No Cookies for You!: Evaluating the Promises of Big Tech's 'Privacy-Enhancing' Techniques.

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February 6, 2024

I. Expanded Results

A. Use of Inferences versus Raw Data - by data type

For section 1 of the results,[4] we compared the use of inferences versus raw data for specific data types in Figures 4a-e in the main article. For example, Figure 4a shows the average rating (degree scenario is OK) for different uses of knowledge for location data (Survey 1) compared to inferences *drawn from* location data from Survey 2. The averages plotted in Figure 4a "to improve services" are calculated from vignettes where location data is included and used to improve services (Survey 1) as well as where inferences based on location data are used to improve services (Survey 2). A box around location data and inference designates statistically identical averages (based on ttests and p<0.05).

In this appendix, we measure whether the <u>uses</u> of a particular inference/data are statistically different. So, where a box in Figure measures whether inferences v. data statistically differ for a given use, the table measures whether the privacy judgements of the uses of knowledge are statistically different *for a given data/inference.* For example, Table A1 shows that the use of location data to improve services (16.02) is statistically different from the privacy judgment for the use of location data to target ads later online (-36.59; t = -17.1136, p < 0.0001). Similarly, Table A1 also provides the ttests comparing the privacy judgements of different uses of inferences based on location data (across all inferences).

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[3] Professor of Computer Science at Cornell University and Cornell Tech. We will to thank constructive feedback from the participants at the *Privacy Law Scholars Conference (2023),* Digital Life Initiative Workshop at *Cornell Tech*, and SPILab at the *University of Michigan School of Information.*
[4] Original Article, Section II.A.1.

FIGURE A1: Use of location data compared to use of inferences based on location data
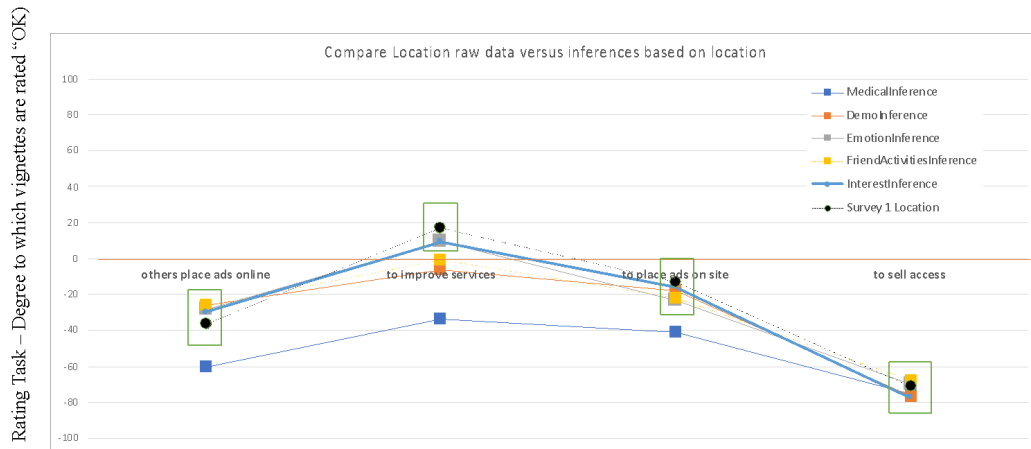

Table A1:   Statistical test comparing average privacy rating for different purposes of using Location Data (Survey 1) and Inferences based on Location Data (Survey 2). N.B. The results show that using location data/inferences to improve services is differentiated from using that same data to place ads on the site. Similarly, placing ads on the site is differentiated from using the data/inferences to target users later online.

Survey 1: Location	Ave	targeted ads later online	improve services	target ads on site	sell access to data
targeted ads later online	-36.59				
improve services	16.93	t = -17.1136 p < 0.0001			
target ads on site	-12.99	t = -7.5241 p < 0.0001	t = 9.0778 p < 0.0001		
sell access to data	-71.19	t = 12.9938 p < 0.0001	t = 31.0235 p < 0.0001	t = 20.3740 p 0.0001	
Survey 2: Location based Inferences	Ave	targeted ads later online	improve services	target ads on site	sell access to data
targeted ads later online	-34.75				
improve services	-4.25	t = --10.4563 p < 0.0001			
target ads on site	-23.84	t = --3.8058 p < 0.0004	t = 6.3103 p < 0.0001		
sell access to data	-73.34	t = 16.4172 p < 0.0001	t = 26.3690 p < 0.0001	t = 19.5335 p < 0.0001	

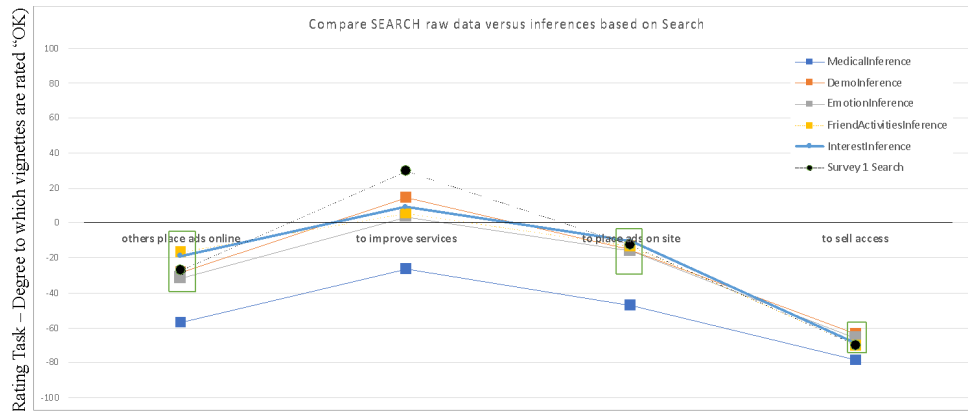FIGURE A2: Use of search data compared to use of inferences based on search data

Table A2: Statistical test comparing average privacy rating for different purposes of using Search Data (Survey 1) and Inferences based on Search Data (Survey 2).N.B. The results show that using search data/inferences to improve services is differentiated from using that same data to place ads on the site. Similarly, placing ads on the site is differentiated from using the data/inferences to target users later online.

Survey 1: Search Data	Ave	targeted ads later online	improve services	target ads on site	sell access to data
targeted ads later online	-27.17				
improve services	29.27	t = -18.5019 p < 0.0001			
target ads on site	-12.84	t = -4.4307 p < 0.0001	t = 13.2545 p < 0.0001		
sell access to data	-70.34	t = 15.4828 p < 0.0001	t = 36.2064 p < 0.0001	t = 19.5181 p 0.0001	
Survey 2: Search Data based Inferences	Ave	targeted ads later online	improve services	target ads on site	sell access to data
targeted ads later online	-30.48				
improve services	1.09	t = -10.4249 p < 0.0001			
target ads on site	-20.40	t = -3.3859 p < 0.0004	t = 7.0419 p < 0.0001		
sell access to data	-69.42	t = 14.6804 p < 0.0001	t = 25.8205 p < 0.0001	t = 18.3193 p < 0.0001	

FIGURE A3: Use of engagement data compared to use of inferences based on engagement data
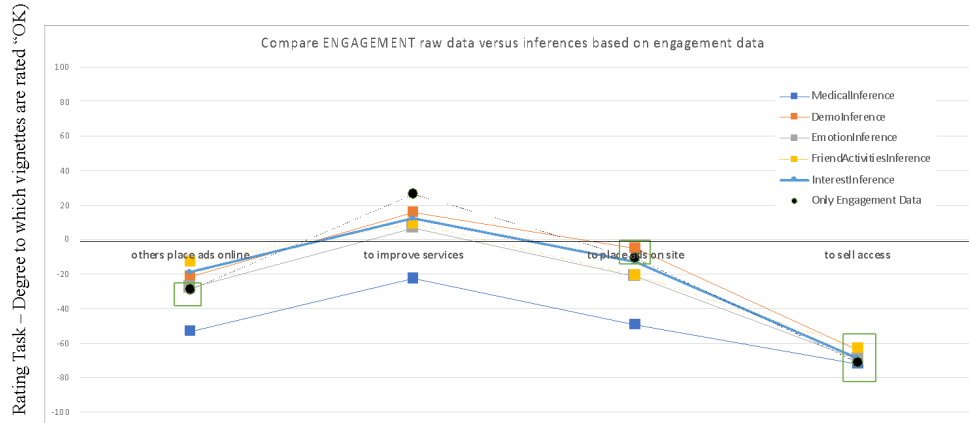

Table A3: Statistical test comparing average privacy rating for different purposes of using Engagement Data (Survey 1) and Inferences based on Engagement Data (Survey 2). N.B. The results show that using engagement data/inferences to improve services is differentiated from using that same data to place ads on the site. Similarly, placing ads on the site is differentiated from using the data/inferences to target users later online.

