

# Experimenting With Definiteness Contrasts

**Definiteness Across Domains Network Workshop**

Humboldt University Berlin

June 29th, 2022

**Florian Schwarz**



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Pronouns, definite descriptions, demonstratives (bare and with NP), and more (clausal dimension!)

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- **One piece of the puzzle :**

**Contrasts** based on **different definite determiner** -  
Anaphoricity vs. Uniqueness

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- **One piece of the puzzle :**

**Contrasts** based on **different definite determiner** - Anaphoricity vs. Uniqueness

- **Today's plan:**

Working towards experimental measures of definiteness contrasts

# Uniqueness vs Anaphoricity

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- Unique Example:

**Context:** Standing in an office with exactly one table

(1) **The table is covered with books.**

**Intuitive Idea:**

Definites pick out an individual with a **unique property**

# The: Uniqueness vs. Anaphoricity

- Unique Example:

**Context:** Standing in an office with exactly one table

(1) **The table is covered with books.**

**Intuitive Idea:**

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- Anaphoric Example

(1') a. **There is a table and a chair in my office.**

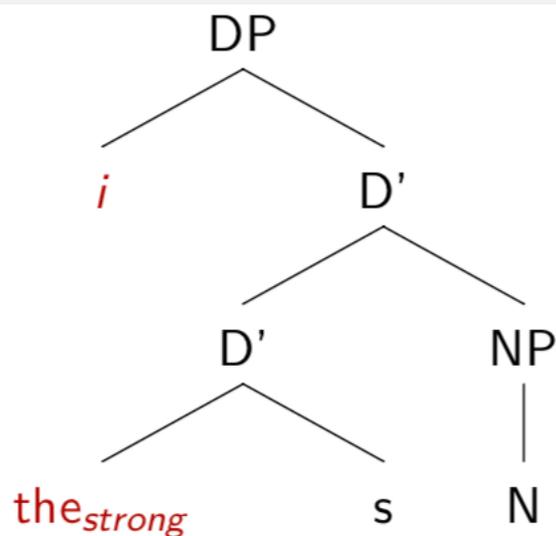
b. **The table is covered with books.**

**Intuitive idea:**

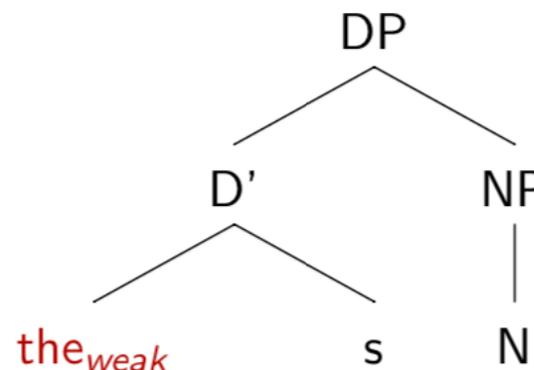
Definites pick out an **individual** that has been **introduced by a previous expression** (or in context)

# Schwarz (2009) Proposal

- Both types exist!
- Distinction between **strong** and **weak** definite articles
  - **Def<sub>weak</sub>**: uniqueness based (relativized to situations)
  - **Def<sub>strong</sub>**: additional **anaphoric** index ( $\sim$  familiarity)



$\lambda s_r \lambda P. \lambda y. \iota x [P(x)(s_r) \ \& \ x = y]$



$\lambda s_r \lambda P. \iota x [P(x)(s_r)]$

# Evidence for Contrast - Germanic

- Several Germanic languages / dialects have long been known to have two full article paradigms, e.g:
- Rhineland dialect Heinrichs (1954); Hartmann (1967), Mönchen-Gladbach dialect Hartmann (1982), Cologne dialect Himmelmann (1997), Bavarian Scheutz (1988); Schwager (2007)

## (2) Example: The definite article paradigms in Fering

	m.Sg.	f.Sg	n.Sg.	Pl.
A-article	<i>a</i>	<i>at</i>	<i>at</i>	<i>a</i>
D-article	<i>di</i>	<i>det</i>	<i>det</i>	<i>dön</i>

(Ebert, 1971, p. 159)

# Preposition-Determiner Contraction

- **German** exhibits **same contrast** in variation in (certain) preposition-determiner combinations:

Form	Article Type	Gloss
<i>zum</i>	<b>weak</b>	<i>P-the<sub>weak</sub></i>
<i>zu dem</i>	<b>strong</b>	<i>P the<sub>strong</sub></i>

**Table:** Terminology for the German Article Forms

# Weak - Uniqueness

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- (4) *In der Kabinettsitzung heute wird ein neuer Vorschlag*  
In the cabinet meeting today is a new proposal  
*✓ vom / #von dem Kanzler erwartet.*  
by-the<sub>weak</sub> / by the<sub>strong</sub> chancellor expected  
'In today's cabinet meeting, a new proposal by the  
chancellor is expected.'

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- (5) *# In der Kabinettsitzung heute wird ein neuer Vorschlag*  
In the cabinet meeting today is a new proposal  
*vom Minister erwartet.*  
by-the<sub>weak</sub> minister expected  
'In today's cabinet meeting, a new proposal by the  
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# Strong - Anaphoric

- (6) a. *Hans hat gestern einen Minister interviewt.*  
Hans has yesterday a minister interviewed  
'Hans interviewed a minister yesterday.'
- b. ✓ *In der Kabinettsitzung heute wird ein neuer  
Vorschlag von dem Minister erwartet.*  
In the cabinet meeting today is a new  
proposal by the<sub>strong</sub> minister expected  
'In today's cabinet meeting, a new proposal by the  
minister is expected.'

