Stats 112 Final Project

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I. Abstract

In our study, we aim to analyze reflection papers from each group on the guest speaker Ms. Susan Philips. We are interested in identifying the underlying common themes among each group's different understanding of the chapters about individuals immigrating to the U.S. and Ms. Phillip's talk. To do this, we utilized text mining techniques such as frequency graphs, and word clouds. For our data model, we used text networks, a cluster dendrogram, and LDA topics modeling to find common and significant words in the reflection papers.

II. Statement of the Problem

The research question we are addressing is "What common themes unify the immigrant experience as seen through group reflections?". Using text mining of the reflection papers, we want to find if similar themes about the immigrant experience resonated among different groups.

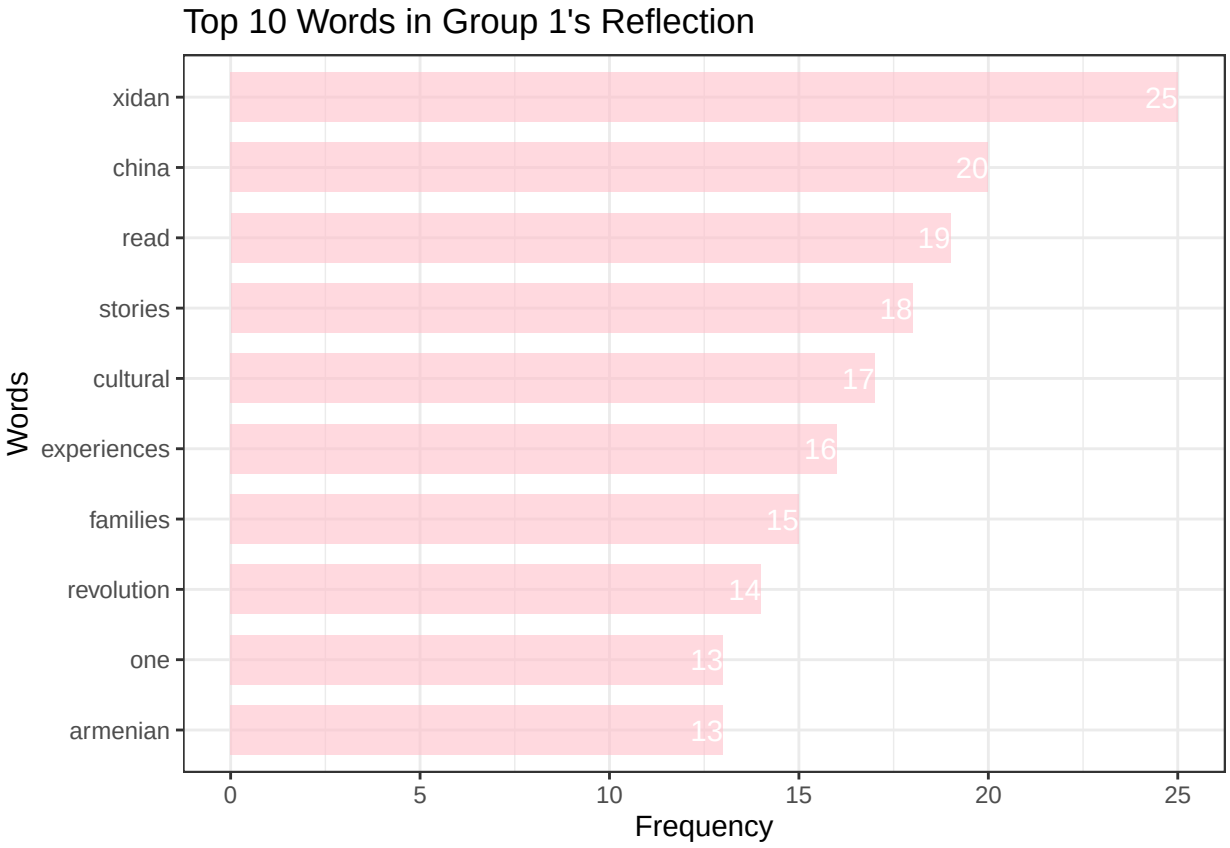
III. Variables

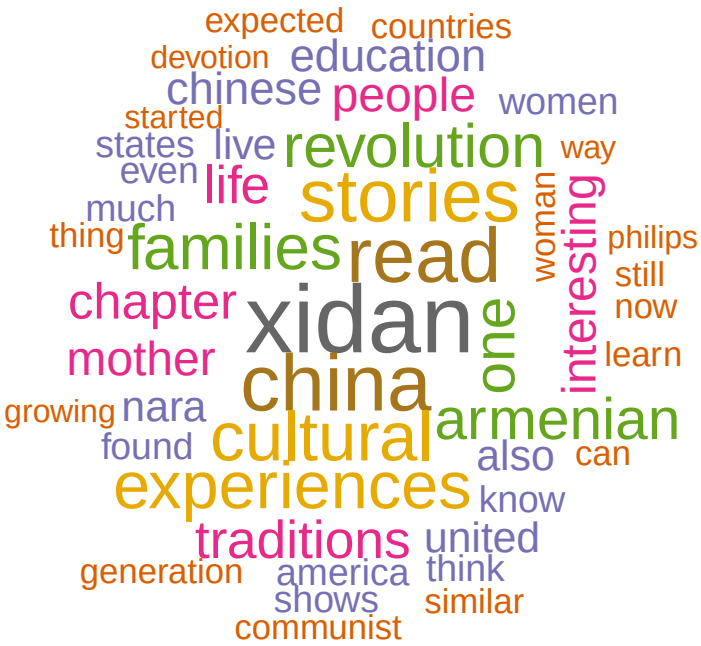
The data we analyzed came in the form of reflection papers from Groups 1-8 along with a solo reflection paper. Each of the group reflection papers includes each member's response to the question "What chapter did you read, and what did you learn from this?" and the entire group's response to the question "Did reading the chapter and listening to Ms. Philips change your attitude or future behavior in any way?". The solo reflection paper is based on the individual's interview with a close friend named Rachel regarding her immigration experience. Our variables are thus in the form of character vectors of the text mined from each of the reflection papers.

IV. Exploratory Data Analysis

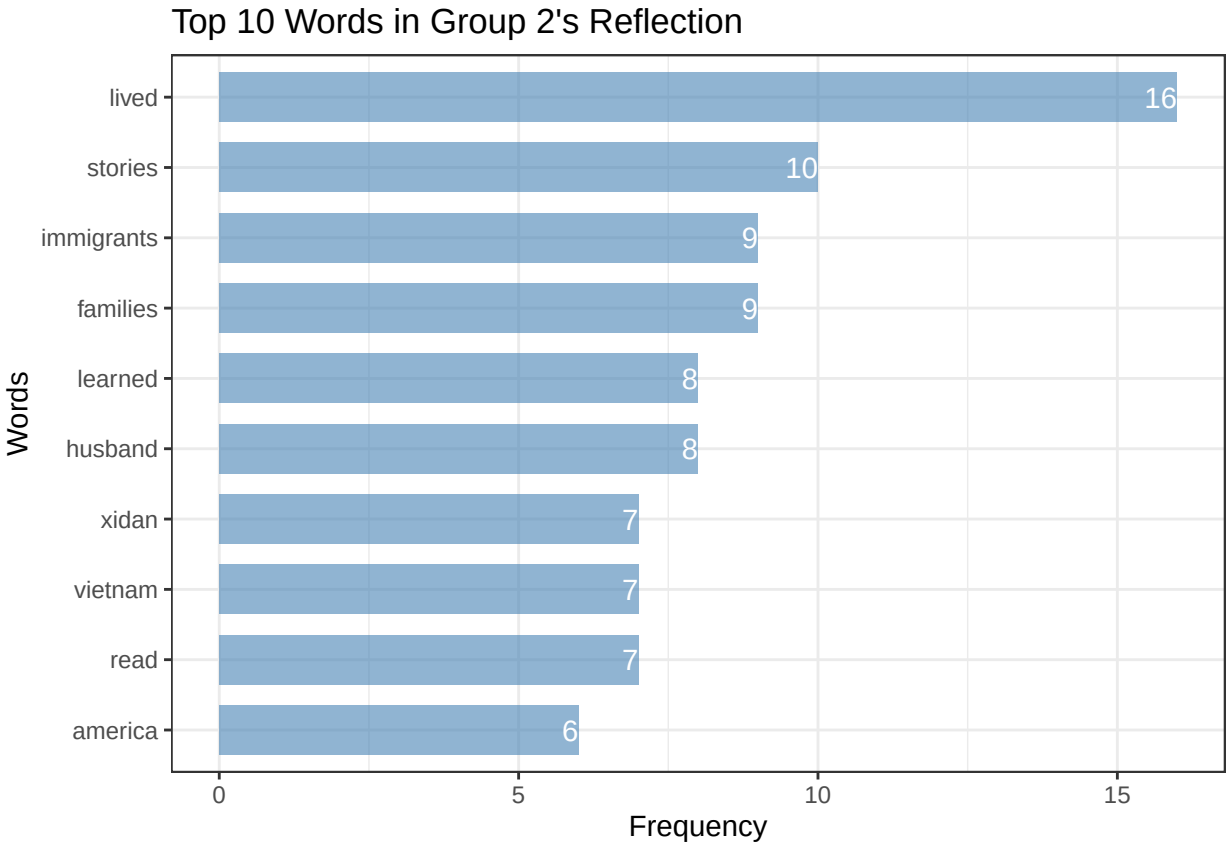
The reflection papers were given in raw PDF format, so we first converted the files into .txt format. As a standard method of cleaning text data, we read in the nine .txt files into R as character vectors and then proceeded to convert them into "corpus" objects. We then cleaned the corpora, getting rid of extraneous words and stemming words in order to combine different tenses of words (for example, "story" and "stories" would both become the stem "stori"). From this, we made frequency graphs and word clouds for each of the nine documents, using unstemmed versions of the previously stemmed words for clarity (now, "stori" would become "stories" again).

