04 - Introduction to Privacy

Lujo Bauer, Nicolas Christin, and Abby Marsh

January 25, 2016

05-436 / 05-836 / 08-534 / 08-734 / 19-534 / 19-734 Usable Privacy and Security Carnegie Mellon University CyLab

institute for SOFTWARE RESEARCH

Engineering & Public Policy



Today!

- What does privacy mean to you?
- Privacy goals
- Why is privacy hard to measure?
- How privacy is protected
- Privacy notice and choice (intro)
- Homework presentations

What does privacy mean to you?

http://cups.cs.cmu.edu/privacyillus trated/

Hard to define

"Privacy is a value so complex, so entangled in competing and contradictory dimensions, so engorged with various and distinct meanings, that I sometimes despair whether it can be usefully addressed at all."

Robert C. Post, Three Concepts of Privacy, 89 Geo. L.J. 2087 (2001).

Limited access to self



"Being alone." - Shane (age 4)

"the right to be let alone"

- Samuel D. Warren and Louis D. Brandeis, *The Right to Privacy,* 4 Harv. L. Rev. 193 (1890)

"our concern over our accessibility to others: the extent to which we are known to others, the extent to which others have physical access to us, and the extent to which we are the subject of others attention.

- Ruth Gavison, "Privacy and the Limits of the Law," Yale Law Journal 89 (1980)

Control over information

"Privacy is the claim of individuals, groups or institutions to determine for themselves when, how, and to what extent information about them is communicated to others."

"...each individual is continually engaged in a personal adjustment process in which he balances the desire for privacy with the desire for disclosure and communication...."





How does each goal relate to privacy?

I want to have... I want to be....

- Solitude, uninterrupted
- Unseen, unheard, unread
- Not talked about
- Not judged
- Not profiled, not targeted, not treated differently than others
- Not misjudged
- Free to try, practice, make mistakes, self-reflect
- Not surprised (contextual integrity)
- Not accountable

- Not required to reveal
- Unknown
- Forgotten
- Intimacy
- Control
- Boundaries
- Identity
- Security
- Safety
- Others?

Measuring privacy

- Why is privacy hard to measure?
- Why are attitudes about privacy hard to measure?
- Why is the cost of privacy invasion hard to measure?

How privacy is protected

- Laws, self regulation, technology
 - Notice and access
 - Control over collection, use, deletion, sharing
 - Collection limitation
 - Use limitation
 - Security and accountability

Privacy laws around the world

- Privacy laws and regulations vary widely
- US has mostly sector-specific laws, minimal protections, often referred to as "patchwork quilt"
 - No explicit constitutional right to privacy or general privacy law
 - But some privacy rights inferred from constitution
 - Narrow regulations for health, financial, education, videos, children, etc.
 - Federal Trade Commission jurisdiction over fraud and deceptive practices
 - Federal Communications Commission regulates telecommunications
 - Some state and local laws
- European Data Protection Directive EU countries must adopt similar comprehensive laws, recognize privacy as fundamental human right
 - Privacy commissions in each country

OECD fair information principles

- Collection limitation
- Data quality
- Purpose specification
- Use limitation
- Security safeguards
- Openness
- Individual participation
- Accountability
- <u>http://www.privacyrights.org/ar/fairinfo.htm</u>

US government privacy reports

- U.S. FTC and White House reports released in 2012
- U.S. Department of Commerce multi-stakeholder process to develop enforceable codes of conduct



Privacy self regulation



Notice and choice

Protect privacy by giving people control over their information

Notice about data collection and use

Choices about allowing their data to be collected and used in that way



Nobody wants to read privacy policies

"the notice-and-choice model, as implemented, has led to long, incomprehensible privacy policies that consumers typically do not read, let alone understand"

 Protecting Consumer Privacy in an Era of Rapid Change. Preliminary FTC Staff Report. December 2010.



