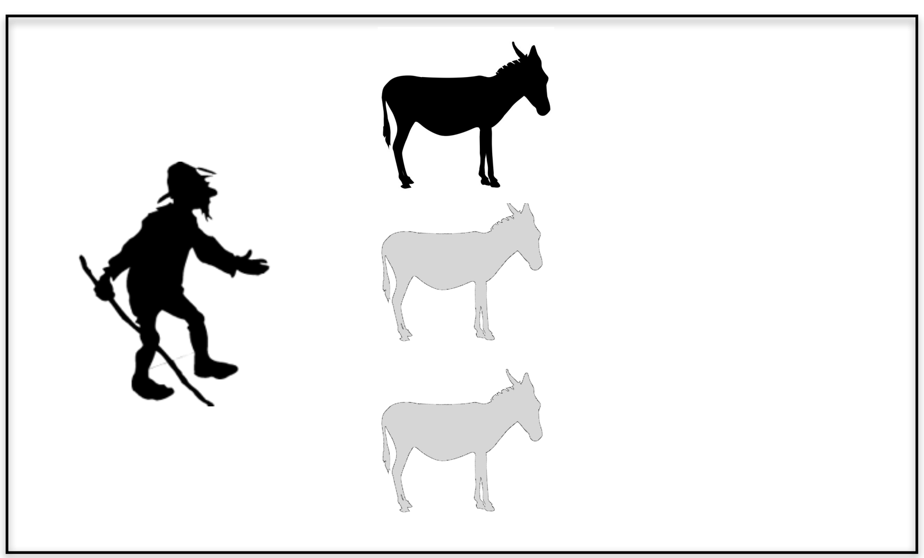
in this mixed scenario



Jake reports his donkey



George reports his donkey



Giles reports *only one* of his donkeys

Goals influence pragmatic interpretation

van Rooij 03, Malamud 12 a.o.

Anyone who catches a Zika fly should bring it to me

What if you catch several flies?

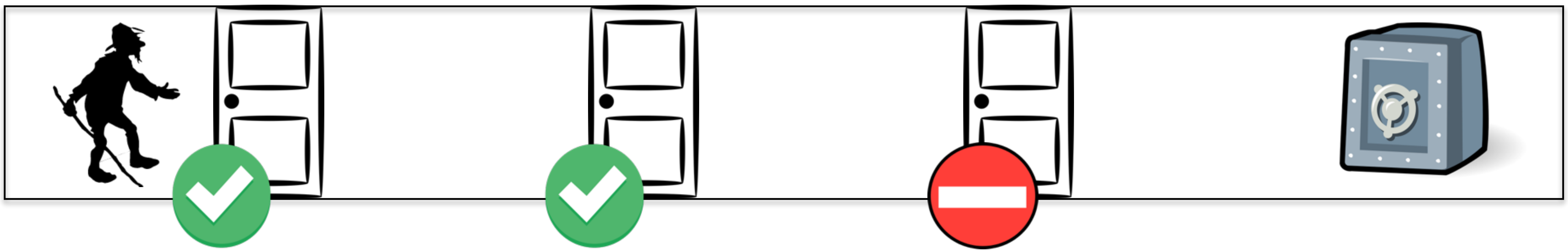
- *Scientist looking for a sample:* bring one!
- *Health official trying to eradicate the species:* bring all!

adapted from Gawron et al. 92

Definite plurals work similarly

Löbner 2000, Malamud 2012, Križ 2015

The doors are open

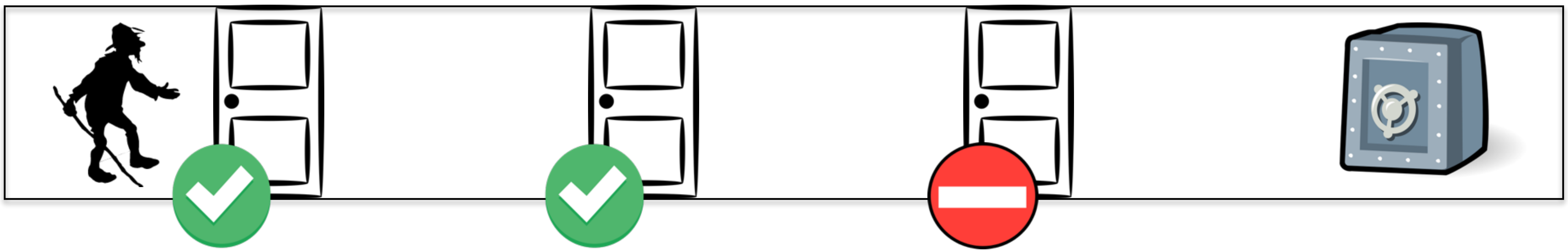


- Two doors are open, the third one is closed
- Doors are arranged in sequence

Löbner 2000, Malamud 2012, Križ 2015

The doors are open

clearly false!

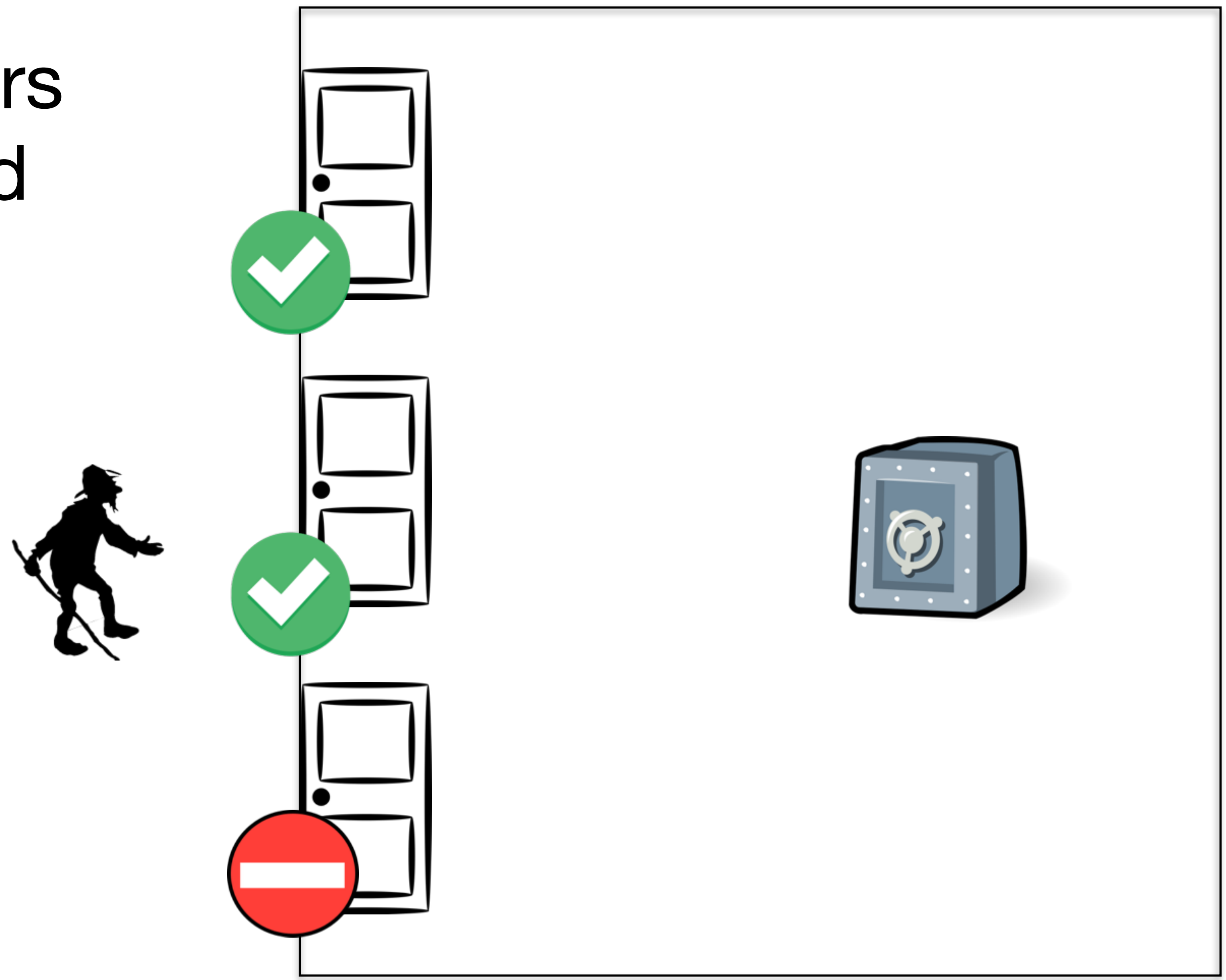


- Two doors are open, the third one is closed
- Doors are arranged in sequence

Löbner 2000, Malamud 2012, Križ 2015

The doors are open

Now the doors are arranged in parallel

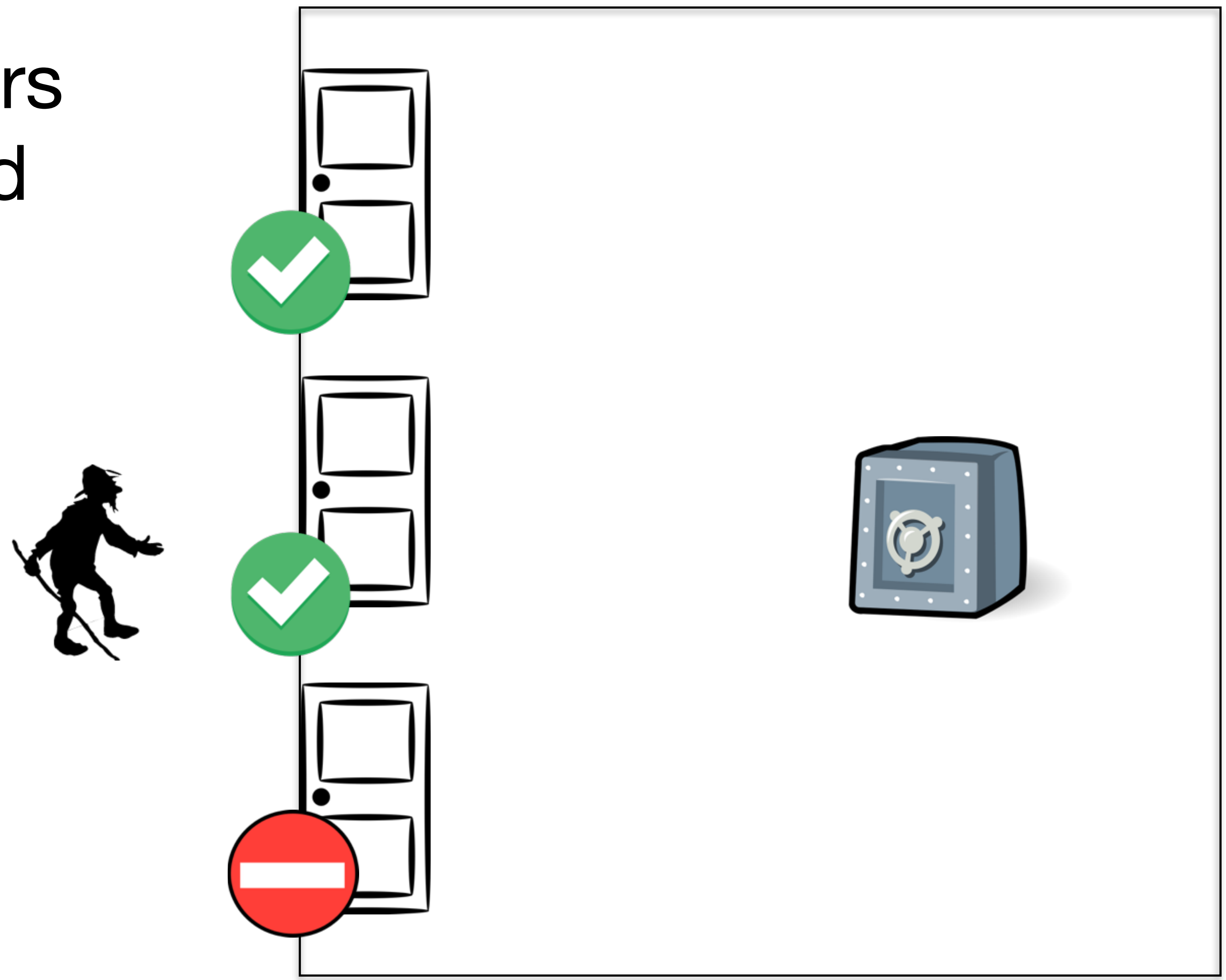


Löbner 2000, Malamud 2012, Križ 2015

The doors are open

clearly true
this time!

Now the doors
are arranged
in parallel



Löbner 2000, Malamud 2012, Križ 2015

Malamud 12, Križ 15 a.o. on plural definites

The semantics produces truth-value gaps:

- [[The doors are open]]
    - TRUE iff all the doors are open
    - FALSE iff no door is open
    - NEITHER iff some but not all of the doors are open

Križ 15 on the pragmatics of truth-value gaps

The Current Issue (≈QUD): a salient question that gives rise to an equivalence relation "≈" on worlds. $w \approx w'$ means that w and w' *agree on the current issue*.

Sentence S is judged true at w_0 iff it is "true enough":

- that is, if S is True (at w_0), or
- if S is Neither at w_0, True at some $w \approx w_0$, and not False at any $w' \approx w_0$

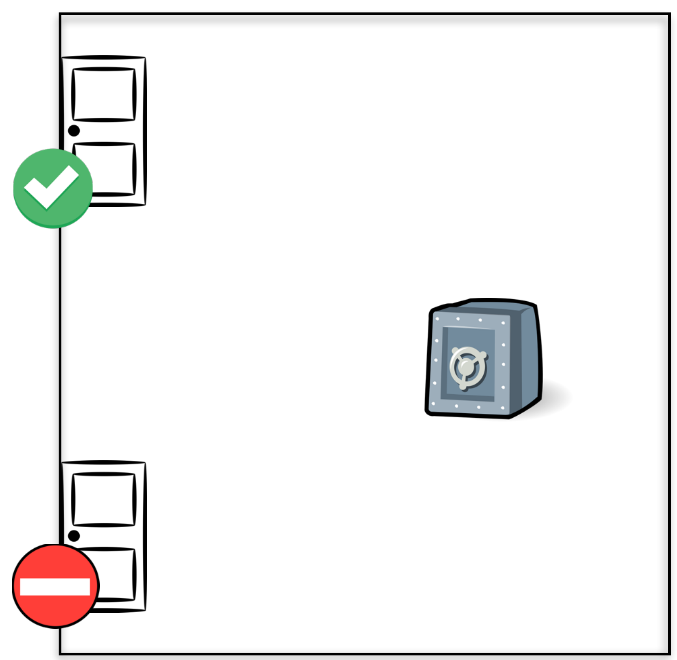
Otherwise, S is judged false.

Precursors: Lewis 79; Lasersohn 99; Malamud 12

Križ 15, applied to definites

A true-enough definite plural

A: “Can we reach the safe?”
B: “The doors are open.”

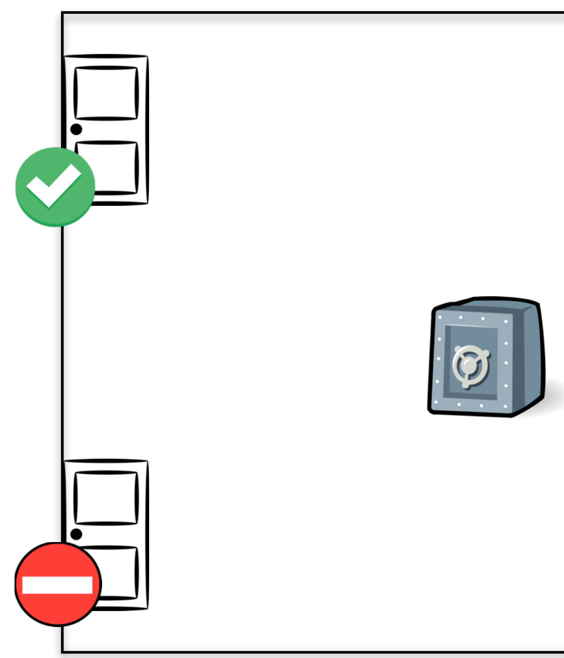


w_{actual}

A true-enough definite plural

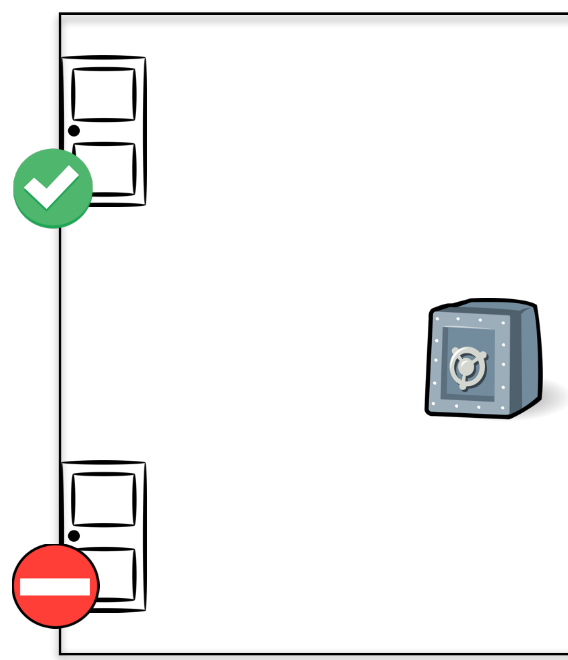
A: “Can we reach the safe?”
B: “The doors are open.”

judged true



w_{actual}

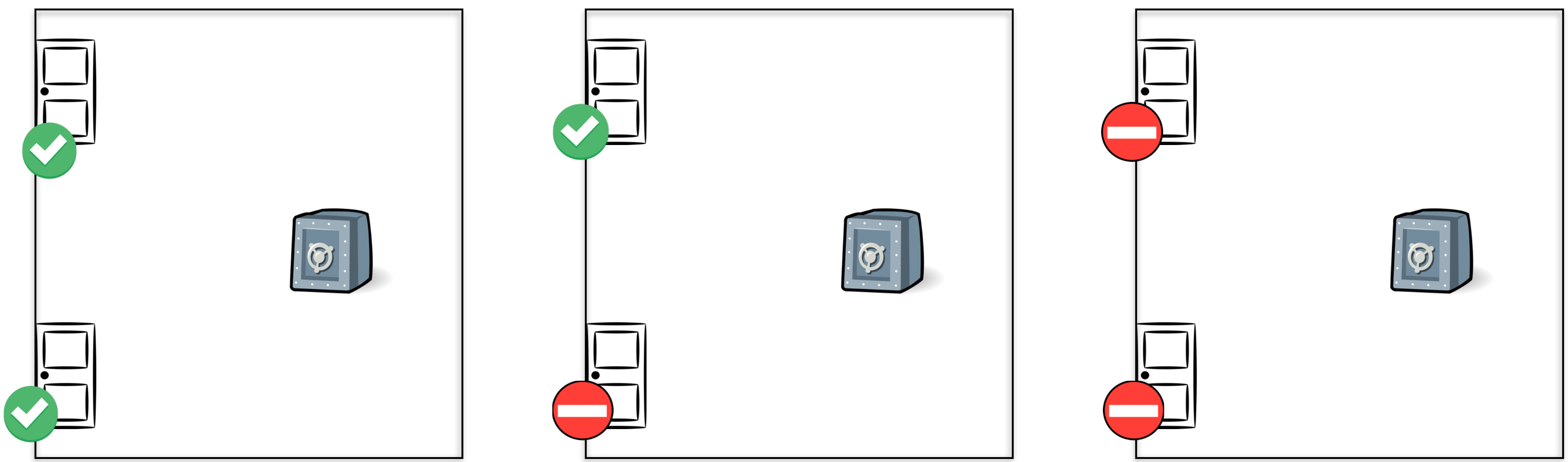
A true-enough definite plural



w_{actual}

safe reachable

A true-enough definite plural

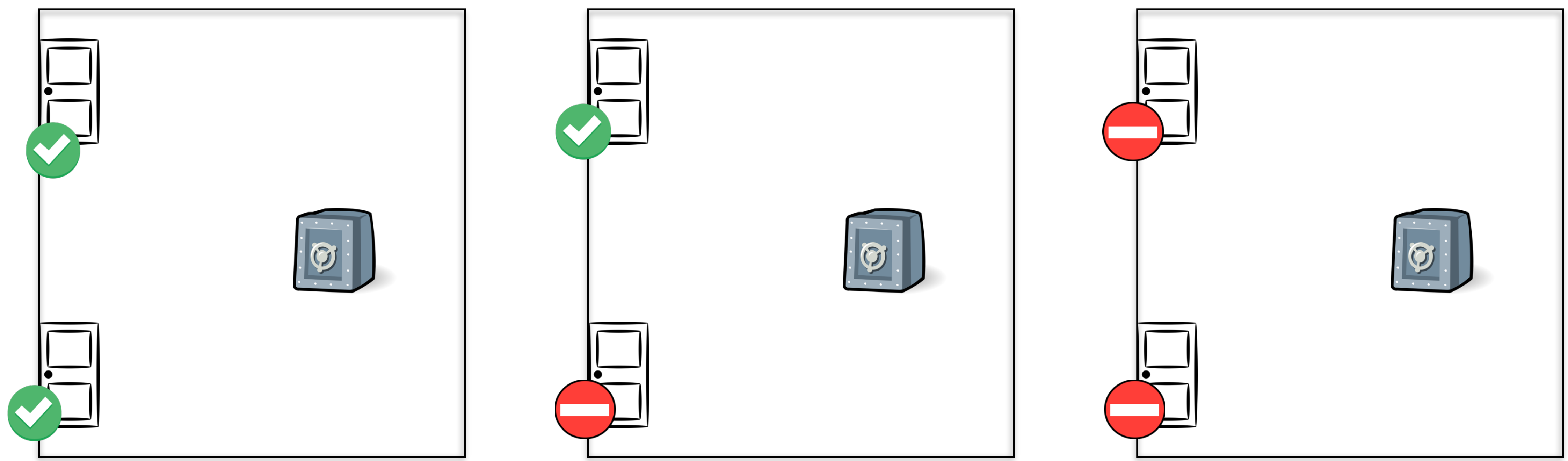


w_{left}
safe reachable

w_{actual}
safe reachable

w_{right}
safe blocked

A true-enough definite plural



w_{left} $\approx$ w_{actual}

safe reachable — safe reachable

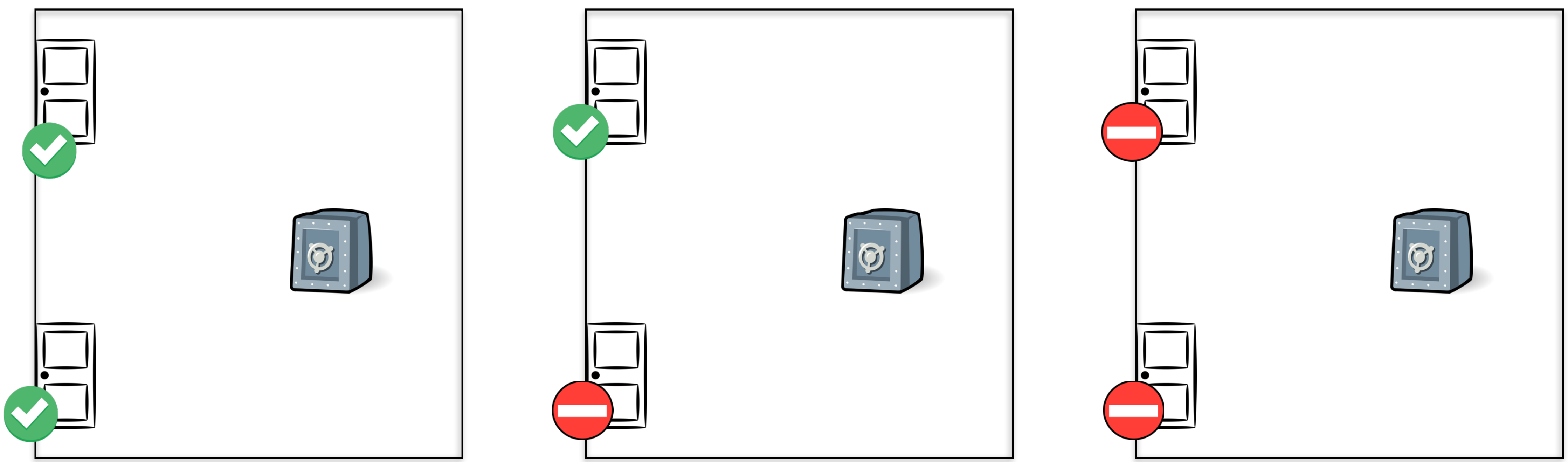
w_{right}

safe blocked

A true-enough definite plural

At w_{actual} “The doors are open” is neither true nor false.

True | Neither | False



w_{left} $\approx$ w_{actual}

safe reachable | safe reachable

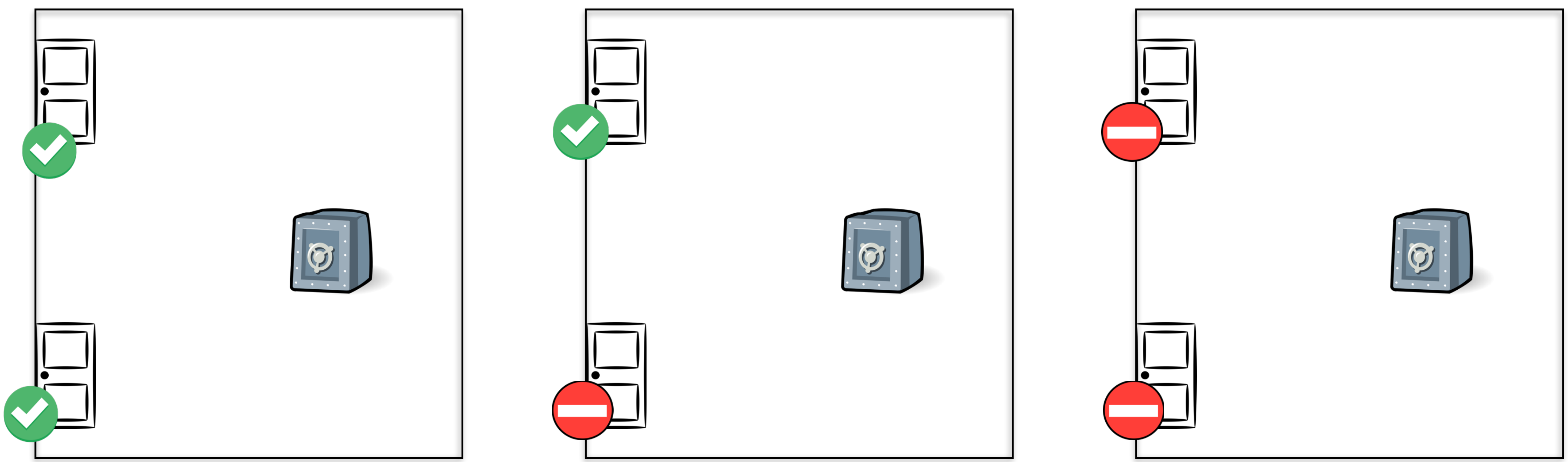
w_{right}

safe blocked

A true-enough definite plural

At w_{actual} “The doors are open” is neither true nor false.
But it is true at w_{left}. So it is true enough at w_{actual} .

True	true enough	False

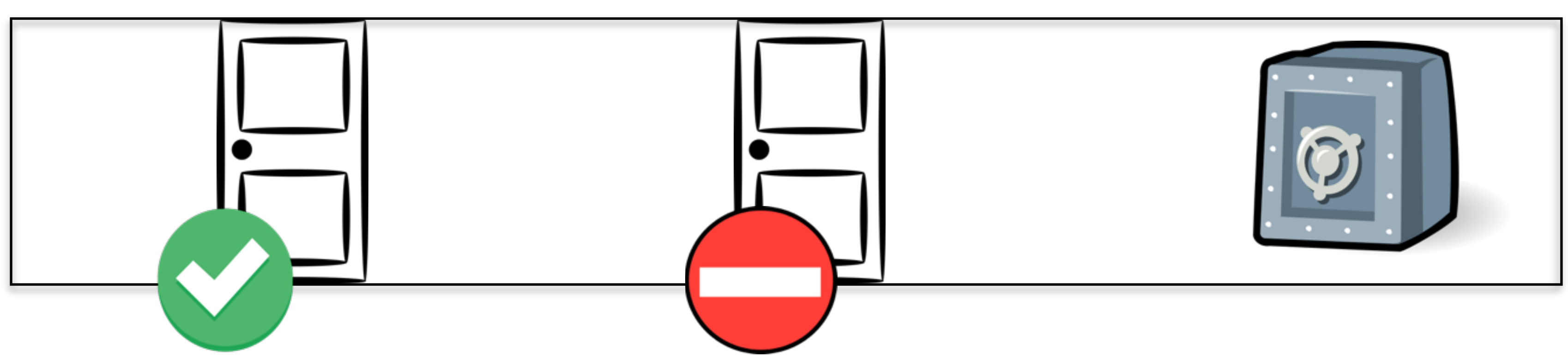


w_{left} ≈	w_{actual}	w_{right}
safe reachable	safe reachable	safe blocked

Not true enough feels false

A: “Can we reach the safe?”
B: “The doors are open.”

w_{actual} blocked safe

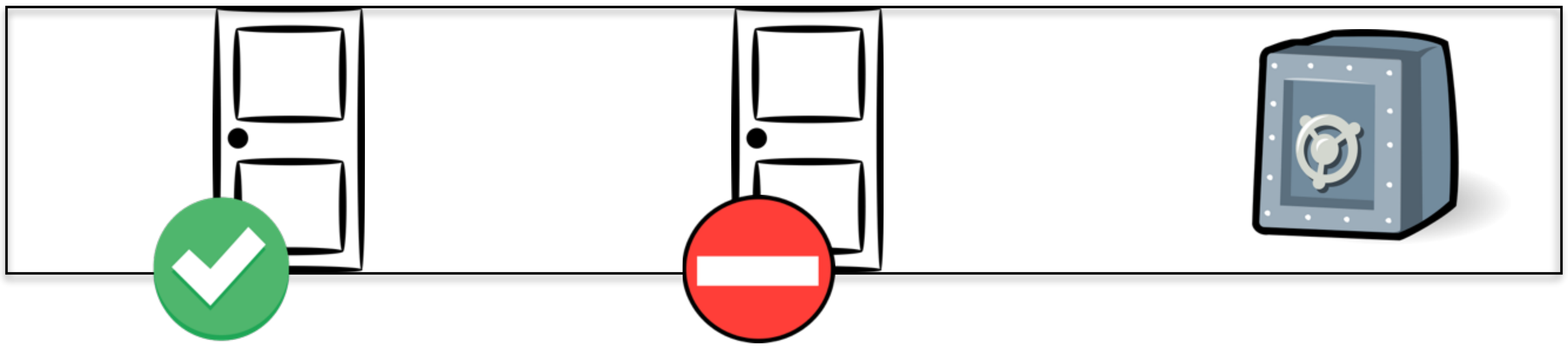


Not true enough feels false

A: “Can we reach the safe?”
B: “The doors are open.”

