On the strength of being positive

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Scales, degrees and implicature Workshop, 26.5.2021

The focus - positive vs negative

(1) It is possible that it contains either a blue ball or a yellow ball.

$\Diamond(A \vee B)$

(2) It is certain that it contains either a blue ball or a yellow ball.

$\Box(A \vee B)$

(3) It contains either a blue ball or a yellow ball.

$A \vee B$

The focus - positive vs negative

(4) It is not certain that it contains both a blue ball and a yellow ball.

$\neg\Box(A \wedge B)$

(5) It is not possible that it contains both a blue ball and a yellow ball.

$\neg\Diamond(A \wedge B)$

(6) It does not contain both a blue ball and a yellow ball.

$\neg(A \wedge B)$

- Large difference in strength between positive and negative

- Large difference in strength between positive and negative
- Consequences for theories of those inferences

- Large difference in strength between positive and negative
- Consequences for theories of those inferences
- And for accounts of the differences between them and regular scalar implicatures

Background

Background

The inferences of the positive cases

The positive cases and their inferences

(7) It is possible that it contains either a blue ball or a yellow ball.

The positive cases and their inferences

(7) It is possible that it contains either a blue ball or a yellow ball.

$\rightsquigarrow$ *it's possible one and possible the other* $\Diamond A \wedge \Diamond B$

FREE CHOICE

The positive cases and their inferences

(7) It is possible that it contains either a blue ball or a yellow ball.

$\rightsquigarrow$ *it's possible one and possible the other* $\Diamond A \wedge \Diamond B$

FREE CHOICE

(8) It is certain that it contains either a blue ball or a yellow ball.

The positive cases and their inferences

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$\rightsquigarrow$ *it's possible one and possible the other* $\Diamond A \wedge \Diamond B$

FREE CHOICE

(8) It is certain that it contains either a blue ball or a yellow ball.

$\rightsquigarrow$ *it's not certain one and not certain the other* $\neg\Box A \wedge \neg\Box B$

DISTRIBUTIVE

The positive cases and their inferences

(7) It is possible that it contains either a blue ball or a yellow ball.

$\rightsquigarrow$ *it's possible one and possible the other* $\Diamond A \wedge \Diamond B$

FREE CHOICE

(8) It is certain that it contains either a blue ball or a yellow ball.

$\rightsquigarrow$ *it's not certain one and not certain the other* $\neg\Box A \wedge \neg\Box B$

DISTRIBUTIVE

(9) It contains either a blue ball or a yellow ball.

The positive cases and their inferences

(7) It is possible that it contains either a blue ball or a yellow ball.

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FREE CHOICE

(8) It is certain that it contains either a blue ball or a yellow ball.

$\rightsquigarrow$ *it's not certain one and not certain the other* $\neg\Box A \wedge \neg\Box B$

DISTRIBUTIVE

(9) It contains either a blue ball or a yellow ball.

$\rightsquigarrow$ *the speaker doesn't know which* $I_s A \wedge I_s B$

IGNORANCE

Similarities and differences

- Similarities and differences with regular scalar implicatures

Similarities and differences

- Similarities and differences with regular scalar implicatures

(10) It is possible that it contains a blue ball. $\Diamond A$

$\rightsquigarrow$ *it's not certain that it does* $\neg\Box A$

SCALAR

Similarities and differences

- Similarities and differences with regular scalar implicatures

(10) It is possible that it contains a blue ball. $\Diamond A$

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SCALAR

- Implicature approach of free choice, distributive, and ignorance inferences

Similarities and differences

- Similarities and differences with regular scalar implicatures

(10) It is possible that it contains a blue ball. $\Diamond A$

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SCALAR

- Implicature approach of free choice, distributive, and ignorance inferences
- It accounts for their similarities with regular implicatures

Similarities and differences

- Similarities and differences with regular scalar implicatures

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SCALAR

- Implicature approach of free choice, distributive, and ignorance inferences
- It accounts for their similarities with regular implicatures
- Supplemented with an account of their differences

Background

Starting from free choice

What is free choice?[1]

[1] von Wright 1968, Kamp 1974, 1978

What is free choice?[2]

(11) It is possible that it contains either a blue ball or a yellow ball.

[2] von Wright 1968, Kamp 1974, 1978

What is free choice?[2]

(11) It is possible that it contains either a blue ball or a yellow ball.

$\rightsquigarrow$ *It is possible that it contains one and possible it contains the other*

[2] von Wright 1968, Kamp 1974, 1978

Why problematic?

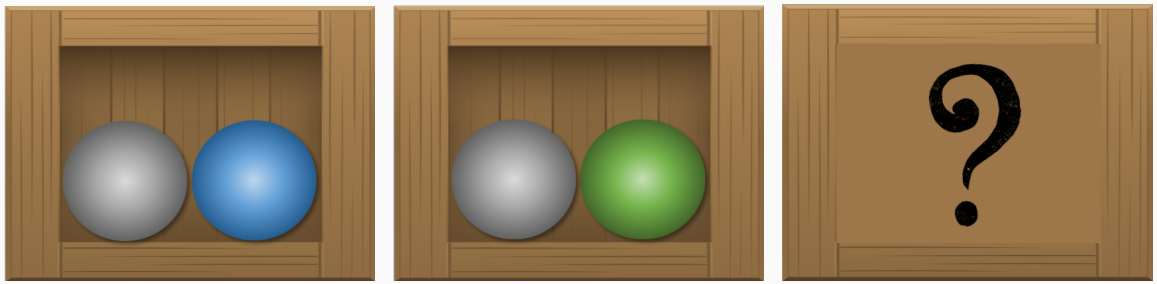
- It doesn't follow from the standard meanings of modals and disjunction

To illustrate

To illustrate

- We don't know what is in the mystery box, but we know it is identical to one of the overt boxes

To illustrate

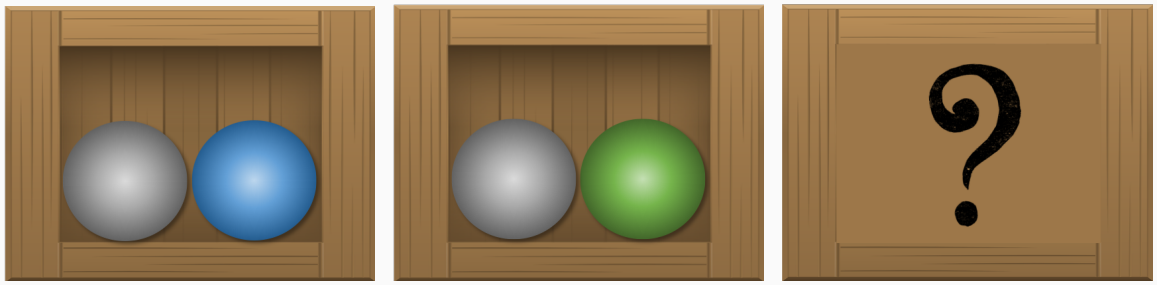


Why problematic: the meaning of modals

(12) It is possible that it contains a blue ball $\Diamond A$

Why problematic: the meaning of modals

(12) It is possible that it contains a blue ball $\Diamond A$

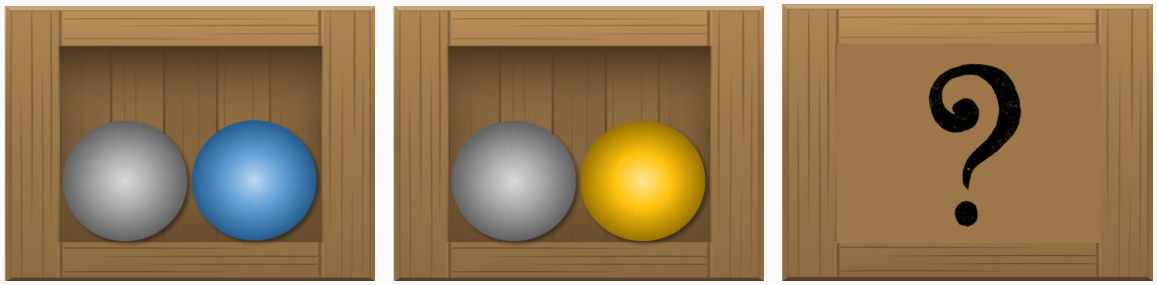


Why problematic: the meaning of disjunction

(13) It contains a blue or a yellow ball $(A \vee B)$

Why problematic: the meaning of disjunction

(13) It contains a blue or a yellow ball $(A \vee B)$

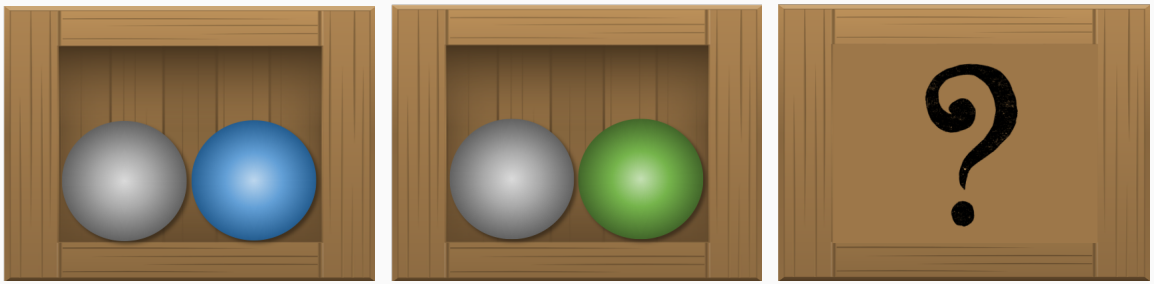


Why problematic

(14) It is possible that it contains either a blue or a yellow ball $\Diamond(A \vee B)$

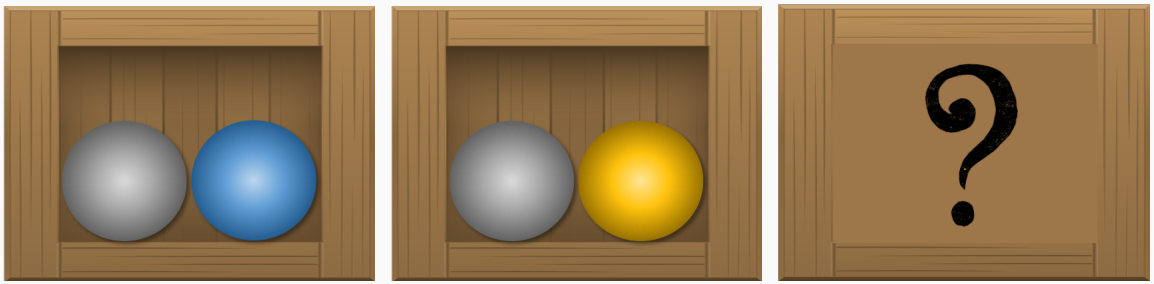
Why problematic

(14) It is possible that it contains either a blue or a yellow ball $\Diamond(A \vee B)$



Why problematic

(15) It is possible that it contains either a blue or a yellow ball $\Diamond(A \vee B)$



The general question

- Where does free choice come from?

Background

The implicature approach

The implicature approach[3]

- The meaning of disjunction and modals are standard

[3] Fox 2007, Klinedinst 2006, Chierchia 2013, Chemla 2010, Franke 2013, Santorio & Romoli 2018, Bar-Lev & Fox 2017 a.o

The implicature approach[3]

- The meaning of disjunction and modals are standard
- Free choice is an implicature

[3] Fox 2007, Klinedinst 2006, Chierchia 2013, Chemla 2010, Franke 2013, Santorio & Romoli 2018, Bar-Lev & Fox 2017 a.o

Free choice and the implicature approach

(16) It is possible A or B $= \Diamond A \vee \Diamond B$

Free choice and the implicature approach

(16) It is possible A or B $= \Diamond A \vee \Diamond B$

(17) $\left\{ \begin{array}{ll} \text{It is possible A} & \Diamond A \\ \text{It is possible B} & \Diamond B \\ \ldots & \end{array} \right\}$

Free choice and the implicature approach

(18) $\left\{ \begin{array}{ll} \text{It is possible A} & \Diamond A \\ \text{It is possible B} & \Diamond B \end{array} \right\}$

Free choice and the implicature approach

(18) $\left\{ \begin{array}{ll} \text{It is possible A} & \Diamond A \\ \text{It is possible B} & \Diamond B \end{array} \right\}$

(19) $\textsc{imp}$[It is possible A or B] $\rightsquigarrow$

Free choice and the implicature approach

(18) $\left\{ \begin{array}{ll} \text{It is possible A} & \Diamond A \\ \text{It is possible B} & \Diamond B \end{array} \right\}$

(19) IMP[It is possible A or B] $\rightsquigarrow$

It is possible A and It is possible B $\Diamond A \wedge \Diamond B$

Background

Related inferences

Distributive inferences[4]

(20) It is certain that it contains either a blue ball or a yellow ball.

[4] Sauerland 2004, Chierchia et al 2012, Crnic et al 2015, Santorio and Romoli 2018

Distributive inferences[4]

(20) It is certain that it contains either a blue ball or a yellow ball.
$\rightsquigarrow$ *It is not certain one and not certain the other*

[4] Sauerland 2004, Chierchia et al 2012, Crnic et al 2015, Santorio and Romoli 2018

Distributivity and the implicature approach

(21) It is certain A or B $= \Box(A \vee B)$

Distributivity and the implicature approach

(21) It is certain A or B $= \Box(A \vee B)$

(22) $\left\{ \begin{array}{ll} \text{It is certain A} & \Box A \\ \text{It is certain B} & \Box B \\ \ldots & \end{array} \right\}$

Distributivity and the implicature approach

(23) $\left\{ \begin{array}{ll} \text{It is certain A} & \Box A \\ \text{It is certain B} & \Box B \end{array} \right\}$

(24) $\textsc{imp}[\text{It is certain A or B}] \rightsquigarrow$

Distributivity and the implicature approach

(23) $\left\{ \begin{array}{ll} \text{It is certain A} & \Box A \\ \text{It is certain B} & \Box B \end{array} \right\}$

(24) IMP[It is certain A or B] $\rightsquigarrow$

It is not certain A and It is not certain B $\neg\Box A \wedge \neg\Box B$

Ignorance and the implicature approach[5]

(25) It contains either a blue ball or a yellow ball.

[5] Gazdar 1979, Sauerland 2004, Fox 2007, Meyer 2013, Buccola and Haida 2019

Ignorance and the implicature approach[5]

(25) It contains either a blue ball or a yellow ball.
$\rightsquigarrow$ *The speaker doesn't know which one*

[5] Gazdar 1979, Sauerland 2004, Fox 2007, Meyer 2013, Buccola and Haida 2019

Ignorance and the implicature approach[6]

(26) $\quad A \text{ or } B = A \vee B$

[6] Gazdar 1979, Sauerland 2004, Fox 2007, Meyer 2013, Buccola and Haida 2019

Ignorance and the implicature approach[7]

(27) A or B $\left\{ \text{A}, \text{B}, \neg\text{A}, \neg\text{B} \right\}$

[7] Gazdar 1979, Sauerland 2004, Fox 2007, Meyer 2013, Buccola and Haida 2019

Ignorance and the implicature approach[7]

(27) A or B $\left\{ \text{A}, \text{B}, \neg\text{A}, \neg\text{B} \right\}$

(28) IMP[K[A or B]] $\left\{ \text{K[A]}, \text{K[B]} \right\}$

[7] Gazdar 1979, Sauerland 2004, Fox 2007, Meyer 2013, Buccola and Haida 2019

Ignorance and the implicature approach[7]

(27) A or B $\left\{ \text{A}, \text{B}, \neg\text{A}, \neg\text{B} \right\}$

(28) IMP[K[A or B]] $\left\{ \text{K[A]}, \text{K[B]} \right\}$

$\rightsquigarrow$ *the speaker doesn't know whether A and doesn't know whether B*

$I_s\text{A} \wedge I_s\text{B}$

[7] Gazdar 1979, Sauerland 2004, Fox 2007, Meyer 2013, Buccola and Haida 2019

Free choice, the others, and implicatures[8]

- The implicature approach to free choice, distributive inferences, and ignorance has been prominent

[8] Fox 2007; see also Franke 2011, Geurts 2010, Schwarz 2020 and Katzir and Fox 2019

Free choice, the others, and implicatures[8]

- The implicature approach to free choice, distributive inferences, and ignorance has been prominent
- Free choice as a testing ground for theories of implicatures

[8] Fox 2007; see also Franke 2011, Geurts 2010, Schwarz 2020 and Katzir and Fox 2019

Background

Free choice, distributivity, ignorance, and scalar diversity

Scalar diversity

- Large differences among different scalar inferences

Scalar diversity

- Large differences among different scalar inferences
  - Comprehension

Scalar diversity

- Large differences among different scalar inferences
  - Comprehension
  - Processing

Scalar diversity

- Large differences among different scalar inferences
  - Comprehension
  - Processing
  - Acquisition

Free choice and scalar diversity[9]

- Free choice appears more robust than scalar implicatures

[9] Chemla 2009, Chemla and Bott 2013, Tieu et al 2016, Meyer and Feiman 2020

Free choice and scalar diversity[9]

- Free choice appears more robust than scalar implicatures
- It differs in its processing profile from scalar implicatures

[9] Chemla 2009, Chemla and Bott 2013, Tieu et al 2016, Meyer and Feiman 2020

Free choice and scalar diversity[9]

- Free choice appears more robust than scalar implicatures
- It differs in its processing profile from scalar implicatures
- It is also acquired earlier

[9] Chemla 2009, Chemla and Bott 2013, Tieu et al 2016, Meyer and Feiman 2020

Distributivity and ignorance and scalar diversity[10]

- Distributive and ignorance inferences investigated less

[10] Van Tiel and Schaeken 2017, Pagliarini et al 2018, Hochstein et al 2016

Distributivity and ignorance and scalar diversity[10]

- Distributive and ignorance inferences investigated less
- Similar differences to regular implicatures

[10] Van Tiel and Schaeken 2017, Pagliarini et al 2018, Hochstein et al 2016

In sum

- Free choice and related inferences appear more robust, faster to process and easier to acquire than regular scalar implicatures

In sum

- Free choice and related inferences appear more robust, faster to process and easier to acquire than regular scalar implicatures
- Challenging for the implicature approach

Background

Alternatives as the source of scalar diversity

Alternatives and scalar diversity

- The source of these differences would be in alternatives

The source would be alternatives

(29) It possible that it contains a blue ball

The source would be alternatives

(29) It possible that it contains a blue ball

$\rightsquigarrow$*it is not certain that it contains a blue ball*

The source would be alternatives

(29) It possible that it contains a blue ball
$\rightsquigarrow$*it is not certain that it contains a blue ball*

(30) $\left\{ \text{It is } \boxed{\text{certain}} \text{ that it contains a blue ball} \right\}$

The source would be alternatives

(31) It is possible that it contains a blue ball or a yellow ball

The source would be alternatives

(31) It is possible that it contains a blue ball or a yellow ball
$\rightsquigarrow$*it is possible one and it is possible the other*

The source would be alternatives

(31) It is possible that it contains a blue ball or a yellow ball
$\rightsquigarrow$*it is possible one and it is possible the other*

(32) $\left\{ \begin{array}{l} \text{It is possible that it contains a blue ball,} \\ \text{It is possible that it contains a yellow ball} \end{array} \right\}$

The source would be alternatives

(33) It is possible that it contains a blue ball or a yellow ball.
$\rightsquigarrow$*it is possible one and it is possible the other*

(34) $\left\{ \begin{array}{l} \text{It is possible that it contains a blue ball,} \\ \text{it is possible that it contains a yellow ball} \end{array} \right\}$

The source would be alternatives

(35) It is possible that it contains a blue ball or a yellow ball
$\rightsquigarrow$*it is possible one and it is possible the other*

(36) $\left\{ \begin{array}{l} \text{It is possible that it contains a blue ball,} \\ \text{It is possible that it contains a yellow ball} \end{array} \right\}$

The source would be alternatives

(37) It is certain that it contains a blue ball or a yellow ball
$\rightsquigarrow$*it is not certain one and it is not certain the other*

(38) $\left\{ \begin{array}{l} \text{It is certain that it contains a blue ball,} \\ \text{It is certain that it contains a yellow ball} \end{array} \right\}$

The source would be alternatives

(39) It contains a blue ball or a yellow ball
$\rightsquigarrow$*the speaker doesn't know which*

(40) $\left\{ \begin{array}{l} \text{It contains a blue ball,} \\ \text{It contains a yellow ball} \\ \ldots \end{array} \right\}$

The hypothesis about alternatives[11]

- Alternatives that do not involve lexical substitution are more robust, faster to process, and easier to acquire

[11] Chemla and Bott 2014, Tieu et al 2016, Barner et al 2013, Singh et al 2016; for variants of it see Bar-Lev and Fox 2020 and Singh 2019

The project

The project

Testing the hypothesis further

Today

- Testing the hypothesis about alternatives further

Today

- Testing the hypothesis about alternatives further
- Looking at other constructions with related inferences

Today

- Testing the hypothesis about alternatives further
- Looking at other constructions with related inferences
- Involving the same type of alternatives as the inferences above

Today

- Their inferences should pattern with those above and unlike regular implicatures

The positive cases again

(41) It is possible that it contains either a blue ball or a yellow ball.
$\rightsquigarrow$ *it's possible one and possible the other*

The positive cases again

(41) It is possible that it contains either a blue ball or a yellow ball.
$\rightsquigarrow$ *it's possible one and possible the other*

(42) It is certain that it contains either a blue ball or a yellow ball.
$\rightsquigarrow$ *it's not certain one and not certain the other*

The positive cases again

(41) It is possible that it contains either a blue ball or a yellow ball.
$\rightsquigarrow$ *it's possible one and possible the other*

(42) It is certain that it contains either a blue ball or a yellow ball.
$\rightsquigarrow$ *it's not certain one and not certain the other*