Cost of reading privacy policies

- What would happen if everyone read the privacy policy for each site they visited once each month?
- Time = 244/hours year
- Cost = \$3,534/year
- National opportunity cost for time to read policies: \$781 billion



A. McDonald and L. Cranor. The Cost of Reading Privacy Policies. I/S: A Journal of Law and Policy for the Information Society. 2008 Privacy Year in Review Issue. <u>http://lorrie.cranor.org/pubs/readingPolicyCost-authorDraft.pdf</u>

ADER JOE'S ® HREDDED BITE SIZE WHEATS	BARBARA'S Shredded	TRADER JOE'S®	Nutrition Facts Sering Size in cup (Dig Serings Fer Confamer about 12 Serings Fer Confamer about 12	Shredded Oats Dogats	TRADER JOE'S • Organic HIGH FIBER O'S	
	Multigrain	Very	Calories 110 150 Calories from Fat 5 10	Servings Per Container About 12 We to Com WA 45	Nutrition Facts Serving Size 1 1/4 cup (55g) Servings per Container 8	Nutrition Facts Serving Size 1 Cup (30g) Servings Per Container about 11
Iutrition Facts arving Size 1 cup (49 g)		Berry	Total Fat 0.5g* 1% 1% Seturated Fat 0g 0% 0%	Amount Per Serving Cenal Son Mit Calories 220 260	Amount per Serving	Calories 110 Calories from Fat 0
nvings Per Container about 10	Nutrition Facts Serving Size 3/4 Cup (32g)	Clusters	Trans Fat 0g Polyumaturated Fat 0g Monounsaturated Fat 0g	Calories from Fat 25 25 5 Daily Value** Total Fat 2.5g* 4% 4%	Catories 190 Catories from Fat 10 % Delly Value* Total Fat 10 9%	Total Fat 0g 0% Saturated Fat 0g 0%
alories 190 Calories from Fat 10 % Daily Value*	Servings Per Container About 21	CEREAL	Cholesterol Ong 0% 1% Sodium 125mg 5% 8% Potassium tông 2% 8%	Total Fat 2.5g* 4% 4% Saturated Fat 0.5g 2% 2% Trans Fat 0g	Saturated Fat 0g 0% Trans Fat 0g	Trans Fat 0g Cholesterol 0mg Offs Sodium 280mg 12%
Saturated Fat Og 0%	Amount Per Serving Cond Son Bit Calories 120 160	Nutrition Facts Serving Size 1 cup (55 g)	Total Carbohydrate 25g 81% 1016 Dietary Fiber 2g 81% 81%	Cholesterol (mg 0% 1% Sodium 250mg 10% 12%	Cholesterol Omg 0% Sodium 115mg 5%	Total Carbohydrate 26g 9% Dietary Fiber less than to 3%
Trans Fat 0g Cholesterol Omg 0% Lodium Omg 0%	Calories from Fat 15 15 % Delty Yalw**	Amount Par Serving	Sugars 4g Other Cabohydrate 19g Protein 3g	Potassium 180mg 5% 11% Total Carbohydrate 40g 14% 16%	Total Carbohydrate 44g 15% Dietary Fiber 9g 36%	Sugars 2g Protein 2g
Potassium 180mg 5% Total Carbohydrate 38g 13%	Total Fat 1.5g* 2% 2% Saturated Fat 0g 0% 0%	Catories 230 Catories from Fat 50	Vitamin A 01% 41% Vitamin C 01% 01%	Dietary Fiber 5g 20% 20% Soluble Fiber 2g	Soluble Fiber less than 1g Insoluble Fiber 8g	Vitamin A 25% Vitamin C 25% Calcium 0% Iron 45%
Dietary Fiber 5g 20% Sugars 0g	Trans Fat 0g Cholesterol 0mg 0% 1% Sodium 200mg 8% 11%	Total Fat 5g 8% Saturated Fat 0.5g 3% Trans Fat 0g	Calcium 016 1516 Iron 2516 2516 Vitamin D 016 1516	Insoluble Fiber 3g Sugars 11g	Supars 9g Protein 6g 12%	Vitamin 0.25% • Thiramin 25% Ribotavin 25% • Niacin 25% Vitamin 86 25% • Folic Acid 50%
Vitamin A 0% • Vitamin C 0%	Potassium 125mg 4% 9%	Cholesterol Ong 0% Sodium 140mg 6%	Thiamin 25% 30% Nacin 25% 25%	Protein 6g Vitamin A 0% 6%	Vitamin A 0% • Vitamin C 130% Calcium 4% • Iron 30%	Vitamin B12 25% • Zinc 25% Percent Day Vitas an based in a 2.000 laking day
Calolum 0% • Iron 8% Thiamine 8% • Riboflavin 2% Niacin 10% • Vitamin D 0%	Carbohydrate 24g 8% 10% Dietary Fiber 4g 15% 15% Solutile Fiber 1g	Total Carbohydrate 42g 14% Dietary Fiber 3g 11%	Vitamin B, 25% 25% Folc Acid 25% 25% Phosphorus 8% 25%	Vitamin C 35% 35% Calcium 2% 15%	Thiamin 25% • Ribotlavin 25% Niacin 25% • Vitamin B6 25% Folate 25% • Vitamin B12 25%	Calcular Frank Frank