Survey 1: Engagement **Data**	Ave	targeted ads later online	improve services	target ads on site	sell access to data
targeted ads later online	-28.82				
improve services	26.21	t = -18.0045 p < 0.0001			
target ads on site	-10.84	t = -5.7320 p < 0.0001	t = 11.8610 p < 0.0001		
sell access to data	-71.07	t = 15.5978 p < 0.0001	t = 36.24 p < 0.0001	t = 21.6395 p 0.0001	
Survey 2: Engagement **Data based Inferences**	Ave	targeted ads later online	improve services	target ads on site	sell access to data
targeted ads later online	-26.94				
improve services	5.24	t = -10.9086 p < 0.0001			
target ads on site	-22.01	t = -1.7378 p < 0.04	t = 9.1002 p < 0.0001		
sell access to data	-67.54	t = 15.5844 p < 0.0001	t = 26.2642 p < 0.0001	t = 17.2521 p < 0.0001	

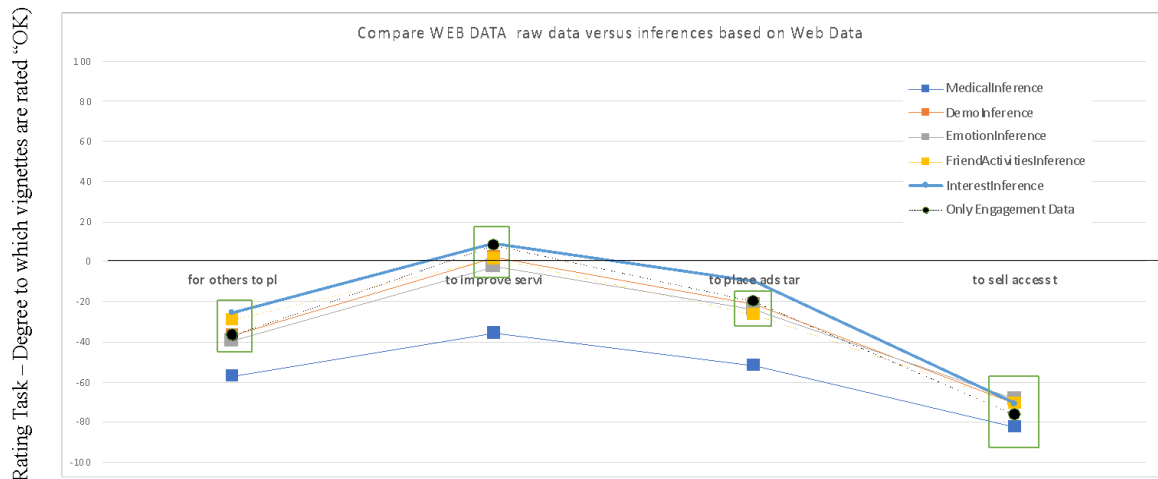Figure A4: Use of web history data v. inferences based on web history data

Table A4: Statistical test comparing average privacy rating for different purposes of using Web History Data (Survey 1) and Inferences based on Web History Data (Survey 2).N.B. The results show that using web history data/inferences to improve services is differentiated from using that same data to place ads on the site. Similarly, placing ads on the site is differentiated from using the data/inferences to target users later online.

Survey 1: Web History **Data**	Ave	targeted ads later online	improve services	target ads on site	sell access to data
targeted ads later online	-36.89				
improve services	8.29	t = -14.2509 p < 0.0001			
target ads on site	-19.75	t = -5.5265 p < 0.0001	t = 8.7426 p < 0.0001		
sell access to data	-76.56	t = 15.6084 p < 0.0001	t = 31.4496 p < 0.0001	t = 21.7440 p 0.0001	
Survey 2: Web History **Data based Inferences**	Ave	targeted ads later online	improve services	target ads on site	sell access to data
targeted ads later online	-37.11				
improve services	-5.05	t = -10.9527 p < 0.0001			
target ads on site	-26.88	t = -3.5609 p = 0.0002	t = 7.0279 p < 0.0001		
sell access to data	-72.85	t = 14.4746 p < 0.0001	t = 25.1316 p < 0.0001	t = 17.5224 p < 0.0001	

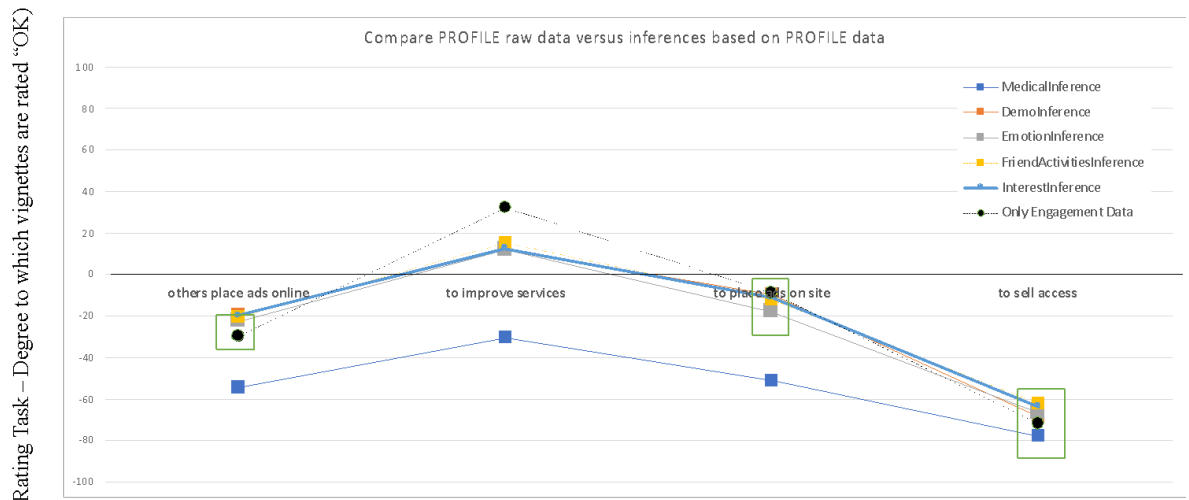Figure A5: Use of profile data v. inferences based on profile data

Table A5: Statistical test comparing average privacy rating for different purposes of using Profile Data (Survey 1) and Inferences based on Profile Data (Survey 2). N.B. The results show that using profile data/inferences to improve services is differentiated from using that same data to place ads on the site. Similarly, placing ads on the site is differentiated from using the data/inferences to target users later online.

Survey 1: Profile Data	Ave	targeted ads later online	improve services	target ads on site	sell access to data
targeted ads later online	-29.76				
improve services	32.40	t = -20.0428 p < 0.0001			
target ads on site	-8.64	t = -6.5262 p < 0.0001	t = 13.2467 p < 0.0001		
sell access to data	-71.71	t = 15.2990 p < 0.0001	t = 39.6183 p < 0.0001	t = 22.8500 p 0.0001	
Survey 2: Profile Data based Inferences	Ave	targeted ads later online	improve services	target ads on site	sell access to data
targeted ads later online	-27.73				
improve services	3.52	t = -10.1662 p < 0.0001			
target ads on site	-19.77	t = -2.5387 p = 0.0056	t = 7.2811 p < 0.0001		
sell access to data	-68.00	t = 14.7453 p < 0.0001	t = 25.4571 p < 0.0001	t = 16.9944 p < 0.0001	

B.   *Use of Inferences versus Raw Data – by contextual actor*

We next turn to measure whether the use of inferences or raw data by each contextual actor for different purposes is statistically significant (Figures A6-A8).   For example, Figure A6 shows the average privacy judgment for a search site using raw data (including search terms, location, browsing history, profile data) or inferences (any inferences) for each purpose or use. The box around two points means the averages are statistically the same (no significant difference).   The table shows whether the different uses of knowledge are statistically different using a ttest.

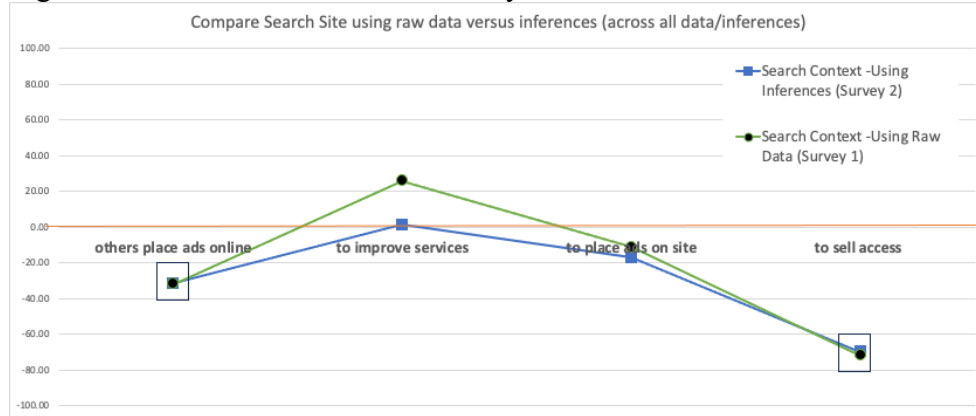Figure A6: Use of data v. inferences by a Search Site.

Table A6:   Statistical test comparing average privacy rating for different purposes of using Data (Survey 1) v Inferences for Search Context (Survey 2). Table A6 shows that the use of data to place ads later online or on the site is a privacy violation and differentiated from improving services for both raw data and inferences for Search Context.

Survey 1: Search Cxt using raw data	Ave	targeted ads later online	improve services	target ads on site	sell access to data
targeted ads later online	-31.86				
improve services	25.78	t = -18.5396 p < 0.0001			
target ads on site	-11.46	t = -6.4158 p < 0.0001	t = 11.4445 p < 0.0001		
sell access to data	-72.00	t = 15.1270 p < 0.0001	t = 36.0082 p < 0.0001	t = 21.5668 p < 0.0001	
Survey 2: Search Cxt using Inferences	Ave	targeted ads later online	improve services	target ads on site	sell access to data
targeted ads later online	-31.53				
improve services	1.21	t = -10.9854 p < 0.0001			
target ads on site	-17.13	t = -4.8920 p < 0.0001	t = 5.8065 p < 0.0001		
sell access to data	-70.09	t = 15.5405 p < 0.0001	t = 26.5224 p < 0.0001	t = 20.1440 p < 0.0001	

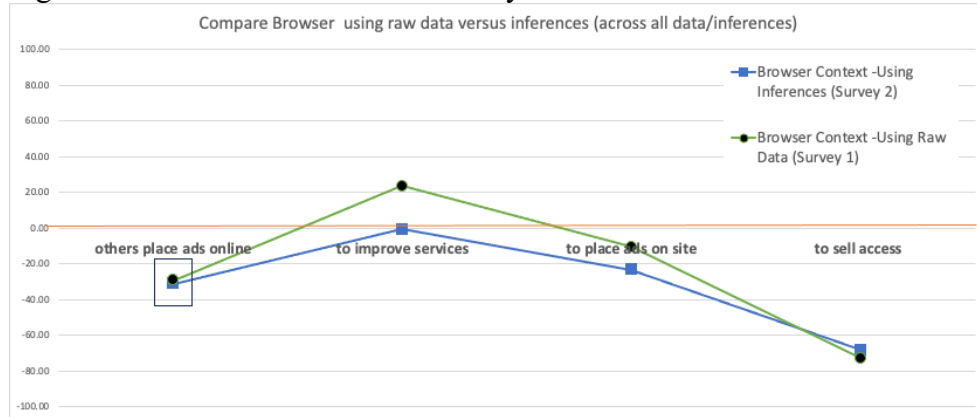Figure A7: Use of data v. inferences by a Browser.