(43) It contains either a blue ball or a yellow ball.
$\rightsquigarrow$ *the speaker doesn't know which*

The negative counterparts

(44) It is not certain that it contains both a blue ball and a yellow ball.
$\rightsquigarrow$ *it's not certain one and not certain the other*

The negative counterparts

(44) It is not certain that it contains both a blue ball and a yellow ball.
$\rightsquigarrow$ *it's not certain one and not certain the other*

(45) It is not possible that it contains both a blue ball and a yellow ball.
$\rightsquigarrow$ *it's possible one and possible the other*

The negative counterparts

(44) It is not certain that it contains both a blue ball and a yellow ball.
$\rightsquigarrow$ *it's not certain one and not certain the other*

(45) It is not possible that it contains both a blue ball and a yellow ball.
$\rightsquigarrow$ *it's possible one and possible the other*

(46) It doesn't contain both a blue ball and a yellow ball.
$\rightsquigarrow$ *the speaker doesn't know which*

The project

The implicature approach

Negative free choice

(47) It is not certain that A and B $= \neg\Box A \vee \neg\Box B$

Negative free choice

(47) It is not certain that A and B $= \neg\Box A \vee \neg\Box B$

(48) $\left\{ \begin{array}{ll} \text{It is not certain that A} & \neg\Box A \\ \text{It is not certain that B} & \neg\Box B \end{array} \right\}$

Negative free choice

(49) $\left\{ \begin{array}{ll} \text{It is not certain that A} & \neg\Box A \\ \text{It is not certain that B} & \neg\Box B \end{array} \right\}$

Negative free choice

(49) $\left\{ \begin{array}{ll} \text{It is not certain that A} & \neg\Box A \\ \text{It is not certain that B} & \neg\Box B \end{array} \right\}$

(50) IMP[It is not certain A and B] $\rightsquigarrow$

It is not certain A and It is not certain B $\neg\Box A \wedge \neg\Box B$

Negative distributivity

(51) It is not possible that A and B $= \neg\Diamond(A \wedge B)$

Negative distributivity

(51) It is not possible that A and B $= \neg\Diamond(A \wedge B)$

(52) $\left\{ \begin{array}{ll} \text{It is not possible that A} & \neg\Diamond A \\ \text{It is not possible that B} & \neg\Diamond B \end{array} \right\}$

Negative distributivity

(53) $\left\{ \begin{array}{ll} \text{It is not possible that A} & \neg\Diamond A \\ \text{It is not possible that B} & \neg\Diamond B \end{array} \right\}$

(54) IMP[It is not possible A and B] $\rightsquigarrow$

It is possible A and it is possible B $\Diamond A \wedge \Diamond B$

Negative ignorance

(55) not both A and B $= \neg(A \wedge B)$

Negative ignorance

(56) $\left\{ \neg A, \neg B, A, B \right\}$ $\left\{ K[\neg A], K[\neg B] \right\}$

(57) not both A and B $\textsc{imp}$[K[not both A and B]]

$\rightsquigarrow$ *The speaker doesn't know whether A and doesn't know whether B* $I_s A \wedge I_s B$

The prediction

- The implicature approach predicts the negative inferences in the same way

The prediction

- The implicature approach predicts the negative inferences in the same way
- On the basis of the same type of alternatives

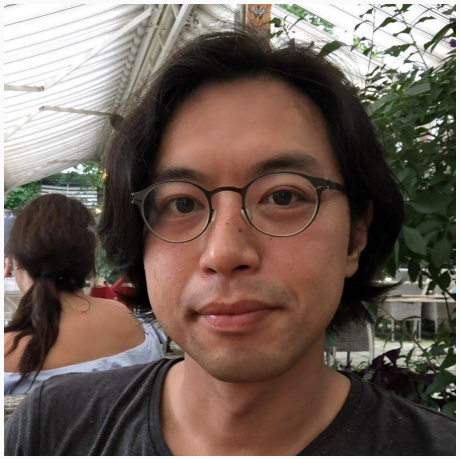
The prediction

- The implicature approach predicts the negative inferences in the same way
- On the basis of the same type of alternatives
- Their inferences should pattern with their positive counterparts and unlike regular implicatures

Question

- Do the negative inferences behave similarly to their positive counterparts and unlike regular scalar implicatures?

Collaborators


The project

Alternatives in the foundations of implicit meanings

The rest of today

1. The experiment

The rest of today

1. The experiment
2. The challenge

The rest of today

1. The experiment
2. The challenge
3. Conclusion and looking ahead

The previous study

The paper

Negative Free Choice*

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Abstract Free Choice (FC) is an inference arising from the interaction between existential modals and disjunction. For instance, a sentence of the form *permitted(A or B)* gives rise to the inference $\Diamond A \wedge \Diamond B$. Many competing theories of FC have

What we did[12]

- Comparing positive vs negative free choice with deontic modals against each other

[12] Building on Chemla 2009 and Marty et al 2015 and Tieu et al 2018

What we did[12]

- Comparing positive vs negative free choice with deontic modals against each other
- And to the corresponding cases with regular scalar implicatures

[12] Building on Chemla 2009 and Marty et al 2015 and Tieu et al 2018

The main results

- Negative Free Choice much weaker than its positive counterpart

The main results

- Negative Free Choice much weaker than its positive counterpart
- No corresponding difference between positive and negative regular scalar implicatures

The experiment

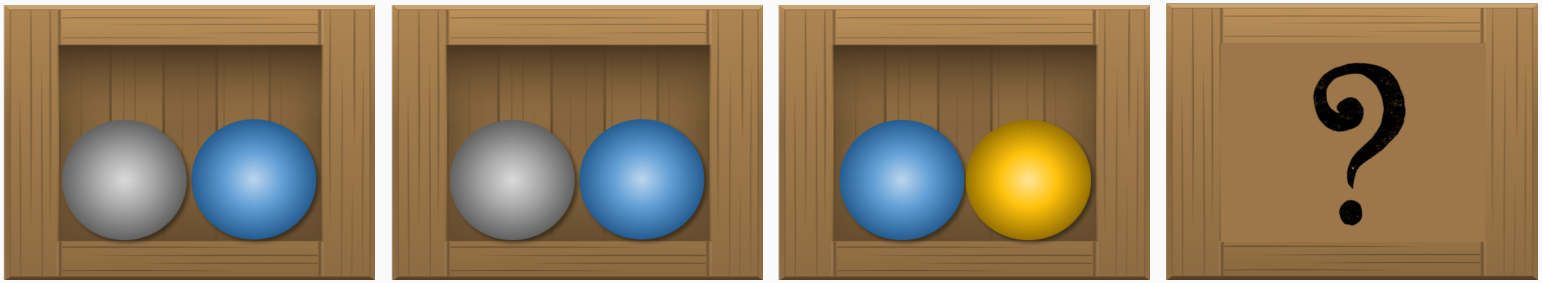
The goal

- Comparing positive and negative inferences, free choice, distributive, and ignorance

The goal

- Comparing positive and negative inferences, free choice, distributive, and ignorance
- Comparing them to positive and negative regular implicatures

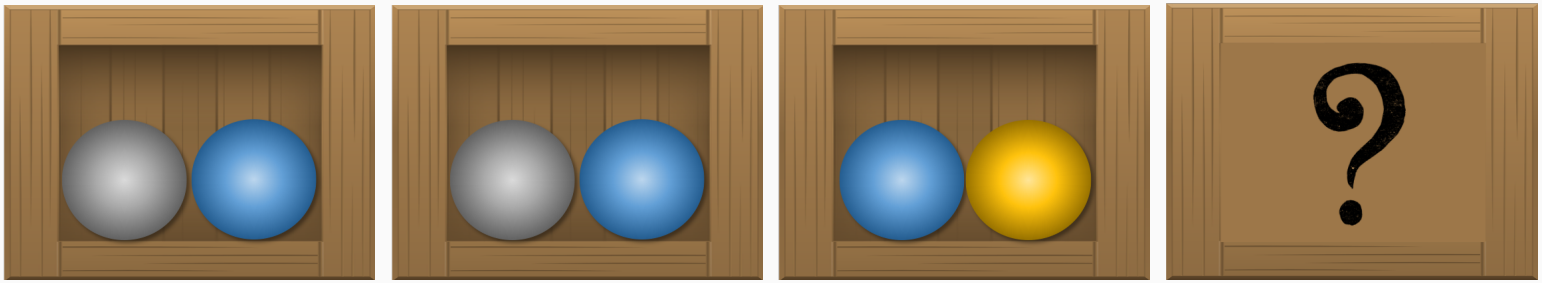
Task[13]



- Mistery box paradigm: identical to one of the overt boxes

[13] adapted from Noveck 2001; see also Moscati et al 2015

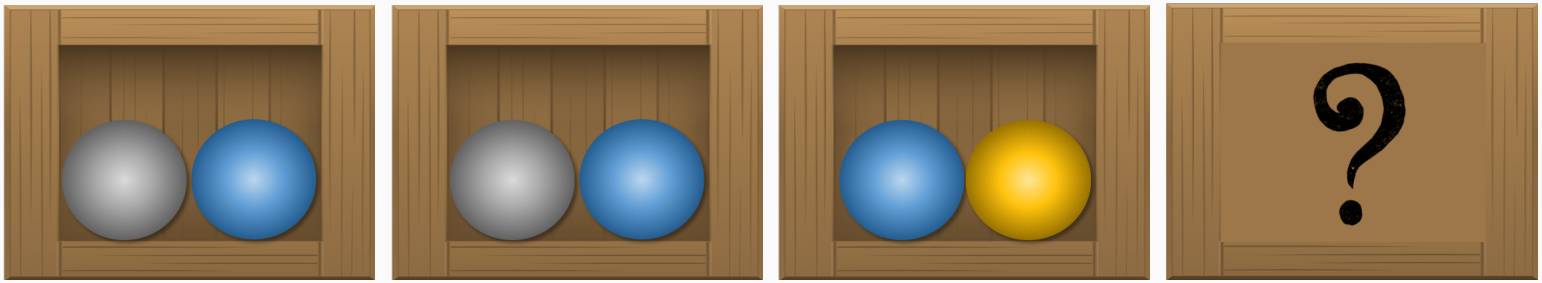
Task[13]



- Mistery box paradigm: identical to one of the overt boxes
- Task: whether the sentence was a good description of the picture

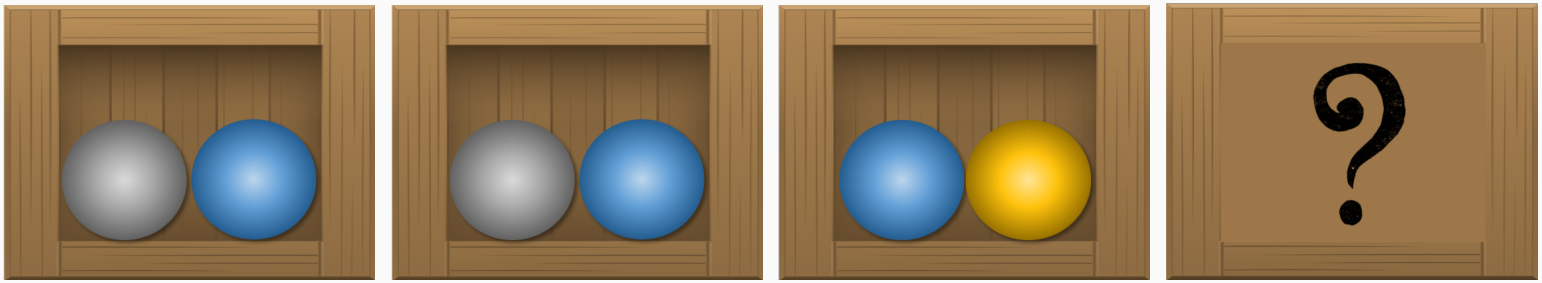
[13] adapted from Noveck 2001; see also Moscati et al 2015

Training with feedback



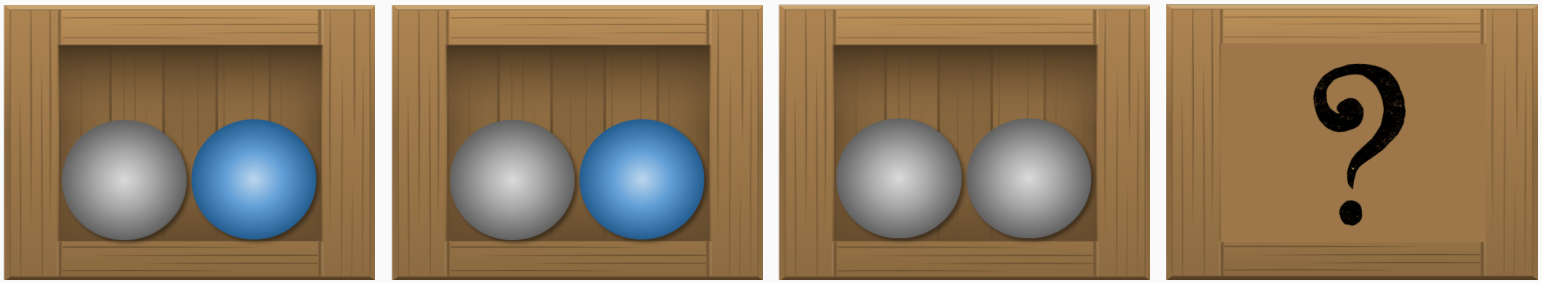
(58) It is certain that the mistery box contains a blue ball

Training with feedback



(59) It is not possible that the mistery box contains a yellow ball

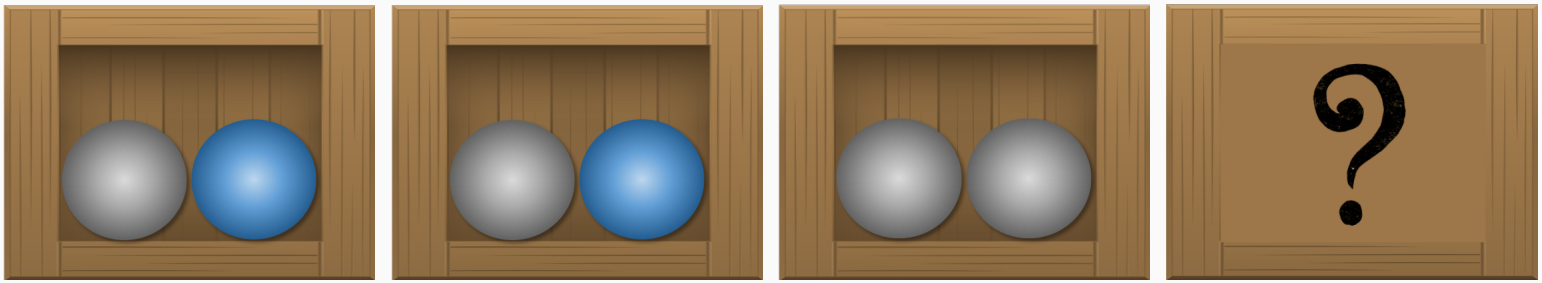
Material: FC targets



(60) It is possible that the mistery box contains either a blue ball or a yellow ball

$\Diamond A \vee \Diamond B$ LITERAL MEANING

Material: FC targets

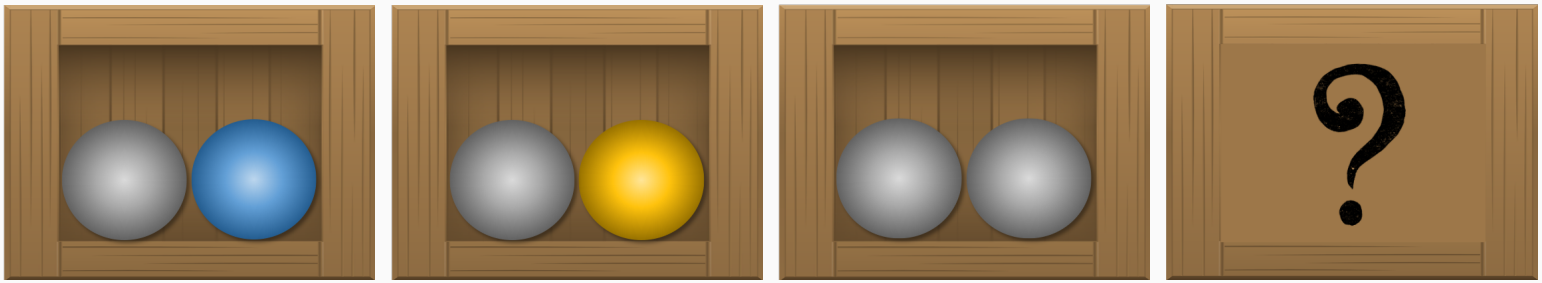


(60) It is possible that the mistery box contains either a blue ball or a yellow ball

$\Diamond A \vee \Diamond B$ LITERAL MEANING

$\Diamond A \wedge \Diamond B$ FREE CHOICE MEANING

Material: FC true control

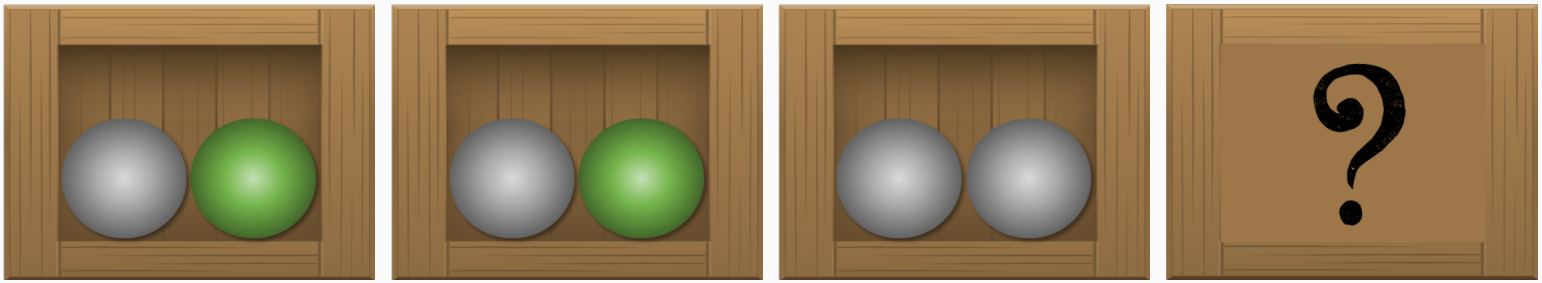


(61) It is possible that the mistery box contains either a blue ball or a yellow ball

$\Diamond A \vee \Diamond B$ LITERAL MEANING

$\Diamond A \wedge \Diamond B$ FREE CHOICE MEANING

Material: FC false control

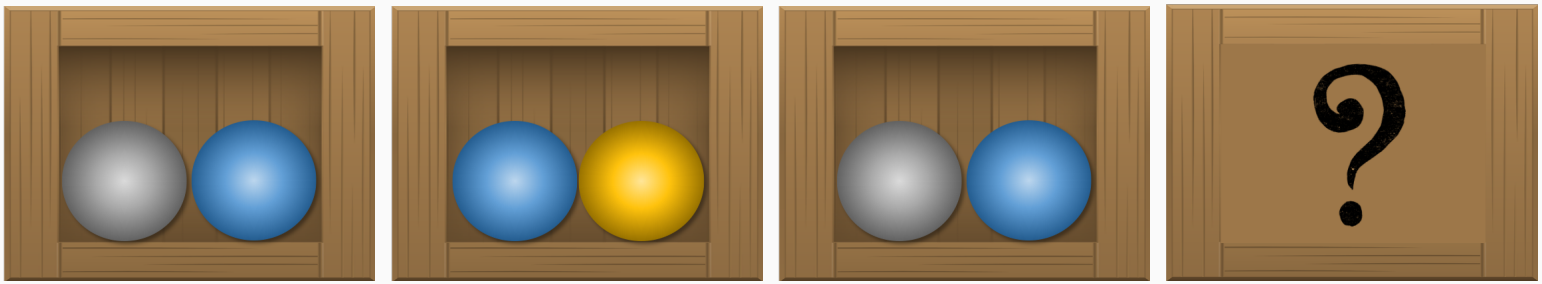


(62) It is possible that the mistery box contains either a blue ball or a yellow ball

$\Diamond A \vee \Diamond B$ LITERAL MEANING

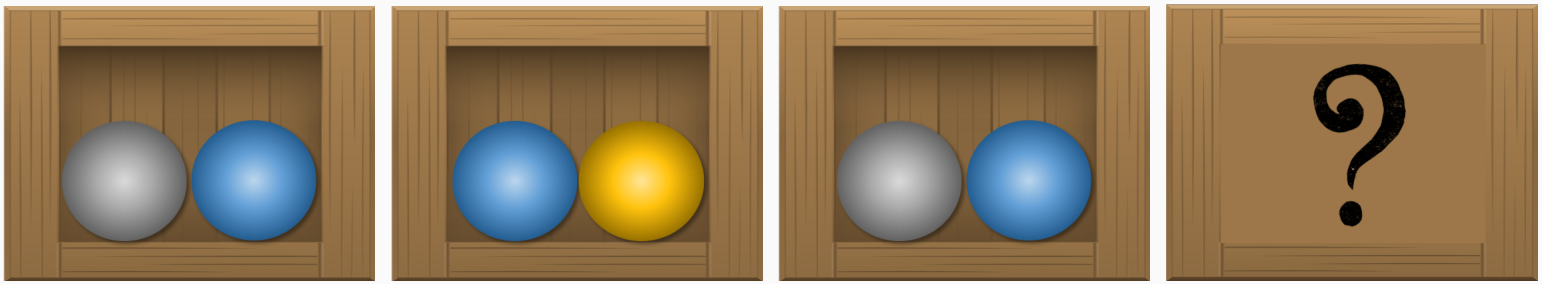
$\Diamond A \wedge \Diamond B$ FREE CHOICE MEANING