- **Uniqueness** is neither sufficient nor necessary for  $\text{Def}_{\text{strong}}$
- $\text{Def}_{\text{strong}}$  becomes **available** if there is an antecedent

# Cross-linguistic Picture

- Lots of great work over last decade on **cross-linguistic** instances or variations of contrasts (too many to cite!)
- Interesting **questions concerning specific relation** between contrasts across languages
- **Systematic comparison** and bigger picture of variation crucially needed

# Reflections on Evidence

- The **contrasts** are **subtle**
- To **get clear effects**, a lot of **care** is needed (e.g., world knowledge **Kabinettsitzung - Minister**)
- Additional potential **interference** from
  - **prescriptive norms** and
  - **variation in availability** of contraction

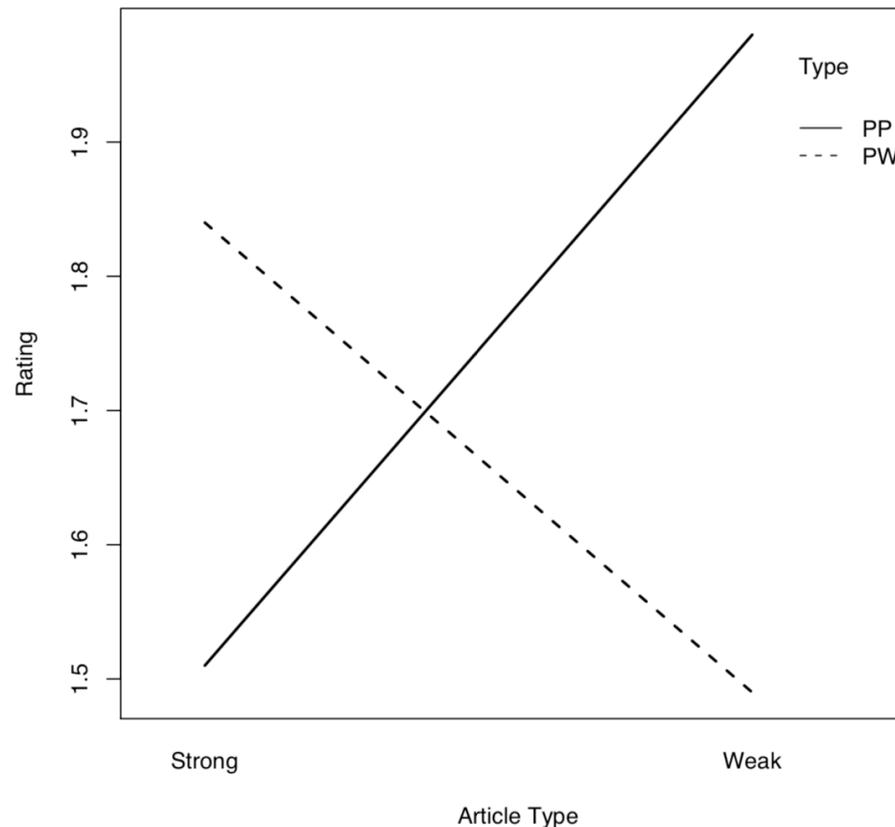
# No Complementary Distribution

- Schwarz (2009) analysis predicts **overlap** in the **contexts of use** for the two forms, as long as
  - there is a **suitable antecedent** (linguistic or potentially otherwise - open issue!)
  - the corresponding **referent is the unique entity** (in the relevant situation) meeting NP description
- **Documenting contrasts**, and comparing them across languages, is **delicate and challenging**

# Bridging Acceptability

- Schwarz 2009: Compare two types of bridging

- (58): **Part-Whole** relationship (fridge - crisper, house - living room, bike-bike handle)
- (59): **Producer-Product** relationship (author - play, painter - painting, etc.)



# Limitations

- **Judgments** and **effects** subtle, and may not be easy to replicate
- **Bridging-type difference** does not easily translate, theoretically depends on specific lexical properties
- More generally, **contextual manipulations** are hard to generalize and require careful adjustments for cross-linguistic manipulations

# Empirical Challenge & Goal

- **Various factors** impact the availability, felicity, and successful communicative use of the two types of definite descriptions.
- How can we get a **clear grasp on those factors** with the goal of uncovering the posited underlying semantic contrast?



# Experimental Approach

# Experimenting with the Contrast

- **Experiments** provide a useful **tool to control and manipulate** various factors as desired
- **Keep everything else constant**  
—> Link effects to **underlying meaning difference**
- Additional **trick** from experimental toolbox:  
**pit definiteness contrast** against  
**another factor** that can affect reference resolution
- Goal:  
Get **differences between articles** to **emerge** in  
terms of their **strength relative this other factor**

# Background: Conceptual Pacts

- Literature on how interlocutors **negotiate** and **maintain** referring expressions:  
(e.g., Brennan and Clark 1996)
- **Repeated reference** using a particular description leads to **lexical entrainment**
- Interlocutors form a **conceptual pact** to describe a given entity with a particular noun
- When **pacts are broken**, this leads to **delays in reference resolution**  
(relative to novel speakers using a novel description)

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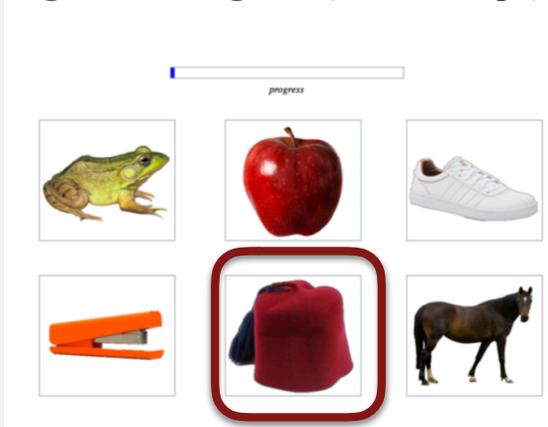
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  - **Reverse question:** how strongly do interlocutors **maintain an association** between a particular referent and a definite description when an additional candidate referent is introduced
  - **Repeated exposure** to picture requests
  - In **critical trials**, an additional object of the same category is introduced

Fig. 1 Training trial (“the red cap”)

