

Listeners are Mentally Contaminated

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Poster presented at the 44th annual meeting of the Psychonomic Society, Vancouver, B.C., November 2003

INTRODUCTION

- Past research has demonstrated "privileged knowledge effects" in language comprehension, wherein listeners take into account *privileged information*--that is, information that is outside of their common ground with the speaker.

Common ground is a kind of meta-knowledge that is not only shared, but known to be shared (Clark & Marshall, 1981). Note that the fact that it is known to be shared makes it conceptually distinct from shared knowledge.



Studies that have demonstrated interference due to privileged knowledge have typically used the eyetracking / referential communication paradigm pioneered by Tanenhaus and colleagues (Tanenhaus, Spivey-Knowlton, Eberhard, & Sedivy, 1996). These studies typically find that listeners fixate privileged potential referents at above-chance levels, suggesting that they are actively considering them as referents (Barr & Keysar, 2002; Keysar, Barr, Balin & Brauner, 2000; Keysar, Barr, & Lin, 2003; Nadig & Sedivy, 2002; Hanna, Trueswell, & Tanenhaus, 2003).

- Two explanations of privileged knowledge effects have been proposed:

Perspective Adjustment

Listeners consider privileged information because they are egocentric. Comprehension is characterized in terms of an "anchoring and adjustment" decision model (following Tversky & Kahneman, 1974) wherein listeners initially anchor in available information regardless of its mutuality. They later can later use common ground to adjust their interpretations in the direction of the speaker's perspective, although this process is optional.

(Keysar, Barr, & Horton, 1998; Keysar et al., 2000)

Constraint-Based Processing

Listeners consider privileged information because common ground is a probabilistic cue that only partially constrains the domain of reference. As with any other cue, its efficacy depends on its salience and reliability. Thus, although privileged information is considered, it is considered less strongly than it would be if it were in common ground. Crucially, interference from matching referents should be attenuated, and this attenuation should be visible from the earliest moments of comprehension.

(Hanna, Tanenhaus, & Trueswell, 2003; Nadig & Sedivy, 2002)

- However, there exists a third possibility that has not been considered:

Mental Contamination Hypothesis

Privileged knowledge effects reflect the results of automatic processing in the comprehension system. This automatic processing effectively results in a form of "mental contamination," (Wilson & Brekke, 1994) a phenomenon in which a person's judgments are influenced by factors outside of awareness or control, including the results of automatic processing.

The Mental Contamination Hypothesis proposes that listeners can strategically adopt strategies to attenuate interference from potential referents that are not shared with the speaker. They may even strive to completely restrict the search for referents to information in common ground, as predicted by Clark and Carlson (1981). For example, they could attempt to strategically inhibit eye-movements to privileged objects.

However, certain processes in the comprehension system, such as lexical activation and selection, might activate available information in a manner that is largely bottom-up, automatic, and unconscious. This could counteract listeners' strategic attempts to inhibit privileged information.

OBJECTIVE

- Study privileged knowledge effects in a lexical competition paradigm, where processes of lexical activation can be clearly differentiated from strategic effects.

speaker says: "click on the bucket"
upon hearing "...buck--" listener activates



BUCKET (target)

and



BUCKLE (competitor)



MUG

but not

- Prior to hearing the critical word (e.g., "bucket"), do listeners strategically inhibit eye movements to privileged objects?
- Upon hearing the critical word, are competitors in privileged ground less likely to be activated than competitors in common ground?

