

# Homogeneity or implicature

## An experimental study of free choice

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SALT 29, UCLA, the 18th May 2019

# Implicatures and their boundaries

- What should we treat as **implicatures**?

# Implicatures and their boundaries

- Plural definites
- Bare plurals
- Neg-raising
- Temporal inferences
- Free choice
- ...

## The focus

- Plural definites
- Bare plurals
- Neg-raising
- Temporal inferences
- Free choice
- ...

# Today

The question: Is **Free choice** an implicature?

# Today

Experimental project directly **addressing** this question

# Outline

- 1 Overview
- 2 Background
  - Free choice and Dual prohibition
  - The implicature approach
  - The homogeneity approach
- 3 Predictions
- 4 The experiment
  - Results
- 5 Discussion
  - The main result
  - Wide scope disjunction
  - Further directions
- 6 Conclusion
  - Addressing the challenge

# What is free choice?<sup>1</sup>

(1) Angie is **allowed** to buy the car **or** the boat.

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<sup>1</sup>von Wright 1968, Kamp 1974



# What is free choice?<sup>1</sup>

- (1) Angie is **allowed** to buy the car **or** the boat.  
↪ *Angie can choose between the two*

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<sup>1</sup>von Wright 1968, Kamp 1974

## Disappearing under negation

(2) Angie is **not allowed** to buy the car **or** the boat.

## Disappearing under negation

- (2) Angie is **not allowed** to buy the car **or** the boat.  
*↯ It's not true that Angie can choose between the two*

## Disappearing under negation

- (2) Angie is **not allowed** to buy the car **or** the boat.  
 $\nrightarrow$  *It's not true that Angie can choose between the two*  
 $\rightsquigarrow$  *Angie cannot buy either one*

## Two main approaches

- ① Implicature based
- ② Non-implicature based

## The goal

Testing a clear **divergent prediction** of the two approaches

## The main result

A **challenge** for the implicature approach

## Why does it matter?

- Tells us something about theories of **free choice**



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- Tells us something about theories of **free choice**
- Potentially about **implicatures** as well

## Why does it matter?

- Tells us something about theories of **free choice**
- Potentially about **implicatures** as well
- Experimentally **distinguishes** between theories

# The rest of today

## ① Background

# The rest of today

- 1 Background
- 2 The two approaches

## The rest of today

- ① Background
- ② The two approaches
- ③ The divergent prediction

# The rest of today

- ① Background
- ② The two approaches
- ③ The divergent prediction
- ④ The experiment

## The rest of today

- 1 Background
- 2 The two approaches
- 3 The divergent prediction
- 4 The experiment
- 5 Discussion and conclusion

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## Free choice

- (3) Angie is **allowed** to buy the car **or** the boat.  
~→ *Angie can choose between the two*

## Under negation

- (4) Angie is **not allowed** to buy the car **or** the boat.  
 $\nrightarrow$  *It's not true that Angie can choose between the two*  
 $\rightsquigarrow$  *Angie cannot buy either one*

## More schematically

$$(5) \quad \diamond(A \vee B)$$

## More schematically

$$(5) \quad \diamond(A \vee B) \rightsquigarrow \diamond A \wedge \diamond B$$

FREE CHOICE

## More schematically

$$(5) \quad \diamond(A \vee B) \rightsquigarrow \diamond A \wedge \diamond B$$

FREE CHOICE

$$(6) \quad \neg \diamond(A \vee B) \rightsquigarrow \neg \diamond A \wedge \neg \diamond B$$

## More schematically

$$(5) \quad \diamond(A \vee B) \rightsquigarrow \diamond A \wedge \diamond B$$

FREE CHOICE

$$(6) \quad \neg \diamond(A \vee B) \rightsquigarrow \neg \diamond A \wedge \neg \diamond B$$

DUAL PROHIBITION

# The empirical puzzle

- How **free choice** arises in positive contexts



# The empirical puzzle

- How **free choice** arises in positive contexts
- How **dual prohibition** arises in negative contexts

## Two main approaches

- 1 Implicature based
- 2 Non-implicature based

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## The implicature approach<sup>2</sup>

- Free choice is an **implicature**

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<sup>2</sup>Fox 2007, Klinedinst 2006, Chierchia 2013, Chemla 2010, Franke 2013, Santorio & Romoli 2018, Bar-Lev & Fox 2017 a.o

## The implicature approach<sup>2</sup>

- Free choice is an **implicature**
- Dual prohibition is just part of the **literal meaning**

---

<sup>2</sup>Fox 2007, Klinedinst 2006, Chierchia 2013, Chemla 2010, Franke 2013, Santorio & Romoli 2018, Bar-Lev & Fox 2017 a.o

## The implicature approach: the gist

$$(7) \quad \diamond(A \vee B) = \diamond A \vee \diamond B$$

LITERAL MEANING

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$$(7) \quad \diamond(A \vee B) = \diamond A \vee \diamond B$$

LITERAL MEANING

$$(8) \quad \neg\diamond(A \vee B) = \neg\diamond A \wedge \neg\diamond B$$

DUAL PROHIB

## The implicature approach: the gist

$$(7) \quad \diamond(A \vee B) = \diamond A \vee \diamond B$$

LITERAL MEANING

$$(8) \quad \neg\diamond(A \vee B) = \neg\diamond A \wedge \neg\diamond B$$

DUAL PROHIB

$$(9) \quad \text{IMP}[\diamond(A \vee B)] = \diamond A \wedge \diamond B$$

FREE CHOICE



## The implicature approach: the gist

- (7)  $\diamond(A \vee B) = \diamond A \vee \diamond B$  LITERAL MEANING
- (8)  $\neg\diamond(A \vee B) = \neg\diamond A \wedge \neg\diamond B$  DUAL PROHIB
- (9) **IMP** $[\diamond(A \vee B)] = \diamond A \wedge \diamond B$  FREE CHOICE
- (10)  $*\neg_{\text{IMP}}\diamond(A \vee B) = \neg\diamond A \vee \neg\diamond B$  NEGATED FREE CHOICE