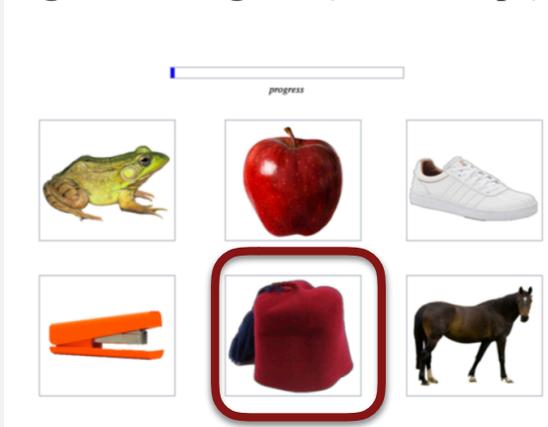
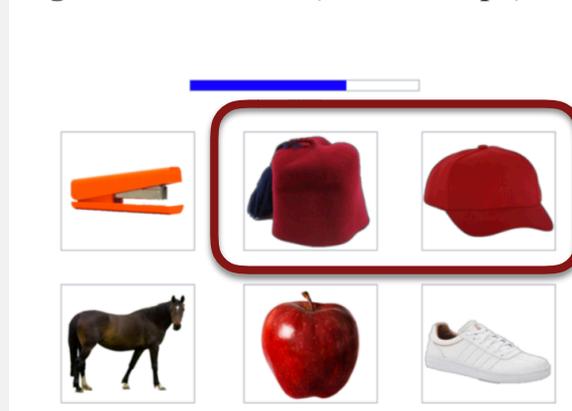


Fig. 2 Critical trial (“the red cap”)



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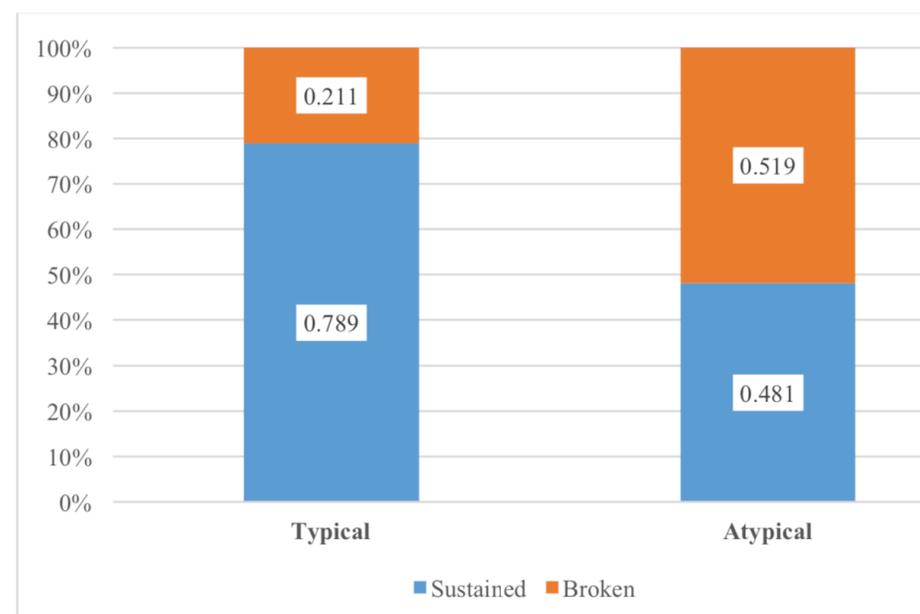
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Fig. 5 Effects of typicality on sustenance/breaking of pact



# Design Idea

- Adapt **typicality manipulation** to a task with an indefinite antecedent

## Atypical First



A hat

## Typical First



...



The hat



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- **Def<sub>strong</sub>**: **i** -> antecedent vs. **Ref choice** -> typical

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- **Def<sub>strong</sub>**: **i** -> antecedent vs. **Ref choice** -> typical
- **Def<sub>weak</sub>**: **Ref choice** -> typical