TASK



Critical utterance:
"Click on the bucket"

- Listeners played the role of "listener" in a card game with a "virtual partner"
 - They believed they were listening to a naive participant who spoke to them from another room
 - In reality, they listened to pre-recorded utterances from a confederate
- Pictures were on the backs of cards which were marked as either shared (known to both) or hidden (known only to the listener)
- Listeners' eye movements were monitored as they followed the speaker's instructions
- Listeners' eyes were allowed to freely view the stimuli (i.e., no central fixation point was used) in order to reveal strategic effects

DESIGN

Identity of Comparison Object

Status of Comparison Object

	Control (stepladder)	Competitor (buckle)
Privileged		
Common		

Critical utterance:

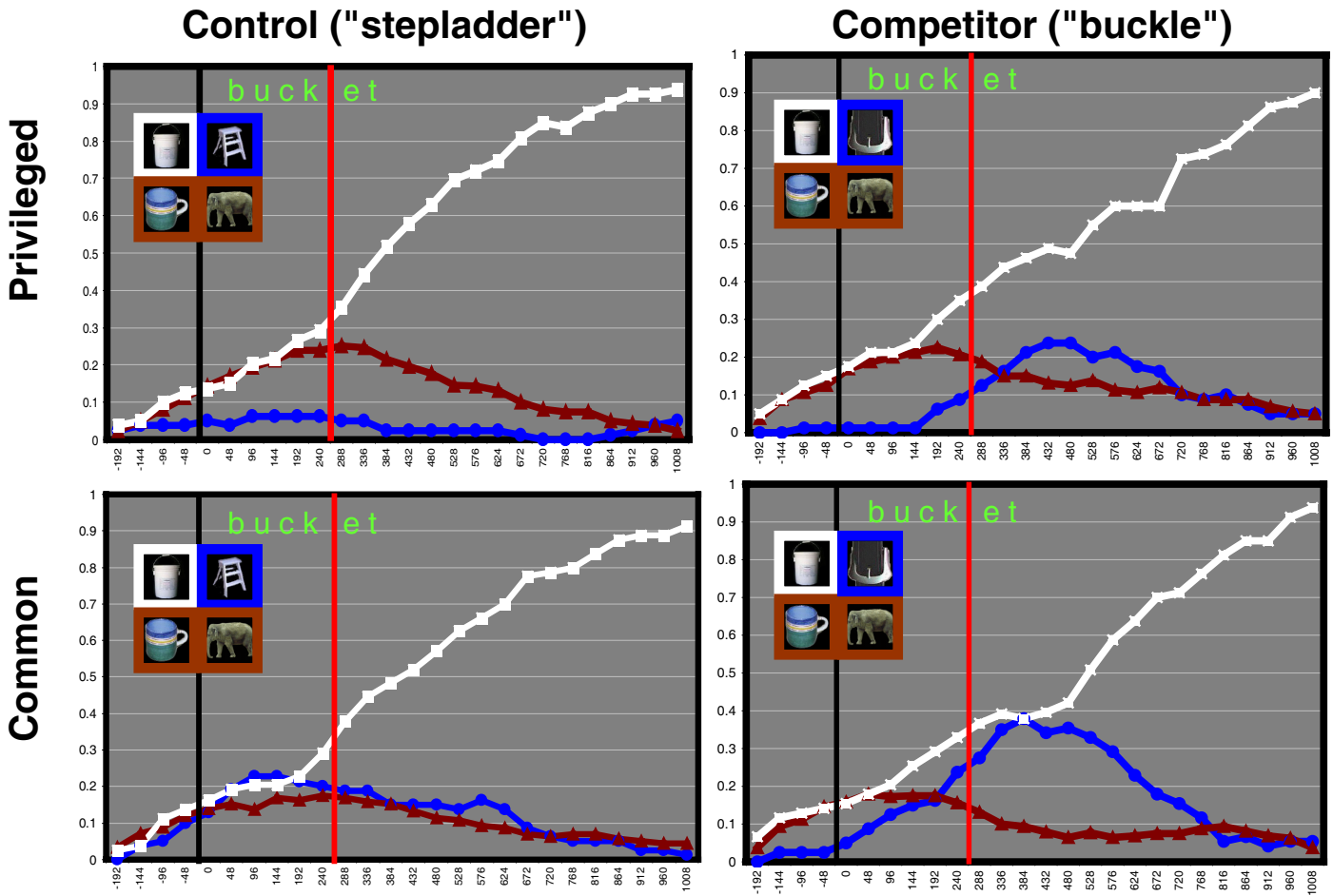
"Click on the bucket"