Material: NFC targets



(63) It is not certain that the mistery box contains both a blue ball and a yellow ball

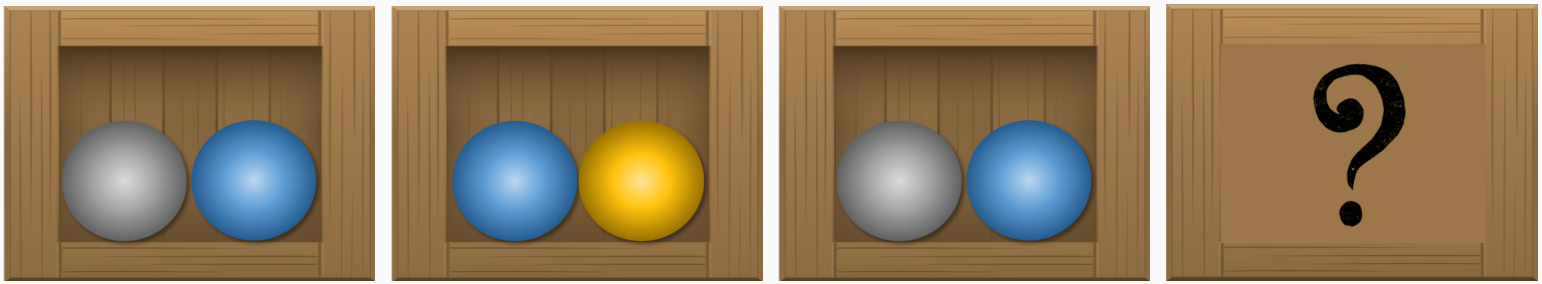
Material: NFC targets



(63) It is not certain that the mistery box contains both a blue ball and a yellow ball

$\neg\Box A \vee \neg\Box B$ LITERAL MEANING

Material: NFC targets

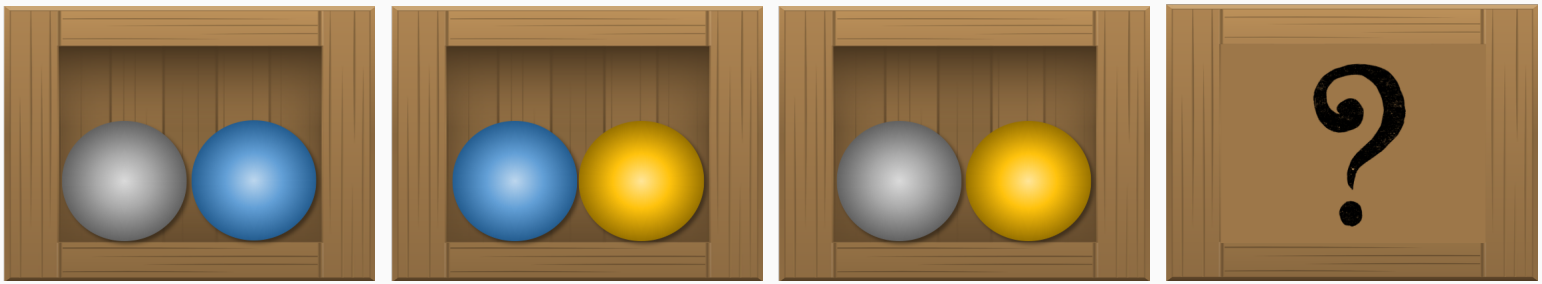


(63) It is not certain that the mistery box contains both a blue ball and a yellow ball

$\neg\Box A \vee \neg\Box B$ LITERAL MEANING

$\neg\Box A \wedge \neg\Box B$ NEGATIVE FREE CHOICE MEANING

Material: NFC true control

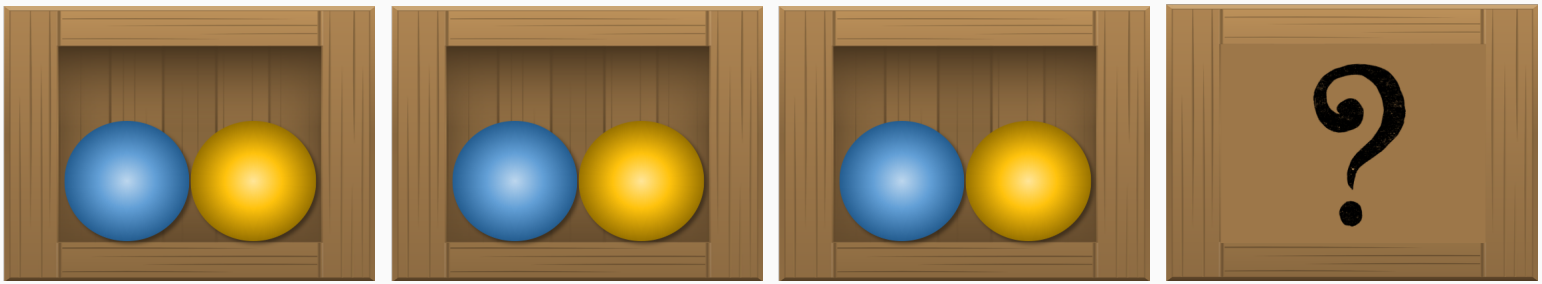


(64) It is not certain that the mistery box contains both a blue ball and a yellow ball

$\neg\Box A \vee \neg\Box B$ LITERAL MEANING

$\neg\Box A \wedge \neg\Box B$ NEGATIVE FREE CHOICE MEANING

Material: NFC false control

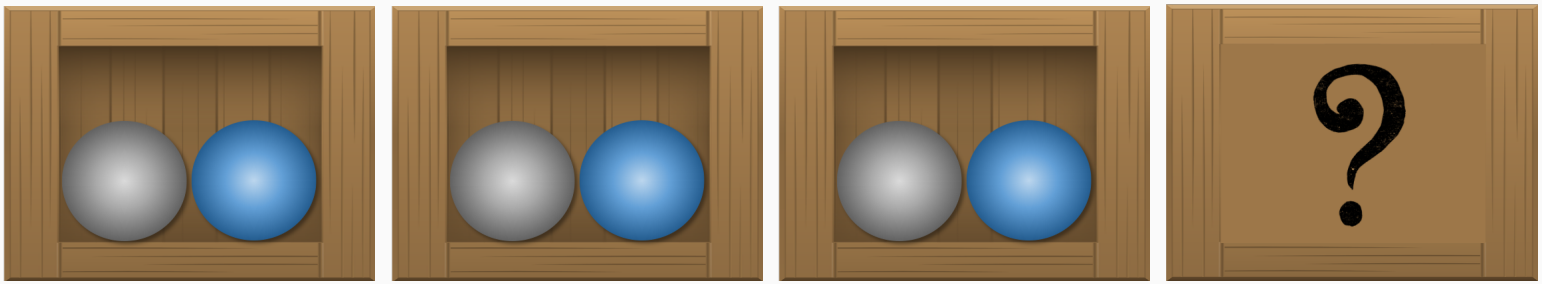


(65) It is not certain that the mistery box contains both a blue ball and a yellow ball

$\neg\Box A \vee \neg\Box B$ LITERAL MEANING

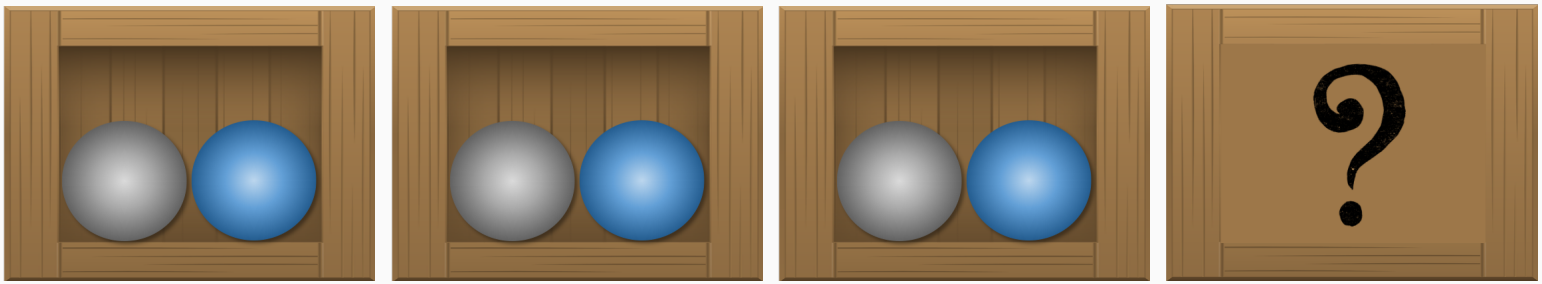
$\neg\Box A \wedge \neg\Box B$ NEGATIVE FREE CHOICE MEANING

Material: Dist targets



(66) It is certain that the mistery box contains either a blue ball or a yellow ball

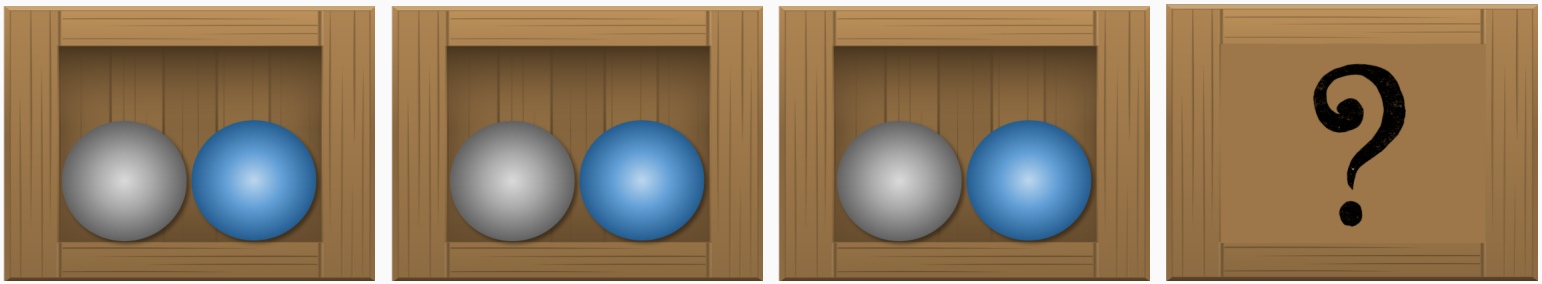
Material: Dist targets



(66) It is certain that the mistery box contains either a blue ball or a yellow ball

$\Box(A \vee B)$ LITERAL MEANING

Material: Dist targets

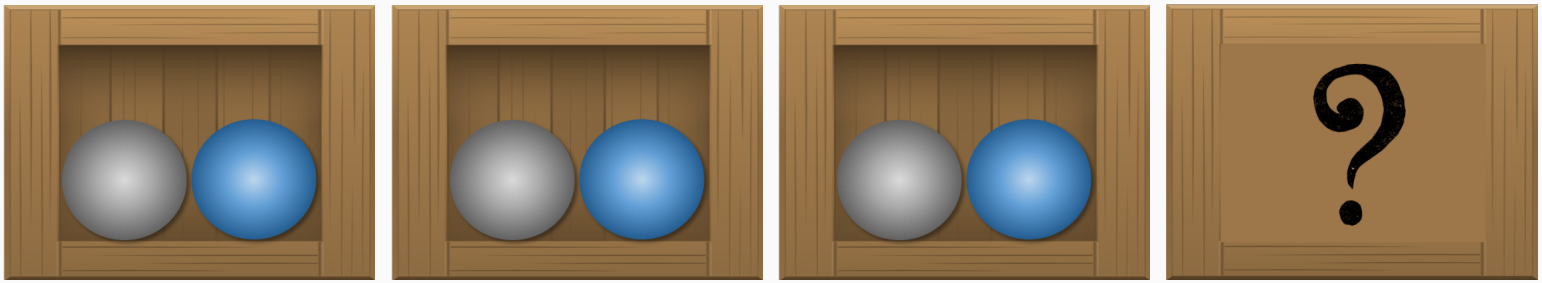


(66) It is certain that the mistery box contains either a blue ball or a yellow ball

$\Box(A \vee B)$ LITERAL MEANING

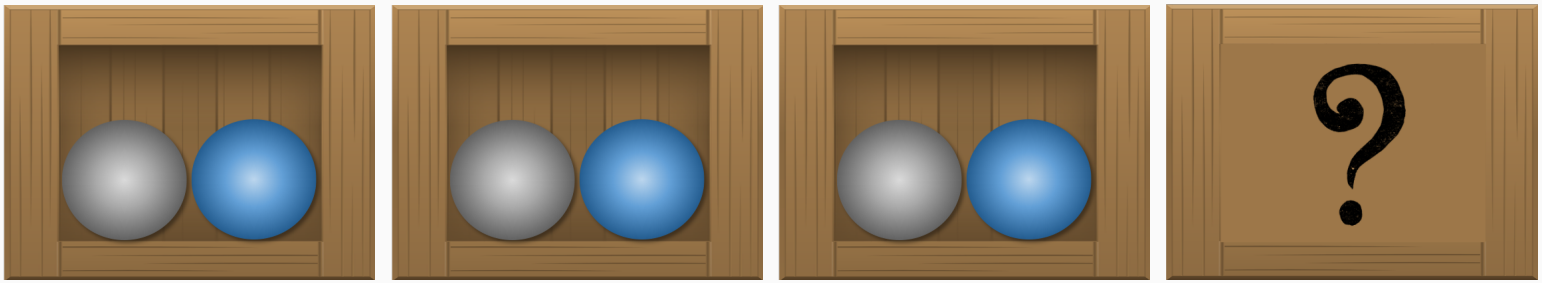
$\neg\Box A \wedge \neg\Box B$ DISTRIBUTIVE MEANING

Material: NDist targets



(67) It is not possible that the mistery box contains both a blue ball and a yellow ball

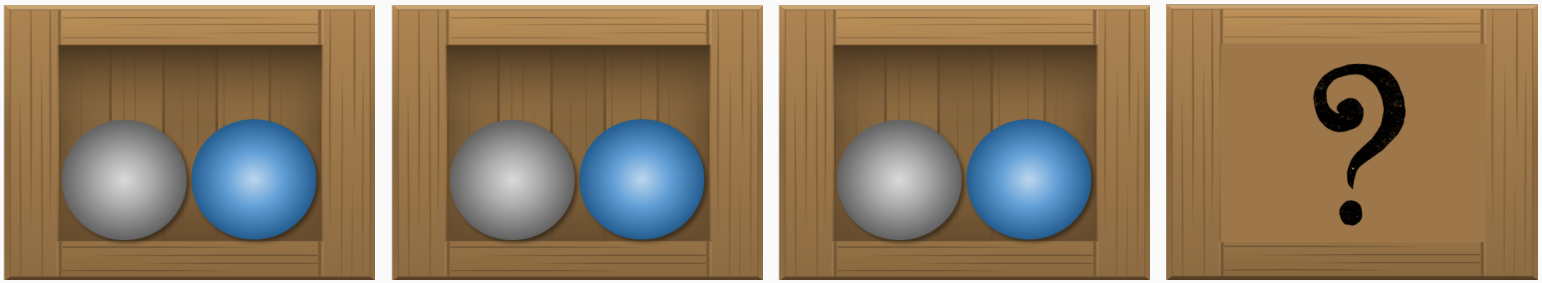
Material: NDist targets



(67) It is not possible that the mistery box contains both a blue ball and a yellow ball

$\neg\Diamond(A \wedge B)$ LITERAL MEANING

Material: NDist targets

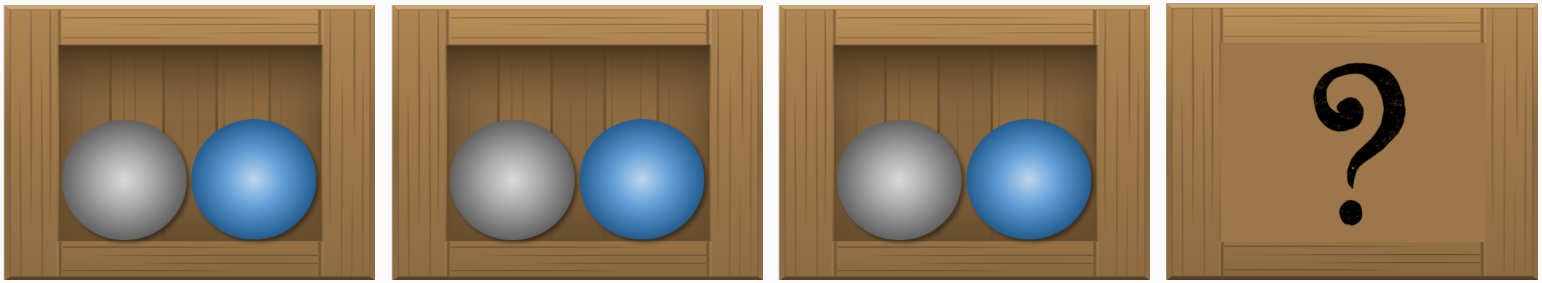


(67) It is not possible that the mistery box contains both a blue ball and a yellow ball

$\neg\Diamond(A \wedge B)$ LITERAL MEANING

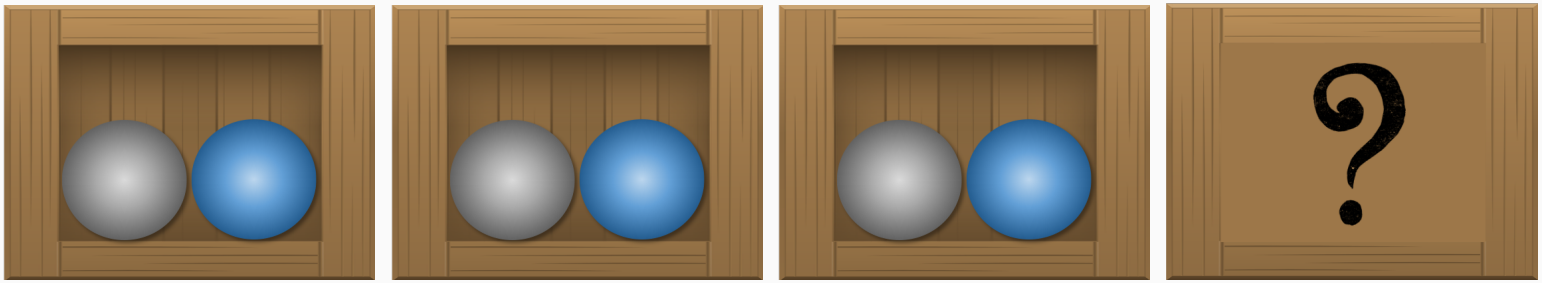
$\Diamond A \wedge \Diamond B$ DISTRIBUTIVE MEANING

Material: II targets



(68) The mistery box contains either a blue ball or a yellow ball

Material: II targets

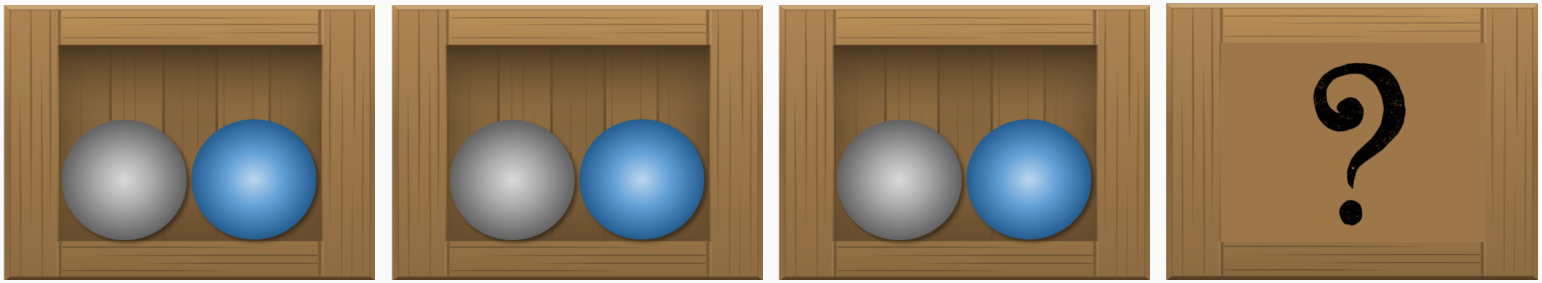


(68) The mistery box contains either a blue ball or a yellow ball

$A \vee B$

LITERAL MEANING

Material: II targets

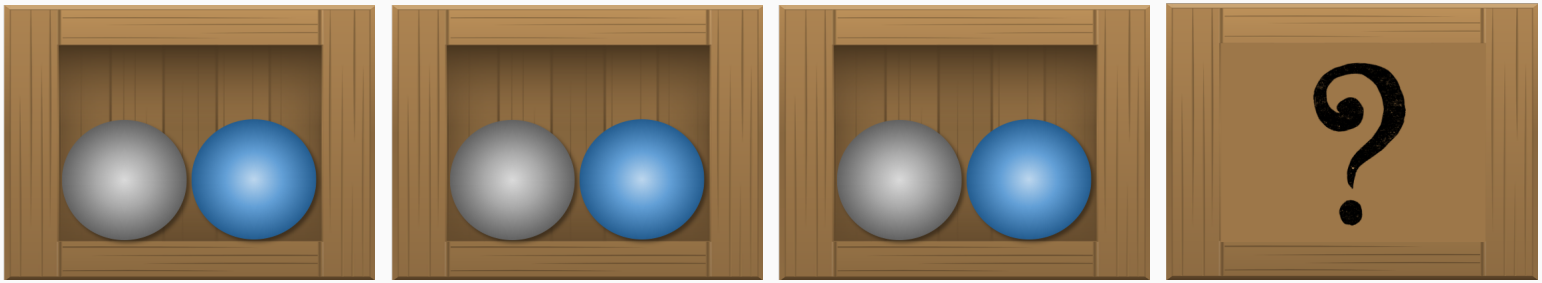


(68) The mistery box contains either a blue ball or a yellow ball

$A \vee B$ LITERAL MEANING

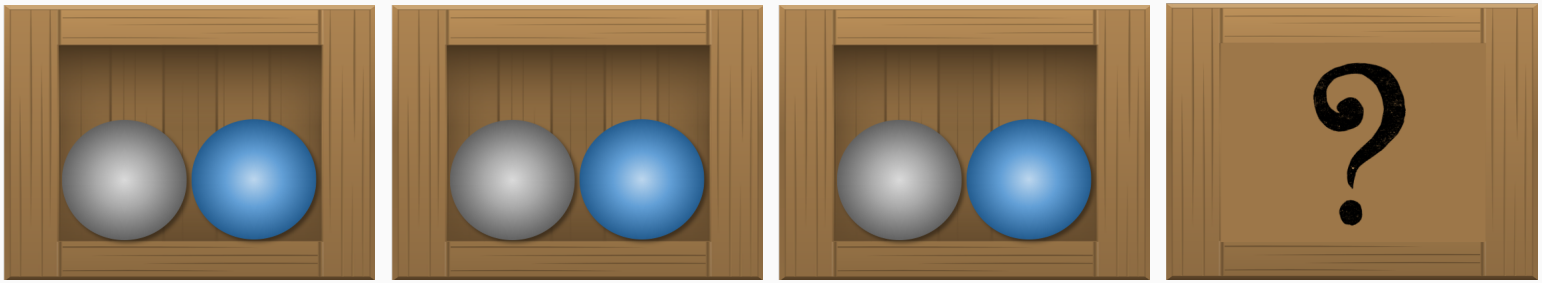
$\neg I_s A \wedge \neg I_s B$ IGNORANCE INFERENCE