Table A7:   Statistical test comparing average privacy rating for different purposes of using Data (Survey 1) v Inferences for Browser Context (Survey 2). Table A7 shows that the use of data to place ads later online or on the site is a privacy violation and differentiated from improving services for both raw data and inferences for Browser Context.

Survey 1: Browser Cxt using raw data	Ave	targeted ads later online	improve services	target ads on site	sell access to data
targeted ads later online	-29.28				
improve services	23.29	t = -16.6083 p < 0.0001			
target ads on site	-10.69	t = -5.7847 p < 0.0001	t = 10.4679 p < 0.0001		
sell access to data	-72.82	t = 15.9359 p < 0.0001	t = 34.6440 p < 0.0001	t = 21.8295 p < 0.0001	
Survey 2: Browser Cxt using Inferences	Ave	targeted ads later online	improve services	target ads on site	sell access to data
targeted ads later online	-31.37				
improve services	-0.75	t = -10.1726 p < 0.0001			
target ads on site	-23.50	t = - -2.6693 p = 0.0038	t = 7.3745 p < 0.0001		
sell access to data	-68.48	t = 14.1954 p < 0.0001	t = 24.4518 p < 0.0001	t = 16.8035 p < 0.0001	

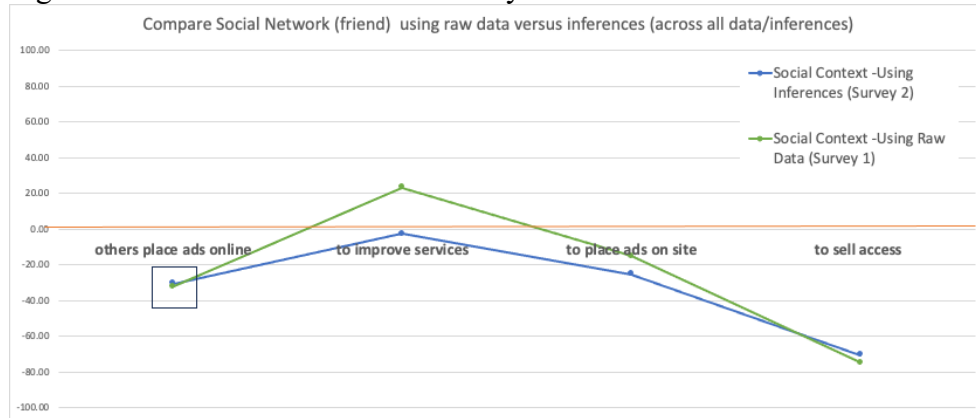Figure A8: Use of data v. inferences by a Social Network Context..

Table A8: Statistical test comparing average privacy rating for different purposes of using Data (Survey 1) v Inferences for Browser Context (Survey 2). Table A8 shows that the use of data to place ads later online or on the site is a privacy violation and differentiated from improving services for both raw data and inferences for Social Network Context.

Survey 1: Social Cxt using raw data	Ave	targeted ads later online	improve services	target ads on site	sell access to data
targeted ads later online	-32.13				
improve services	23.17	t = -17.7615 p < 0.0001			
target ads on site	-15.40	t = -5.2166 p < 0.0001	t = 12.2120 p < 0.0001		
sell access to data	-74.77	t = 16.0704 p < 0.0001	t = 36.8955 p < 0.0001	t = 21.9647 p < 0.0001	
Survey 2: Social Cxt using Inferences	Ave	targeted ads later online	improve services	target ads on site	sell access to data
targeted ads later online	-30.61				
improve services	-2.65	t = -9.4469 p < 0.0001			
target ads on site	-25.43	t = -1.7675 p < 0.0001	t = 7.4325 p < 0.0001		
sell access to data	-70.55	t = 15.3531 p = 0.0387	t = 24.8971 p < 0.0001	t = 16.8006 p < 0.0001	

C. Use of Inferences versus Raw Data – special cases

We also examined five specific cases common in practice (Figures A9-A13):

- The collection of search data by search engines
- The collection of location data by search engines
- The collection of engagement data by social networks
- The collection of web history data by browsers
- The collection of location data by news sites

The results are in Figures A9-A13 with the corresponding Tables (A9-A13) with ttests. The figures illustrate whether respondents differentiated between the use of raw data (e.g., search terms for the search engine in Figure A9) versus inferences (e.g., inferences based on search terms for the search engine) for different uses of that data. A box around points means that the rating for the use of raw data is statistically equivalent to the use of inferences based on that data for a given use. For the search engine context (Figure A9), the use of search term data to improve services is positive (+38.25) and statistically the same as using demographic inferences based on search terms to improve services. However, respondents rated other inferences statistically lower at being "OK" than search terms for improving services. On the other hand, the use of search terms and most inferences are considered a privacy violation if used for others to place ads while later online.

A few key points

- The use of search terms to place ads on a search engine is rated neutrally (ave = 1.10) however the use of inferences based on browsing history to place ads on the search site is negative (in Figure A9b).

Figure A9a: Rating Average for Use of Search Data versus Inferences by Search Engine
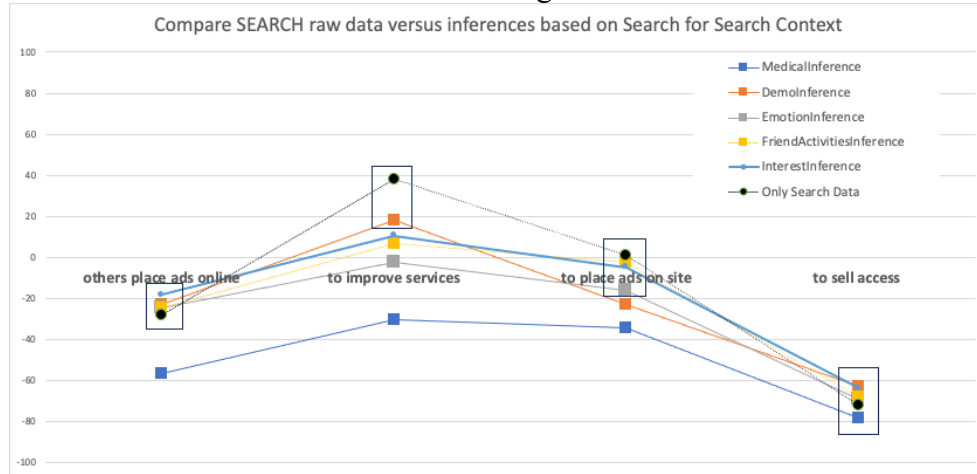

Table A9: Statistical test comparing average privacy rating for different purposes of using Search Data (Survey 1) and Inferences based on Search Data (Survey 2) by a Search Website. Table A9 shows that the use of search data to place ads later online is a privacy violation and differentiated from improving services for both raw data and inferences for a Search site.

Survey 1: Search Data	Ave	targeted ads later online	improve services	target ads on site	sell access to data
targeted ads later online	-27.92				
improve services	38.25	t = -9.4826 p < 0.0001			
target ads on site	1.10	t = -4.1138 p < 0.0001	t = 4.9004 p < 0.0001		
sell access to data	-72.33	t = 8.0040 p < 0.0001	t = 18.6550 p < 0.0001	t = 11.9132 p < 0.0001	
Survey 2: Search Data based Inferences	Ave	targeted ads later online	improve services	target ads on site	sell access to data
targeted ads later online	-30.28				
improve services	-0.71	t = -4.3132 p < 0.0001			
target ads on site	-16.69	t = -2.0318 p = 0.02	t = 2.3077 p = 0.01		
sell access to data	-69.07	t = 6.5788 p < 0.0001	t = 11.0383 p < 0.0001	t = 8.7423 p < 0.0001	

Figure A9b: Privacy Judgments of Search Term Data versus Inferences
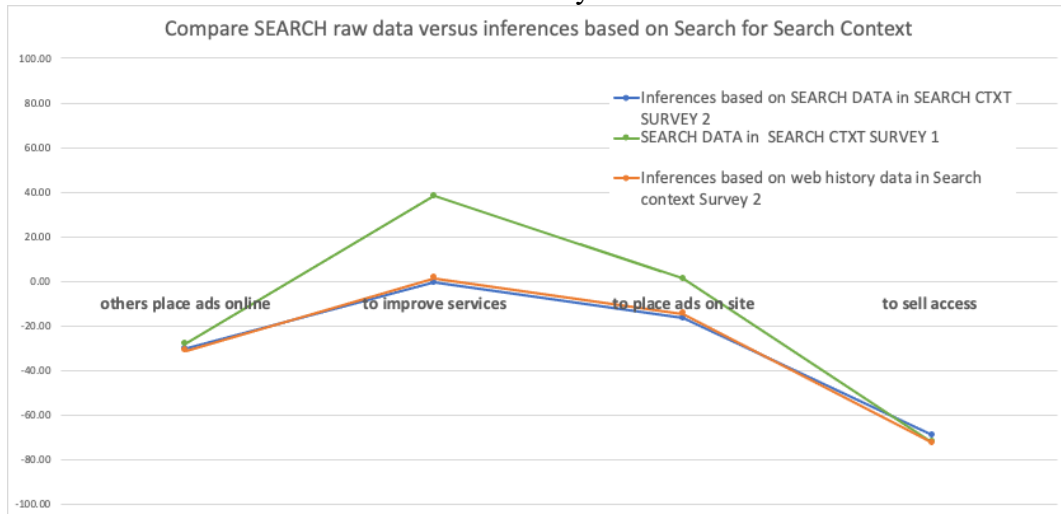based on Search Data or Web History within Search Context

Figure A9b shows that the use of search term data for either improving services on a search site or even placing ads on the site is considered ok or not a privacy violation. However, the use of inferences based on search terms or web history for placing ads on the site or later when online are considered privacy violations.

