An Online Shopping Search Engine User Study

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Research Motivation

- Privacy Concerns
  - Studies consistently show that people have privacy concerns.

- Privacy Policies ≠ Privacy-Protecting Behavior
  - Difficult to read and understand.
  - Dichotomy between stated privacy preferences and observed behavior.
Research Question

Will the prominent display of privacy information cause consumers to take privacy into account when making online purchasing decisions?
Understandable Privacy Policies

- Platform for Privacy Preferences (P3P)
  - Communicate privacy policies in a standard machine-readable format.
- Enables development of tools
  - Summarize privacy policies.
  - Compare policies with user preference.
  - Alert and advise users.
Privacy Finder

- Privacy-enhanced P3P search engine

- **Decorate with Framed Posters, Art Prints & Photography from Barewalls.com**
  Offers posters and lithographs. Custom framing, canvas transfers, and board mounting services also available.
  http://www.barewalls.com/ - No Cache - Privacy Policy - Similar Pages

- **AllPosters.com - The World's Largest Poster and Print Store!**
  Online store for posters and prints of movies, actors, sports, music, and other subjects.
  http://www.allposters.com/ - No Cache - Privacy Policy - Similar Pages
Barewalls Interactive Art, Inc. Privacy Practices

Privacy Policy Summary | Full Privacy Policy | Contact Site | P3P Policy

Privacy Policy Check

Barewalls Interactive Art, Inc.'s privacy policy matches your preferences.

Barewalls Interactive Art, Inc. may share your information with:

- Delivery companies that help this site fulfill your requests and who may also use your information in other ways -- only if you request this
- Companies that help this site fulfill your requests (for example, shipping a product to you), but these companies must not use your information for any other purpose
AllPosters.Com Privacy Practices

Privacy Policy Summary | Full Privacy Policy | Opt-Out | Contact Site | P3P Policy

Privacy Policy Check

AllPosters.Com's privacy policy does not match your preferences:

- Site may contact you to interest you in other services or products and does not allow you to remove yourself from marketing/mailing list

AllPosters.Com may share your information with:

- Companies that help this site fulfill your requests (for example, shipping a product to you), but these companies must not use your information for any other purpose
- Delivery companies that help this site fulfill your requests and who may also use your information in other ways
Research Objectives

- Privacy Concerns
  - Determine the level of concern in various online scenarios.
  - Determine if Privacy Finder addresses relevant concerns.

- Privacy-Related Behavior
  - Determine if users will select websites with P3P policies and pay a premium for privacy.
  - Investigate the effectiveness of Privacy Finder as a risk communication tool.
Surveys

Survey Design

• Decide what you want out of the survey.
• Decide what questions to ask.
  ▪ Conduct a literature review for examples.
• Write out some analysis procedures.
• Select a format for your survey.
  ▪ Paper
  ▪ Email
  ▪ Webpage
• Submit an IRB application.
• Pilot the study with friends.
• Edit/Update the survey.
Online Concerns Survey

- Logistics
  - Designed survey on paper and ported to SurveyMonkey.com
  - Raffled off an iPod Nano
- Methodology
  - Duration: 1 week
  - Participants solicited via Craigslist
  - $n = 276$
- Evaluated Perceived Likelihood of Privacy Violations
- Developed a Risk Score
- Selected Products for Purchasing
Online Concern Scenarios

Likert Scale

Family/Friends | Employers | Credit Card | Lawsuit | Continued Contact | Search History | Dossier | Information sold | Unwanted Email | Infer Information | Track items

Likelihood | Trouble

Addressed by Privacy Finder
Would Not Purchase, No Concerns
Purchase, Very Concerned
Purchase, Somewhat Concerned
Purchase, No Concerns

User Study Items

Textbooks
Office Supplies
Flowers
Shoes
Laptop
Lingerie
Condoms
Lubricant
Book - Depression
Pregnancy Test
Book - Bankruptcy
Fertilizer
Adult Diapers
Hunting Knife
Cigarettes
Bottle of Peroxide
Sex toys
HIV test
Porn DVD
STD Medication
Bulletproof jacket
Bullets
Bomb-Making

1
2
3
4
Would Not Purchase
Purchase, Very Concerned
Purchase, Somewhat Concerned
Purchase, No Concerns
User Studies

- Experimental Design
  - What are you testing?
  - How can you design your study to get the biggest effect?
    - Is there a target user population?
    - Will you be able to generalize your results?
  - What kind of user study?
    - Online
    - One-on-one
    - Group Interview
  - How many sessions?
    - One session?
    - Many sessions?
  - IRB Application
Logistics

- Recruit Users
  - Misc. Market (CMU)
  - Pittsburgh Craigslist
  - CMU Center for Behavioral and Decision Research
  - Flyers around town

- Select Users
  - Screening survey

- Schedule Users
  - Create several sessions
  - Takes longer than you think
  - No shows
• Running the User Study
  ▪ Reserve space
  ▪ Prepare materials
  ▪ Create a script
  ▪ Prepare computer(s)

• Compensation
  ▪ Cash
  ▪ Entry into a raffle
  ▪ Gift certificate
Online Shopping User Study

 Experimental Design

• Framing: Usability Test of a New Search Engine
• Price Incentive for Purchases
  ▪ Provide lump sum payment
  ▪ Participants keep “remainder” after purchase
• Screening Survey
The User Study

