**How Visual Salience Affects Structure Choice: Implications for Audience Design**

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### Introduction

What makes speakers vary their sentence structure from one situation to the next?

One factor appears to be the speaker’s focus in a message:

- Speakers tend to produce sentences so that animate (F. Ferreira, 1994) or given (Bock & Irwin, 1980) nouns are placed earlier in the utterance.
- Generally attributed to more “accessible” nouns being uttered first
- Animate or given entities also tend to be, pragmatically, the topic or focus of the sentence
- Visual salience may also affect focus, and thus production choices

We can examine the effect of visual salience on production choices to better understand the role of selecting a topic or focus in production choices

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### Methods

**Participants:** 68 native English speakers

Participants viewed 20 color illustrations that contained humans acting upon human and inanimate entities and answered an auditorially presented question. The question referred to either an animate patient or an inanimate theme.

**Animate Target:** Who is wearing orange?

**Sample Answer:**
- Active: “The man (that) the woman is throwing” or
- Passive: “The man (that is being thrown by the woman”

**Inanimate Target:** What is red?

**Sample Answer:**
- Active: “The ball (that) the man is throwing” or
- Passive: “The ball (that is being thrown by the man”

**Visual salience of inanimate entities varied across trials.**

Ball being thrown is small and in the corner of the scene.

Toy being hugged is large and in the foreground of the scene.

**Visual salience was assessed with two norming tasks.**

1. **Naming task**, in which participants’ latency (z-scored) to name items after spoken questions (e.g., “what is red?”) was adopted as the visual salience value.
2. **Rating task**, in which participants rated visual salience of the items on a 1-7 scale

**Production Difficulty Measurements**

In addition to the produced structure (active object relative or passive relative) we recorded a variety of production difficulty measures.

- Initiation latency
- Number of words in the first NP
- Relative Pronoun use (that, whom)
- Number of words in the RC

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### When Production Was Difficult

**Analyses were performed with multilevel models** (lmer, Baayen, Davidson & Bates, 2008)

**Initiation Latencies**

- Predicted by **animacy**: animates were faster than inanimates (Coefficient=-0.33, SE=0.13, t=-2.58; change in model fit from intercept; $\chi^2=60.29$, p<0.001)
- Predicted by **head noun phrase length**, (before RC) but only in animate utterances, likely because other factors (visual salience) influenced inanimate utterances. (Coefficient=0.11, SE=0.06, t=1.92; change in model fit from intercept; $\chi^2=3.70$, p=0.054)
- Predicted by **visual salience**: visually salient targets had faster initiation latencies (Naming task: $\chi^2=15.99$, p=0.01, rating task: $\chi^2=43.72$, p<0.001)

**Relative Pronoun Use (That, Whom)**

- Predicted by the **upcoming relative clause length** (logit model: Coefficient=0.51, Standard Error= 0.12, z=4.28, p<0.001)

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### How Visual Salience Affects Choices

- Visual salience predicted structure choice, such that less visually salient items tended to be described with a passive relative.

**Visual salience effect:** more passives for less salient entities

**Audience Design interpretation:** Speakers use passives to increase focus on hard-to-find items, aiding identification

**Alternative:** The visual search task subtly changed task demands. When attention is split between the target and competitors, the target entity becomes the focus of the utterances, promoting the use of the passive to contrast the target from the competitors.

**Motivations of Structure Choice**

Animate entities are topicworthy → Focus of utterance → Passive

Less visually salient entities must be contrasted → Focus of utterance → Passive

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### References


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### What People Said

- Description of animate patients (man) almost always were passive relatives
- Inanimates (ball) yielded mix of active and passive relatives
- Replicates other corpus and experimental results (Gennari & MacDonald, 2009; Roland et al., 2007)

Animates tend to appear as passives when that maintains them as the focus (F. Ferreira, 1994)