Parcent Cally Values are based on a 2,000 calorie det. Your daily values may be figher or keen depending on your calorie needs:	Insoluble Fiber 3g Sugars 5g	Sugars 12g Protein 5g	Magnesium 6% 10% Zinc 25% 30%	Iron 10% 10% Vitamin E 8% 8%	Zinc 15%	Tex Ful Level Train 600 2000 Differences and the State State Crossesson Level Texa 2000 2000 Solution Level Texa 2000 2000 Solution Level Texa 2000 2000 Differences 2000 2000 2000 Differences 2000 2000 2000 Differences 2000 2000
Catories 2,000 2,300 Soai Far Lass Ran Big Nig Sar Far Lass Ran Dig Nig Cholestenid Lass Ran XXmg XXMmg Robam Lass Ran 2,400mg 2,400mg Potasatum 3,100mg 3,000mg	Protein 4g Vitamin A 0% 4%	Vitamin A 0% Vitamin C 2% Calcium 2% Iron 8%	Nevertile cases, it lands of a see place service provide by test to: test has been been been to be tables of the protocol of the service of the tagent and by protocol of the service of the "Protect by tables are been to a 1.000 unless dat. "And data values ray to represe traver depending on the data wash."	Thiamin 10% 15% Riboflavin 4% 10% Niacin 6% 6%	or lower depending on your calorie needs:	Catory per year Ret Catory test 4 Pose 4 MGREDIENTS: ORCANIC MILLED CORN.
Bolken Less Han 2,400mg 2,400mg Potassium 3,500mg 3,800mg Total Carbohydrate 300g 375g Datary Filter 71g 39g	Vitamin C 8% 10% Calcium 2% 15%	* Percent Daily Values are basied on a 2,000 calore deit. Your daily values may be higher or lower depending on your caloria needs: Celores 2,000 2,000	Calories 2.000 2.000	Nacin 6% 6% Phosphorus 15% 30% Magnesium 15% 20%	Sat Pat Less than 55g Ng Sat Pat Less than 25g 25g Onolesarol Less than 300mg 300mg	SALT, ORGANIC BARLEY MALT EXTRACT.
INGREDIENTS: Whole Wheat,	Iron 45 45 Vitamin E 45 45	Total Fail Levis Train 10g Mig Sail Fail Levis Train 20g 20g Ondersteril Levis Train 200rps 300rps	Tata far Lan far fig Kip Tata far Lan far fig Kip Dafar Lan far King Story Dokum Lan far Hong Story Solum Lan far L4Drog L4Drog Naman L3Drog L4Drog Status far L4Drog L4Drog Status far L4Drog L4Drog Status far L4Drog L4Drog	Zinc 10% 19% Copper 10% 10%	Total Carbonydraxe 200g 2760 Detary Floer 25g 35g Protein 50g 65g	PRESERVE FRESHNESS WITAMINS &
Vitamin E (to preserve freshness).	*Ansunt in canael. One half cup skim milk controlutes an additional kill calores. Blong addition, 200mg potaesium, fig calores. Blong addition, 200mg potaesium, fig angles.	Bodum Lass tran 2 400mg 2400mg Tote Carbonystee 800g 81%g Dietery Piter 25g 80g	Descy film Dig Ng Ng MCREDINTS MARLE GRAN WHERE ADD CORN MCA * NATURALLY MILLED SUGAR SAT, MA I FORMACY WHEN I MORE	* Amount in censel. One had oup sken milk contributes an additional 40 calories, 65mp andum, 200mp potensium, 6p subchydrate (d)s supprise. and 4p potensi.	INCREMENTS: Organic Whete Grain Wheat From, Organic Whete Brain, Organic Emporated	MITAMIN CI, VITAMIN A ACETATE NACINA
Dist. & Sold Exclusively By: Trader Joe's, Moerovia, CA 91016	"Percent daily values are based on a 2,000 cauce day, You daily values may be lighted or leave depending on your calcula reads." Calculat. 200 2,001.	Tel3 Concrudent 4 Presen 4 MOREDRENTE: WHOLE ROLLED GATS.	TRESPIRESS. TORGANC VITAMINE AND MINERALS: FOR AND ZINC	Percent dely values are based on a 2,000 calore del. Your dely values may be higher or lower depending on your calore needs:	Caramel Gelor, Meteral Vilamia E.	CHANOCOBALAMIN (VITAMIN) B12)