- Three Conditions
  - Condition 1: No Information
  - Condition 2: Irrelevant Information
  - Condition 3: Privacy Information

- Two Products
  - Privacy Sensitive
  - Non-Privacy Sensitive

- 16 Participants in each Condition
# eCommerce website selection factors

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<thead>
<tr>
<th>Factors</th>
<th>Mean</th>
<th>p Value</th>
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<tbody>
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<td>Return Policy</td>
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<td>Price</td>
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<td>Duracell Alkaline Battery, AA, 8/PK</td>
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<td>Duracell AA8 DURACELL - Alkaline Batteries Value Packs</td>
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<td>Duracell Coppertop Alkaline AA Batteries</td>
<td>$15.14 (w/shipping)</td>
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</table>
Condition 2: Handicap Information

Duracell AA batteries 8-pack

Duracell Alkaline Battery, AA, 8/PK
Duracell Coppertop Alkaline AA Batteries Long-life alkaline batteries provide the best, longest power source. Recommended for use in smoke alarms, flashlights, lanterns, calculators, pagers, cameras, recorders, radios, CD players
www.ccvsoftware.com/c/product.html?record@56119

$14.45 (w/shipping)

Duracell AA8 DURACELL - Alkaline Batteries Value Packs
Duracell AA8 DURACELL Alkaline Battery Value Packs...
discountofficeitems.zoovy.com/product/DURMN15RT12Z

$14.60 (w/shipping)

Duracell Alkaline Battery Value Packs
Duracell AA8 DURACELL Alkaline Battery Value Packs DURACELL AA ALKALINE BATTERY - 8 PACK Cardboard card for peg hook 8 pack Specifications Weight 0.45 lbs Length 4.5 inches Width 3.75 inches Height 1 inches Manufactures Web site www.duracell...
www.instawares.com/Coppertop-Alkaline-Lithium-Bat...

$14.80 (w/shipping)

Duracell Coppertop Alkaline AA Batteries
Long-life alkaline batteries provide the best, longest power source. Recommended for use in smoke alarms, flashlights, lanterns, calculators, pagers, cameras, recorders, radios, CD players, medical equipment, toys and electronic games. Dependable after seven years of storage.
www.officequarters.com/product.php/item/DUR-MN1500B8...

$15.14 (w/shipping)
Condition 3: Privacy Information

**Duracell Alkaline Battery, AA, 8/PK**
Duracell Coppertop Alkaline AA Batteries Long-life alkaline batteries provide the best, longest power source. Recommended for use in smoke alarms, flashlights, lanterns, calculators, pagers, cameras, recorders, radios, CD players
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www.officequarters.com/product.php/item/DUR-MN1500B8... Privacy Policy

Privacy Premium  $0.69  4.8%
H1: Privacy Influences Purchases

% Purchases by Level of Privacy

- Batteries
- Sex Toy

Level of Privacy: None, Low, Medium, High

Results:
- No Information
- Handicap
- Privacy
Price Premium

- Impact
  - $\text{Price premium}_{\text{batteries}} < \text{Price premium}_{\text{sex toy}}$
  - People may have been more willing to pay for high privacy for batteries for $.50 than $1.50 for the sex toy.
### Privacy Premium

<table>
<thead>
<tr>
<th></th>
<th>Condition 1: No Information</th>
<th>Condition 2: Handicap Information</th>
<th>Premium</th>
<th>p Value</th>
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</thead>
<tbody>
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<td><strong>Average Price Batteries</strong></td>
<td>$14.64</td>
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<td><strong>Average Price Vibrator</strong></td>
<td>$15.26</td>
<td>$15.30</td>
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</table>

No significant price differences
<table>
<thead>
<tr>
<th></th>
<th>Condition 1: Privacy Information</th>
<th>Condition 3: Privacy Information</th>
<th>Premium</th>
<th>p Value</th>
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<tbody>
<tr>
<td><strong>Average Price Batteries</strong></td>
<td>$14.64</td>
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<td><strong>Average Price Sex Toy</strong></td>
<td>$15.26</td>
<td>$15.88</td>
<td>$0.62</td>
<td>0.00005</td>
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</tbody>
</table>

Significant price differences.
Risk Communication

• Notice
  ▪ 92% noticed the Privacy Icons

• Read
  ▪ 32% of participants read the Privacy Report

• Shop
  ▪ For 60%, privacy information influenced the sites visited and the sites from which purchases were made.
“Which factor had the most influence on your decision?”

- Open Ended Response of “Privacy Policy”
- Batteries
  - 32% (Privacy Condition)
  - 6% (“Handicap Information” Condition)
  - 0% (“No Information” Condition)
  - Privacy information heightened awareness!
- Sex Toy
  - 36% (Privacy Condition)
  - 11.8% (“Handicap Information” Condition)
  - 14.8% (“No Information” Condition)
  - Privacy concern already existed with privacy-sensitive item.
Lessons Learned

- Have a Backup Plan
  - Users do crazy things....
    - Try to use Google to search for items
    - Try to search for coupon codes
    - Go directly to their favorite online stores
  - Out of Stock!
    - Various websites ran out of items during the study
    - New results selected and presented
    - Toss out data and find new participants
Conclusion

- Accessible privacy information affects consumer behavior
- Consumers willing to pay for better privacy
- *Privacy Finder* helps users make privacy informed decisions
CMU Usable Privacy and Security Laboratory
http://cups.cs.cmu.edu/
Carnegie Mellon