

Privacy economics, attitudes, and behavior

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8-533 / 8-733 / 19-608 / 95-818:
Privacy Policy, Law, and Technology

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Today's Agenda

- Quiz
- IRB and Human Subjects Research
- Economics of Privacy
- Measuring Privacy Attitudes and Behaviors

By the end of class, you should be able to:

- Understand the review process of doing privacy research on human subjects
- Understand the difficulties in measuring privacy preferences and behavior
- Critically evaluate studies on privacy preferences or behavior

Human subjects research

Institutional Review Board

- Reviews human subjects research to make sure it is ethical and human subjects are protected
- Takes time and lots of paperwork
- Before submitting paperwork to IRB, you must complete human subjects training
- <http://www.cmu.edu/research-compliance/human-subject-research/>

IRB approval

- Research involving human subjects requires IRB approval
- Surveys are exempt, but you must ask IRB for exemption
- Exempt and low-risk IRB approval usually happens within 2 weeks
- High risk usually takes about a month, but may be longer
- Whenever possible, design study with informed consent
 - You will have to convince IRB that there is a good reason not to
- Submit your IRB form as early as possible
 - You can submit a modification later

Ethical considerations

- Sometimes tests can be distressing
 - users have left in tears
- You have a responsibility to alleviate
 - make voluntary with informed consent
 - avoid pressure to participate
 - let them know they can stop at any time
 - stress that you are testing the system, not them
 - make collected data as anonymous as possible

IRB approval needed?

- A grad student is conducting an anonymous online survey to find out how people feel about employers firing people who posted about work on Facebook. She plans to write a paper about this.
- A professor is surveying her students to find out which of the course reading assignments were most and least useful so that she can improve the assignments next semester.
- A grad student is recording his Facebook feed every day for a month and then systematically analyzing the posts to determine whether the number of words in each posts is correlated with the time of day it was posted. If he finds something interesting he will write a paper about it.

Economics of privacy

Financial Transactions

- Buyer and seller example [Varian 1996]
- Why do buyers want sellers to know what they want?
- What do buyers not want sellers to know?
- How can sellers incentivize buyers to honestly reveal information?

Externality

- The actions of a mailing list buyer impose costs on individuals on that list
- The seller of the list ignores those costs
- Varian says: Costs could be mitigated through choice

Contracts and markets for info

- What if we had property rights in information about ourselves?

Public interest in personal information

- Public records
 - Court records
 - Tax assessments
 - Salaries of public officials
- What happens when information goes online and transaction costs approach zero?

Privacy attitudes and behaviors

Consumer surveys to measure privacy attitudes

- Westin/Harris surveys
 - Privacy fundamentalist, pragmatist, unconcerned (marginally concerned)
- TRUSTe surveys
 - <http://www.truste.com/us-mobile-privacy-index-2013/>
- Academic research
- Does it matter what consumers think?

Privacy concerns seem inconsistent with behavior

- People say they want privacy, but don't always take steps to protect it
- Many possible explanations
 - They don't really care that much about privacy
 - They prefer immediate gratification to privacy protections that they won't benefit from until later
 - They don't understand the privacy implications of their behavior
 - The cost of privacy protection (including figuring out how to protect their privacy) is too high

How do we measure privacy behaviors?

- Self reported behaviors
- Web surveys
- Lab studies
- Field experiments
- Natural experiments