## In sum

- **Free choice** arises as an implicature
- **Dual prohibition** is just part of the literal meaning

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## Non-implicature accounts<sup>3</sup>

- The implicature approach is not the only option

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<sup>3</sup>Aloni 2018, Starr 2016, Willer 2018, Goldstein 2018, Rothschild and Yablo 2018; see also Chemla 2010

## Non-implicature accounts<sup>3</sup>

- The implicature approach is not the only option
- Non-implicature accounts of free choice

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## Non-implicature accounts<sup>3</sup>

- The implicature approach is not the only option
- Non-implicature accounts of free choice
- A recent account based on **homogeneity** for concreteness

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<sup>3</sup>Aloni 2018, Starr 2016, Willer 2018, Goldstein 2018, Rothschild and Yablo 2018; see also Chemla 2010

## The homogeneity approach: the gist<sup>4</sup>

- Free choice is just part of the **literal meaning**

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<sup>4</sup>Goldstein 2018, Rothschild and Yablo 2018

## The homogeneity approach: the gist<sup>4</sup>

- Free choice is just part of the **literal meaning**
- Dual prohibition arises via **homogeneity**

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<sup>4</sup>Goldstein 2018, Rothschild and Yablo 2018



## The homogeneity approach: the gist<sup>5</sup>

- Free choice is just part of the **literal meaning**
- Dual prohibition arises via a **homogeneity presupposition**

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<sup>5</sup>Goldstein 2018, Rothschild and Yablo 2018

## The homogeneity approach: the gist

$$(11) \quad \diamond(A \vee B) = \diamond A \wedge \diamond B$$

FREE CHOICE

## The homogeneity approach: the gist

$$(11) \quad \diamond(A \vee B) = \diamond A \wedge \diamond B$$

FREE CHOICE

$$(12) \quad \diamond A \leftrightarrow \diamond B$$

HOMOGENEITY

## The homogeneity approach: the gist

- (11)  $\diamond(A \vee B) = \diamond A \wedge \diamond B$  FREE CHOICE
- (12)  $\diamond A \leftrightarrow \diamond B$  HOMOGENEITY
- (13)  $\neg\diamond(A \vee B) = \neg(\diamond A \wedge \diamond B)$  NEGATED FREE CHOICE

## The homogeneity approach: the gist

- (14)  $\diamond(A \vee B) = \diamond A \wedge \diamond B$  FREE CHOICE
- (15)  $\diamond A \leftrightarrow \diamond B$  HOMOGENEITY
- (16)  $\neg\diamond(A \vee B) = \neg(\diamond A \wedge \diamond B)$  NEGATED FREE CHOICE

## The homogeneity approach: the gist

- (14)  $\diamond(A \vee B) = \diamond A \wedge \diamond B$  FREE CHOICE
- (15)  $\diamond A \leftrightarrow \diamond B$  HOMOGENEITY
- (16)  $\neg\diamond(A \vee B) = \neg(\diamond A \wedge \diamond B)$  NEGATED FREE CHOICE
- (17)  $\neg\diamond A \wedge \neg\diamond B$  DUAL PROHIB

## In sum

- **Free choice** is just part of the literal meaning
- **Dual prohibition** arises via the homogeneity presupposition

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## The two approaches

- **Successfully** capture basic pattern and more complex data

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- **Successfully** capture basic pattern and more complex data
- Roughly with **similar** empirical coverage

## A simple divergent prediction<sup>6</sup>

Distinguish between the two given a **simple** divergent prediction

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<sup>6</sup>Kriz 2015, 2017, Tieu et al 2018

## Free choice vs dual prohibition

- (18) Angie is allowed to buy the car or the boat  
~→ *Angie can choose between the two*      FREE CHOICE
- (19) Angie is not allowed to buy the car or the boat  
~→ *Angie cannot buy either one*      DUAL PROHIB

## The implicature approach

- (20) Angie is allowed to buy the car or the boat  
     $\rightsquigarrow$  *Angie can choose between the two*      IMPLICATURE

## The implicature approach

- (20) Angie is allowed to buy the car or the boat  
     $\rightsquigarrow$  *Angie can choose between the two*          IMPLICATURE
- (21) Angie is not allowed to buy the car or the boat  
     $\rightsquigarrow$  *Angie cannot buy either one*          LITERAL MEANING

## The homogeneity approach

- (22) Angie is allowed to buy the car or the boat  
~→ *Angie can choose between the two* LITERAL MEANING

## The homogeneity approach

- (22) Angie is allowed to buy the car or the boat  
~→ *Angie can choose between the two* LITERAL MEANING
- (23) Angie is not allowed to buy the car or the boat  
~→ *Angie cannot buy either one* (VIA) PRESUPPOSITION



## The homogeneity approach

- (24) Angie is allowed to buy the car or the boat  
     $\rightsquigarrow$  *Angie can choose one iff she can choose the other* PRES
- (25) Angie is not allowed to buy the car or the boat  
     $\rightsquigarrow$  *Angie can choose one iff she can choose the other* PRES

## Difference in status

**Context:** Angie is only allowed to buy the boat

(26) Angie is allowed to buy the car or the boat

$\rightsquigarrow$  *Angie can choose between the two*

FALSE IMP

## Difference in status

**Context:** Angie is only allowed to buy the boat

(27) Angie is not allowed to buy the car or the boat  
 $\rightsquigarrow$  *Angie cannot buy either one*

FALSE

## No difference in status

**Context:** Angie is only allowed to buy the boat

(28) Angie is allowed to buy the car or the boat  
 $\rightsquigarrow$  *Angie can choose one iff she can choose the other* PS FAIL

## No difference in status

**Context:** Angie is only allowed to buy the boat

- (29) Angie is not allowed to buy the car or the boat  
↷ *Angie can choose one iff she can choose the other* PS FAIL