Material: NII targets



(69) The mistery box doesn't contain both a blue ball and a yellow ball

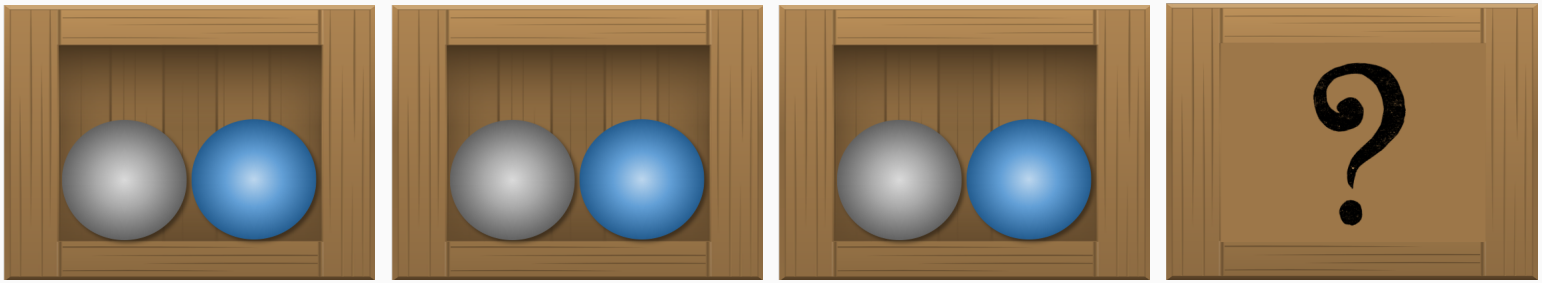
Material: NII targets



(69) The mistery box doesn't contain both a blue ball and a yellow ball

$\neg(A \wedge B)$ LITERAL MEANING

Material: NII targets

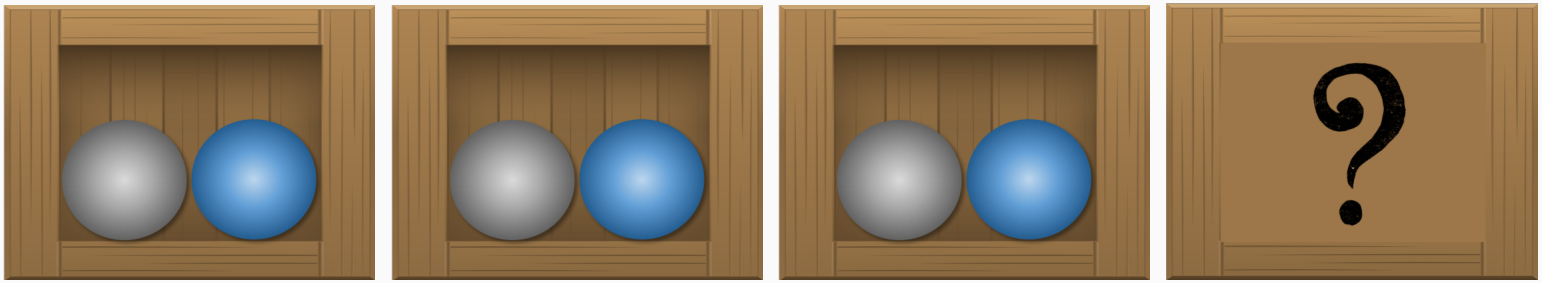


(69) The mistery box doesn't contain both a blue ball and a yellow ball

$\neg(A \wedge B)$ LITERAL MEANING

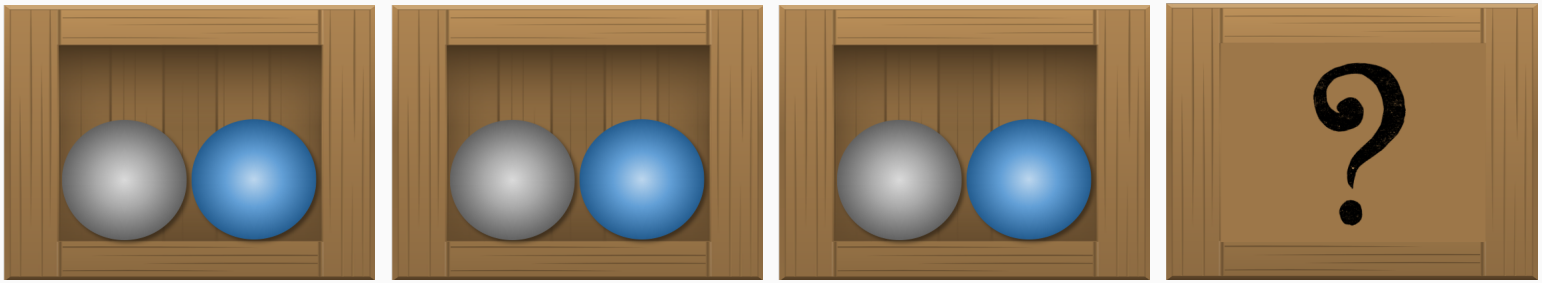
$\neg I_s A \wedge \neg I_s B$ IGNORANCE INFERENCE

Material: SI targets



(70) It is possible that the mistery box contains a blue ball

Material: SI targets

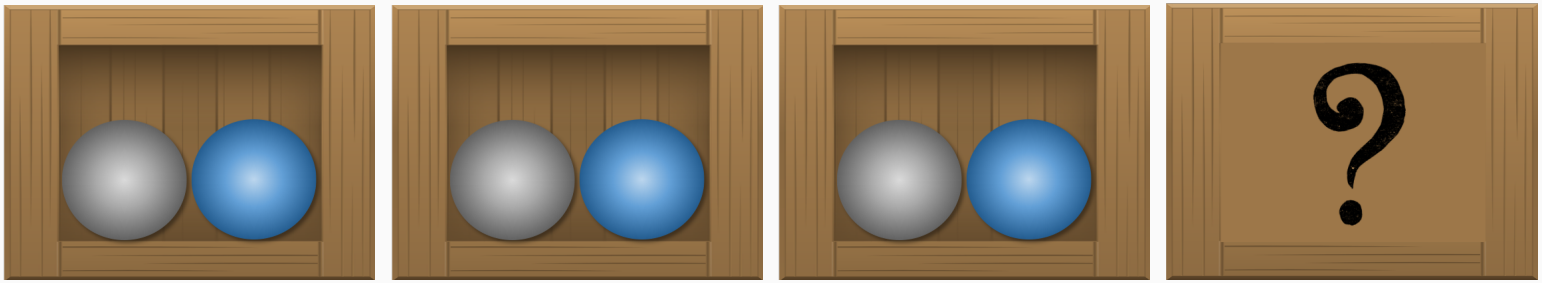


(70) It is possible that the mistery box contains a blue ball

$\Diamond A \vee \Box A$

LITERAL MEANING

Material: SI targets

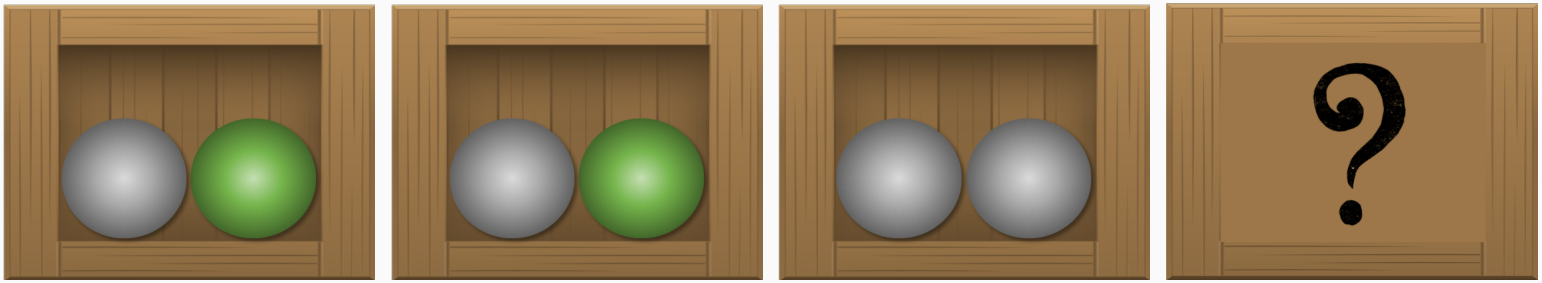


(70) It is possible that the mistery box contains a blue ball

$\Diamond A \vee \Box A$ LITERAL MEANING

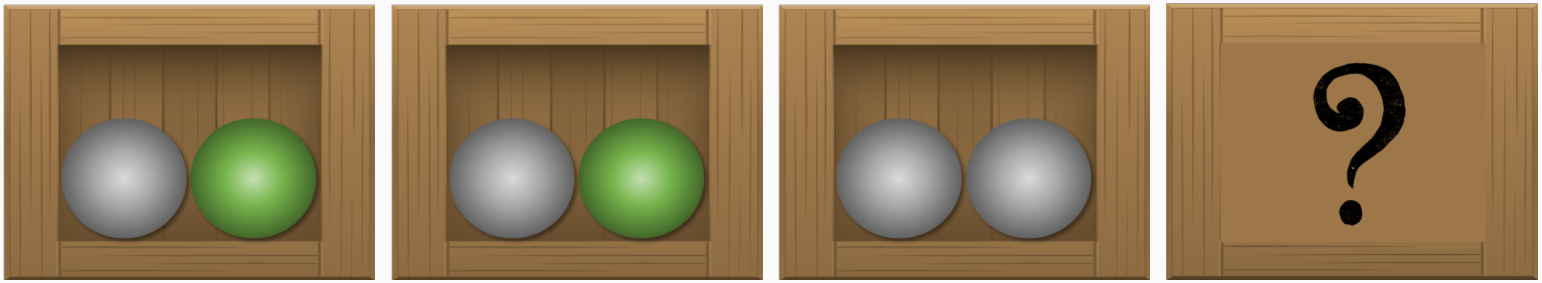
$\Diamond A \wedge \neg \Box A$ SI MEANING

Material: ISI targets



(71) It is not certain that the mistery box contains a blue ball

Material: ISI targets

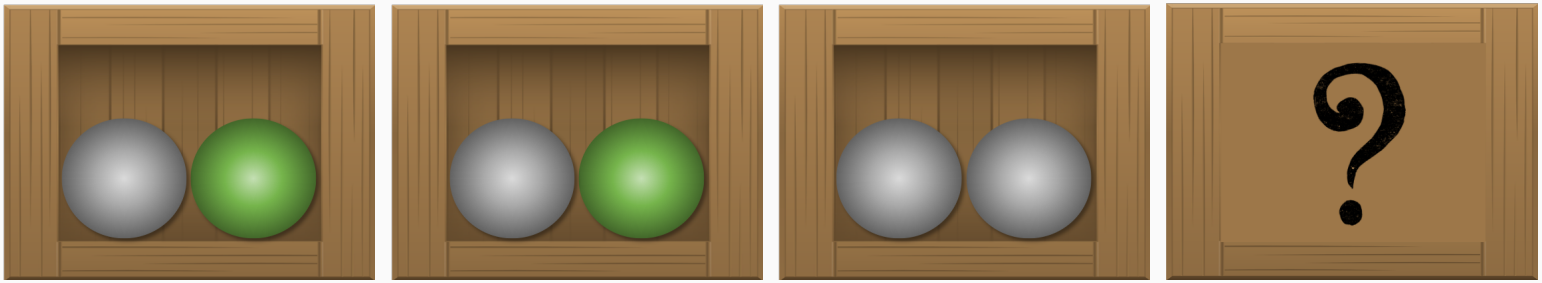


(71) It is not certain that the mistery box contains a blue ball

$\neg\Diamond A \vee \neg\Box A$

LITERAL MEANING

Material: ISI targets

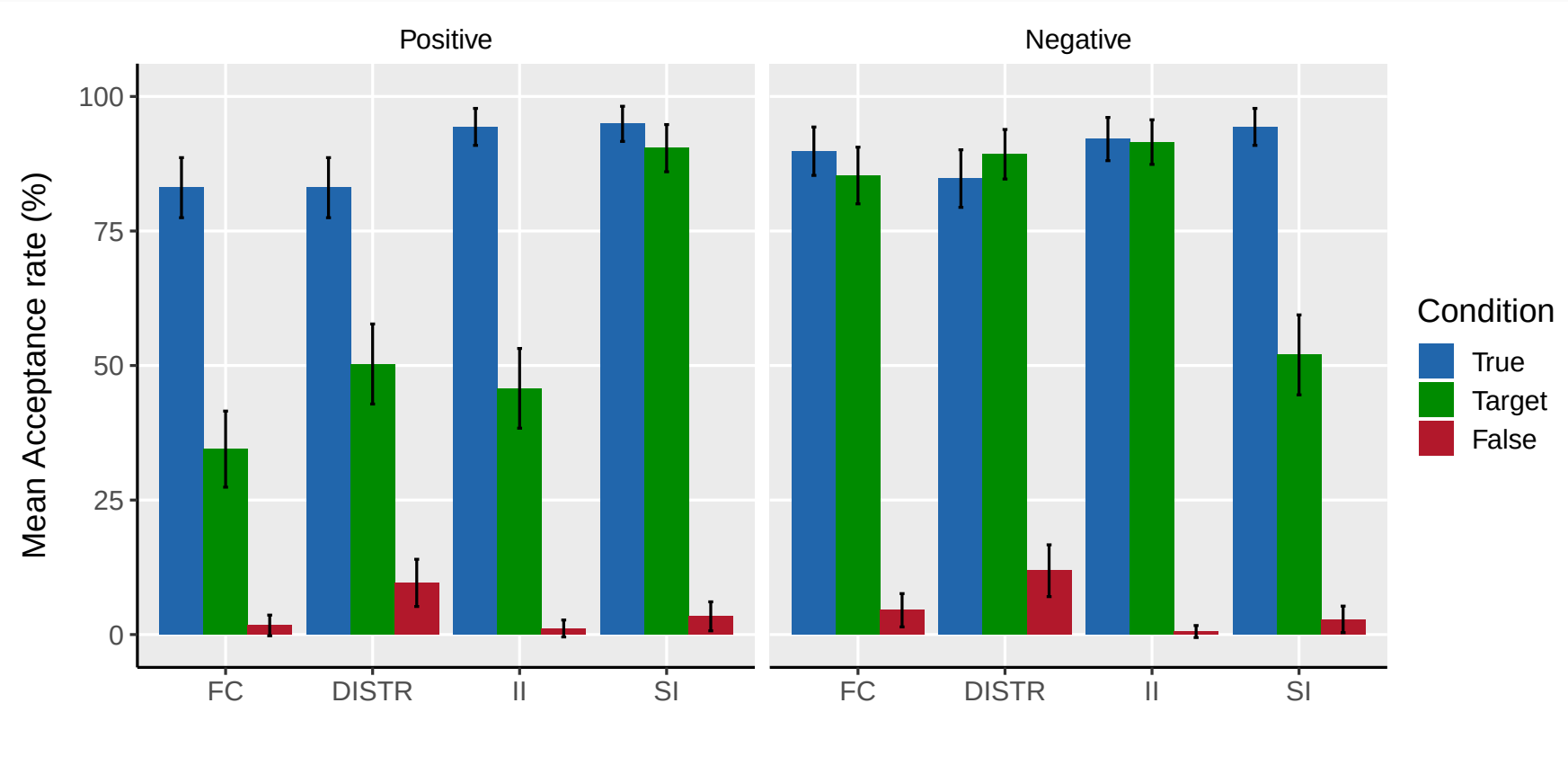


(71) It is not certain that the mistery box contains a blue ball

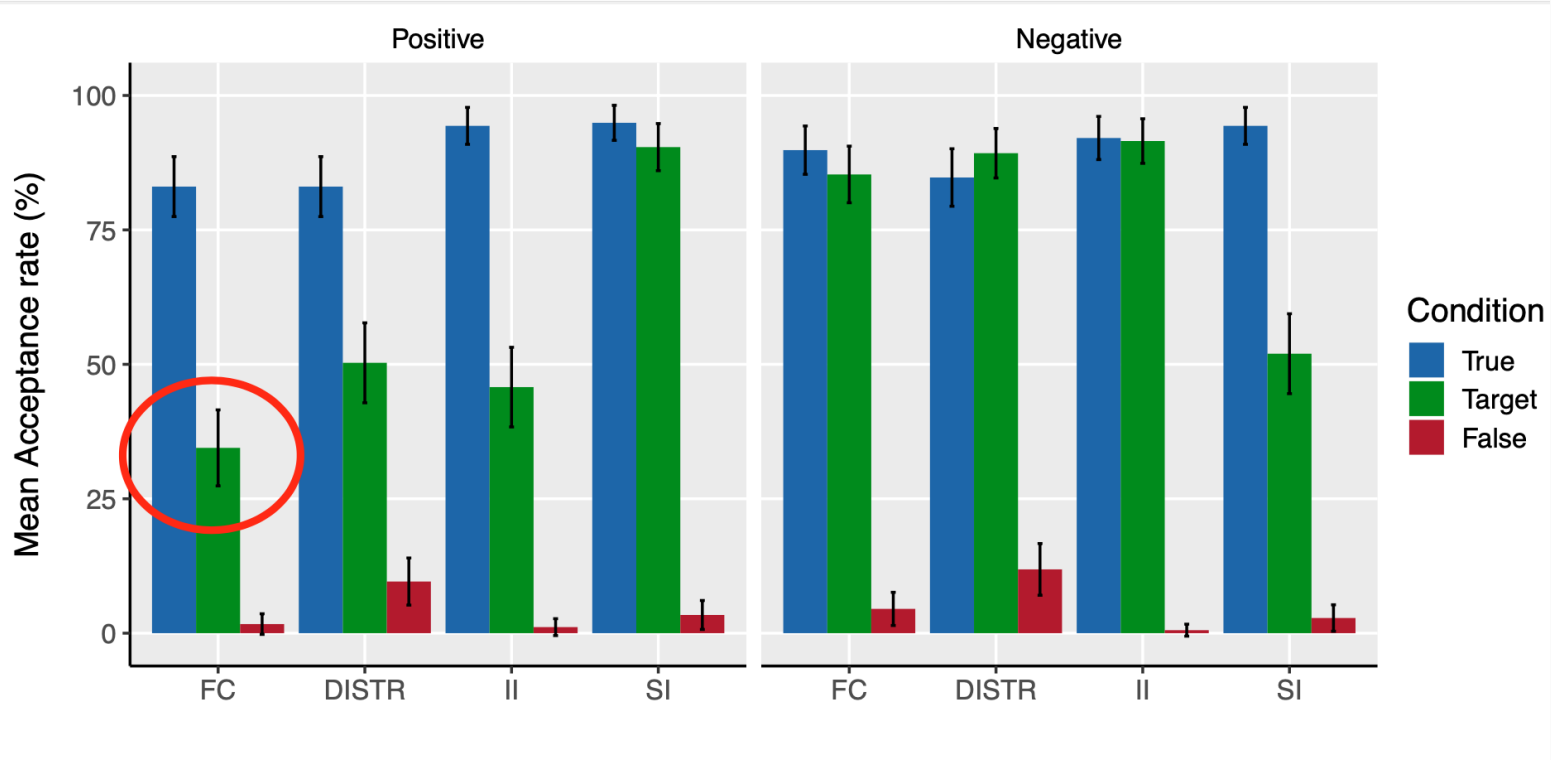
$\neg\Diamond A \vee \neg\Box A$ LITERAL MEANING

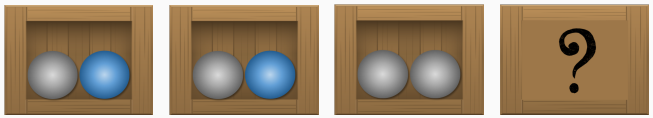
$\Diamond A \wedge \neg\Box A$ SI MEANING

Results


Positive
Negative
Mean Acceptance rate (%)
100
75
50
25
0
FC
DISTR
II
SI
Condition
True
Target
False

