FOCUS FACILITATION AND NON-ASSOCIATED SETS

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Focus

Focus is (casually) a truth-conditionally significant pitch accent that cannot be explained by normal rules of prosody or metrical structure.

- Tom only introduced \textit{Mary}_F to John at the party.
  - Tom didn’t introduce Kim to John at the party.
- Tom only introduced Mary to \textit{John}_F at the party.
  - Tom didn’t introduce Mary to Chris at the party.
- Tom only introduced Mary to John at the \textit{party}_F.
  - Tom didn’t introduce Mary to John over dinner.
- Tom only \textit{introduced}_F Mary to John at the party.
  - Tom didn’t require that Mary and John talk to each other at the party.
Focus

- Focus affects an enormous range of linguistic phenomenon.
  - Focused constituents favored as anaphoric antecedents
    - Cowles and Graham 2005, but see Kaiser in press
  - Focus used to resolve ambiguity in sluicing constructions
    - Frazier and Clifton 2008
  - Just the expectation of focus can guide ambiguity resolution
    - Carlson et al. 2005
  - Focused constituents are more easily remembered
    - Gernsbacher and Jescheniak 1995
  - The referents of focused constituents are more easily identified
    - Tanenhaus and Spivy-Knowlton 1995

- An understanding of focus is crucial to an understanding of dialogue.
Focus

Theoretical analyses of focus posit that focus evokes a set of alternatives.


Jane\textsubscript{Focus} loves Mark.

- ordinary semantic value:
  - $\exists x \exists y. \ x=\text{Jane} \ & \ y=\text{Mark} \ & \ \text{loves}(x,y)$
- focus semantic value:
  - $\exists x \ \exists y. \ y=\text{Mark} \ & \ \text{loves}(x,y) \ & \ x \in C \ & \ C=\{\text{Jane, Sue, Kim,\ldots}\}$
Focus

Question:
- Is the focus set of alternatives cognitively real?

Possible answer:
- Items in the focus set of alternatives should be more salient than items not in the focus set of alternatives.
  - There is evidence of this.
  - Eyetracking: Kim et al 2010
  - Cross Modal Lexical Decision: Braun & Tagliapietra 2009
**Focus Facilitation**

- *Kim et al 2010*
  - Participants were faster to disambiguate a target word when the word was focused with ‘only’ or ‘also.’
  - *Mark has some candy and some apples.*
  - *Jane (only/also) has some apples.*

- Focusing a constituent made related words more activated!

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*Target:*
- Apples

*Cohort competitor:*
- Axes

*Target:*
- Apples

*Distracter:*
- Candles

*Unrelated distracter:*
- Candy
SEMANTIC PRIMING

- **Task:** Lexical decision – is this string of letters a real word or a nonword?
  - Measuring: participants’ reaction time to real words
- **LOCK** => response is ‘yes’, but **how fast** do you respond?

1\textsuperscript{st}: **BOLT**  
2\textsuperscript{nd}: **LOCK** <= relatively **fast** response time

1\textsuperscript{st}: **APPLE**  
2\textsuperscript{nd}: **LOCK** <= **slower** response time

- Participants say ‘yes’ faster if first word is **semantically associated** with the second word
  - Spreading activation
  - Collins & Loft (1975): When a concept’s representation is activated, activation spreads to associated representations

- ‘lock’ would already be partially activated if you recently saw ‘bolt’ – **Semantic priming**!
FOCUS FACILITATION

- **Braun and Tagliapietra 2009** (cf. Norris et al 2006)
  - Participants were faster to identify a target as a real word when it was a contrastive alternative to a contrastively focused prime.
    - Contrastive focus signaled by means of contrastive prosody.

- **STEP #1: Participants heard:**
  (a) The girl saw a flamingo. **OR**
  (b) The boy saw a duck, but the girl\textsubscript{F} saw a flamingo\textsubscript{F}.