Measuring Behavior in lab studies

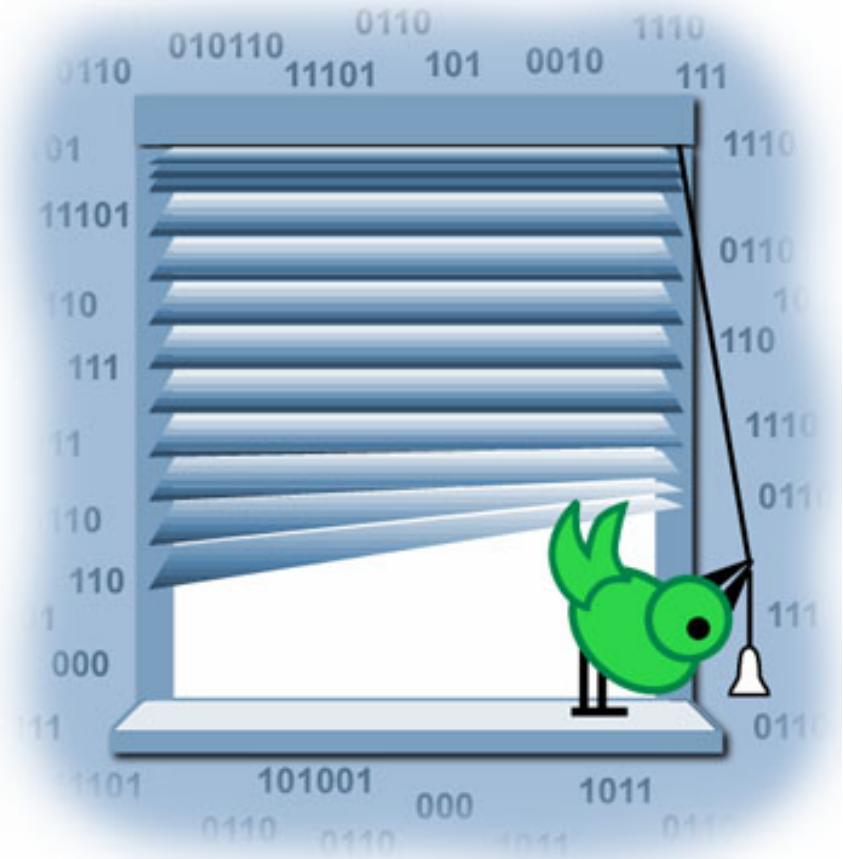
Effect of privacy info on purchasing

Will the salient display of privacy information cause consumers to take privacy into account when making online purchasing decisions?

- J. Gideon, S. Egelman, L. Cranor, and A. Acquisti. **Power Strips, Prophylactics, and Privacy, Oh My!** SOUPS 2006. http://cups.cs.cmu.edu/soups/2006/proceedings/p133_gideon.pdf
- S. Egelman, J. Tsai, L. Cranor, and A. Acquisti. 2009. Timing is Everything? The Effects of Timing and Placement of Online Privacy Indicators. CHI2009.
- J. Tsai, S. Egelman, L. Cranor, and A. Acquisti. The Effect of Online Privacy Information on Purchasing Behavior: an Experimental Study. Information Systems Research. Published online 2010.

What if we make privacy protection easy?

Will people pay to protect their privacy?



Add privacy meters to search results

PrivacyFinder Search for: merrell primo chill slide

http://www.privacyfinder.org/?q=merrell+primo+chill+slic - nutrition label

merrell primo chill slide Search


Search Engine: Google Yahoo! Shopping Preference Level: Medium


Privacy Report [Merrell Primo Chill Slide - Men's Tan: Merrell Shoes](#)
Buy Merrell Primo Chill Slide - Men's Tan and find Spring trends at Onlineshoes. Free Shipping and Exchanges on all Merrell!...
<http://yhs.trafficdashboard.com/track.htm?pid=1031...> - [Privacy Policy](#) - [Similar Pages](#)


Privacy Report [merrell" Primo Chill Slide Shoes, Chocolate, Women's](#)
Italian styled winter slide for convenience and warmth. Easy-on and water resistant, the Primo Chill gives your feet after-sport comfort in casual style. Water-resistant pigskin leather upper with sheepskin lining. Removable wool fleece footbed. Injection-molded nylon shank for increased arch support. Air Cushion EVA midsole for softer flex and increased comfort. Merrell Pilot sole with sticky rubber sports a weight-saving design that is siped and barred for traction....
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Privacy Report [Merrell Primo Chill Slide](#)
We heated up our stylish Italian standout slide with a sheepskin lining with removable footbed and a water resistant pigskin upper. Merrell Pilot Sole has a weight-saving cutaway configuration but is boldly siped and barred for wet and dry surface traction. Slip Lasted Construction. Water Resistant Pigskin Upper. Sheepskin Lining. Wool Fleece Footbed. Nylon 6. 6 Injection Molded Arch Shank. Compression Molded EVA Footframe. Air Cushion Midsole. Merrell Pilot Sole/Sticky Rubber....
<http://shopping.yahoo.com/p:Merrell%20Primo%20Chil...> - [Privacy Policy](#) - [Similar Pages](#)

Privacy Report [Merrell Primo Chill Slide \(Men's\)](#)
We heated up our stylish Italian standout slide with a sheepskin lining with removable footbed and water resistant pigskin upper. Merrell Pilot Sole has a weight--saving cutaway configuration but is boldly siped and barred for wet and dry surface traction. FEATURES:

 \$89.95

 \$90.00

 \$89.95 - \$89.95



How can we test whether privacy meters change behavior?

Hypothetical task

- Search for product
- Which site would you buy from?

