

## HOMEWORK 4

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### Problem 1:

*On running the code provided, we get the following output:*

To get Bob's genetic information, type B. To get someone else's genetic information, type X:  
b

Bob's age is 56 with his height being 56 cm and weight equal to 72 kg. His Warfarin dosage per week is 21 mg. Also, he takes enzyme-inducers like carbamazepine, phenytoin, rifampin, or rifampicin and takes amiodarone

Genetic information is as follows:

+-----+-----+-----+-----+			
	VKORC1		CYP2C9   Closeness to actual value
+-----+-----+-----+-----+			
	A/G		*2/*3   0.0260343050442
	Unknown		*3/*3   -0.00226569495584
	A/A		*1/*3   0.181234305044
	A/A		*2/*2   0.0553343050442
+-----+-----+-----+-----+			

### Problem 2:

*On running the code provided, we get the following output:*

+----+-----+		
	X	Accuracy (when N=3)
+----+-----+		
	3	9148/10000(91.48%)
	5	9337/10000(93.37%)
	7	9563/10000(95.63%)
	10	9684/10000(96.84%)
+----+-----+		

As we increase the number of nodes, our accuracy increases. This is because our data is distributed over the ten nodes. As we increase the number of nodes, more data is trained, and with more trained data our model becomes more accurate.

+-----+-----+		
	N	Accuracy (when X=5)
+-----+-----+		
	3	9478/10000(94.78%)
	5	9596/10000(95.96%)
	10	9702/10000(97.02%)
+-----+-----+		

With an increasing number of epochs, our accuracy increases. As the number of iterations ie, epoch increases, the model is trained as many times, and the model is trained, the weights are updated and pushed towards more accurate weights, hence the model becomes more accurate.

### **Problem 3:**

Survey to measure people's privacy concerns regarding dating sites and apps.

#### **a) Statement of research question and/or hypothesis:**

While engaging in online dating are users aware of the kind of data that is collected from them and the risks associated in this context.

#### **b) Major decisions and things kept in mind when designing the survey:**

I first gave my participants some background knowledge regarding the information collected by dating sites and apps along with a past breach to help them understand the privacy risks of using online dating platforms. While designing the survey, I wanted to collect basic demographics information to look at how age, occupation, background in Computer Science etc shape privacy perspectives regarding online dating platforms. After this, I asked questions from Westin's General Privacy Concern Index with respect to online dating for categorizing my participants. As these three questions do not fully capture the context, I devised a few more scenario based questions, with a positive and negative outcome to see if the concerns change from Westin's questions.

#### **c) Text used to recruit participants:**

Hey! I have created a survey to determine the privacy concerns regarding dating apps and sites as part of my coursework in CSC 591(Privacy). If you've ever engaged in online dating or were curious about it, you should know that your profiles are being sold, and you are giving away more information than you bargained for. Take the survey if you want to find out more! It shouldn't take more than 2-3 minutes, and your email ID isn't collected :). [Here is the link](#). Thanks in advance!

#### **d) Recruitment of participants and screening criteria:**

I recruited a younger demographic for my participant pool, as they are more likely to use online dating platforms. As these apps require users to be 18+, I screened out potential candidates who were 17 and younger. I also recruited participants from outside of the US, and ensured that they were diverse in terms of having/not having a technical background.

#### **e) Implementation of survey:**

I used Google forms. The survey is linked [here](#).

#### **f) Survey:**

**Privacy Concerns Regarding Dating Apps and Sites**

As part of Homework 4 for CSC 591:002(Privacy) course, I am conducting a survey wherein you will be asked a series of questions about privacy concerns regarding dating apps and sites.

Have you ever engaged/want to engage in online dating? Read ahead.

Dating apps and sites collect information directly from you such as your name, occupation, partner preferences, orientation. Apart from this, they also gather data from your phone like location, contacts, photos, and files on your device, which do not serve the function of these apps. These apps also reserve the right to share data with one another. For example, Match Group owns Plenty of Fish, OKCupid, Match, Hinge, among others, and when you sign up for multiple apps, the data collected from each app can be used to create a more comprehensive profile.

