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## Investigating Intrinsic and Extrinsic Variables During Simulated Internet Search

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## 5.14 Investigating Intrinsic and Extrinsic Variables During Simulated Internet Search

### Investigating Intrinsic and Extrinsic Variables During Simulated Internet Search

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**Abstract.** Using an eye tracker we examined decision-making processes during an internet search task. Twenty experienced homebuyers and twenty-five undergraduates from Old Dominion University viewed homes on a simulated real estate website. Several of the homes included physical properties that had the potential to negatively impact individual perceptions. These negative externalities were either easy to change (Level 1) or impossible to change (Level 2). Eye movements were analyzed to examine the relationship between participants' "stated preferences"[verbalized preferences], "revealed preferences"[actual decisions], and experience. Dwell times, fixation durations/counts, and saccade counts/amplitudes were analyzed. Results revealed that experienced homebuyers demonstrated a more refined search pattern than novice searchers. Experienced homebuyers were also less impacted by negative externalities. Furthermore, stated preferences were discrepant from revealed preferences; although participants initially stated they liked/disliked a graphic, their eye movement patterns did not reflect this trend. These results have important implications for design of user-friendly web interfaces.

#### 1.0 INTRODUCTION

Everyday a large number of people are utilizing the internet for everything from email to grocery shopping. This use places a greater emphasis on the quality and quantity of information being presented, thus making the design and layout of web pages a crucial component to decision making and user satisfaction. The internet affords people the opportunity to make decisions and purchase goods online with the simple click of a button. Whether the decision involves the purchase of a computer, a car, or even a home, a significant proportion of preliminary purchase decisions (or, "homework") can be accomplished without ever having to leave the comfort of one's home. The information on specific aspects of these designs and their impact on a consumer becomes a very important consideration in this environment.

#### 1.1 Role of Experience

Experience often affects how individuals interact with their environment and the internet is no exception. The amount of expertise an individual possesses has been

shown to guide visual search [1]. With experts having a much more refined and effective visual search pattern. The study performed by Reference [1], demonstrated that experts tended to have longer fixations on items of importance to their search and their gaze remained central to the visual scene. Novices in comparison tended to scan the entire scene, with no true direction or long fixations on anything of particular importance to the search.

Experts and novices not only differ in the manner that they scan a visual scene but also in the approach taken to analyzing and inferring information from it. Reference [2] found that when it came to induction and reasoning experts were more flexible than novices in their ability to reason and induce information from a visual scene. Overall, it has been found that experts use past experience and previous knowledge to not only guide visual search, but to compensate for any declining task-specific abilities [3]. Experts use contextual cues and location cues to guide many of their visual searches. This also allows them to become much faster at refining visual searches, with

reaction times shortening with age and expertise. Experience with certain visual cues can also have an effect on visual search of a scene, with knowledge of former individual cues influencing an individual in either a positive or a negative way.

## **1.2 Negative Externalities**

We know from past research [4] that the visual display of a website can have a large impact on an individual's task performance and in general their primary search and satisfaction. Individuals place a premium on their time; when they use the internet, they expect to find the most relevant information to their problem quickly. Most of the research generated on visual layout is studied from the perspective of the effectiveness of a graphic. This study differs from previous research on graphics in that we are looking at how the unpleasantness of a graphic, or a negative object (referred to as a "negative externality") can impact the user. Not only in the way it impacts their visual search, but also their preference for a particular visual scene.

## **1.3 Stated versus Revealed Preferences**

The question of interest is whether it is possible to design an effective website using the stated preferences of individuals. Do internet users really know what it is they are searching for and if so, are they able to convey it verbally? Do verbally stated preferences match with preferences that are revealed during actual internet search?

Organizations of all sizes and interests spend large amounts of money every year on gathering a consumer's stated preference or SPs' and revealed preferences or RPs'[5]. They use this information to do what they called "Consumer Forecasting," or predicting what consumers would want in the future. They were given access to large databases filled with survey and interview information (SP) as well as purchase histories (RP) and were then asked to predict what consumers would do based on all of the data. The

predictions they made were conflicting depending on the type of information they primarily used (SP or RP). This would seem to demonstrate that there is a potential discrepancy between SP (stated preference) and RP (revealed preference).

## **1.4 Eye Tracking**

Eye movements are the most frequent of all human movements and a reliable physiological measure of a psychological state. Eye tracking methodology is based on Reference [6] "eye-mind" hypothesis: the location of a person's gaze directly corresponds to the most immediate thought in their mind. Monitoring an individual's eye fixations (where the eye stops for a moment), their saccades (the rapid movements of the eye), and scan paths allows us to gain insight into certain aspects of an individual's cognitive processes at a particular moment in time. This is due to the eye movements close tie to attentional mechanisms.

Previous eye tracking studies have been used to specifically study how individuals read and scan websites on the internet [7]. When people encounter cognitively complex material, the rate at which they read tends to slow down, as can be indicated from increases in fixations and decreases in saccade durations [8]. In our domain of interest, eye tracking can be used as an unobtrusive way to gain access and insight into what a potential homebuyer is interested in as they view homes on the internet.

## **1.5 Purpose of the present study**

This study was designed to assess the intrinsic factor of experience and its relationship to extrinsic negative externalities (pink paint and power lines). SP and RP were evaluated in order to determine if a discrepancy existed. RP was assessed through length and number of fixations, which is the point at which the eye stops moving for a moment. Also, number as well as amplitude of saccade. From this we are able to measure how difficult and



important the information being viewed is [9], due to the fact that we know intense cognitive processing occurs during a fixation [10]. Thus, we hypothesized that if a person views something important to them they should have a greater number of fixations and longer durations for each fixation. It was also hypothesized that the greater experience an individual possessed for the search task the more refined their visual search pattern would be. In assessing these variables, valuable information was gathered regarding the optimal design of these websites. This information will allow web designers to present the most salient and important information to potential homebuyers quickly and effectively.