judged false

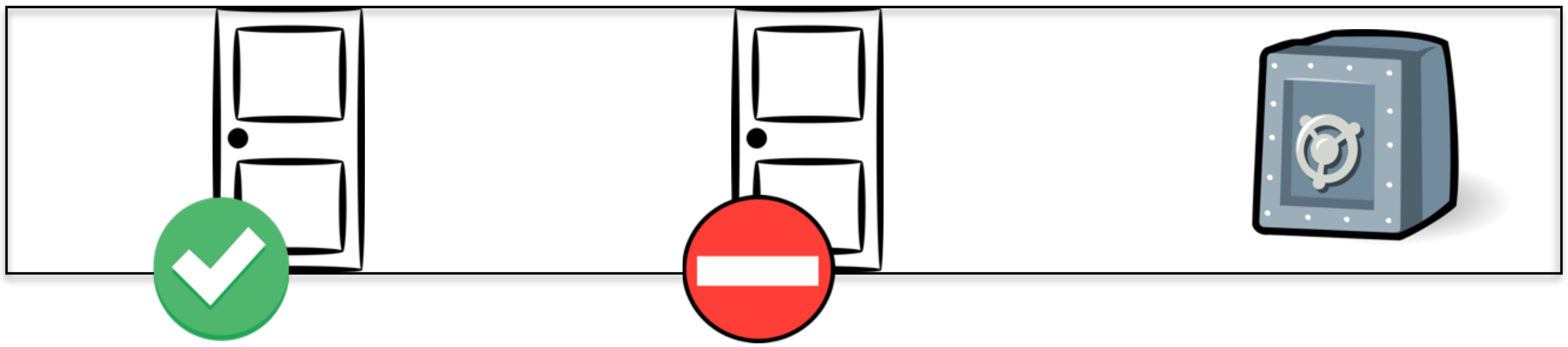
w_{actual} blocked safe



Not true enough feels false

w_{actual}

blocked
safe

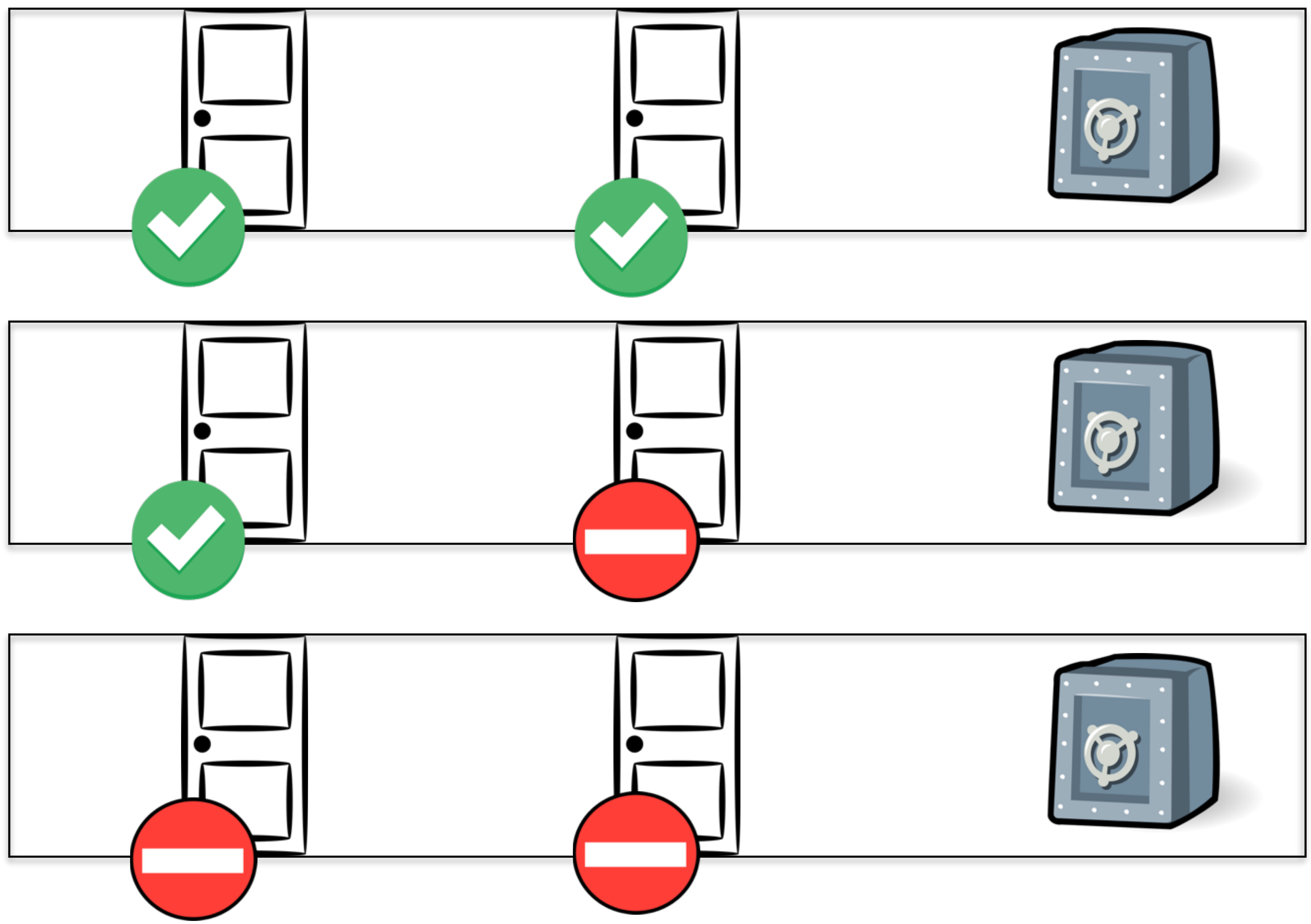


Not true enough feels false

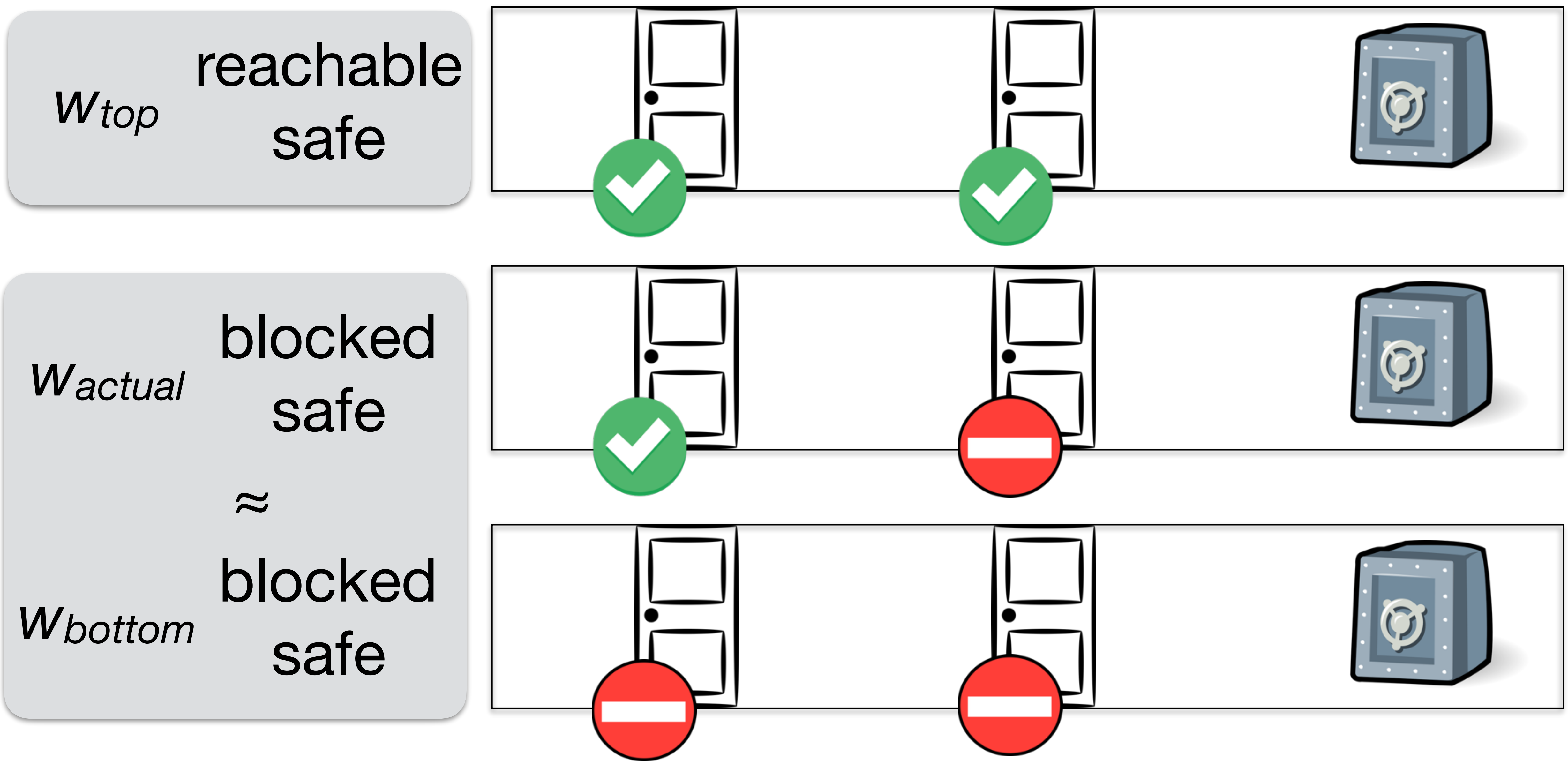
w_{top} reachable safe

w_{actual} blocked safe

w_{bottom} blocked safe

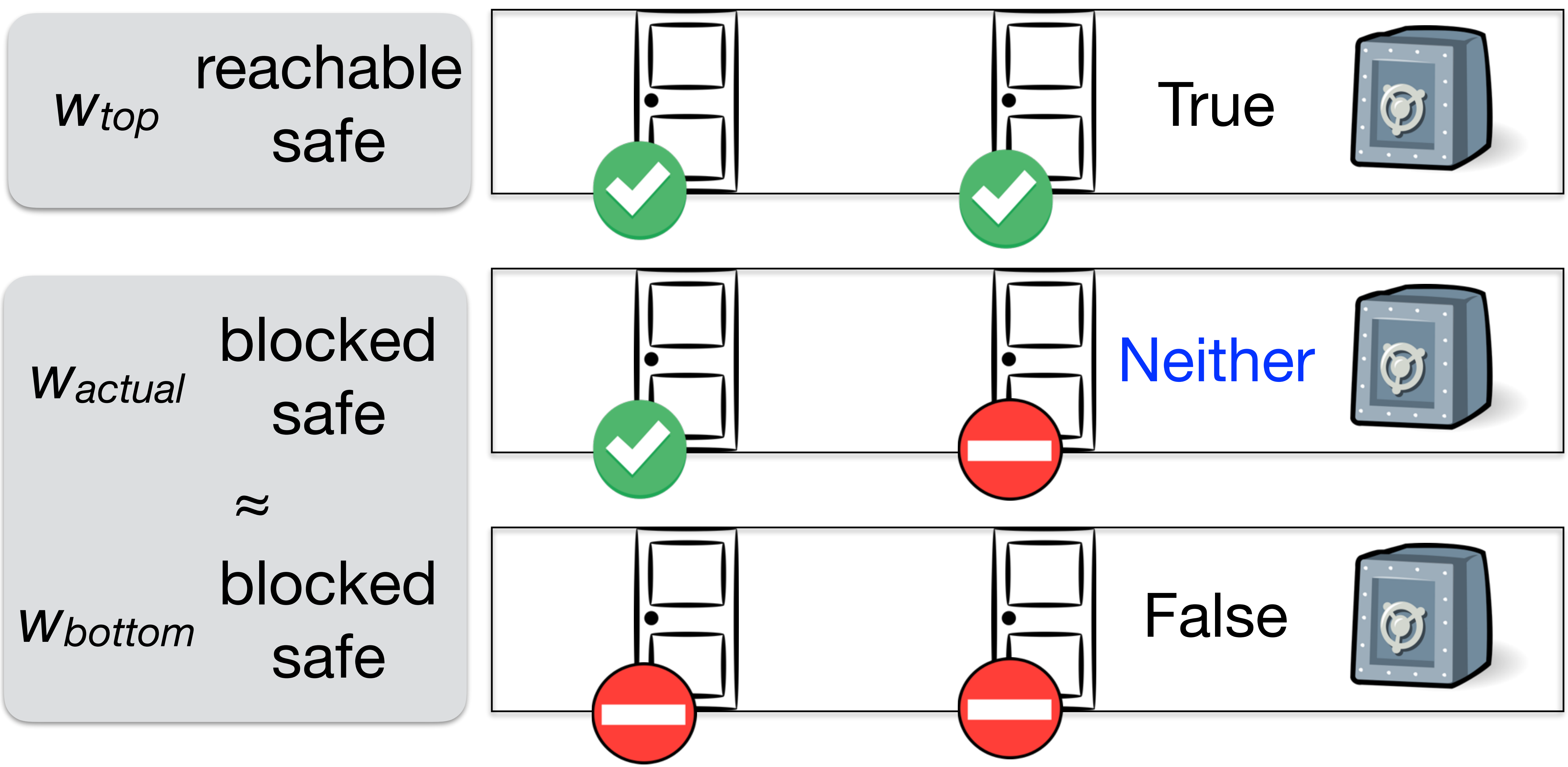


Not true enough feels false



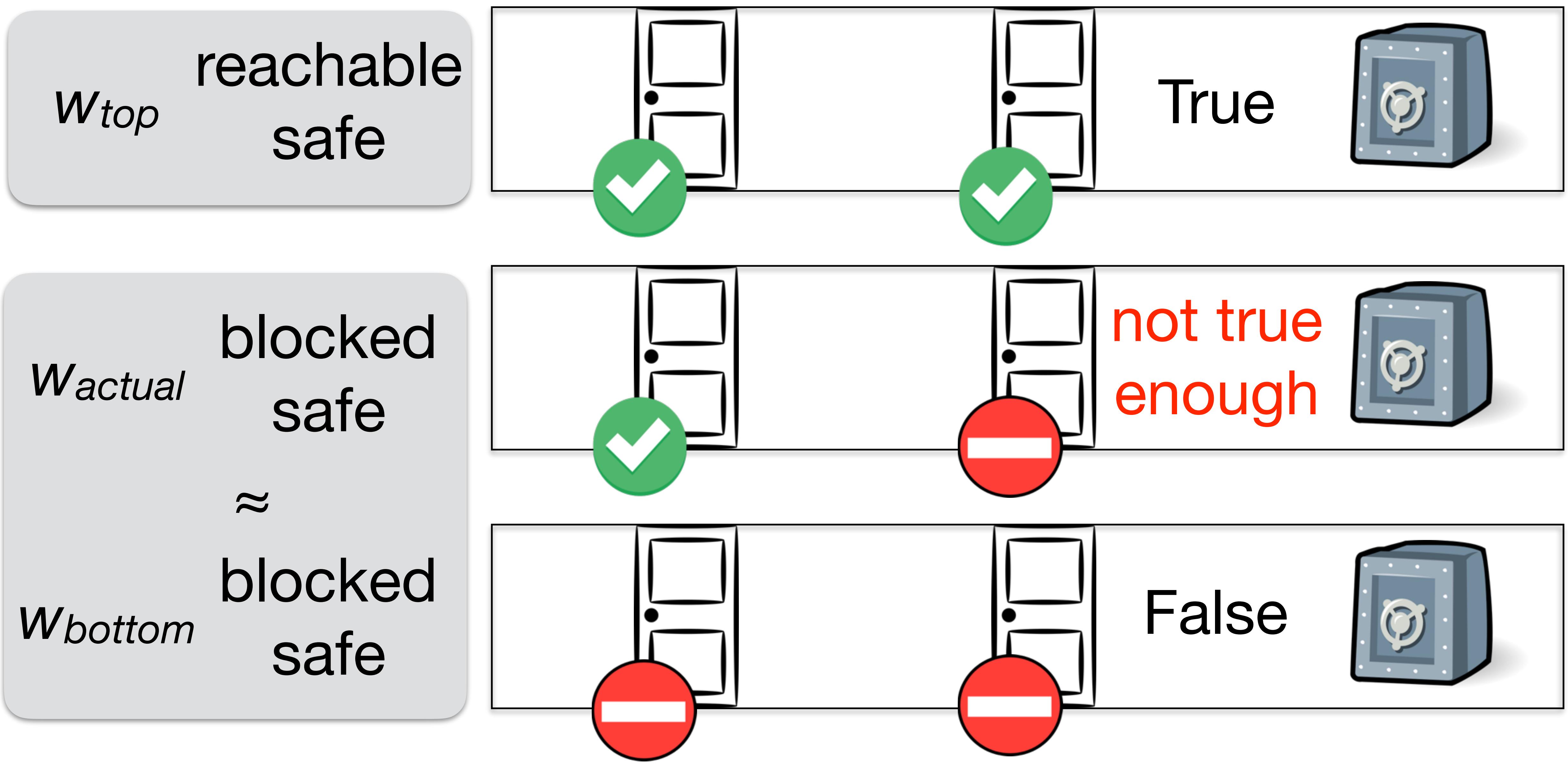
Not true enough feels false

At w_{actual} "The doors are open" is neither true nor false.



Not true enough feels false

At w_{actual} “The doors are open” is neither true nor false. It is false at w_{bottom}. So it is not true enough at w_{actual}.

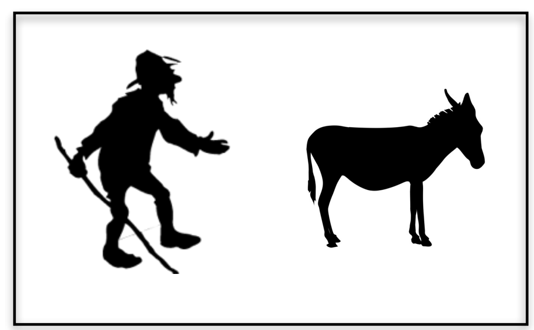


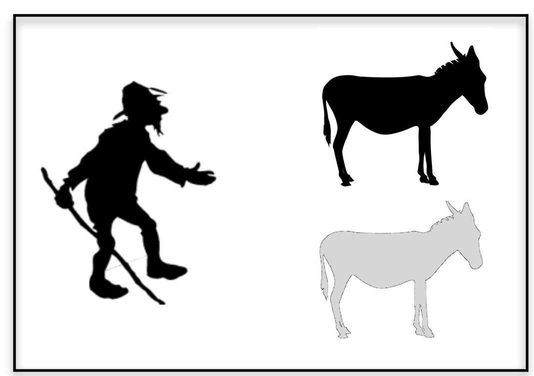
Extending Križ 15 to donkey sentences

The farmers of Ithaca, N.Y., are stressed out. They fight constantly with each other. Eventually, they decide to go to the local psychotherapist. Her recommendation is that every farmer who has a donkey should beat it, and channel his aggressiveness in this way.

credited by Chierchia 95 to Paolo Casalegno

Every farmer who owns a donkey beats it

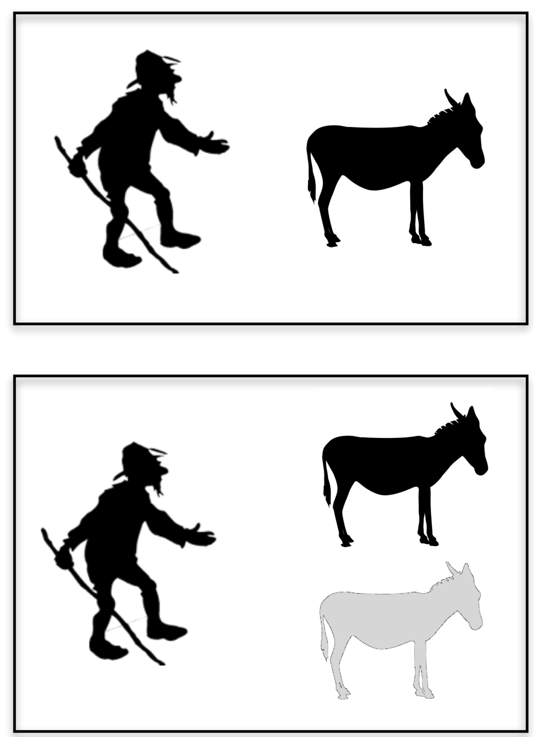




w_{actual}

Every farmer who owns a donkey beats it

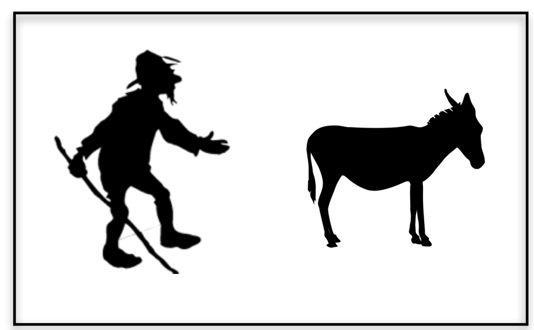
judged true (Chierchia 95)

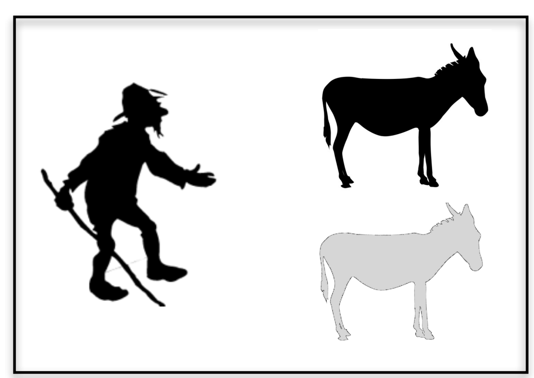


w_{actual}

Every farmer who owns a donkey beats it

“Is everyone channeling his aggressiveness?”

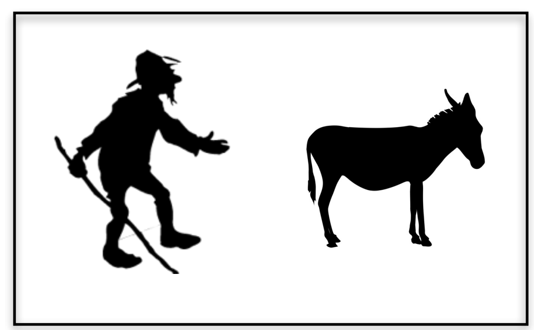


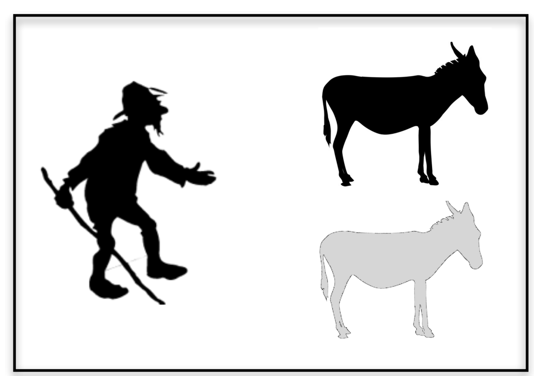


w_{actual}

Every farmer who owns a donkey beats it

"Is everyone channeling his aggressiveness?"



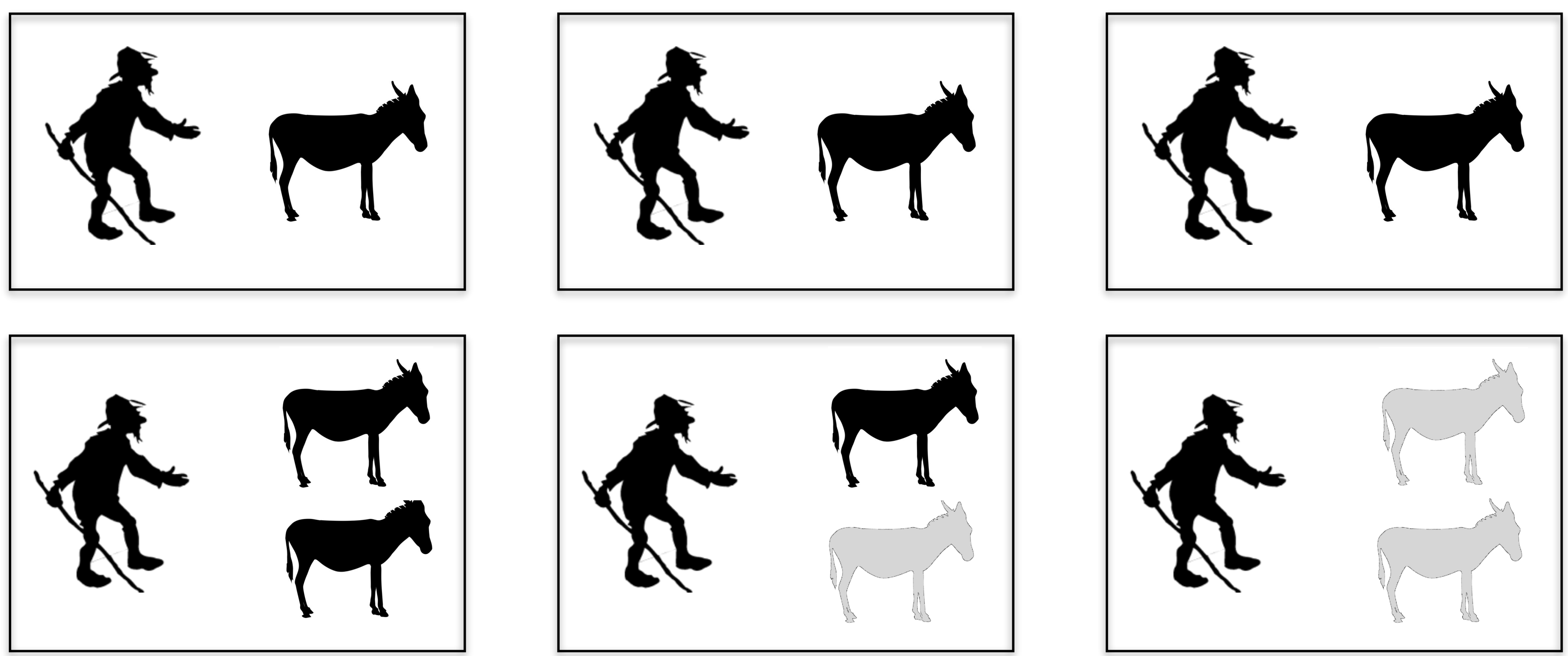


w_{actual}

yes

Every farmer who owns a donkey beats it

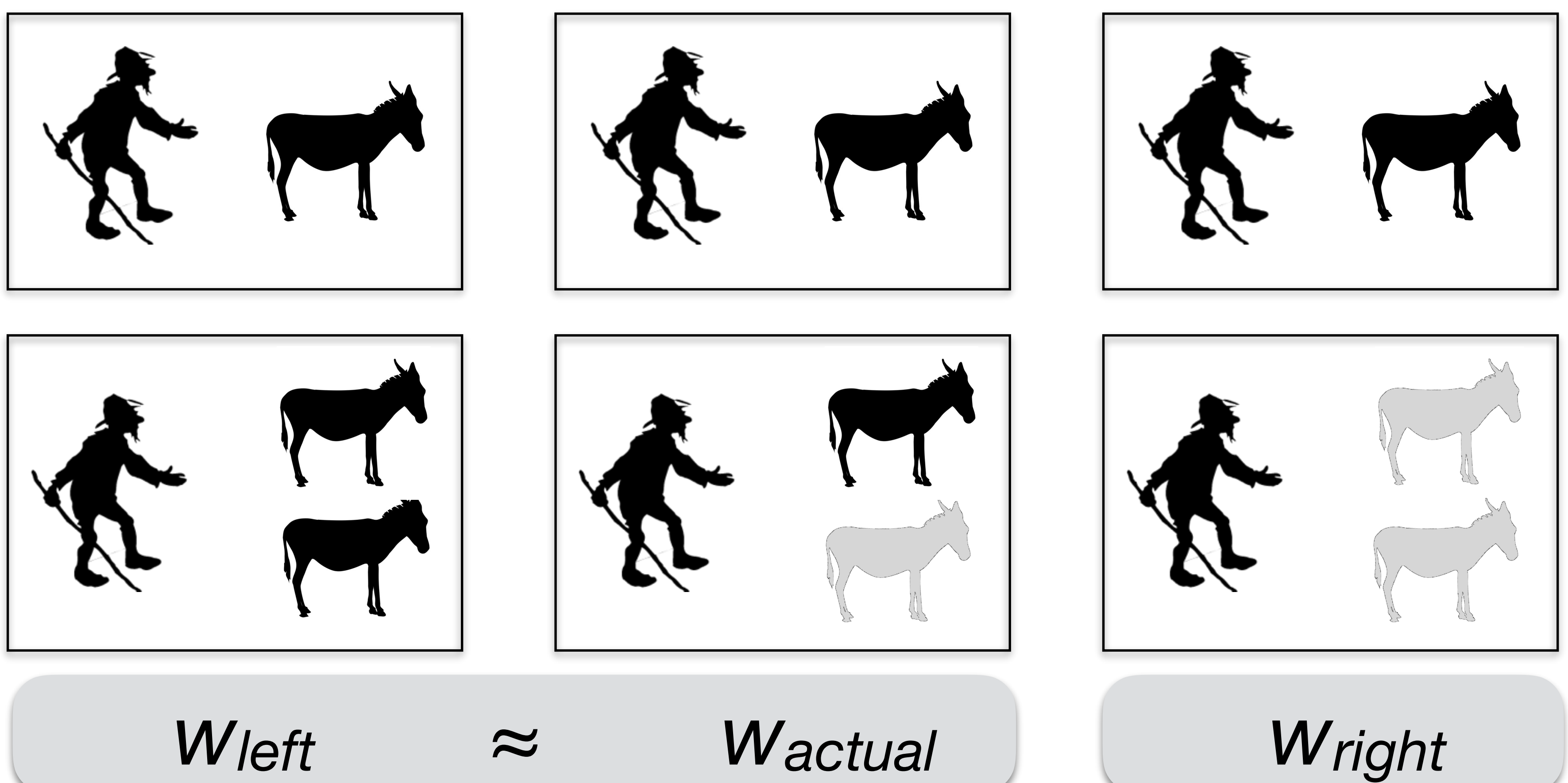
"Is everyone channeling his aggressiveness?"



w_{left}	w_{actual}	w_{right}
yes	yes	no

Every farmer who owns a donkey beats it

“Is everyone channeling his aggressiveness?”

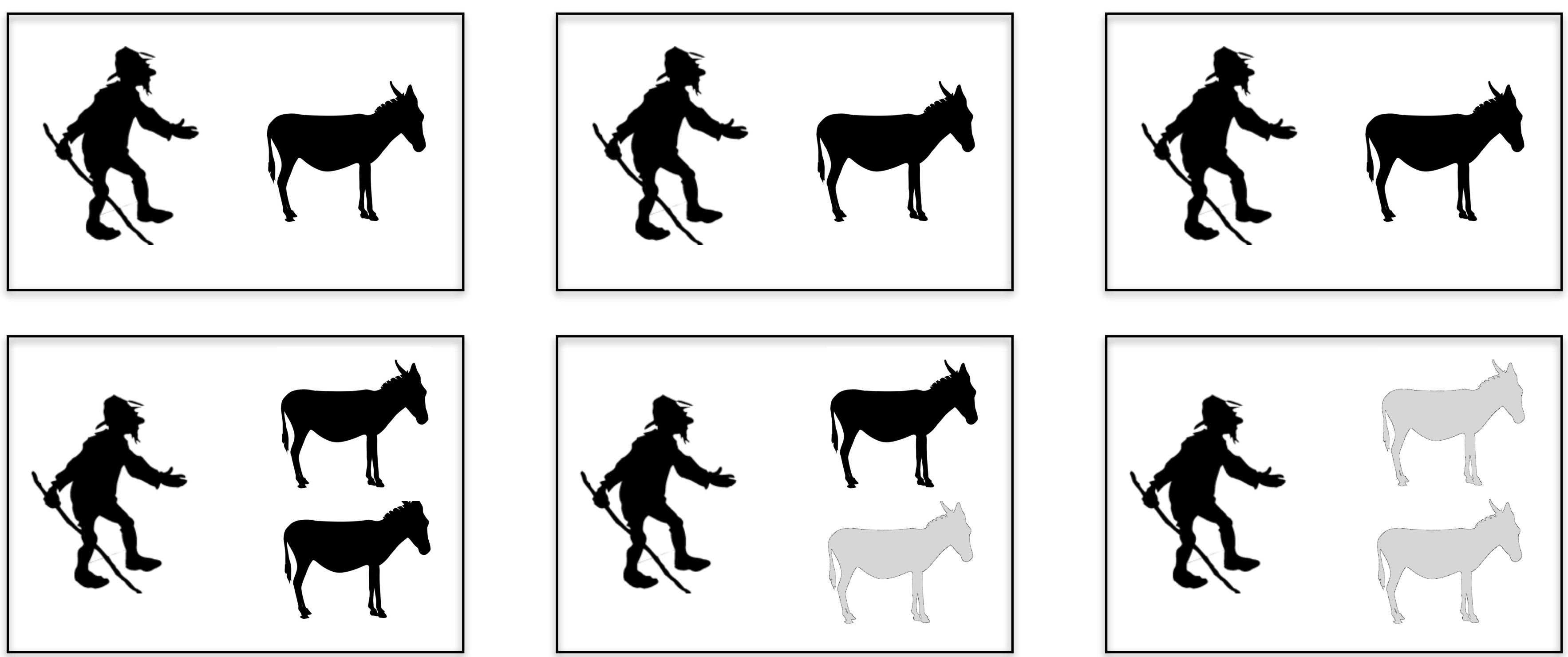


yes yes no

Every farmer who owns a donkey beats it

At w_{actual} the donkey sentence is neither true nor false.