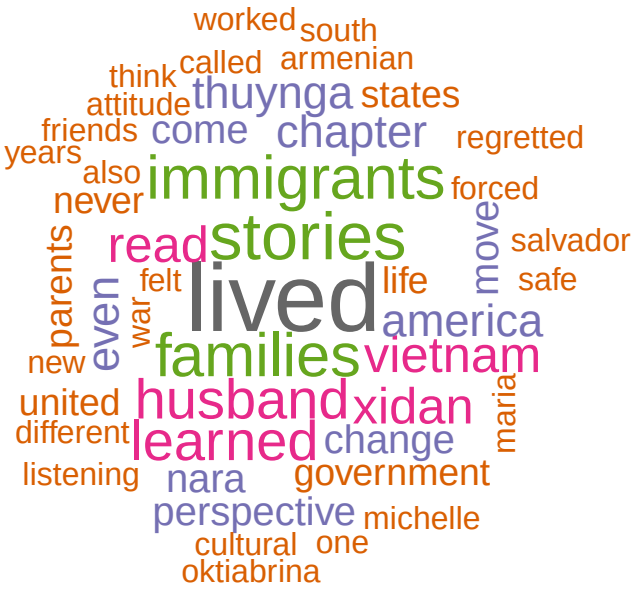
Group 1


Top 10 Words in Group 1's Reflection
Words
xidan
china
read
stories
cultural
experiences
families
revolution
one
armenian
25
20
19
18
17
16
15
14
13
13
0
5
10
15
20
25
Frequency

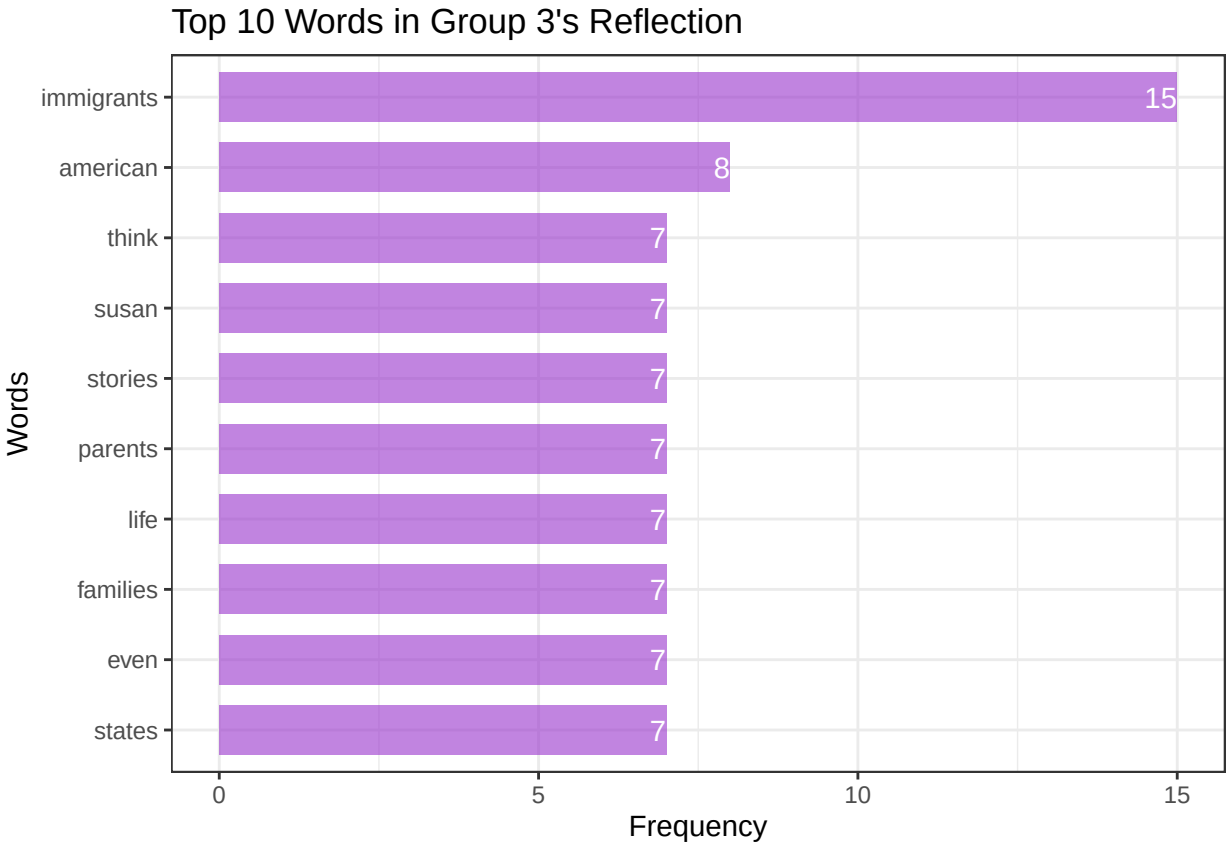

expected
countries
devotion
education
chinese
people
women
started
states
live
revolution
way
even
life
stories
much
thing
families
read
woman
interesting
philips
still
chapter
xidan
one
now
mother
china
learn
growing
nara
armenian
found
cultural
also
can
experiences
know
traditions
united
generation
america
think
shows
similar
communist

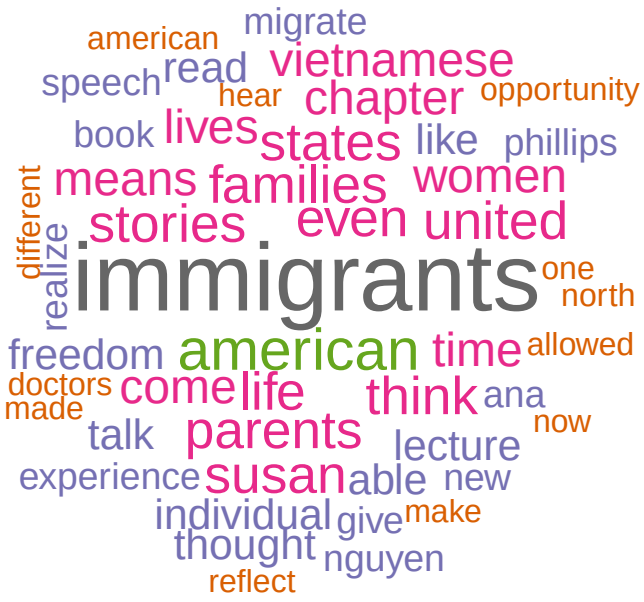
Group 2


Top 10 Words in Group 2's Reflection
Words
lived
stories
immigrants
families
learned
husband
xidan
vietnam
read
america
16
10
9
9
8
8
7
7
7
6
0
5
10
15
Frequency

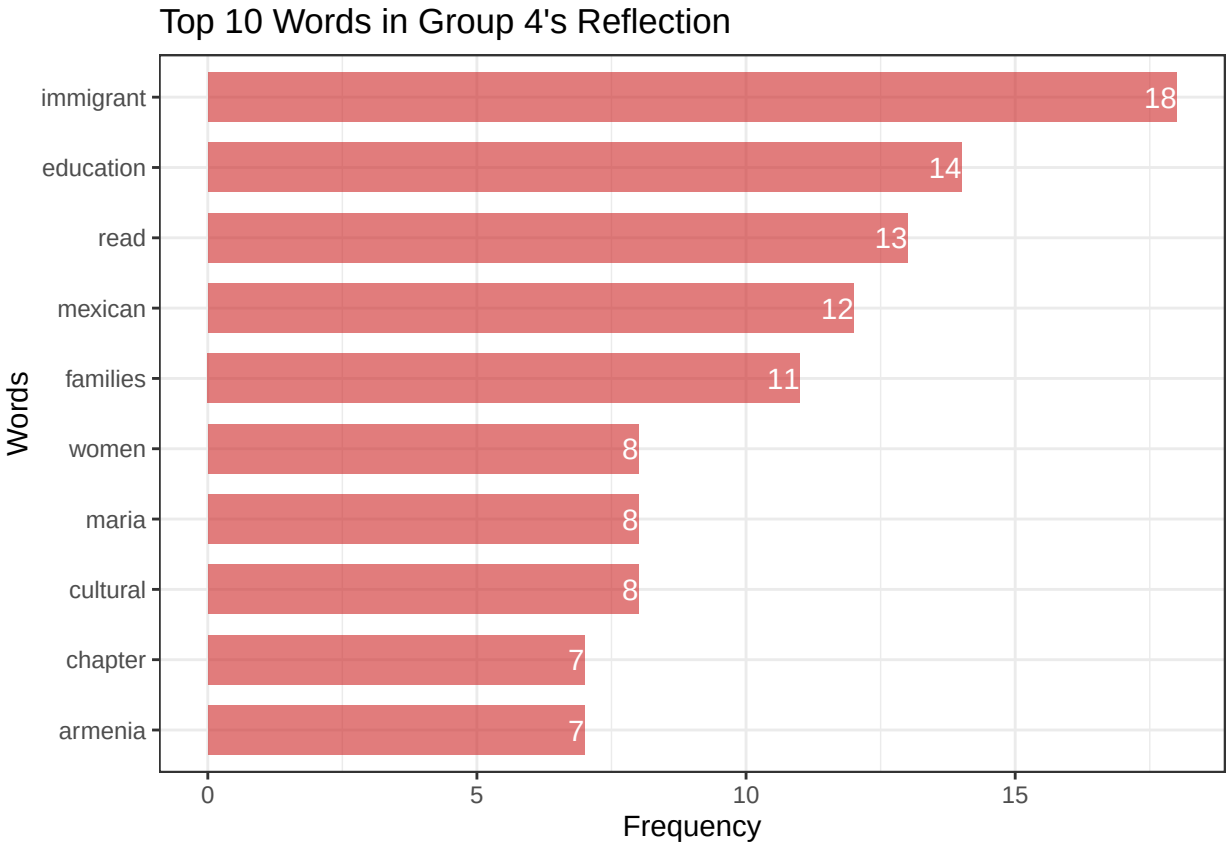

worked
south
called
armenian
think
thuynga
states
attitude
friends
come
chapter
regretted
years
also
immigrants
forced
never
read
stories
salvador
parents
move
felt
life
safe
even
war
lived
america
new
families
vietnam
united
husband
xidan
maria
different
learned
change
listening
nara
government
perspective
michelle
cultural
one
oktiabrina

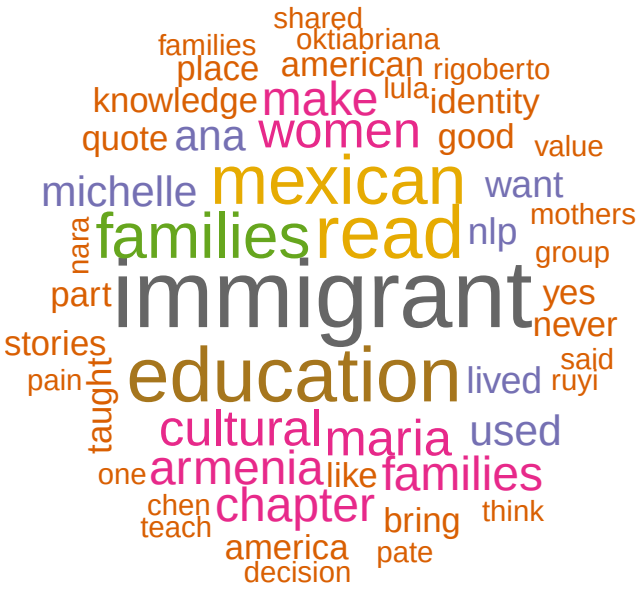
Group 3


Top 10 Words in Group 3's Reflection
Words
immigrants
american
think
susan
stories
parents
life
families
even
states
15
8
7
7
7
7
7
7
7
7
0
5
10
15
Frequency