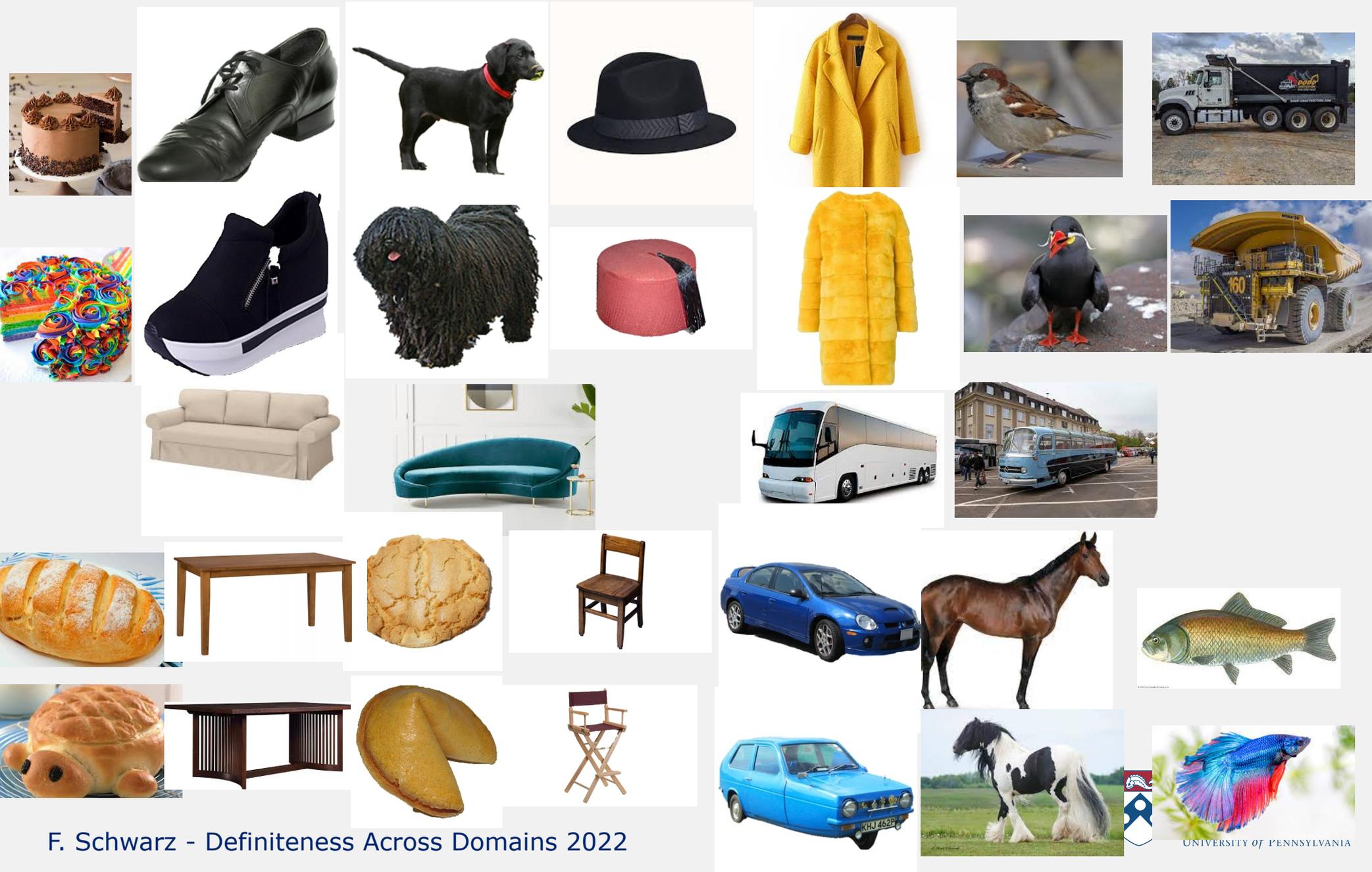
# Predictions

Order/ Article	Typ > Atyp	Atyp > Typ
(strong) von dem	Ant & Ref Pressures: <b>Typ</b>	Ant: <b>Atyp</b> Ref: <b>Typ</b>
(weak) vom	Ref Pressure: <b>Typ</b>	Ref Pressure: <b>Typ</b>

Does **Anaphoric nature** of **Def<sub>strong</sub>**  
impact **reference choice**?

—> **Interaction!**

# Norming Typicality



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How typical is this for a N?

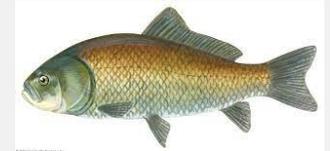
Means (on scale from 0-7)

Typical: 6.0

Atypical: 2.6

Mean Difference: 3.4

Minimum Item difference: 1.24



# Assistant in a Game Task

(To read on, press any key!!)

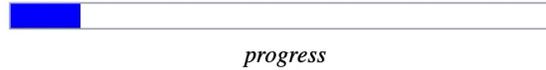
In this experiment, you are the assistant to a play in a simple game. In the game, there are two players. Each round, six pictures will be laid out. Each player has to collect pictures in particular categories. For this, they receive two category cards: one for a general category (e.g., 'animals') and one for a more specific category (e.g., 'fire truck'). In addition, before choosing a picture on their turn, they get a third category card from a mixed stack, which can be general or specific. When it's a player's turn, they must choose a picture that fits the categories they have as well as possible. Pictures for specific categories count for more points. When a picture for a given category has been selected, the category card is discarded (and replaced next round).

Fortunately, you don't have to worry about the details of the rules of the game too much. Your task is simply to help the player you are assisting and select the pictures they are asking for by clicking on them.

You first see how the other player is making their choice, and an additional card is removed.

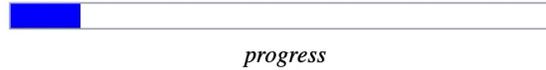
While the other player is making their decision, you'll hear comments from your player on the cards that are available. When it's your player's turn, new cards are added, and your player will tell you which card to select for them by clicking on it.

# Trial Illustration



What do we have here? There's a cake and a bread...  
So, and now... Can you give me the picture of the  
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(alternating recording order and matching prosody)
- Tried to **clearly articulate** non-contracted  
**strong form** without stressing or overdoing it.

# Materials

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- 16 **fillers** with **unique referent** in final display
  - 4 **referred back** to indefinite antecedent
  - 12 **referred** to newly added item
- 24 **fillers** with plural context sentences:

**So, what do we have here? There's some animals and some furniture.**

**Target reference** to items in mentioned categories, 12 to newly added items, 12 to initially present items

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- **Factor 2:** Typicality order:  
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(within subjects)
- **Note:**  
Definiteness type was **fully uniform** within each group, **including fillers**  
i.e., a given subject would **only hear vom** or only hear **von dem** throughout  
  
(modulo non-contracting forms in fillers like **von der**)

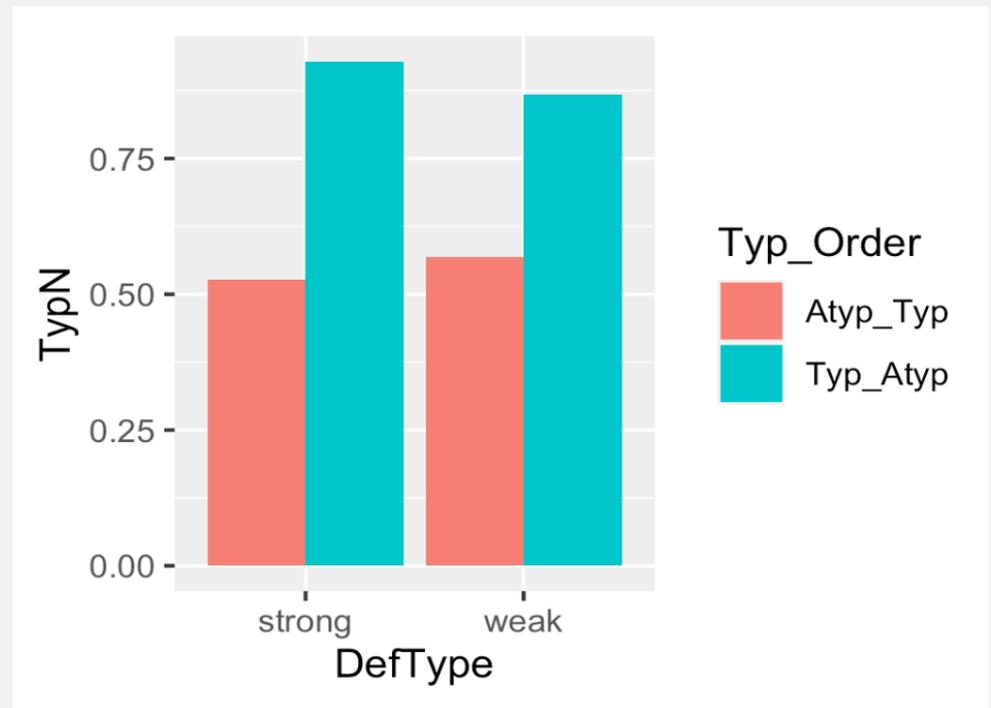
# Pilot Results

- 32 participants (Prolific)