True | Neither | False

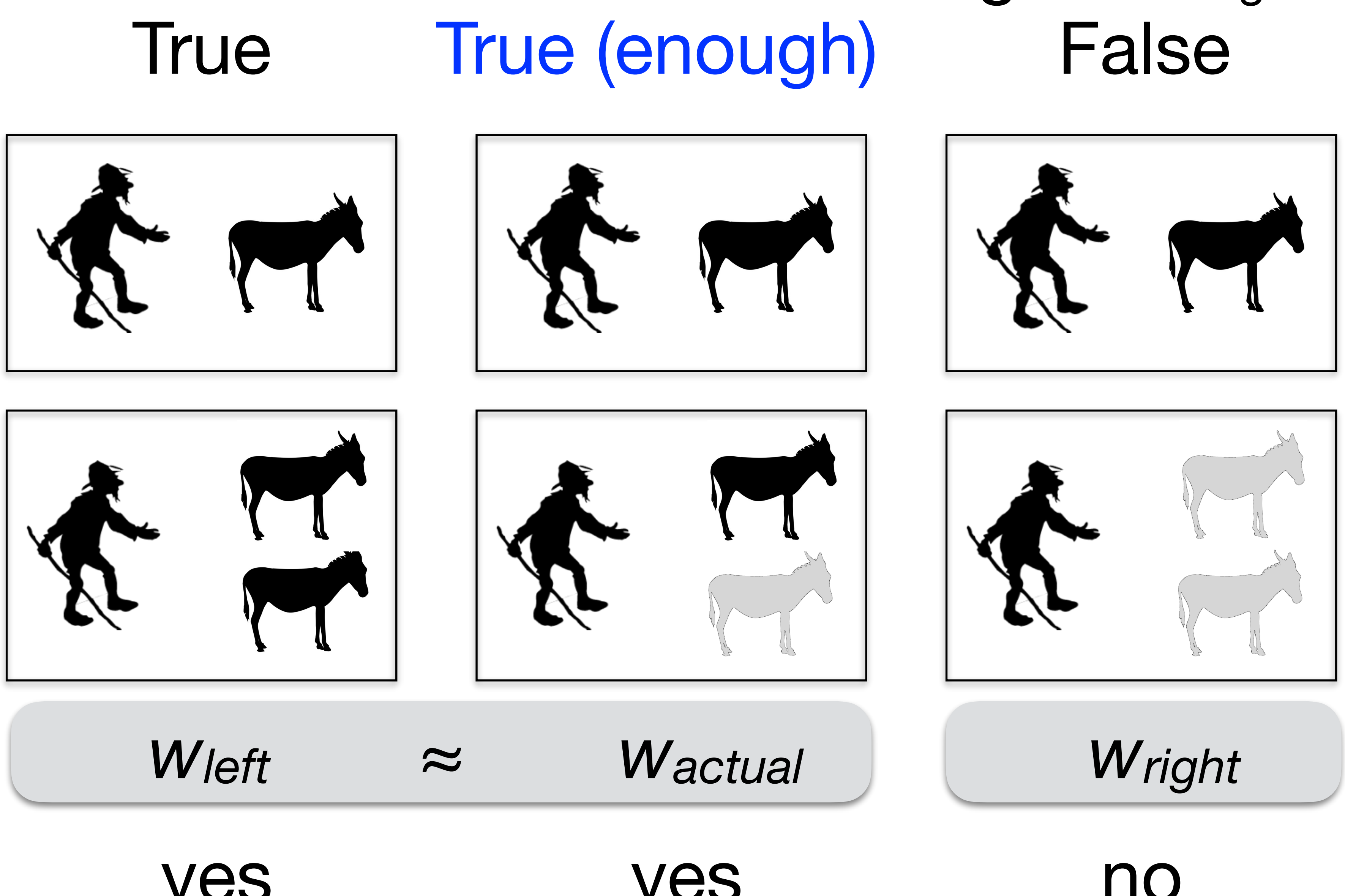


w_{left} ≈ w_{actual} | w_{right}

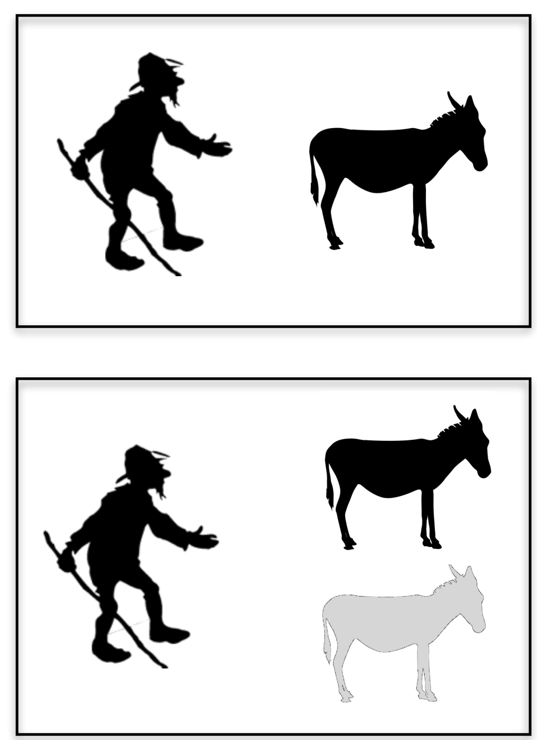
yes | yes | no

Every farmer who owns a donkey beats it

At w_{actual} the donkey sentence is neither true nor false. But it is true at w_{left}. So it is true enough at w_{right}.



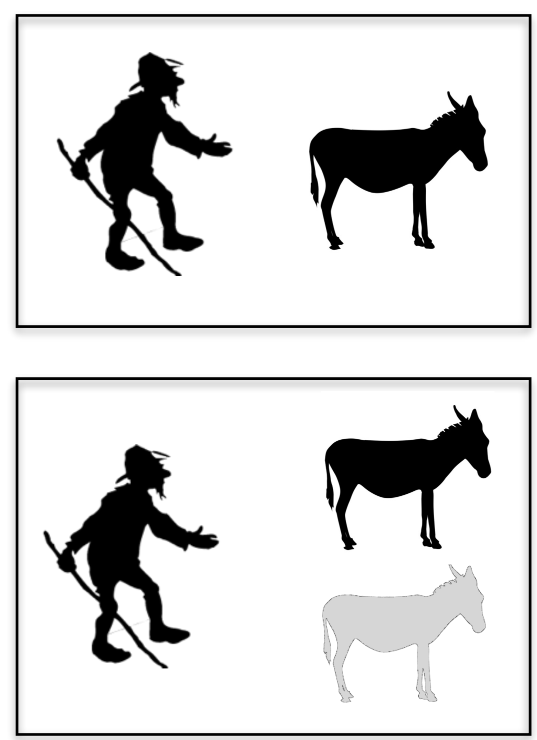
Every farmer who owns a donkey reports it to the IRS



w_{actual}

Every farmer who owns a donkey reports it to the IRS

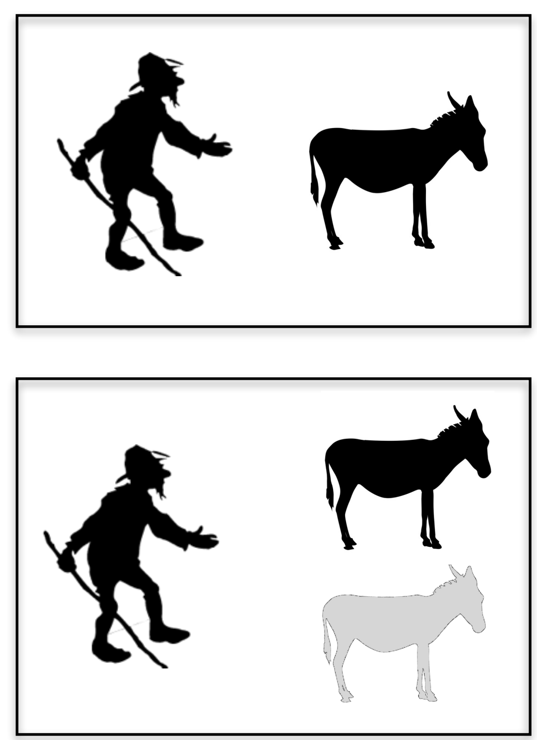
judged false



w_{actual}

Every farmer who owns a donkey reports it to the IRS

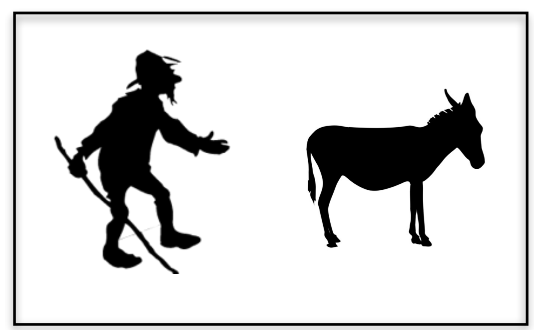
"Is anyone breaking the law?"

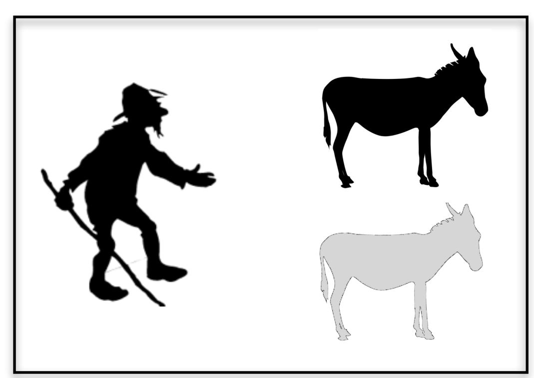


w_{actual}

Every farmer who owns a donkey reports it to the IRS

"Is anyone breaking the law?"



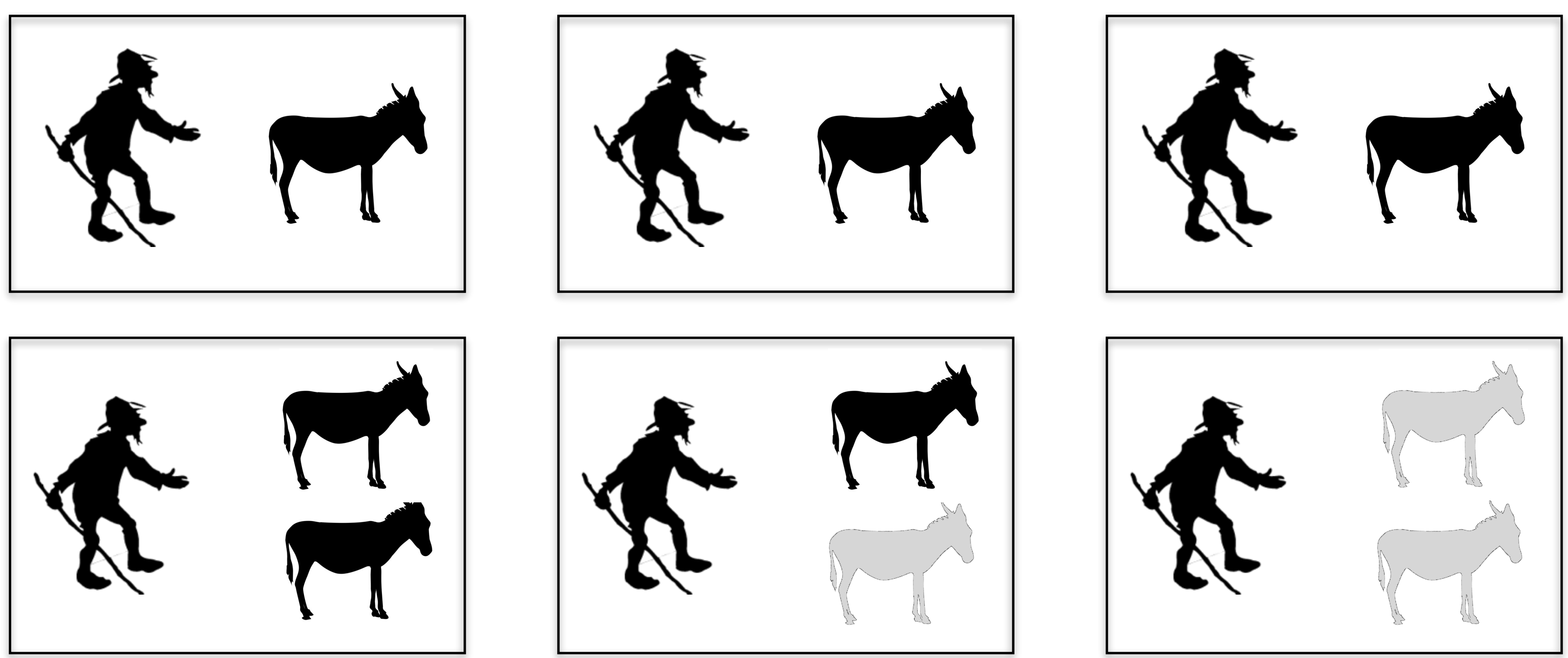


w_{actual}

yes

Every farmer who owns a donkey reports it to the IRS

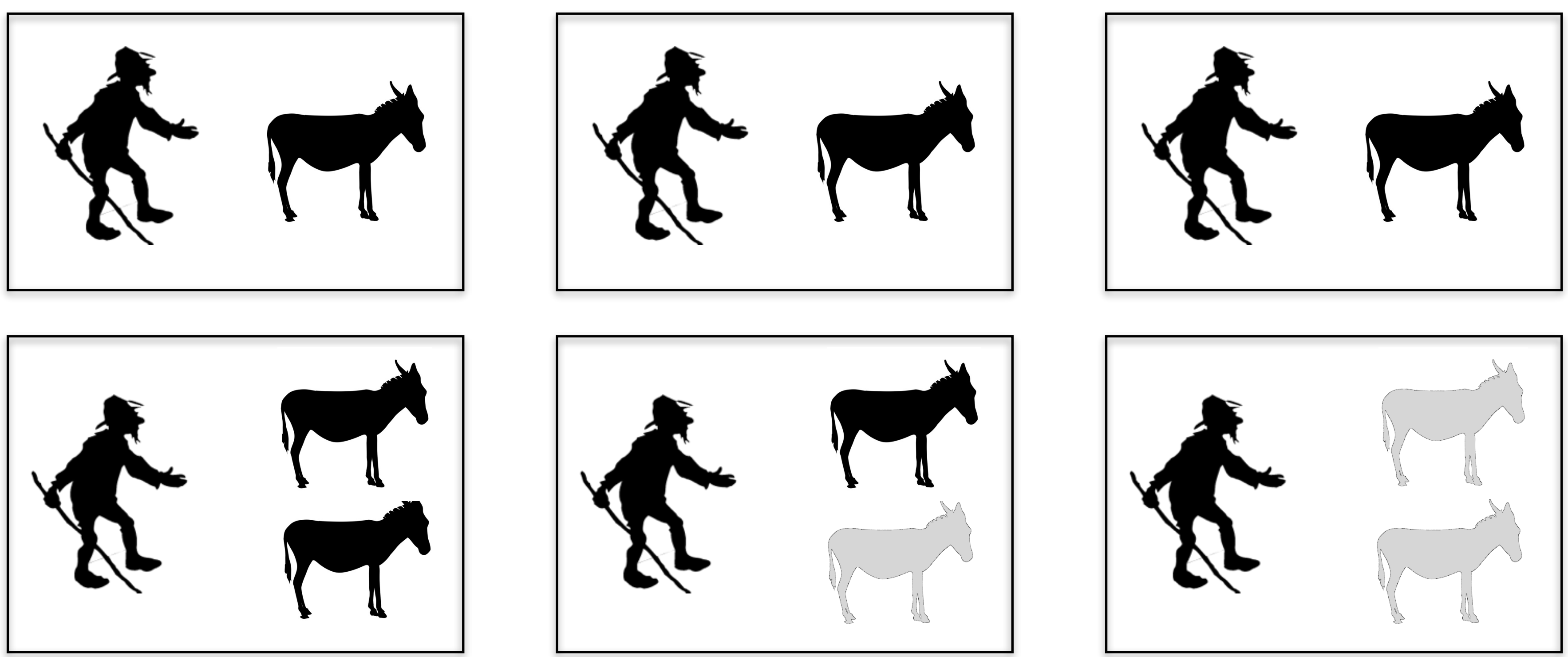
"Is anyone breaking the law?"



w_{left}	w_{actual}	w_{right}
no	yes	yes

Every farmer who owns a donkey reports it to the IRS

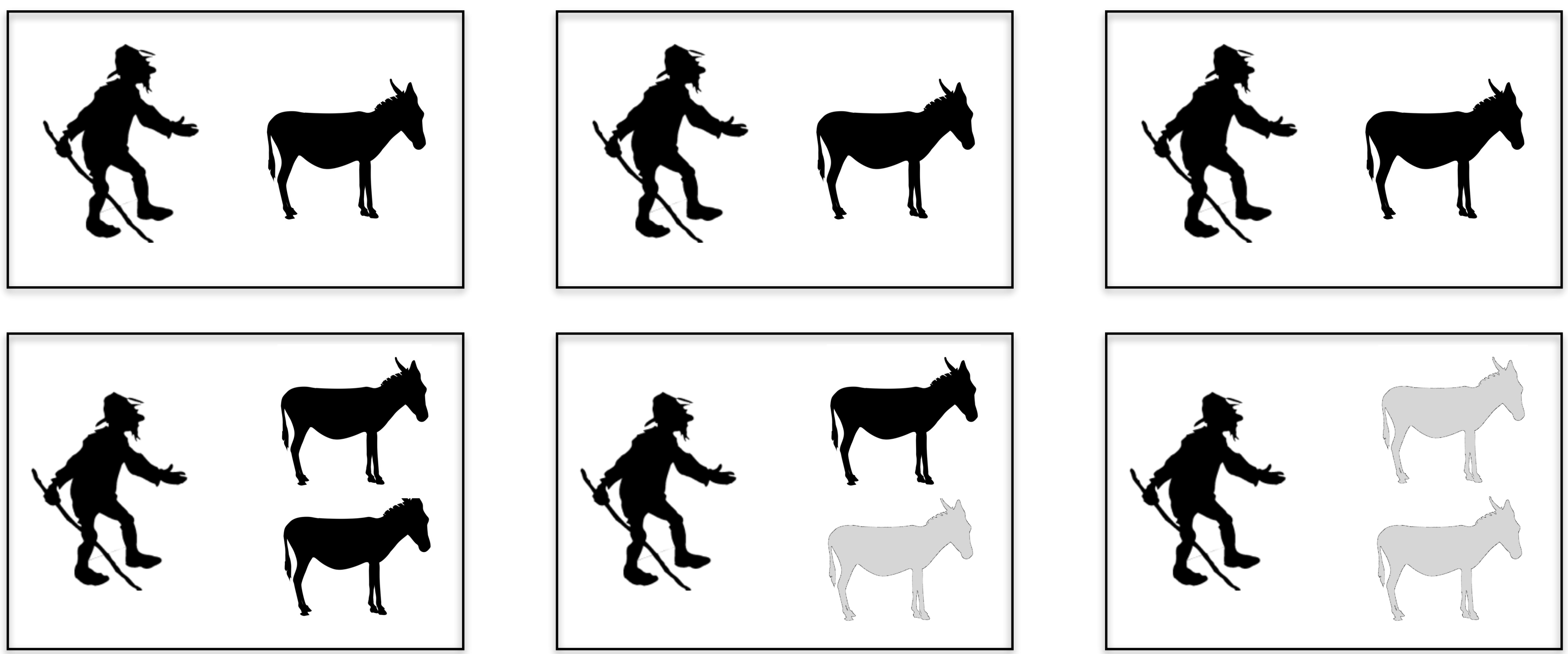
"Is anyone breaking the law?"



w_{left}	w_{actual}	≈	w_{right}
no	yes		yes

Every farmer who owns a donkey reports it to the IRS

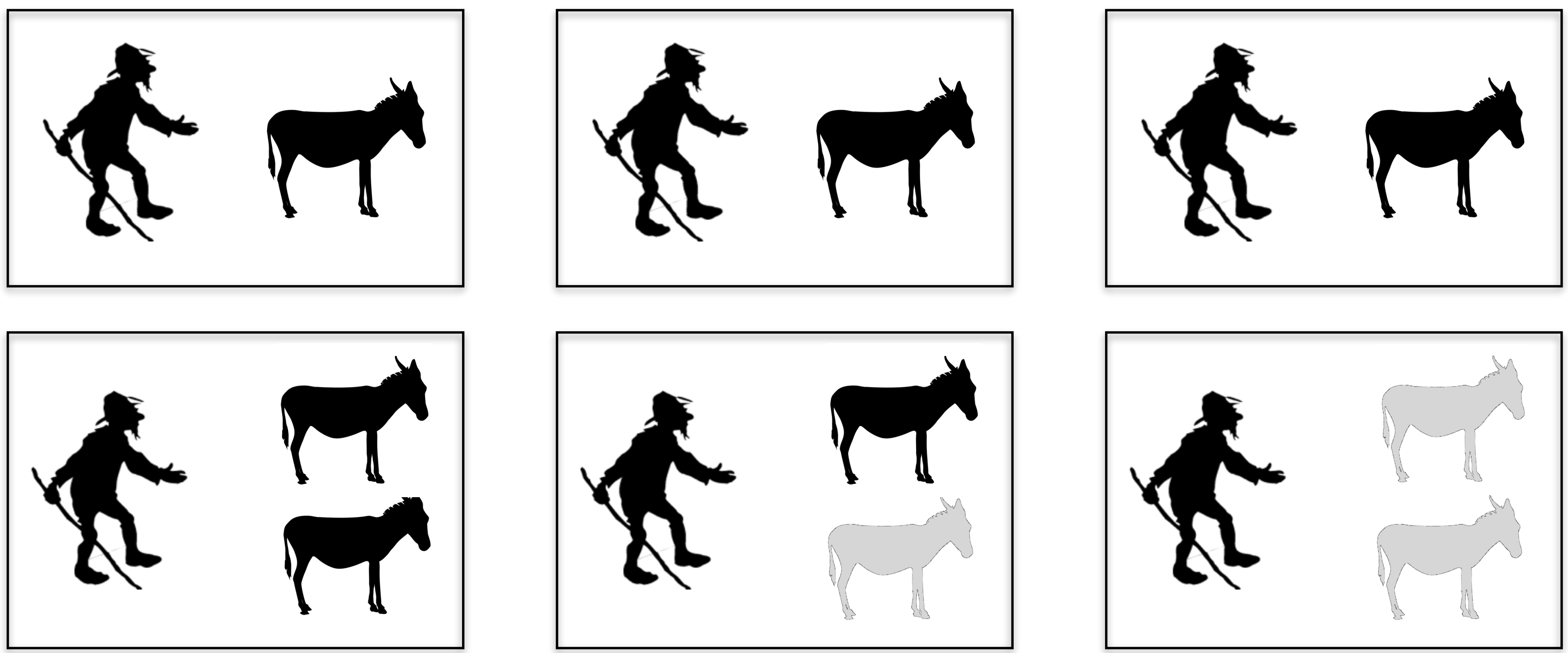
True | Neither | False



w_{left}	w_{actual}	$\approx$	w_{right}
no	yes		yes

Every farmer who owns a donkey reports it to the IRS

True | not true enough | False



w_{left}

no

$w_{actual} \approx w_{right}$

yes | yes

No man who has an umbrella leaves it home on a rainy day

Umbrellas left home
are **black**
(and with a house)

Umbrellas taken along
are grey
(and without a house)

No man who has an umbrella leaves it home on a rainy day

w_{actual}

No man who has an umbrella leaves it home on a rainy day

judged true

w_{actual}

No man who has an umbrella leaves it home on a rainy day

"Does everyone have an umbrella with him?"

w_{actual}

No man who has an umbrella leaves it home on a rainy day

"Does everyone have an umbrella with him?"

w_{actual}

yes

No man who has an umbrella leaves it home on a rainy day

“Does everyone have an umbrella with him?”

w_{left} yes

w_{actual} yes

w_{right} no

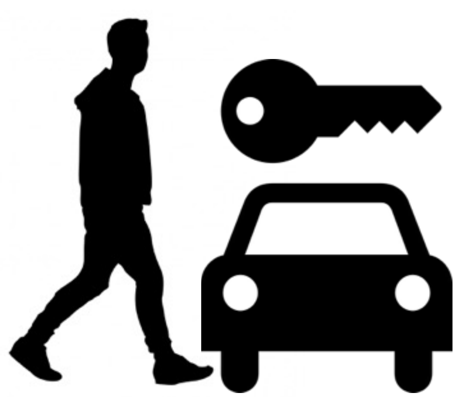
No man who has an umbrella leaves it home on a rainy day

True | True (enough) | False

w_{left} ≈ w_{actual} | w_{right}

yes | yes | no

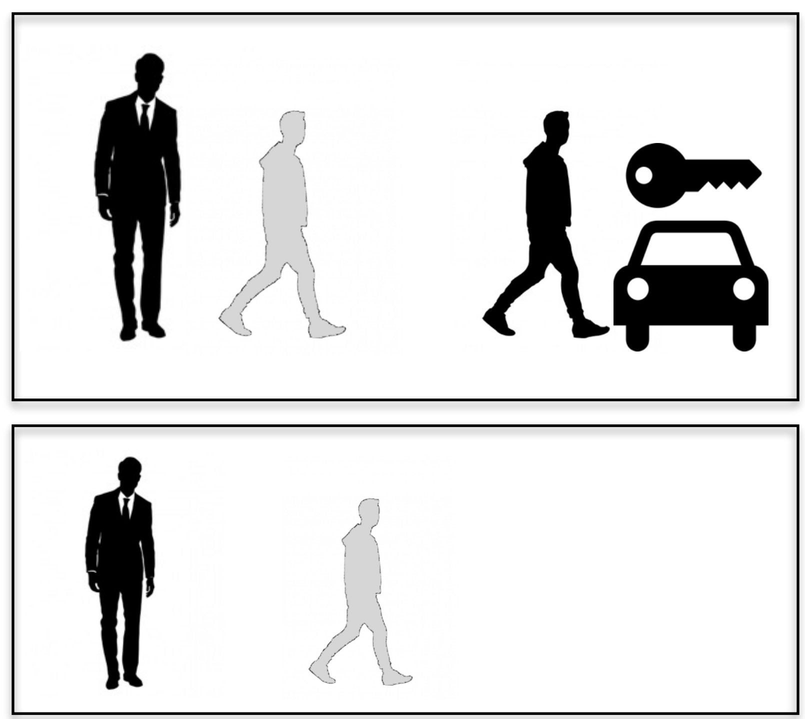
No man who has a 10-year-old son gives him the car keys



Sons that get the keys will be shown in **black** (and with keys)

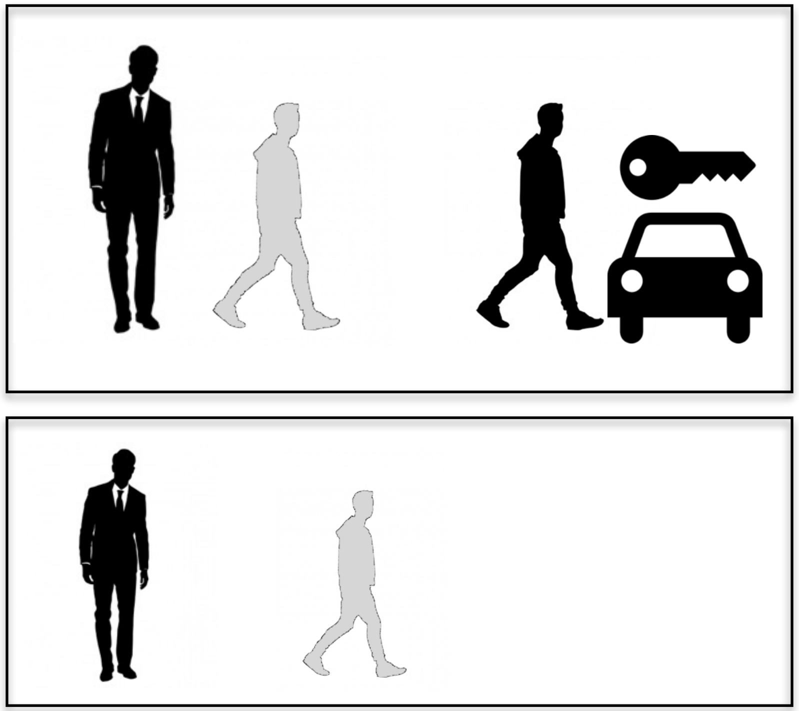
Sons that don't get them, in **grey** (and without keys)

No man who has a 10-year-old son gives him the car keys



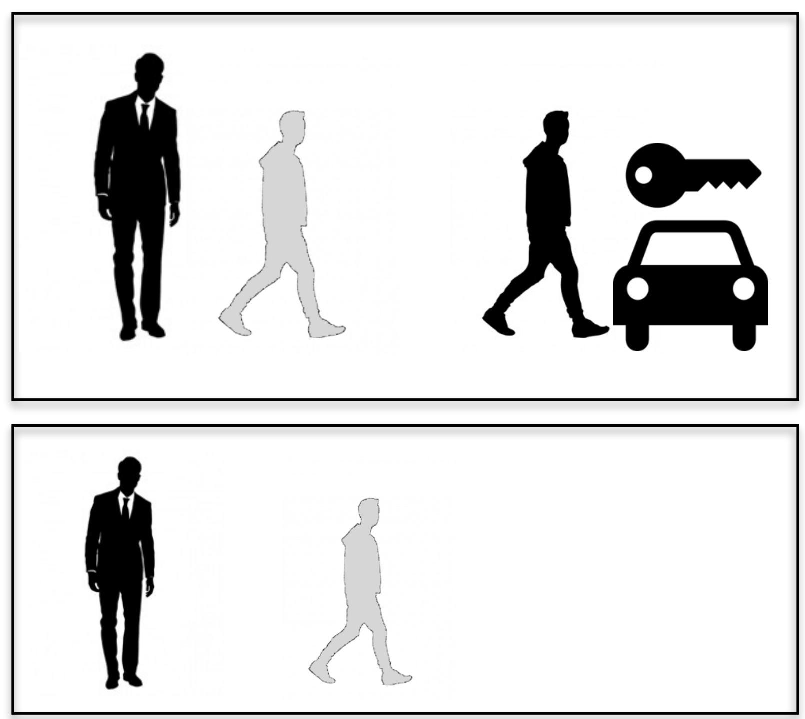
No man who has a 10-year-old son gives him the car keys

judged false



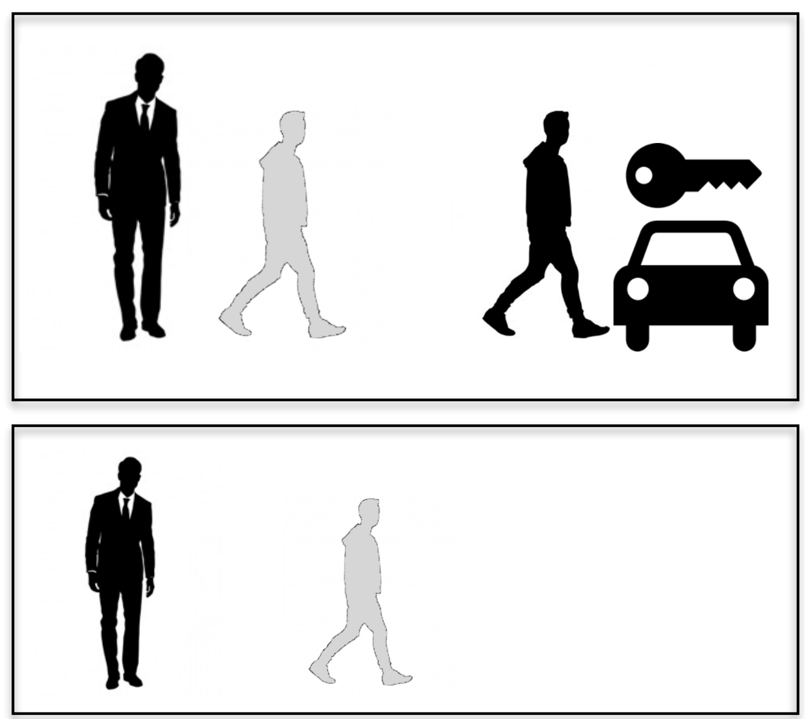
No man who has a 10-year-old son gives him the car keys

“Does every father behave responsibly?”



No man who has a 10-year-old son gives him the car keys

"Does every father behave responsibly?"