- If listeners are mentally contaminated, then fixations on privileged objects should be low prior to the critical word, reflecting a strategic attempt to restrict the search
- However, upon hearing the critical word, fixations to the competitor should increase at the same rate in the privileged ground and common ground conditions

RESULTS

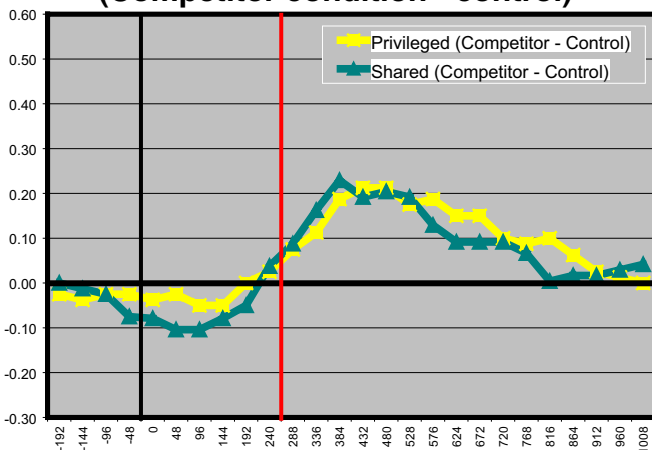
Identity of Comparison Object

Status of Comparison Object

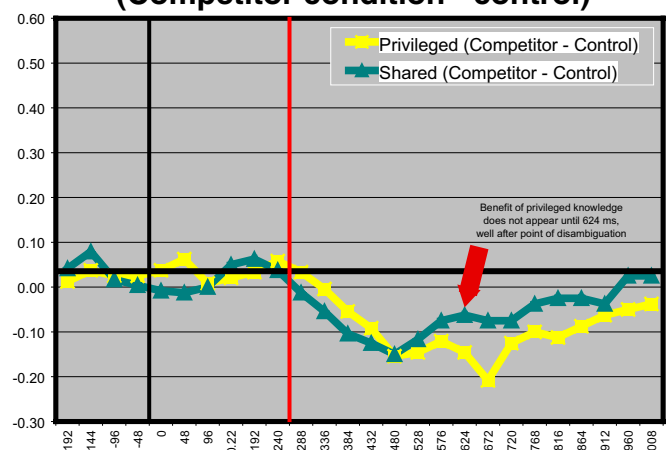


- Clearly, listeners were strategically inhibiting privileged objects prior to the onset of the critical word at 0 ms
- In the charts below, in order to compare the rate of activation of targets and competitors across ground conditions, within each ground condition the control condition (which represents a chance baseline) was subtracted from the competitor condition

COMPARISON OBJECT
(Competitor condition - control)



TARGET OBJECT
(Competitor condition - control)



CONCLUSIONS

- The Mental Contamination Hypothesis was supported
- There was clear evidence that listeners attempted to restrict search to common ground objects prior to the onset of the critical word
- However, fixations to the competitor object **rose at the same rate** regardless of whether the competitor was privileged or common
- Likewise, the competitor produced equal interference in fixating the target regardless of ground
- This strongly suggests that privileged knowledge effects are NOT the result of egocentrism per se nor of the use of common ground as a probabilistic cue
- Instead, it suggests that they are the result of automatic processing in the comprehension system, which appears to activate referents without regard to mutuality
- Thus, certain components of the comprehension system may be functionally encapsulated from high-level knowledge
- Other studies that provide evidence for "partial constraint" (e.g., Hanna et al., 2003; Nadig & Sedivy, 2002) do not subtract from a chance baseline, and thus do not differentiate between strategic and automatic effects
- The central fixation point is not "neutral" at all, but instead serves to mask any pre-programmed inhibition or facilitation of eye movements to the various regions of a display
- Lastly, theories of common ground use in comprehension may be overly general. Different components of the processing system may be differentially sensitive to the influence of common ground, depending on their level of automaticity

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