## **2.0 METHOD**

### **2.1 Participants**

Twenty-five undergraduates from Old Dominion University and twenty experienced homebuyers from the community were recruited to participate in this study. There were no age requirements for participants, who all had normal or corrected vision (some participants wore contacts but no participants wore glasses) none of the participants were colorblind. Undergraduate participants who finished the experiment were compensated 2 extra credit points at the end of the experimental session and experienced homebuyers were given a \$50 gas card if they completed the study.

All participants viewed ten homes; the same ten homes were shown to all participants albeit in a different order. Four homes were digitally altered such that they possessed two levels of what we designated as "negative externalities." A home with a Level 1 externality had a living room with a bright pink wall; this was considered a Level 1 negative externality due to the fact that a homebuyer could easily change pink paint. A home with a Level 2 externality present included a power line in the curb appeal picture (the first picture of the home a participant saw). Power lines were labeled a

Level 2 externality due to the fact that the homebuyer could not change them. The homes as well as the individual rooms within each home were viewed in random order except for the curb appeal picture that always appeared first; a separate computer program generated this random order. Only four homes were altered to include the negative externalities; each participant viewed a home with a Level 1 and Level 2 externality during the experiment.

### **2.2 Materials and procedure**

We used an Eye link 1000 eye tracker, which is a desk mounted eye tracking system offering 1000 Hz pupil and CR (corneal reflection) eye tracking (takes 1000 measurements per second). Participants were asked to rest their head on a chin rest during the experiment, ensuring reliability of the eye link camera. All participants viewed 10 homes presented in random order, very similar to a typical real estate website; the experimenter kept track of the sequence of the homes for data collection purposes later. Of these, each participant viewed two 'substandard' homes - one home with a bright pink painted wall (Level 1 negative externality) and one home with power lines in the curb appeal photograph (Level 2 negative externality). Photographs were selected by the real estate agency.

In order to counterbalance these homes, the first half of the participants observed the house with pink paint as house #4 and the house with power lines as house #7. The second half of the participants viewed the pink paint on house #5 and the power lines on house #9. The homes were presented in random order.

After viewing a room, participants would rate them on a scale from 1 (worst version of that room) to 9 (best version of that room). This rating for each room was treated as the measure of "SP" in the analyses below. Once the rating had been provided, the experimenter would move on to the next picture. All participants received

a short 5 minute break after viewing the first 5 homes.

The dependent variables of interest were fixation duration/count, saccade count, and saccade amplitude.

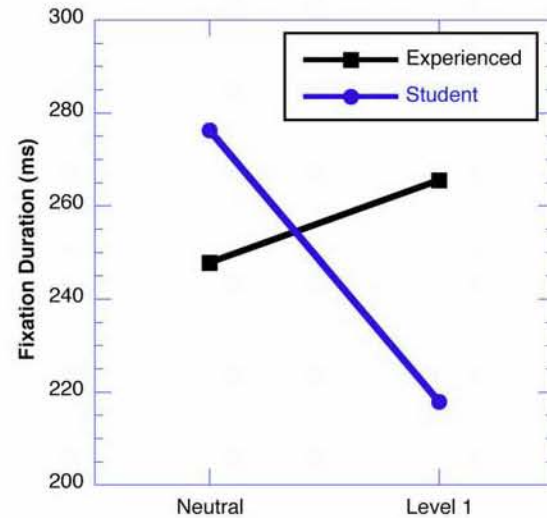
### 3.0 RESULTS

To evaluate revealed preferences, the eye tracking variables of fixation duration/count, and saccade count/amplitude were analyzed for each of the homes containing a negative externality (house #3 & 4, pink paint/ house #6 & 8, power line) using 6 (rooms) X 2 (gender) X 2 (negative externality) repeated measure ANOVAs. This allowed for evaluation of the relationship between intrinsic and extrinsic factors and their effects on revealed preferences.

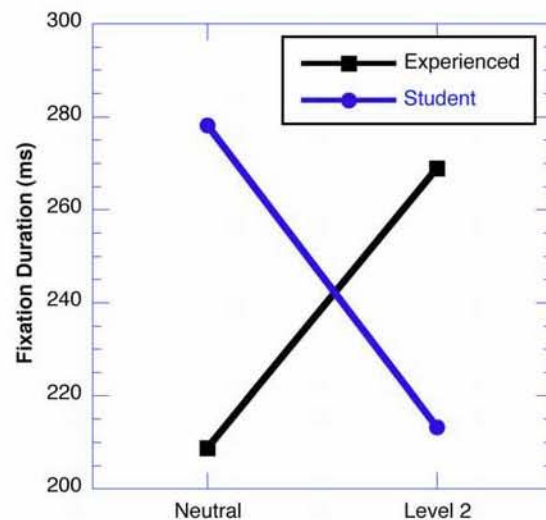
#### 3.1 Role of Experience

A 6 X 2 X 2 ANOVA of fixation duration revealed a significant interaction of Homebuyer X Level 1 negative externality,  $F(5,185) = 4.91, p = .03, \text{partial } \eta^2 = .117$ . Experienced homebuyers had a longer fixation duration when a Level 1 negative externality was present and the novice students had a distinctly opposite reaction with fixation duration declining with the presence of pink paint (Level 1 negative externality). The 6 X 2 X 2 ANOVA also revealed a significant interaction of Homebuyer X Level 2 negative externality,  $F(5,185) = 12.09, p < .001, \text{partial } \eta^2 = .246$ . Experienced homebuyers again had a longer fixation duration when the house contained a Level 2 negative externality (power line), but novice students, as before, had a decreased fixation duration in the presence of a Level 2 negative externality (see figure 1 & 2).

