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# Investigating the Effects of Header Display Formats on Reading Webpages

Matthew J. Hennessy

Western University, mhennes6@uwo.ca

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## Abstract

This thesis investigated the influence of format (static vs. dynamic) and relevance (relevant vs. not relevant) on the creation of effective Web site header displays. Through evaluation of current trends in header display design, the aim of this research was to offer plausible explanatory mechanisms within the perceptual and visual systems, along with practical recommendations for both users and designers alike. While presenting 100 undergraduate students with simplified Web page interfaces containing only a header and paragraph text, looking time was measured followed by score on a set of text-comprehension questions. Score was then considered as a function of header characteristics such as format and relevance to determine any notable effects. Results revealed a negative relationship between scores in the relevant and irrelevant conditions, suggesting an influence of header relevance on subsequent text-comprehension.

## Background

A header is the top-most content on a Web page, often in the form of a rectangular image.

Very little empirical evidence exists to support current trends in Web site header design. Primarily, Web sites are trending towards large and graphical headers that use animations and movement to increase visual appeal.

There are currently two main schools of thought:

1. Headers must be visually appealing, and relevance to content is **not** important
2. Headers must be relevant to the content (and visually appealing is **just a bonus**)

### Attentional Selection (AS)

- Determines how headers are visually processed by the user
- Top-down AS is goal-directed and results in better understanding (Yantis, 1993)
  - i.e.* because the stimuli is relevant to your current goal
- Bottom-up AS is automatic and results in faster processing/recognition (Theeuwes, 1992)
  - i.e.* because of the salience of the stimuli

## Experimental Conditions

### Header Format (Between-Subjects)



#### Dynamic Headers

- Contain movement, animations, or other changing properties
- Should be processed in a bottom-up, automatic fashion (faster)
- Should be judged as more interesting, thus increasing looking time



#### Static Headers

- Still-images that do not move, change, or contain animations
- Should be processed in a top-down fashion (slower, more effortful)
- Should be judged as less interesting, thus decreasing looking time

### Header Relevance (Within-Subjects)

#### Relevant Headers

- Related to the content of the page (*i.e.* coffee image above coffee text)
- Should prime related concepts, preparing user for the text



#### Irrelevant Headers

- Not related to the content of the page (*i.e.* YouTube image above coffee text)
- Should prime unrelated concepts, distracting user before they read



## Do format and relevance matter when it comes to header design?

## Hypotheses

### Main Effects

- Dynamic headers will result in better text-comprehension than static headers
- Relevant headers will result in better text-comprehension than irrelevant headers

### Format x Relevance Interaction

- Dynamic + relevant headers will produce the best text-comprehension
- Dynamic + irrelevant headers will produce the worst text-comprehension



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I Have Finished Reading

## Method

### Participants

- 100 undergraduate students for course credit
- 9 data sets excluded because of incomplete questionnaires
- Gender: 50 men, 30 women, and 11 unspecified;  $M = 18.58$  years of age
- Screen resolution:  $M = 1380 \times 840$  pixels
- Browser type: 38 Google Chrome, 32 Safari, 8 Firefox, 2 Other, 11 unspecified

### Materials

- 2 header images (seen above), each with an animated and still-image version
- 2 news articles, approximately 6 paragraphs in length (topic: youtube OR coffee)
- 2 sets of 10 multiple choice questions (one set pertaining to each article)

### Procedure

Participants completed the study at home from their personal computers and were randomly assigned to an experimental condition. The order of trials (and respective IV conditions) was counterbalanced across participants to eliminate possible order effects.

Each participant completed two trials, consisting of:

1. Reading an introduction explaining the task then clicking to begin trial.
2. Reading a news article (format seen above) then clicking button when finished.
3. Responding to a set of 10 multiple choice questions pertaining to the article.