- Dependent measure:

**Typical Reference**  
Choice proportion

- **Subtle**, but **pattern in the right direction**:  
Greater **Order** difference for **Def<sub>strong</sub>**
- Some **adjustments** to implementation  
trying to increase contrast



# Change 1: Filler Article Choices

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Clearly **non-anaphoric** uses of **Def<sub>strong</sub>** in most fillers (12 in antecedent fillers; 24 in plural fillers)
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  - ‘Anaphoric’ uses of **Def<sub>weak</sub>** in 4 fillers
- **Change:**
  - uniform weak article for former,
  - uniform strong article for latter,
- regardless of critical condition group (i.e., mix of article types across critical items and fillers)

# Change 2: Tightening the Discourse

- **Original: Longish lead** in Target sentence

What do we have here? There's a cake and a bread...  
**So, and now...** Can you give me the picture of the bread, please?

- **Intuition:** this **disrupts discourse continuity** for consideration of the indefinite antecedents (i.e., intro 'cleans slate' in terms of referents, making indefinite antecedent less salient)
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# New Trial Illustration



*progress*



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# Methods

- 97 participants on Prolific
- Same Materials as before except for noted changes
- Dependent variable: Rate of Typical image choices
- 2x2 - Typicality Order x Definite Type
- PCIBex Demo Link  
(with access to underlying code for 1-click replication):

<https://farm.pcibex.net/r/jfgGsL/>

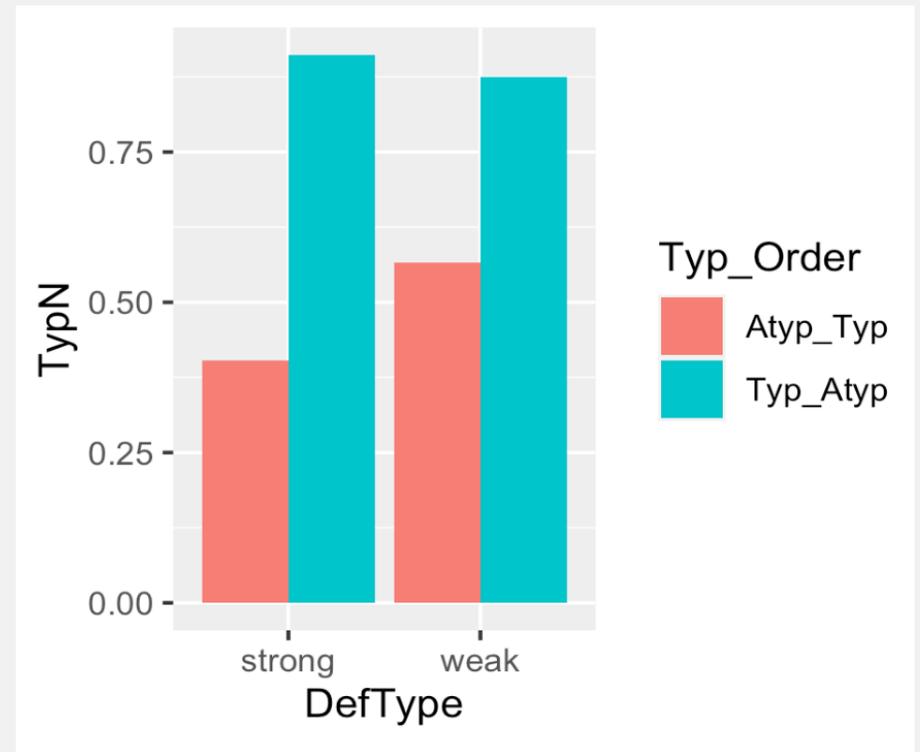
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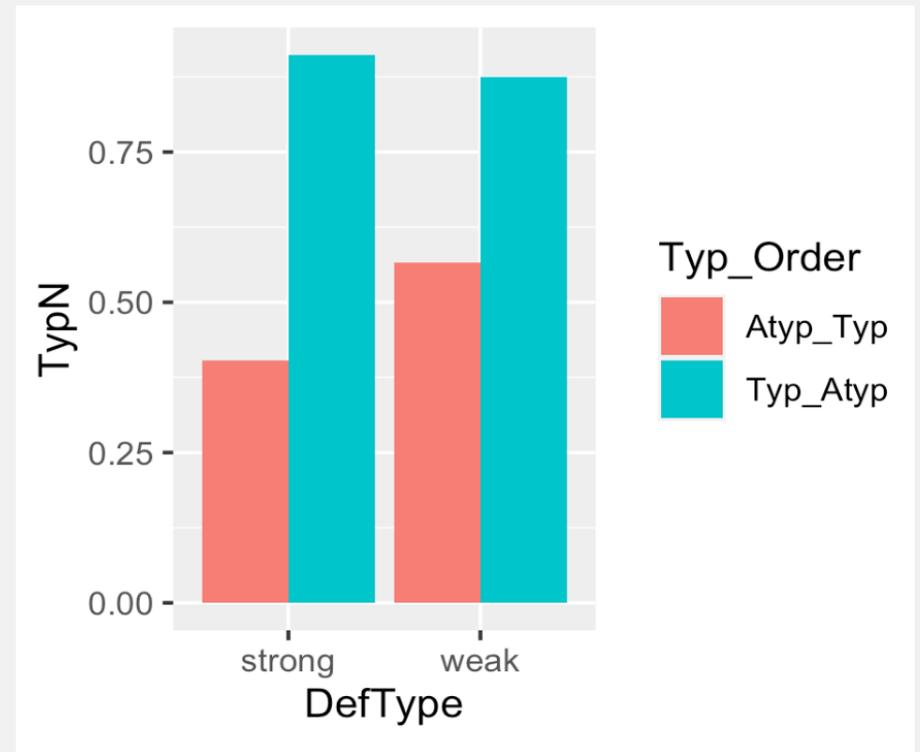