Read more here:

<https://www.consumerreports.org/privacy/how-private-is-your-online-dating-data/>

Last year, it was found that data brokers were selling profiles for as little as \$153 for a million. The information included usernames, e-mail addresses, nationality, gender, age and detailed personal information, such as their sexual orientation, interests, profession, physical characteristics, and personality traits.

Read the details of this investigative report here: <https://datadating.tacticaltech.org/viz>

In 2015, a scandal erupted when AshleyMadison.com was breached. The hackers responsible claimed they wanted to expose how the full delete feature, which promised removal of site usage history and personally identifiable information, didn't remove the users' purchase details which included real name and address.

Read more here: <https://www.vox.com/2015/7/20/9007039/ashley-madison-hack-explained>

#### Demographics Information:

1. What is your age?
  - 17 and younger
  - 18-20
  - 21-29
  - 30-39
  - 40-49
  - 50-59
  - 60 and older
2. What do you identify your gender as?
  - Man
  - Woman
  - Genderqueer/Non-Binary
  - Prefer not to say

3. What is your occupational status?

- Student
- Employed
- Unemployed
- Retired
- Prefer not to say

4. Do you have a background in Computer Science, IT, or any other related field?

- Yes
- No

5. What is your marital status?

- Single
- Married
- In a domestic partnership/relationship
- Divorced
- Widowed
- Prefer not to say

6. Have you ever used a dating app?

- Yes
- No

If yes, the user is directed to Page 2. If not, the user is directed to Page 3.

## **Page 2:**

Which of the following dating apps or sites have you used?(Check all that apply)

- Tinder
- Facebook Dating
- Match
- Bumble
- Plenty of Fish
- OKCupid
- Zoosk
- Coffee Meets Bagel
- Hinge
- Happn
- The League
- eHarmony
- Grindr
- Other:

## **Page 3:**

Survey Questions:

In this document, the scale is represented as stars on a scale of 1 to 4, from left to right.

1. Do you feel that users have lost control over how their profile information is collected and used by dating sites and apps?



Not at all

Very much so

2. Do you think dating apps and sites provide adequate and proper technical protection to keep users' data confidential?



Not at all

Very much so

3. Do you think current laws and organizational practices of dating sites and apps keep users' data reasonably protected?



Not at all

Very much so

4. Knowing the information collected by dating apps and sites, and its potential misuse, how concerned are you about users' privacy on said apps and sites?



Not Concerned

Very Concerned

5. Having read how information on dating sites and apps could be misused and/or breached, would you limit your profile information at the cost of fewer potential matches?



Not at all

Definitely

6. If offered a premium subscription package on a preferred dating site/app, with more features (for e.g., you would be listed as a top match in the area), how likely would you be willing to give up your rights to your data?



Not at all likely

Very likely

7. Knowing that deleting or deactivating your online dating profile doesn't scrub your data entirely, does it discourage you from using dating sites or apps?



Not at all

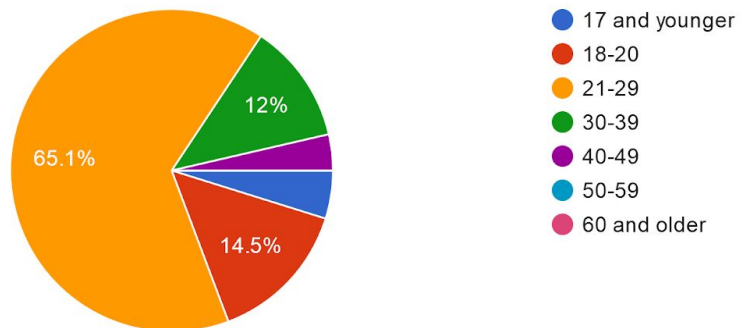


Very much so

**g) The findings from the participants:**

What is your age?