FIGURE A10: Rating Average for Use of Location Data versus Inferences by Search Engine
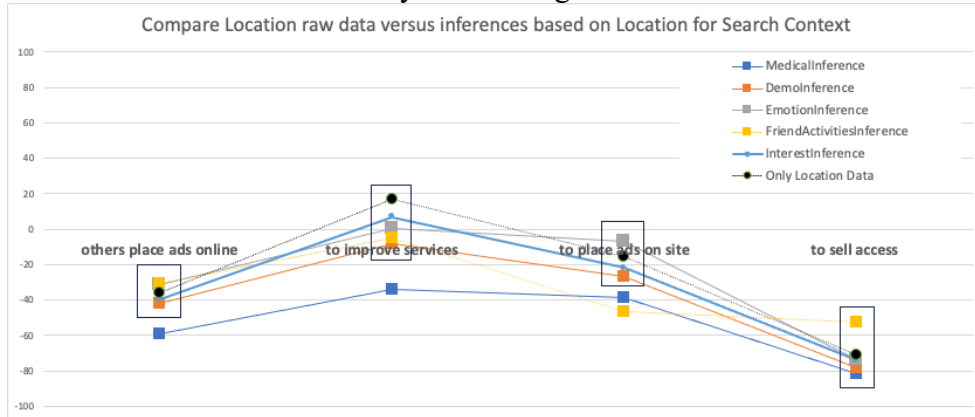
Table A10: Statistical test comparing average privacy rating for different purposes of using Location Data (Survey 1) and Inferences based on Location Data (Survey 2) by a Search Website. Table A10 shows that the use of search data to place ads later online is a privacy violation and differentiated from improving services for both raw data and inferences for a Search site.

Survey 1: Location **Data**	Ave	targeted ads later online	improve services	target ads on site	sell access to data
targeted ads later online	-35.60				
improve services	16.93	t = -7.6761 p < 0.0001			
target ads on site	-15.33	t = -2.8741 p < 0.0001	t = 4.9004 p < 0.0001		
sell access to data	-70.97	t = 5.8704 p < 0.0001	t = 13.9703 p < 0.0001	t = 8.5294 p < 0.0001	
Survey 2: Location- **Data based Inferences**	Ave	targeted ads later online	improve services	target ads on site	sell access to data
targeted ads later online	-42.57				
improve services	-8.33	t = -5.1884 p < 0.0001			
target ads on site	-28.83	t = -2.1319 p = 0.0169	t = 2.9122 p = 0.0019		
sell access to data	-72.33	t = 5.7704 p < 0.0001	t = 10.9297 p < 0.0001	t = 7.7217 p < 0.0001	

FIGURE A11: Rating Average for Use of Engagement Data versus
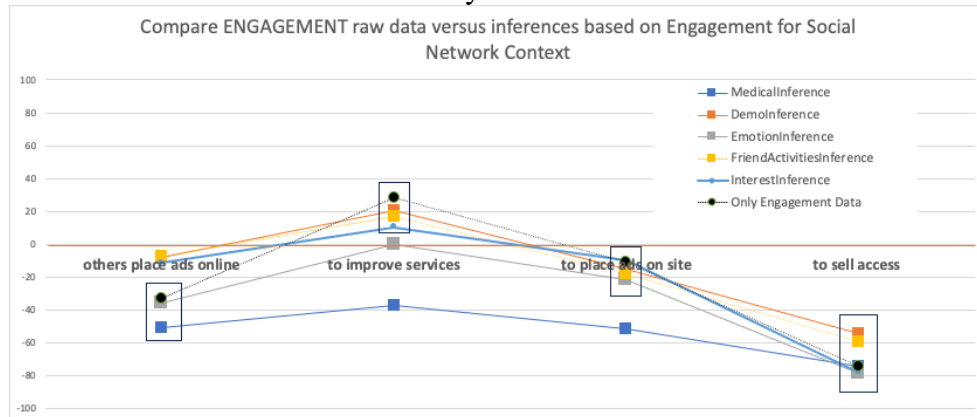Inferences by Social Network

Table A11:   Statistical test comparing average privacy rating for different
purposes of using Engagement Data (Survey 1) and Inferences based on
Engagement Data (Survey 2) by a Social Network Website.   Table A11
shows that the use of engagement data to place ads later online is a privacy
violation and differentiated from improving services for both raw data and
inferences for a Social Network site.

Survey 1: Engagement **Data**	Ave	targeted ads later online	improve services	target ads on site	sell access to data
targeted ads later online	-32.82				
improve services	28.51	t = -9.2146 p < 0.0001			
target ads on site	-11.08	t = -3.1973 p = 0.0008	t = 5.8885 p < 0.0001		
sell access to data	-74.47	t = 7.0872 p < 0.0001	t = 17.8806 p < 0.0001	t = 10.6614 p < 0.0001	
Survey 2: Engagement- **Data based Inferences**	Ave	targeted ads later online	improve services	target ads on site	sell access to data
targeted ads later online	-24.04				
improve services	2.85	t = -3.9674 p < 0.0001			
target ads on site	-23.56	t = --0.0740 p = 0.525	t = 3.8368 p = 0.0001		
sell access to data	-68.90	t = 7.6092 p < 0.0001	t = 11.4491 p < 0.0001	t = 7.5562 p < 0.0001	

FIGURE A12: Rating Average for Use of Web Activity Data versus Inferences by Browser
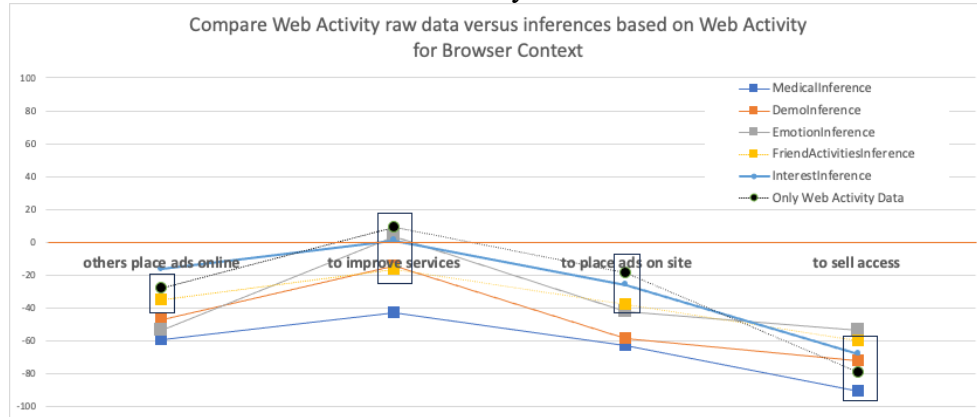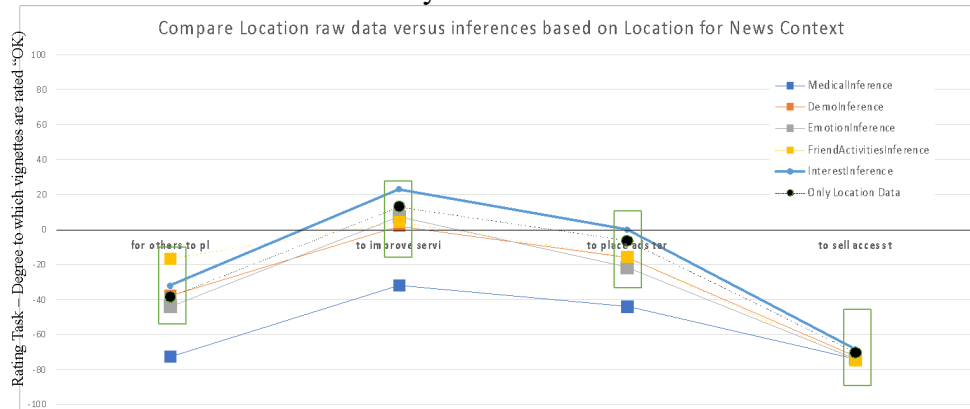

Table A12:   Statistical test comparing average privacy rating for different purposes of using Web Activity Data (Survey 1) and Inferences based on Web Activity Data (Survey 2) by a Browser. Table A12 shows that the use of web activity data to place ads later online is a privacy violation and differentiated from improving services for both raw data and inferences for a Browser.

Survey 1: Web Activity **Data**	Ave	targeted ads later online	improve services	target ads on site	sell access to data
targeted ads later online	-28.17				
improve services	8.79	t = -5.1809 p < 0.0001			
target ads on site	-18.62	t = -1.3224 p = 0.0936	t = 3.9052 p = 0.0001		
sell access to data	-79.48	t = 9.0451 p < 0.0001	t = 15.8155 p < 0.0001	t = 10.7016 p < 0.0001	
Survey 2: Web Activity- **Data based Inferences**	Ave	targeted ads later online	improve services	target ads on site	sell access to data
targeted ads later online	-41.64				
improve services	-15.10	t = -4.0194 p < 0.0001			
target ads on site	-42.56	t = 0.1468 p = 0.44417	t = 4.0533 p = 0.0001		
sell access to data	-69.57	t = 4.9016 p < 0.0001	t = 8.7634 p < 0.0001	t = 4.6441 p < 0.0001	

FIGURE A13: Rating Average for Use of Location Data versus Inferences by News Site

Table A13:   Statistical test comparing average privacy rating for different purposes of using Web Activity Data (Survey 1) and Inferences based on Web Activity Data (Survey 2) by a Browser. Table A13 shows that the use of web activity data to place ads later online is a privacy violation and differentiated from improving services for both raw data and inferences for a Browser.