## In sum

	IMPLICATURE	HOMOGENEITY
POS	IMPLICATURE VIOLATION	PRESUPPOSITION FAILURE
NEG	FALSITY	PRESUPPOSITION FAILURE

## In sum

	IMPLICATURE	HOMOGENEITY
POS	IMPLICATURE VIOLATION	PRESUPPOSITION FAILURE
NEG	FALSITY	PRESUPPOSITION FAILURE

## In sum

- Testing these predictions



## In sum

- Testing these **predictions**
- A simple way to **distinguish** between the two approaches

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## The goal

- **Testing** the divergent predictions above

## The goal

A ternary task building on **previous work** on implicatures, presuppositions, and homogeneity<sup>7</sup>

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<sup>7</sup>Kriz & Chemla 2016, Katsos and Bishop 2011, Abrusan and Szendroi 2013

## Free choice - FC

- (30) Angie is allowed to buy the car or the boat
- (31) Angie is not allowed to buy the car or the boat

## Simple disjunction - OR

- (32) Angie bought the car or the boat
- (33) Angie didn't buy the car or the boat

## Simple disjunction - OR

- (34) Angie bought the car or the boat  
 $\rightsquigarrow$  *Angie didn't buy both the car and the boat*      IMP

## Simple disjunction - OR

- (34) Angie bought the car or the boat  
     $\rightsquigarrow$  *Angie didn't buy both the car and the boat*                   IMP
- (35) Angie didn't buy the car or the boat  
     $\rightsquigarrow$  *Angie didn't buy either*   LIT MEAN



## The design

2x2 design with INFERENCE TYPE (FC vs OR; between) and POLARITY (within) as factors

## Material: FC targets

**Context:** Angie is only allowed to buy the car

## Material: FC targets

**Context:** Angie is only allowed to buy the car

(36) Angie is allowed to buy the car or the boat

(37) Angie is not allowed to buy the car or the boat

## Material: OR targets

**Context:** Angie bought both the car and the boat

## Material: OR targets

**Context:** Angie bought both the car and the boat

(38) Angie bought the car or the boat

(39) Angie didn't buy the car or the boat

# Controls

- FC and OR
- Positive and negative
- True and false

# Materials

- Each participant saw 8 targets and 8 controls in total

## Procedure

- Ternary judgment task with participants evaluating sentences attributed to a puppet against a scenario



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- The task is to choose a reward among three possible ones

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## Procedure

**Prediction mode:** the sentences are puppet's guesses about

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- what a character is allowed/not allowed to buy

FC

## Procedure

**Prediction mode:** the sentences are puppet's guesses about

- what a character is allowed/not allowed to buy FC
- what a character bought/didn't buy OR

## Example FC negative



Angie is not allowed to buy the car or the boat

## Example FC negative



## Example FC negative

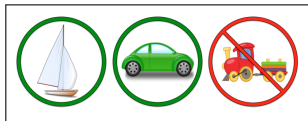




## Participants

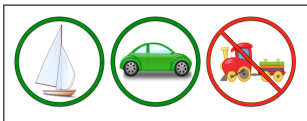
- 114 participants recruited through AMT, randomly assigned to the two conditions
- 3 excluded for not reporting English as their native language, leaving 111 participants (56 in FC condition, 55 in disjunction condition)

## Predictions - OR - both approaches





## Predictions - OR



(42) Angie bought the car or the boat



(43) Angie didn't buy the car or the boat



## Predictions - FC - implicature approach



## Predictions - FC - implicature approach



- (44) Angie is allowed to buy the car or the boat      IMP FALSE
- (45) Angie is not allowed to buy the car or the boat      FALSE

## Predictions - FC - implicature approach



(46) Angie is allowed to buy the car or the boat



(47) Angie isn't allowed to buy the car or the boat



## Predictions - FC - homogeneity approach



- (48) Angie is allowed to buy the car or the boat PS FAIL
- (49) Angie is not allowed to buy the car or the boat PS FAIL



## Predictions - FC - homogeneity approach



(50) Angie is allowed to buy the car or the boat



(51) Angie isn't allowed to buy the car or the boat



## Predictions - FC - homogeneity approach



(52) Angie is allowed to buy the car or the boat



(53) Angie isn't allowed to buy the car or the boat



## In sum - Predictions

	OR	FC IMP	FC HOM
POS	IMP VIOLATION	IMP VIOLATION	PS FAIL
NEG	FALSITY	FALSITY	PS FAIL

## In sum - Predictions

	OR	FC IMP	FC HOM
POS	IMP VIOLATION	IMP VIOLATION	PS FAIL
NEG	FALSITY	FALSITY	PS FAIL

## In sum - Predictions

	OR	FC IMP	FC HOM
POS	IMP VIOLATION	IMP VIOLATION	PS FAIL
NEG	FALSITY	FALSITY	PS FAIL

## In sum - Predictions

	OR	FC IMP	FC HOM
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## Predictions - in sum

- An interaction between TYPE OF INFERENCE and POLARITY

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- An interaction between TYPE OF INFERENCE and POLARITY
- **Challenging** for the implicature approach



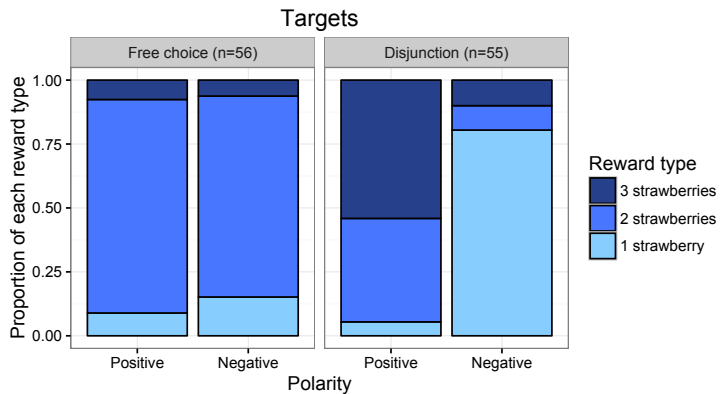
## Predictions - in sum

- An interaction between TYPE OF INFERENCE and POLARITY
- **Challenging** for the implicature approach
- Entirely **in line** with the homogeneity approach