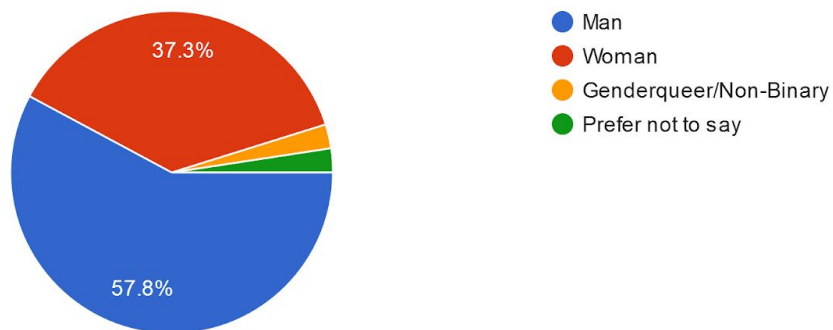
83 responses



There is not much diversity from the participants as most of them are in their 20s, however most of the age groups were captured, though in the minority.

What do you identify your gender as?

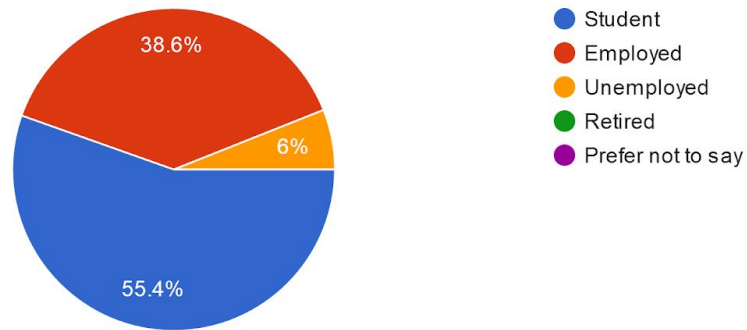
83 responses



Most respondents to my survey turned out to be male.

## What is your occupational status?

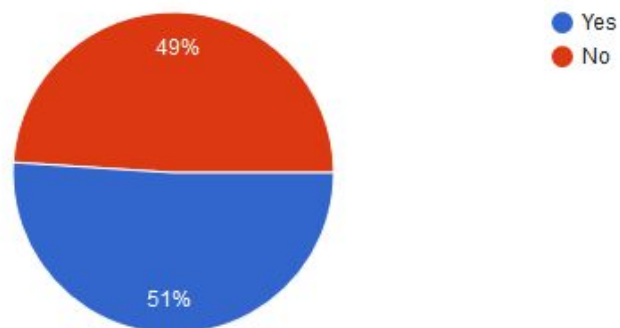
83 responses



Most respondents who answered were students, some employed, few were unemployed. As none of the respondents were 60 and above, no retired respondents are seen.'

## Do you have a background in Computer Science, IT, or any other related field?

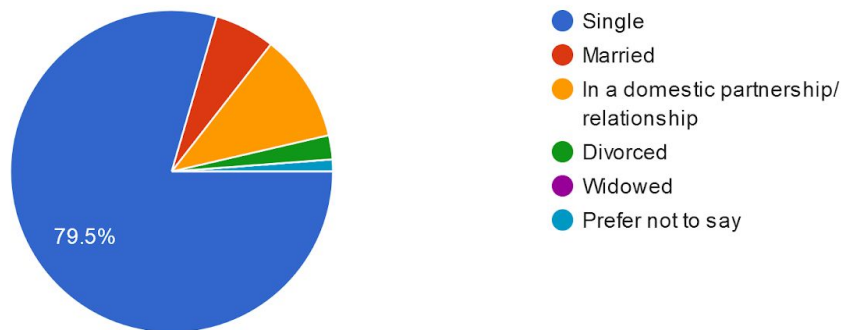
83 responses



Almost half of the respondents were of a non-technical background, almost an even split.