- **STEP #2: Lexical decision – Is word on screen a real word (vs. nonsense word)?**
  - *pelican* (contrastive associate) => faster when ‘flamingo’ is focused than not focused
  - *pink* (non-contrastive associate) => fast regardless of whether ‘flamingo’ is focused [**semantic priming**]
  - *celebrity* (unrelated) => slowest

- Focusing a constituent made related alternatives more activated!
NON-ASSOCIATED SETS

- All of the studies previously mentioned used **semantic associations** between words.
- Semantic association is commonly measured by **free association** procedure.
  - *Free association:* Given a cue, participants say the first word that comes to mind.
  - Ex: Candlestick → Wax
    - Doctor → Nurse

- The most likely alternatives for a focused constituent, though, might be unique to the circumstances of the utterances and not ‘normal’ semantic associates.
  - Ex: (circumstance: Playing Clue) Miss Scarlet used the candlestick in the kitchen.
    - Candlestick_F → Revolver
NON-ASSOCIATED SETS

- McKoon and Ratcliff 1979, 1986:
  - Newly learned associations can be primed.

- **Step#1**: Participants studied lists with pairs of words that were not normal associates. (ex: city → grass)

- **Step #2**: Lexical decision (Is this a real word or not?)
  - Participants identified the target as a word faster when it was proceeded by a learned prime.
    - city → grass made response to grass fast
    - kitchen → grass made response to grass slow

- This effect was found even at SOAs of 50 ms suggesting that episodic priming is automatic.
CURRENT STUDY: GOALS & PREDICTIONS

Main Goals:
- 1) Provide additional evidence for the focus set of alternatives.
- 2) Test whether non-associated words are included in the set of alternatives. (aka: test whether that the set of alternatives can be created from context.)

Predictions for Lexical Decision Task:
- 1) Semantically associated targets will be recognized as words faster when the prime is contrastively focused than when it is not.
- 2) Non-associated targets will be recognized as words faster when the prime is contrastively focused than when it is not.
- 3) Unrelated targets should always be recognized the slowest.
CURRENT STUDY: MATERIALS

Trials consisted of four sentences:
- Christina wants to buy a lock, nails, and a bolt.
- She needs these to fix her front entrance.
- Two days ago, she went to a store that didn’t have a wide selection.
- At the store, she was able to buy [PRIME WORD HERE]
  - Target: lock

Prime word manipulated for 6 conditions:
- Focused, associated with target: only a bolt
- Unfocused, associated with target: a bolt
- Focused, unassociated with target: only nails
- Unfocused, unassociated with target: nails
- Focused, unrelated: only a lamp
- Unfocused, unrelated: a lamp
CURRENT STUDY: MATERIALS

- **Association:** determined by free association
  (Nelson, McEvoy & Schreiber 1998)
  - Forward cue-to-target strength of .08-.25
    - # of responses
    - # of participants

- **Frequency:**
  - All targets: 10-29 words/million
  - Members of set: within 10 words/million of each other

- **Focus**
  - Determined by the presence of ‘only’
  - Silent prosody (Fodor 1998, 2002)
CURRENT STUDY: PROCEDURE

- Participants read one sentence at a time.
  - They pressed the spacebar to move to the next sentence.
- Participants read the last sentence in 1-3 word chunks.
  - Mimic more familiar lexical decision task procedures
  - Control the timing between the prime and the target
- 250 ms pause between prime and target
- Participants read the target and responded.
  - Participants pressed “f” to indicate a real word.
  - Participants pressed “j” to indicate a made-up word.
- There were 30 items, 48 fillers, and 4 comprehension questions.
CURRENT STUDY: EXAMPLE ITEM

Christina wants to buy a lock, nails, and a bolt.
CURRENT STUDY: EXAMPLE ITEM

She needs these to fix her front entrance.
Two days ago, she went to a store that didn’t have a wide selection.
At the store, ___ ___ ____ __ ___ ____ _ ___.
CURRENT STUDY: EXAMPLE ITEM