The 6 X 2 X 2 ANOVA of fixation counts revealed a significant 3-way interaction of room X gender X experience,  $F(5,185) = 2.41, p < .04, \text{partial } \eta^2 = .061$ . Experienced male homebuyers had a significantly smaller number of fixations, specifically for the curb appeal photograph ( $M = 57.6, SD =$



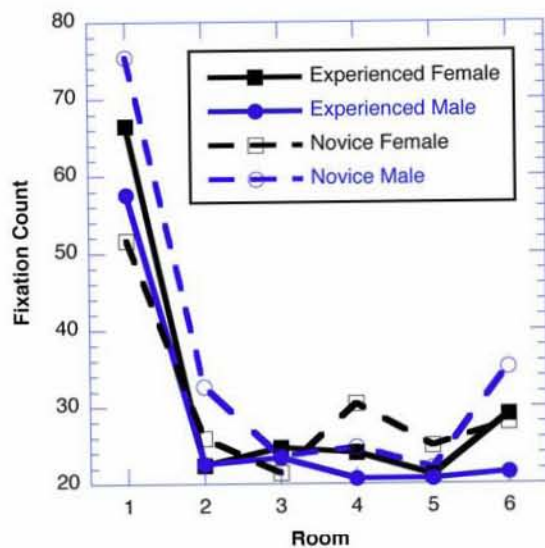
**Figure 1. Fixation duration comparison between neutral and Level 1 negative externality.**



**Figure 2. Fixation duration comparison between neutral and Level 2 negative externality.**

9.10) compared to novice male undergraduates ( $M = 75.4, SD = 10.24$ ). In contrast, experienced female homebuyers had a greater number of fixations ( $M = 66.5, SD = 9.10$ ) compared to the novice female undergraduates ( $M = 51.58, SD = 7.10$ ) in





**Figure 3. Fixation counts of experienced homebuyers vs. novice students.**

the presence of a Level 1 externality (see Figure 3).

A significant 3-way interaction of room X gender X experience was also found for saccade count,  $F(5,185) = 2.37, p < .04$ ,  $\text{partial } \eta^2 = .060$ . Experienced male homebuyers had a significantly smaller number of saccades, specifically for the curb appeal photograph ( $M = 57.5, SD = 9.10$ ) compared to novice male undergraduates ( $M = 75.3, SD = 10.31$ ). Experienced female homebuyers, on the other hand had a greater number of saccades ( $M = 66.2, SD = 9.10$ ) compared to the novice female undergraduates ( $M = 51.47, SD = 7.10$ ) in the presence of a Level 1 externality.

Lastly, results indicated that in the presence of both a Level 1 and Level 2 negative externality experienced homebuyers had greater saccade amplitudes than their student counterparts,  $F(5,185) = 4.53, p < .04$ ,  $\text{partial } \eta^2 = .100$  /  $F(5,185) = 3.39, p < .07$ ,  $\text{partial } \eta^2 = .076$ .

### 3.2 Stated Preferences

Participants were given a General home survey that asked them to rate on a scale of

1 to 9 how important a room would be to them in a home search. The 6 (rooms) X 2 (experience) ANOVA revealed a main effect of room,  $F(5, 105) = 3.95, p < .01$ ,  $\text{partial } \eta^2 = .084$ . The curb appeal photograph was consistently rated low, in terms of perceived importance by the novice students ( $M = 6.34, SD = .36$ ) compared to the experienced homebuyers who gave it a much higher rating in terms of importance ( $M = 7.45, SD = .35$ ).

Evaluating the Home specific surveys a 3-way interaction of room X Level 1 externality X experience was found,  $F(5, 105) = 4.94, p < .03$ ,  $\text{partial } \eta^2 = .108$ . Of interest was the rating given for the living room; when it contained pink paint experienced homebuyers rated it lower ( $M = 4.0, SD = .57$ ) than novice students ( $M = 5.69, SD = .99$ ). When it was neutral, experienced homebuyers rated it higher ( $M = 6.5, SD = .56$ ) than novice students ( $M = 5.8, SD = .52$ ).

### 3.3 Scan paths

Observing the scan paths of experienced homebuyers compared to novice students a difference was observed in the number of saccades and the amplitude of saccades, this also appeared to be tempered by gender. Results and scan paths demonstrated that novice male students had a greater number of saccades; their eyes traveled around the photographs more often and their saccade amplitudes were shorter such that their movements were small bursts across the visual scene. This when compared to experienced male homebuyers reveals that the latter had a smaller number of saccades; their eyes moved around the photograph less often, and because their saccade amplitudes were longer with fixations closer together, it appears experienced male homebuyers had a predetermined idea of where in the visual scene they wanted to look.

Similar to the pattern for male participants, novice female participants also had fewer saccades but just like their novice male



Figure 4. Scan paths with Level 2 negative externality present.

counterparts with shorter amplitudes. Their eye movements were also short, quick movements around the visual scene. Experienced female homebuyers, in contrast to novice female participants, had a greater number of saccades with longer saccade amplitudes. They again appeared to have specific points on the screen that they wished to analyze as indicated by the longer saccade amplitudes, similar to experienced male homebuyers (see figure 4 for sample scanpaths).

## 4.0 DISCUSSION

The purpose of this study was to investigate the intrinsic factor of experience and the extrinsic factor of negative externalities on stated and revealed preferences in an internet search task.

### 4.1 Role of experience

Results revealed experience with internet home search made a difference in the way in which the search task was performed. Gender also appeared to have an effect on experience. For males experience was expressed through fewer fixations, with

longer durations, fewer saccades, and longer saccade amplitudes indicating that they were focused on specific aspects of photographs and had preconceived ideas about what they wished to investigate. Experienced females in contrast to their novice female counterparts had a greater number of fixations, with longer durations, and fewer saccades, but as with experienced male homebuyers they also expressed longer saccade amplitudes again, indicating a clear idea for the direction of their eye gaze in the visual scene. Experienced male participants had the fewest number of fixation counts and saccade counts which seems to be indicative of low interest in the photographs altogether (reference [10]).

