Visual Attention & Choice in Retail Settings

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Agenda

• Visual attention
  – Exposure- **Attention** – Perception- **Retention**

• Marketing & Retail applications/ implications:
  – (Atalay, Bodur, and Rasolofoarison 2012)
Can the store/shelf layout make the consumer buy?

✔ Atmospherics
✔ Impact of Packaging
✔ Impact of Facings

? Impact of shelf location
Exposure to Stimuli in Retail Settings

Four levels of Filtering:

1. Selective **Exposure** - medium through which the stimulus gets delivered. (is the brand available?)

2. Selective **Attention** – does each stimulus/brand get noticed? (is the brand seen?)

3. Selective **Perception** – do people understand the stimulus? (how is the brand evaluated?)

   ➢ *Is the brand chosen?*

4. **Selective Retention** – does the stimulus make it all the way to memory so people can use that information when they need to. (is the brand remembered?)
Breaking out of the clutter

• What makes people pay attention?
  § Prominence Effect:
    § People attend mostly to a more prominent (standing out, easily noticeable) attribute (e.g. benefit as opposed to cost)
      § *Vividness/salience*
      § *Relevance* – personally important
      § *Concreteness* – easy to picture or imagine/think about
      § *Proximity*
Selective perception & retention

- Perception = how we **organize** the information into a ‘coherent’ whole
- Perception = a lot of **interpretation** to arrive at a meaningful picture of the world
- Perception = is **subjective** process

- Retention: Our **interpretations** from the perception processes is what is **retained** and goes into memory (long term).
Mere Exposure Effect

- Familiarity leads to liking (Zajonc, 1968)
- The more you see a novel stimulus, the more you like it.
  - Examples: nonsense syllables, Chinese characters, faces, the Eiffel Tower.

- In vision research: Looking more is a predictor of choice (Krajbich et al. 2010).

- A feedback loop: The more the individuals look at a stimulus, the more they like it, and the more they like it the more they look at it (Simion and Shimojo 2006).
Can shelf location make consumers buy?

- Central Shelf Location vs. Eye/Hand Level
  - Ergonomics: Eye level is superior (verticality)
  - Centrality: horizontal location – MIXED EVIDENCE
    - Center is perceived to be popular.
    - Left is low visual lift.
    - Right is preferred.
Origins

• Which dessert would be chosen more often?

Left?  Center?  Right?
Origins

• Which bathroom stall would be chosen more often?

Left? Center? Right?
Preliminary evidence

• People choose the middle options rather than the ends of the array:
  • Christenfeld (1995), based on field data:
    – Bathroom stalls (Chosen = 60%, Exp = 50%)
    – Toilet paper dispensers (Chosen = 62%, Exp = 50%)
    – Items on supermarket shelves (3-21% more than expected%)
  • Shaw et al. (2000), based on lab data:
    – Highlighters (61%), surveys (76%), chairs (71% vs. exp 33%)

• **Explanations:**
  – Minimum effort explanation
  – Preference for symmetry explanation
  – Focus of attention explanation (directional support)
Centrality effect in marketing

- Consumer exposure to (horizontal) arrays of products in various contexts
  - Movie selection, combo menu displays, vending machines
  - Online and offline product displays
Centrality effect in marketing
Centrality effect in marketing
Centrality effect in marketing

Horizontal center → Brand choice

Further evidence, different explanations

(1) Due to in-store attention (Chandon et al., 2009)

Horizontal Centrality → Visual Attention (eye tracking) → Brand Choice

(2) Due to perception/ brand inferences (Valenzuela & Raghubir, 2009)

Horizontal Centrality → Brand Inferences → Brand Choice
Motivation ...

• Does horizontal centrality increase brand choice probability?

• How?
  – Brand-related attention or Brand inferences?
Methodology: Pretest

- **Control for familiarity & memory:**
  - fictitious brands

- **Control for vividness & salience:**
  Eliminate differences in package color
  - Pretest (N=58)
  - 10 color patches with fictitious brand names tested
  - Manipulated colors on HSL (hue, saturation, luminosity) dimensions.
  - DV’s: ease of readability

- **Control for facings (exposure):**
  - 3 variants of each brand
Procedures:
Study 1A

(1) Calibration with Tobii 1750 eye-tracker
(2) Evaluate products from shelf display (planogram, 3 x 3 matrix), no time constraints or head-gear
(3) Choose one of 3 brands
(4) Self report measures of brand inferences
(5) Self report measures of attention
Methodology: Study 1A

**Stimuli:** Vitamin supplements, meal replacement bars

**Design:** 3 (brand name) x 3 (brand location)

**Attributes:** Similar in importance (pretested)

**Brand names:** Similar in attractiveness (pretested)
Methodology: Study 1A

- Brand inference measures:
  - Attractiveness
  - Popularity
  - Quality
  - Market share
  - Retail space allocation

- Attention measures:
  - Visual attention
  - Self-reports of attention (2 items)
  - Recall based attention
    - Unaided recall
    - Aided recall
Study 1A: Basic Findings

• N=63
• All fixations > 100 ms
• Brand in center
  – Higher choice frequency
    • Center: 45.3% vs. Left/right: 27.3%, p < .01
  – Higher eye fixation frequency
    • 60.9 vs. 48.7; F(1, 375) = 13.47, p < .01
  – Higher total fixation duration
    • 15.1 vs. 12.6 sec; F(1, 375) = 5.37, p < .05
  – No difference in brand inferences OR self-reports of attention
• Similar results with different fixation cutoff’s: 50, 100, 200 ms
Study 1A: Mediation Results

Multiple Mediation Model: Preacher & Hayes, 2009, Bootstrapping with 5000 samples
Study 1A: GAZE PATTERNS

Potential Explanations for the process of the effect:

Central Fixation Bias (Tatler 2007): Individuals fixate on the center of scene in the initial moments for orientation.