	The Far Lear There for the Per- tition Far Lear There for the Perti- tion Far Learn There for the Perturbation for the Perturbation Learning Learning Theorem The Learning Learning Theorem The Perturbation Learning The Theorem Theorem Theo	INGREDIENTE: WHOLE ROLLED GATE, MILLED CAME SUGAR, CORN'R DUR, RACE FLOW, VEDETABLE OR, ICANOLA AND OR SAFFLOWER AND OR SUMPLOWER OR.).	MINETAL NUTHEN 25, A 8 VITAMIN INACINAMICE, A 8 VITAMIN (FOLIC ACD), VITAMIN B: (TRAMIN MONOPHINATE), VITAMIN B: (PHINDIANE INTORIDOL ORDE),	General 200 100 Tear Far Lees Then 100 Rep Der Far Lees Then 200 Rep Der Far Lees Then 200 Rep Rocken Lees Then 2.000mg 2.000mg Rocken Lees Then 2.000mg 2.000mg	Thinmin, Folate, Villamin 812. Our readers being free March 812.	AIBOFLAVIN (VITAMIN BC), MONONTDUTE (VITAMIN BC), THAMIN
	Torona Sila Sila Sila Sila Sila Sila Sila Sil	WHOLE WHEAT FLOUR, BROWN RICE, CORNSTARCH, HONEY, SALT, BARLEY MALT SYRUP, FREEZE DRIED BLUEBERRIES.	CONTRACS INVERT INGREDIENTS. MAT CONTAIN ALMOND, SOY AND MILK INGREDIENTS.	The Carbonychum 200g 21%	Next to separate separations to treat price context with altergent, Made in shared price restant with size and a very. Facing pri-	OUR VERSION FOLLOW GOD MARKACTURAL PACTERS TO SERVICE REALINET TO AND CASE DESIGNATION AND ADDRESS MORE IN DORMANT SAVES WITH WHEN AD SOC RECEIPT PROCESSES WANTS AND
	Carena program Tara Contractions 1 Foreir 1 Expendicants: Whole Oat Floor (With Added Oat Bran), Weber Care Floor (Web, Added Core Dat Bran), Weber Care Floor Weber Weber	FREEZE ORIED RASPRERINES. FREEZE DRIED STMANBURKIES, KATURAL FLAUDR, ANNANTO (FOR COLOR), TRANSITIC (FOR COLOR), FURPLE CARROT JUICE (FOR	DISTRIBUTED BY SMALL PLANET FOODS, INC. SEDING-MODILLEY, WA MICHIN USA PRODUCT OF CANADA	Conversion providence and a second se	Dist. & South Companying Street	AND ON FOURMENT SHARED WITH WHEAT AND SON FACLITY PROCESSES PEANLITS AND THEE MUTS
This product is sold by weight not volume. Some settling of contents may have occurred during handling	Play, Unsupport Scota, Natural Vitamin E Rour, Sait, Baking Scota, Natural Vitamin E (Meed Tocopherois (Sov)), Vitamin C	COLOR), PURPLE CARROT JUICE (FOR COLOR), CARDAMOM SEED, FENNEL SEED, FENUGREEK SEED, NUTMEG.	© 2008 Small Planet Foods, Inc. CERTIFIED ORGANIC The anders is perfiled upper is the	Pour, Unsulphured Molasses, Matted Barley Extract, Baking Socia, Sat. Natural Vitamin E (Mixed Tocopherois (Soy)), Vitamin C.	Carilland Descent Col. STORE	DIST & SOLD EXCLUSIVELY BY TRADER JOE'S, MONROVA, GA 91016 CERTERIO
and shipping.	Contains wheat and soy. Made in a pearut-tree facility.	CONTAINS WHEAT, MAY CONTAIN TRACES OF THEE MUTS & SOT.	The product is certified arguest in the Weakingtone frame of adjustment of adjustments is assumations with the arguest considering of the U.S. Department of Agriculture	Contains wheat and soy. Made on equipment that also processes milk, almonds and hatelogis.	Contra America Science (CA)	CERTIFIED ORGANIC BY OUALITY ASSUMANCE INTERNATIONAL (200) THIS PRODUCT IS SOLD BY WART WIT
A STATE OF THE REAL OF	a Weetable North America Company 20 Cameron Street, Clinton, MA 01510 www.BarbarasBakery.com	DIST. & SOLD EXCLUSIVELY BY: TRADER JOE'S, MONROVIA, CA 91016	This package is said by weight, not by volume. No can be amounted of proper weight new though some setting of	Distributed by: Barbara's Bakery, Inc.®, a Weetabla North America Company		THIS PRODUCT IS SOLD BY MIGHT NOT MILLINE SOME STITULING OF CONTINUES MAY WHE DOCUMED DURING SHITTING
and the second second second	Product of Canuta CC008 Berbara's Bukery	This product is sold by weight and volume. Bane patting of contents may have accurred during handling and objecting.	anicht if proper weigt som floogh some artifolg of Carterto normally accurs during depreset and familities	20 Cameron Street, Clinton, MA 01510 www.BarbarasBakery.com Product of Canada		
			3594258109	C2008 Barbara's Bakery		009213316