Hypothetical

No real privacy tradeoff

Real task

- Search for product
- Make purchase with your credit card

Expensive

Difficult to control

2005 – 2009 Privacy Finder studies



Power strips, prophylactics, and privacy, oh my!

- “Online shopping study” in our lab
- 24 students paid \$10 plus reimbursement for purchases made with their own credit cards
- Used “Shopping Finder” search engine
 - Control condition: no privacy icons
 - Experimental condition: privacy icons

J. Gideon, S. Egelman, L. Cranor, and A. Acquisti.






Power Strips, Prophylactics, and Privacy, Oh My! SOUPS 2006.



Shopping Finder Search for: Trojan Shared Sensation 12 pack

Shopping Finder Search for: Trojan Shared Sensation 12 pack

Shopping Finer

-  [Trojan Shared Sensation Spermicidal Condoms - 12 Pack](#)
Trojan Shared Sensation Spermicidal Condoms - 12 Pack - Unique Shared Sensation Design for the Pleasure and Excitement of Both Partners: -Alternating rows of raised bumps and ridges for her -Flared ...
store.yahoo.com/eprice/trojsharsens.html - [Cached](#) - [Privacy Policy](#) - [Similar Pages](#)
- [Trojan Shared Sensation Condoms](#)
Purchase Trojan Shared Sensation condoms at QuikCondoms.com for discount prices and free shipping! ... Product Description. The Trojan Shared Sensation is part of the latest trend in condom design; with condoms companies ... QC Price. Qty. Trojan Shared Sensation Lubricated 12 Pack. 11.99 ...
<https://www.quikcondoms.com/product.jsp?id=151> - [Cached](#) - [Similar Pages](#)
-  [Trojan Shared Sensation Lubricated Latex Condoms - 12 Condoms | Vitacost](#)
Trojan Shared Sensation Lubricated Latex Condoms - 12 Condoms - Pleasure for Both Partners. Unique Shared Sensation Design for the Pleasure and Excitement of Both Partners: alternating ...
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- [Trojan Shared Sensation Spermicide Condoms - 12 Pack](#)
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... Spermicidal Condoms > Trojan Shared Sensation Spermicidal Condoms. Trojan Shared Sensation Spermicidal Condoms ... Size: 12 Retail Pack. Trojan Shared Sensation Spermicidal Condoms ...
www.condomave.com/trojan-shared-sensation-spermicidal-lubricated-condoms-condom.html - [Cached](#) - [Privacy Policy](#) - [Similar Pages](#)
-  [Trojan Shared Sensation Condoms 12 PK](#)
... Trojan Shared Sensation Condoms 12 PK. Lubricated Unique Shared Sensation is design for the pleasure and excitement of ... Trojan Ultra Pleasure 12 pack ...
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-  [Trojan Shared Sensation Lubricated - 12 pack](#)
Shared Sensation Lubricated Trojan Condoms supplies pleasure and excitement of both partners. It has alternating rows of raised bumps and ridges for her, and a flared design that's roomy at the tip for him.
store.yahoo.com/loveessentials/trojsharsenl.html - [Cached](#) - [Privacy Policy](#) - [Similar Pages](#)

Privacy icons influenced purchases



- **With privacy info:** more people purchased from sites with better privacy
- Larger effect for privacy-sensitive purchase