Gaze Cascade Effect (Shimojo et al. 2003; Simion and Shimojo 2006): a tendency to accelerate gazes in the final moments of the search on the central option?

1. Does horizontal central brand get more attention in the initial OR final moments of the choice task?

2. If attention is concentrated on the center initially/finally, does this bias lead to choice?

Gaze patterns include all fixations, including very short fixations (> 20ms).
Vitamins:

Does central brand get more attention in the initial OR final moments?

- Initial 5 seconds
- Final 5 seconds

<table>
<thead>
<tr>
<th></th>
<th>Initial 5 seconds</th>
<th>Final 5 seconds</th>
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<tbody>
<tr>
<td>Bold</td>
<td>60%</td>
<td>60%</td>
</tr>
<tr>
<td>Solid</td>
<td>80%</td>
<td>80%</td>
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<tr>
<td>Dashed</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Bold: Likelihood to look at the central brand
Solid: Likelihood to look at the left brand
Dashed: Likelihood to look at the right brand
Meal Bars:
Does central brand get more attention in the initial OR final moments?

- Initial 5 seconds
- Final 5 seconds

Bold: Likelihood to look at the central brand
Solid: Likelihood to look at the left brand
Dashed: Likelihood to look at the right brand
Is brand choice driven by *initial* or *final* fixation densities?

Multiple Mediation Model: Preacher & Hayes, 2009, Bootstrapping with 5000 samples

IV: *Fixation density*: the proportion of fixations on the centrally located brand and all fixations in the *initial* (*final*) 5 seconds of the gaze.

Results are replicated when initial and final $\frac{1}{2}, 1, 2, 3, 4$ seconds are used.
Study 1A: Gaze Patterns

Gaze Cascade Effect (Shimojo et al., 2003): Bias in the gaze directed toward the to-be-chosen option.

Does horizontal central brand get more attention because it is in the center OR because it is chosen or to-be-chosen?

— DV= Gaze likelihood (probability of looking at the center, arcsine transformed).
— IVs= chosen (chosen =1), central location (center = 1), choice × central location

\[ \text{Pr}(\text{Fixation}) = \beta_0 + \beta_1 \times \text{Chosen} + \beta_2 \times \text{Central} + \beta_3 \times (\text{Central} \times \text{Chosen}) \]

\[ \beta_1 = .33, \ t = 6.03, \ p < .01 \]
\[ \beta_2 = .14, \ t = 2.60, \ p < .01 \]
\[ \beta_3 \text{ not significant, } p > .10 \]

\[ \text{An additive effect of both!} \]
Study 1A: Conclusions

Horizontal Centrality → Choice

• Not explained by:
  – Brand inferences
  – Memory-based measures of attention
  – Central fixation bias

• BUT by **gaze cascades** on the central brand in the final few seconds of the task
Study 1B: Motivation

• Could computer-based task lead to more fixations in the center?
  – Unlikely given S1A results with initial fixations

• Replicated S1A after shifting choice set to the left or right of the screen
Study 1B: Sample Stimuli
Study 1B: Results

- N=64
- All fixations > 100 ms
- Brand in center
  - Higher choice frequency
    - Center: 44.4% vs. Left: 23.8% or right 31.7%, p < .05
  - Higher eye fixation frequency
    - 57.4 vs. 49.3; p < .05
  - Higher total fixation duration
    - 14.5 vs. 12.5 sec, p < .05
- No difference in brand inferences OR self-reports of attention
- Similar pattern of results as Study 1A
Study 1B: Mediation Results

Multiple Mediation Model: Preacher & Hayes, 2009, Bootstrapping with 5000 samples
Study 2: Overview

Center of **product array** vs. **center of shelf**

- Centrally located brand in one product category may not be in the center of the shelf space *or* the consumers’ visual field
- Would a brand placed in the center of the product category, but not the center of the shelf still be chosen more often?

Eliminate common method variance:
- Choice context with tangible product packages (not PC based)

Design:
- 3 (brand location within category: left, center, right) × 2 (product category location on the shelf: left, right)
Study 2: Energy Drinks

• Evaluate Energy Drinks presented with 2 other filler product categories
Study 2: Results Summary

- N=84

\[ Brand\_Choice = \beta_0 + \beta_1 \times ProdCatCenter + \beta_2 \times ShelfLocation + \beta_3 \times (ProdCatCenter \times ShelfLocation) \]

- Brand in horizontal center of the category was chosen more often \( \beta = 1.62, p < .05 \).

- Shelf location did not have a direct or indirect effect on choice all \( p \)'s > .10.
Discussion

Horizontal centrality → Choice

• Robust across 3 studies and 3 product categories
• Mediated by attention but not inferences
• No significant correlation between memory-based vs. visual attention measures
• Not an artifact of screen-based presentation
• Preference for the center of the product category regardless of other options
Limitations

• Caution with inferences of causality
• Focus on unfamiliar product categories and fictitious brands
  – Dominance of in-store (vs. out-of-store) factors: 2:1 (van der Lans, 2008)
  – Consistent with findings with familiar products (Chandon et al., 2009)
Future Directions

• What motivates the observed patterns of attention?
  – Loop of initial and final visual attention
• Would this effect hold with familiar product categories?
• Can underdog brands use central location as a competitive advantage?
• When does the attention advantage translate into longer term brand inference effects?
QUESTIONS?

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Thank you!