Saccade amplitudes and fixation placement were interesting in this study. The saccade amplitudes followed distinctly opposite patterns for experienced versus novice participants. Experienced homebuyers demonstrated a longer array of visual movements than novice students across the webpage; which may indicate a



preconceived idea of where in the visual scene they would find relevant information to their search. Evaluating scan paths it is clear that experienced homebuyers tended to fixate on the central portions of the visual scene and spent less time on the perimeters which supports previous research (reference [1]) that experts tend to focus on the central aspects of a visual scene.

The present study is unique in that it takes into account differences in experience using physiological measures of an individual during a search task focusing on eye tracking indices of dwell time, fixation duration/count, and saccade count/ and amplitude. These physiological data suggest that experienced homebuyers might be better at acquiring target specific information than novice students since they seem to localize their area of interest quickly (revealed by longer saccade amplitudes and a fewer number of saccades).

#### **4.2 Role of negative externalities**

Negative externalities in this study were operationalized in two levels depending on the ease to which they could be modified by the user – Level 1 (pink paint) and Level 2 (power lines). From previous studies we know that a greater number of fixations and the longer the duration indicate that viewers are focusing intense cognitive resources on the object being viewed [10]. In this study the effect of the negative externality varied by the experience of the participant and the room that was being viewed. When viewing the living room photograph with pink paint (Level 1 externality) experienced homebuyers found it to be less of a detractor than novice students. The presence of the pink paint did not stop the experienced homebuyers from investigating the home more fully in contrast to the novice students.

The same was true when a power line or Level 2 negative externality was present. Again, the fixation duration and fixation count, were affected. The experienced

homebuyer when presented with the Level 2 externality would spend more time looking at the home. Their eye would stop more often and for a longer duration, compared to the novice student. The novice student would spend less time looking at the home photographs, and would fixate less often for a shorter duration of time, compared to the experienced homebuyers. The results indicate that the experienced homebuyers were less distracted by the presence of a Level 2 negative externality and had more interest in the home photographs as a consequence.

It appears that the Level 1 and Level 2 externalities led to fewer physiological influences on visual search for experienced homebuyers; instead their presence perhaps gave experienced homebuyers additional reason to scrutinize the photographs carefully possibly to find positive aspects to compensate for the presence of the Level 1 and Level 2 negative externalities. In either case the presence of a negative externality appeared to affect how participants viewed the entire home. This is interesting news for designers; it is evident that one “bad apple” could have the potential to spoil the entire barrel.

#### **4.3 Stated versus Revealed Preferences**

In the General survey novice students rated that the curb appeal photograph would be of little importance to their visual search which is in contrast to the experienced homebuyer who gave it a much higher rating of importance for the home search. A discrepancy was observed when these ratings were compared to RP determined through eye tracking variables for the novice student. For fixation count and saccade count there was a main effect of room caused by the curb appeal photograph, regardless of experience. In other words, the curb appeal photograph generated the maximum interest during visual search, the experienced homebuyers realized this and there was no discrepancy between their SP



and RP, but the novice students did not. It is interesting that this finding was consistent even for participants that took the General survey after viewing all of the homes.

The Home specific survey also demonstrated a discrepancy between SP and RP, but only for the Level 1 negative externality. When pink paint was present the ratings given (SP) were opposite of the eye tracking measures recorded (RP). Regardless of experience participants rated the living room photographs low, but when we look at their eye tracking variables, they spent a considerable amount of time viewing those same photographs, illustrating a discrepancy. This discrepancy was larger for the novice student than the experienced homebuyers. This discrepancy was not found for the Level 2 negative externality.

Overall, our results indicate that there is a difference between a person's stated preferences and revealed preferences; although not consistent across all variables a discrepancy was found and that experience may temper how large a discrepancy exists or if one will exist at all.

#### 4.4 Implications

In the present study, a trend toward discrepancies between SP and RP were found dependent on experience, supporting previous research [11] that preference may be something that is formed in many different stages of a decision and that experience may solidify that preference [2]. Furthermore, differences were found in the search patterns that were used by the experienced and novice participants as a function of what they were looking at on the webpage. These results have significant implications for web design for the population in general. The scan paths revealed that the graphic portions of the web pages were indeed where participants spent the greatest amount of their time looking, reinstating the idea that visual aspects of a web page are the most important. Knowing your audience and the

amount of experience they possess as they view a webpage carries important considerations for design in the future.

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# Investigating Intrinsic and Extrinsic Variables During Simulated Internet Search



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## Purpose of the Study:

- Assess the intrinsic factor of experience and its relationship to extrinsic negative externalities (pink paint and power lines)
- Stated vs. revealed preferences





## Previous Research

- Role of Experience
  - Expertise has been shown to guide visual search (Willaims, Ward, Knowles, & Smeeton, 2002)
    - Experts – more refined/ Novices – scanned entire scene
    - Experts – more flexible/ Novices – rigid ideas (Shafto & Coley, 2003)
- Preference
  - Discrepancies have been studied, but not through the use of physiological measures/ (Horskey, Nelson, & Posavac, 2004; Simonson, 1999; Zajonc, 1980)

## Research Questions:

- Will experience alter the way in which homes are viewed?
- How will negative externalities impact the overall visual search?
- Will stated preferences differ from revealed preferences?