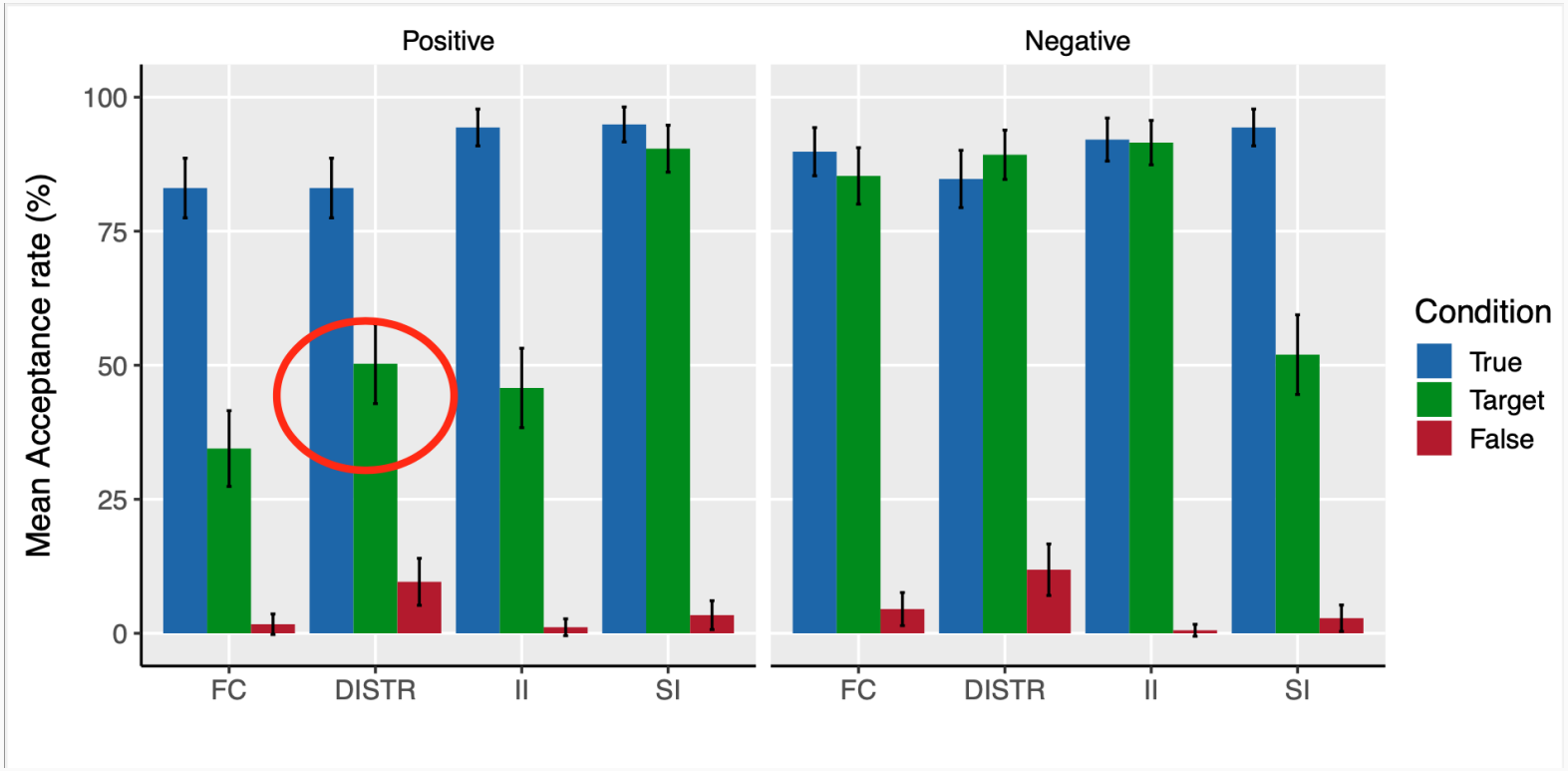
Results

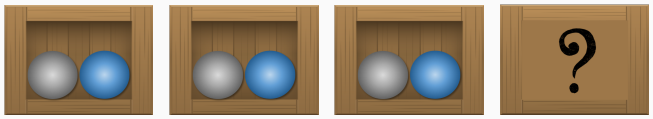




It is possible that it contains either A or B

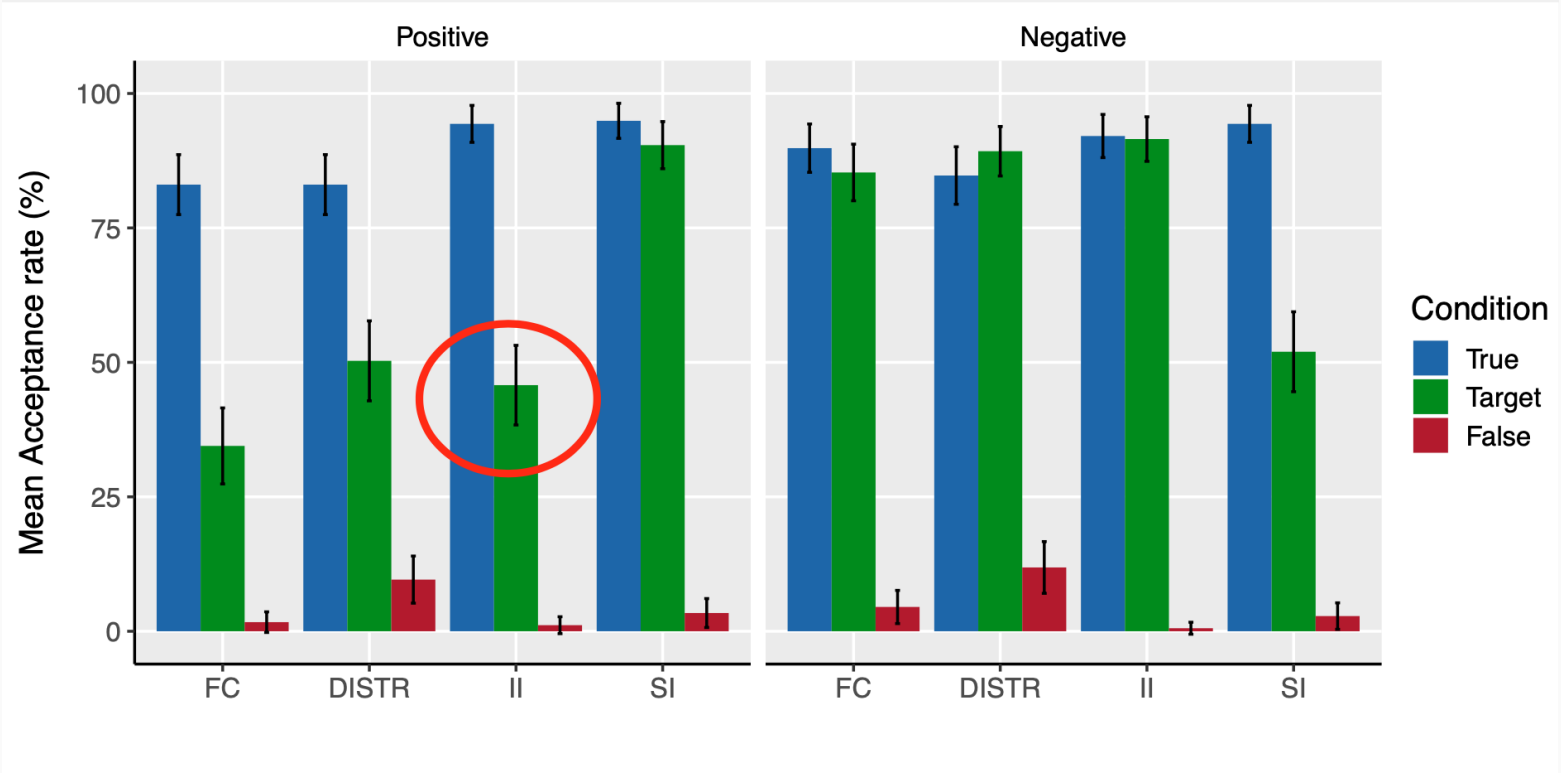
Results

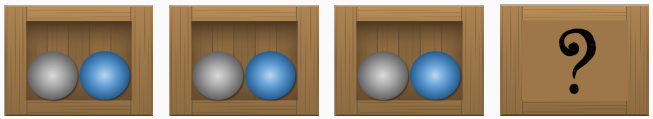




It is certain that it contains either A or B

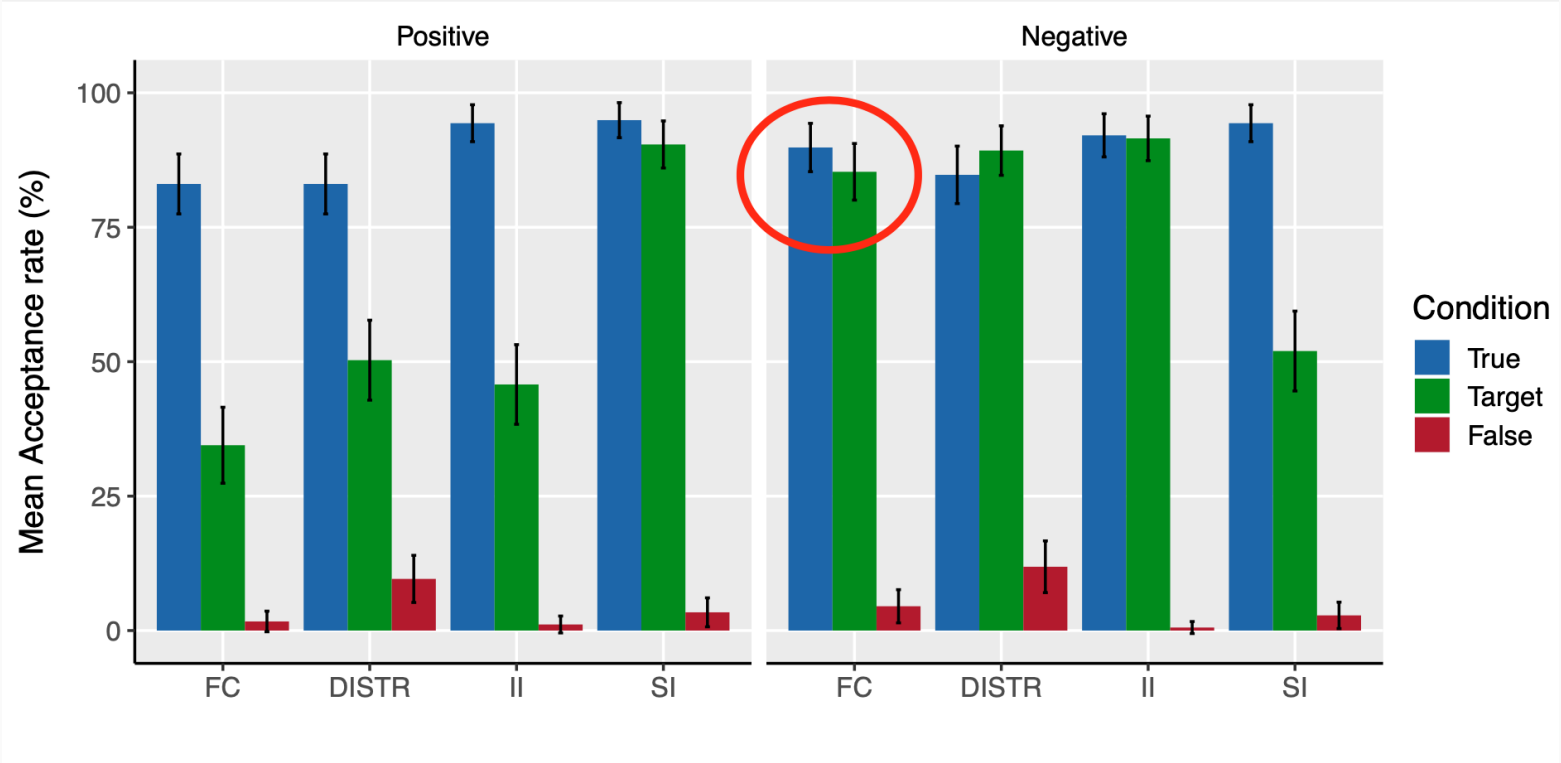
Results

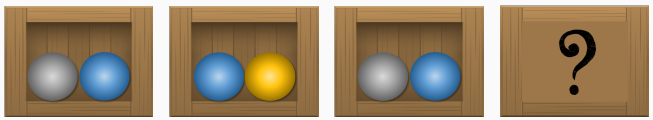




It contains either A or B

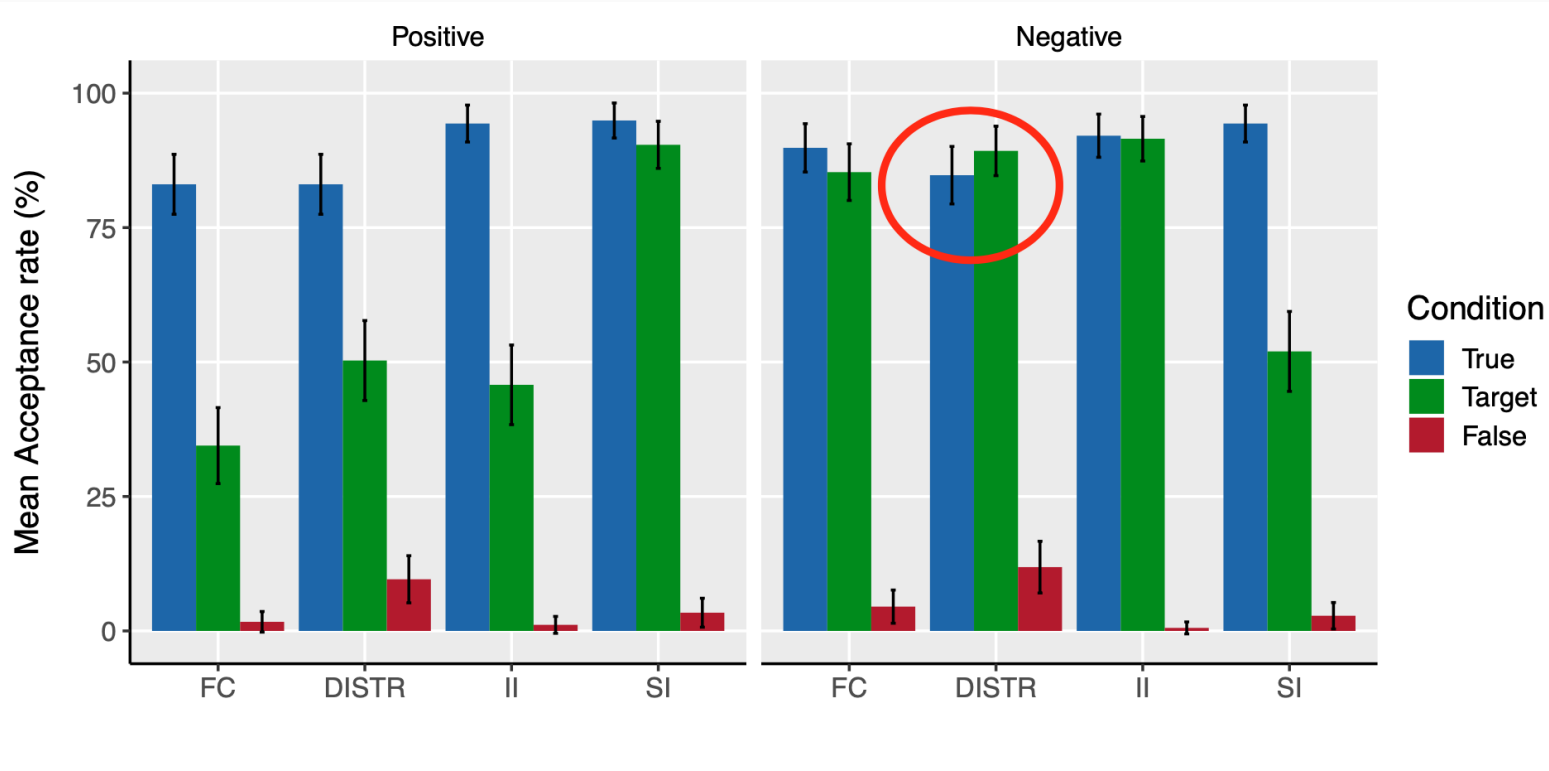
Results

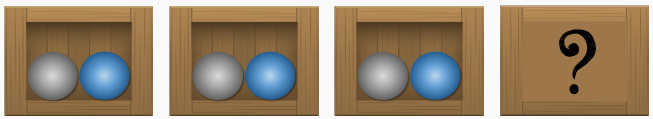




It is not certain that it contains both A and B

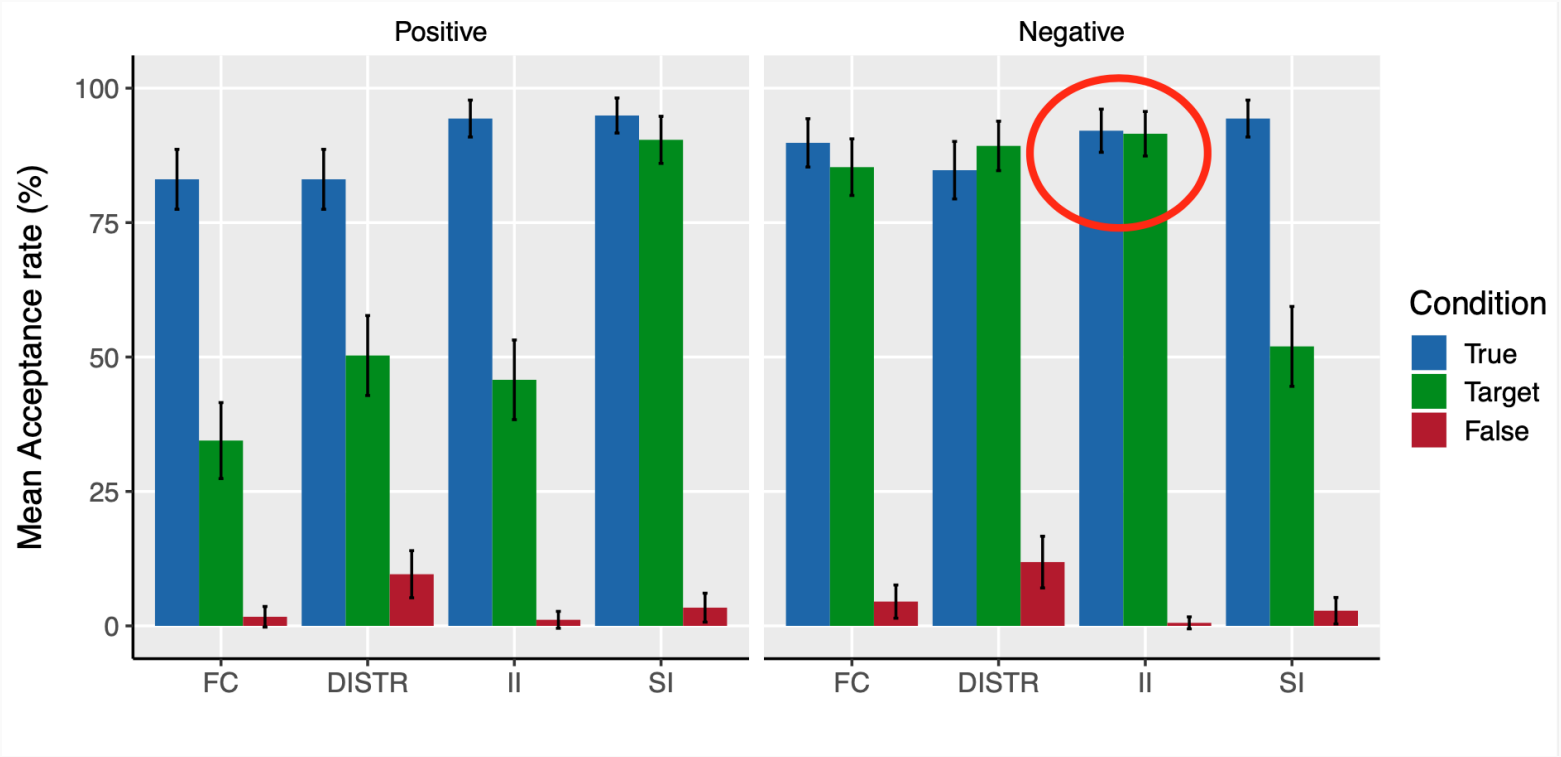
Results

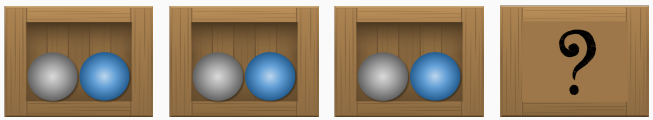




It is not possible that it contains both A and B

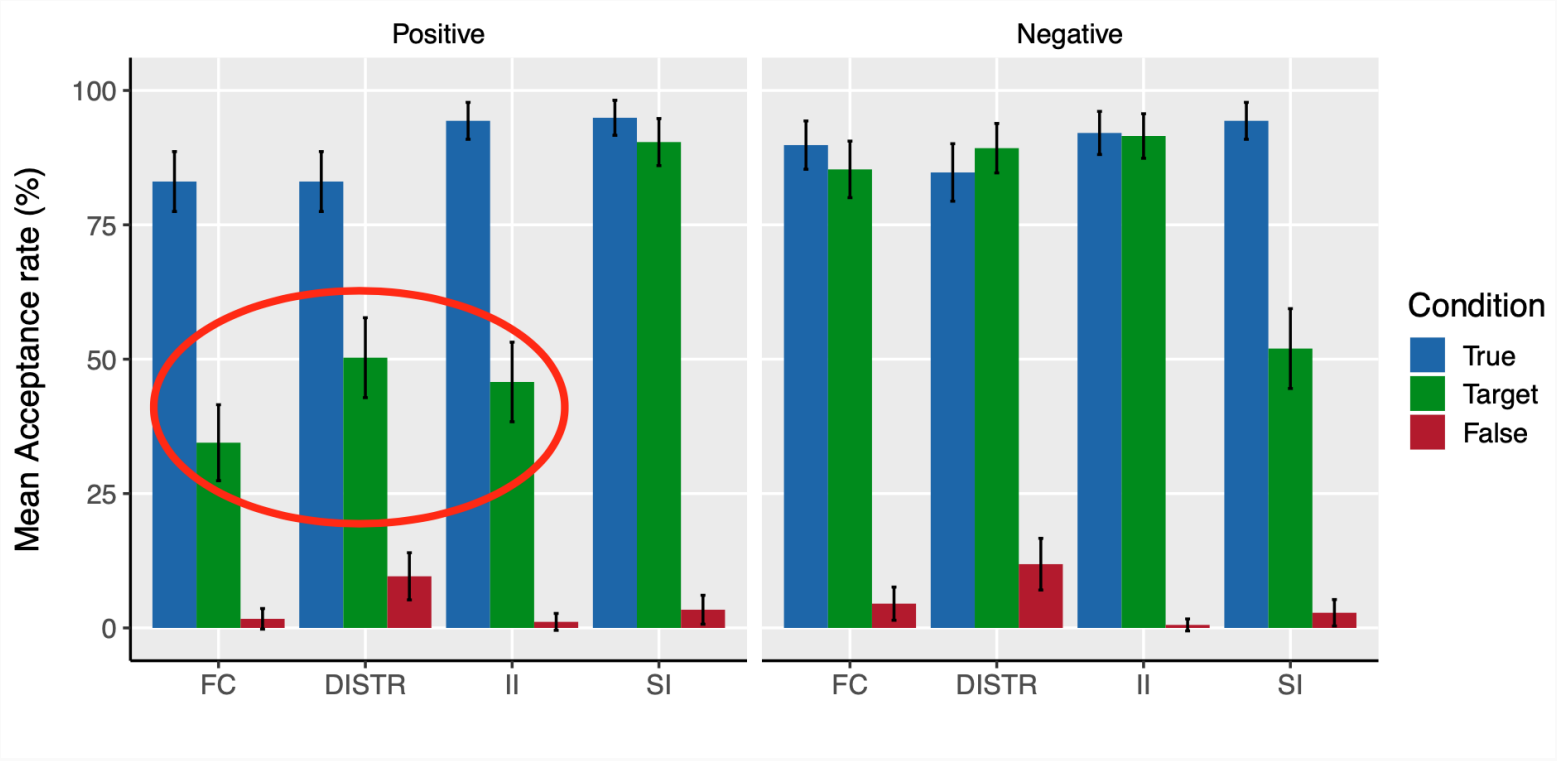
Results



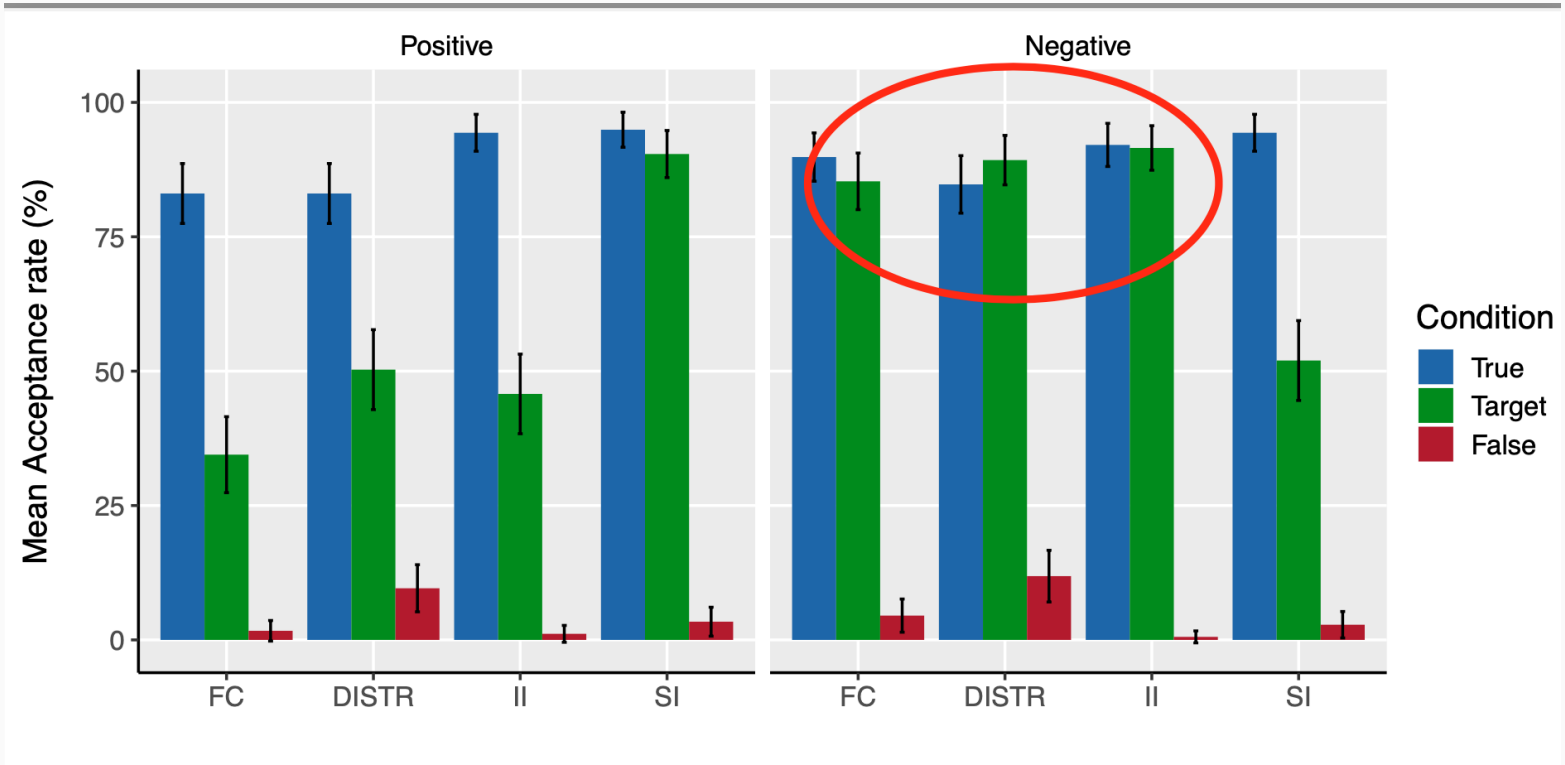


It doesn't contain both A and B

Results


Positive
Negative
Mean Acceptance rate (%)
100
75
50
25
0
FC
DISTR
II
SI
Condition
True
Target
False

Results


Positive
Negative
Mean Acceptance rate (%)
100
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0