Survey 1: Web Activity **Data**	Ave	targeted ads later online	improve services	target ads on site	sell access to data
targeted ads later online	-38.47				
improve services	13.04	t = 5.5475 p < 0.0001			
target ads on site	-6.36	t = 2.6146 p = 0.0047	t = 3.9052 p = 0.0001		
sell access to data	-70.45	t = 9.0451 p < 0.0001	t = 13.1533 p < 0.0001	t = 10.4239 p < 0.0001	
Survey 2: Web Activity- **Data based Inferences**	Ave	targeted ads later online	improve services	target ads on site	sell access to data
targeted ads later online	-40.22				
improve services	1.79	t = -6.4432 p < 0.0001			
target ads on site	-20.37	t = -3.0367 p = 0.0013	t = 3.2108 p = 0.0007		
sell access to data	-72.88	t = 6.2062 p < 0.0001	t = 12.9500 p < 0.0001	t = 9.2857 p < 0.0001	

D.   *Use of Inferences versus Raw Data – by data brokers.*

FIGURE A14: Comparing privacy judgments about data brokers collecting location data versus inferences based on location data.
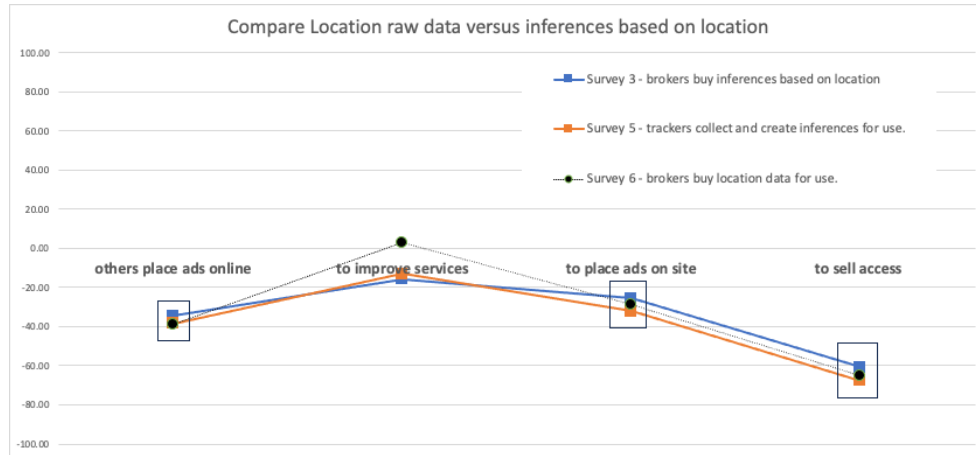

Table A14:   Statistical test comparing average privacy rating for different purposes of using Location Data (Survey 6) and Inferences based on Location Data (Survey 3 and 5) for data brokers.

	Survey 6 - brokers buy location data for use.	Survey 3 - brokers buy inferences based on location	Survey 5 - trackers collect and create inferences for use.	6 v. 5	6 v 3
targeted ads later online	-38.99	-34.35	-38.43	t = 1.6957 p = 0.0451	t = 0.2079 p = .41
improve services	2.95	-15.80	-12.94	t = -6.0884 p < 0.0001	t = -4.9452 p < 0.0001
target ads on site	-28.55	-25.64	-32.09	t = 1.0002 p = 0.1587	t = -1.2102 p = 0.1132
sell access to data	-64.84	-60.71	-67.72	t = 1.7512 p = 0.0400	t = -1.2507 p = 0.1057

FIGURE A15: Comparing privacy judgments about data brokers collecting search data versus inferences based on search term data.
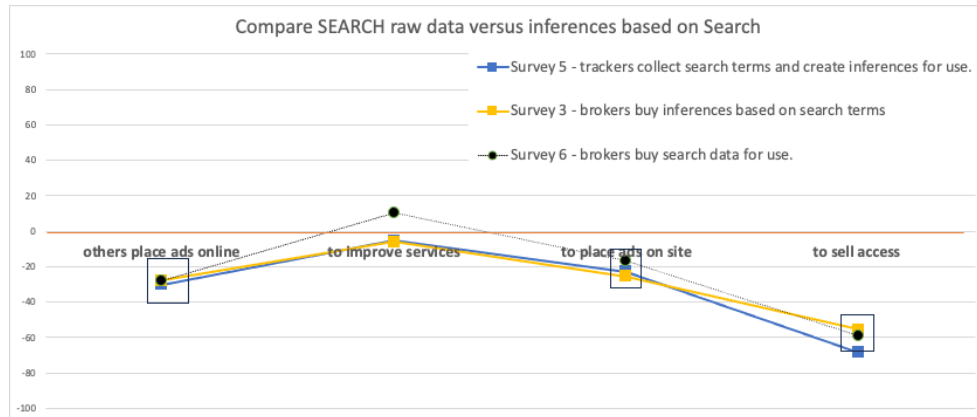

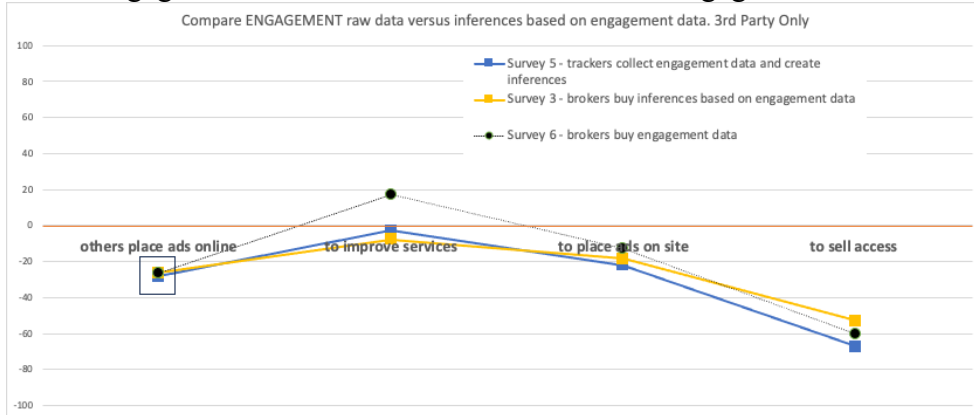Table A15: Statistical test comparing average privacy rating for different purposes of using search term Data (Survey 6) and Inferences based on search term Data (Survey 3 and 5) for data brokers.

	Survey 6 - brokers buy search data for use.	Survey 3 - brokers buy inferences based on search	Survey 5 - trackers collect and create inferences for use.	6 v. 5	6 v 3
targeted ads later online	-28.23	-27.87	-29.94	t = -0.5856 p = .2791	t = 0.1242 p = 0.451
improve services	10.58	-5.91	-5.32	t = -5.1336 p < 0.0001	t = -5.3537 p < 0.0001
target ads on site	-16.47	-25.39	-22.98	t = -2.1144 p = 0.0173	t = -2.9697 p = 0.0015
sell access to data	-58.68	-55.57	-68.30	t = -4.1547 p < 0.0001	t = 1.2551 p = 0.1048

FIGURE A16: Comparing privacy judgments about data brokers collecting engagement data versus inferences based on engagement data.

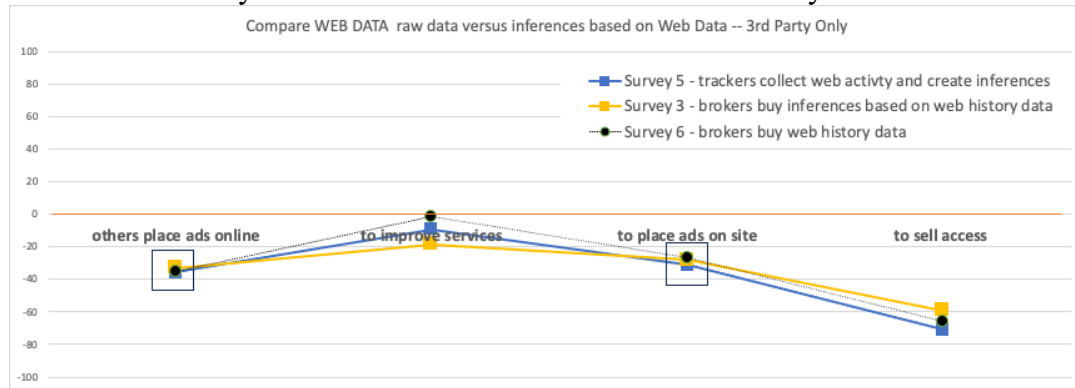Table A16: Statistical test comparing average privacy rating for different purposes of using engagement Data (Survey 6) and Inferences based on engagement Data (Survey 3 and 5) for data brokers.