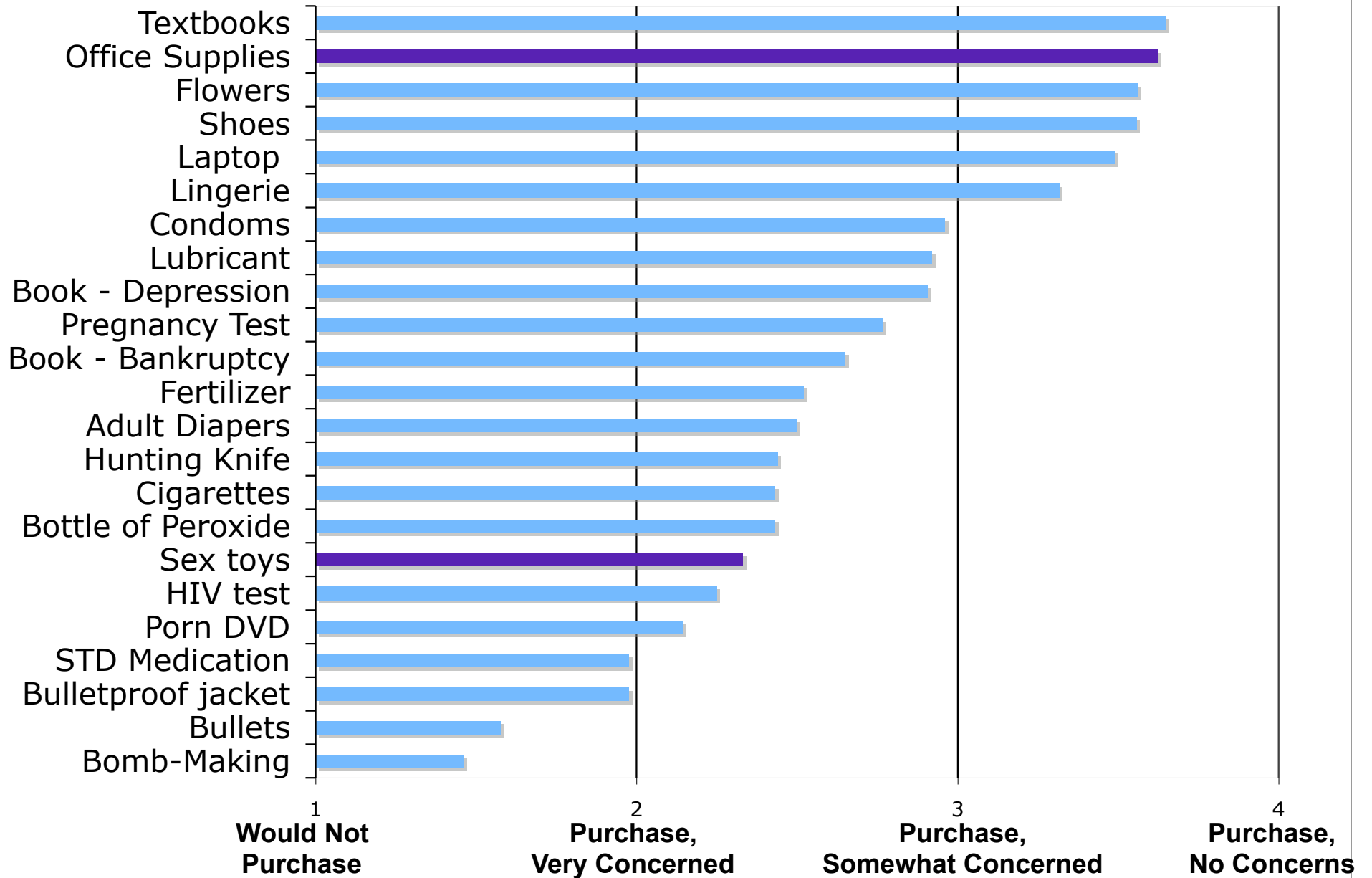
But study had significant limitations

- Participants were all students
- Reimbursement did not incentivize saving
- Price/privacy tradeoff not obvious
- Maybe people just like pretty indicators
- Privacy-sensitive item not sensitive enough

So we tried again

- 72 Pittsburgh residents
- Price/privacy tradeoff
- Fixed payment, keep the change
- New icons, new products, new conditions

User Study Items





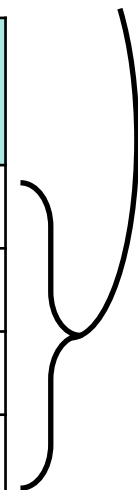
Merchant selection

- Selected 10 merchants for each product
- No well-known merchants
- Controlled first four search results:
more expensive → better privacy


\$.69 privacy premium



Merchant	Privacy score	Price w/ shipping
ccvsoftware.com	?	\$14.45
discountofficeitems.zoovy.com	0/4	\$14.60
instawares.com	2/4	\$14.80
officequarters.com	4/4	\$15.14



Privacy information condition

 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 alarm, cameras, recorders, radios, CD players
www.ccvsoftware.com/c/product.htm

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[Duracell AA8 DURACELL](#)
Duracell AA8 DURACELL Alkaline Battery Value Packs
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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... [Privacy Policy](#)


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[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... [Privacy Policy](#)


 \$14.45 (w/shipping)

 \$14.60 (w/shipping)

 \$14.80 (w/shipping)

 \$15.14 (w/shipping)

Irrelevant information condition

 Duracell AA batteries 8-pack

[Duracell Alkaline Battery, AA, 8/PK](#)
Duracell Coppertop Alkaline AA Batteries... the best, longest power source. Recommended for use in smoke alarm, cameras, recorders, radios, CD players
www.ccvsoftware.com/c/product.htm

Handicap Accessibility


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discountofficeitems.com/product


Handicap Accessibility


[Duracell Alkaline Battery](#)
Duracell AA8 DURACELL Alkaline Batterie... 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...