### What is your marital status?

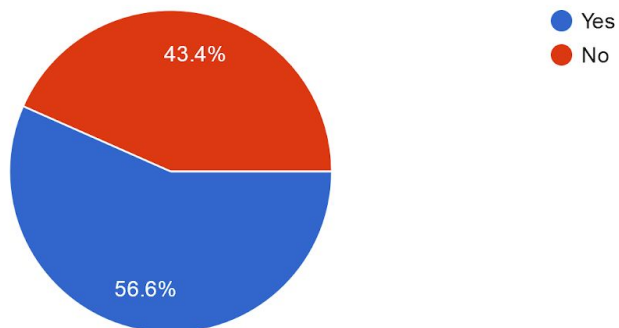
83 responses



An overwhelming majority are single, some being in a partnership, very few were married or divorced.

### Have you ever used a dating app?

83 responses

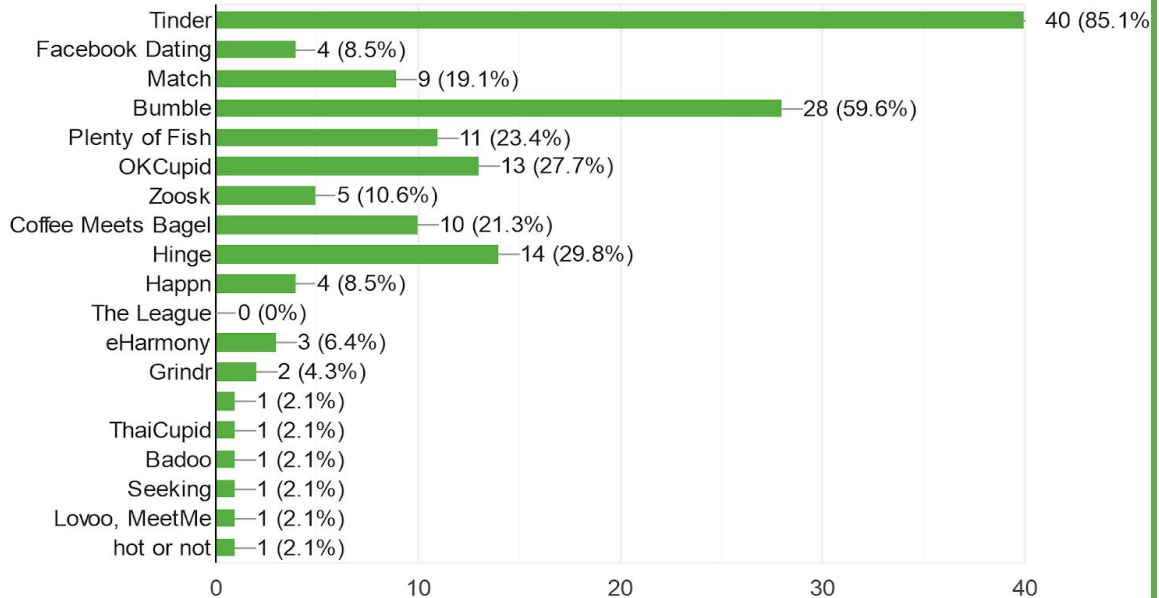


Majority of the participants had used a dating app.