Towards a privacy "nutrition label"

- Standardized format
 - People learn where to find answers
 - Facilitates policy comparisons
- Standardized language
 - People learn terminology
- Brief
 - People find info quickly
- Linked to extended view
 - Get more details if needed

Shredger String Size 1-1/4 (Servings Per Conta Servings Per Conta Calories Calories Calories from Fat Total Fat 2.5g'	Fac Cup (2 oz iner Abo	Cts z/55g) but 12 th 12 Cup Fortified Skim Milk 260 25	
Saturated Fat 0.5g	4% 2%	4% 2%	
Trans Fat 0g			
Cholesterol Omg	0%	1%	
Sodium 250mg	10%	12%	
Potassium 180mg Total	5%	11%	
Carbohydrate 42g	14%	16%	
Dietary Fiber 5g	20%	20%	
Soluble Fiber 2g			
Insoluble Fiber 3g			
Sugars 11g Protein 6g			
Protein og			
Vitamin A	0%	6%	
Vitamin C	35%	35%	
Calcium Iron	2% 10%	15% 10%	
Vitamin E	8%	8%	
Thiamin	10%	15%	
Riboflavin	4%	10%	
Niacin	6%	6%	
Phosphorus	15%	30%	
Magnesium	15%	20%	
Zinc Copper	10%	10%	
 Amount in cereal. One h contributes an additional sodium, 200mg potassiu (6g sugars), and 4g prot Percent daily values are calorie diet. Your daily va or lower depending on y Calories: 	half cup skir I 40 calorie Im, 6g carb tein. I based on a alues may b	m milk s, 65mg ohydrate a 2,000 be higher	
Total Fat Less Than	65g	80g	
Sat Fat Less Than Cholesterol Less Than	20g 300mg	25g 300mg	
Sodium Less Than Potassium	2,400mg 3,500mg	2,400mg 3,500mg	
Total Carbohydrate Dietary Fiber	300g 25g	375g 30g	
Calories per gram: Fat 9 • Carbohydrate		Protein 4	
Ingredients: Whole Oat Flour, Unsulphured Molas Extract, Baking Soda, Sah (Mixed Tocopherols [Soy Contains wheat and so equipment that also pro-	Flour, Who sses, Malte t, Natural \ /]), Vitamin y. Made o occesses n	le Wheat ed Barley /itamin E n C. n	
almonds and hazelnuts Distributed by: Barbara a Weetabix North Ame 20 Cameron Street, Clir www.BarbarasBakery.co	i's Bakery rica Comp nton, MA (bany	