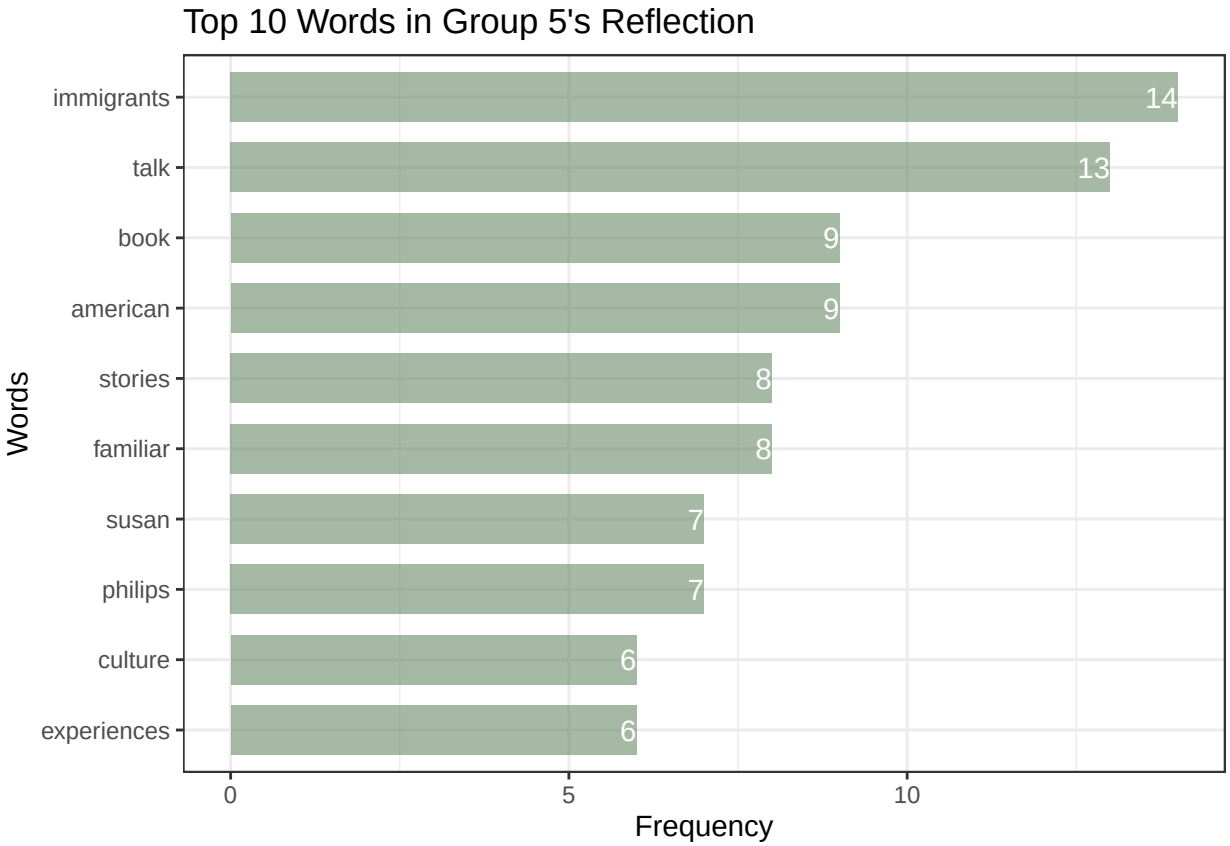

migrate
american
vietnamese
read
speech
hear
chapter
opportunity
book
lives
states
like
phillips
means
families
women
different
stories
even
united
realize
immigrants
one
north
freedom
american
time
allowed
doctors
come
life
think
ana
made
talk
parents
now
lecture
experience
susan
able
new
individual
give
make
thought
nguyen
reflect

Group 4


Top 10 Words in Group 4's Reflection
Words
immigrant
education
read
mexican
families
women
maria
cultural
chapter
armenia
18
14
13
12
11
8
8
8
7
7
0
5
10
15
Frequency

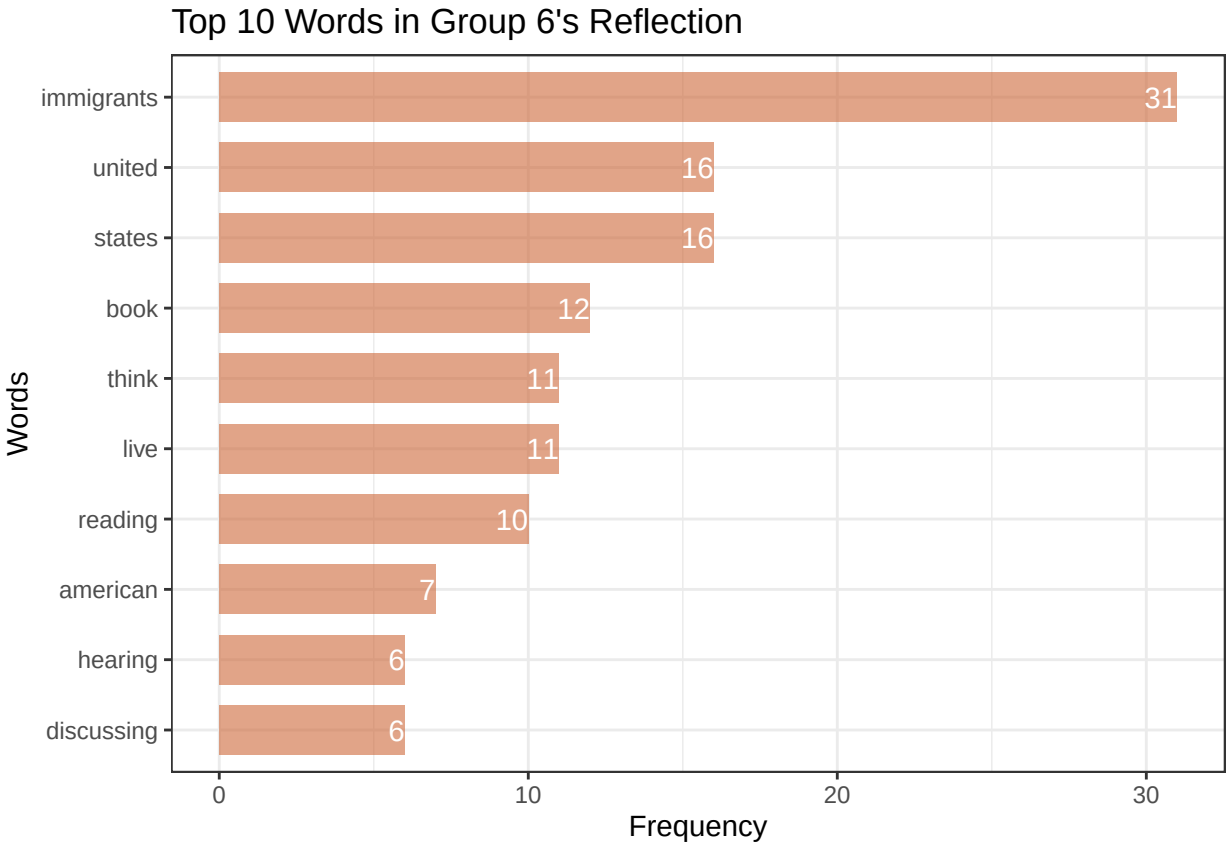

shared
families
oktiabriana
place
american
rigoberto
knowledge
make
lula
identity
quote
ana
women
good
value
michelle
mexican
want
mothers
nara
families
read
nlp
group
immigrant
part
yes
never
stories
education
said
pain
taught
lived
ruyi
cultural
maria
used
one
armenia
like
families
chen
chapter
bring
think
teach
america
pate
decision

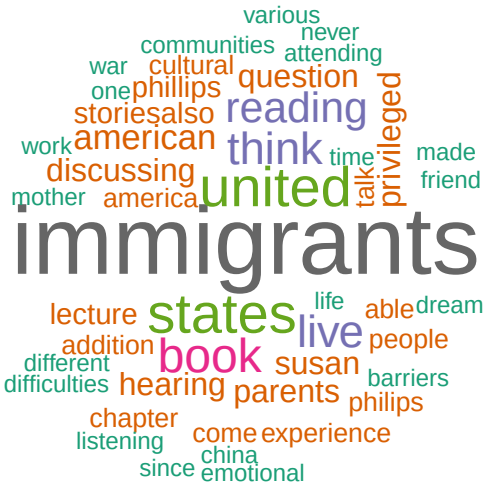
Group 5


Top 10 Words in Group 5's Reflection
Words
immigrants
talk
book
american
stories
familiar
susan
philips
culture
experiences
14
13
9
9
8
8
7
7
6
6
0
5
10
Frequency

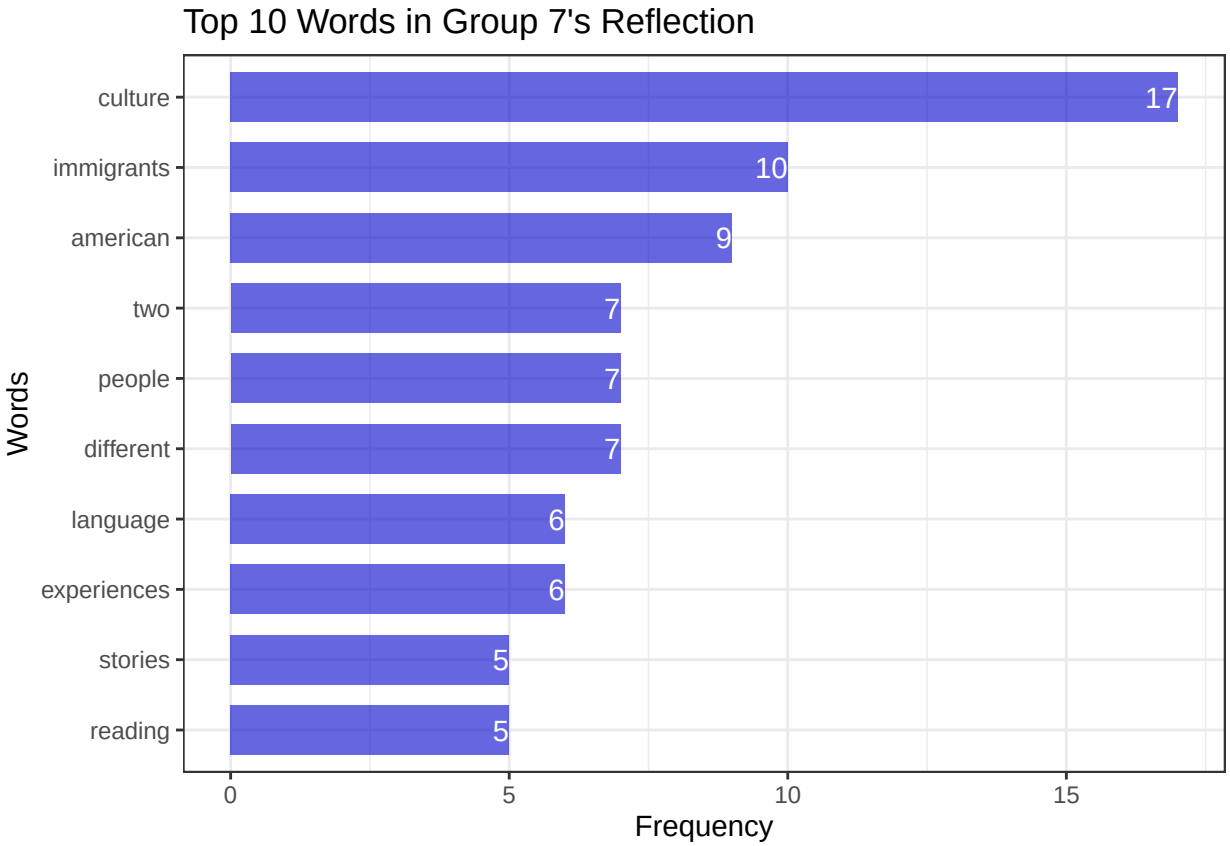

interesting
opinions
conversation
went
question
freedom
women
get
told
able
philips
people
phillips
enjoyed
feeling
book
speak
thought
susan
american
must
just
engaging
states
immigrants
culture
talk
also
felt
personal
stories
life
familiar
means
mother
experiences
make
even
made
class
came
lot
discussion
struggles
work
different
czech