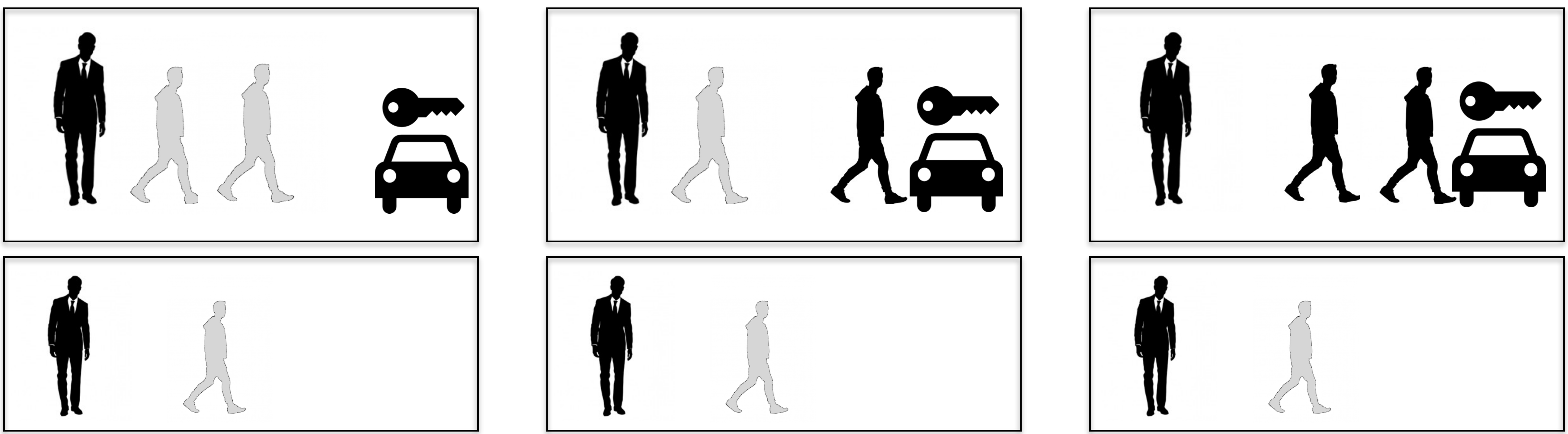


w_{actual}

no

No man who has a 10-year-old son gives him the car keys

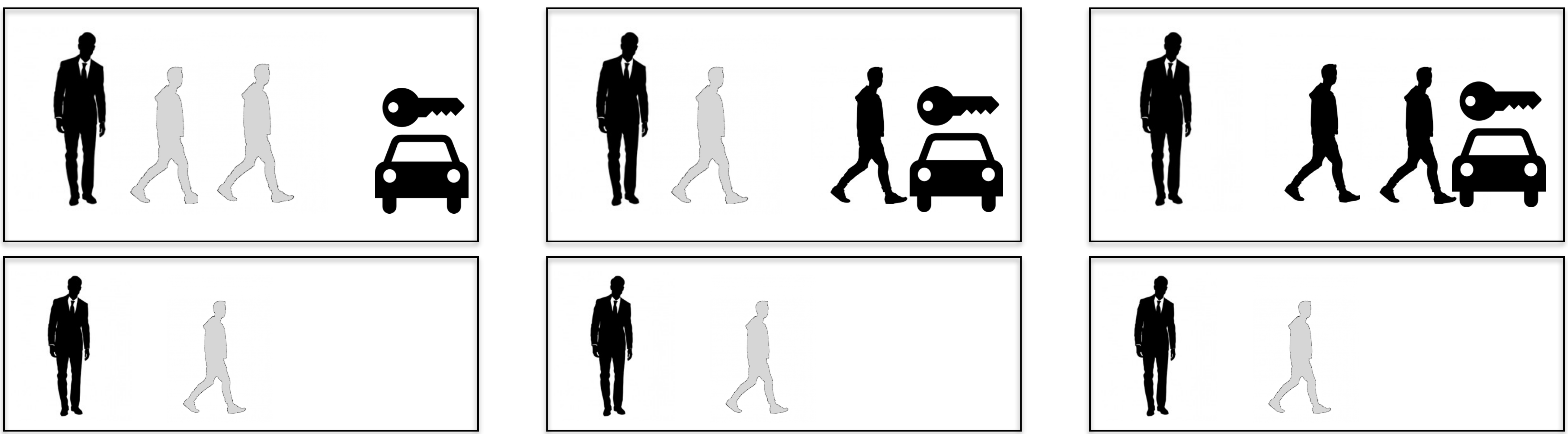
"Does every father behave responsibly?"



w_{left}	w_{actual}	w_{right}
yes	no	no

No man who has a 10-year-old son gives him the car keys

True | not true enough | False



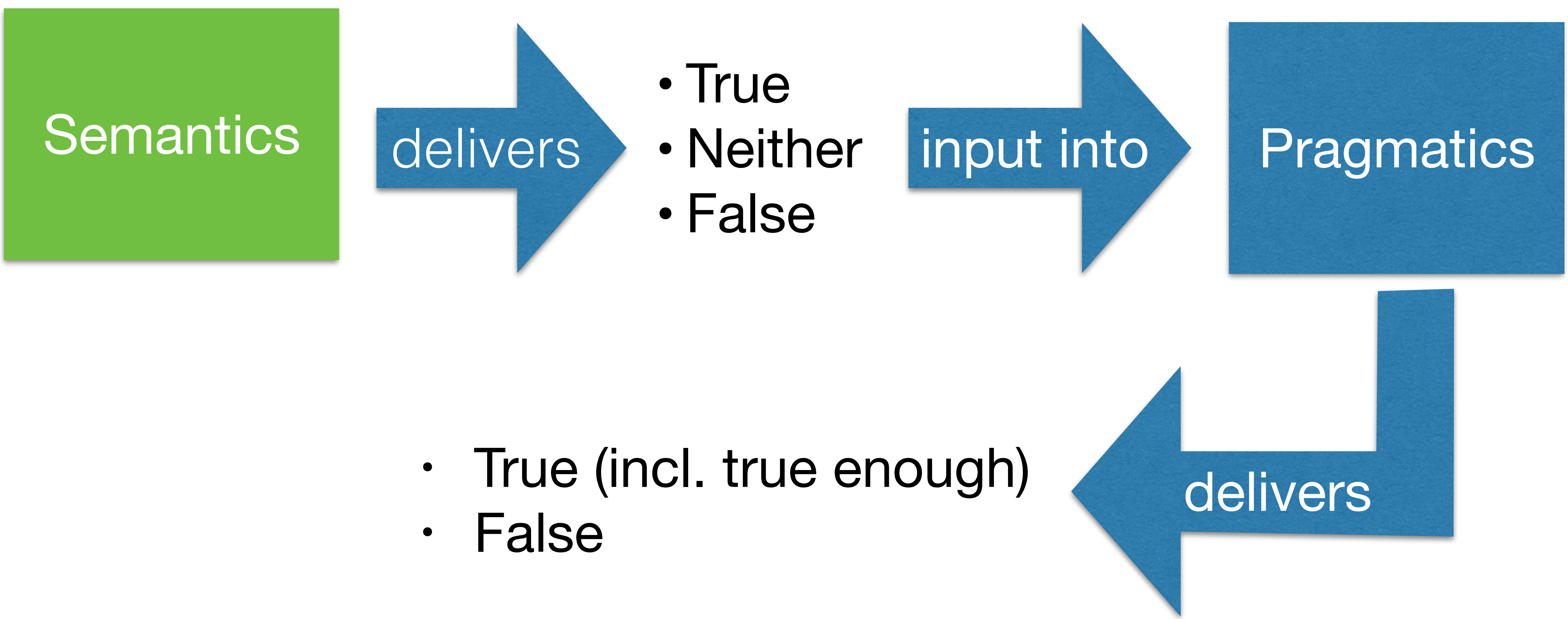
w_{left}	w_{actual}	$\approx$	w_{right}
yes	no		no

The theory so far

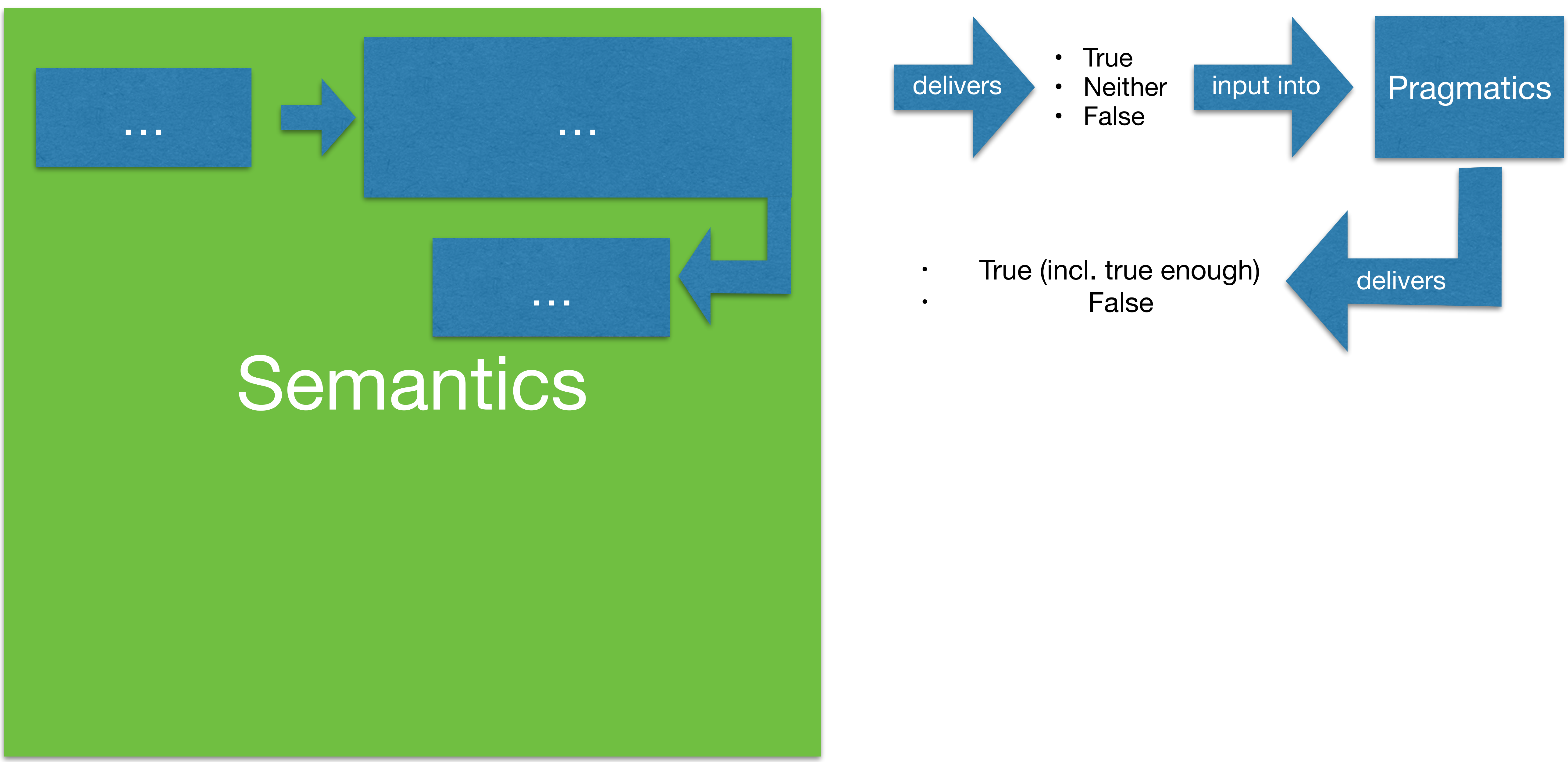
- Context sensitivity of donkey sentences is central (like Yoon 96, Krifka 96)
- Links definite plurals to donkey sentences (like Yoon 96, Krifka 96; building on Križ 15)
- No commitment to sums (unlike Yoon 96, Krifka 96)
- No commitment as to whether truth-value gaps are presuppositions (Barker 96: YES; Križ 15: NO)

Compositional implementation

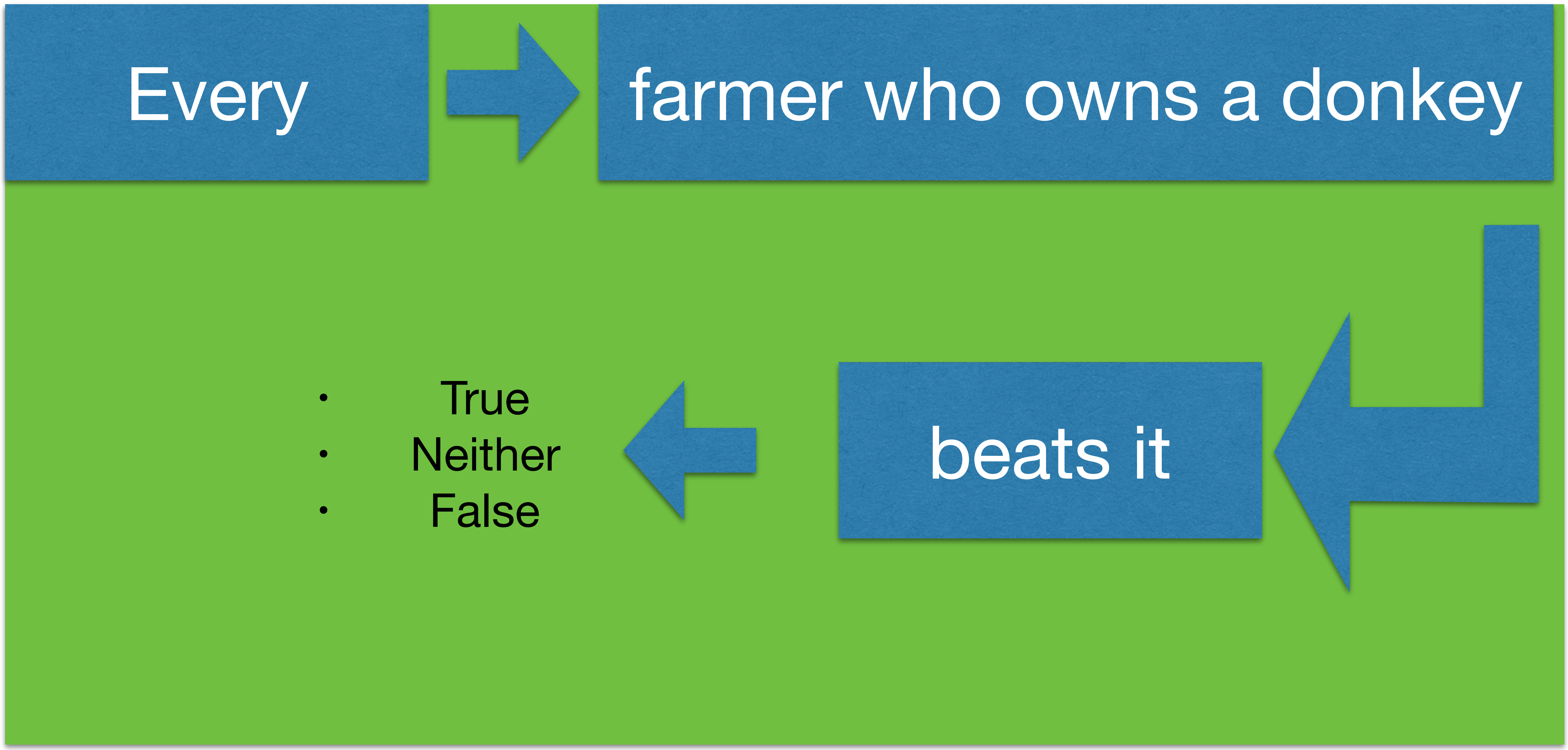
The bird's-eye view



Zooming in on the semantics



The semantic pipeline

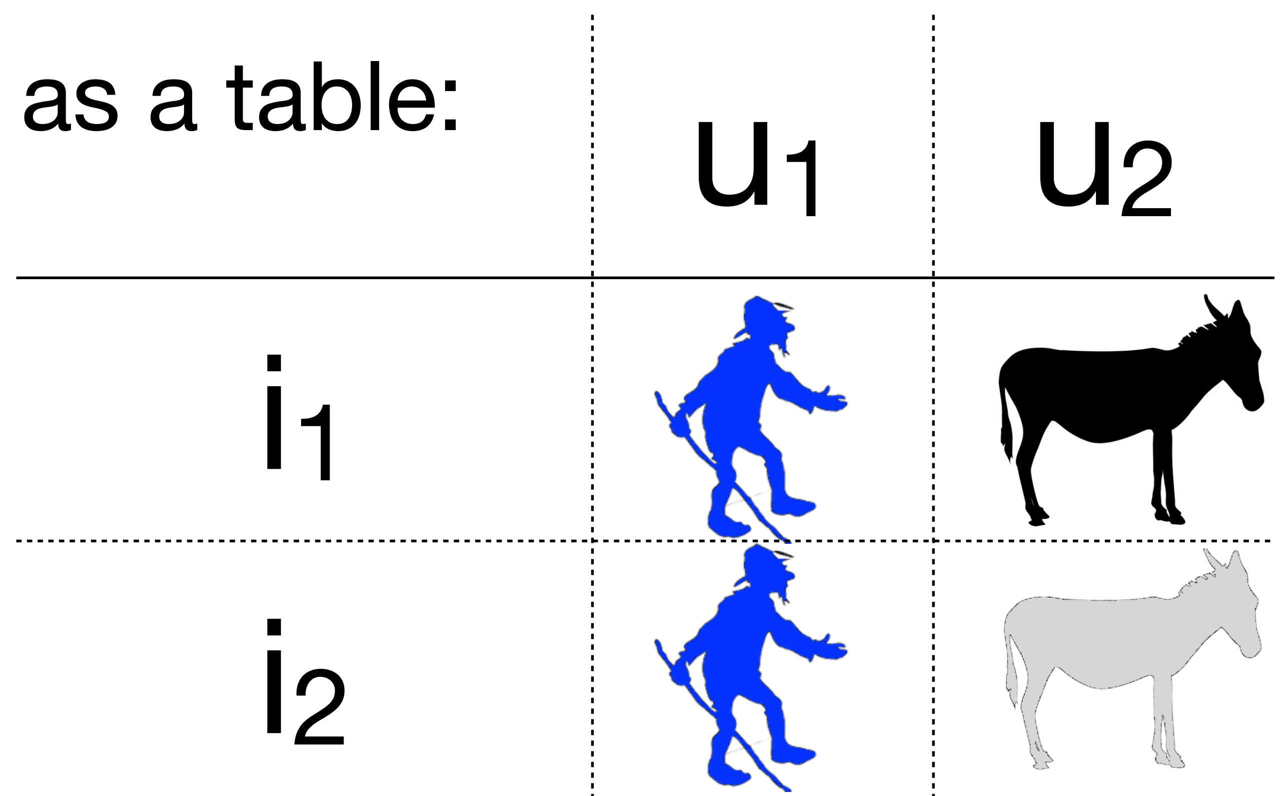


Tasks for the semantics

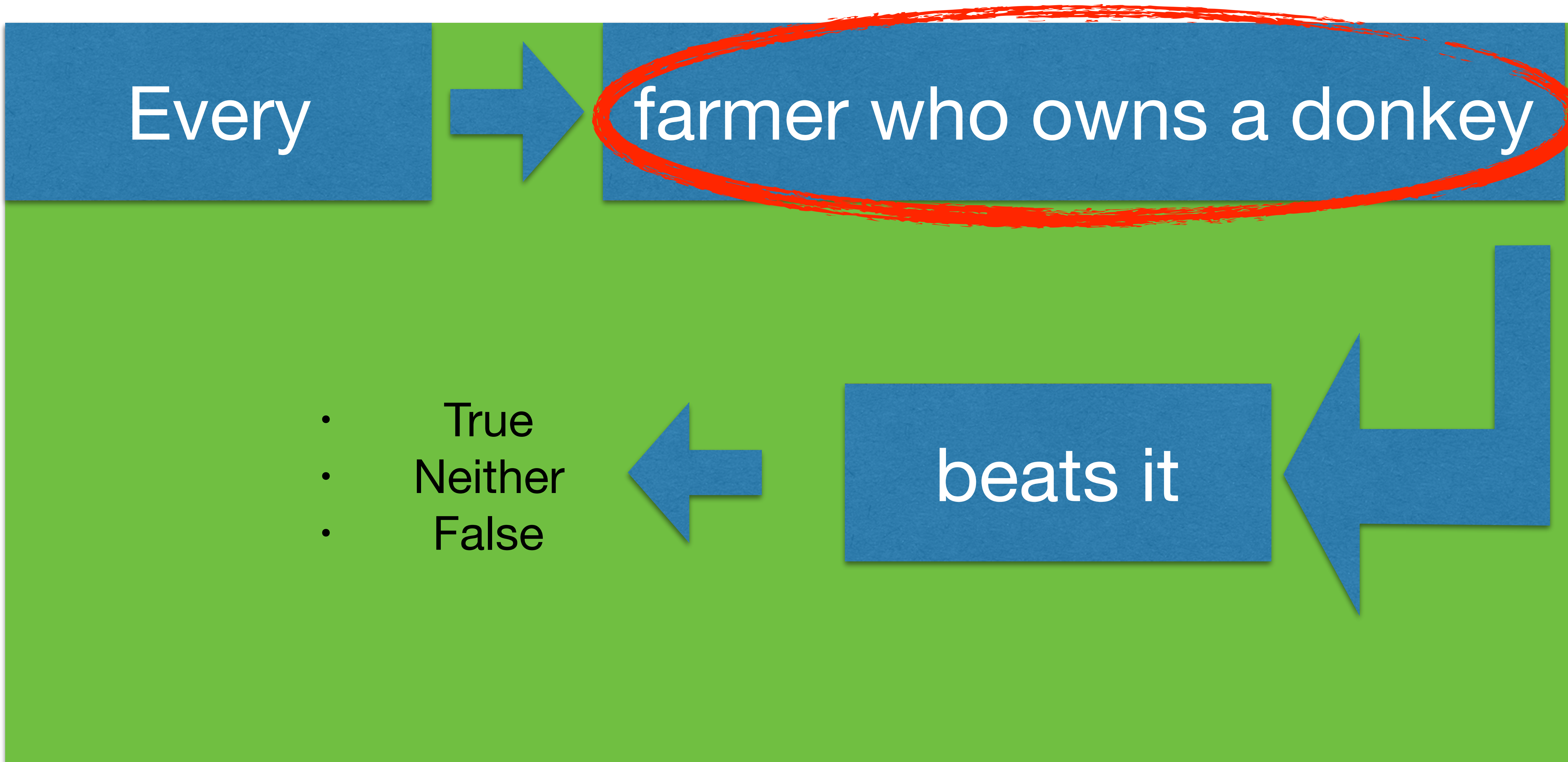
- Generating and managing anaphora without sums
    - *I will build on PCDRT (Brasoveanu 08).*
- Generating truth value gaps
    - *I will enrich PCDRT with error states (van Eijck 93) and assume that donkey pronouns produce gaps*
- Projecting gaps and keeping them under control
    - *Supervaluation quantifiers (van Eijck 96)*

Our semantic backbone: PCDRT (Brasoveanu 08)

- Constituents relate input (I) to output (O) states
- A state is a set of *assignments* i_1, i_2 etc. that relate *discourse referents* u_1, u_2 etc. to entities x, y etc.
- A state can be seen as a table:



Restrictor
(not today's focus)

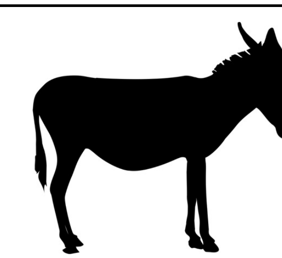
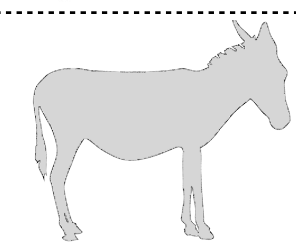


Restrictor (not today's focus)

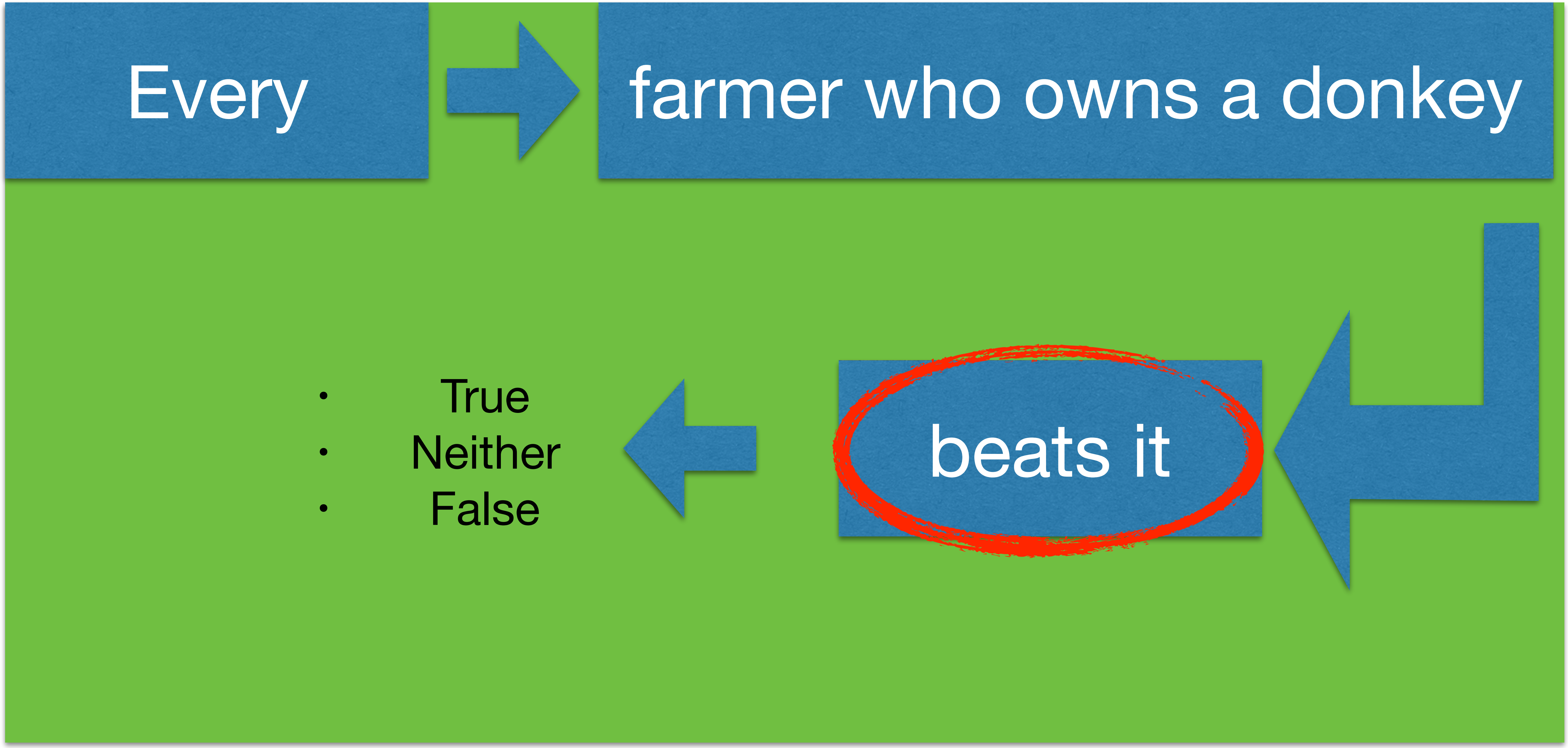
- [[every^{u1} farmer who owns a^{u2} donkey]]

- I assume that all indefinites are *strong*: they introduce as many individuals as they can.

- For each farmer *x*, this will generate a state in which every assignment maps u_1 to *x* and u_2 to a different donkey that *x* owns

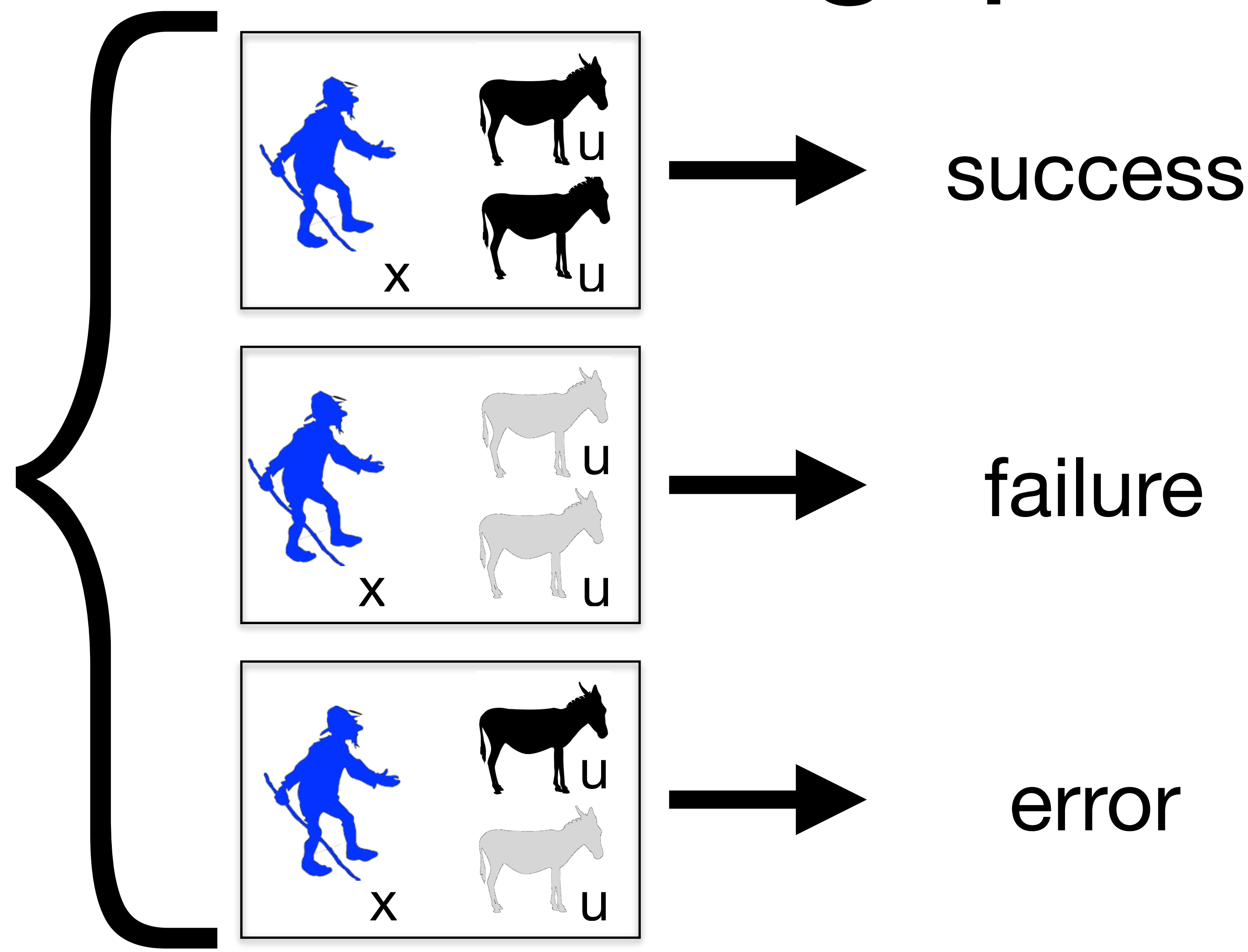
	u_1	u_2
i_1		
i_2		

Verb phrase



Error-state semantics produce VP truth-value gaps

$[[\lambda x.\ x \text{ beats } it_u]] \approx$



van Eijck 93

DPL with error states (van Eijck 93)

- In DPL and related systems, information about the values of variables is encapsulated in a *state*, passed on from one subterm to the next.
- In DPL, states are assignment functions
- van Eijck adds *error states:* special assignments that prevent a formula from having a truth value
- Error states can be thrown, passed on, and caught