# Full Expt - Results



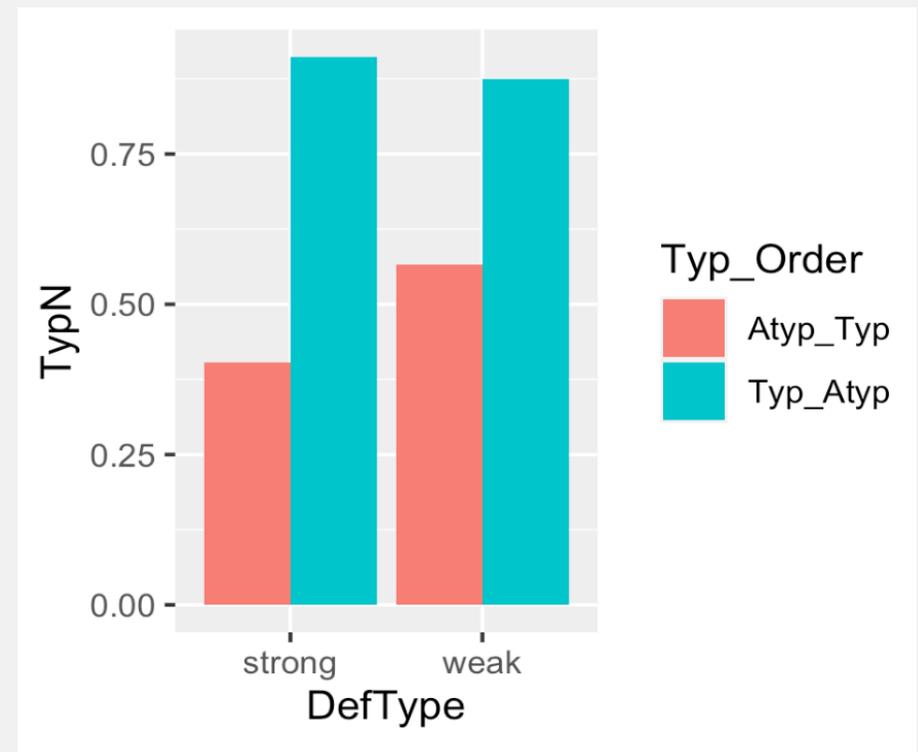
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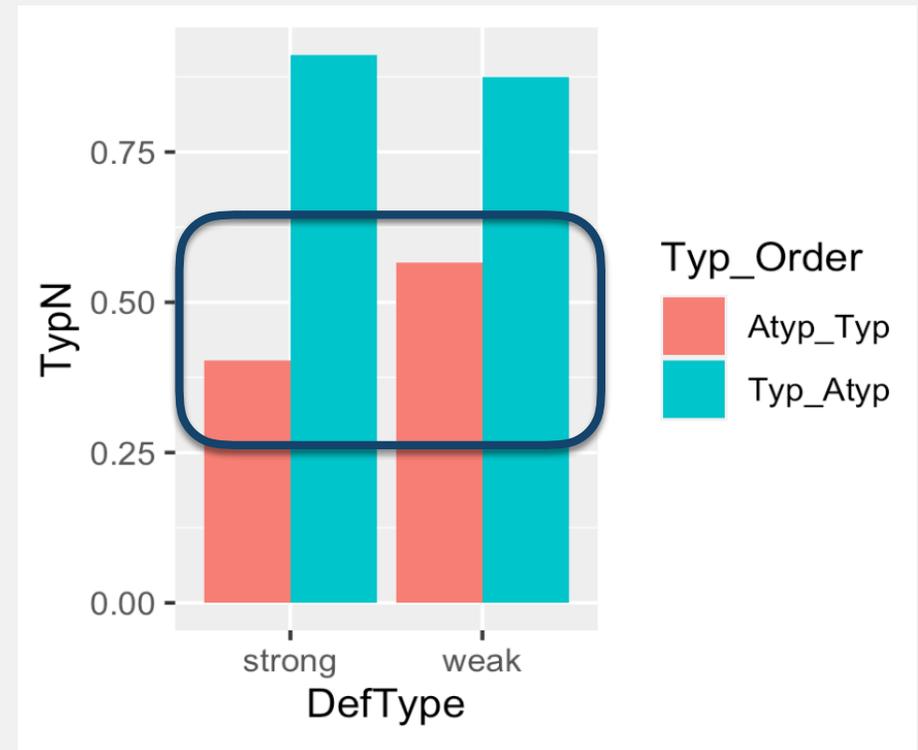
# Full Expt - Results

- Mixed effect logistic regression analysis
- **Significant Interaction** ( $p < .001$ )



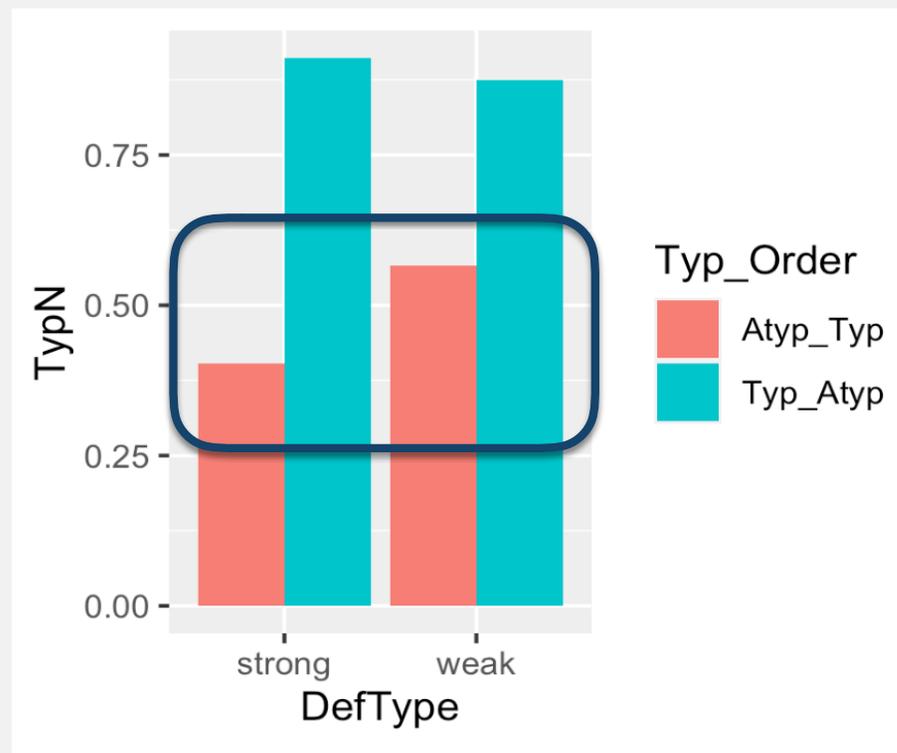
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- Mixed effect logistic regression analysis
  - **Significant Interaction** ( $p < .001$ )
  - Driven by **Significant diff.** for Atyp\_Typ order ( $p < .01$ )
- > **More Typ** for Def<sub>weak</sub>