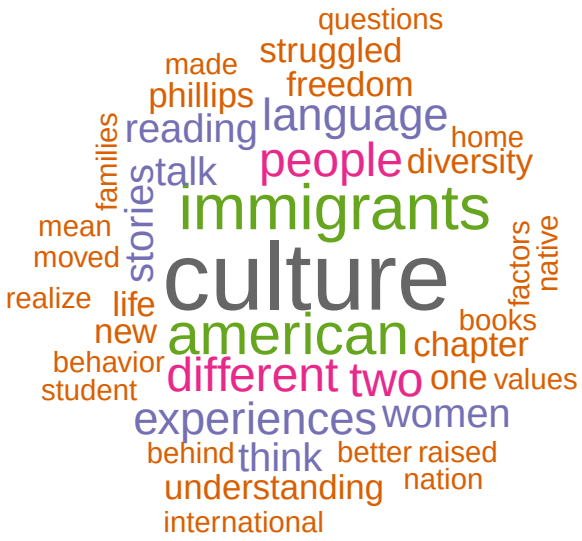
Group 6


Top 10 Words in Group 6's Reflection
Words
immigrants
united
states
book
think
live
reading
american
hearing
discussing
31
16
16
12
11
11
10
7
6
6
0
10
20
30
Frequency

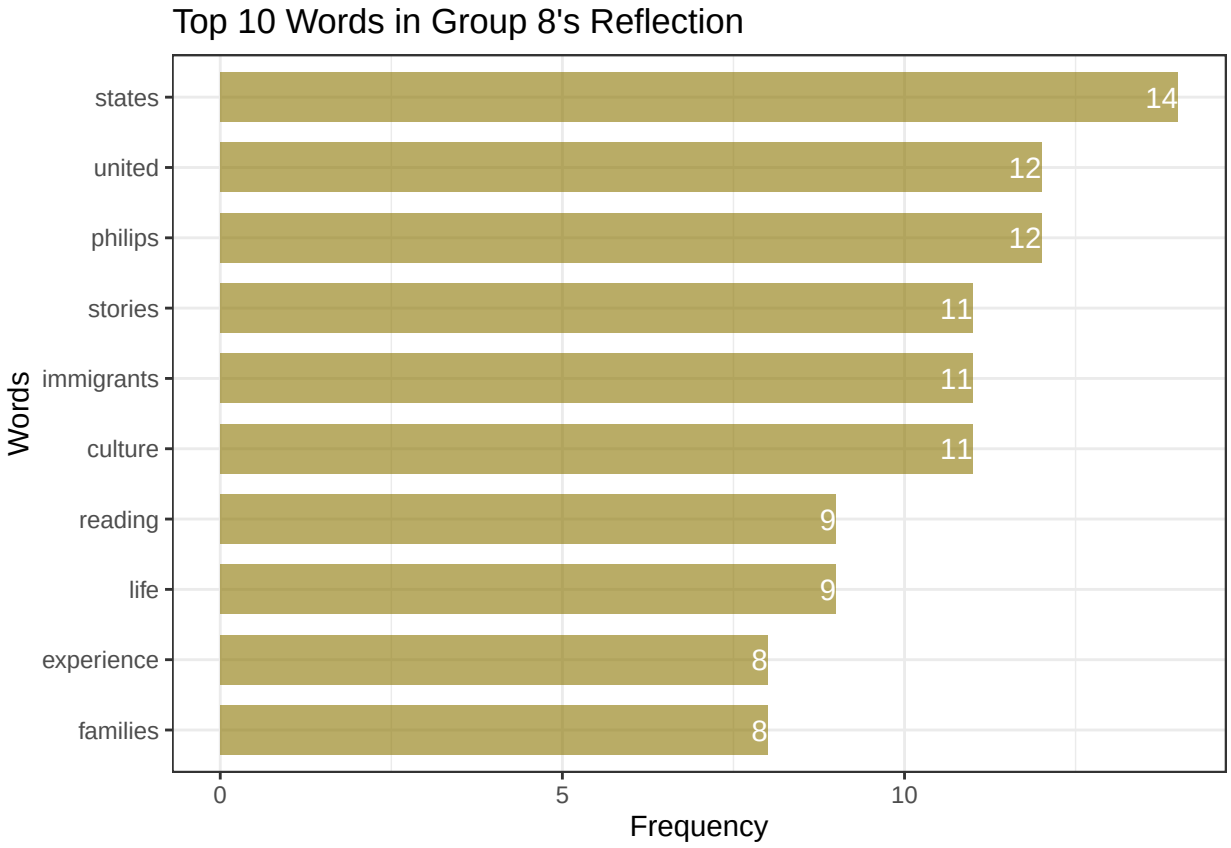

various
never
communities
attending
war
cultural
question
one
phillips
reading
stories
also
work
american
think
time
made
discussing
privileged
friend
mother
america
united
talk
immigrants
lecture
states
life
able
dream
addition
book
live
people
different
susan
barriers
difficulties
hearing
parents
philips
chapter
listening
come
experience
since
china
emotional

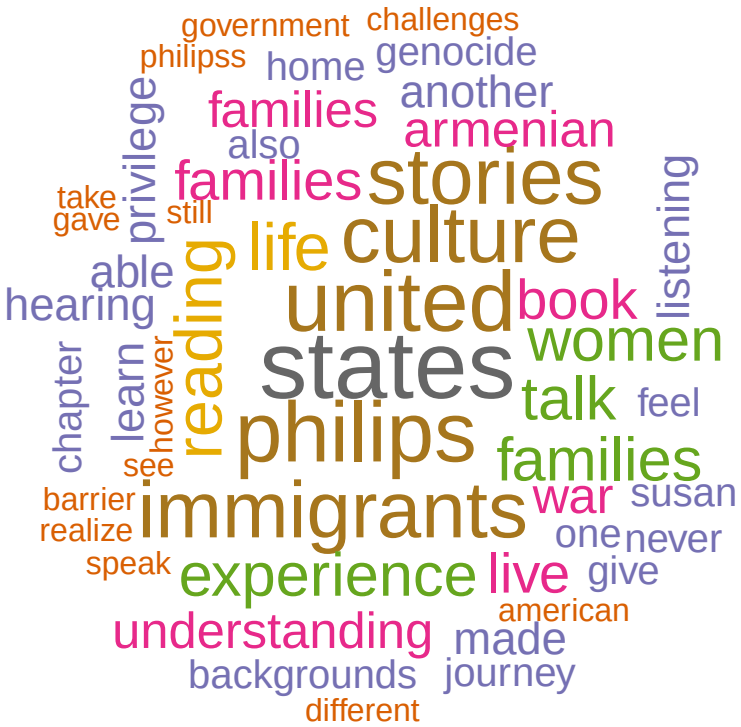
Group 7


Top 10 Words in Group 7's Reflection
culture
immigrants
american
two
people
different
language
experiences
stories
reading
17
10
9
7
7
7
6
6
5
5
Words
0
5
10
15
Frequency

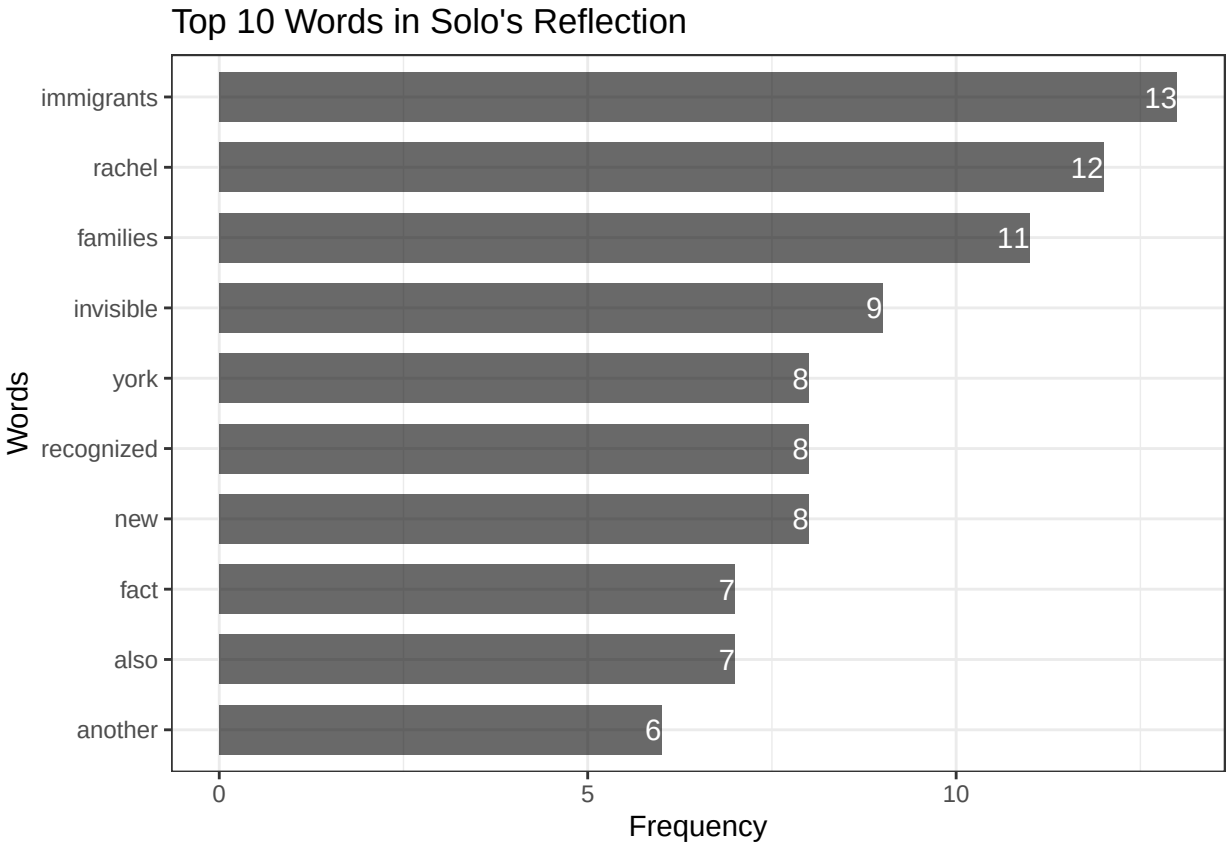

questions
struggled
made
freedom
phillips
language
reading
home
people
diversity
families
talk
stories
immigrants
mean
moved
culture
factors
native
realize
life
books
new
american
chapter
behavior
different
two
one
values
student
experiences
women
behind
think
better
raised
understanding
nation
international