PCDRT with error states

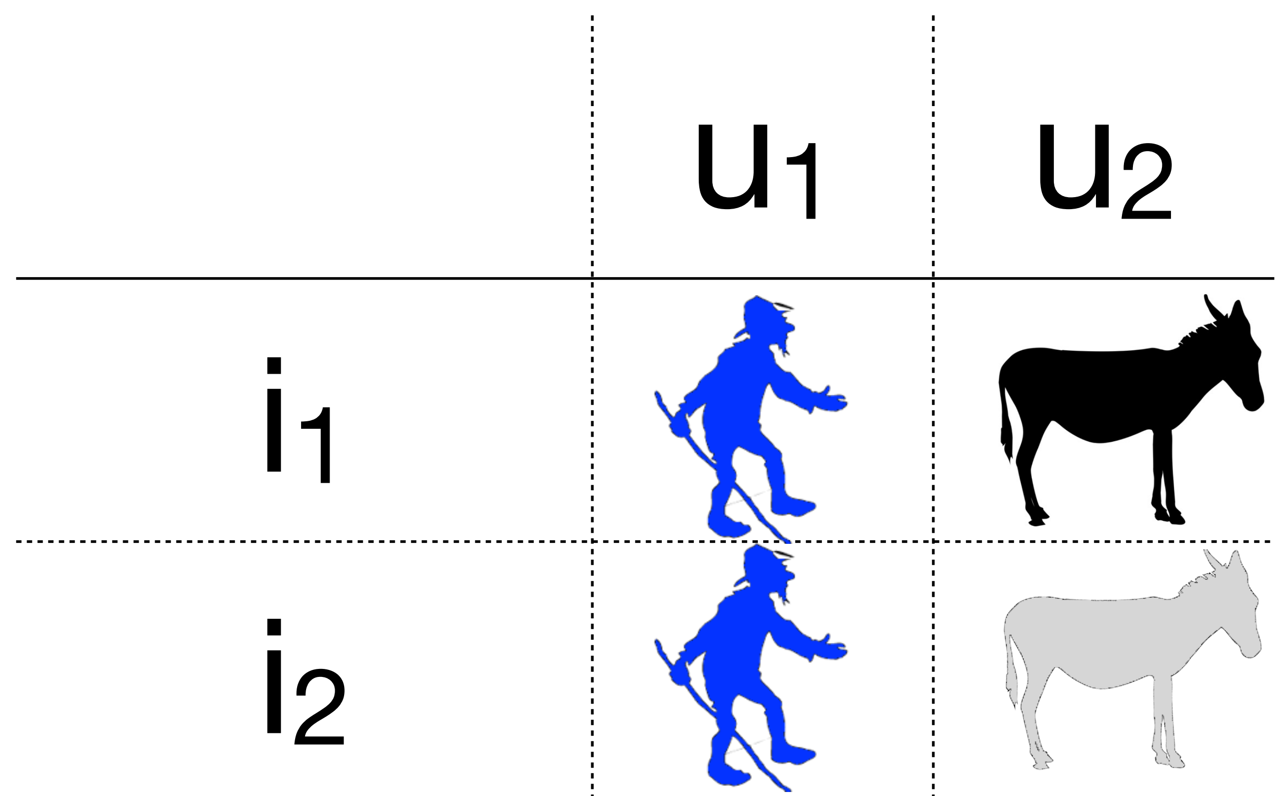
- Conventions:
  - We'll use the empty table ε as an error state
  - Most conditions return true on the error state
  - Most DRSs pass incoming error states onwards
- This requires various tweaks for bookkeeping

A PCDRT predicate denotes a test on each row

- farmer ⇝ λv. λIλO. I=O & forall i in I. farmer(i(v))
  (true if $v=u_1$)

- beats ⇝ λvλv’. λIλO. I=O & forall i in I. beats(i(v),i(v’))
  (false if $v=u_1$, $v'=u_2$)

- No trivalence yet



Introducing PCDRT shorthands

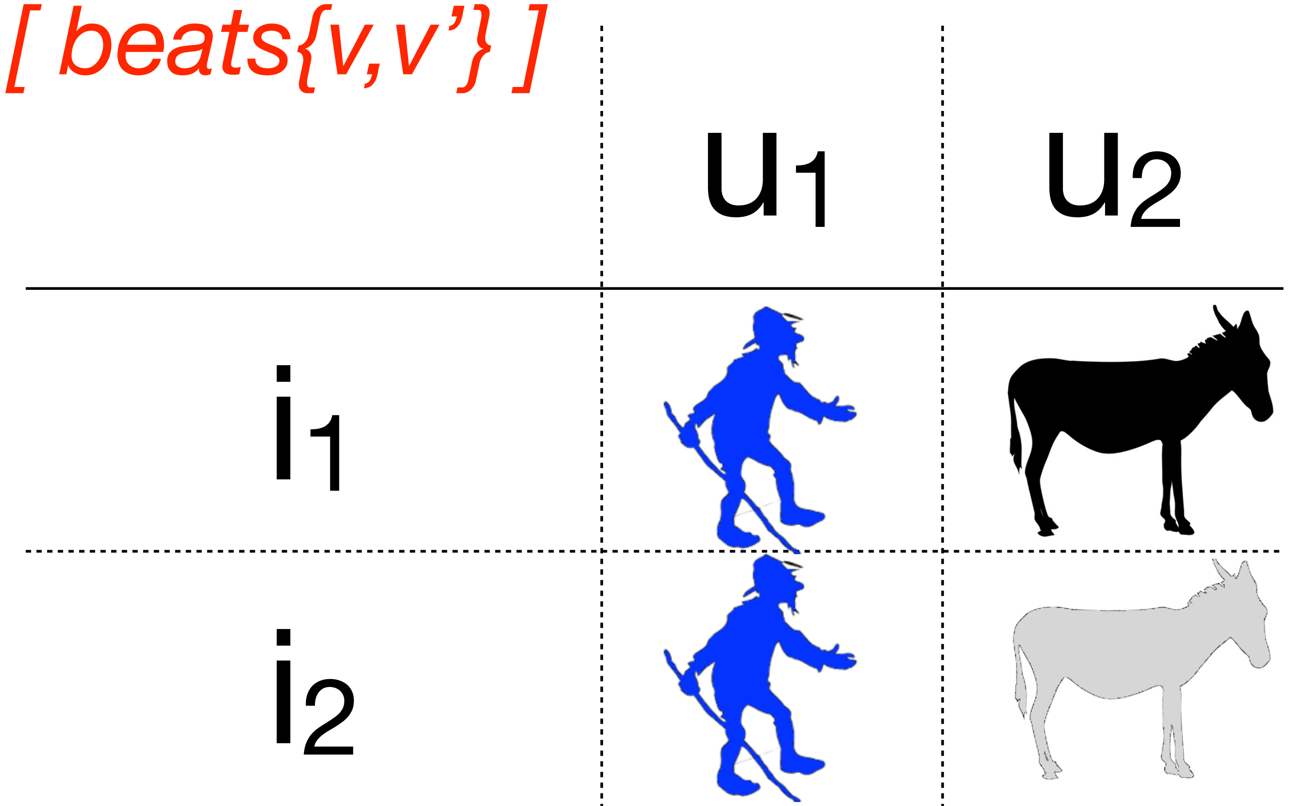
- farmer → $\lambda v.\ \lambda I \lambda O.\ I=O \wedge \forall i \in I.\ farmer(i(v))$

  Shorthand: $\lambda v.$ [farmer{v}]

- beats → $\lambda v \lambda v'.\ \lambda I \lambda O.\ I=O \wedge \forall i \in I.\ beats(i(v),i(v'))$

  Shorthand: $\lambda v \lambda v'.$ [beats{v,v'}]

- No trivalence yet



Conditions only have inputs, DRSs also have outputs

- A *condition* is a test on an input state: $\lambda I \ldots$
  - Atomic predicates:
    $R\{u\} =_{def} \lambda I.\ \forall\ i{\in}I.\ R(i(u))$
- A *DRS* relates input to output states: $\lambda I\ \lambda O \ldots$
  - Lifting a condition C into a DRS:
    $[C] =_{def} \lambda I\ \lambda O.\ C(I) \wedge I{=}O$
  - Random and targeted assignments of discourse referents:
    $[u] =_{def} \lambda I\ \lambda O.\ \forall i{\in}I\ \exists o{\in}O.\ i[u]o \wedge \forall o{\in}O\ \exists i{\in}I.\ i[u]o$
    $u{:=}x =_{def} \lambda I\ \lambda O.\ [u](I)(O) \wedge \forall o{\in}O.\ o(u){=}x$

Success, failure, error

- succeeds(D,I) $=_{def}$ $\exists O{\neq}\varepsilon.\ D(I)(O)$
  D transitions to some non-error state

- fails(D,I) $=_{def}$ $\neg\exists O.\ D(I)(O)$
  D does not transition to any output state

- error(D,I) $=_{def}$ $\exists O.\ D(I)(O) \wedge \forall O.\ (D(I)(O) \rightarrow O{=}\varepsilon)$
  D only transitions to error states

Mutually exclusive, jointly exhaustive.

Static connectives turn DRSs into conditions

- DRS negation checks that the DRS fails on any nonempty substate of the input state:
  - $\sim D =_{def} \lambda I.\ \forall H \neq \varepsilon.\ H \subseteq I \rightarrow \text{fails}(D,H)$
- DRS disjunction checks that at least one of the disjuncts succeeds:
  - $D \mid D' =_{def} \lambda I.\ \text{succeeds}(D,I) \vee \text{succeeds}(D',I)$

Dynamic connectives turn DRSs into other DRSs

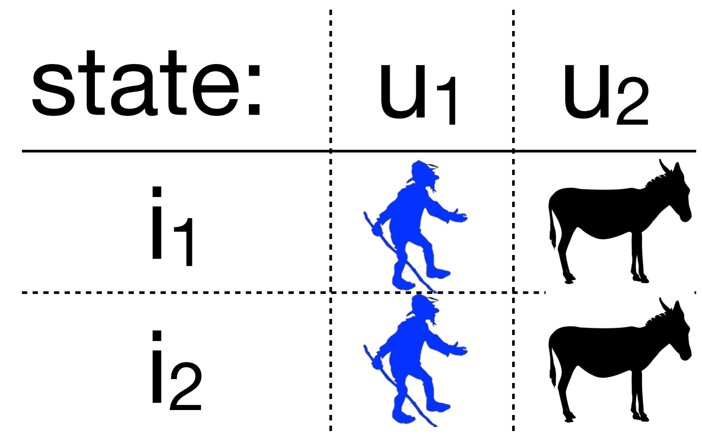
- DRS conjunction: apply the two DRSs in sequence
  - $D ; D' =_{def} \lambda I \lambda O.\ \exists H.\ D(I)(H) \wedge D'(H)(O)$
- Maximalization: store as many different entities under column *u* as possible as long as D returns an output
  - $max_u(D) =_{def} \lambda I \lambda O.\ (I{=}O{=}\varepsilon) \vee$
    $([u] ; D)(I)(O) \wedge \forall K.\ ([u] ; D)(I)(K) \rightarrow uK \subseteq uJ$

    where $uK =_{def} \{ x : \text{there is an } i \text{ in } K \text{ such that } x{=}i(u)\}$

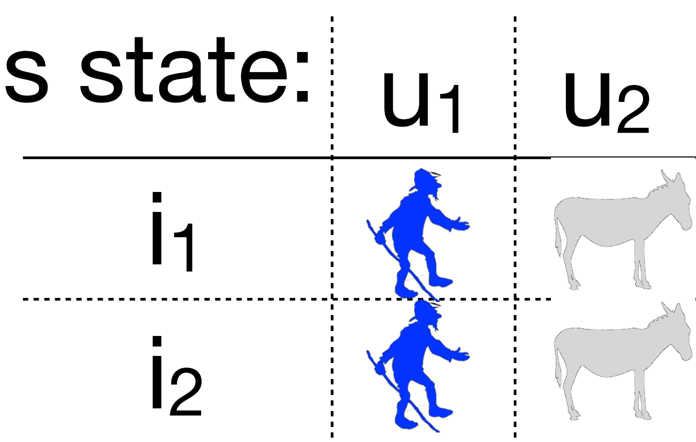
Testing if a DRS treats all rows the same

- uniformTest(D) $=_{def}$ λI. (D | [~D])

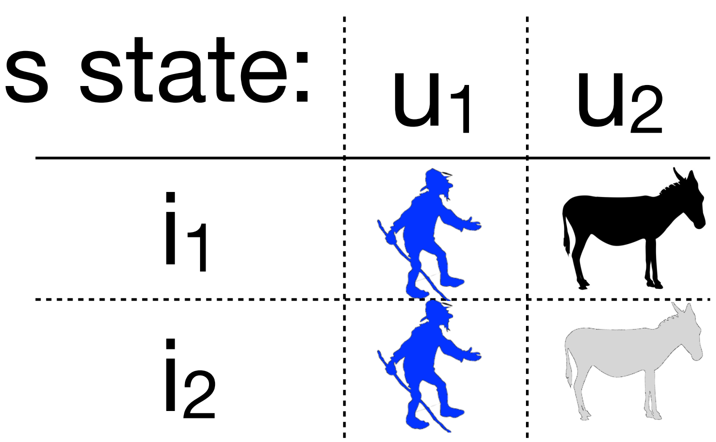
uniformTest([beats{u_1,u_2}]) holds of this state:



and of this state:



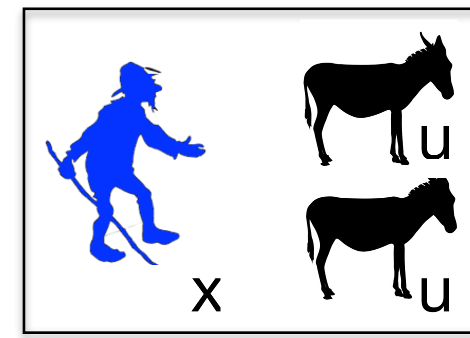
but not of this state:



Goal: mixed worlds should trigger error states

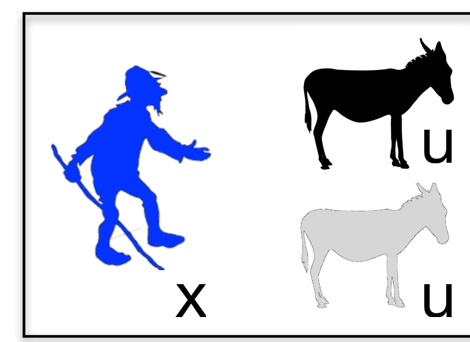
beats it_u → $\lambda v.\ \lambda I \lambda O.$

O=I and v beats all the referents of u in I



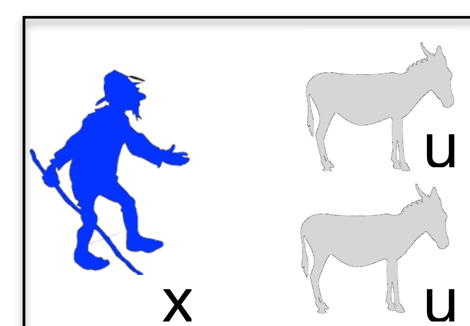
or

O = ε and v beats some but not all of the referents of u in I



or

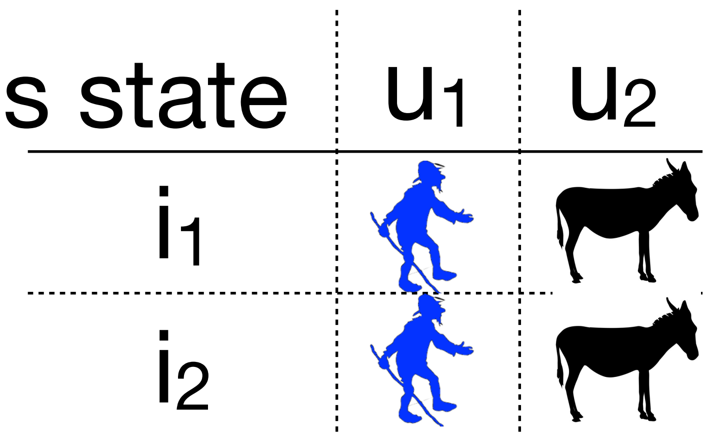
(in the third case, no output matches the input)



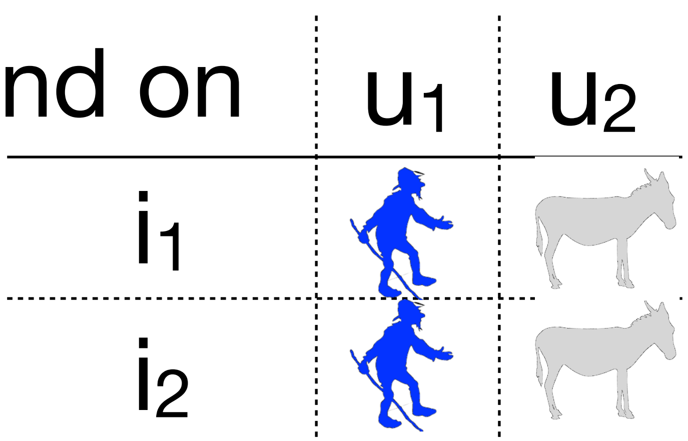
The DRS *uniform* converts failed *uniformTests* into error states

uniform(D) $=_{def}$ λI λO.
(uniformTest(D)(I) ∧ I=O) ∨ (¬uniformTest(D)(I) ∧ O=ε)

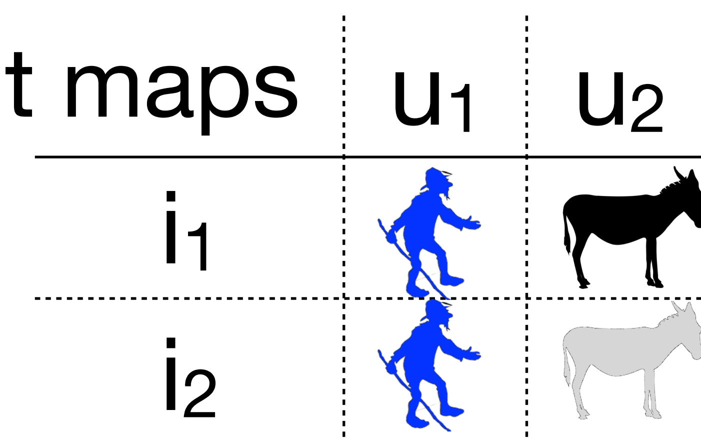
uniform([beats{u_1,u_2}]) succeeds on this state



and on



but maps



to the error state

In pronouns, I depart from Brasoveanu 08

- In original PCDRT, it_u tests if all assignments in the input agree on some atom as the referent of *u*.

$$it_u \rightarrow \lambda P.\ [atom\{u\}]\ ;\ P(u)$$

$$\text{where } atom\{u\} =_{def} \lambda I.\exists x.atom(x) \wedge \forall i{\in}I.\ i(u){=}x$$

- This test precludes trivalence, so I’ll drop it.

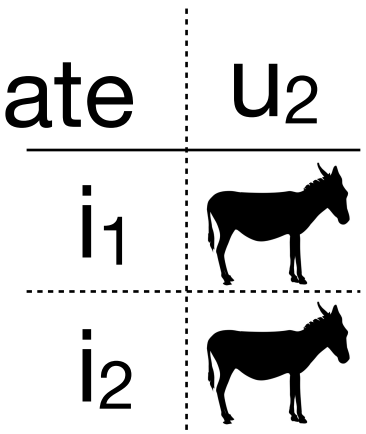
- I don’t use sums, so I’ll drop the atomicity check.

I propose that pronouns introduce trivalence via *uniform*

$it_{u2} \rightsquigarrow \lambda P.\ uniform(P(u_2))\ ;\ P(u_2)$

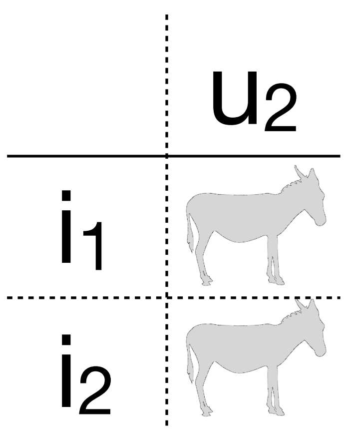
$brays \rightsquigarrow \lambda v.\ brays\{v\}$

it_{u2}(brays) succeeds on this state

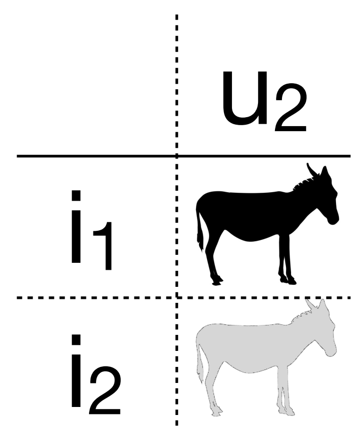


and

fails on



and maps



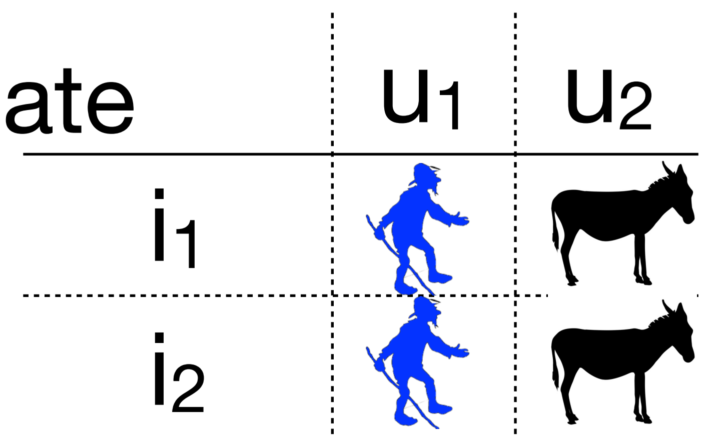
to the error state

Pronouns in object position are type-lifted in the usual way

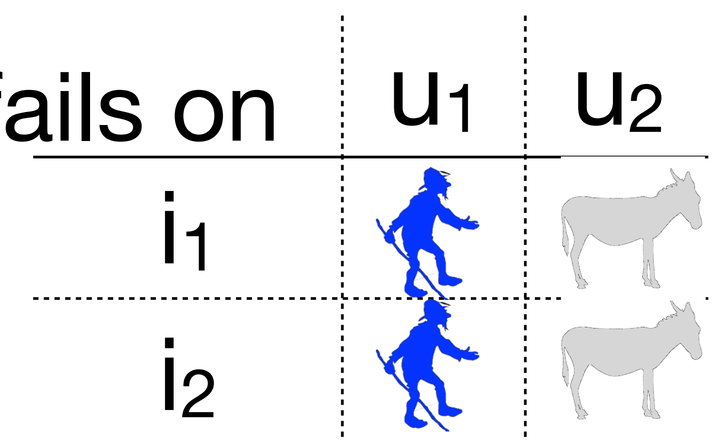
Lift(it_{u2}) ⇝ λRλv. uniform(R(u_2)(v)) ; R(u_2)(v)

beats ⇝ λv'λv. beats{v,v'}

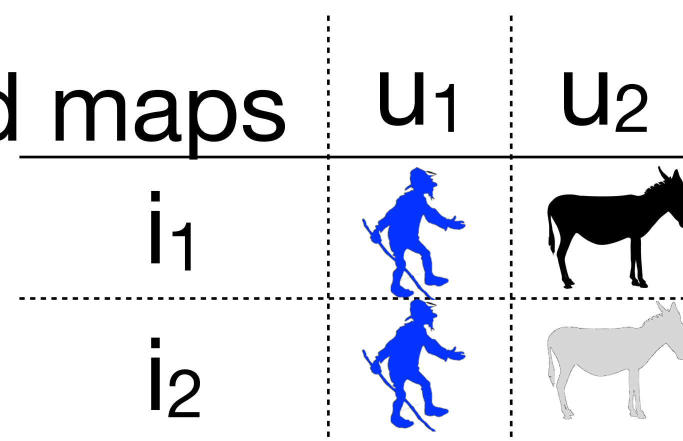
Lift(it_{u2})(beats)(u_1) succeeds on this state



fails on

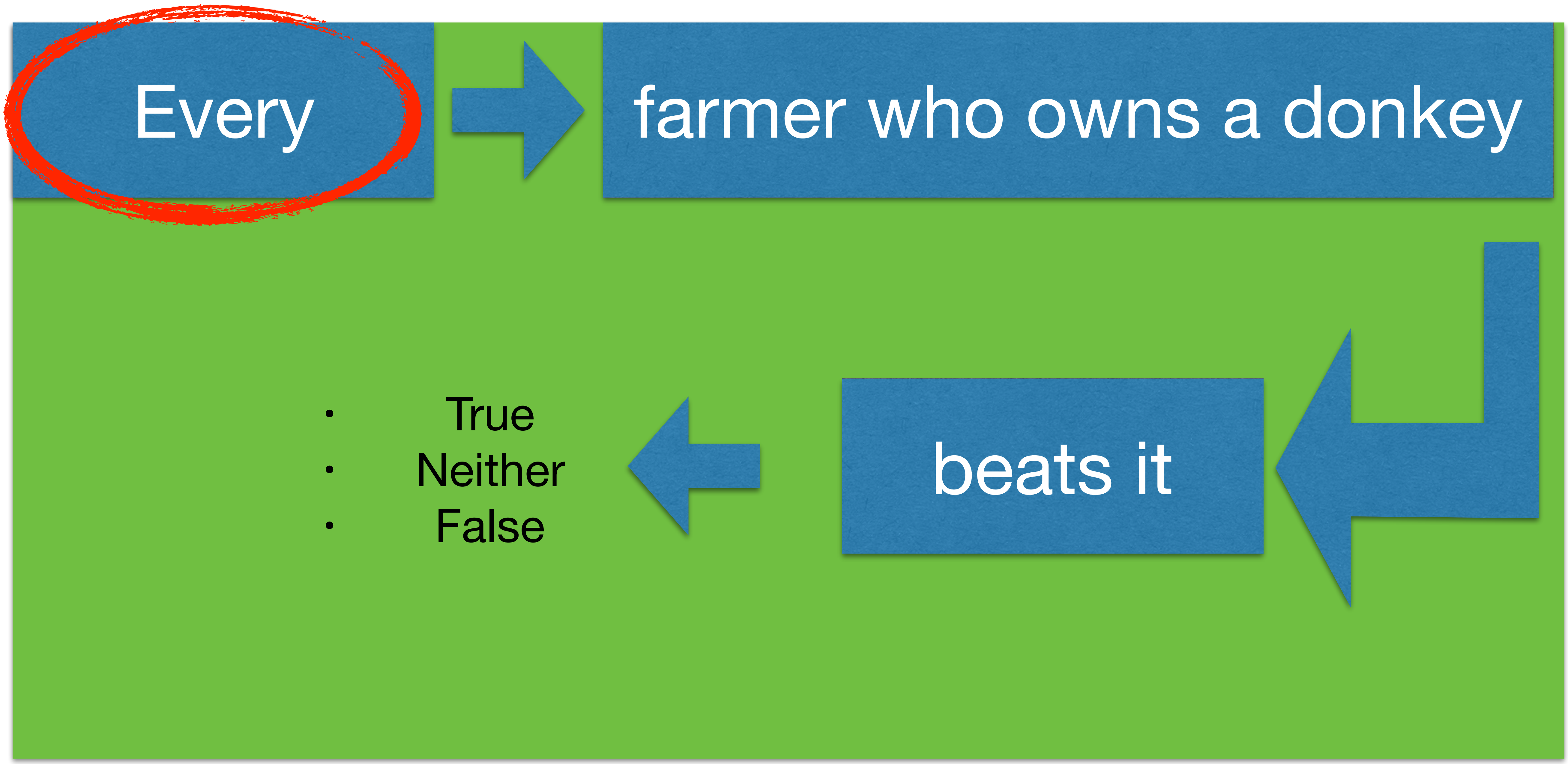


and maps



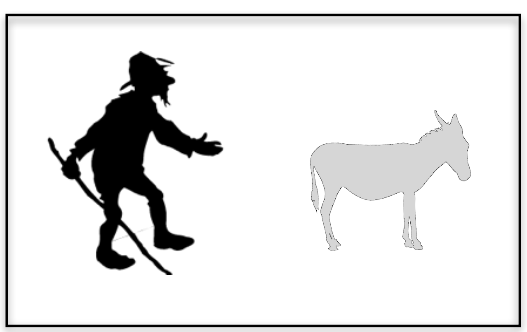
to the error state

Embedding quantifier (not today's focus)

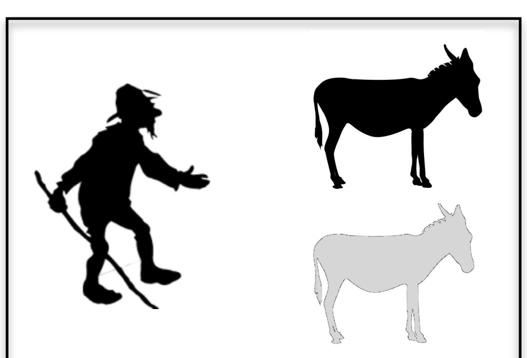


Every farmer who owns a donkey beats it

- We can't just let errors bubble up to the top level.
- As soon as we find a farmer who doesn't beat any donkey of his, we know the sentence is false.