	Survey 6 - brokers buy engagement data for use.	Survey 3 - brokers buy inferences based on engagement	Survey 5 - trackers collect and create inferences for use.	6 v. 5	6 v 3
targeted ads later online	-26.46	-26.23	-28.19	t = -0.6142 p = .2696	t = 0.0780 p = 0.4689
improve services	16.80	-7.83	-2.90	t = -6.3239 p < 0.0001	t = -8.2162 p < 0.0001
target ads on site	-12.76	-18.44	-21.96	t = -3.0983 p = 0.0010	t = --1.9006 p = 0288
sell access to data	-59.99	-52.94	-67.42	t = -3.1706 p < 0.0001	t = 2.7624 p = 0.0029

FIGURE A17: Comparing privacy judgments about data brokers collecting web history data versus inferences based on web history data.
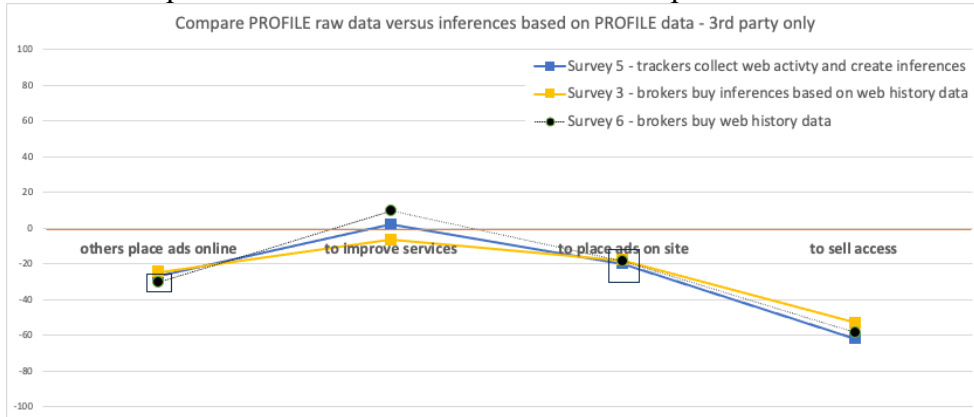

Table A17: Statistical test comparing average privacy rating for different purposes of using web history Data (Survey 6) and Inferences based on web history Data (Survey 3 and 5) for data brokers.

	Survey 6 - brokers buy web history data for use.	Survey 3 - brokers buy inferences based on web history	Survey 5 - trackers collect and create inferences for use.	6 v. 5	6 v 3
targeted ads later online	-34.97	-33.31	-35.69	t = -0.2531 p = .4001	t = 0.5850 p = 0.2793
improve services	-1.71	-18.69	-9.54	t = -2.4693 p = 0.0068	t = -5.5015 p < 0.0001
target ads on site	-27.08	-28.00	-31.05	t = -1.3265 p = 0.0924	t = -0.3246 p =0.3728
sell access to data	-66.24	-59.29	-71.11	t = -2.2229 p < 0.0132	t = 2.9895 p = 0.0014

FIGURE A18: Comparing privacy judgments about data brokers collecting profile data versus inferences based on profile data.

Table A18: Statistical test comparing average privacy rating for different purposes of using profile Data (Survey 6) and Inferences based on profile Data (Survey 3 and 5) for data brokers.

	Survey 6 - brokers buy profile data for use.	Survey 3 - brokers buy inferences based on profile	Survey 5 - trackers collect and create inferences for use.	6 v. 5	6 v 3
targeted ads later online	-30.47	-24.88	-26.71	t = 1.2758 p = .1011	t = 1.87110 p = 0.0308
improve services	9.23	-6.64	1.67	t = -2.4222 p = 0.0078	t = -5.2261 p < 0.0001
target ads on site	-18.86	-18.29	-20.30	t = -0.4665 p = 3205	t = 0.1851 p =0.5734
sell access to data	-58.65	-53.26	-62.22	t = -1.4397 p < 0.0751	t = 2.1290 5 p = 0.0167

> ### E.   *Third versus First Party Results for Creating/Using Inferences*

We compared first versus third party collecting and using *inferences* by comparing Surveys 2 and 3.

Figure A21: Average rating for the 1st and 3rd party use of inferences across uses for Search.
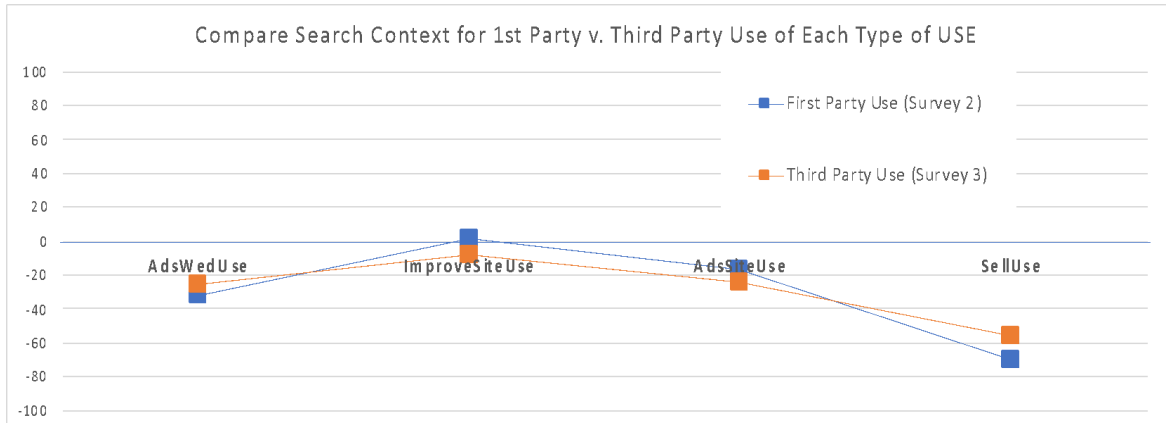

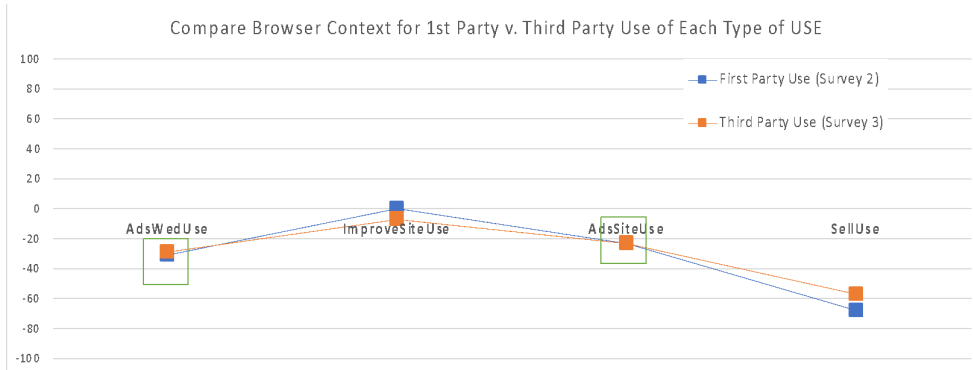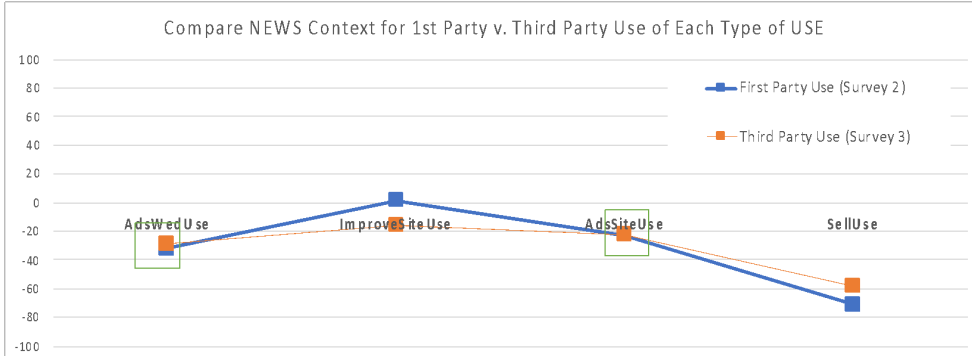Figure A22: Average rating for the 1st and 3rd party use of inferences across uses for Browser.

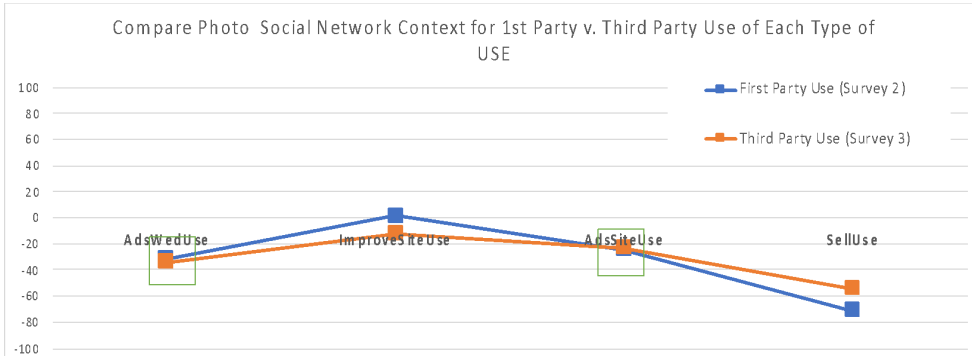Figure A23: Average rating for the 1st and 3rd party use of inferences across uses for News.

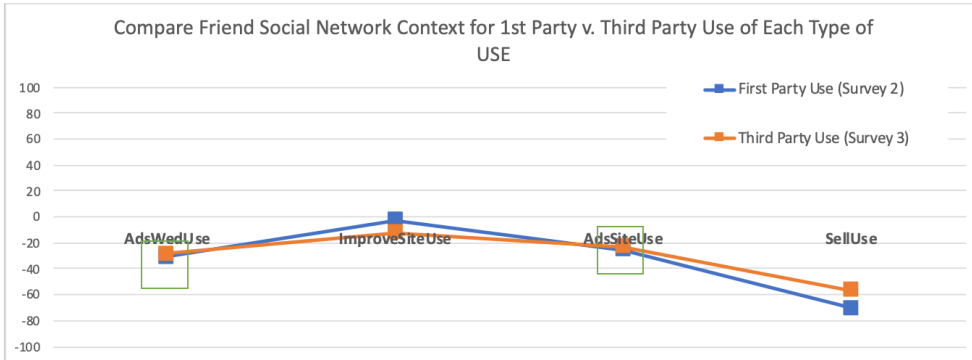Figure A24: Average rating for the 1st and 3rd party use of inferences across uses for Photo Social Network.

Figure A25: Average rating for the 1st and 3rd party use of inferences across uses for Friend Social Network.