Group 8


Top 10 Words in Group 8's Reflection
states
united
philips
stories
immigrants
culture
reading
life
experience
families
Words
14
12
12
11
11
11
9
9
8
8
0
5
10
Frequency


government
challenges
philipss
home
genocide
another
families
armenian
also
privilege
families
stories
take
gave
still
life
culture
able
reading
united
book
listening
hearing
women
states
chapter
learn
however
talk
feel
philips
families
see
barrier
immigrants
war
susan
realize
one
never
speak
experience
live
give
american
understanding
made
backgrounds
journey
different

Solo

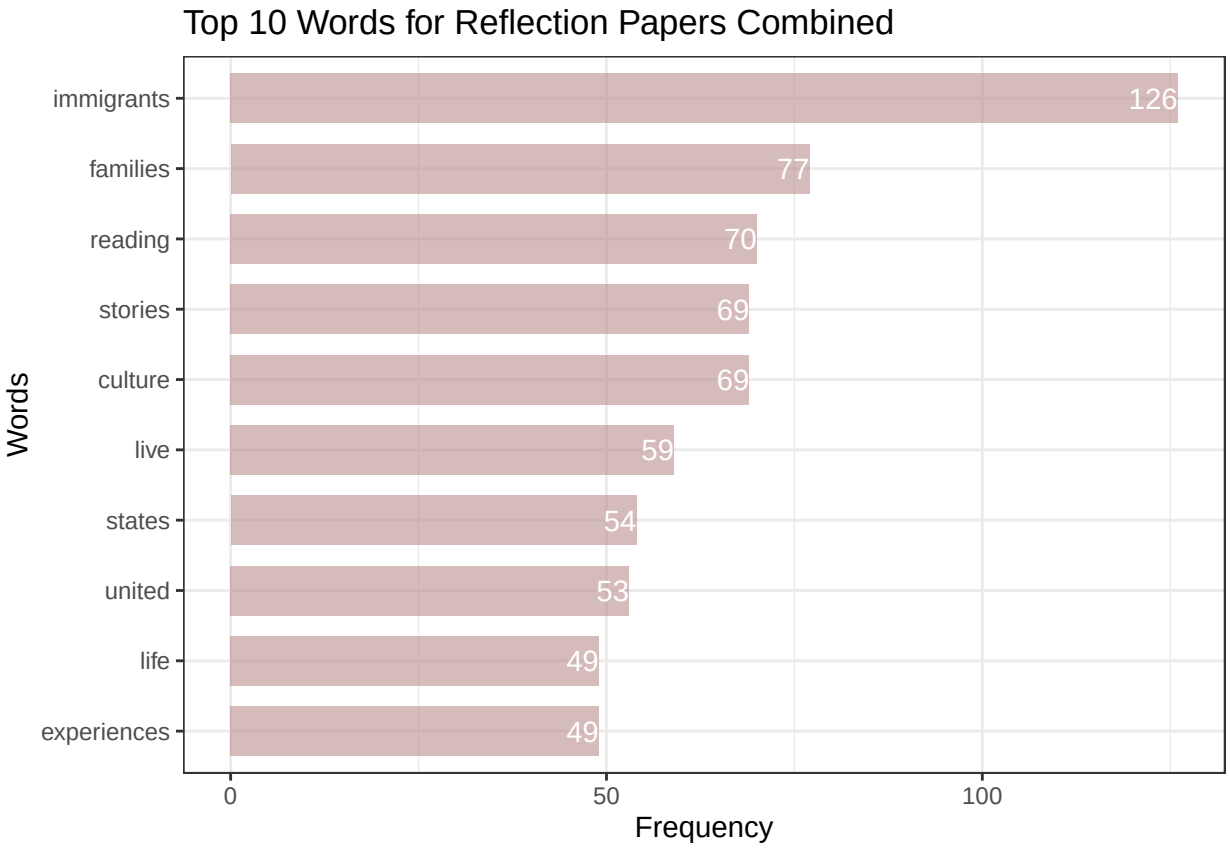


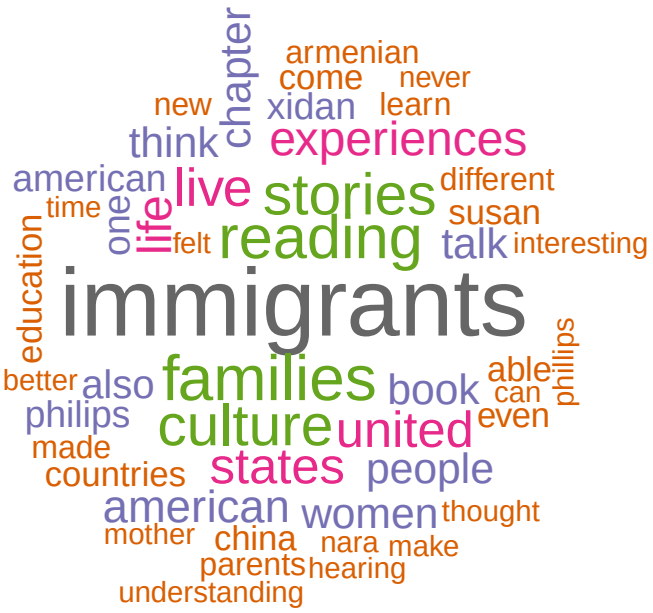
As can be seen through these frequency charts and word clouds, there are some common words that frequently appear across all of the reflection papers. For instance, "immigrants", "families", and "culture" are among the top ten most frequent words. For a closer look at each group's reflection paper, some common words unique to Group 1, for instance, are "Xidan", "China", and "revolution." Group 4's reflection commonly

used the words “education” and “women”, and the solo reflection commonly used the words “invisible” and “recognized.” All of these words speak to the various significant factors of the immigrant experience, such as the separation or unification of families, the mixture between host culture and guest culture, educational opportunities or lack of opportunities, and much more.

The following frequency chart and commonality word cloud highlights the words that appeared most frequently for all nine reflection papers combined. As mentioned previously, these words include “immigrants”, “families”, “reading”, “stories”, “culture”, “live”, “United States”, “life”, and “experiences.” Some other interesting words that are used less frequently and shown in the word cloud are “parents” and “mother”, which contributes to the common theme of “family” across all reflection papers. Lastly, the words “understanding” and “different” are also important to point out as they speak to the notion of how despite these commonalities, each immigrant experience is still different in its own way.

Commonality



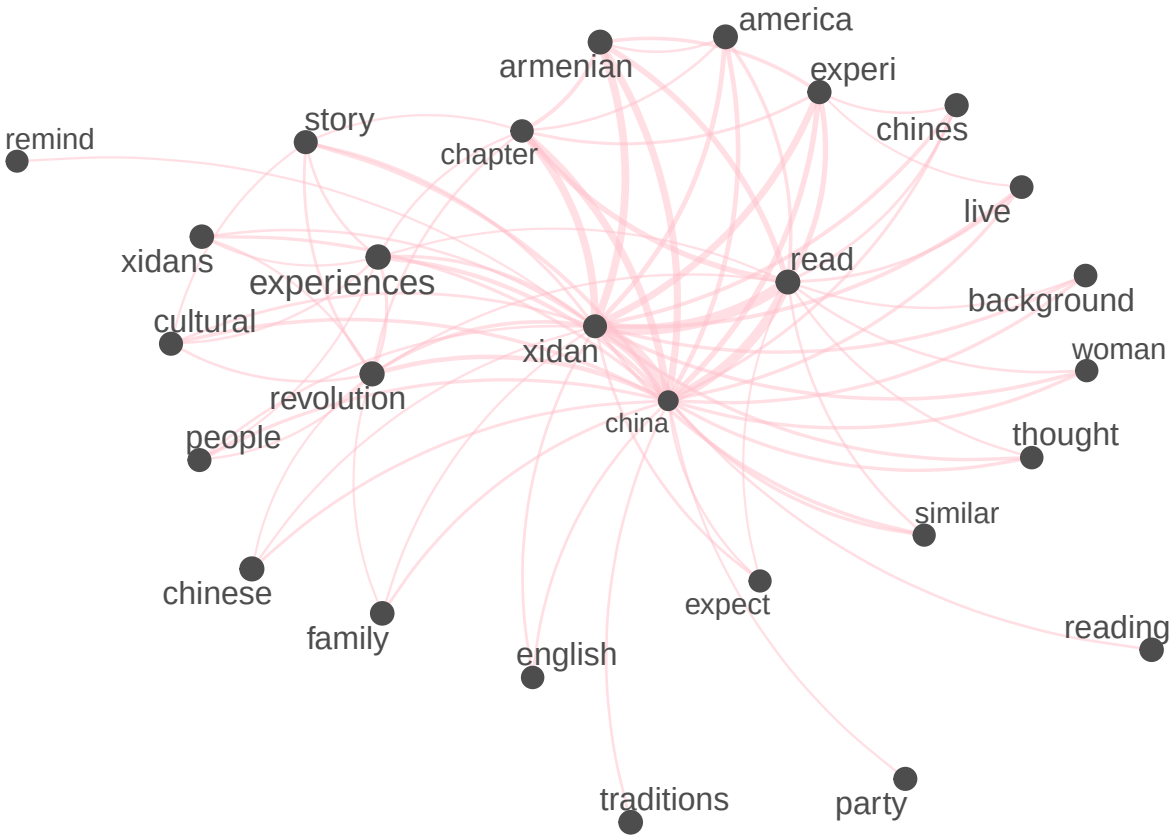


V. Statistical Methods and Summary of Results

Text Networks

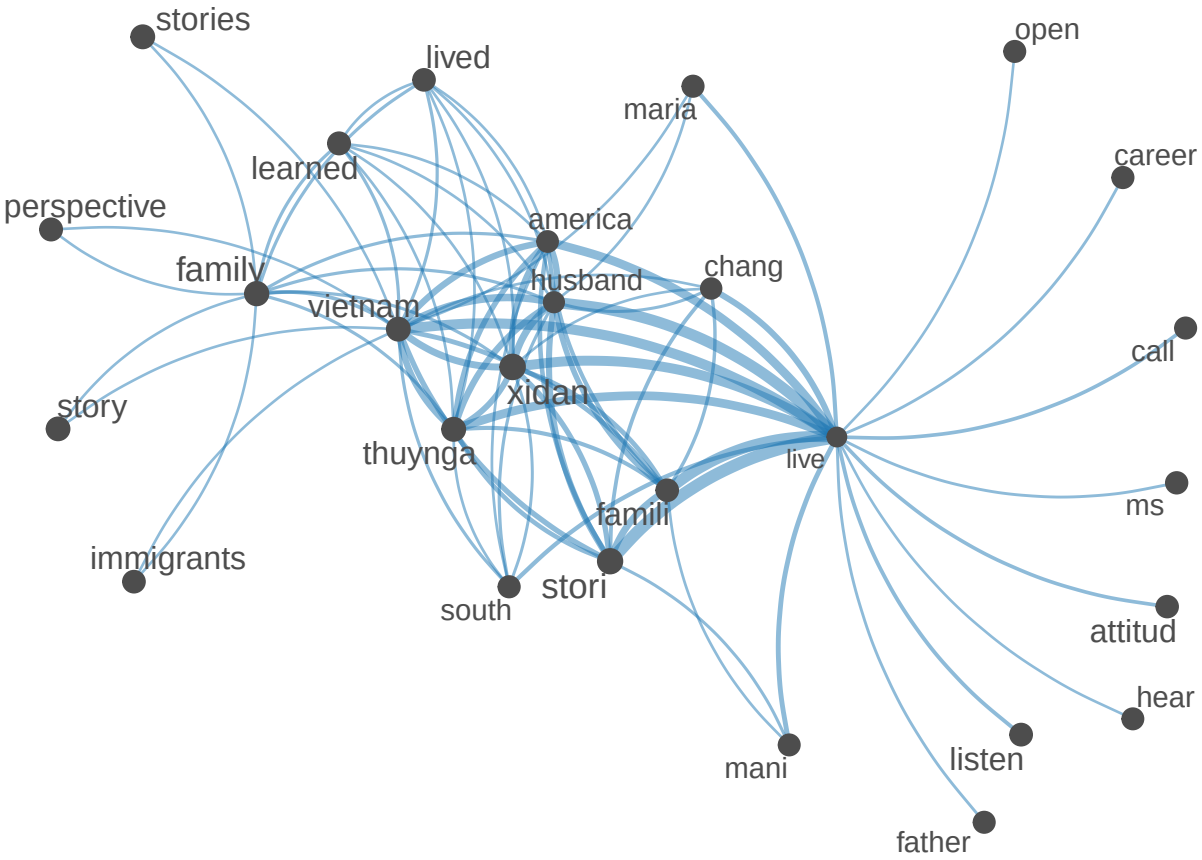
Text Networks use linguistic analysis to show the relationships between words, with the location of nodes revealing the physical closeness of the words in the text and thickness of lines revealing how often the words appear together in the text. It's worth noting that the words are represented by their stems, so some context is necessary to determine what the unstemmed word should be.