FC
DISTR
II
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Condition
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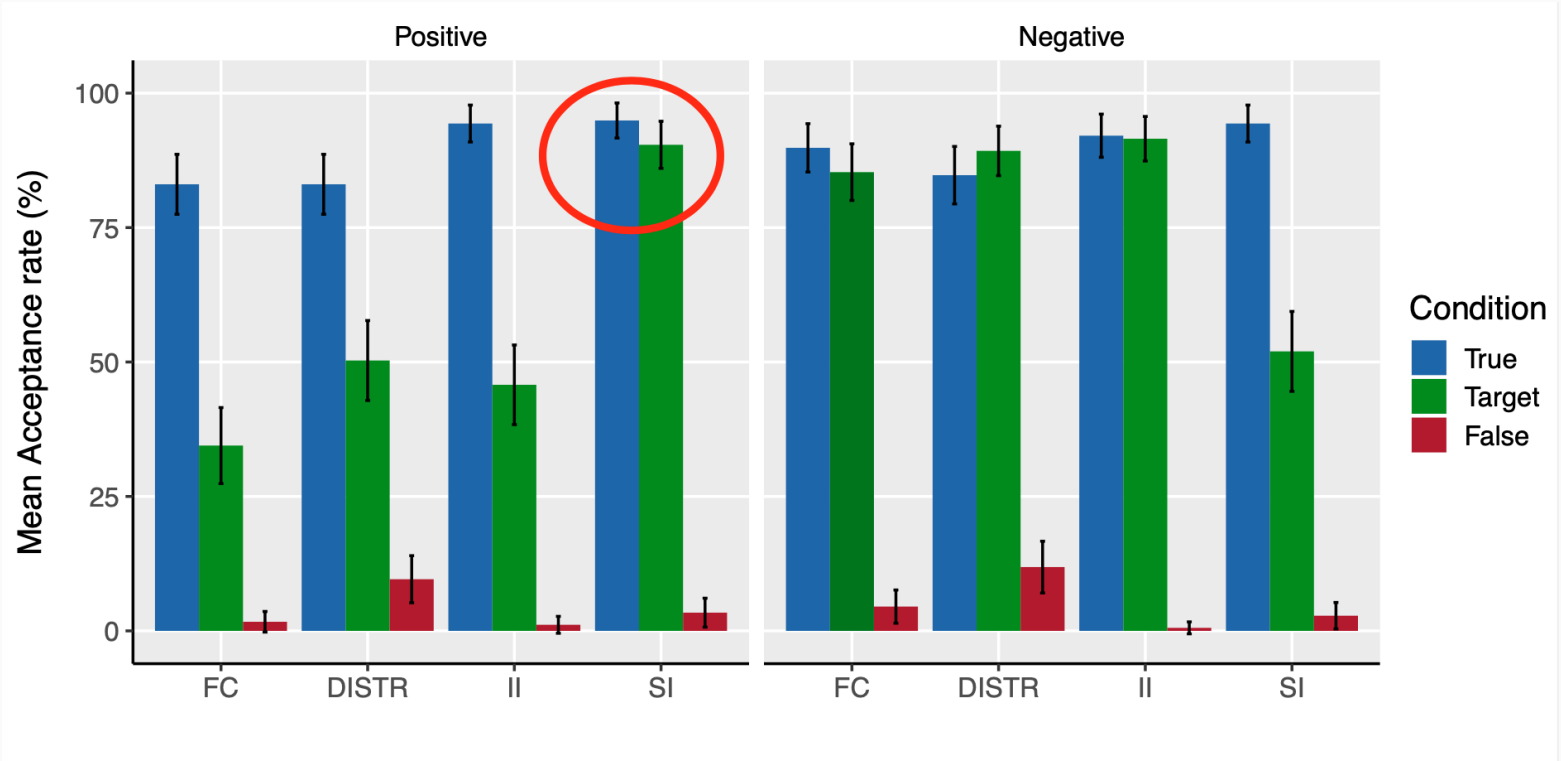
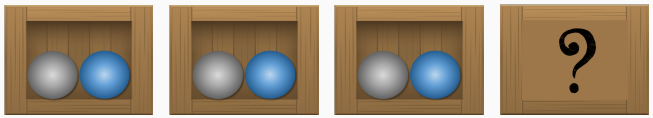
Target
False

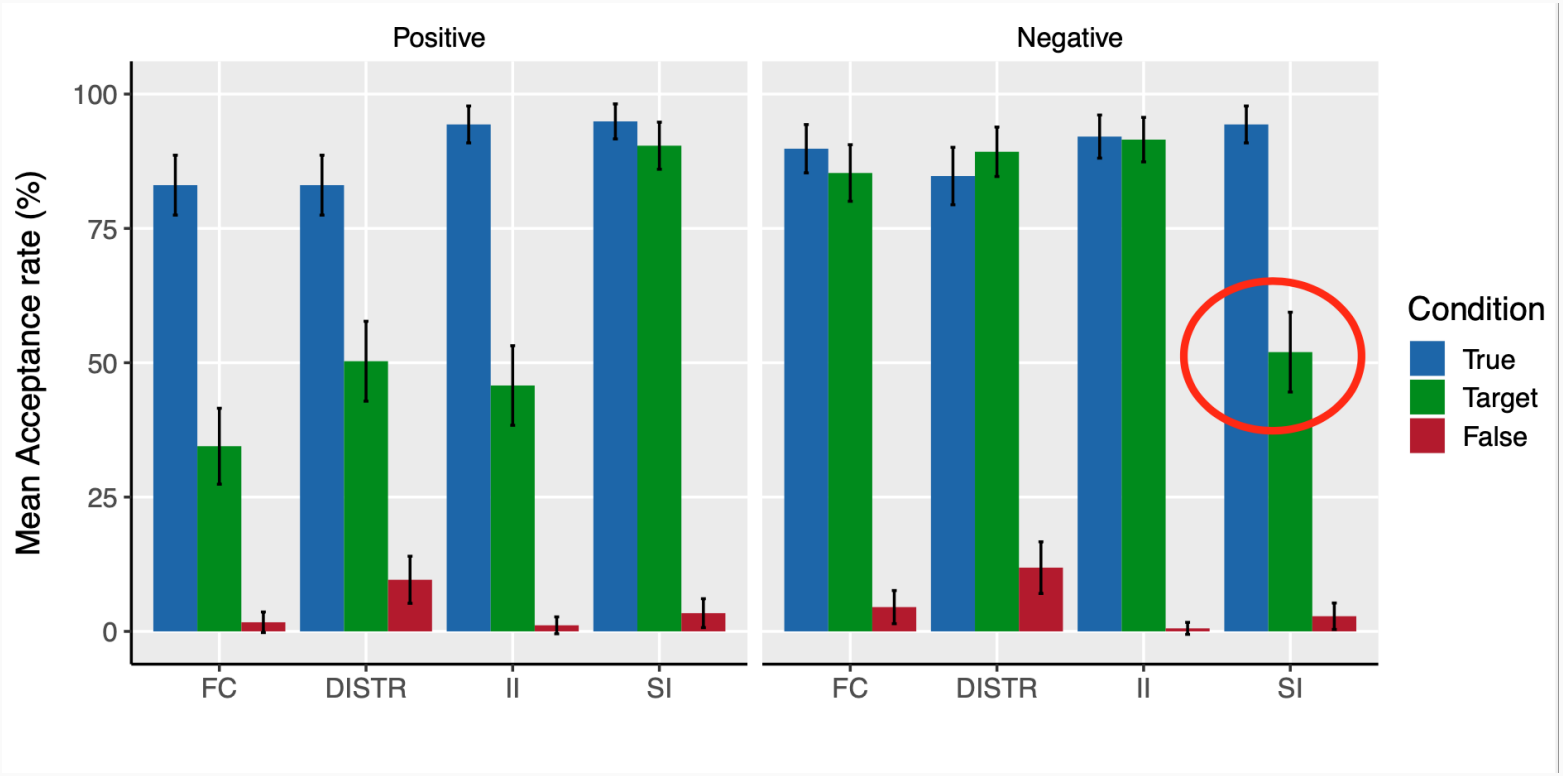
Results

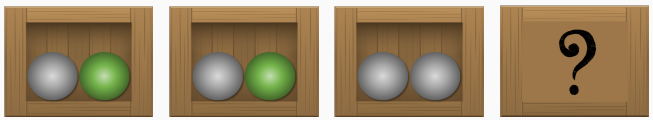




It is possible that A

Results





It is not certain that A

General Discussion and conclusion

The main results

- Our results are challenging the hypothesis about alternatives and the implicature approach

The hypothesis again

- Alternatives that do not involve lexical substitution are more robust, faster to process, and easier to acquire

Why challenging

- The positive and negative versions are all based on alternatives that do not involve lexical substitutions

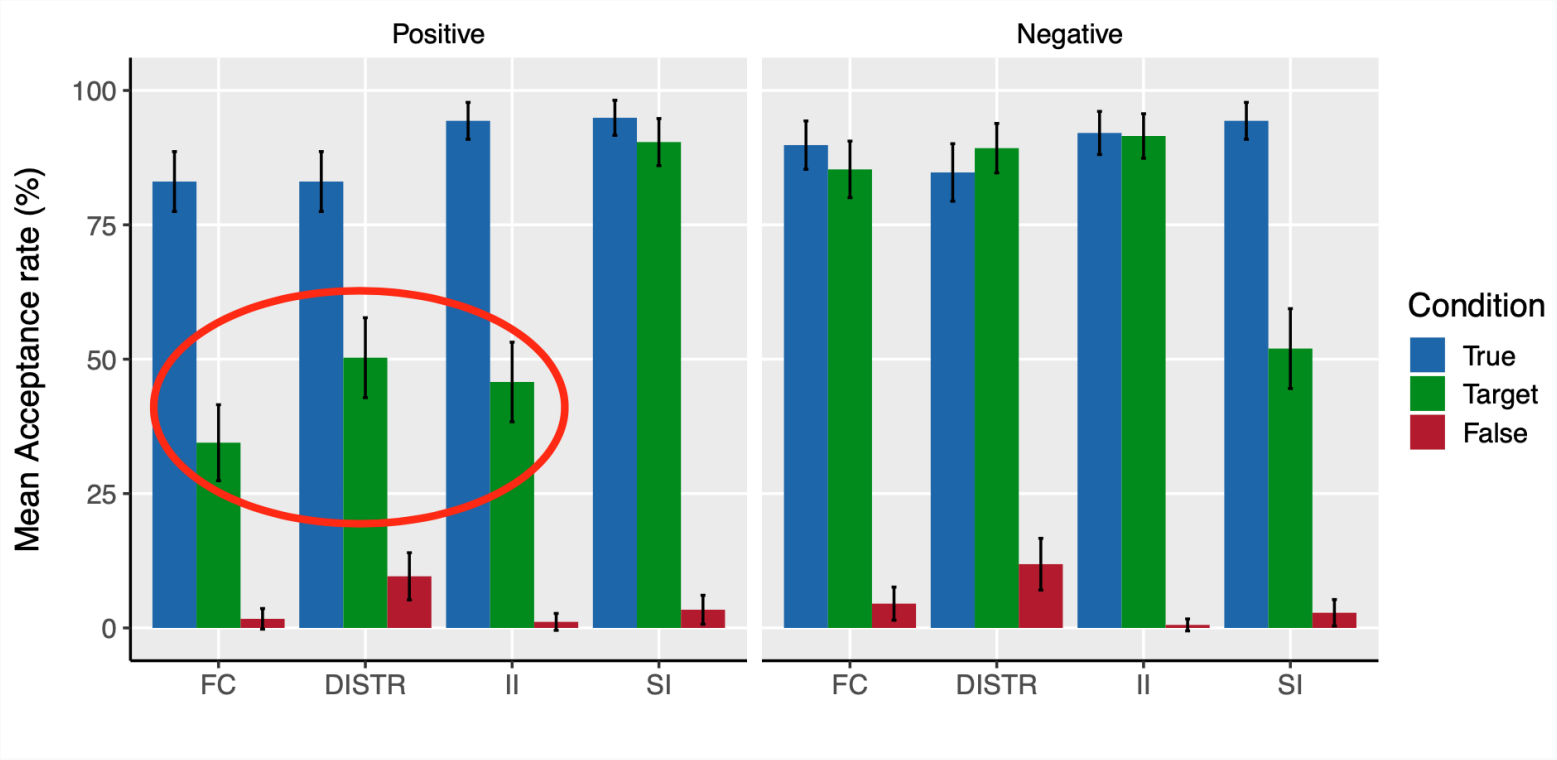
Why challenging

- The positive and negative versions are all based on alternatives that do not involve lexical substitutions
- Why so much difference in the rates of endorsement?