___ ___ _____, she ___ ___ ___ ___ ___ ___ ___.
CURRENT STUDY: EXAMPLE ITEM

___ ___ _____, ___ was able ___ ___ ____ _ ___.

CURRENT STUDY: EXAMPLE ITEM

___ ___ _____, ___ ___ ____ to buy ____ _ __.
Current Study: Example Item

___ ___ ____ , ___ ___ ____ __ ___ only a bolt.
CURRENT STUDY: EXAMPLE ITEM

lock
CURRENT STUDY: RESULTS

- Main effect of Focus
- Target recognized faster when prime is focused with ‘only’ => Evidence for set of alternatives, even w/ written materials (silent prosody, Fodor 2002).

\[ F_1(1, 41)= 6.62, p<.05; F_2(1, 29)= 4.26, p < .05 \]
CURRENT STUDY: RESULTS

- Marginal effect of relatedness
  - Target recognized faster for associated and newly learned unassociated primes than unrelated, unlearned primes => Newly learned associations can be primed.

F_1(2, 40)= 2.55, p_1 = .091, F_2(2, 28)= 3.06, p_2 = .063
CURRENT STUDY: RESULTS

Unassociated primes result in faster target RTs when prime is focused => Prime is activating target, due to shared membership in ‘ad-hoc’ set created in narrative  \( p_1 = 0.076, p_2 = 0.097 \)

Priming: Associated faster than unrelated  \( p_1 < 0.05, p_2 = 0.187 \)

Focused unassociated primes have faster target RTs than focused unrelated primes  \( p_1 < 0.05, p_2 < 0.05 \)
CURRENT STUDY: RESULTS SUMMARY

1) Focus makes lexical recognition faster.
2) Unassociated primes cause the targets to be recognized faster than unrelated primes when focused.
3) Focused unassociated primes cause the targets to be recognized faster than unfocused unassociated primes.
1) Focus makes lexical recognition faster.

- Target is recognized faster when prime is focused
- Evidence for focus set of alternatives
  - If participants are actively thinking of the alternatives to the focused prime, then these alternatives will be more activated (increased RT)

Confirms previous findings without explicit prosody.
- Focus facilitation arises as a result of contrastiveness, not specific prosodic cues.
  - Silent prosody (Fodor 2002)
Current Study: Discussion

2) Unassociated primes cause the target to be recognized faster than unrelated primes when focused.
   - only nails => lock **faster**
   - only a lamp => lock

Focused primes related to target only by context cause the target to be recognized faster than unrelated primes
   - “Christina wants to buy a lock, nails, and a bolt”

3) Focused unassociated primes cause the target to be recognized faster than unfocused unassociated primes.
   - only nails => lock **faster**
   - nails => lock

Newly learned, unassociated primes were sensitive to the focus manipulation.

=> Newly learned associations can be part of the focus set of alternatives.
=> The set of alternatives is built from context.
FOCUS AND DISCOURSE: SOME IMPLICATIONS

- The meaning of focus is that a constituent is being compared to possible alternatives.
  - Describes the additional implications of focusing.
    - That knife can’t cut this pear. => that knife is really dull.
      - pear vs. {apple, melon, meat}
    - That knife can’t cut this pear. => this pear is really hard?

- Words related to a focused constituent are more accessible.
  - Likely to be mentioned in future conversation.
    - A: Hondas gets 30 miles to the gallon.
    - B: What do Fords get?
  - More easily integrated into the discourse model
    - Already part of the shared knowledge of the speakers

- The context determines the set of alternatives.
  - It is important to be environmentally conscious when commuting.
    - Hondas gets 30 miles to the gallon, but bicycles do even better.
  - It is important to be environmentally conscious when car shopping.
    - Hondas gets 30 miles to the gallon, but Fords do even better.
Thank you!
WORKS CITED