Group 1



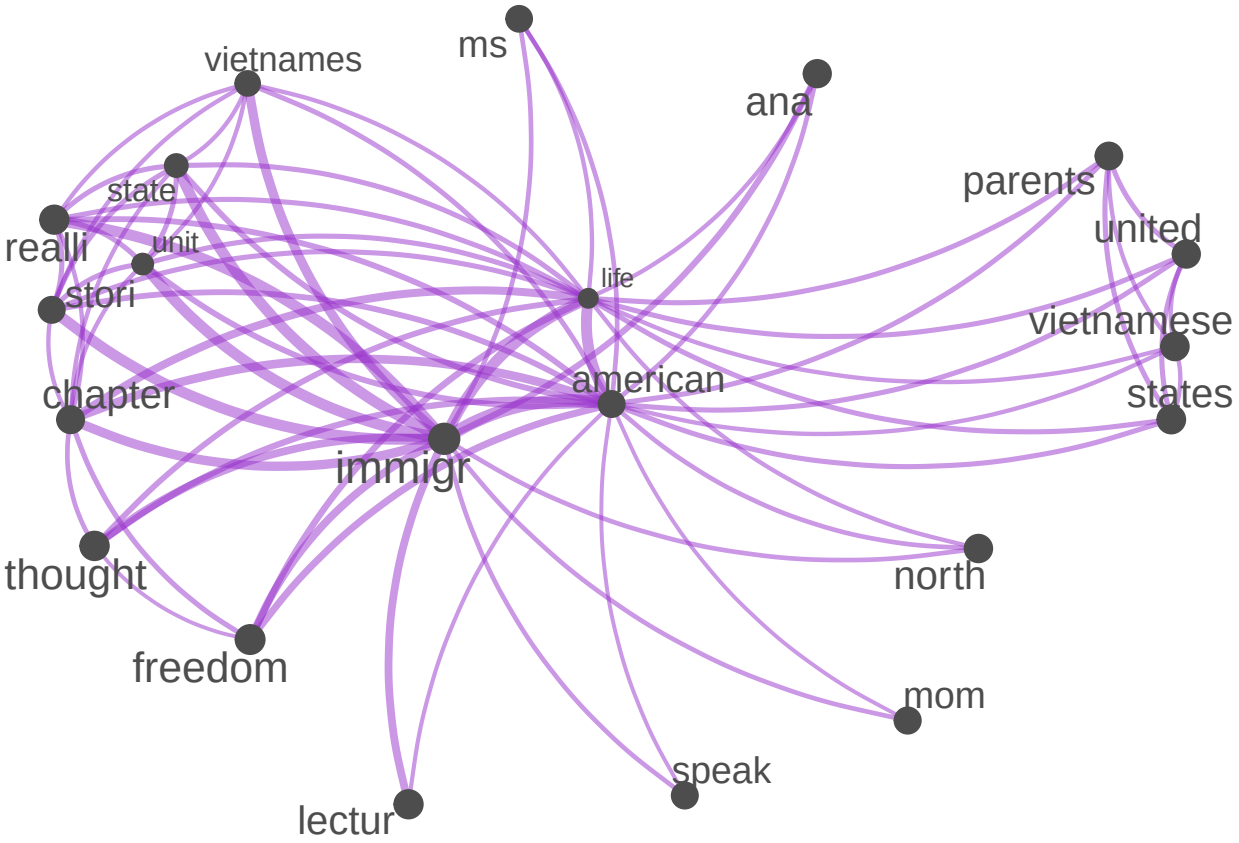
Xidan and China are, expectedly, quite close in the network, along with the word "read", since that was the story that Group 1 focused on the most. Other words that appear in the network that reveal themes are "experiences", "similar", and "family".

Group 2



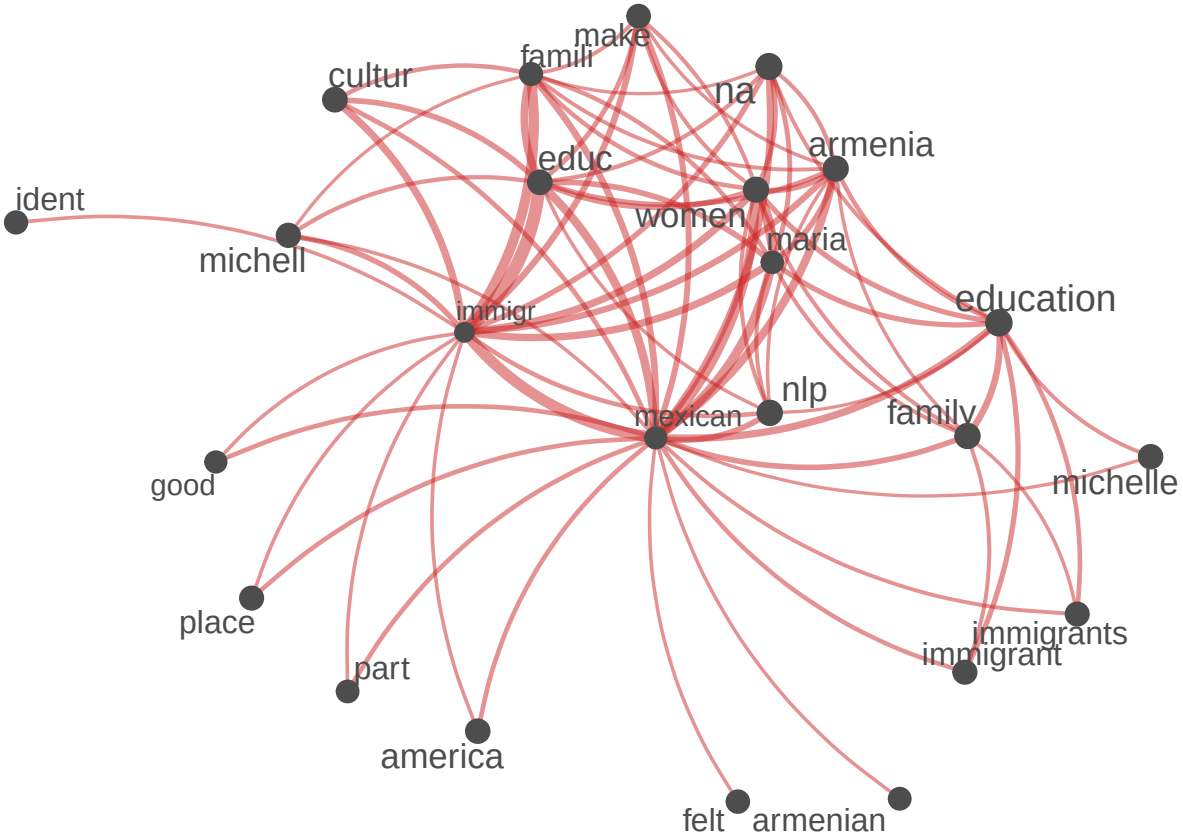
There are very strong lines in the center of Group 2's network, including among "family", "story", "lived", and "husband", as well as the locations and names of people in the book.

Group 3



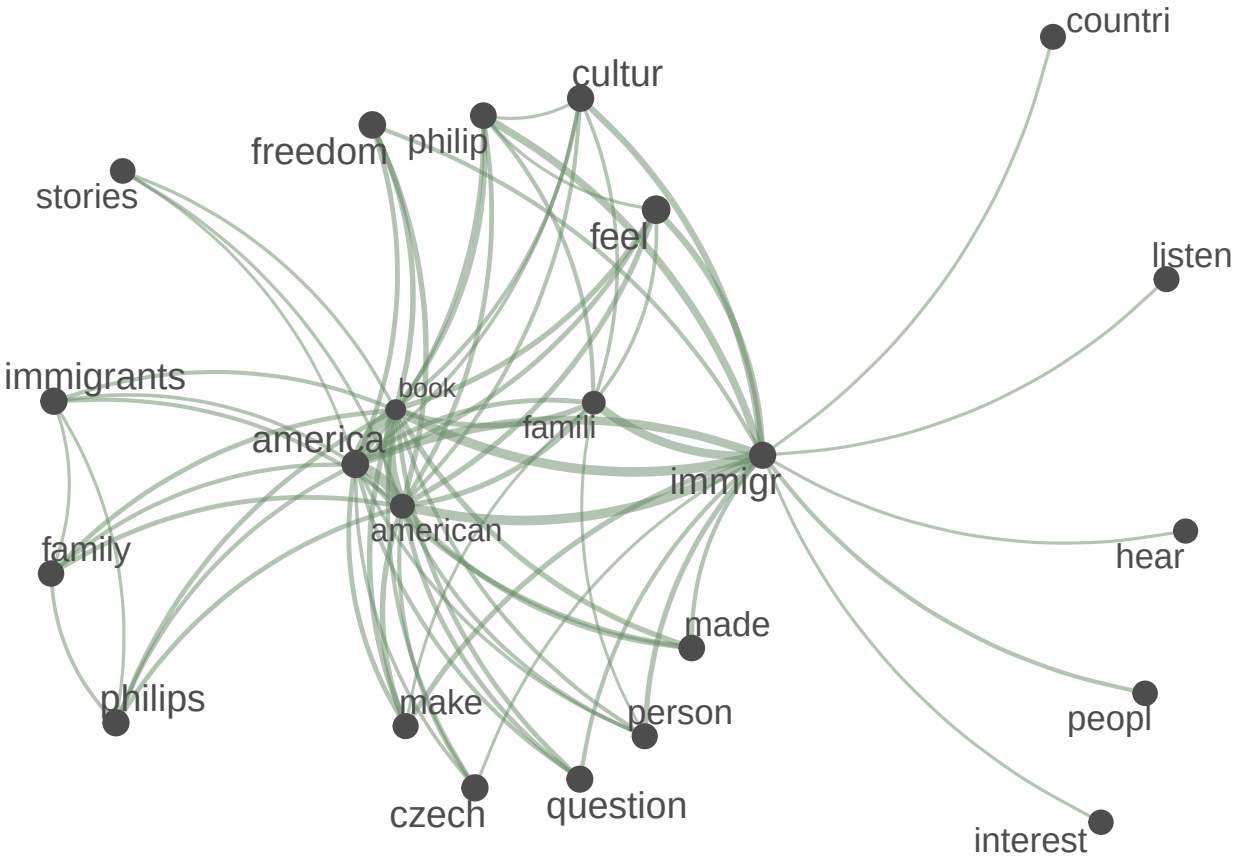
"Immigrants", "American", "freedom", and "life" appear predominantly in Group 3's network, signaling the emphasis they placed on the experiences of people after their immigration to America.