## Which of the following dating apps or sites have you used?(Check all that apply)

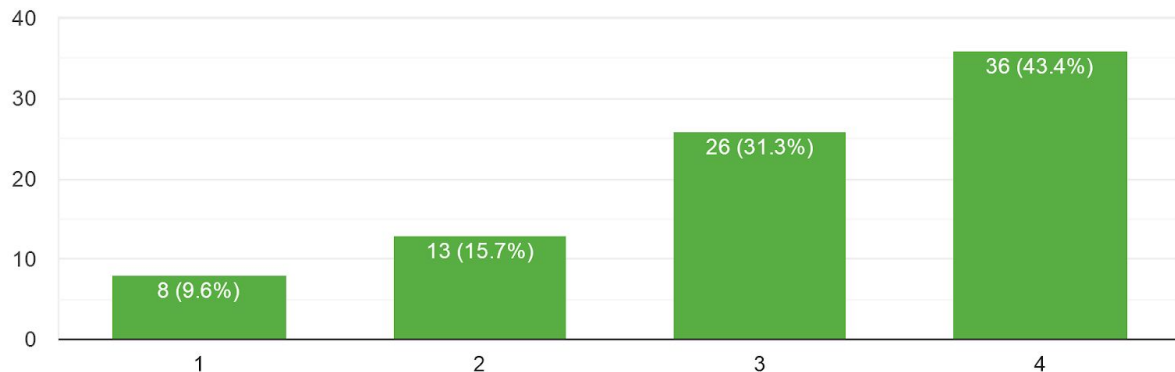
47 responses



The most popular dating apps were Tinder and Bumble, followed by Hinge, Plenty of Fish, and OKCupid.

## Do you feel that users have lost control over how their profile information is collected and used by dating sites and apps?

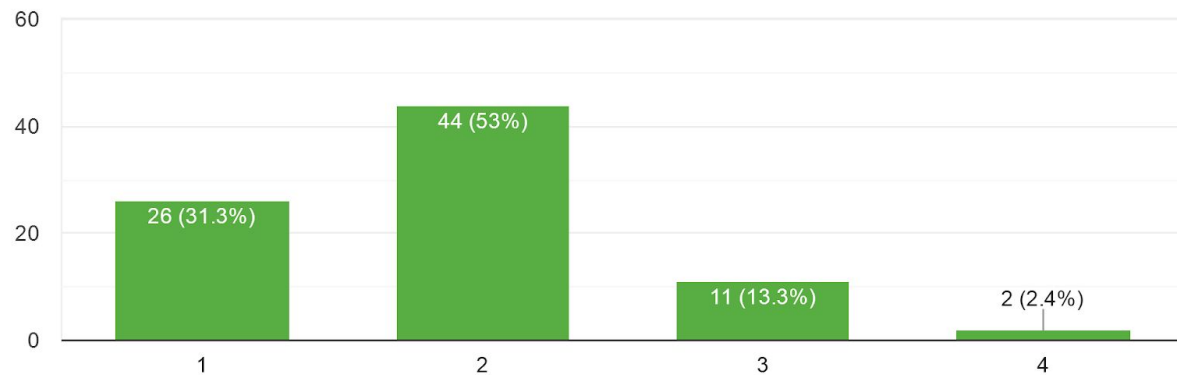
83 responses



Majority of the people felt that users have lost control over how their profile information is collected and used by dating sites and apps.

Do you think dating apps and sites provide adequate and proper technical protection to keep users' data confidential?