This farmer makes the sentence false

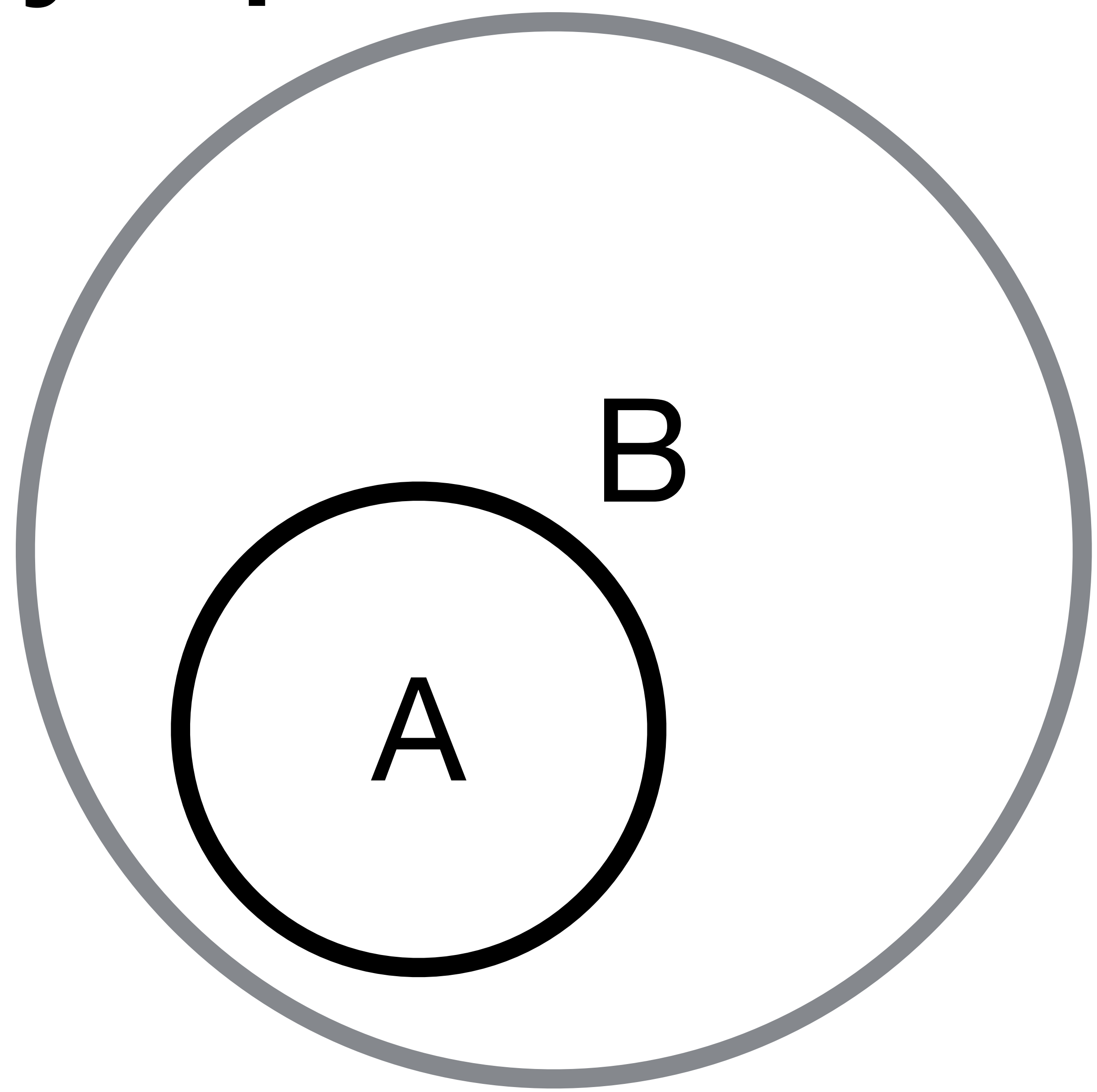


This farmer introduces a spurious error

Ordinary quantifiers

Every A is a B

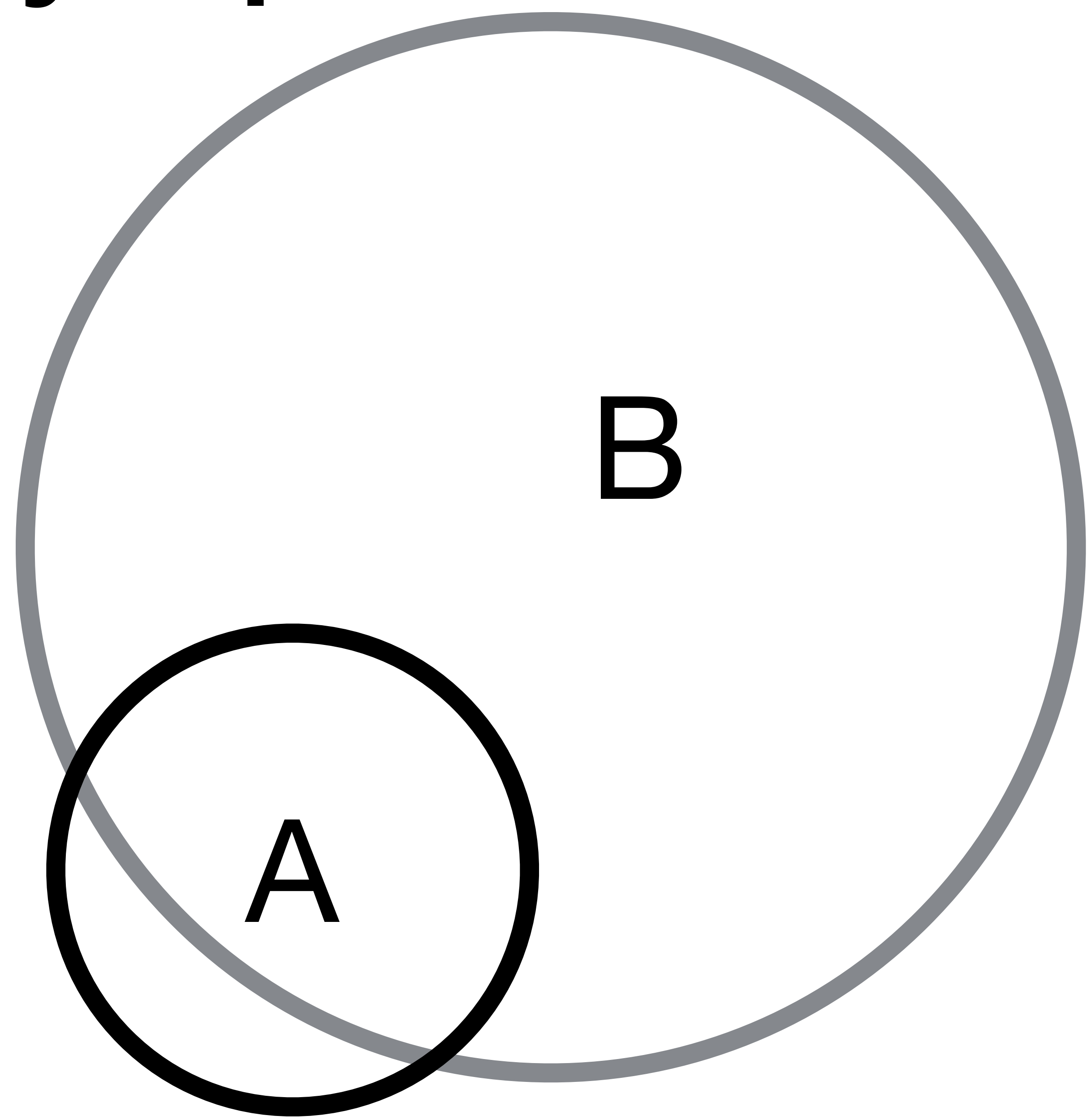
TRUE



Ordinary quantifiers

Every A is a B

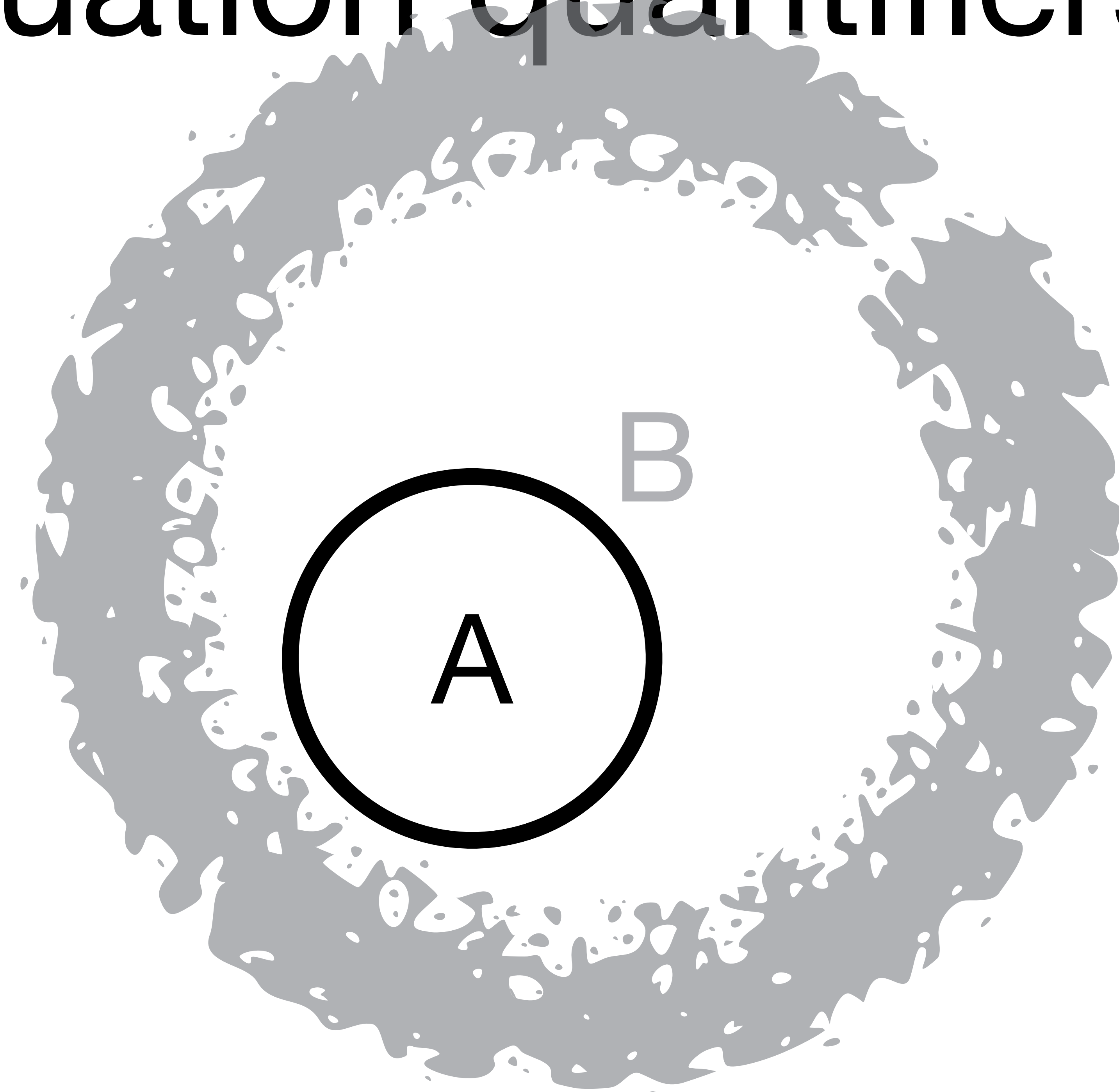
FALSE



Supervaluation quantifiers

Every A is a B

(SUPER)TRUE

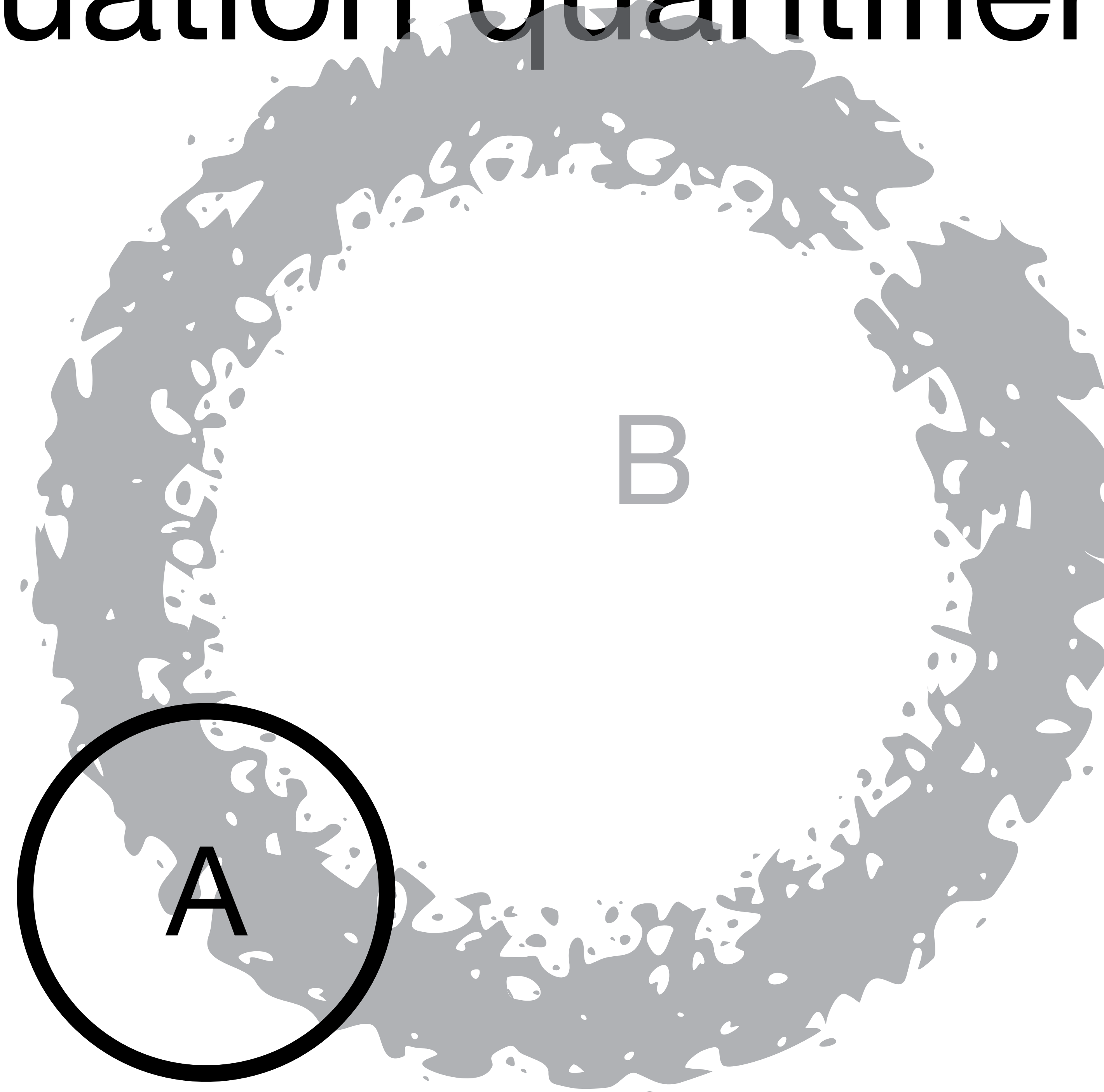


(Everything inside A is definitely inside B)

Supervaluation quantifiers

Every A is a B

(SUPER)FALSE

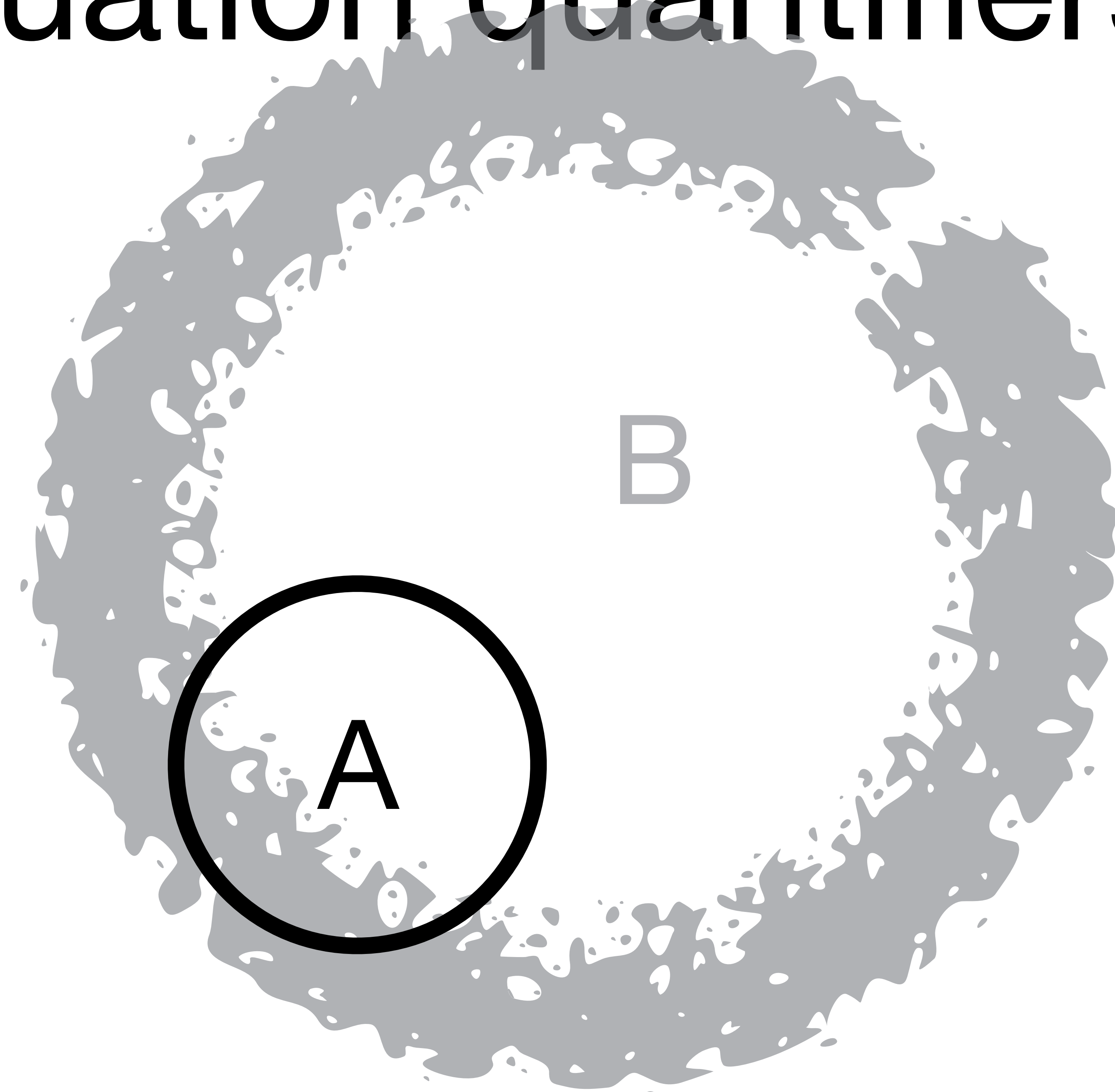


(Some things inside A are definitely outside B)

Supervaluation quantifiers

Every A is a B

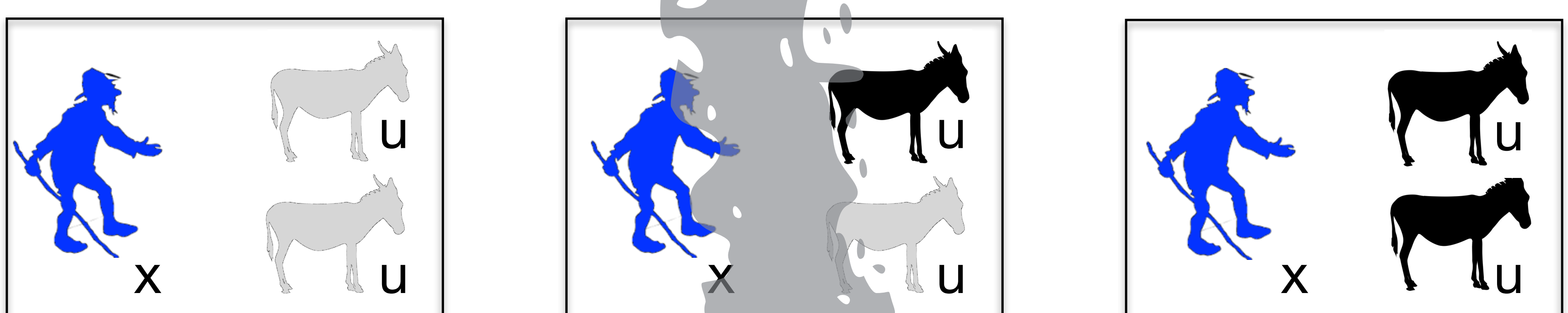
NEITHER



(Some things inside A may or may not be inside B)

Supervaluation quantifiers and trivalent VP meanings

$$B = [[\lambda x.\ x \text{ beats } it_u]]$$



clearly out   neither   clearly in

The supervaluation quantifier *every*$_u$

- If the sentence is supertrue (that is, every farmer beats all of his donkeys), return the input state.

- Otherwise return an error… unless it is superfalse (that is, some farmer beats none of his donkeys).

- (In that case, do nothing.)

The supervaluation quantifier *every*$_u$

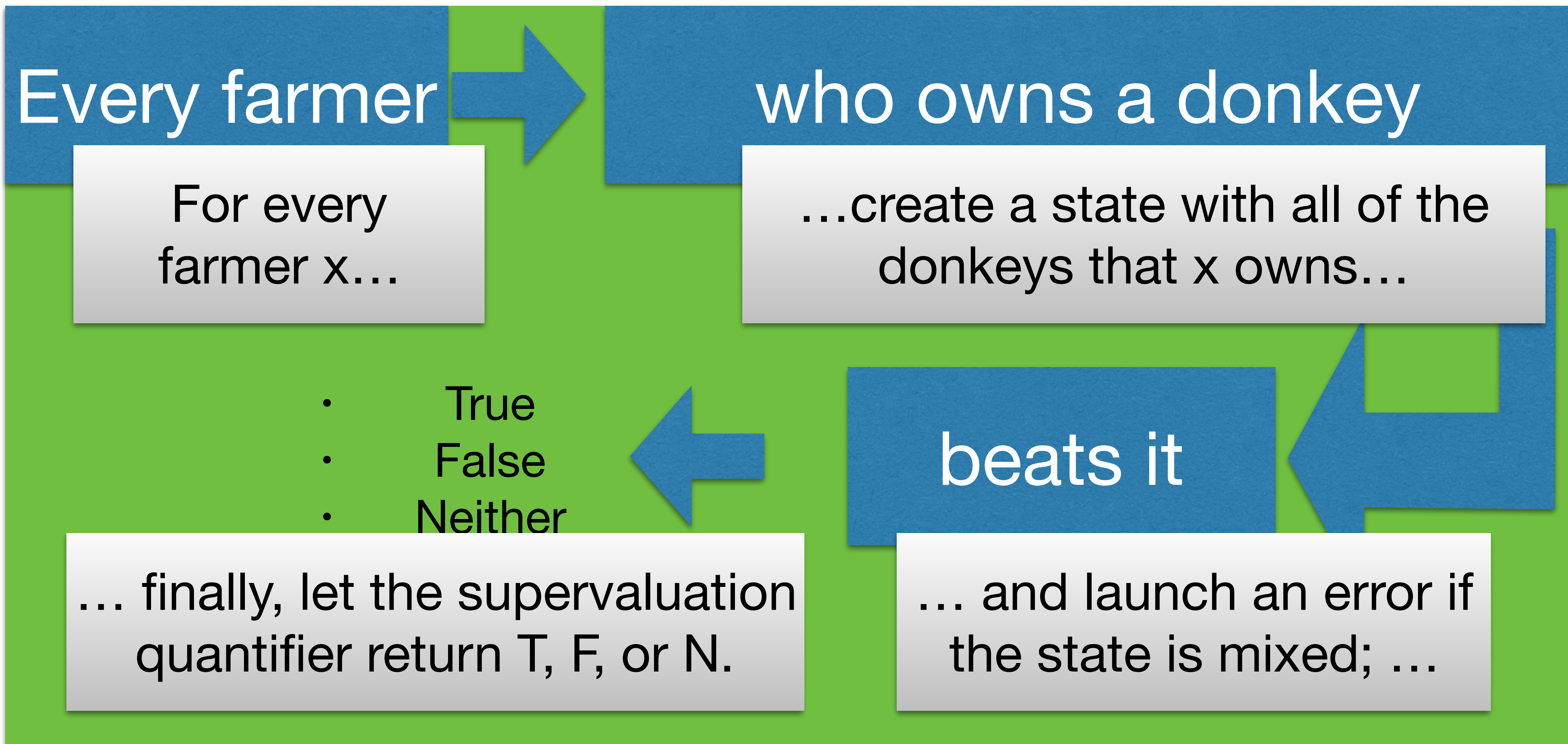
$every_u =_{def} \lambda D \lambda D' \lambda I \lambda O.$

$(O=I \wedge$
$\forall x. (succeeds(u{:=}x ; D)(I) \rightarrow succeeds(u{:=}x ; D ; D')(I)))$

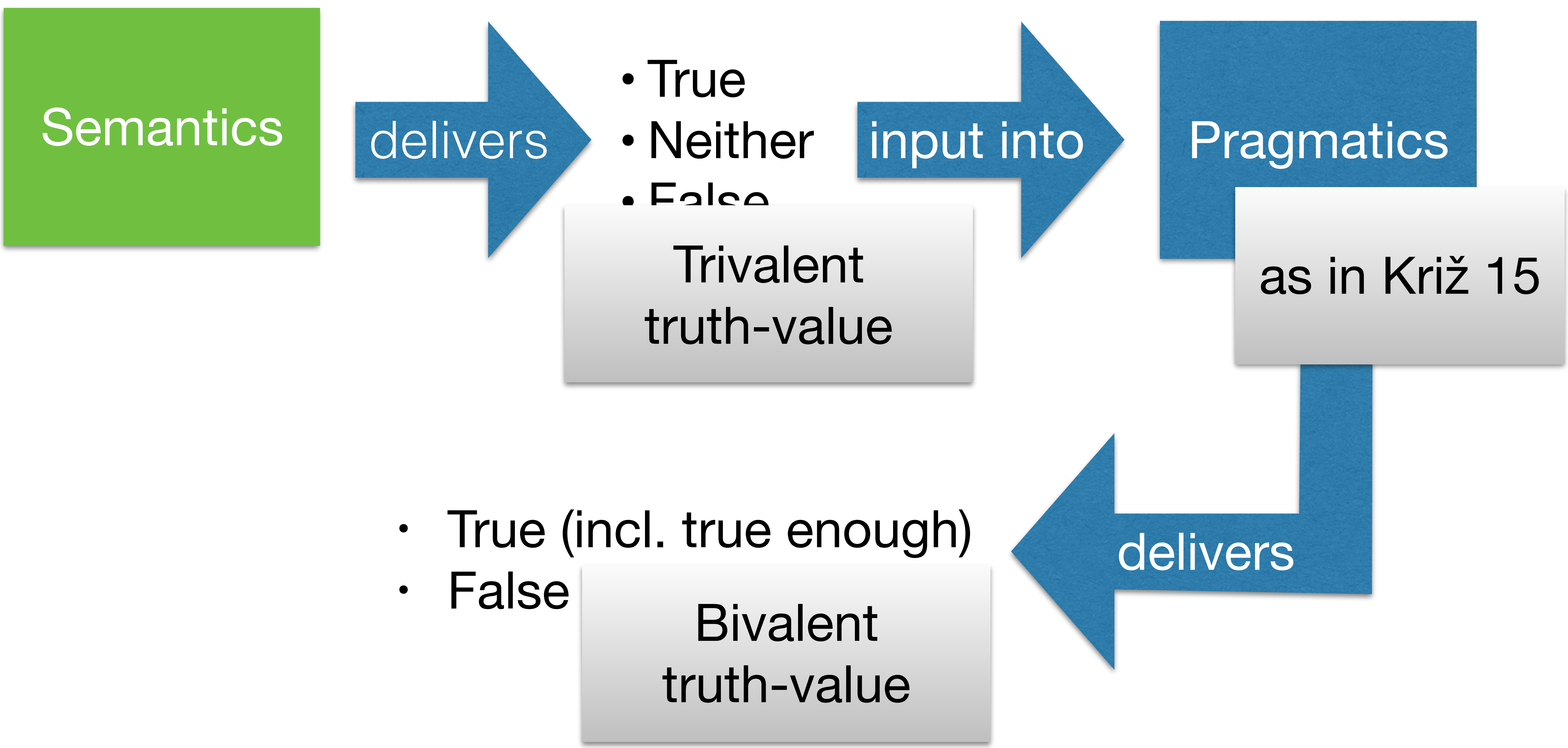
$\vee$

$(O=\varepsilon \wedge$
$\neg\forall x. (succeeds(u{:=}x ; D)(I) \rightarrow succeeds(u{:=}x ; D ; D')$
$(I)) \wedge$
$\wedge\ \exists x. (succeeds(u{:=}x; D)(I) \wedge fails(u{:=}x ; D ; D')(I)))$

Overview of the semantics

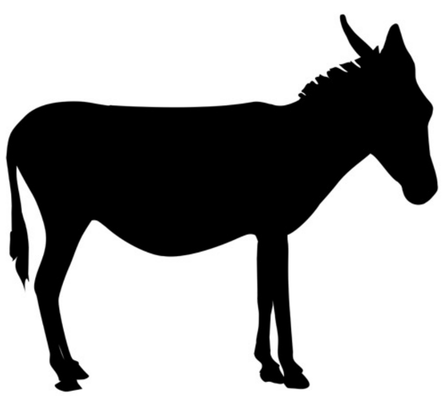


Overview of the pragmatics

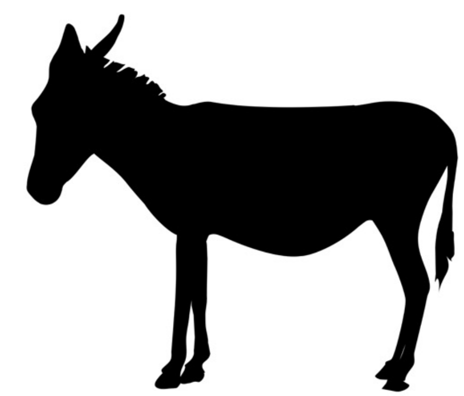


Conclusion

- Definite plurals and donkey sentences can be given a uniform pragmatic treatment (Yoon 96, Krifka 96)
- No need for sum individuals, so we avoid the problems in Kanazawa 01
- By combining van Eijck 93, van Eijck 96, and Brasoveanu 08, we can deliver trivalent semantics in a fully compositional way



Thank you!



Thanks to Justin Bledin, Adrian Brasoveanu,
Jan van Eijck, Manuel Križ,
and NYU colleagues and students
for feedback and encouragement

Bonus slides

for question/answer session

Barker 96 on homogeneity

- The use of an adverbial quantifiers with an asymmetric readings presupposes homogeneity
- In mixed scenarios, if the quantifier is adverbial and the reading is asymmetric, this is violated
- Domain narrowing can come to the rescue by eliminating individuals

Usually, if a man has a hat, he wears it to the concert.

- Can quantify over man-hat pairs (symmetric reading)
- Can quantify over men; in that case, presupposes scenario is not mixed
- If the scenario is mixed, domain narrowing can eliminate hats to help accommodating the presupposition

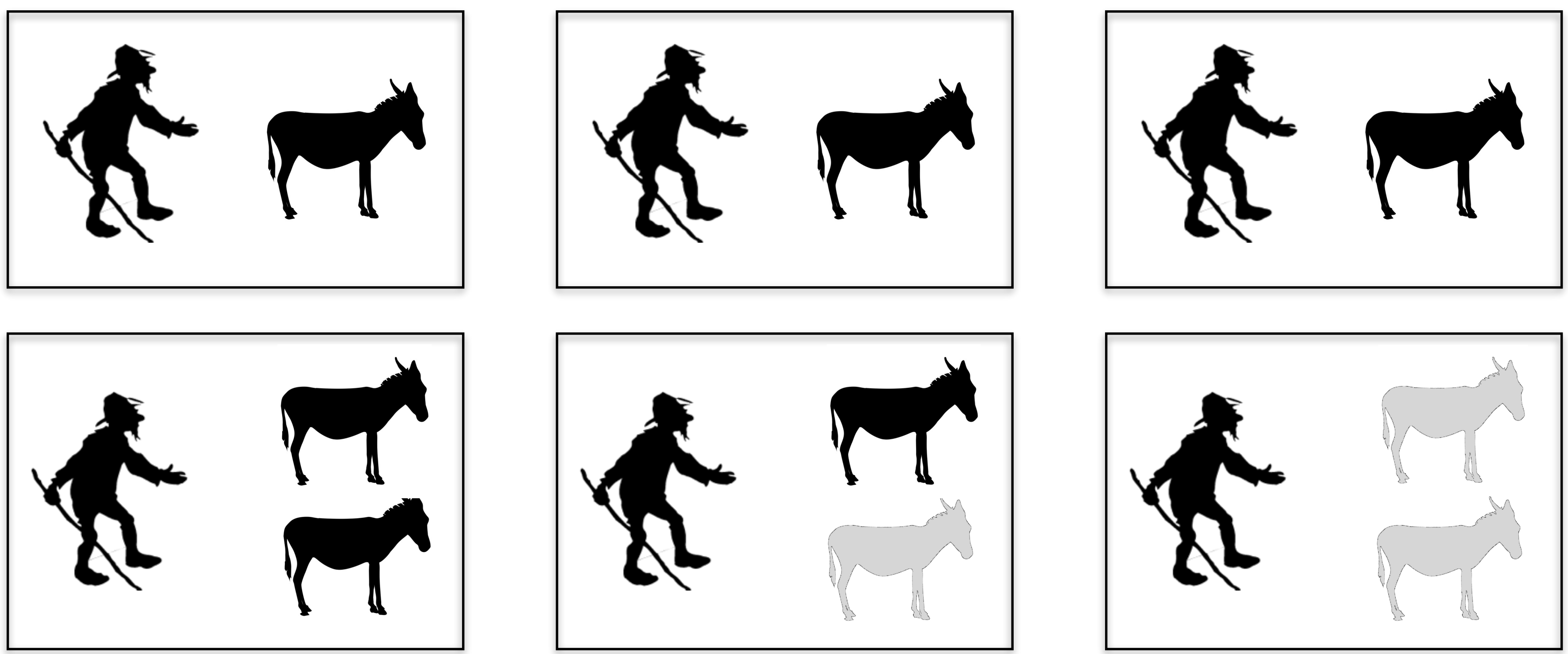
When a professor has a computer problem, he usually solves it.

- 1 professor solved 70 out of 90 problems last year, thus violating homogeneity
- 10 professors each solved 0 of 1 problems
- Barker 96: homogeneity presupposition should lead to presupposition failure, or else domain narrowing should lead to truth by removing 20 hard problems
- But the sentence is judged false

Every farmer who owns a donkey beats it

“What is the world like?”

True | Neither | False



w_{left} | w_{actual} | w_{right}

Predictions of maximally fine-grained current issues

- Every farmer … —> universal reading
- No farmer … -> existential reading
- Most farmers … -> universal reading
- A farmer … -> universal (!) reading

Predictions for uniqueness requirements of pronouns

- A: “This sick boy only speaks Welsh. Can anyone help him?”/“Is there a Welsh doctor in London?”
  B: “There is a doctor in London and he is Welsh.”