# Ocular Tracking

Just & Carpenter (1976) "Eye-mind" hypothesis




## Eye Tracking Variables

- Dwell Time
  - Fixation Duration
  - Fixation Count
  - Saccade Count
  - Saccade Amplitude
- 
- (Loftus and Mackworth, 1978)
  - (Rayner 1998)



## Scan Path



01-10-2006 09:00

MLS	0902171
Price	\$320,000
Bedrooms	3
Bathrooms	2
Sq. Ft.	2,240
Acreage	0.35
Style	Ranch
Year Built	1997
City	Chesapeake
Zip	23321
Schools	Western Branch Senior High School
Neighborhood	Waterstone

**Property:**  
 "SIMPLY EXTRAORDINARY! PRISTINE 3BR, 2 BATH HOME IN HIGHLY SOUGHT AFTER NEIGHBORHOOD. FRESHLY PAINTED. FEATURES LARGE MASTER SUITE W/FP, FORMAL LR, DR, FR AND MORE. A MUST SEE! CORPORATE OWNED AND SOLD AS-IS, WHERE-IS. NO REPORTS OR REPAIRS BY SELLER. A GREAT HOME."

3 2000 WATERSTONE COVE Geoffrey Cardwell "Long & Foster Real Estate, Inc." 4 5

## Website Display



MLS	0902171
Price	\$320,000
Bedrooms	3
Bathrooms	2
Sq. Ft.	2,240
Acreage	0.35
Style	Ranch
Year Built	1997
City	Chesapeake
Zip	23321
Schools	Western Branch Senior High School
Neighborhood	Waterstone

**Property:**  
 "SIMPLY EXTRAORDINARY! PRISTINE 3BR, 2 BATH HOME IN HIGHLY SOUGHT AFTER NEIGHBORHOOD. FRESHLY PAINTED. FEATURES LARGE MASTER SUITE W/FP, FORMAL LR, DR, FR AND MORE. A MUST SEE! CORPORATE OWNED AND SOLD AS-IS, WHERE-IS. NO REPORTS OR REPAIRS BY SELLER. A GREAT HOME."

3 2000 WATERSTONE COVE Geoffrey Cardwell "Long & Foster Real Estate, Inc." 4 5

# Negative Externalities

Pink Paint



Power line



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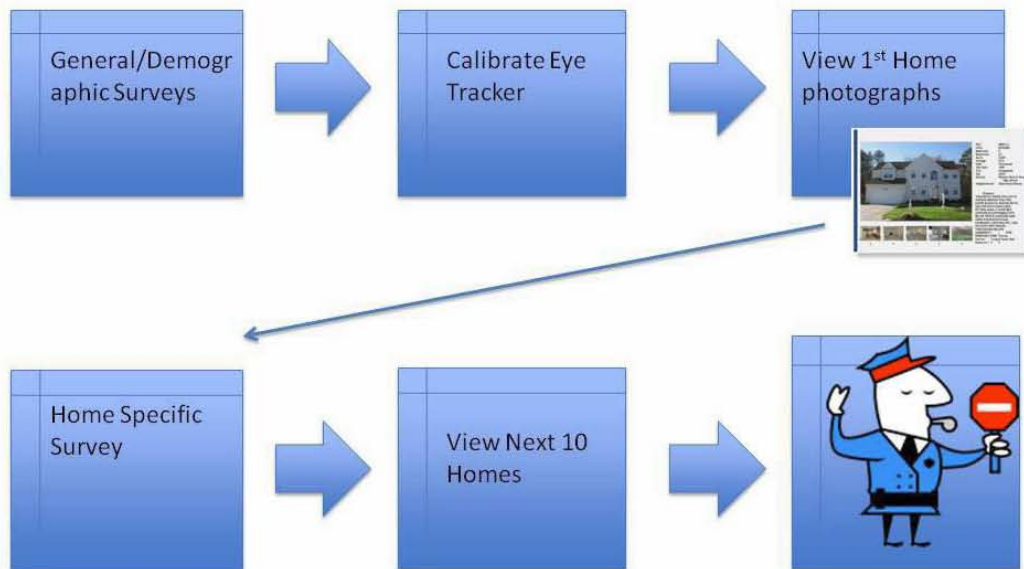
## Experimental Design:

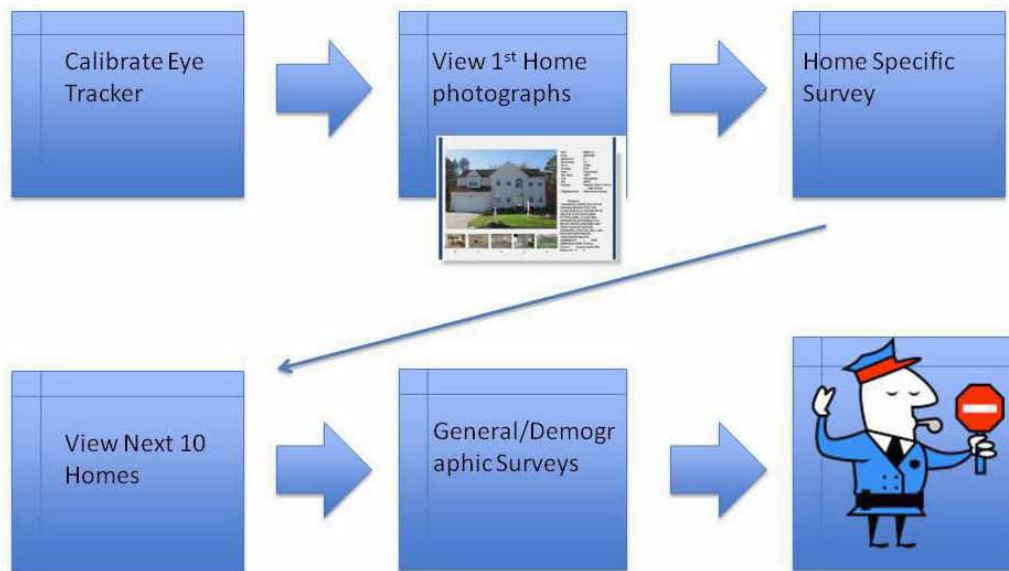
- 25 ODU undergraduates
  - Received class credit
- 20 Homebuyers from the community
  - Received \$50 gas card
- No time limit to view photographs
- 10 homes, each home has 6 photographs (curb appeal, kitchen, living room, master bedroom, master bathroom, and back yard)