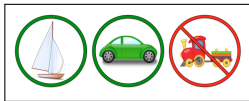
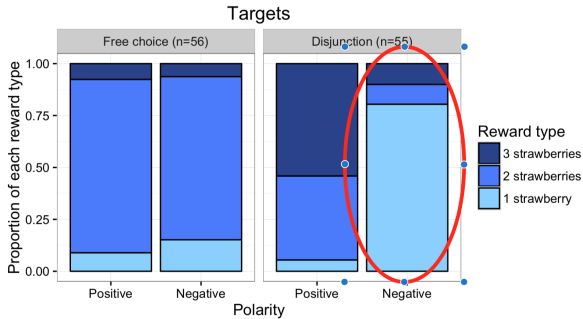
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# Results

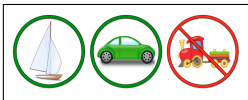
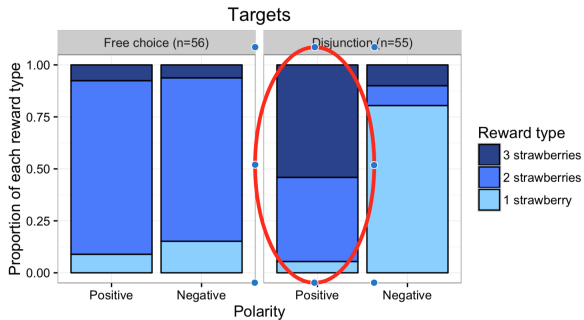


# Results



Angie didn't buy the car or the boat

# Results



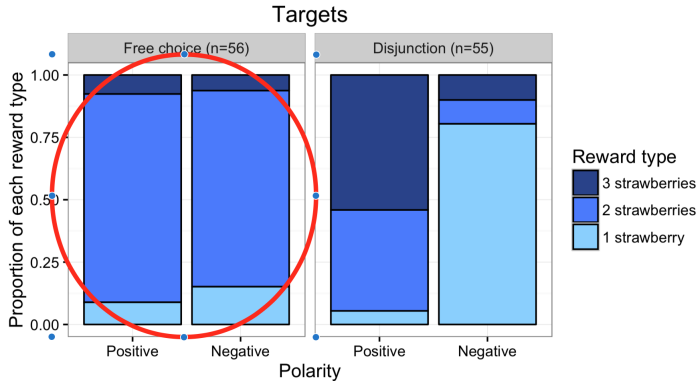
Angie bought the car or the boat

# Results

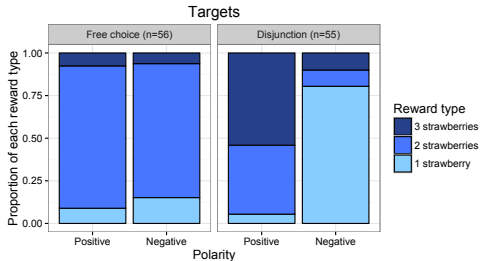


Angie is not allowed to buy the car or the boat

# Results



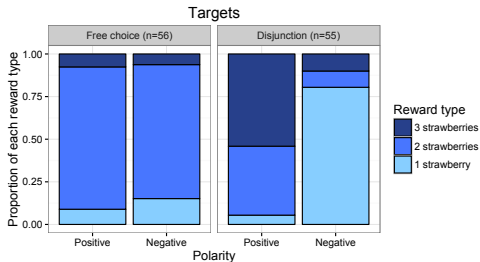
Angie is allowed to buy the car or the boat



**Effect** of POLARITY ( $\chi^2(1) = 102, p < .001$ )

Marginal effect of INFERENCE TYPE ( $\chi^2(1) = 3.2, p = .07$ )





**Interaction** between INFERENCE TYPE and POLARITY  
 $(\chi^2(1) = 88, p < .001)$

## In sum

- **Interaction** between type of inference and polarity

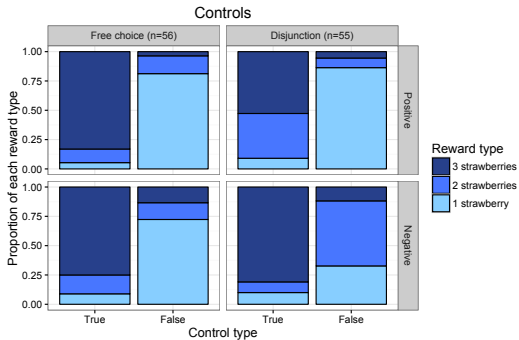
## In sum

- **Interaction** between type of inference and polarity
- **Difference** between positive and negative with OR

## In sum

- **Interaction** between type of inference and polarity
- **Difference** between positive and negative with OR
- **Symmetric** responses for positive and negative with FC

# Controls



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## The main result

- Participants' behavior on disjunction in line with previous studies



## The main result

- Participants' behavior on disjunction in line with previous studies
- Distinguished between falsity and implicature violation

## The main result

- Participants' behavior on disjunction in line with previous studies
- Distinguished between falsity and implicature violation
- Assigned intermediate status to both positive and negative for FC

## The main result

- **Challenging** for the implicature approach

## The main result

- **Challenging** for the implicature approach
- Entirely **in line** with the homogeneity approach

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## A difference

- OR and FC are analogous in both positive and negative

## A difference

- OR and FC are analogous in both positive and negative
- The FC negative condition has a true reading with **wide scope** disjunction