### Variables of Interest

- Score on each questionnaire
- Time spent reading each article
- Screen width/height and browser type

## Results

### Regression Analysis

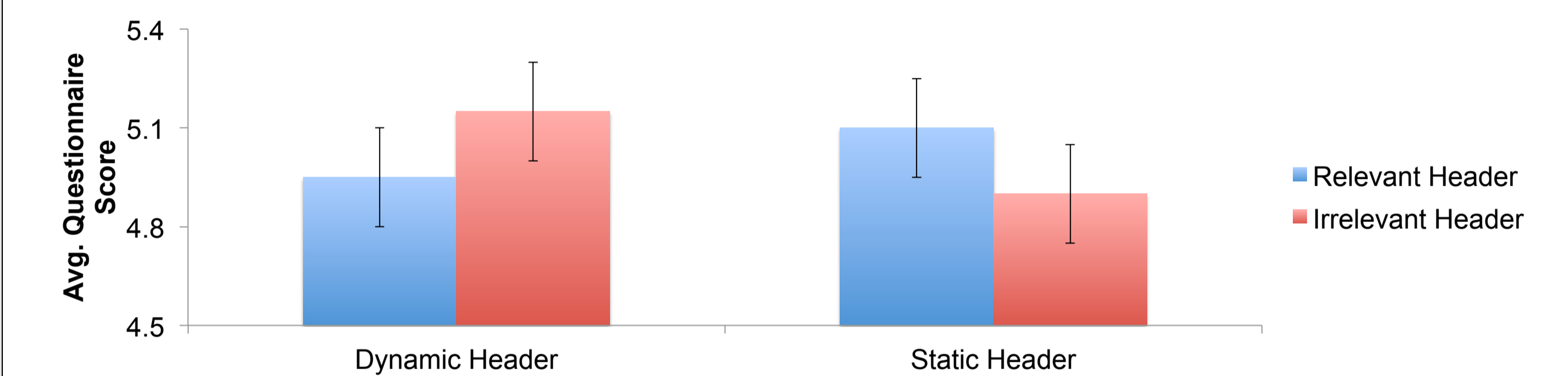
- Using demographic and browser/screen information to predict questionnaire score(s)
- None of these variables significantly predict any variance

### Correlations

- Score in the relevant and irrelevant conditions ( $r = -.394, p < .001$ )
- Score and reading time in the relevant condition ( $r = -.200, p < .05$ )
- Score and reading time in the irrelevant condition ( $r = .158, n.s.$ )

### Analysis of Variance (Format x Relevance)

- Score as DV:  $F(1, 88) = .000, n.s.$  (relevance),  $F(1, 88) = .187, n.s.$  (format)  
 $F(1, 88) = 1.692, n.s.$  (interaction)
- Reading time as DV:  $F(1, 89) = .761, n.s.$  (relevance),  $F(1, 89) = .062, n.s.$  (format)  
 $F(1, 89) = .946, n.s.$  (interaction)



## Conclusions

### Data Analysis Summary

- Demographics did not appear to significantly influence questionnaire score(s)
- Higher score in the relevant condition meant lower score in the irrelevant condition
- Large amount of variance in score/reading time across all conditions
  - Scores ranged from 0 to 10; reading times ranged from 30 seconds to 16 minutes
  - This huge amount of variance undermined the use of an ANOVA design

### Models of Attention

- Data support the idea that there is an effect of header relevance
- Individuals who are helped by relevant headers are harmed by irrelevant ones
- More research is needed to understand the type of visual processing that occurs

### Moving Forward

#### Strengths of Research

- Counterbalancing condition order and article/questionnaire content eliminates concerns about questionnaire equivalency and participant interest in article topics
- Used overly simplistic interface to eliminate potential environmental confounds

#### Limitations of Research

- Large variances in score/reading time indicate the need for in-the-lab replication
- Questionnaires may not be accurate measures of text-comprehension

#### Practically Speaking

- Relevant headers should be used to promote better understanding of content
- Irrelevant ads and other page elements should be avoided (regardless of their format)

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