# Surveys

- Demographic
- General
  - Curb Appeal
- 1 2 3 4 5 6 7 8 9
- Home Specific
  - 1 2 3 4 5 6 7 8 9
  - Worst Average Best





## Hypotheses:

- **Interest in a scene =**
  - longer dwell times
  - longer fixation durations
  - greater number of fixations
- **Greater experience =**
  - more refined search
- **The presence of negative externalities =**
  - shorter dwell times
  - shorter fixation durations/counts

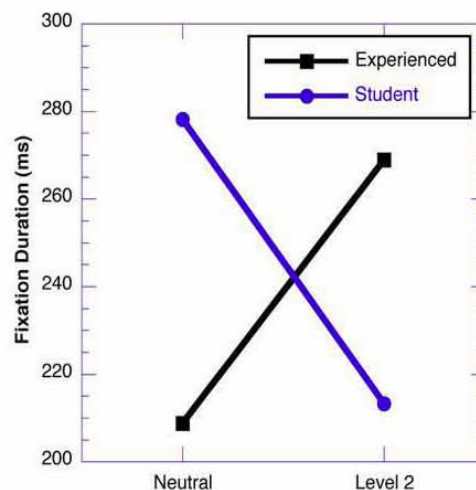
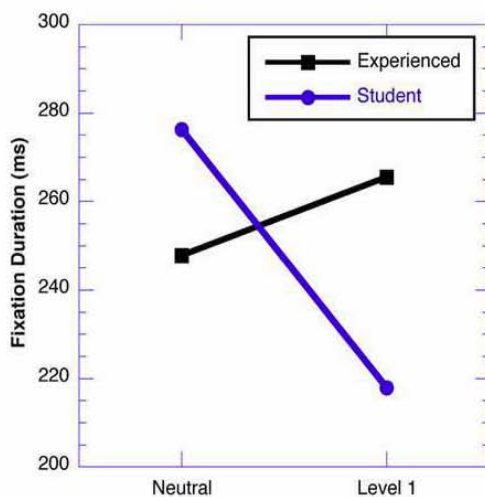
# Analysis

- ✓ 6(rooms) X 2(expert/novice) X 2(Negative Externality)
- ✓ 6(Home survey) X 2(expert/novice) X 2(Negative Externality)
- ✓ 6(General survey) X 2(expert/novice)
- ✓ Scan paths

THIS WAS DONE FOR THE FOUR HOMES THAT CONTAINED  
OUR NEGATIVE EXTERNALITIES (HOUSE #3 & #4, PINK  
PAINT/ HOUSE #6 & #8, POWER LINE)

## Experience

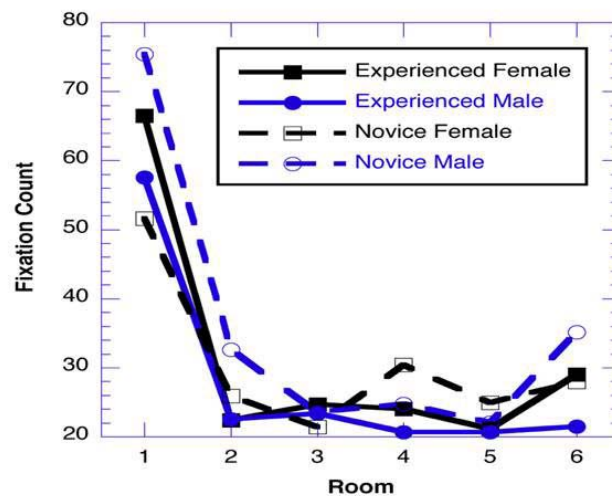
- Fixation Duration: Homebuyer X Negative externality
  - $F(5,185) = 4.91, p = .03, \text{partial } \eta^2 = .117$  (Level 1)
  - $F(5,185) = 12.09, p < .001, \text{partial } \eta^2 = .246$  (Level 2)