Handicap Accessibility

[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...

 \$14.45 (w/shipping)

 \$14.60 (w/shipping)

 \$14.80 (w/shipping)

 \$15.14 (w/shipping)

No information condition



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



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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.com

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\$14.80 (w/shipping)

Duracell Coppertop Alkaline AA Batteries

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www.officequarters.com/product.php/item/DUR-MN1500B8...



\$15.14 (w/shipping)

Privacy icons influenced purchases

- **No privacy info:** most people purchased where price was lowest
- **With privacy info:** more people purchased from expensive sites with better privacy
- No clear difference between products
 - Because we didn't control **privacy premium?**



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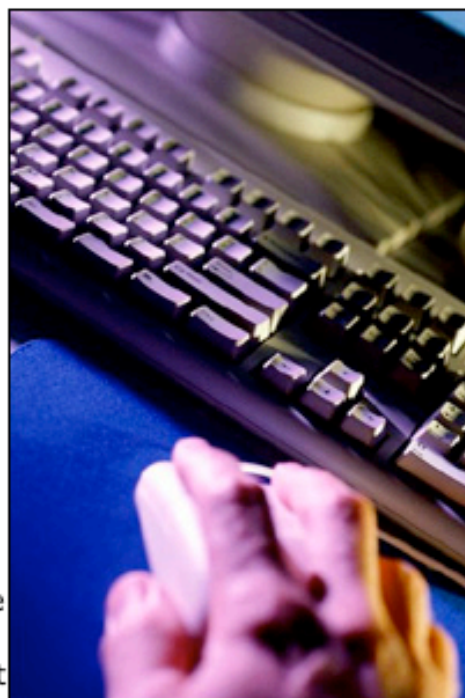
Good privacy pays for web stores

People will pay more for goods if a website does a good job of protecting their privacy, a study shows.

The Carnegie Mellon study looked at what shoppers do when they are told what sites do with personal data.

It suggests that shoppers will pay a premium equal to about \$0.60 (30p) on goods worth \$15 (£7) if they are reassured about privacy.

The study was used to evaluate a tool that aims to give web users clearer information about privacy policies.



Many web shoppers worry about what happens to personal data

Follow-up study with cooperation of vendors to control privacy premium

- Contacted 46 battery and sex toy vendors
- Convinced 8 to adjust prices for our study
 - Asked one to lower prices and promised to pay the difference
 - Sent \$140 check to The Dirty Bunny for “research project assistance”



Also investigated timing of privacy notice

- In search results
- Interstitial
- At top of website



Duracell

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www.littleofficesupply.com/durmn1500b8z.html - [Privacy Policy](#)



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Duracell AA8 - Alkaline Batteries

Trusted Everywhere, Delivers long-lasting, dependable quality in wide range of everyday devices. For general use; Battery Size: AA; For Use With: General Use. Coppertop Alkaline Batteries, 1.5v, 8 Batteries per Pack, AA
www.instawares.com/coppertop-alkaline-lithium-batt... - [Privacy Policy](#)



\$15.75 (w/shipping)

Duracell Alkaline Battery 8-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.officequarters.com/product.php/item/DUR-MN1500B8Z/D... - [Privacy Policy](#)



\$16.00 (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.ontimesupplies.com/Duracell_Coppertop_Alkaline_Batteri... - [Privacy Policy](#)



\$16.25 (w/shipping)

AA8 DURACELL DURACELL AA ALKALINE

Manufacturer: DURACELL Model: AA8DURACELL Part Number: AA8 DURACELL UPC: 41333825014 Cardboard card for peg hook Dimensions: 4.5x3.75x1 Comments:...
www.shopfoodex.com/duracell-batteries-count-p-31250.html - [Privacy Policy](#)



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Coppertop Alkaline Batteries, AA, 8/pack

Home » Office Equipment & Equipment Supplies » Batteries » General » Duracell Coppertop Alkaline Batteries



Live Support
ONLINE
CLICK HERE TO TALK!

Customer Login

E-mail address

Login

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Done

Sure enough...

- Privacy-sensitive nature of product impacts willingness to pay a premium for privacy
- Privacy information had the greatest impact when presented alongside search results



S. Egelman, J. Tsai, L. Cranor, A. Acquisti. **Timing is Everything? The Effects of Timing and Placement of Online Privacy Indicators.** CHI 2009.

Research questions

- What questions about privacy attitudes or behavior would you be interested in investigating?



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