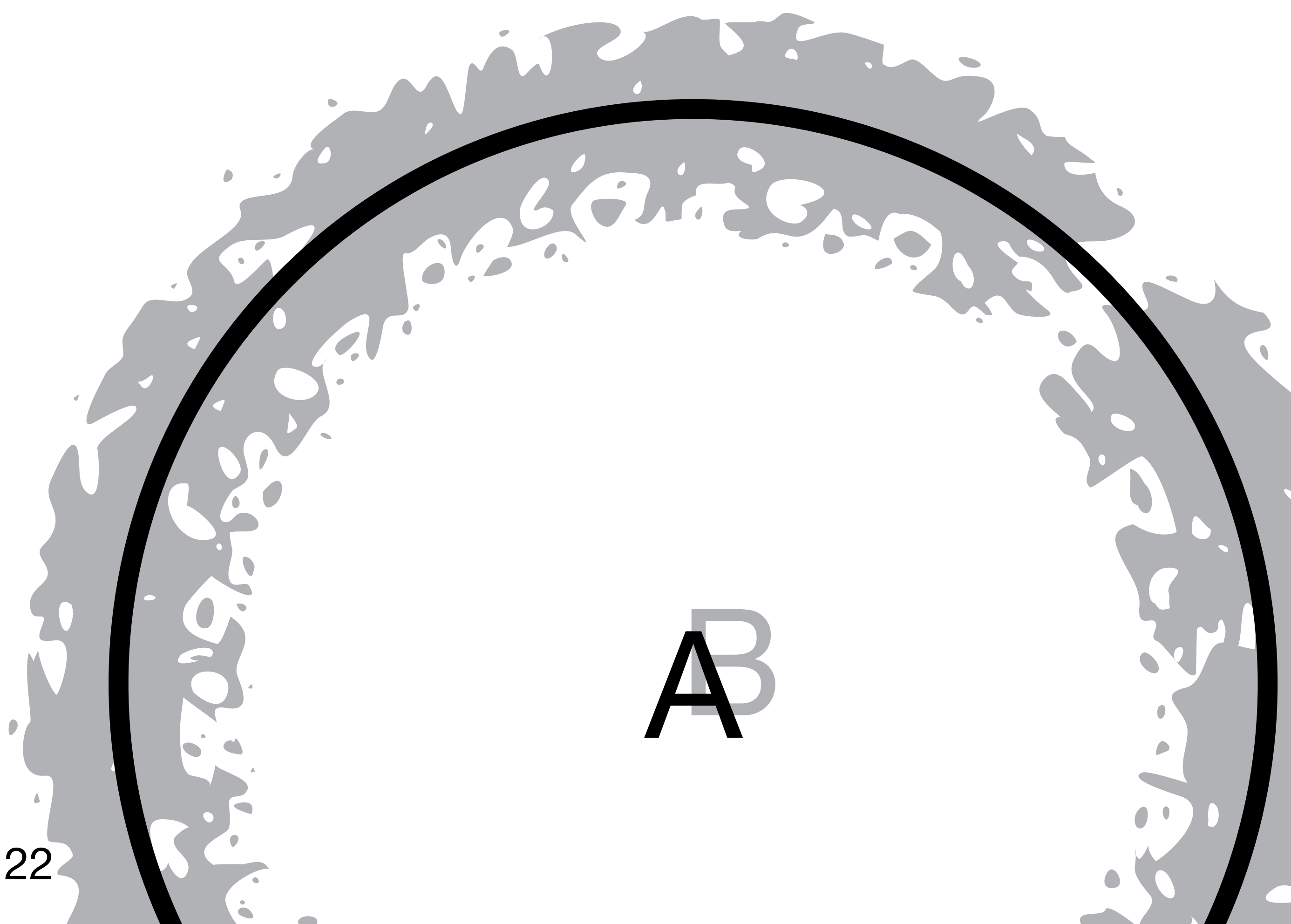
- *true enough despite the presence of non-Welsh doctors in London*

- A: “How many Welsh doctors are in the city?” / “Are there any non-Welsh ones?”
  B: “There is a doctor in London and he is Welsh.”
  not true enough due to non-Welsh doctors

A DRS D resolves a DRS D’ iff it makes it totally precise

- resolves($D_{precise}$,D_{fuzzy}) $=_{def}$

  $\forall I.$ (succeeds(D_{fuzzy},I) → succeeds($D_{precise}$,I)) ∧
  $\forall I.$ (fails(D_{fuzzy},I) → fails($D_{precise}$,I)) ∧
  $\neg\exists I.$ error($D_{precise}$,I)

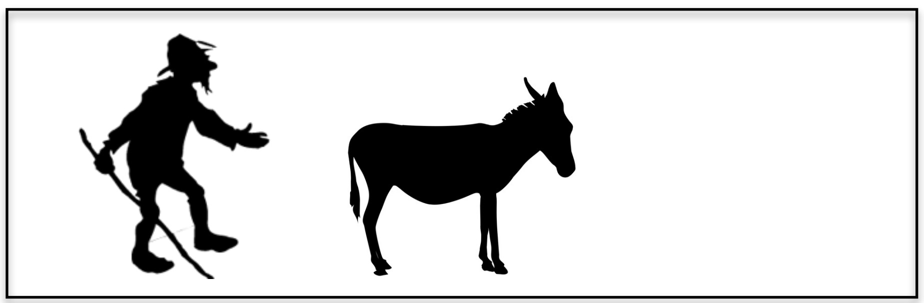


Existential and universal readings

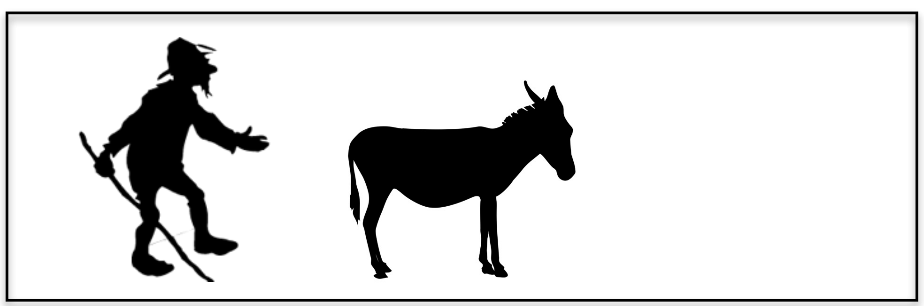
Every farmer who owns a donkey reports it to the IRS

clearly false

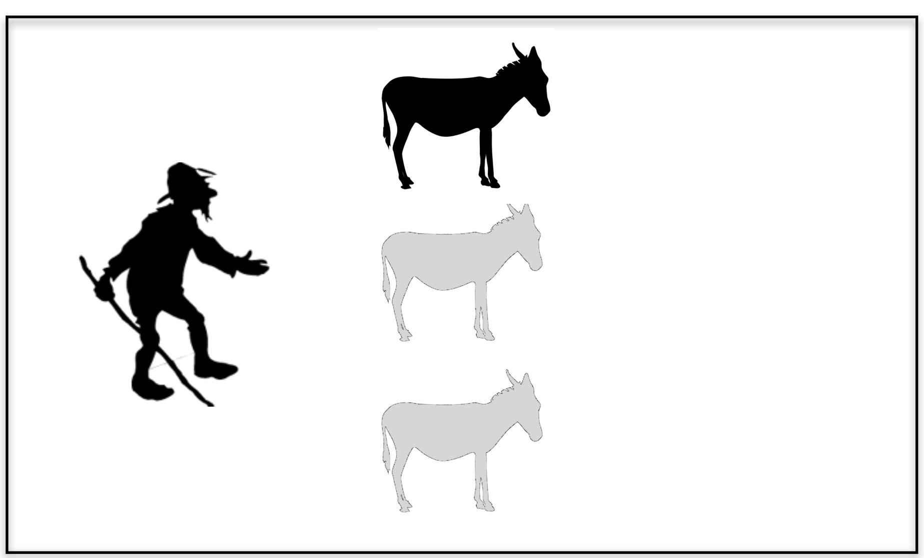
in this mixed scenario



Jake reports his donkey



George reports his donkey



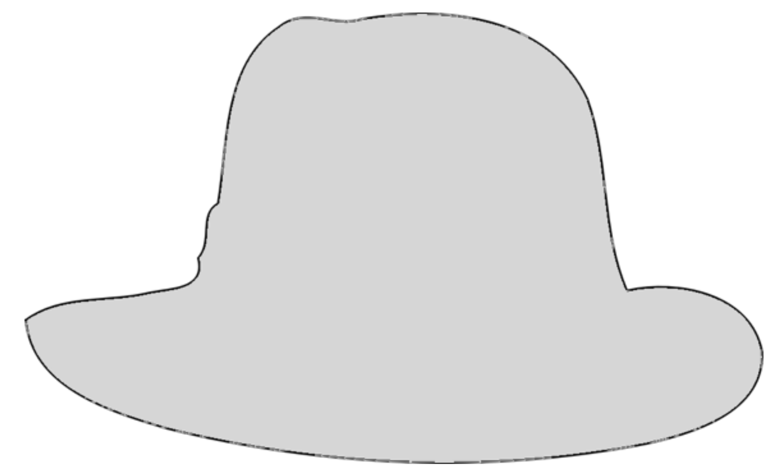
Giles reports *only one* of his donkeys

Every farmer who owns a

... donkey will report all of his donkeys to the IRS

This is the universal reading

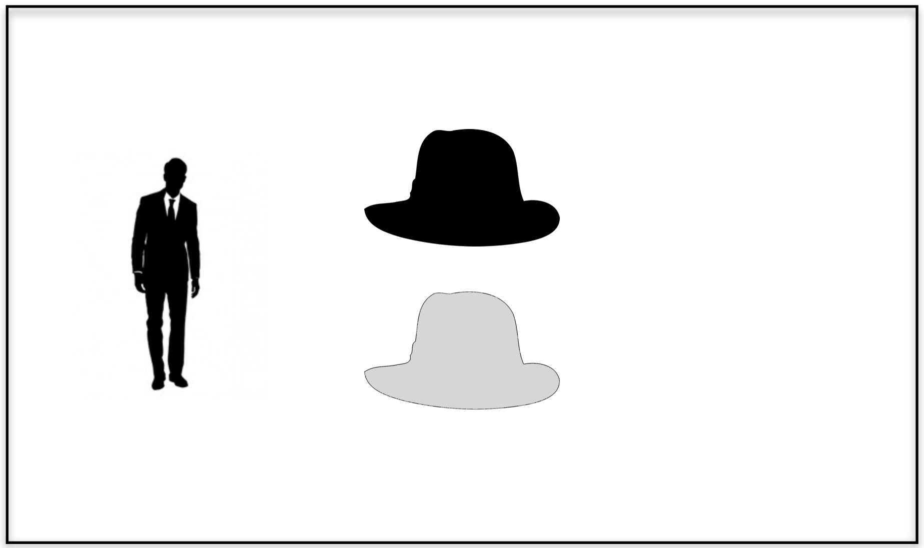
Every man who has a hat will wear it to the concert



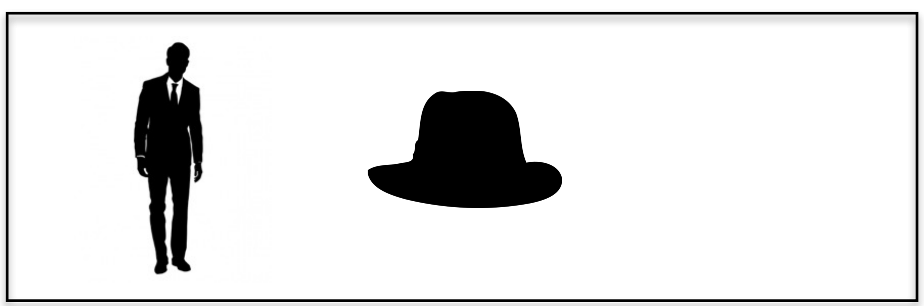
Hats that get worn will be shown in **black**

Hats that don't get worn, in **grey**

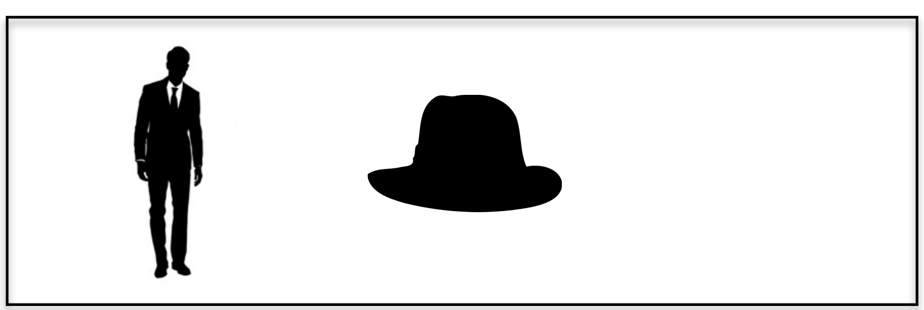
Every man who has a hat will wear it to the concert



Al will wear *one* of his two hats



Bill will wear his hat

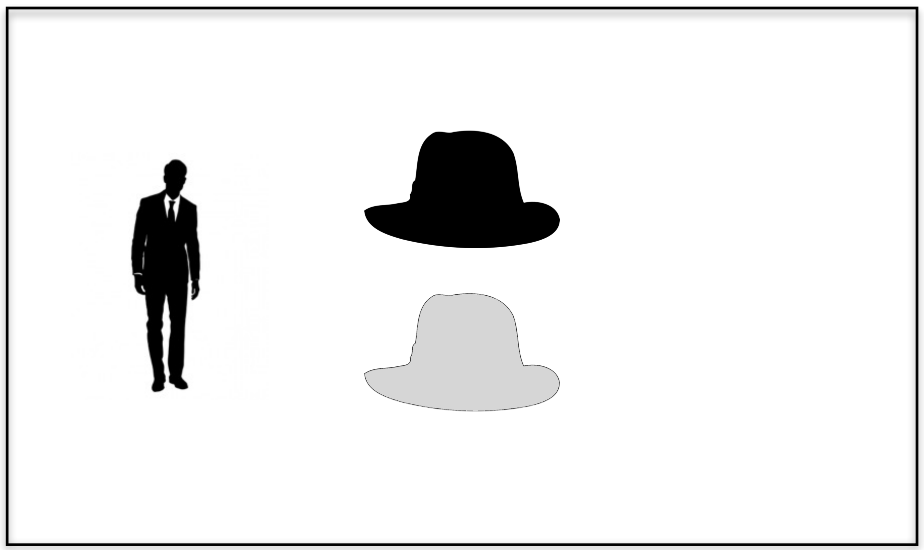


Carl will wear his hat

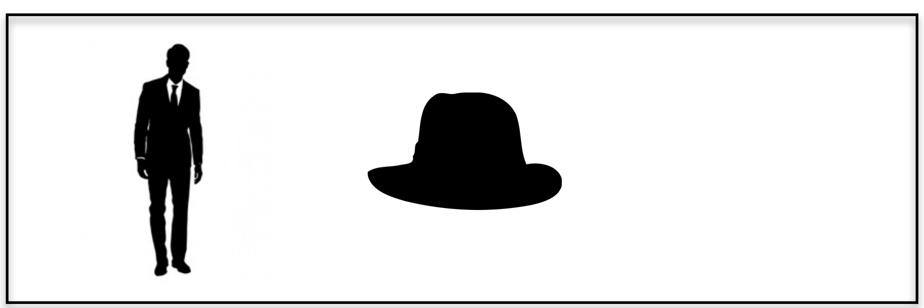
Dekker 93; Chierchia 95

Every man who has a hat will wear it to the concert

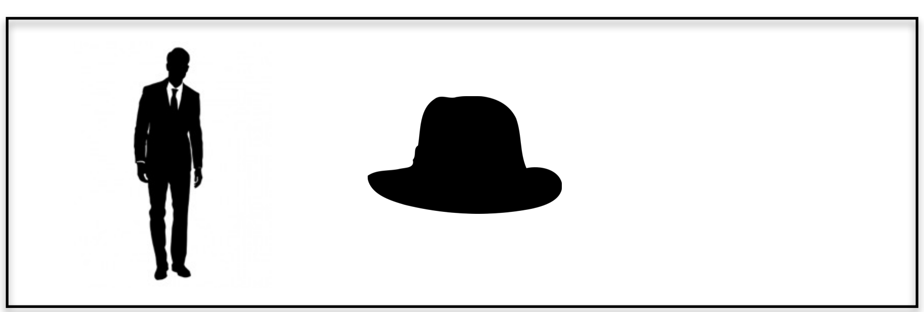
clearly true
in this mixed scenario



Al will wear *one* of his two hats



Bill will wear his hat



Carl will wear his hat

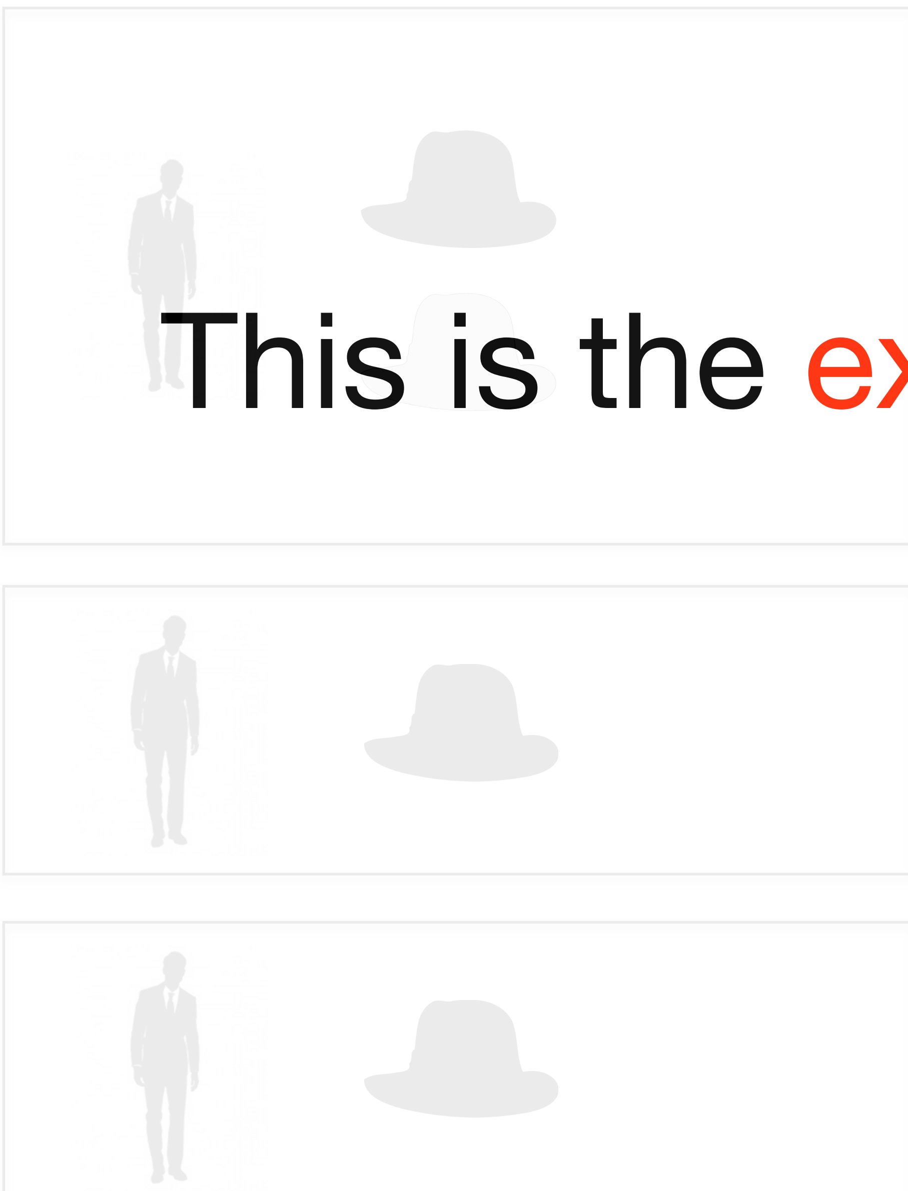
Dekker 93; Chierchia 95

Every man who has a hat

will wear it to the concert

... will wear *one of his hats* to the concert

clearly true in this mixed scenario



Al will wear *one* of his two hats

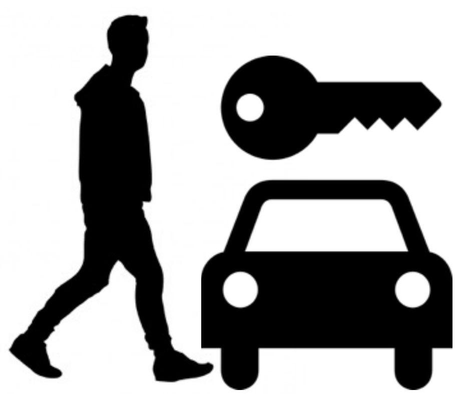
This is the *existential* reading

Bill will wear his hat

Carl will wear his hat

Dekker 93; Chierchia 95

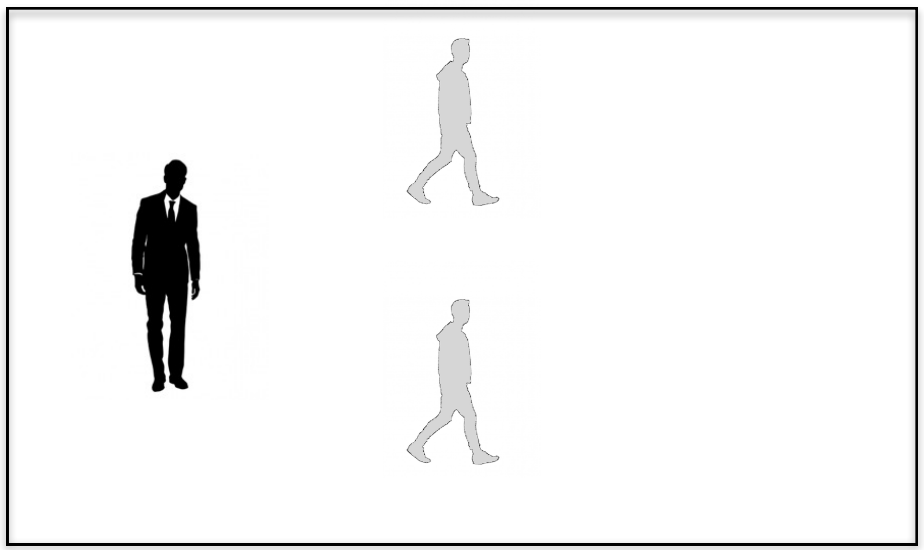
No man who has a 10-year-old son gives him the car keys



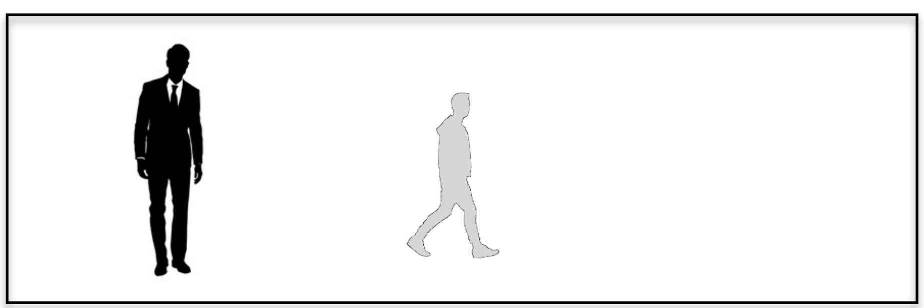
Sons that get the keys will be shown in **black** (and with keys)

Sons that don't get them, in **grey** (and without keys)

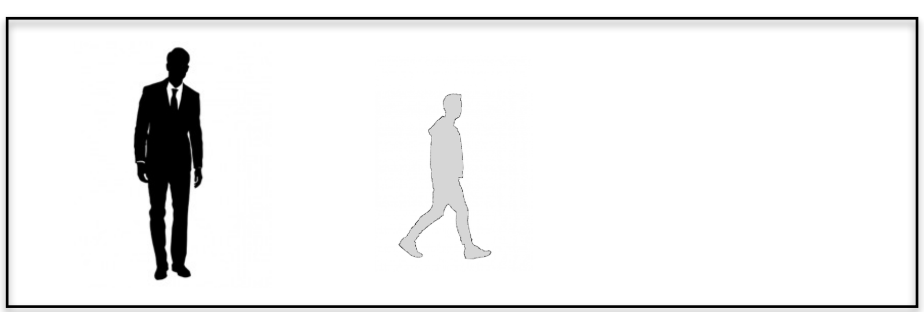
No man who has a 10-year-old son gives him the car keys



Al gives *none* of his sons the keys



Bill doesn’t give his son the keys

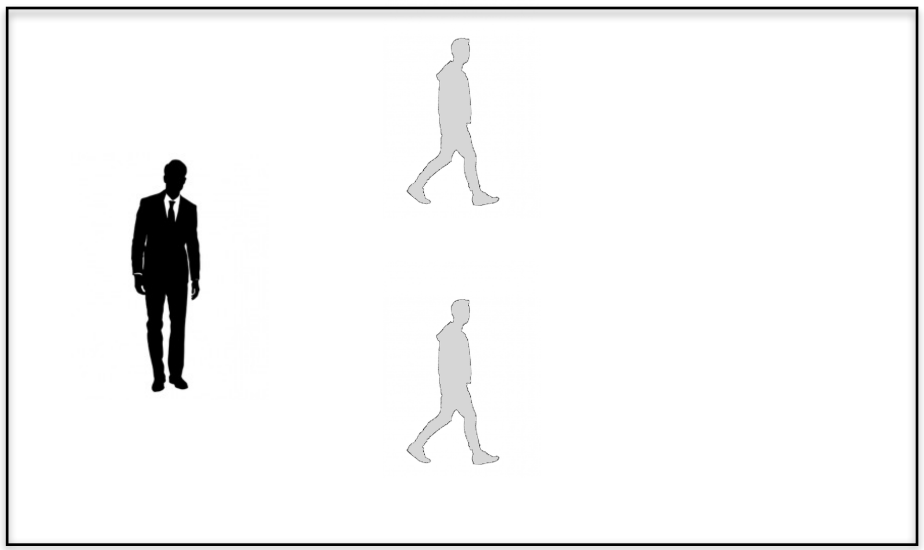


Carl doesn’t give his son the keys

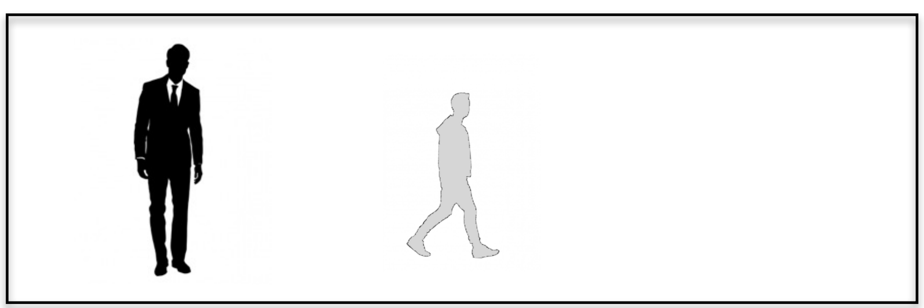
Rooth 87

No man who has a 10-year-old son gives him the car keys

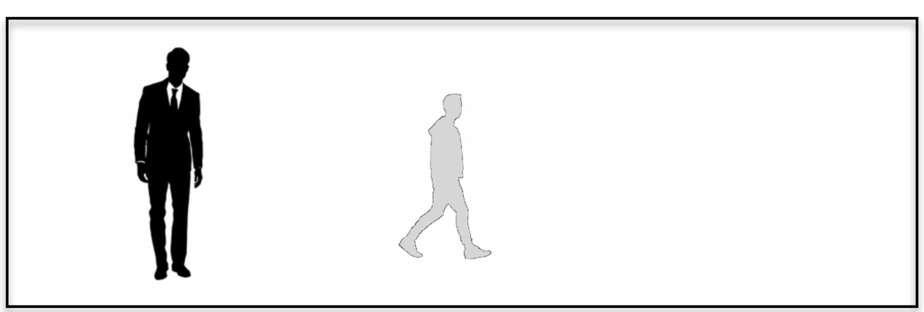
clearly true



Al gives *none* of his sons the keys



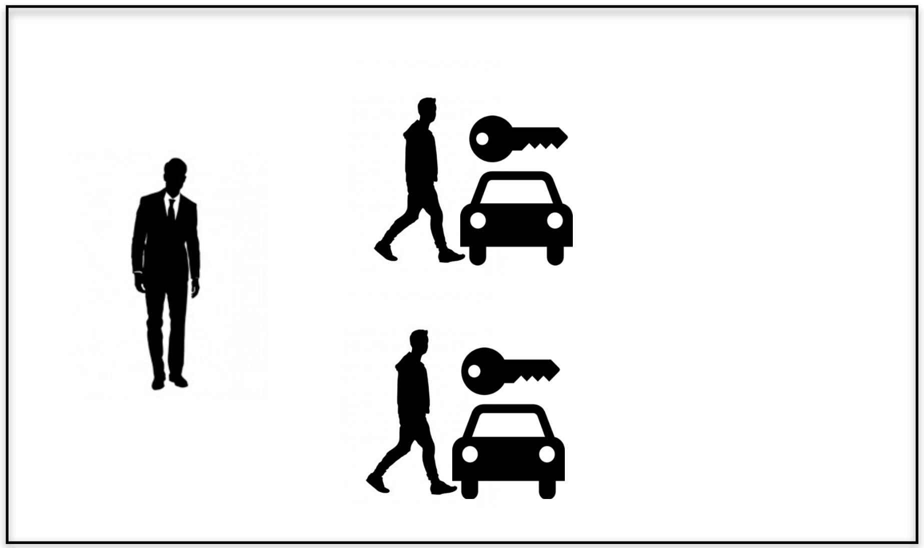
Bill doesn’t give his son the keys



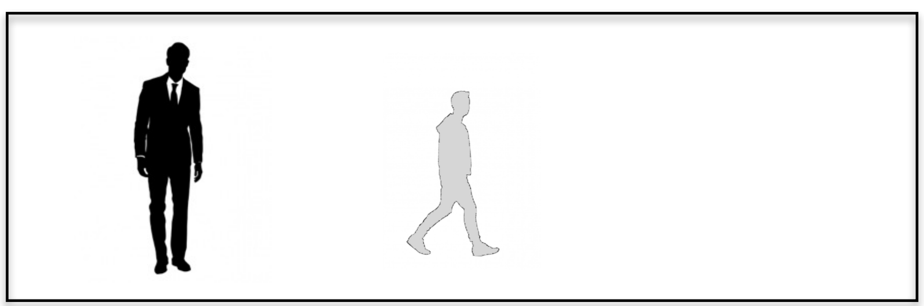
Carl doesn’t give his son the keys

Rooth 87

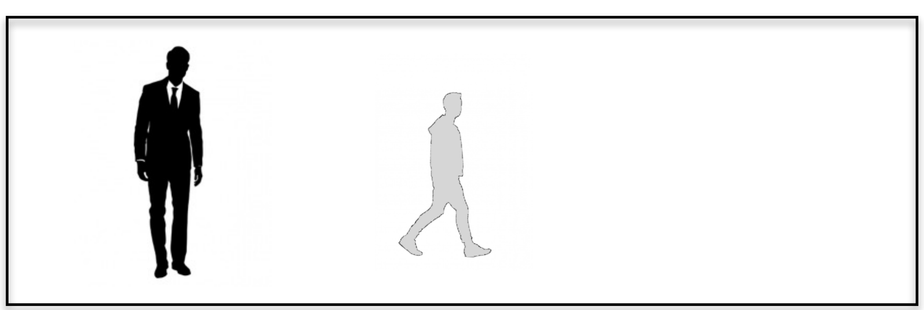
No man who has a 10-year-old son gives him the car keys