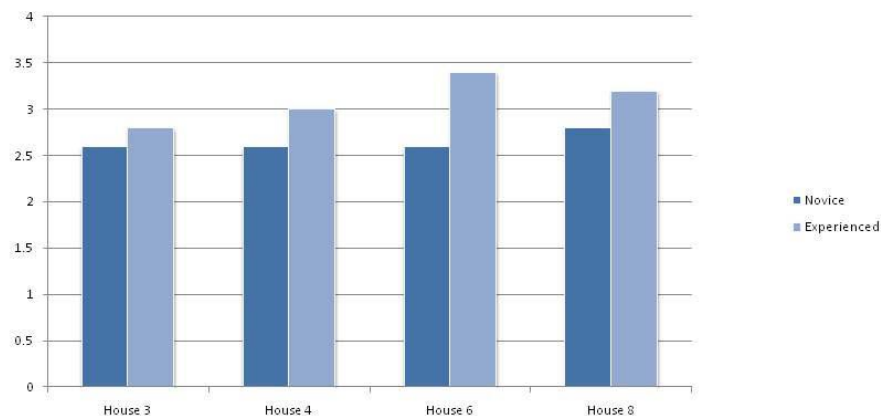
# Experience

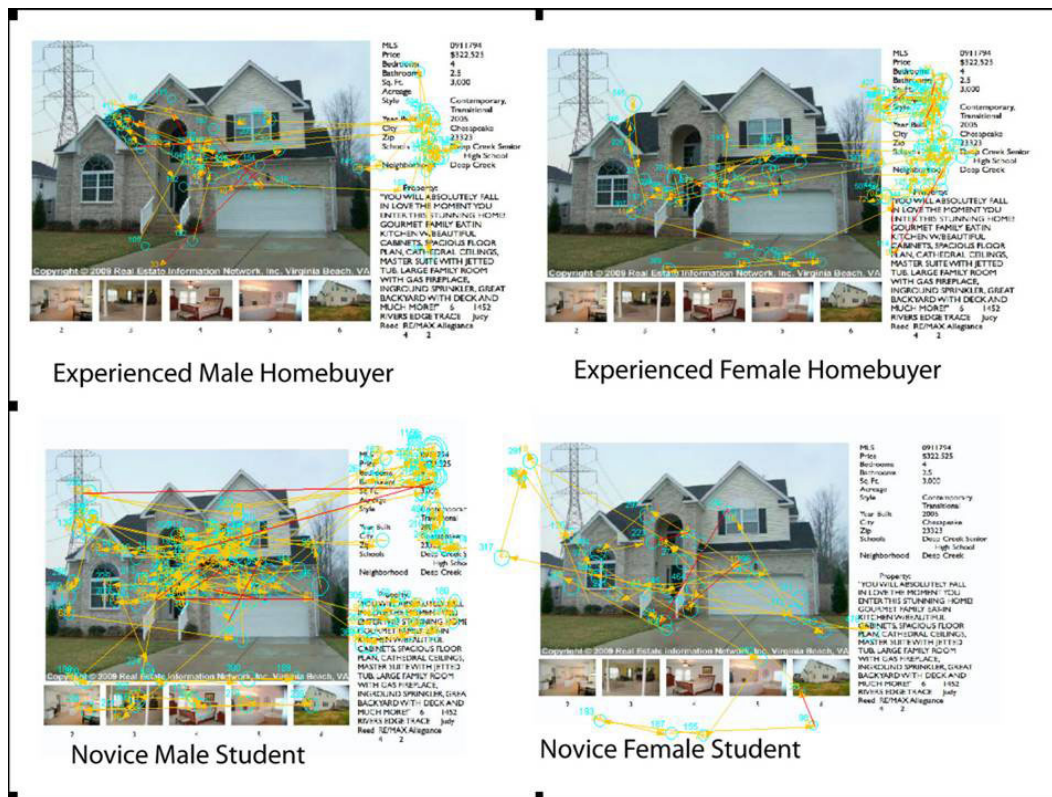
- Fixation Count: room X gender X experience
  - $F(5,185) = 2.41, p < .04, \text{partial } \eta^2 = .061$ .
- Saccade Count: room X gender X experience
  - $F(5,185) = 2.37, p < .04, \text{partial } \eta^2 = .060$



# Experience

- Saccade Amplitudes
- 6 (room) X 2 (experience) X 2 (negative externality)
  - Main effect of experience (both Level 1 and 2 neg. externality)





## Interest Areas

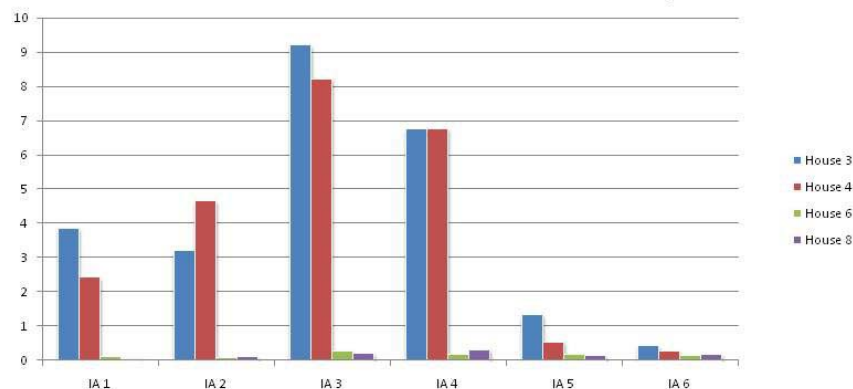
Main Effect of Interest Area:

House 3:  $F(5,185) = 22.07, p < .01, \text{partial } \eta^2 = .408$

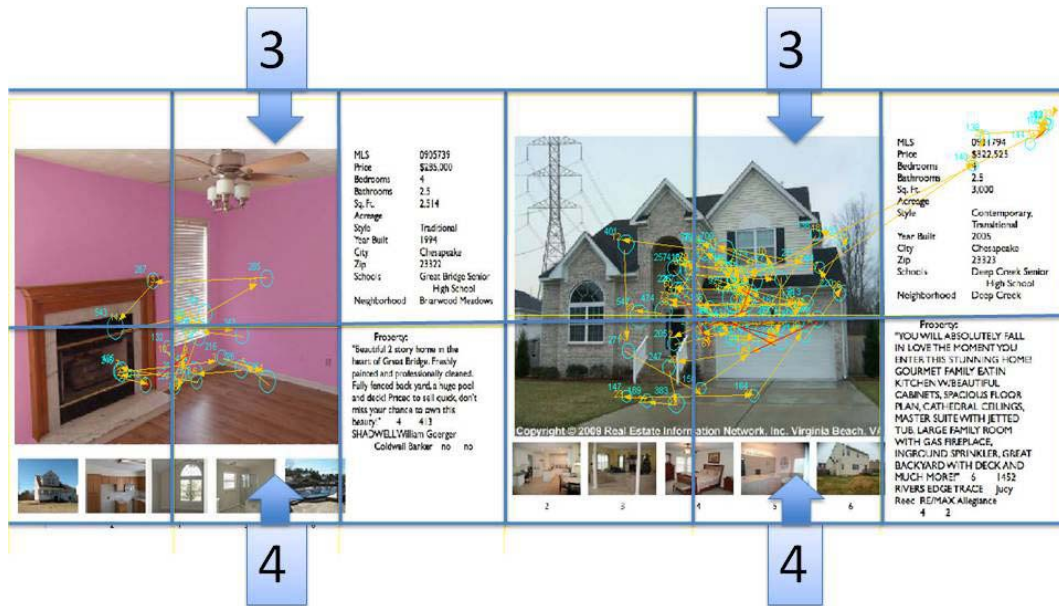
House 4:  $F(5,185) = 27.07, p < .01, \text{partial } \eta^2 = .451$