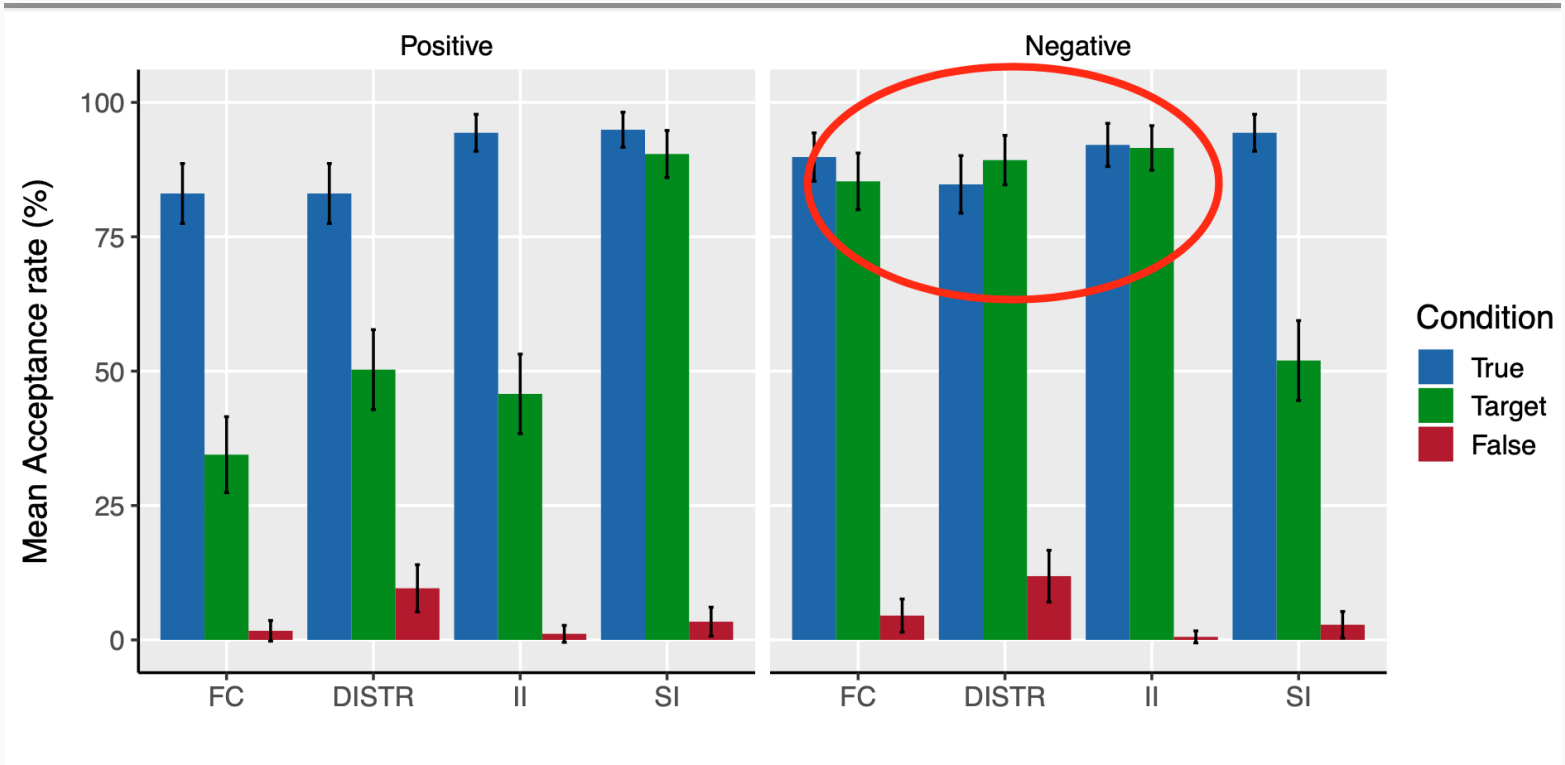
Why challenging

- The positive and negative versions are all based on alternatives that do not involve lexical substitutions
- Why so much difference in the rates of endorsement?
- With no corresponding difference between regular SIs and ISIs

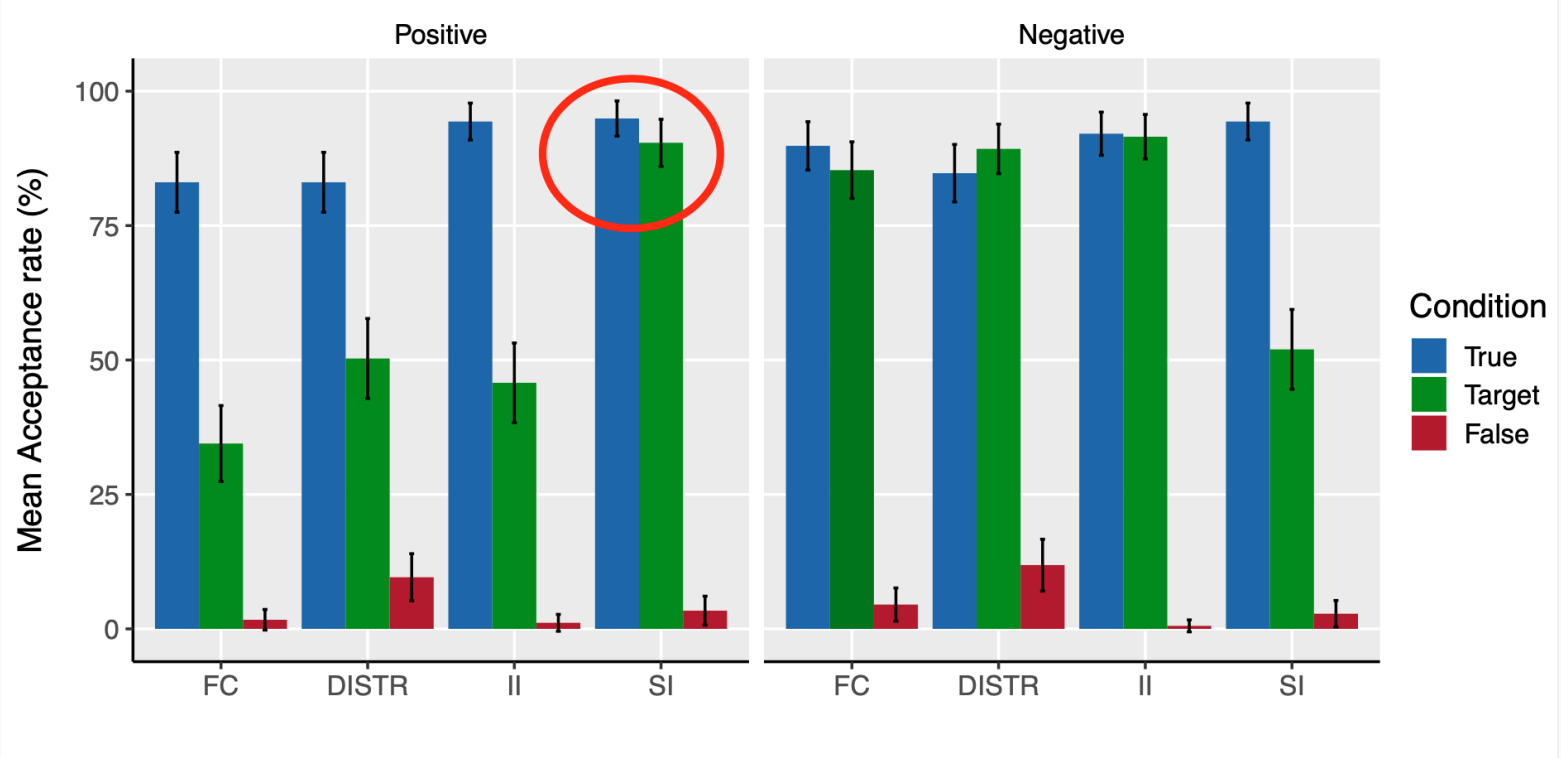
Back to the results



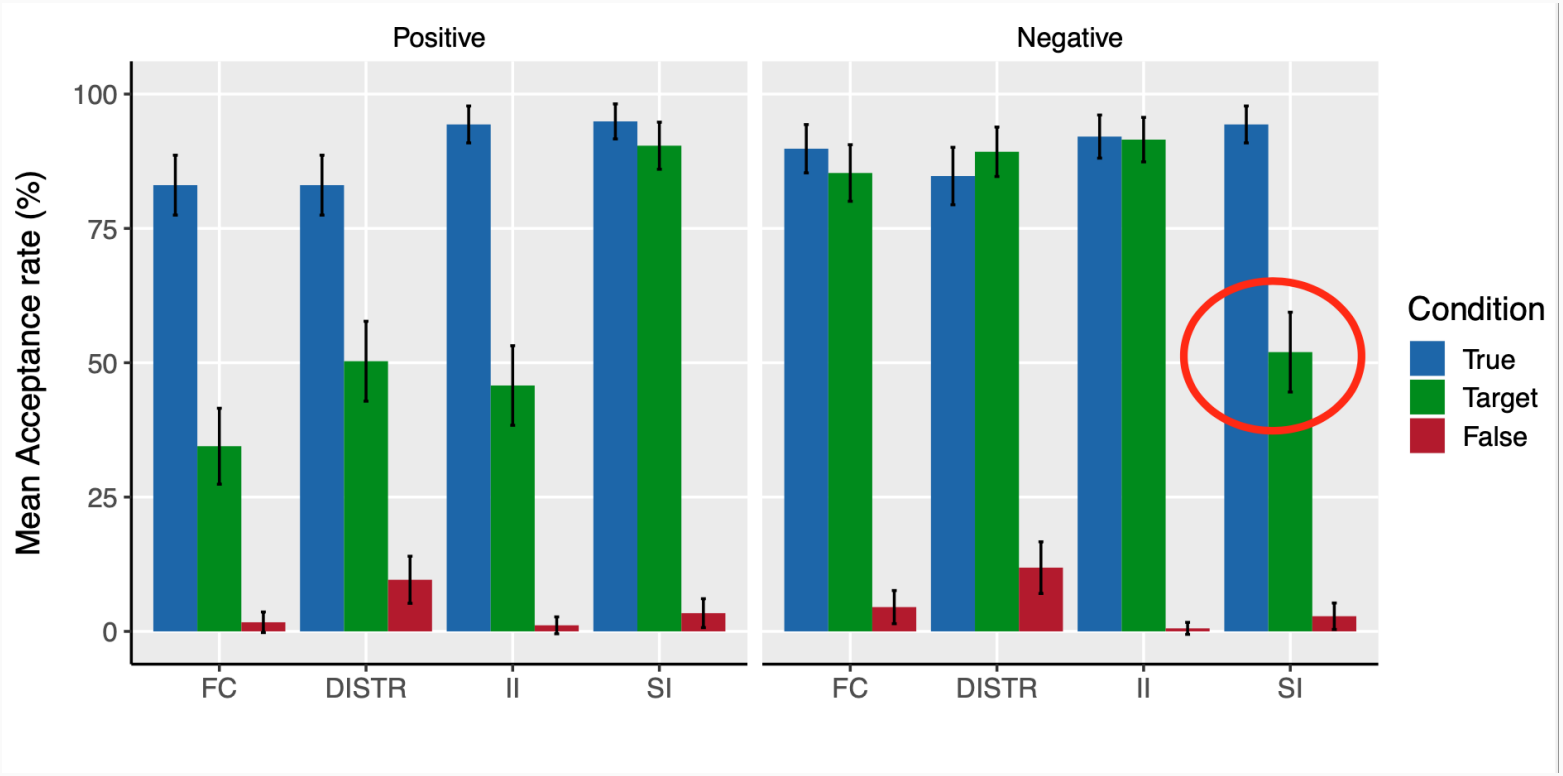
Back to the results



Back to the results



Back to the results



What we need

- An account of the difference between positive and negative

What we need

- An account of the difference between positive and negative
- not extending to regular implicatures

Three directions

- A hybrid approach

Three directions

- A hybrid approach
- More alternatives

Three directions

- A hybrid approach
- More alternatives
- A relevance-based account

Conclusion

- Negative vs positive as a powerful perspective

Conclusion

- Negative vs positive as a powerful perspective
- To learn more about those inferences and the alternatives they arise from

Conclusion

- Negative vs positive as a powerful perspective
- To learn more about those inferences and the alternatives they arise from
- And hypotheses about the differences among them

Thanks!

Thanks!

What then

What then

Giving up a unified account

A hybrid account

- Non-implicature approach to FC[14]

[14] Not extending to NFC though e.g. Goldstein 2019 but not Aloni 2018 or Willer 2018

A hybrid account

- Non-implicature approach to FC[14]
- Implicature approach to NFC

[14] Not extending to NFC though e.g. Goldstein 2019 but not Aloni 2018 or Willer 2018

What then

More alternatives

More alternatives to consider[15]

- NFC is weaker because it involves more alternatives

[15] Bar-lev and Fox 2017 2020

More alternatives to consider[15]

- NFC is weaker because it involves more alternatives
- When those additional alternatives are factored in no inference arises

[15] Bar-lev and Fox 2017 2020

More alternatives

- The gist of the idea is that negation can be replaced by EXH

Back to negative free choice

(72) $\left\{ \begin{array}{ll} \text{It is not required that A} & \neg\Box A \\ \text{It is not required that B} & \neg\Box B \end{array} \right\}$

(73) $\textsc{exh}$[It is not required A and B] =

It is not required A and It is not required B $\neg\Box A \wedge \neg\Box B$

Back to negative free choice

(74)

$$\left\{\begin{array}{ll}
\textsf{not}[\text{It is required that A and B}] & \neg\Box(A \wedge B) \\
\textsf{not}[\text{It is required that A}] & \neg\Box A \\
\textsf{not}[\text{It is required that B}] & \neg\Box B \\
\textsf{not}[\text{It is required that A or B}] & \neg\Box(A \vee B) \\
\textsc{exh}[\text{It is required that A and B}] & \Box(A \wedge B) \\
\textsc{exh}[\text{It is required that A}] & \Box A \wedge \neg\Box B \\
\textsc{exh}[\text{It is required that B}] & \Box B \wedge \neg\Box A \\
\textsc{exh}[\text{It is required that A or B}] & \Box(A \vee B) \wedge \neg\Box(A \wedge B)
\end{array}\right\}$$

Back to negative free choice

(74)

$$\left\{\begin{array}{ll}
\text{not}[\text{It is required that A and B}] & \neg\Box(A \wedge B) \\
\text{not}[\text{It is required that A}] & \neg\Box A \\
\text{not}[\text{It is required that B}] & \neg\Box B \\
\text{not}[\text{It is required that A or B}] & \neg\Box(A \vee B) \\
\text{EXH}[\text{It is required that A and B}] & \Box(A \wedge B) \\
\text{EXH}[\text{It is required that A}] & \Box A \wedge \neg\Box B \\
\text{EXH}[\text{It is required that B}] & \Box B \wedge \neg\Box A \\
\text{EXH}[\text{It is required that A or B}] & \Box(A \vee B) \wedge \neg\Box(A \wedge B)
\end{array}\right\}$$

(75) $\text{EXH}[$ It is not required A and B$] =$

It is not required A or It is not required B $\neg\Box A \vee \neg\Box B$

The problem

(76) EXH[It is not required that A] =
It is not required that A but it is permitted that A ISI

The problem

(76) $\textsc{exh}$[It is not required that A] =
It is not required that A but it is permitted that A $\textsc{isi}$

(77) $\left\{ \begin{array}{ll} \text{It is not required that A} & \neg\Box A \\ \text{It is not permitted that A} & \neg\Diamond A \end{array} \right\}$

The problem

(78)

$$\left\{\begin{array}{ll} \text{not[It is required that A]} & \neg\Box A \\ \text{not[It is permitted that A]} & \neg\Diamond A \\ \textsc{exh}\text{[It is required that A]} & \Box A \\ \textsc{exh}\text{[It is permitted that A]} & \Diamond A \wedge \neg\Box A \end{array}\right\}$$

The problem

(78)

$$\left\{\begin{array}{ll} \text{not[It is required that A]} & \neg\Box A \\ \text{not[It is permitted that A]} & \neg\Diamond A \\ \textsc{exh}\text{[It is required that A]} & \Box A \\ \textsc{exh}\text{[It is permitted that A]} & \Diamond A \wedge \neg\Box A \end{array}\right\}$$

(79) $\textsc{exh}$[It is not required that A] =
It is not required that A NO ISI

In sum

- The idea allows to account for the difference between FC and NFC

In sum

- The idea allows to account for the difference between FC and NFC
- It incorrectly extends to predict that ISIs should be weaker than SIs

What then

Relevance

The account

- The implicature approach to free choice

The account

- The implicature approach to free choice
- A notion of Relevance and the pragmatics of negation

Relevance

- A sentence is relevant if its meaning addresses the understood QUD

Relevance and implicatures

- Implicatures only arise from relevant alternatives

Relevance[16]

Relevance

A proposition p is relevant in a context c and the partition Q of the context set c induced by the current QUD of c if it is contextually equivalent to a cell or union of cells of Q

[16] Heim 2011, Spector 2010

The pragmatics of negation

- A negative sentence is associated with the expectation that its prejacent is/was possible

The pragmatics of negation

- A negative sentence is associated with the expectation that its prejacent is/was possible
- It evokes a polar QUD about its prejacent

The pragmatics of negation

(80) It's not raining

The pragmatics of negation

(80) It's not raining

(81) QUD: Is it raining?

Putting it all together

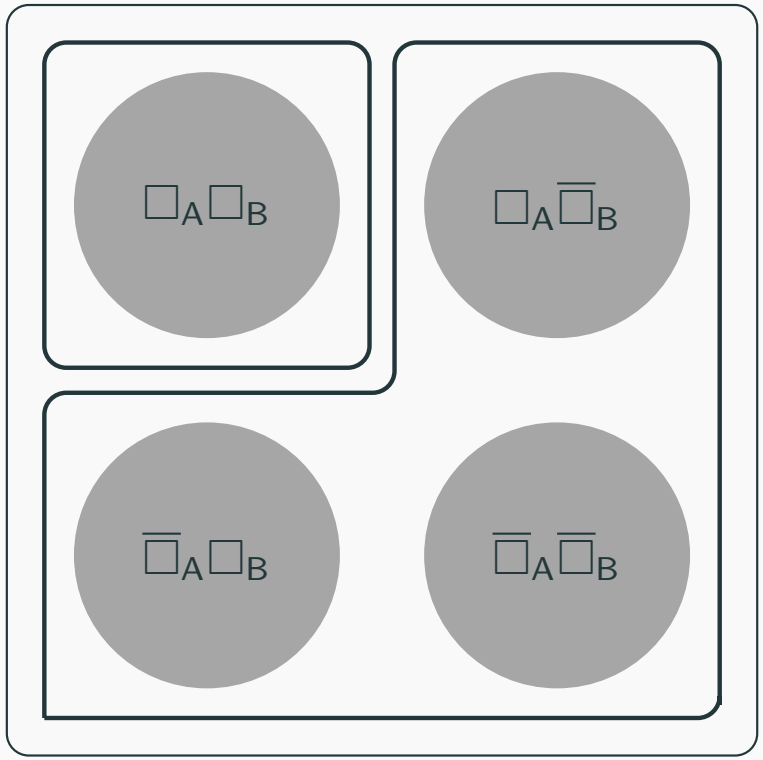
(82) It's not required that Mia buys pears and bananas.

Putting it all together

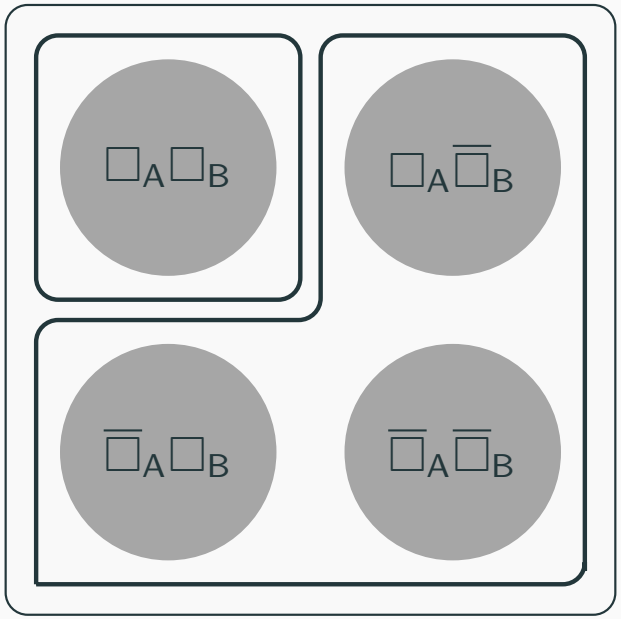
(82) It's not required that Mia buys pears and bananas.

(83) QUD: Is it required that Mia buys pears and bananas?

Is it required that A and B?

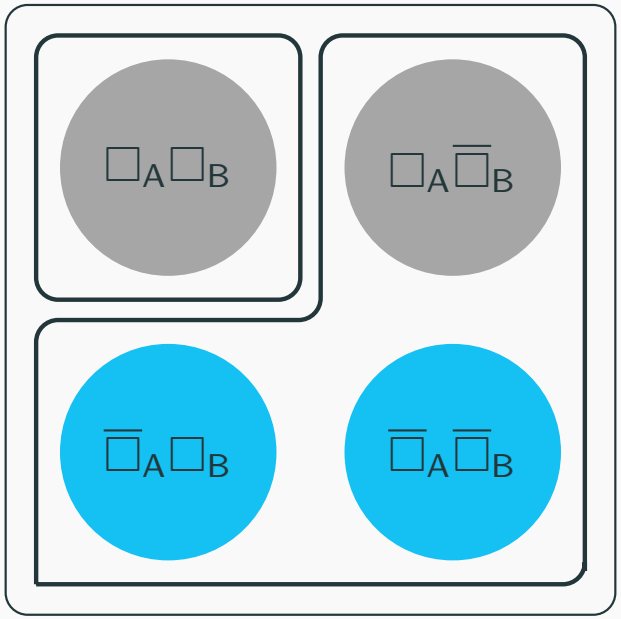


Is it required that A and B?



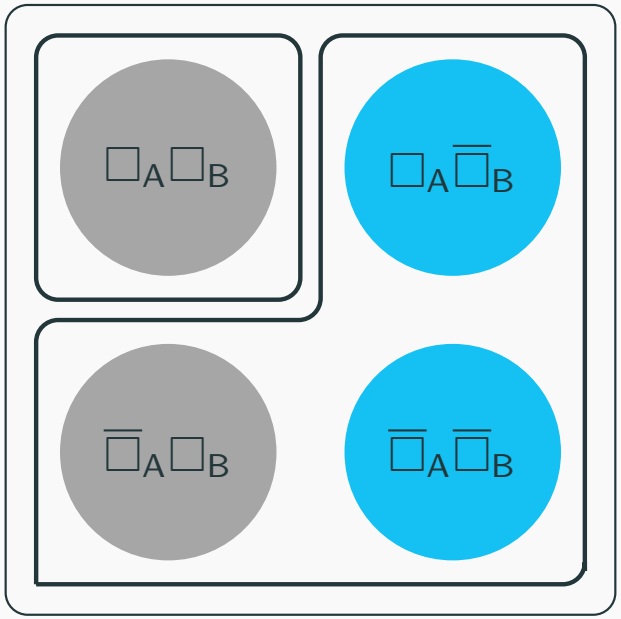
$$\left\{ \begin{array}{ll} \text{It is not required that A} & \neg\Box A \\ \text{It is not required that B} & \neg\Box B \end{array} \right\}$$

Is it required that A and B?



$$\left\{ \begin{array}{ll} \text{It is not required that A} & \neg\Box A \\ \text{It is not required that B} & \neg\Box B \end{array} \right\}$$

Is it required that A and B?



$$\left\{ \begin{array}{ll} \text{It is not required that A} & \neg\Box A \\ \text{It is not required that B} & \neg\Box B \end{array} \right\}$$

No negative free choice

(84) EXH[It is not required A and B] =

It is not required A or It is not required B $\neg\Box A \vee \neg\Box B$

FC remains untouched[17]

(85) It's permitted that Mia buys pears or hamburgers.