# Full Expt - Results

- Mixed effect logistic regression analysis
- **Significant Interaction** ( $p < .001$ )
- Driven by **Significant diff.** for Atyp\_Typ order ( $p < .01$ )
  - > **More Typ** for Def<sub>weak</sub>
- (No sig. diff for Typ\_Atyp)



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  - **Typicality preference** when faced with multiple candidate referents
  - **Propensity of a given definite** form to pick up referent from previous **indefinite** antecedent

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  - **Typicality preference** when faced with multiple candidate referents
  - **Propensity of a given definite** form to pick up referent from previous **indefinite** antecedent
- **Result:**
  - Overall **large effect of typicality** (but not main focus here)
  - Importantly,  $Def_{weak}$  and  $Def_{strong}$  **differ** in their propensity to **stick to an Atypical antecedent** referent

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- Note that the **gradual result** is **consistent with a categorical analysis** of the contrast
  - > Many factors at play, including plausible pragmatic pressures (independent of presence of index) to maintain referent across context and target sentence
- **Key Point:**  
controlling for all other factors,  
**small and auditorily subtle difference in form has a significant impact** on reference choice patterns.

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properties of prosody across conditions?
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- Possible **improvements**:
  - a) **cross-splicing** preposition-article forms into recordings
  - b) Use **synthesized speech** to get rid of prosodic variation entirely

# Interim Assessment

- **New empirical evidence** in favor of contrast in 'extent of anaphoricity'
- **Simple** and **replicable method** that allows us to **measure** for a given determiner how (relatively) 'anaphoric' it is.
- **Tool** for systematic and quantitative comparison of article-/definite-paradigms **across languages**

# Beyond German

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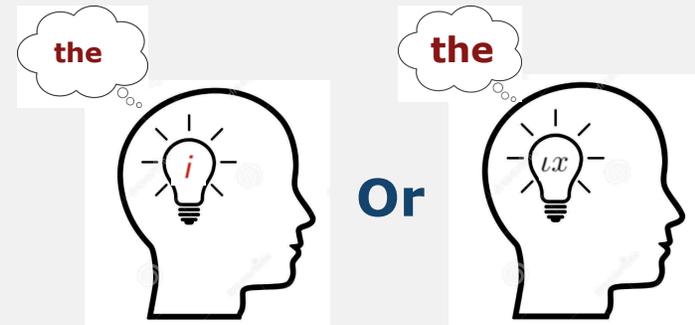
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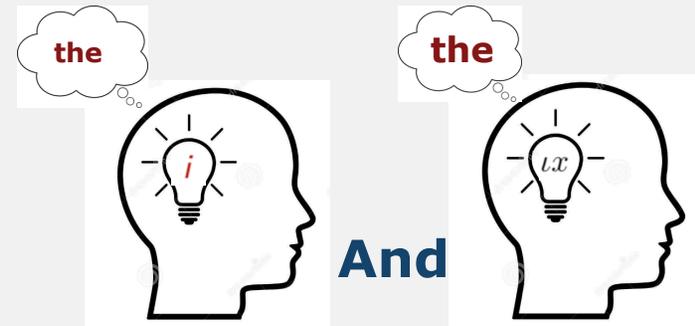
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  - **Uniqueness** or **Anaphoricity** (Familiarity)?
  - Or **ambiguous** between both?



# Implementation

- **Recorded English stimuli** to match the German ones (listen to German sentence, then record English)
- **Alternated Def<sub>weak</sub> and Def<sub>strong</sub>** German sentences as listening sample  
—> **avoid potential biases** in prosodic realization
- Otherwise, all identical to German study
- Running 48 subjects (since there was no between subjects definite type manipulation)
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# Predictions

- $[[\mathbf{the}]] = \text{Def}_{\text{weak}}$   
—> data pattern like **vom**
- $[[\mathbf{the}]] = \text{Def}_{\text{strong}}$   
—> data pattern like **von dem**

# Predictions - Ambiguity

- **[[the]] ambiguous** between the two:
  - a) **mixed** pattern (if both readings are accessed)
  - b) **like strong**, since
    - that's **most helpful** for dealing with reference resolution
    - it's the **presuppositionally strongest** form available,
    - and the **presence of the antecedent** should make this the preferred form
- Hard to see **how pattern matching** Def<sub>weak</sub> could emerge from ambiguous **the!**?