House 6:  $F(5,185) = 10.62, p < .01, \text{partial } \eta^2 = .244$

House 8:  $F(5,185) = 13.27, p < .01, \text{partial } \eta^2 = .287$



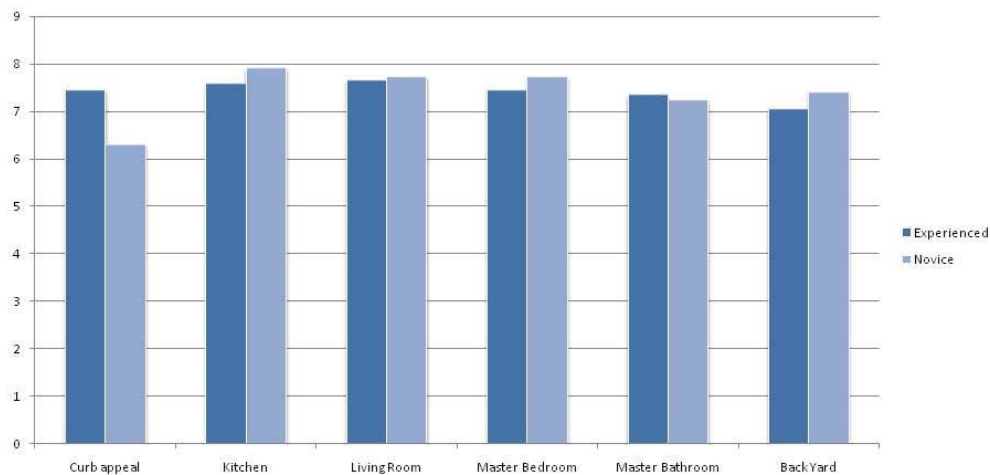
## Interest Areas



## Stated vs Revealed Preferences

General Survey Rating

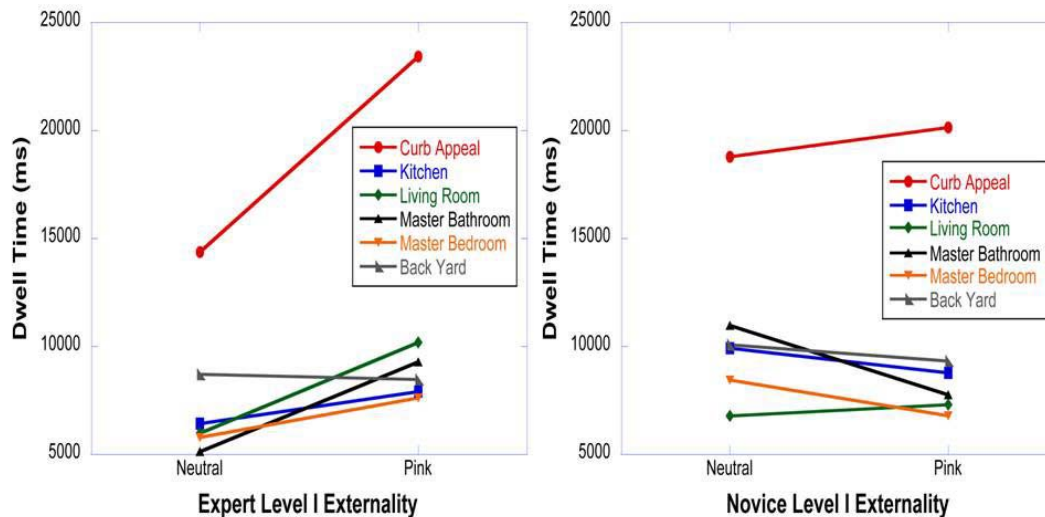
main effect of room,  $F(5, 105) = 3.95, p < .01$ ,  
 $partial \eta^2 = .084$





# Stated vs Revealed Preferences

- Home Survey: room X Level 1 externality X experience was found  
 $F(5, 105) = 4.94, p < .03, \text{partial } \eta^2 = .108$



## Discussion

- Experience:
- Experience with internet home search made a difference in the way in which the search task was performed.
- Saccade amplitudes were of a distinctly opposite patterns for experienced versus novice participants. Experienced homebuyers demonstrated a longer array of visual movements than novice students across the webpage; which may indicate a preconceived idea of where in the visual scene they would find relevant information to their search

# Discussion

- Experience:
- These physiological data suggest that experienced homebuyers might be better at acquiring target specific information than novice students since they seem to localize their area of interest quickly (revealed by longer saccade amplitudes with a fewer number of saccades and fixations).

# Discussion

- Negative Externalities:
  - Varied with the experience of the participant
  - Level 1 and Level 2 externalities led to fewer physiological influences on visual search for experienced homebuyers compared to novice homebuyers
- Stated vs Revealed Preferences
  - There was a discrepancy present
    - Greater for novice homebuyers

# Practical Implications

- **Research Implications**

- Discrepancies between stated and revealed preferences can occur and researchers need to be conscious of this. Level of experience seems to interact with this discrepancy. An individual very familiar with a situation may have more concrete preferences.

- **Web Design Implications**

- Graphics can be very influential
- Negative aspects of an image may or may not be detrimental depending on the individual's experience level