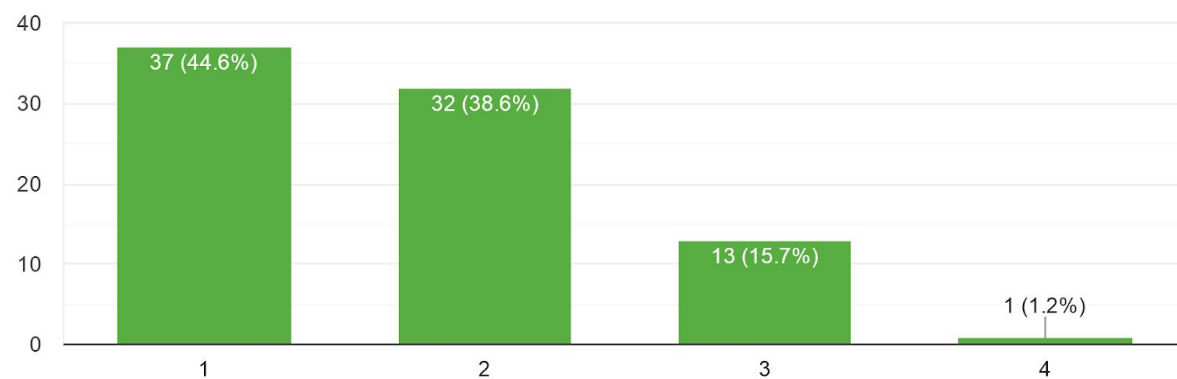
83 responses



Many users felt that dating apps and sites did not provide much technical protection to keep users' data confidential.

Do you think current laws and organizational practices of dating sites and apps keep users' data reasonably protected?

83 responses

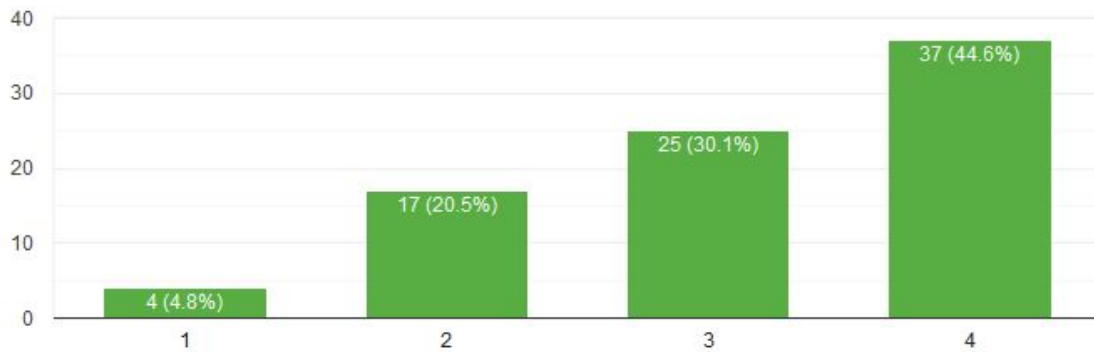


An overwhelming majority of users felt that current laws and organizational practices of dating sites and apps did not keep users' data protected at all.

Knowing the information collected by dating apps and sites, and its potential misuse, how concerned are you about users' privacy on said apps and sites?



83 responses

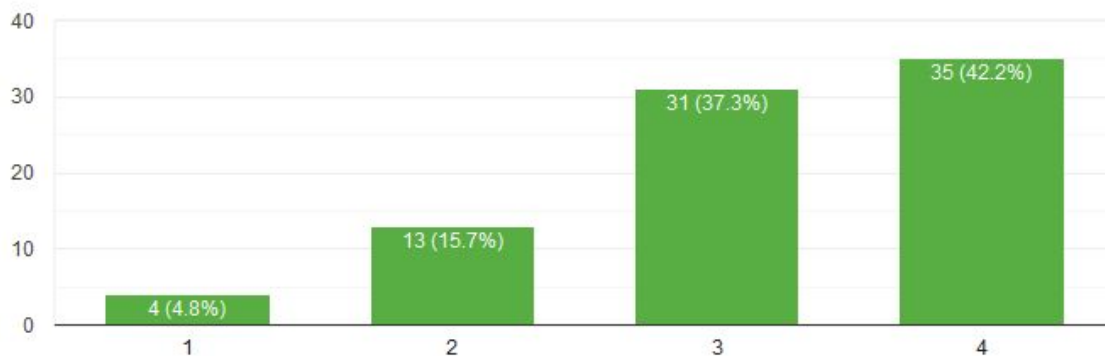


Many users are extremely concerned about the the information collected by dating apps and sites.

Having read how information on dating sites and apps could be misused and/or breached, would you limit your profile information at the cost of fewer potential matches?