## A difference





## A difference



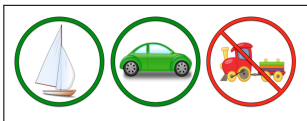
(54) Angie is not allowed to buy the car or the boat FALSE

## A difference

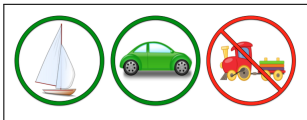


- (54) Angie is not allowed to buy the car or the boat      FALSE
- (55) Either Angie is not allowed to buy the car or she is not allowed to buy the boat      TRUE

## A difference



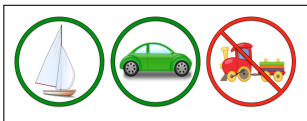
## A difference



(56) Angie didn't buy the car or the boat

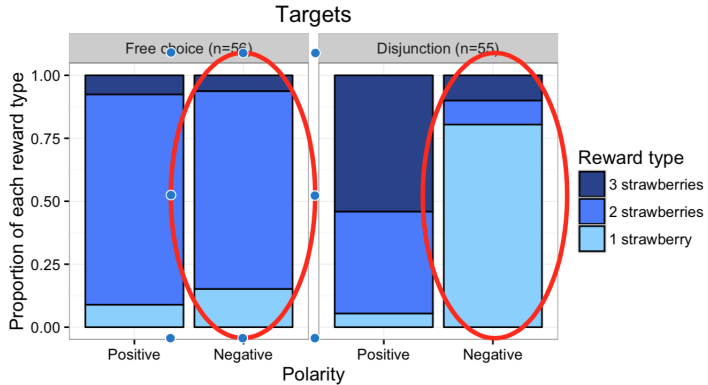
FALSE

## A difference

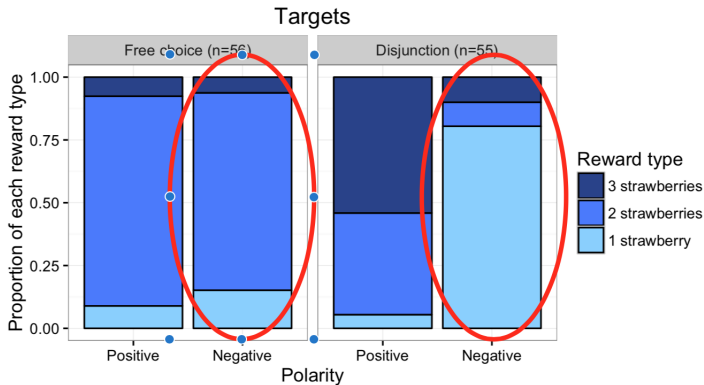


- (56) Angie didn't buy the car or the boat FALSE
- (57) Either Angie did not buy the car or she did not buy the boat FALSE

## Back to the results



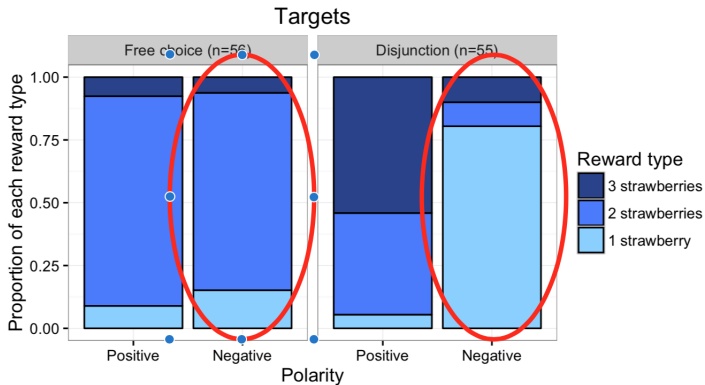
## Possible interpretation



When there is ambiguity and the truth-value of the readings **are different**, the intermediate value is chosen<sup>10</sup>

<sup>10</sup>Bill et al 2018

## Possible interpretation



The negative FC would be accounted for given this hypothesis



## Another comparison

- To test this hypothesis we need a baseline with OR and negation

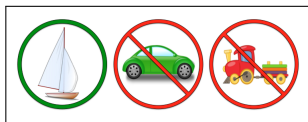
## Another comparison

- To test this hypothesis we need a baseline with OR and negation
- Where wide scope disjunction leads to a true reading

## Another comparison



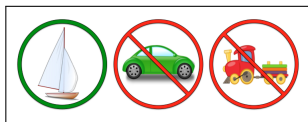
## Another comparison



(58) Angie didn't buy the boat or the car

FALSE

## Another comparison



- (58) Angie didn't buy the boat or the car FALSE
- (59) Either Angie did not buy the boat or she did not buy the car TRUE