	TRADER JOE'S®
H	Organic IGH FIBER O'S
	Nutrition Facts
	Serving Size 1 1/4 cup (55g) Servings per Container 8
	Amount per Serving
	Calories 190 Calories from Fat 10
	% Daily Value*
	Total Fat 1g 2%
	Saturated Fat 0g 0%
	Trans Fat 0g
	Cholesterol Omg 0%
	Sodium 115mg 5%
	Total Carbohydrate 44g 15%
	Dietary Fiber 9g 36%
	Soluble Fiber less than 1g
	Insoluble Fiber 8g
	Sugars 9g
	Protein 6g 12%
	Vitamin A 0% • Vitamin C 130%
	Calcium 4% • Iron 30%
	Thiamin 25% • Riboflavin 25%
	Niacin 25% • Vitamin B6 25%
	Folate 25% • Vitamin B12 25%
	Zinc 15%
	 Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:
	Calories 2,000 2,500 Total Fat Less than 65g 80g
	Sat Fat Less than 20g 25g
	Cholesterol Less than 300mg 300mg Sodium Less than 2,400mg 2,400mg
	Total Carbohydrate 300g 375g Dietary Fiber 25g 30g
	Protein 50g 65g
INGR	EDIENTS: Organic Whole Grain Whea
Flour	r, Organic Wheat Bran, Organic Evaporated
Cane	Juice, Organic Oat Fiber, Sea Salt, Organic
NUTE	amel Color, Natural Vitamin E RITION BLEND: Niacinamide, Vitamin C
Niac	in, Iron, Zinc, Vitamin B6, Riboflavin
Thia	min, Folate, Vitamin B12.
Our v tices	rendors follow Good Manufacturing Prac to segregate ingredients to avoid cross

Our vendors follow Good Manufacturing Practices to segregate ingredients to avoid cross contact with allergens. Made on shared equipment with milk, tree nuts & soy. Facility processes eggs & peanuts.

Dist. & Sold Exclusively By: Trader Joe's, Monrovia, CA 91016 Certified Organic by Quality Assurance International (OAI).



Iterative design process

- Series of studies
 - Focus groups
 - Lab studies
 - Online studies
- Metrics
 - Reading-comprehension (accuracy)
 - Time to find information
 - Ease of policy comparison
 - Subjective opinions, ease, fun, trust
- P.G. Kelley, J. Bresee, L.F. Cranor, and R.W. Reeder. A "Nutrition Label" for Privacy. SOUPS 2009.
- P.G. Kelley, L.J. Cesca, J. Bresee, and L.F. Cranor. Standardizing Privacy Notices: An Online Study of the Nutrition Label Approach. CHI2010.



Privacy label for Android



DESCRIPTION

Like word games? Like weasels? This is the game for you. Word Weasel is a fast word game where you find as many words as you can from 9 letters in 50 seconds. Compete with everyone else playing at the same time, a new game starts every minute!

"The most fun you can have on your own with 9 random letters. Brilliantly simple, devilishly addictive." --Kim, Android Market comment



comment

Ad supported, with ability to upgrade to adfree full version in game.

Uses the SOWPODS word list containing 100,000+ words. They may be obscure, but yes those are words!

Privacy Facts

THIS APP COLLECTS YOUR
Personal information
Contacts
Location

Credit card / financial

21

- Diet / nutrition
- Health / medical
- Photos

THIS APP USES

Calendars

Analytics

REVIEWS



Privacy lcons

http://www.azarask.in/blog/post/privacy-icons/

2010



Your Data is Used Only for the Intended Use



Your data is never bartered or sold.



Your Data May be Used for Purposes You Do Not Intend



Your data may be bartered or sold.



Your data is never given to advertisers.



Site gives your data to advertisers.



Data is given to law enforcement only when legal process is followed.



Data may be given to law enforcement even when legal process is not followed.



More on privacy and privacy notices coming March 16

Homework 1 presentations