F. *Special Cases. – 1ˢᵗ versus 3ʳᵈ Party creating/using inferences*

We examined five specific cases common in practice for first verses third party using *inferences*:

- The collection of search data by search engines
- The collection of location data by search engines
- The collection of engagement data by social networks
- The collection of web history data by browsers
- The collection of location data by news sites

Figure A26: Comparison of First versus Third Party using inferences (Search Data in Search)

Compare First Party (Survey 2) v. Third Party (Survey 3) using inferences based on Search Data in Search Context
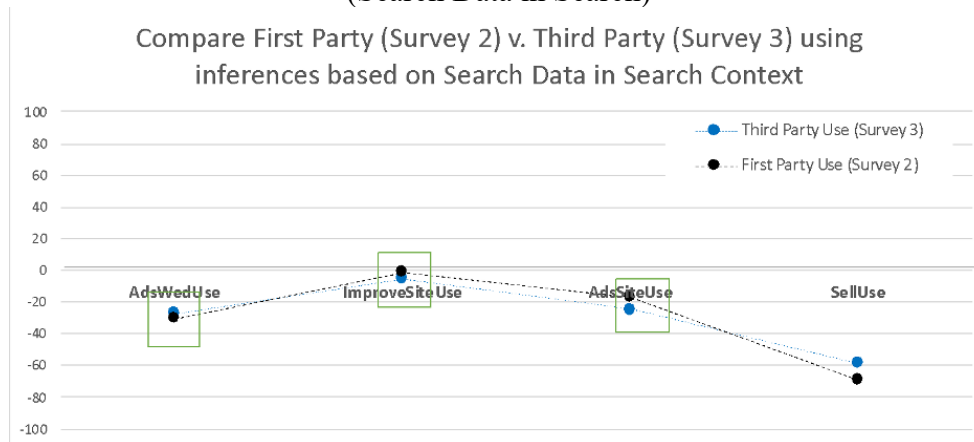
Figure A27: Comparison of First versus Third Party using inferences
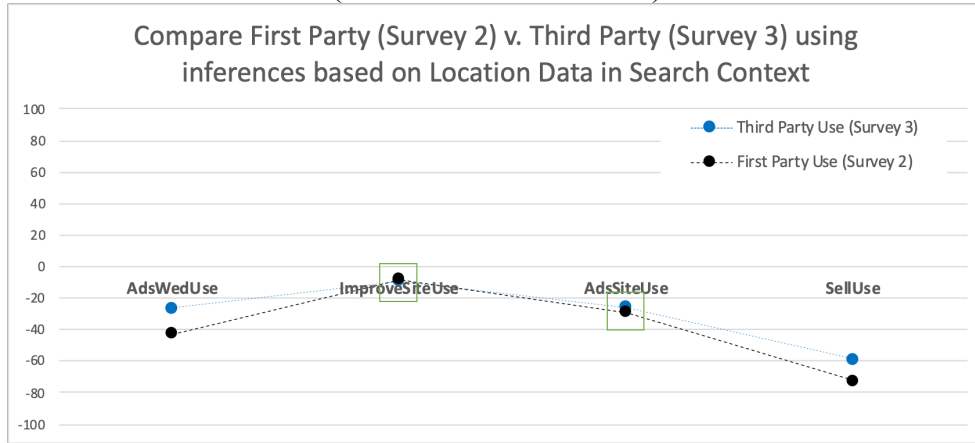(Location Data in Search)

Figure A28: Comparison of Social Network versus Third Party using
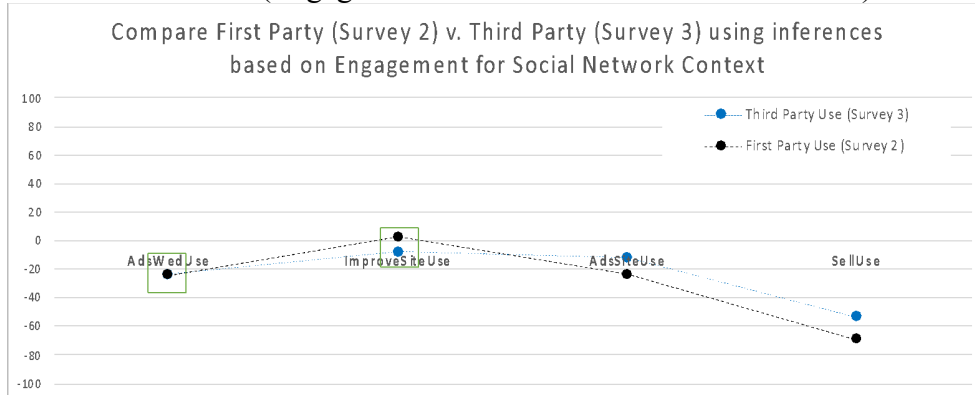inferences (Engagement Data for Social Network Context)

Figure A29: Comparison of Browser versus Third Party using inferences
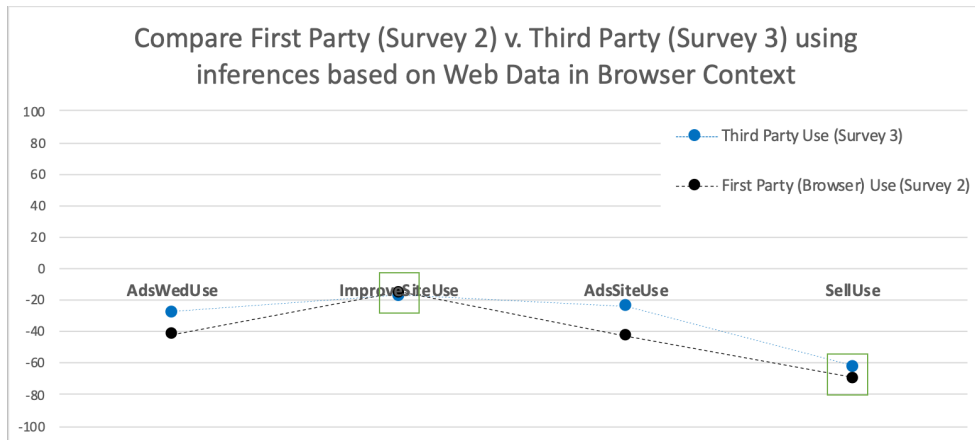based on Web Data

Figure A30: Comparison of First versus Third Party using inferences
(Location Data for News Context)

G. *Third versus First Party Results Collecting/Using Raw Data*

We then repeated the analysis of first versus third party using *raw data* by comparing Surveys 6 (third party) and Survey 1 (first party).

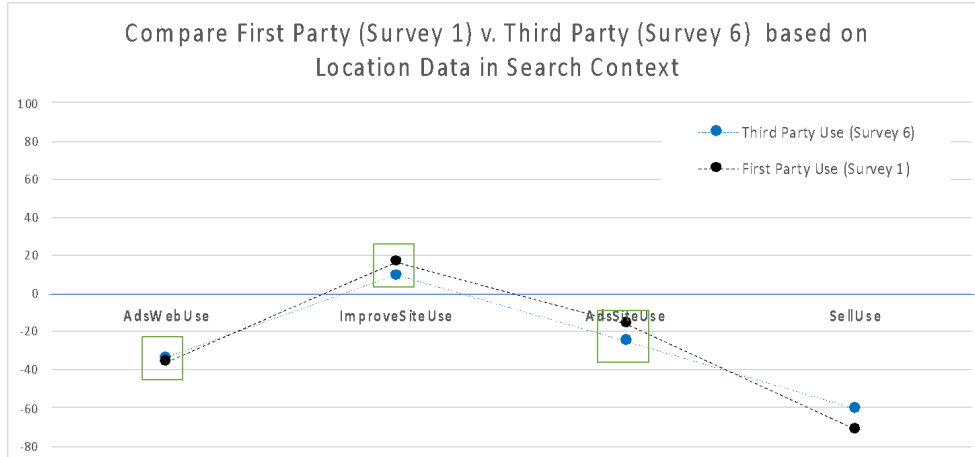Figure A31: Comparison of First versus Third Party using raw data (Location Data for Search Context)

Figure A32: Comparison of First versus Third Party using raw data (Search Data for Search Context)
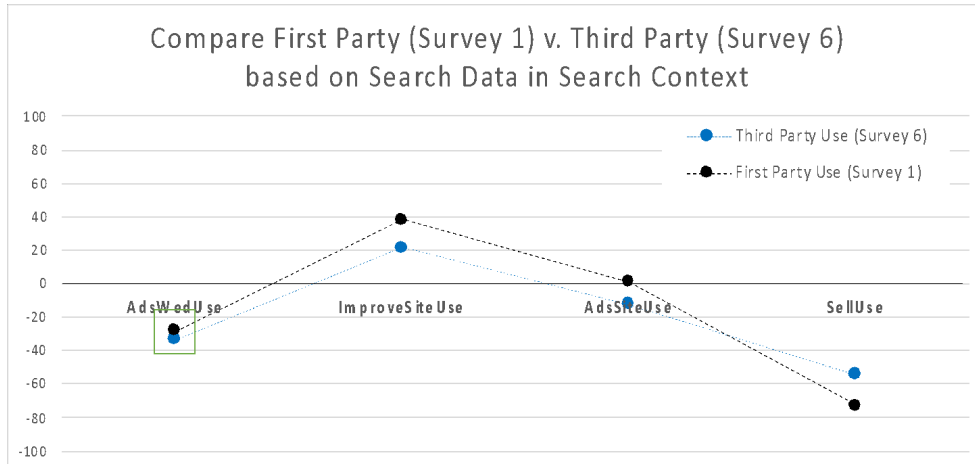
Figure A33: Comparison of First versus Third Party using raw data (Web Data for Browser Context)

Compare First Party (Survey 1) v. Third Party (Survey 6) based on Web History Data in Browser Context

- Third Party Use (Survey 6)
- First Party Use (Survey 1)