## Another comparison

Context:  $A \wedge \neg B$

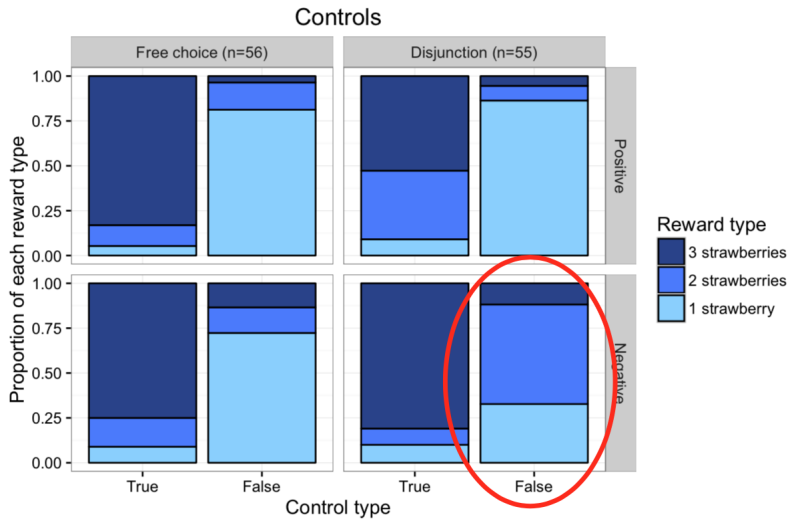
$$(60) \quad \neg(A \vee B)$$

FALSE

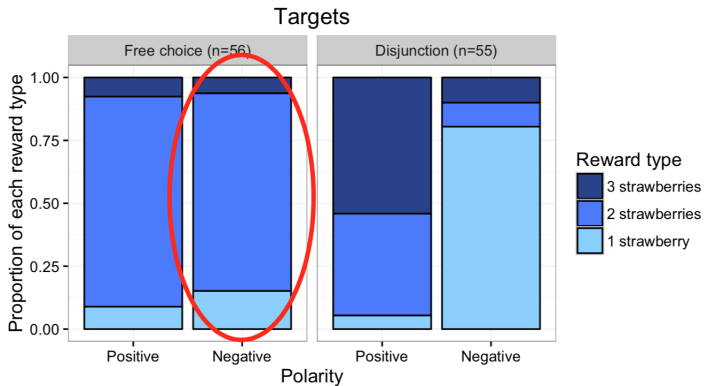
$$(61) \quad \neg A \vee \neg B$$

TRUE

# We have it already

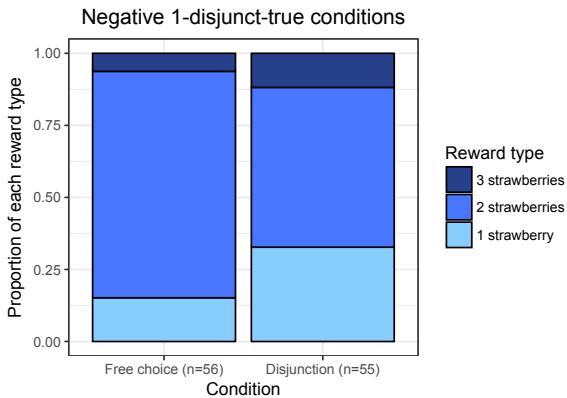


## Comparing it to the FC negative target

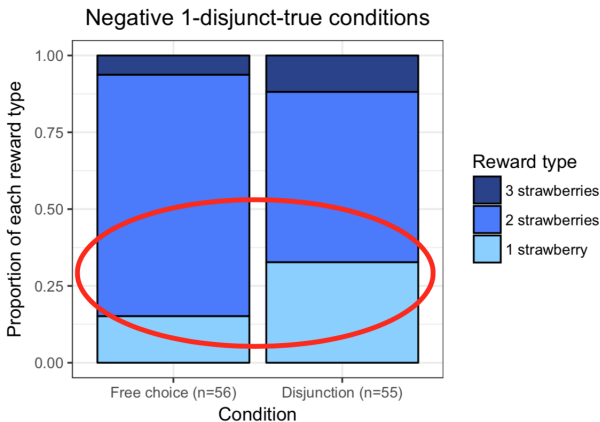




# The comparison

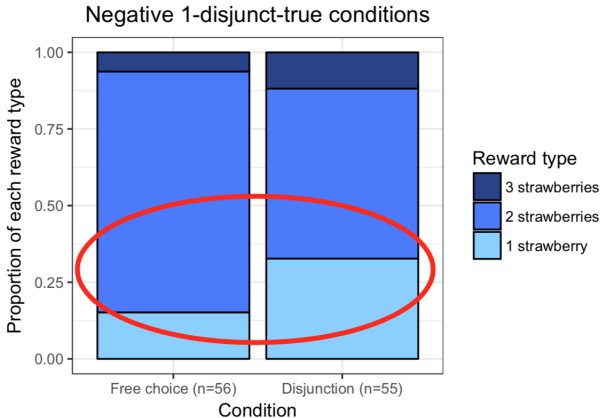


## The comparison



Marginally significant **effect** of inference type ( $z = 1.7, p = .08$ )

## The comparison



(62) Angie is not allowed to buy the car or the boat

(63) Angie didn't buy the car or the boat

## In sum

- Wide scope as an explanation of the difference between OR and FC negative?

## In sum

- Wide scope as an explanation of the difference between OR and FC negative?
- The comparison with the OR control also reveals a difference

## In sum

- Wide scope as an explanation of the difference between OR and FC negative?
- The comparison with the OR control also reveals a difference
- Scope might be playing a role but it can't be the whole story

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  - Further directions**
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## Homogeneity projection<sup>11</sup>

(64) Angie is allowed to buy the car or the boat

---

<sup>11</sup>Kriz and Chemla 2015, Rothschild and Yablo 2018, Romoli and Santorio 2018



## Homogeneity projection<sup>11</sup>

- (64) Angie is allowed to buy the car or the boat  
     $\rightsquigarrow$  *Angie is allowed to buy one iff she is allowed to buy the other*

---

<sup>11</sup>Kriz and Chemla 2015, Rothschild and Yablo 2018, Romoli and Santorio 2018

## Homogeneity projection<sup>11</sup>

- (64) Angie is allowed to buy the car or the boat  
*↷ Angie is allowed to buy one iff she is allowed to buy the other*
- (65) If Angie is allowed to buy the car or the boat, she will choose the car.

---

<sup>11</sup>Kriz and Chemla 2015, Rothschild and Yablo 2018, Romoli and Santorio 2018

## Homogeneity projection<sup>11</sup>

- (64) Angie is allowed to buy the car or the boat  
 $\rightsquigarrow$  *Angie is allowed to buy one iff she is allowed to buy the other*
- (65) If Angie is allowed to buy the car or the boat, she will choose the car.  
 $?$   $\rightsquigarrow$  *Angie is allowed to buy one iff she is allowed to buy the other*

---

<sup>11</sup>Kriz and Chemla 2015, Rothschild and Yablo 2018, Romoli and Santorio 2018

## Homogeneity projection<sup>12</sup>

(66) Angie met the students

---

<sup>12</sup>Kriz and Chemla 2015, Rothschild and Yablo 2018, Romoli and Santorio 2018

## Homogeneity projection<sup>12</sup>

- (66) Angie met the students  
     $\rightsquigarrow$  *Angie either met all or none of the students*

---

<sup>12</sup>Kriz and Chemla 2015, Rothschild and Yablo 2018, Romoli and Santorio 2018

## Homogeneity projection<sup>12</sup>

- (66) Angie met the students  
     $\rightsquigarrow$  *Angie either met all or none of the students*
- (67) If Angie met the students, she knows the situation.