Al gives *both* of his sons the keys



Bill doesn’t give his son the keys

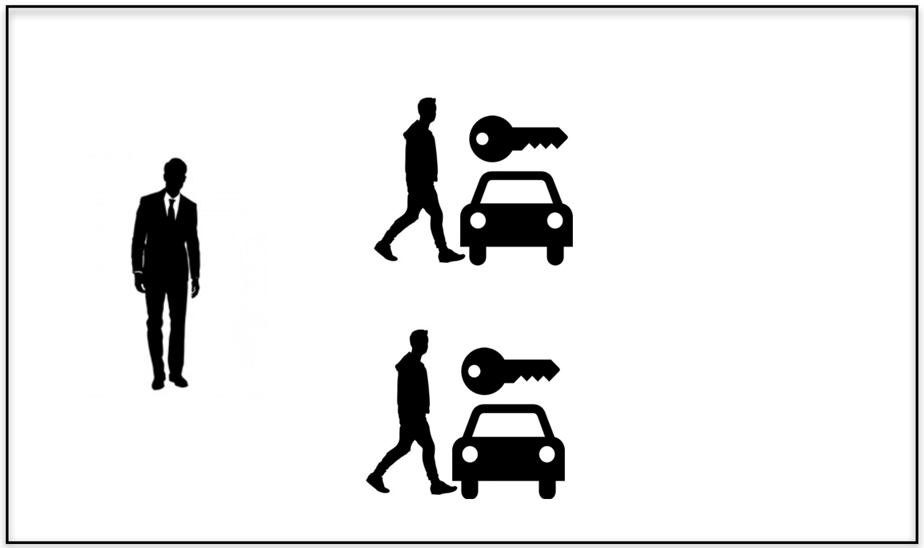


Carl doesn’t give his son the keys

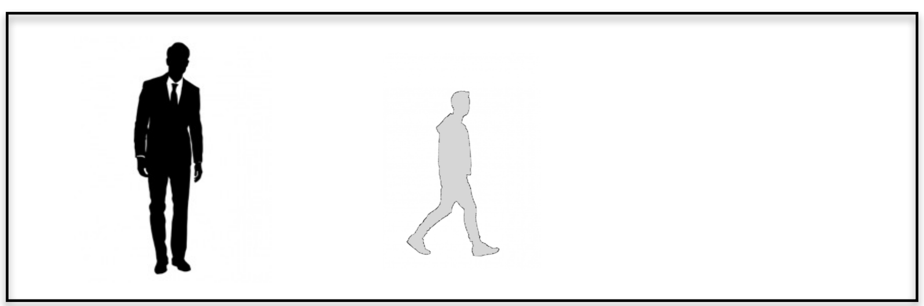
Rooth 87

No man who has a 10-year-old son gives him the car keys

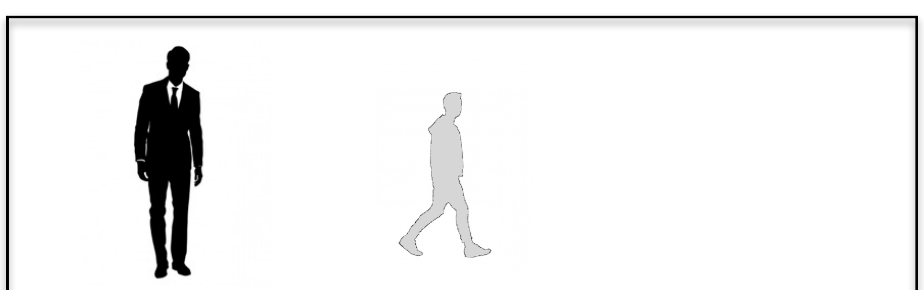
clearly false



Al gives *both* of his sons the keys



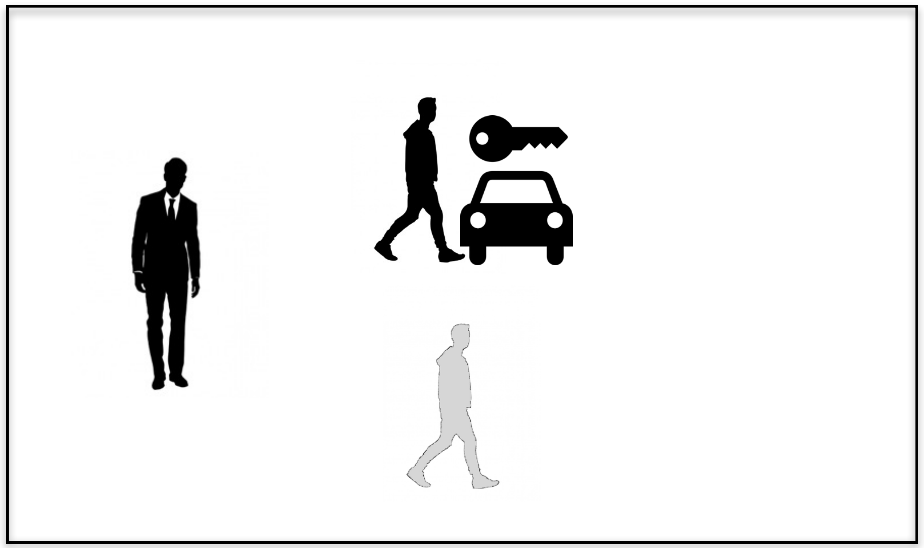
Bill doesn’t give his son the keys



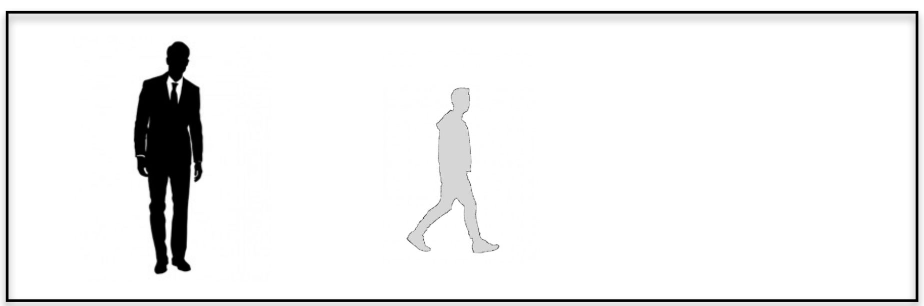
Carl doesn’t give his son the keys

Rooth 87

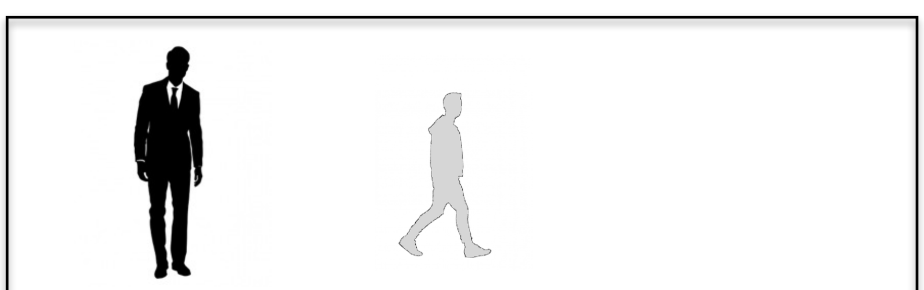
No man who has a 10-year-old son gives him the car keys



Al gives *only one* of his sons the keys



Bill doesn't give his son the keys

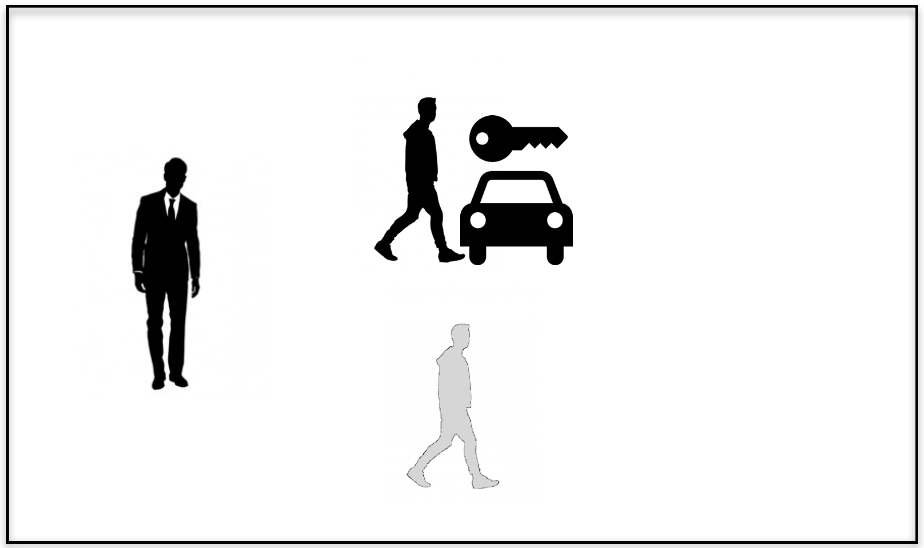


Carl doesn't give his son the keys

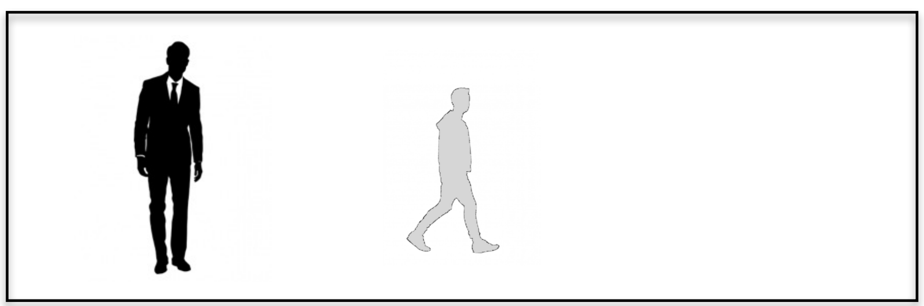
Rooth 87

No man who has a 10-year-old son gives him the car keys

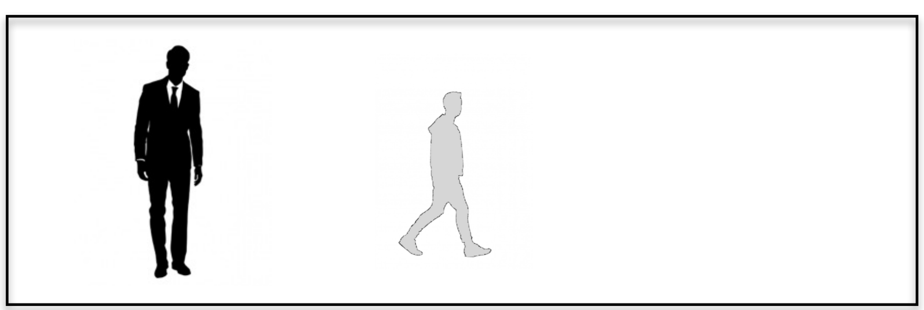
still false
in this mixed scenario



Al gives *only one* of his sons the keys



Bill doesn't give his son the keys



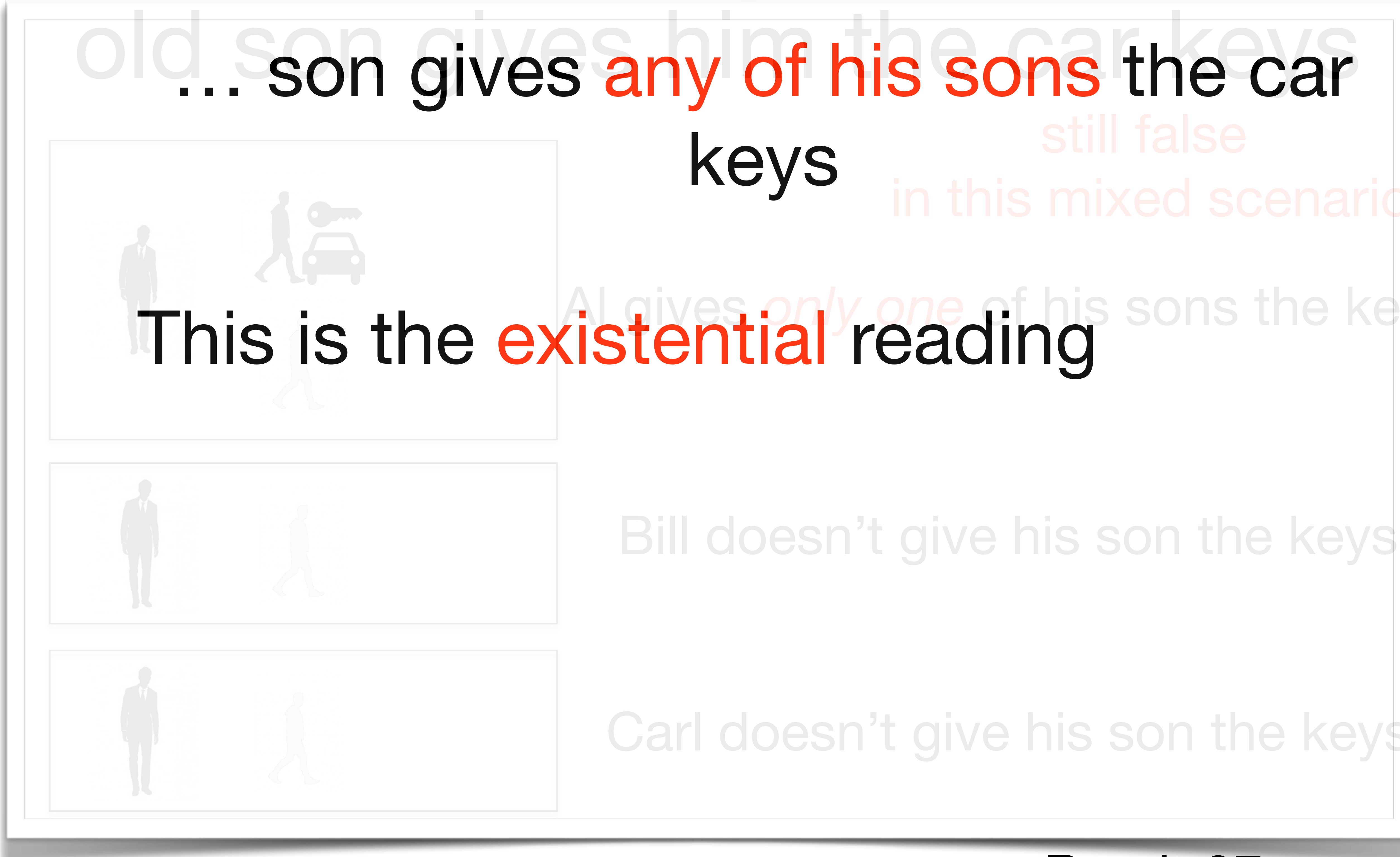
Carl doesn't give his son the keys

Rooth 87

No man who has a 10-year-

… son gives any of his sons the car keys

This is the existential reading



Rooth 87

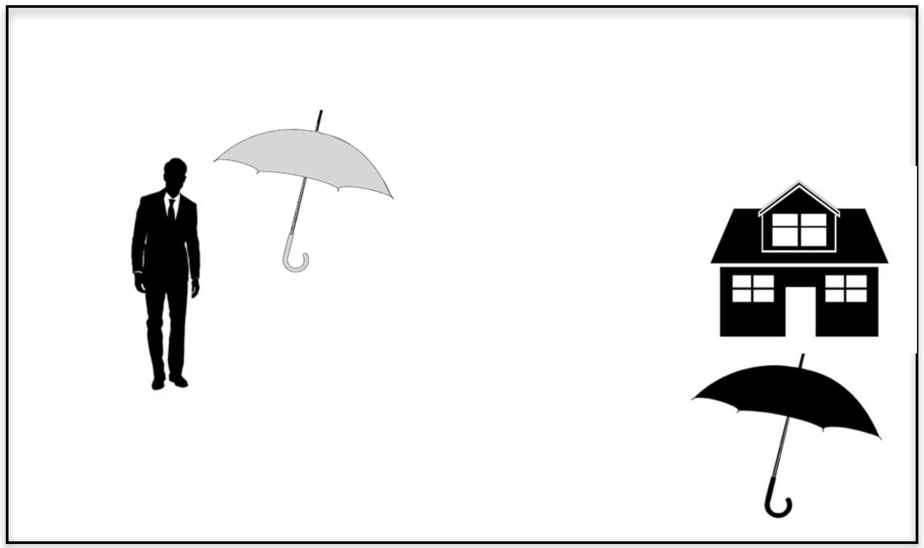
No man who has an umbrella leaves it home on a rainy day

Umbrellas left home
are **black**
(and with a house)

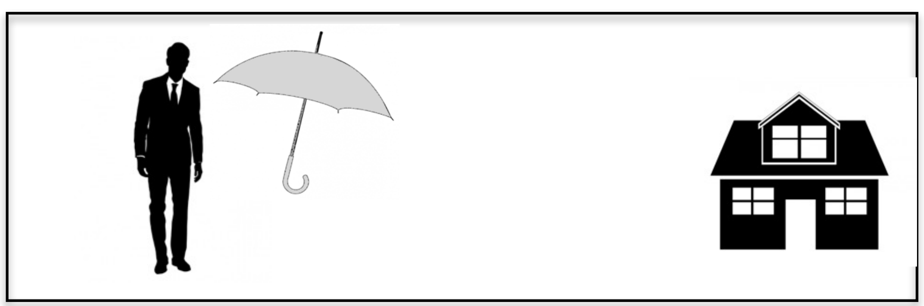
Umbrellas taken along
are grey
(and without a house)

No man who has an umbrella leaves it home on a rainy day

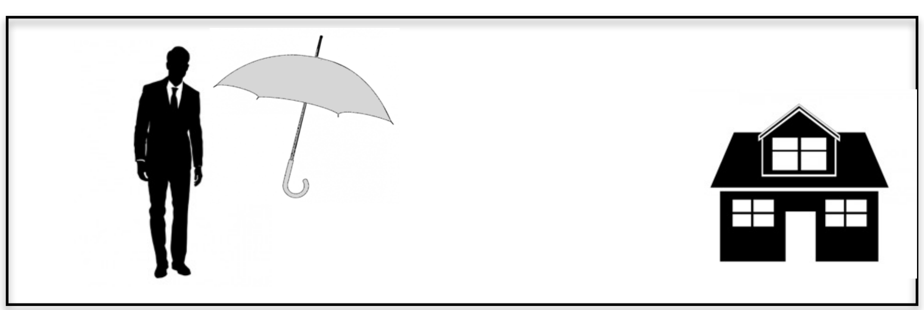
clearly true
in this mixed scenario



Al leaves *one* of his umbrellas home
(but takes another one with him)



Bill doesn’t leave his umbrella home



Carl doesn’t leave his umbrella home

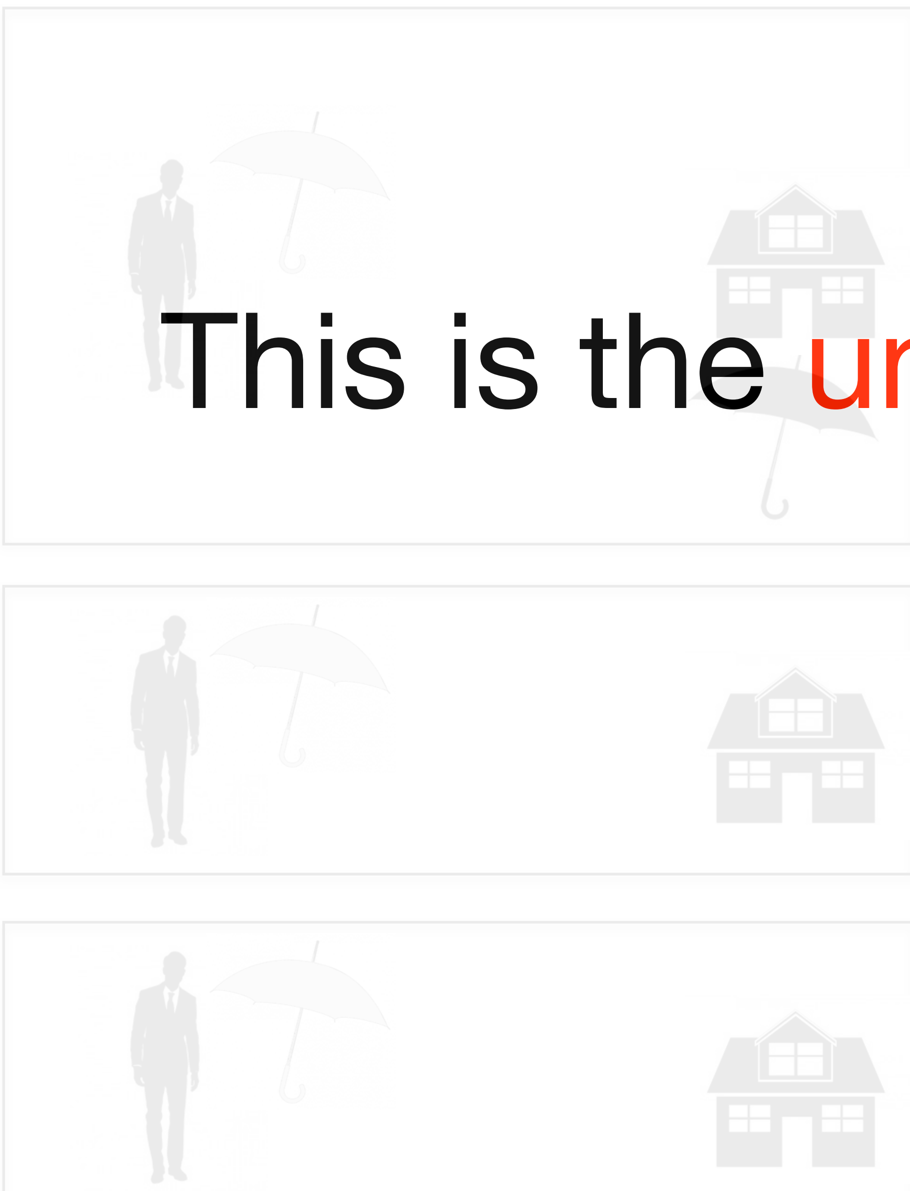
Rooth 87

No man who has an umbrella

leaves it home on a rainy day

... leaves all his umbrellas home on a rainy day

clearly true in this mixed scenario



Al leaves *one* of his umbrellas home (but takes another one with him)

This is the universal reading

Bill doesn't leave his umbrella home

Carl doesn't leave his umbrella home

Rooth 87

I will call a donkey sentence *homogeneous* if it is not judged true in mixed scenarios.

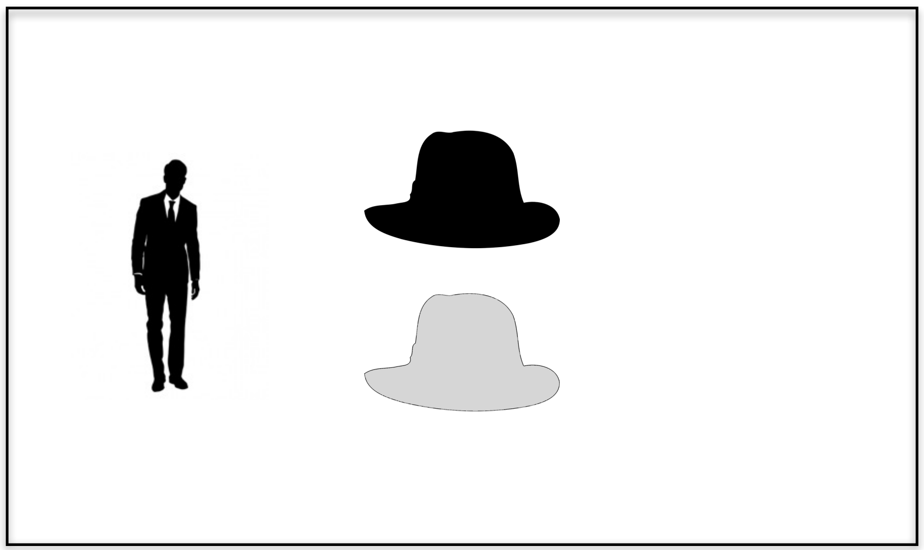
Homogeneous sentences so far

- Every farmer who owns a donkey reports it to the IRS
- Every man who has a hat will leave it home tonight
- No man who has a 10-year-old son gives him the car keys

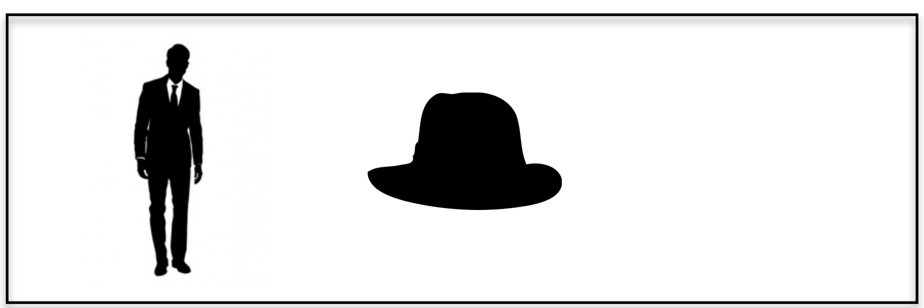
Both universal and existential readings can be homogeneous

- Every farmer who owns a donkey reports all of his donkeys to the IRS —> *universal*
- Every man who has a hat will leave all his hats home tonight—> *universal*
- No man who has a 10-year-old son gives any of his sons the car keys—> *existential*

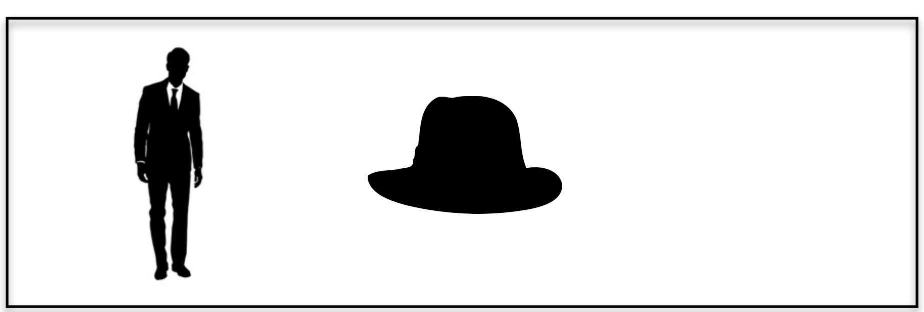
Every man who has a hat will leave it home tonight



Al will leave *one* of his hats home (and take the other one with him)



Bill will leave his hat home

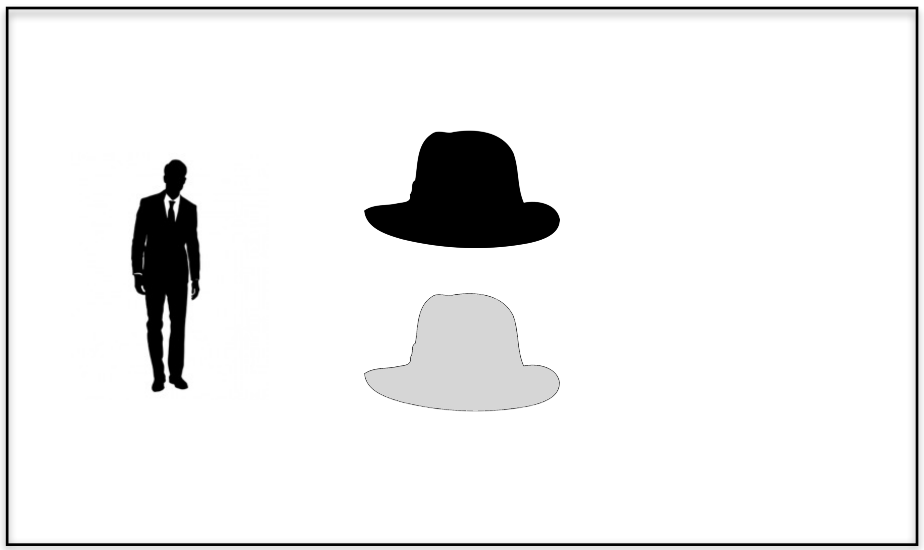


Carl will leave his hat home

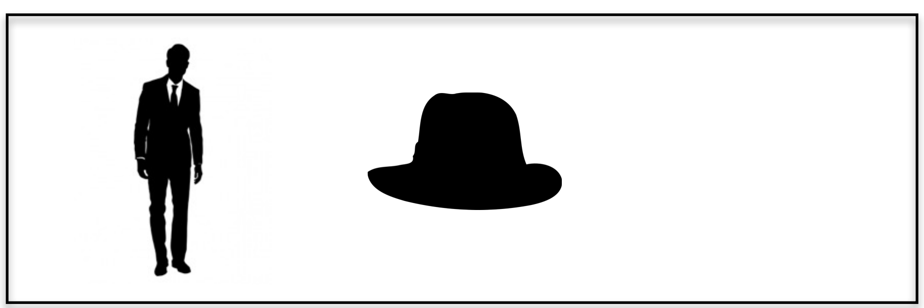
Dekker 93; Chierchia 95

Every man who has a hat will leave it home tonight

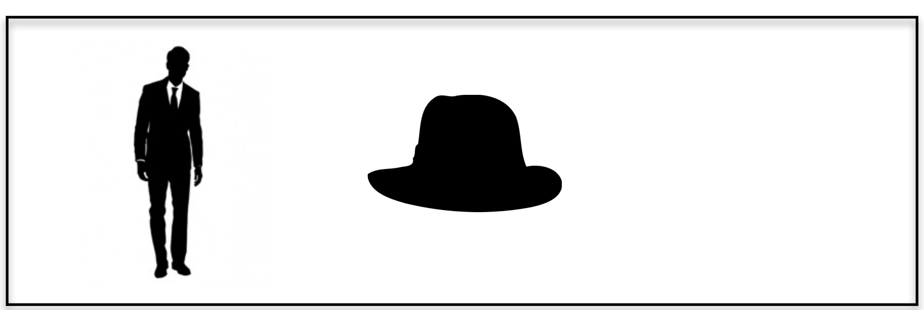
clearly false
in this mixed scenario



Al will leave *one* of his hats home (and take the other one with him)



Bill will leave his hat home



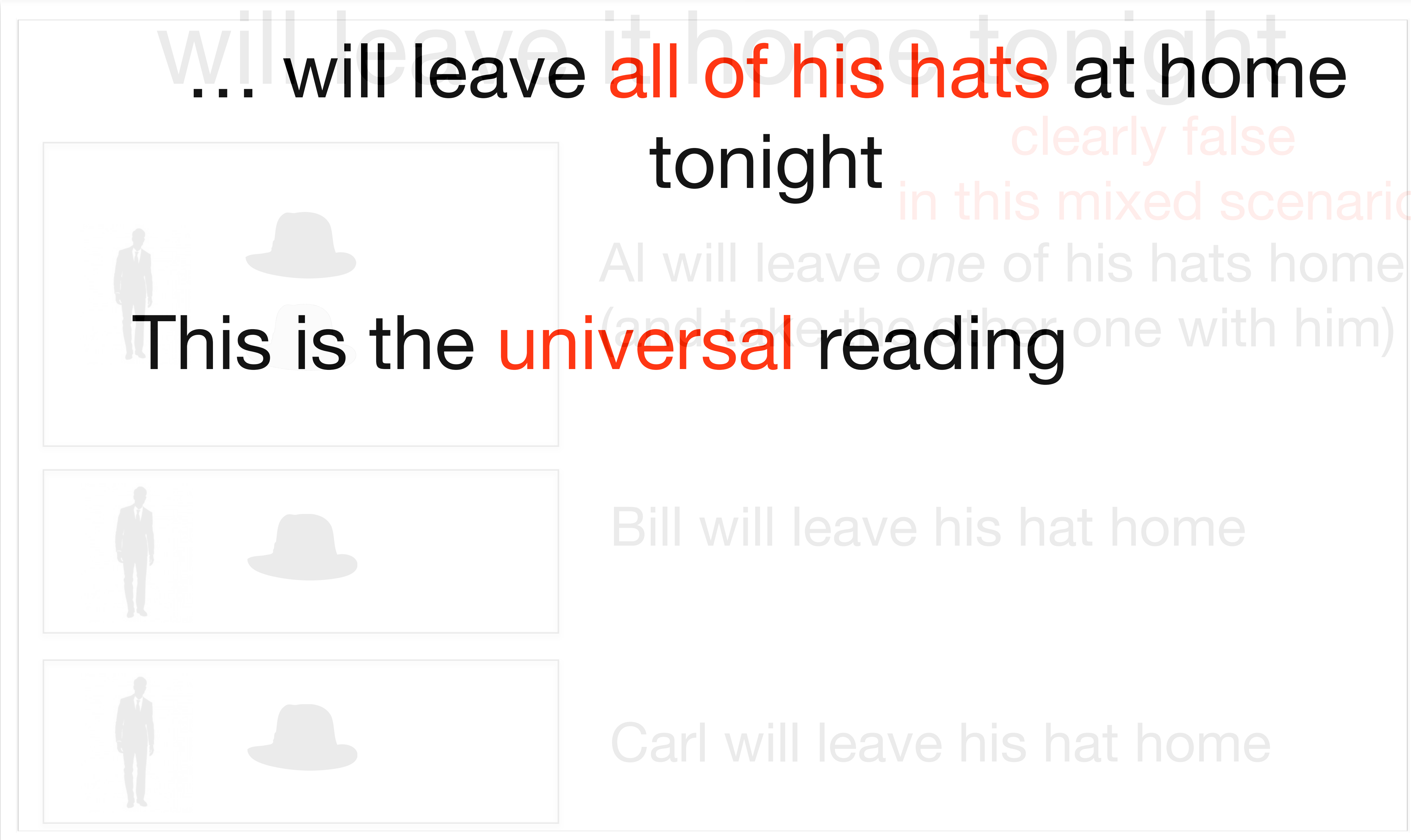
Carl will leave his hat home

Dekker 93; Chierchia 95

Every man who has a hat

… will leave all of his hats at home tonight

This is the universal reading



Dekker 93; Chierchia 95