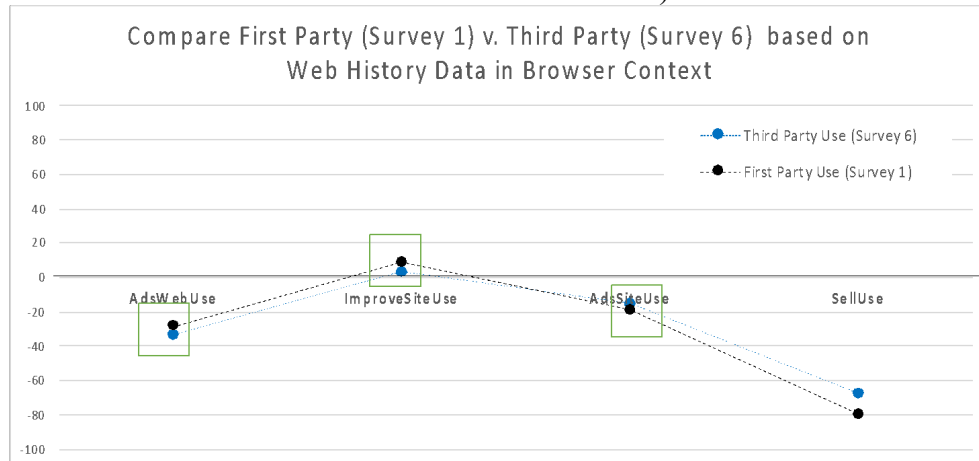Figure A34: Comparison of First versus Third Party using raw data (Engagement Data for Social Network Context)

Compare First Party (Survey 1) v. Third Party (Survey 6) based on Engagement Data in Social Network Context

- Third Party Use (Survey 6)
- First Party Use (Survey 1)
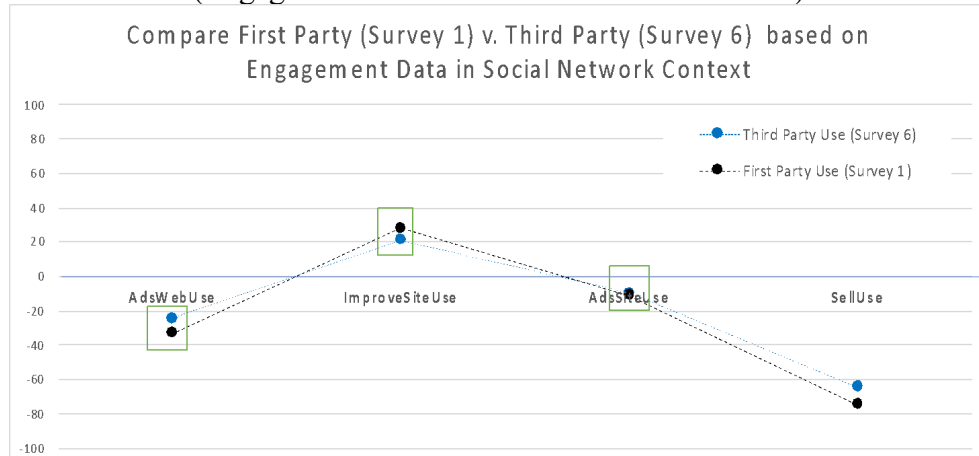
Figure A35: Comparison of First versus Third Party using raw data
(Location Data for News Context)

Compare First Party (Survey 1) v. Third Party (Survey 6) based on Location Data in News Context
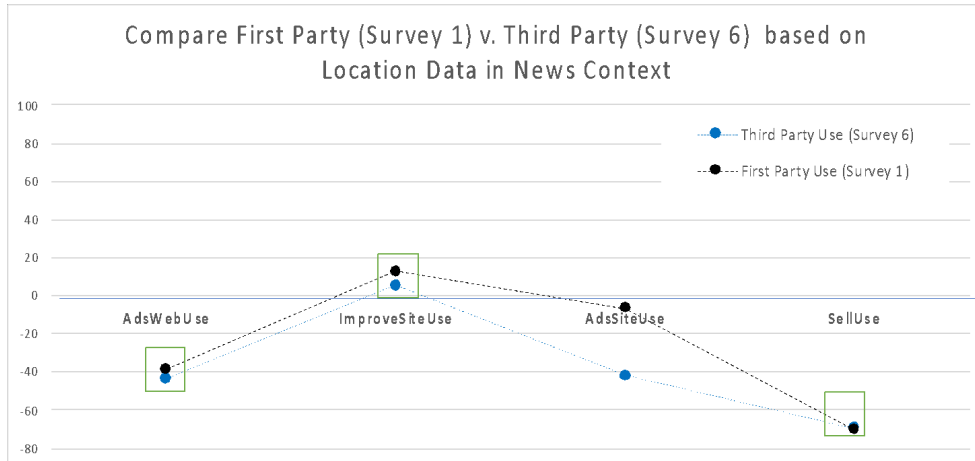
H.   Data Stays on Your Device

Table A19: Regression Results Comparing Surveys 2, 5, and 7.

			Survey 2		Survey 5		Survey 7	
			1st Party Collects + Infers + Uses		3rd Party Collects + Infers + Uses		1st Party collects + infers + uses (stays on device)	
		Respondents	600		600		500	
		Vignettes/Re	30		30		30	
		Ave =	-30.88		-32.74		-32.01	
DATA	EngagementData		-0.02	0.99	**-3.08**	0.03	-0.88	0.58
	LocationData		**-6.11**	0.00	**-10.62**	0.00	-8.83	0.00
	SearchData		-1.83	0.19	**-4.71**	0.00	-2.45	0.12
	WebData		**-7.62**	0.00	**-9.68**	0.00	**-5.55**	**0.00**
	Null = ProfileData							
ACTOR	BrowserContext		-0.08	0.95	1.11	0.43		
	SearchContext		1.88	0.18	0.81	0.56		
	FriendSocialContext		-1.17	0.41	1.58	0.26		
	PhotoSocialContext		-0.44	0.75	0.65	0.64		
	Null = NewsContext							
PURPOSE	**AdsSiteUse**		**-22.80**	0.00	**-19.82**	0.00	**-19.13**	**0.00**
	AdsWebUse		**-31.43**	0.00	**-25.90**	0.00	**-27.02**	**0.00**
	SellAccessUse		**-70.23**	0.00	**-61.77**	0.00	**-60.50**	**0.00**
	Null = ImproveUse							
INFERENCE	EmotionInference		-2.56	0.07	-1.30	0.36	-1.58	0.32
	FriendActivitiesInference		0.43	0.76	0.68	0.63	1.06	0.50
	InterestsInference		1.91	0.17	0.39	0.78	2.17	0.17
	MedicalInference		**-27.44**	0.00	**-32.19**	0.00	**-25.45**	**0.00**
	Null = Demo Infer							
	_cons		8.66	0.00	-1.43	0.92	2.65	0.13
		Mean	-30.88		-32.74		-32.01	
		SD	64.64		64.18		65.21	
		50th Percent	-44.00		-47.10		-46.15	

Figure A36: Use of location data compared to use of inferences based on location data for data brokers
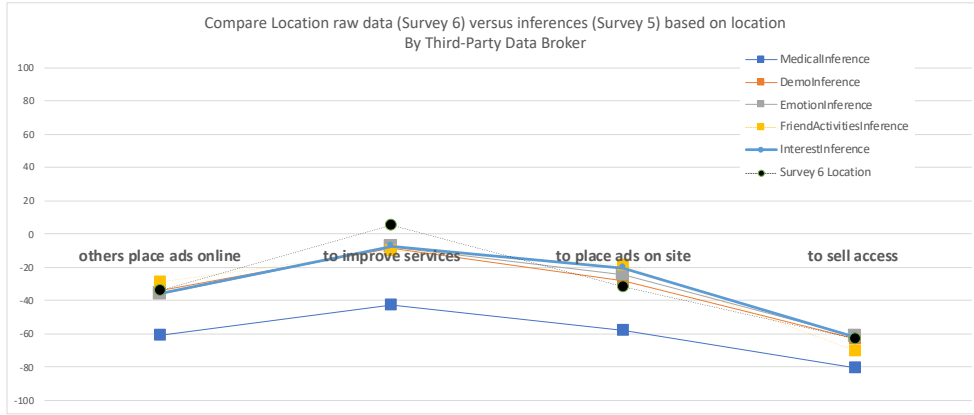

Figure A37: Use of search data compared to use of inferences based on search data for data brokers

Figure A38: Use of engagement data compared to use of inferences based on engagement data for data brokers
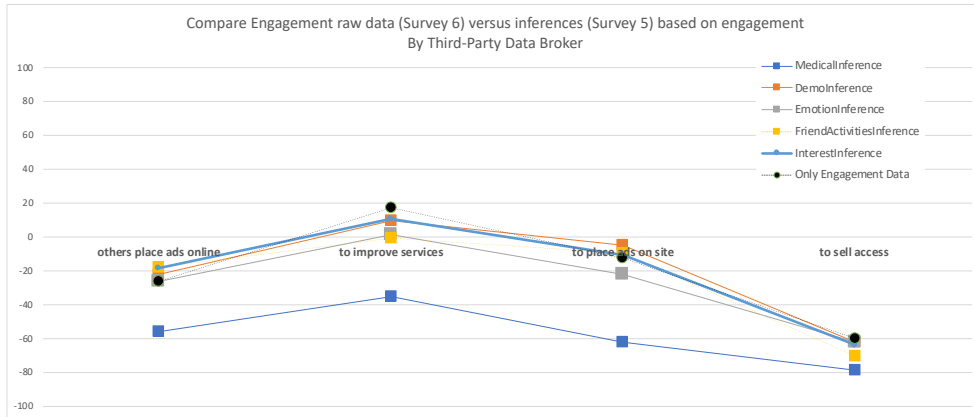

Figure A39: Use of profile data compared to use of inferences based on profile data data for data brokers

Figure A40: Use of web history data compared to use of inferences based on web history data for data brokers

Figure: Survey 5.

Figure Survey 7.

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