Group 4



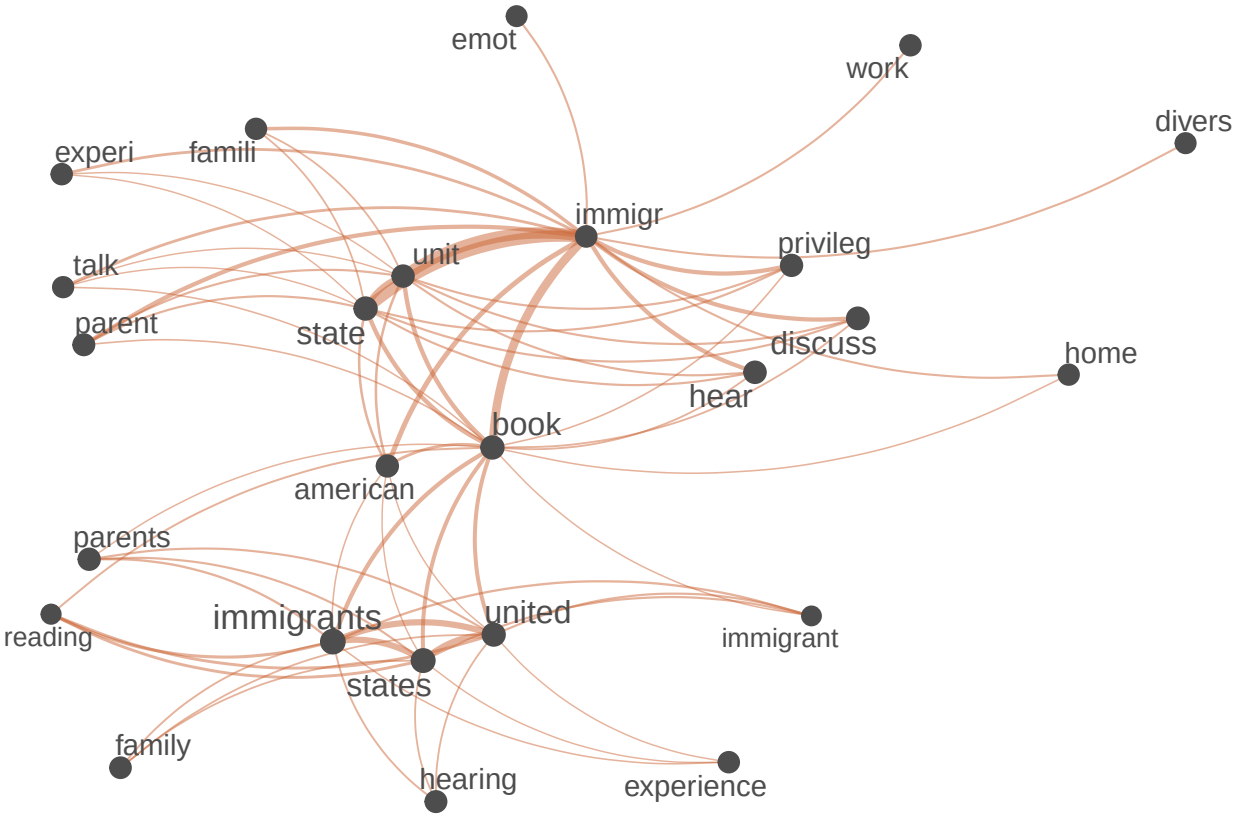
Besides country and person names, words like “education”, “culture”, and “identity” show some of the losses immigrants experience when they move to a new country.

Group 5



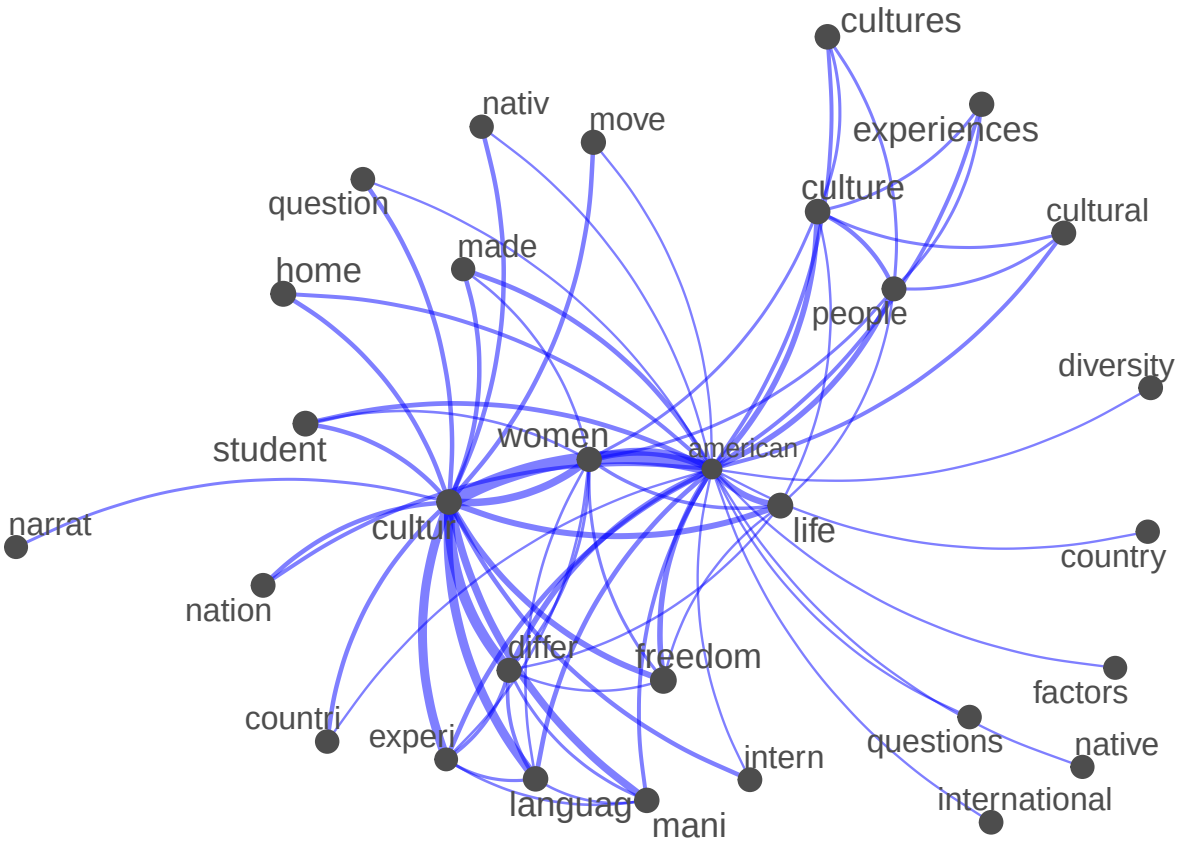
"Freedom", "culture", "America", and "immigrants" appear strongly in this network as well, similarly to other groups.

Group 6



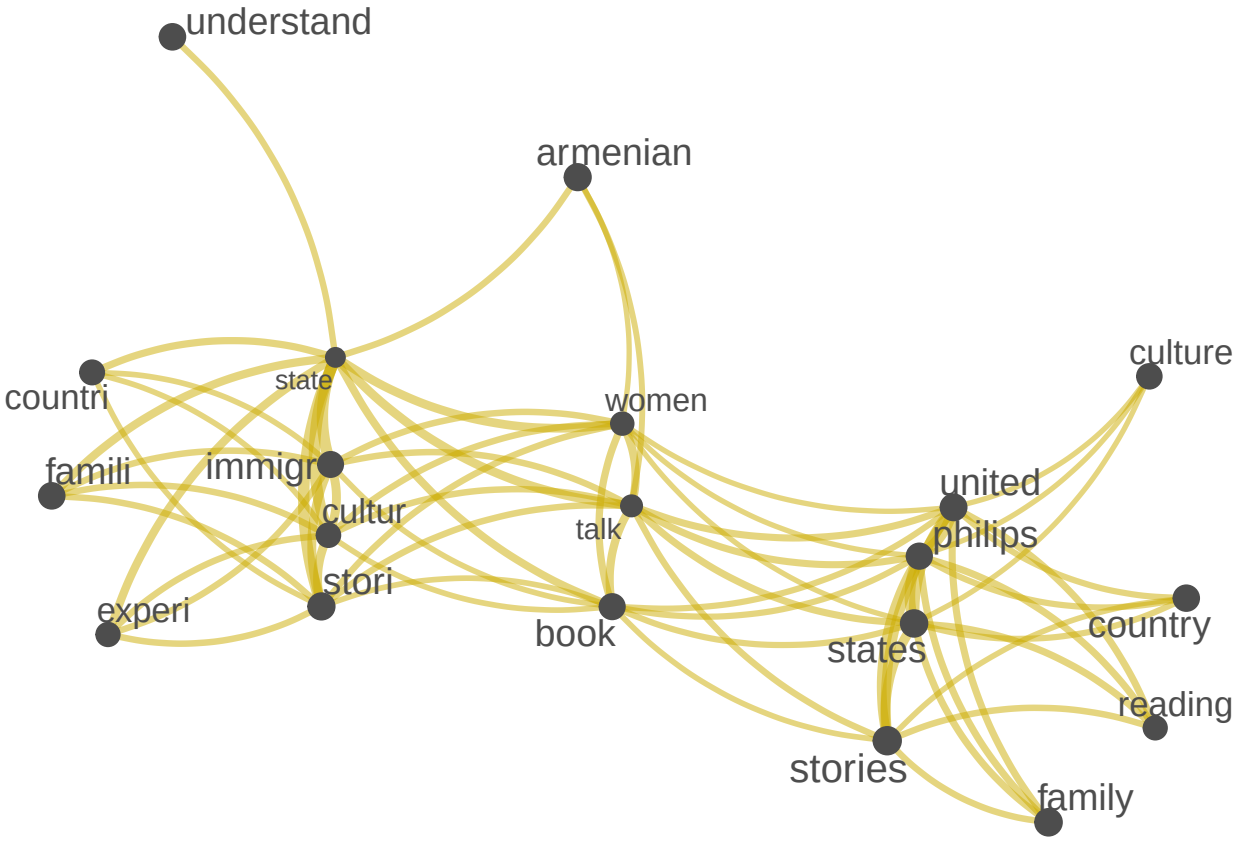
Group 6's network looks slightly different, with the only strong connection being between "United", "States", and "immigrate". Words that have not appeared in other networks appear farther out, such as "diverse" and "emotion".