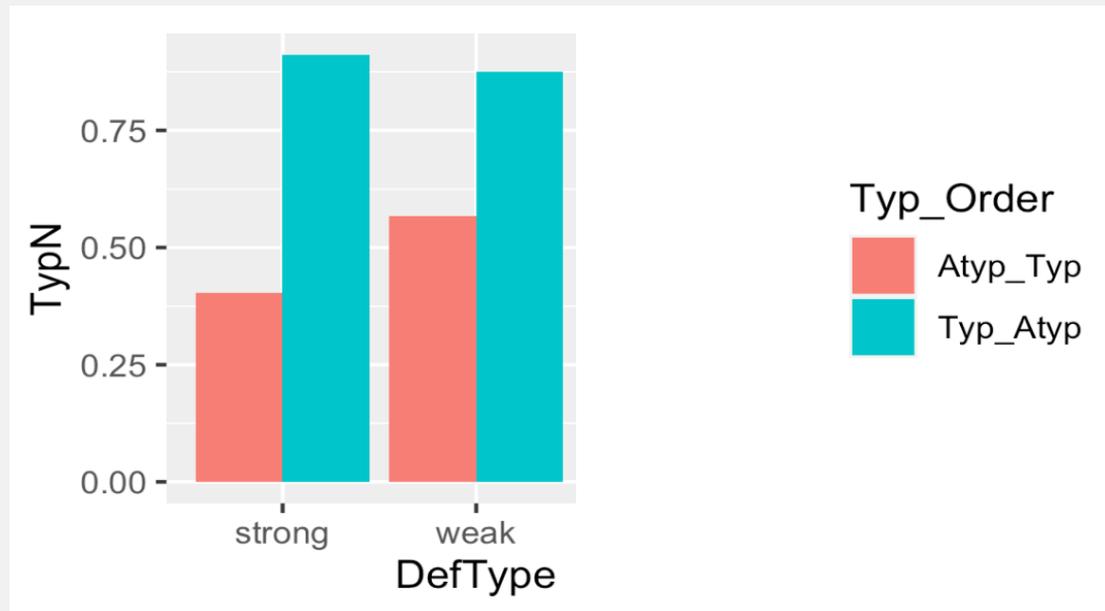
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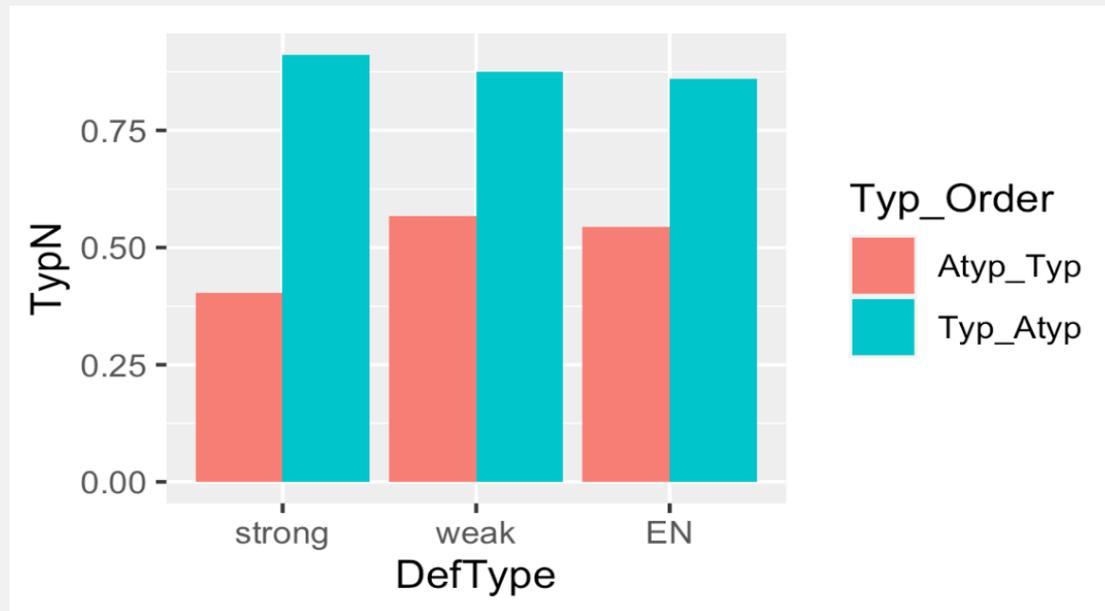
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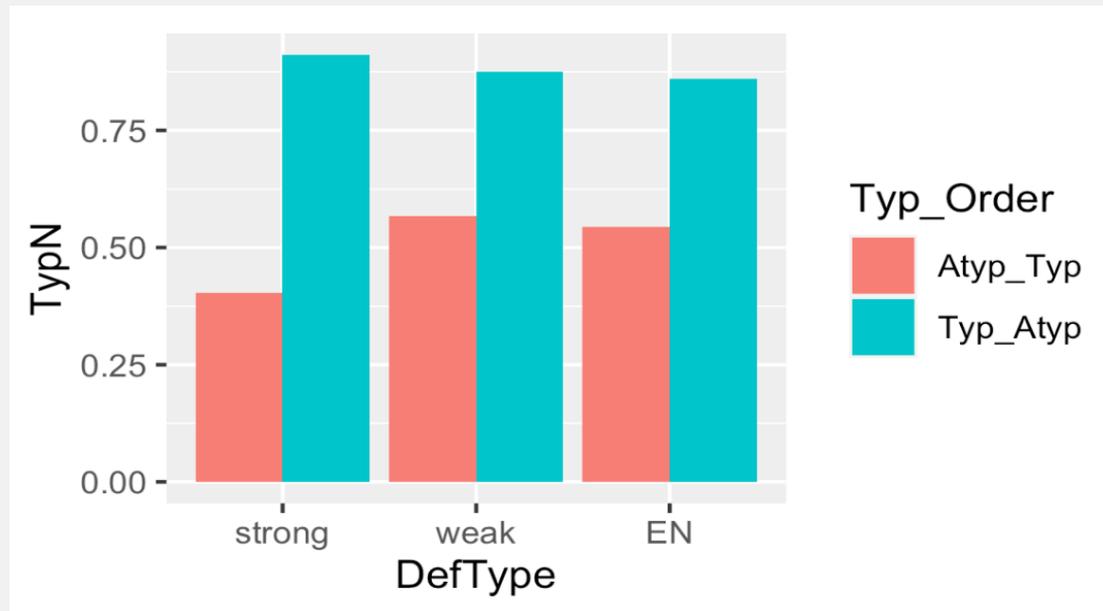
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- **English** results: **[[the]]** = Def<sub>weak</sub>

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- No sig. differences between  $Def_{weak}$  and **the**

# Discussion

- If **English the** had a genuinely anaphoric component, it should show here in some form
- But it's **behaving exactly** as  $\text{Def}_{\text{weak}}$  in German, which arguably has non-anaphoric semantics
- This suggests that **English the** indeed is just a uniqueness article, **on par** with  $\text{Def}_{\text{weak}}$  in German

# Open Issue

- How should **uses of the** for cases where **German seems to only allow**  $\text{Def}_{\text{weak}}$  be analyzed?

- Example:

**I bought a book. The author is French.**

- Others? (Discussion!)

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- Opens up **quantitative comparison** of contrasts and article types **cross-linguistically**
- Easily **replicable**  
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[modulo typicality adjustments as needed]
- **First** cross-linguistic reveal:  $[[\mathbf{the}]] = \text{Def}_{\text{weak}}$



# Thank You!