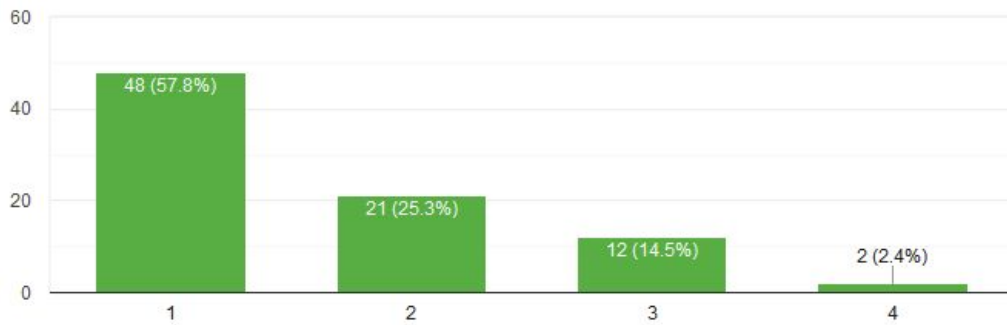
83 responses



Many users would also limit their profile information at the cost of fewer matches. They would prefer a negative outcome(as far as online dating is concerned), to keep their data secure.

If offered a premium subscription package on a preferred dating site/app, with more features(for e.g., you would be listed as a top match in the area), how likely would you be willing to give up your rights to your data?

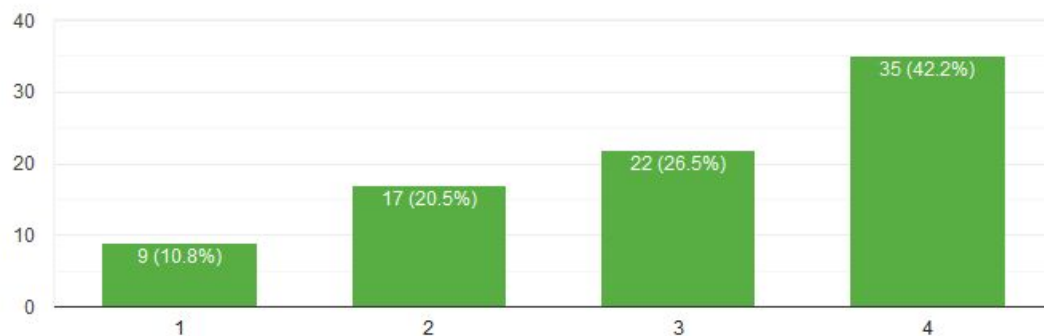
83 responses



Many users would also not prefer to get a premium subscription to give up their rights to their data. They would forfeit a positive outcome(as far as online dating is concerned) to keep their data secure.

Knowing that deleting or deactivating your online dating profile doesn't scrub your data entirely, does it discourage you from using dating sites or apps?

83 responses



A lot of the users were discouraged from using dating apps and sites, knowing that their profile information is retained forever.

From Westin's categorization based on his privacy concern, using the first 3 questions we have:

Fundamentalists - 12

Pragmatists - 61

Unconcerned - 0

To the next 4 questions after Westin's, I categorized users based on:

Answering concerned to 3-4 questions - Fundamentalists

Answering concerned to 2 questions - Pragmatists

Answering concerned to 1 question - Unconcerned

Fundamentalists - 62

Pragmatists - 10

Unconcerned - 11

All of the Unconcerned users were single males who had used at least one dating app, who mostly had a non technical background.

Fundamentalists were equally male and female, mostly a Computer Science background, and most were dating app users, with a diverse marital status

Pragmatists were from mostly non-technical backgrounds, single male, and had not used a dating app, except for a few

According to Westin's categories, a majority of the users are skewed towards pragmatists and there are no concerned users at all. Whereas with the scenario based questions, a majority of the users are fundamentalists, with an almost equal number of pragmatists and unconcerned users. This large discrepancy can be because scenarios capture a lot of the nuances, and Westin's questions do not do that. There is not a lot of context, and a lot of assumptions are made.