---

<sup>12</sup>Kriz and Chemla 2015, Rothschild and Yablo 2018, Romoli and Santorio 2018

## Homogeneity projection<sup>12</sup>

- (66) Angie met the students  
 $\rightsquigarrow$  *Angie either met all or none of the students*
- (67) If Angie met the students, she knows the situation.  
?  $\rightsquigarrow$  *Angie either met all or none of the students*

---

<sup>12</sup>Kriz and Chemla 2015, Rothschild and Yablo 2018, Romoli and Santorio 2018

## Testing the nature of homogeneity

- Adding a direct comparison with presuppositions<sup>13</sup>



## Testing the nature of homogeneity

- Adding a direct comparison with presuppositions<sup>13</sup>
- **Context:** The Pope isn't married

## Testing the nature of homogeneity

- Adding a direct comparison with presuppositions<sup>13</sup>
- **Context:** The Pope isn't married

(68) Angie is travelling with the Pope's wife

## Testing the nature of homogeneity

- Adding a direct comparison with presuppositions<sup>13</sup>
  - **Context:** The Pope isn't married
- (68) Angie is travelling with the Pope's wife
- (69) Angie is not travelling with the Pope's wife

---

<sup>13</sup>Abrusan and Szendroi 2013

## Further directions

- Adding a direct comparison with plural definites<sup>14</sup>

---

<sup>14</sup>Kriz and Chemla 2015

## Further directions

- Adding a direct comparison with plural definites<sup>14</sup>
- **Context:** Angie met only half of the students

---

<sup>14</sup>Kriz and Chemla 2015

## Further directions

- Adding a direct comparison with plural definites<sup>14</sup>
- **Context:** Angie met only half of the students

(70) Angie met the students

---

<sup>14</sup>Kriz and Chemla 2015

## Further directions

- Adding a direct comparison with plural definites<sup>14</sup>
- **Context:** Angie met only half of the students

(70) Angie met the students

(71) Angie didn't meet the students

---

<sup>14</sup>Kriz and Chemla 2015

## Extension to other populations

- 4–6-year-old children



## Extension to other populations

- 4–6-year-old children
- Patients with psychosis<sup>15</sup>

---

<sup>15</sup>Wampers et al 2018

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## Conclusion

- Experimental work addressing the debate between implicature and non-implicature approaches to free choice

## Conclusion

- Experimental work addressing the debate between implicature and non-implicature approaches to free choice
- Results are challenging for the implicature approach

## Conclusion

- Either as supporting a non-implicature approach or as a push to refine the implicature one

## Conclusion

- Either as supporting a non-implicature approach or as a push to refine the implicature one
- Powerful and simple perspective to address this debate

## Conclusion

- Plural definites
- Bare plurals
- Neg-raising
- Temporal inferences
- ...

Thanks!



Moysh Bar-Lev, Milica Denic, Simon Goldstein, Mora Maldonado, Paul Marty,  
Agata Renans, and Paolo Santorio



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## Addressing the challenge

- Appealing to differences among scalar items is not enough<sup>16</sup>

---

<sup>16</sup>Scalar diversity - van Tiel et al 2016

## Addressing the challenge

- Unclear that a difference between alternatives would help<sup>17</sup>

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<sup>17</sup>Chemla and Bott 2013, Tieu et al 2016

## Addressing the challenge

- Re-thinking the distribution of implicatures might help<sup>18</sup>

---

<sup>18</sup>Enguehard and Chemla 2018

## The distribution of implicatures

(72) Angie is not allowed to buy the car or the boat

## The distribution of implicatures

(72) Angie is not allowed to buy the car or the boat

(73) not[Angie is allowed to buy the car or the boat]

## The distribution of implicatures

(72) Angie is not allowed to buy the car or the boat

(73) not[Angie is allowed to buy the car or the boat]

$\rightsquigarrow$  *Angie cannot buy either one*

FALSE

## The distribution of implicatures

- (74) Angie is not allowed to buy the car or the boat
- (75) not[IMP[Angie is allowed to buy the car or the boat]]



## The distribution of implicatures

- (74) Angie is not allowed to buy the car or the boat
- (75) not[IMP[Angie is allowed to buy the car or the boat]  
 $\rightsquigarrow$  *it's not true that Angie can choose between the two*

## The distribution of implicatures

- (74) Angie is not allowed to buy the car or the boat
- (75) not[IMP[Angie is allowed to buy the car or the boat]  
 $\rightsquigarrow$  *it's not true that Angie can choose between the two*  
TRUE

## The distribution of implicatures

**Context:**  $\Diamond A \wedge \neg \Diamond B$

$$(76) \quad \neg \Diamond(A \vee B) = \neg \Diamond A \wedge \neg \Diamond B$$

FALSE

## The distribution of implicatures

**Context:**  $\diamond A \wedge \neg \diamond B$

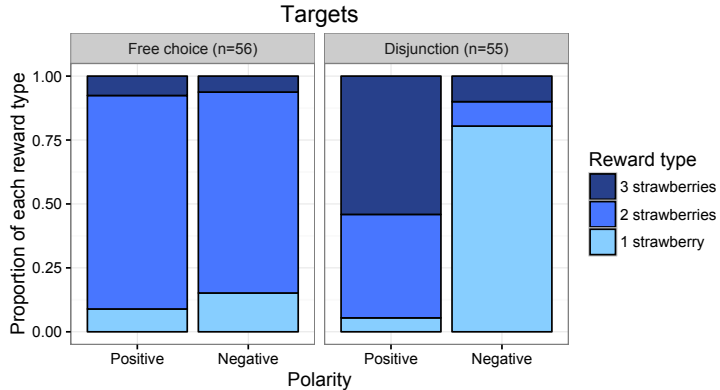
(76)  $\neg \diamond(A \vee B) = \neg \diamond A \wedge \neg \diamond B$  FALSE