[17] Simons 2001, Romoli 2012, Marty and Romoli 2020

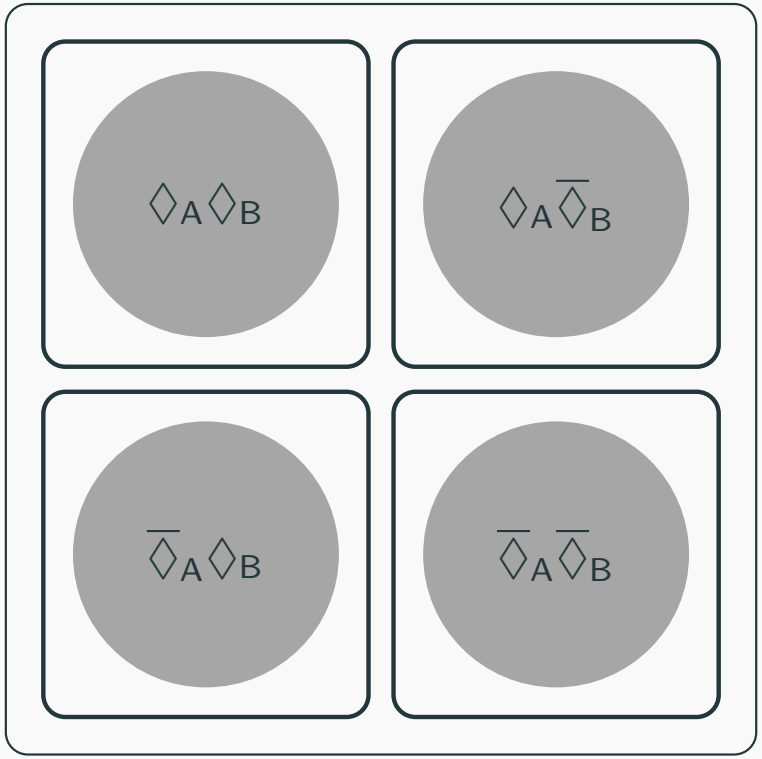
FC remains untouched[17]

(85) It's permitted that Mia buys pears or hamburgers.

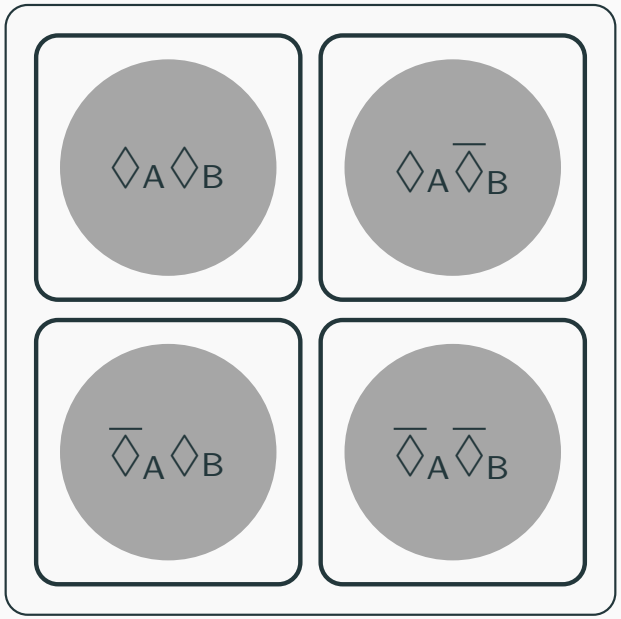
(86) QUD: What is Mia permitted to buy?

[17] Simons 2001, Romoli 2012, Marty and Romoli 2020

What is Mia permitted to buy?

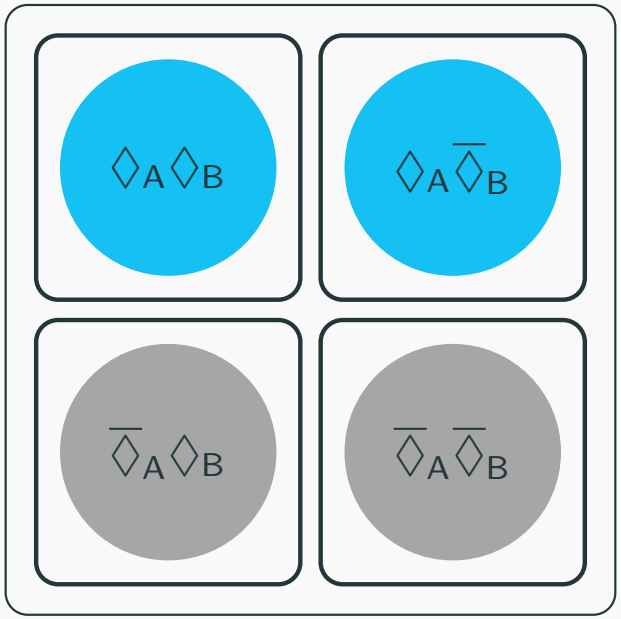


What is Mia permitted to buy?



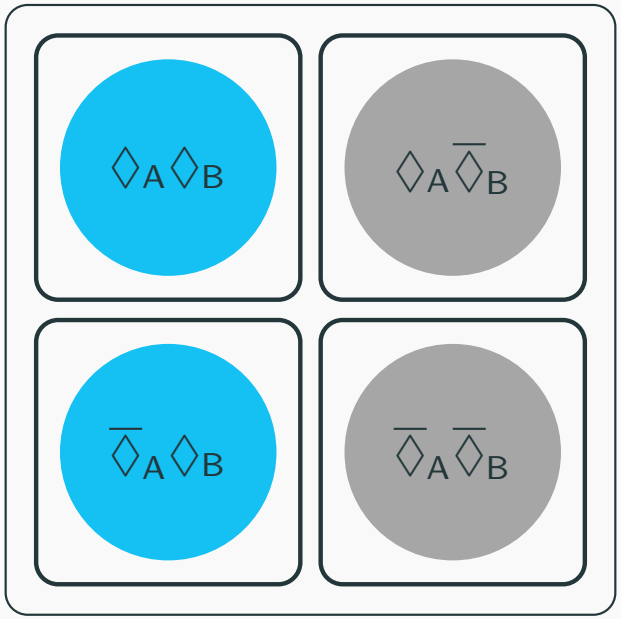
$$\left\{ \begin{array}{ll} \text{It is permitted that A} & \Diamond A \\ \text{It is permitted that B} & \Diamond B \end{array} \right\}$$

What is Mia permitted to buy?



$$\left\{ \begin{array}{ll} \text{It is permitted that A} & \Diamond A \\ \text{It is permitted that B} & \Diamond B \end{array} \right\}$$

What is Mia permitted to buy?



$$\left\{ \begin{array}{ll} \text{It is permitted that A} & \Diamond A \\ \text{It is permitted that B} & \Diamond B \end{array} \right\}$$

Free choice remains untouched

(87) $\left\{ \begin{array}{ll} \text{It is permitted that A} & \Diamond A \\ \text{It is permitted that B} & \Diamond B \end{array} \right\}$

(88) $\textsc{exh}$[It is permitted A or B] =

It is permitted A and It is permitted B $\Diamond A \wedge \Diamond B$

The problem

(89) It's not required that Mia buys pears.

The problem

(89) It's not required that Mia buys pears.

(90) QUD: Is it required that Mia buys pears?

The problem

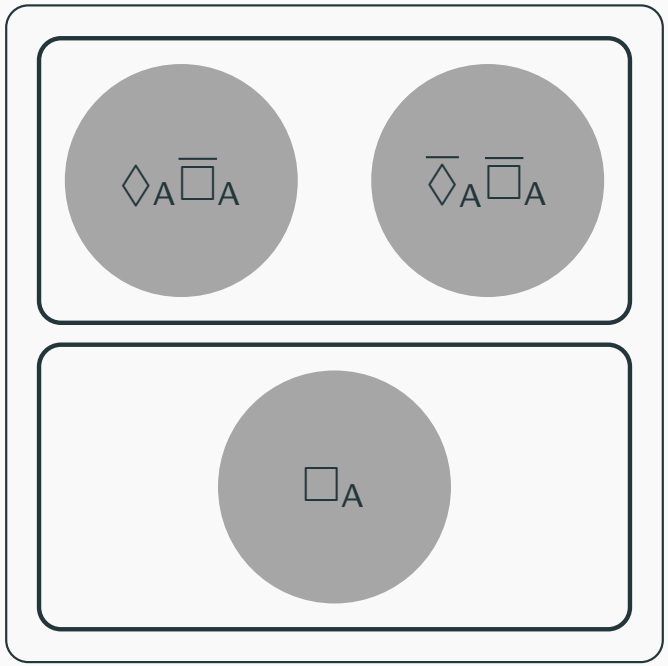
(91) EXH[It is not required that A] =
It is not required that A but it is permitted that A ISI

The problem

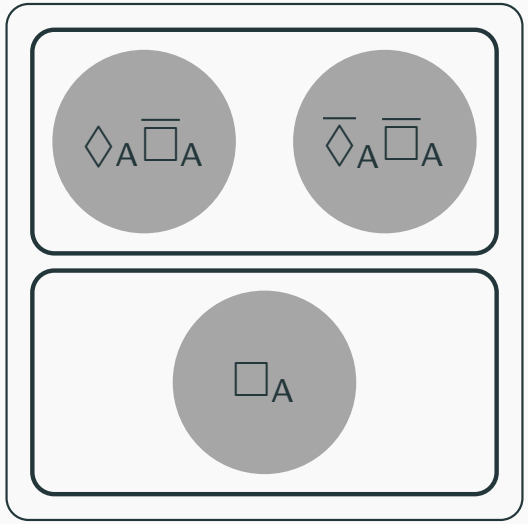
(91) $\textsc{exh}$[It is not required that A] =
It is not required that A but it is permitted that A $\textsc{isi}$

(92) $\left\{ \begin{array}{ll} \text{It is not required that A} & \neg\Box A \\ \text{It is not permitted that A} & \neg\Diamond A \end{array} \right\}$

Is it required that A?

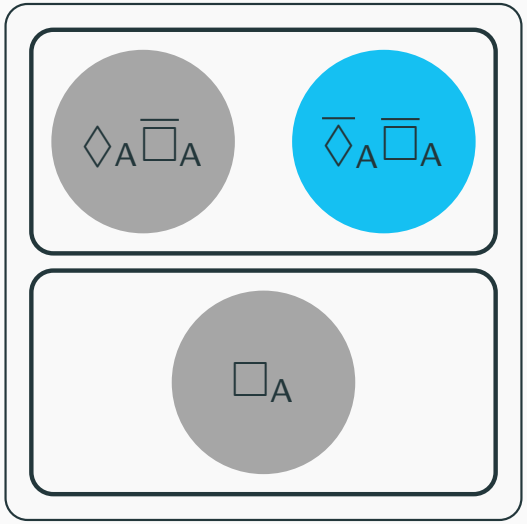


Is it required that A?



$\left\{ \text{It is not permitted that A} \quad \neg\Diamond A \right\}$

Is it required that A?



$\left\{ \text{It is not permitted that A} \quad \neg\Diamond A \right\}$

No indirect scalar implicature

(93) EXH[It is not required that A] =
It is not required that A NO ISI

In sum

- The idea allows to account for the difference between FC and NFC

In sum

- The idea allows to account for the difference between FC and NFC
- It incorrectly extends to predict that ISIs should be weaker than SIs

Experiment 3

- Same as experiment 1 but we didn't use *both* and *either*

Experiment 3

- Same as experiment 1 but we didn't use *both* and *either*
- Results very similar, but higher rejection rate in NFC

Experiment 4

- Motivation: understanding the difference between positive and negative free choice

Experiment 4

- Motivation: understanding the difference between positive and negative free choice
- Comparing them to positive and negative ignorance implicatures

Positive ignorance implicatures

(94) Mia bought avocados or berries.

$\rightsquigarrow$ *The speaker doesn't know which of the two she bought*

Negative ignorance implicatures

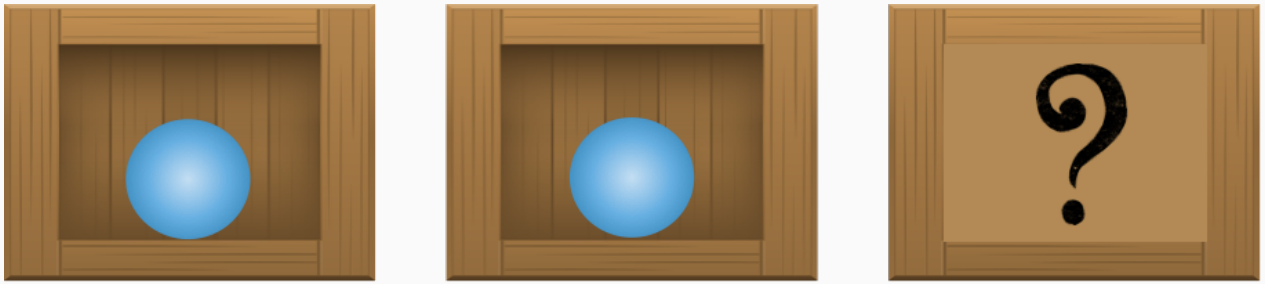
(95) Mia didn't buy both avocados and berries.
$\rightsquigarrow$ *The speaker doesn't know which of the two she didn't buy*

Task[18]

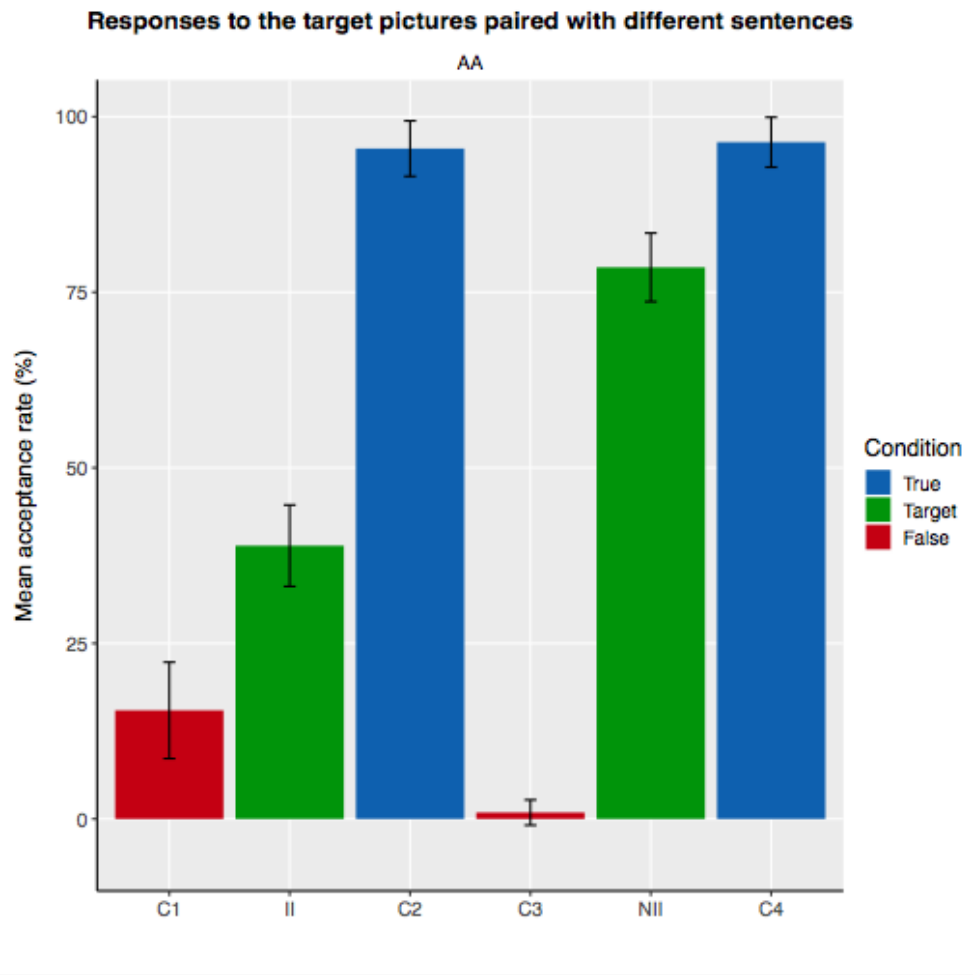
- Mistery box task

[18] adapted from Noveck 2001; see also Moscati et al 2015

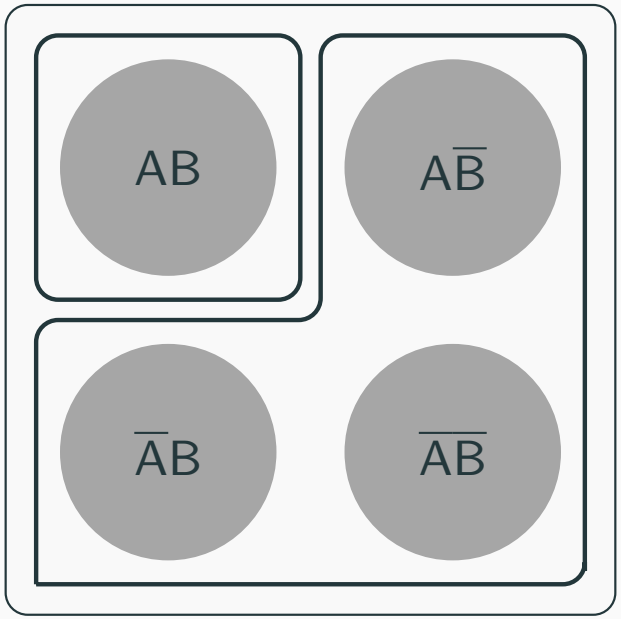
Results



Results

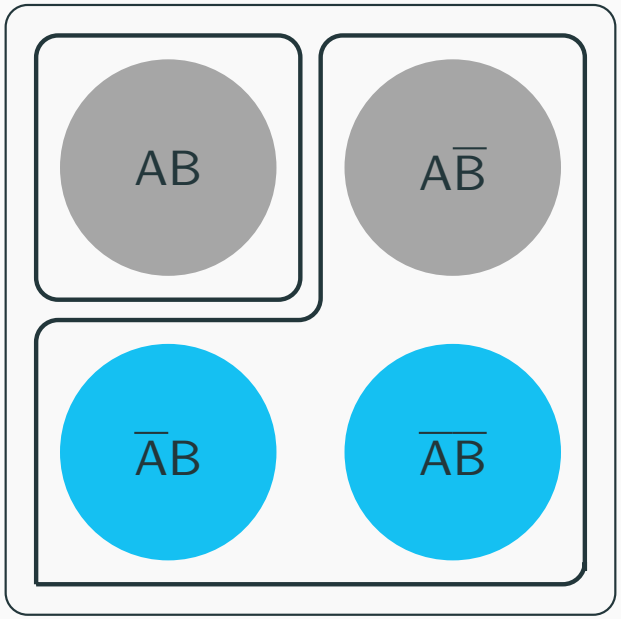

Responses to the target pictures paired with different sentences
AA
Mean acceptance rate (%)
100
75
50
25
0
C1
II
C2
C3
NII
C4
Condition
True
Target
False

Is it A and B?



$$\left\{ \begin{array}{ll} \text{not A} & \neg A \\ \text{not B} & \neg B \end{array} \right\}$$

Is it required that A and B?



$$\left\{ \begin{array}{ll} \text{not A} & \neg A \\ \text{not B} & \neg B \end{array} \right\}$$

No negative ignorance[19]

(96) It is not A and B

[19] Provided a theory of ignorance based on alternatives e.g. not Fox 2007

The previous study

Semantics & Pragmatics Volume 2, Article 2: 1–33, 2009
doi: 10.3765/sp.2.2

Universal implicatures and free choice effects: experimental data*

Emmanuel Chemla
Institut Jean-Nicod, DEC-ENS, Paris
University College London

[20] Chemla 2009

The previous study

- Comparing positive and negative free choice in French

The previous study

- Comparing positive and negative free choice in French
- Using an inferential task

Comparing positive and negative free choice

(97) John is allowed to give me the commentary or the dissertation.

Comparing positive and negative free choice

(97) John is allowed to give me the commentary or the dissertation.
John can choose which of the two he will give to the teacher

Comparing positive and negative free choice

(98) John does not have to give me the dissertation and the commentary.

Comparing positive and negative free choice

(98) John does not have to give me the dissertation and the commentary.
John can choose which of the two he will give to the teacher

Results

- Positive free choice received around 90% of endorsement rate

Results

- Positive free choice received around 90% of endorsement rate
- Negative free choice was around 60%

The problems

- No baseline for inference endorsement

The problems

- No baseline for inference endorsement
- How do we know that it was really an inference?

The problem[21]

- Particularly problematic given the inferential task

[21] Geurts and Poscoulous 2009, Chemla and Spector 2011, Gotzner and Romoli 2018

The problem[21]

- Particularly problematic given the inferential task
- Inviting endorsement of the candidate inference

[21] Geurts and Poscoulous 2009, Chemla and Spector 2011, Gotzner and Romoli 2018

The problem

The fact that the alleged inference was explicitly mentioned may have an effect on the derivation of the inference [. . .] even if it might prevent us from drawing strong conclusions from absolute results, the differences between conditions remains meaningful. (Chemla 2009; p. 14)

The problems

- Also not using 'both' so not controlling for a potential role of the homogeneity of conjunction

In sum

- The results are promising and suggest that negative free choice is weaker than the positive one, if it is there

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- We also do not know what is the role of the homogeneity of 'and'

In sum

- The results are promising and suggest that negative free choice is weaker than the positive one, if it is there
- But no baseline: we can't conclude that negative free choice is there
- We also do not know what is the role of the homogeneity of 'and'
- The debate is not settled