(77)  $\neg(\text{IMP} \diamond(A \vee B)) = \neg(\diamond A \wedge \diamond B)$  TRUE

## The interpretation as before

If one reading is true and one is false go for the intermediate value

## Back to the results



## The standard constraint

**Do not weaken!:** do not compute an implicature if it weakens the overall meaning of the sentence

## The distribution of implicatures

$$(78) \quad \neg\Diamond(A \vee B) = \neg\Diamond A \wedge \neg\Diamond B$$

FALSE



## The distribution of implicatures

(78)  $\neg\Diamond(A \vee B) = \neg\Diamond A \wedge \neg\Diamond B$  FALSE

(79)  $*\neg(\text{IMP}\Diamond(A \vee B)) = \neg(\Diamond A \wedge \Diamond B)$  TRUE

## Same for OR

$$(80) \quad \neg(A \vee B) = \neg A \wedge \neg B$$

FALSE

## Same for OR

$$(80) \quad \neg(A \vee B) = \neg A \wedge \neg B \quad \text{FALSE}$$

$$(81) \quad \neg(\text{IMP}(A \vee B)) = \neg[(A \vee B) \wedge \neg(A \wedge B)] \quad \text{TRUE}$$

## Same for OR

(82)  $\neg(A \vee B) = \neg A \wedge \neg B$  FALSE

(83)  $*\neg(\text{IMP}(A \vee B)) = \neg[(A \vee B) \wedge \neg(A \wedge B)]$  TRUE

## A different principle<sup>19</sup>

Do not compute an implicature if it leads to a non-connected meaning

---

<sup>19</sup>Enguehard and Chemla 2018

## A different principle<sup>20</sup>

- This principle can distinguish between FC and OR

## A different principle<sup>20</sup>

- This principle can distinguish between FC and OR
- The inference of disjunction under negation leads to a non-connected meaning

## A different principle<sup>20</sup>

- This principle can distinguish between FC and OR
- The inference of disjunction under negation leads to a non-connected meaning
- Free choice under negation leads to a connected meaning



## A different principle

Context:  $\Diamond A \wedge \neg \Diamond B$

$$(84) \quad \neg \Diamond(A \vee B) = \neg \Diamond A \wedge \neg \Diamond B \quad \text{FALSE}$$

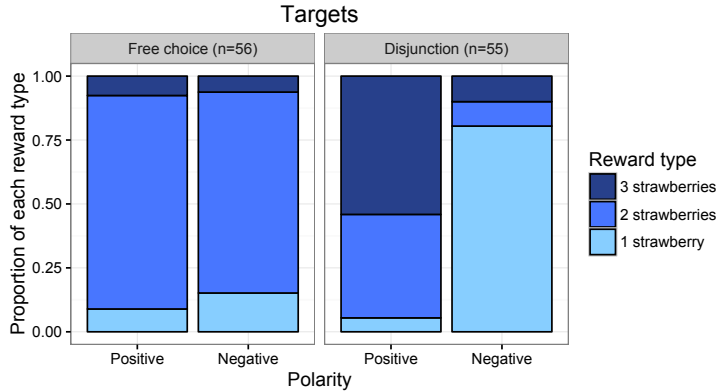
$$(85) \quad \neg(\text{IMP} \Diamond(A \vee B)) = \neg(\Diamond A \wedge \Diamond B) \quad \text{TRUE}$$

## Different for OR

(86)  $\neg(A \vee B) = \neg A \wedge \neg B$  FALSE

(87)  $*\neg(\text{IMP}(A \vee B)) = \neg[(A \vee B) \wedge \neg(A \wedge B)]$  TRUE

## Back to the results



## Prediction

(88) Angie didn't buy the car or the boat . . .

## Prediction

- (88) Angie didn't buy the car or the boat . . . she didn't want either one

## Prediction

- (88) Angie didn't buy the car or the boat . . . she didn't want  
either one EASY

## Prediction

- (88) Angie didn't buy the car or the boat . . . she didn't want  
either one EASY
- (89) Angie didn't buy the car or the boat . . .

## Prediction

- (88) Angie didn't buy the car or the boat . . . she didn't want either one EASY
- (89) Angie didn't buy the car or the boat . . . she bought both of them



## Prediction

- (88) Angie didn't buy the car or the boat . . . she didn't want  
either one EASY
- (89) Angie didn't buy the car or the boat . . . she bought both  
of them HARD

## Prediction

(90) Angie is not allowed to buy the car or the boat . . .

## Prediction

- (90) Angie is not allowed to buy the car or the boat . . . she doesn't deserve either one

## Prediction

- (90) Angie is not allowed to buy the car or the boat . . . she  
doesn't deserve either one EASY

## Prediction

- (90) Angie is not allowed to buy the car or the boat . . . she  
doesn't deserve either one EASY
- (91) Angie is not allowed to buy the car or the boat . . .

## Prediction

- (90) Angie is not allowed to buy the car or the boat . . . she doesn't deserve either one EASY
- (91) Angie is not allowed to buy the car or the boat . . . she can only buy the car

## Prediction

- (90) Angie is not allowed to buy the car or the boat . . . she doesn't deserve either one EASY
- (91) Angie is not allowed to buy the car or the boat . . . she can only buy the car EASY

## In sum

**Promising** direction to address the challenge for the implicature approach