Group 7



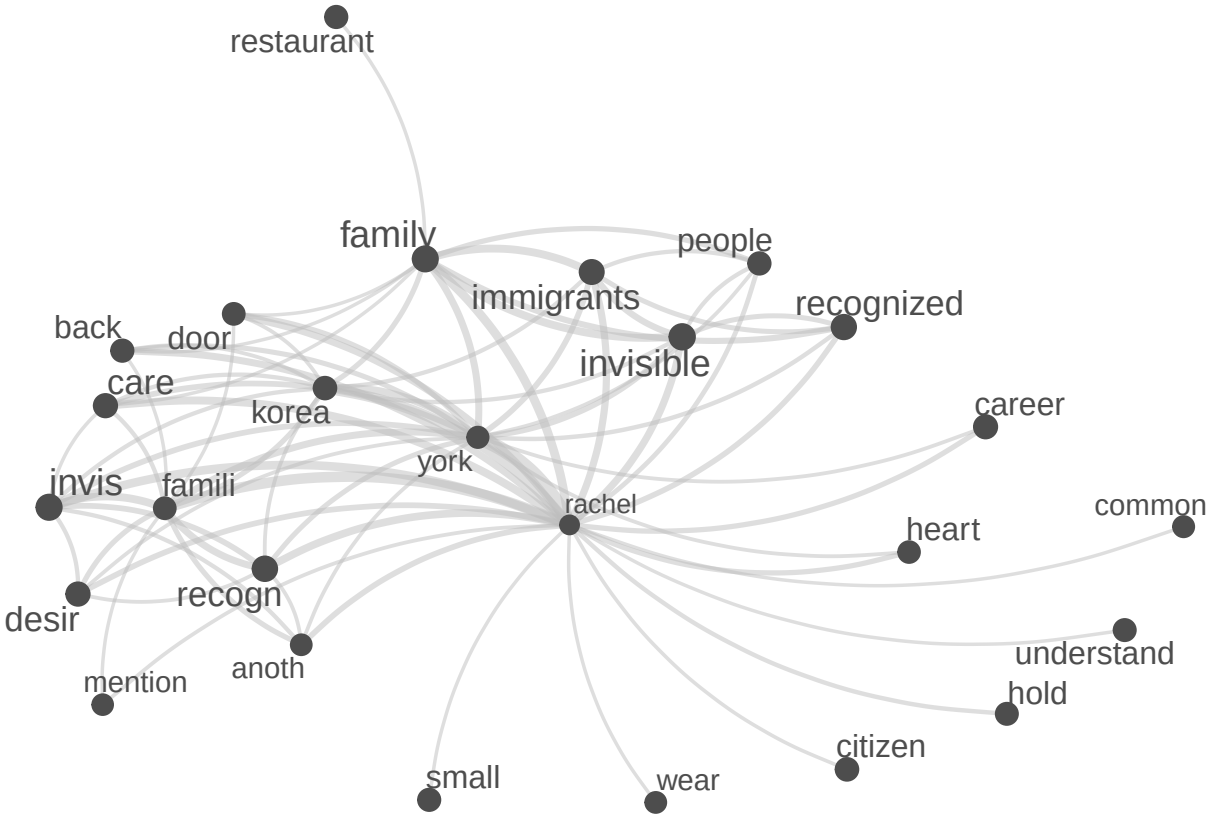
There are many strong connections in Group 7's network, including among "women", "culture", "language", "experience", and "American". This reveals some of the commonalities of the women's feelings after immigrating.

Group 8



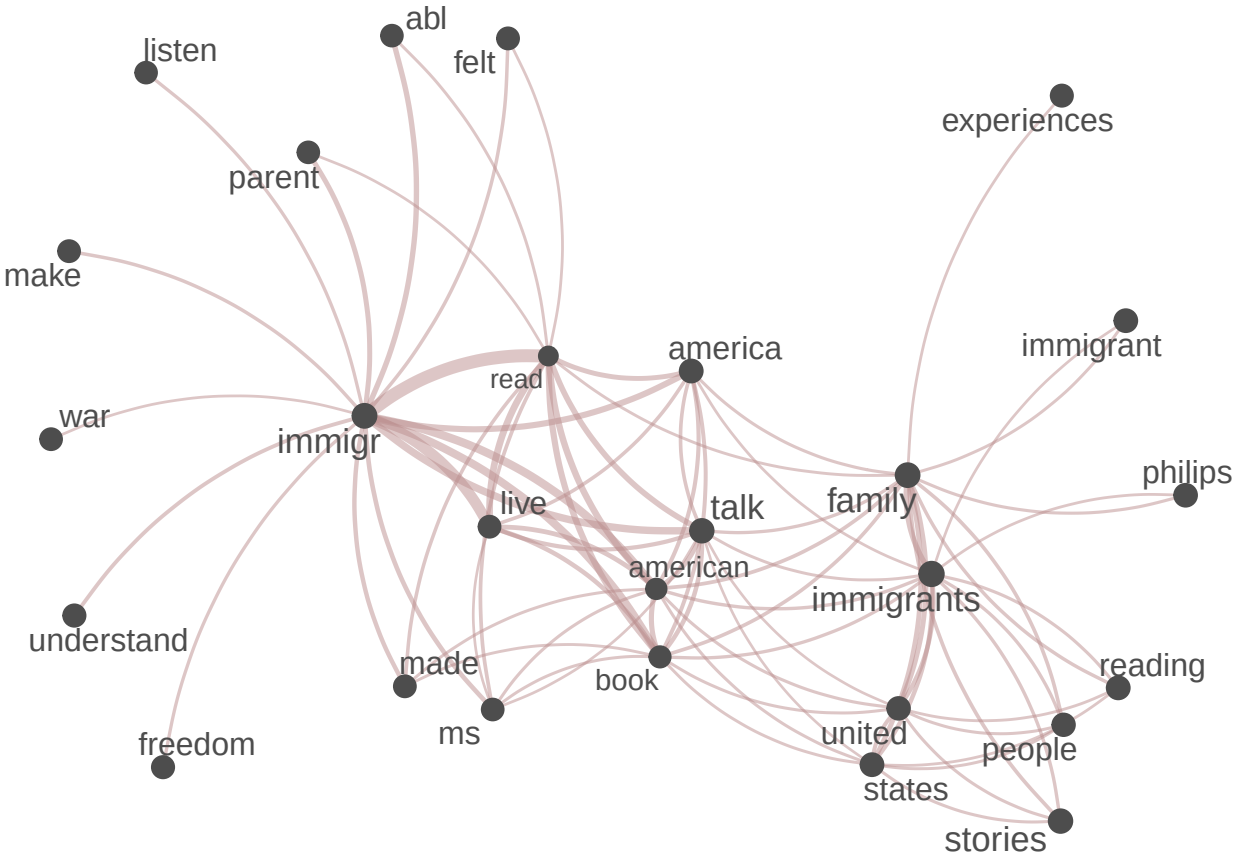
Words like “Philips”, “United”, and “States” are expected to be close and strongly connected because of the purpose of the book, along with “immigrate” and “culture”.

Solo



Because the subject of the interview was Rachel, her name shows up predominantly in the center of the network, with lines connected to “invisible”, “recognize”, and “care”.

Combination



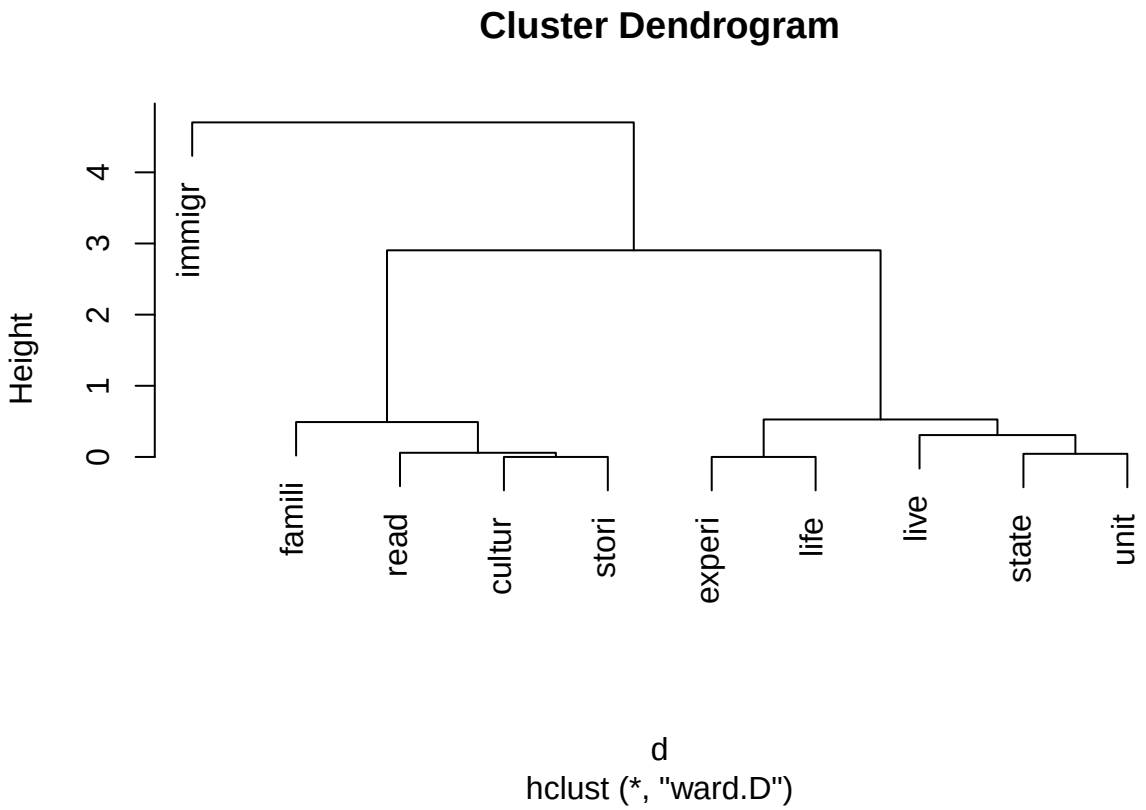
Some of the connected words found in all of the documents were “family”, “live”, “immigrants”, and “America”. Words on the outside of the network like “felt”, “war”, and “freedom” reveal further themes in all of the stories.

Cluster Dendrogram

Cluster dendrograms present a visual flowchart to represent the relationships between words, with words at the top branching down to words that they are often found with. Words stemming from the same branch are often found directly paired with each other.

```
## <<TermDocumentMatrix (terms: 1473, documents: 1)>>
## Non-/sparse entries: 1473/0
## Sparsity           : 0%
## Maximal term length: 17
## Weighting          : term frequency (tf)
## Sample             :
##         Docs
## Terms    Combination.txt
##   cultur              69
##   experi              49
##   famili              77
##   immigr             126
##   life                49
##   live                59
##   read                70
##   state               54
```

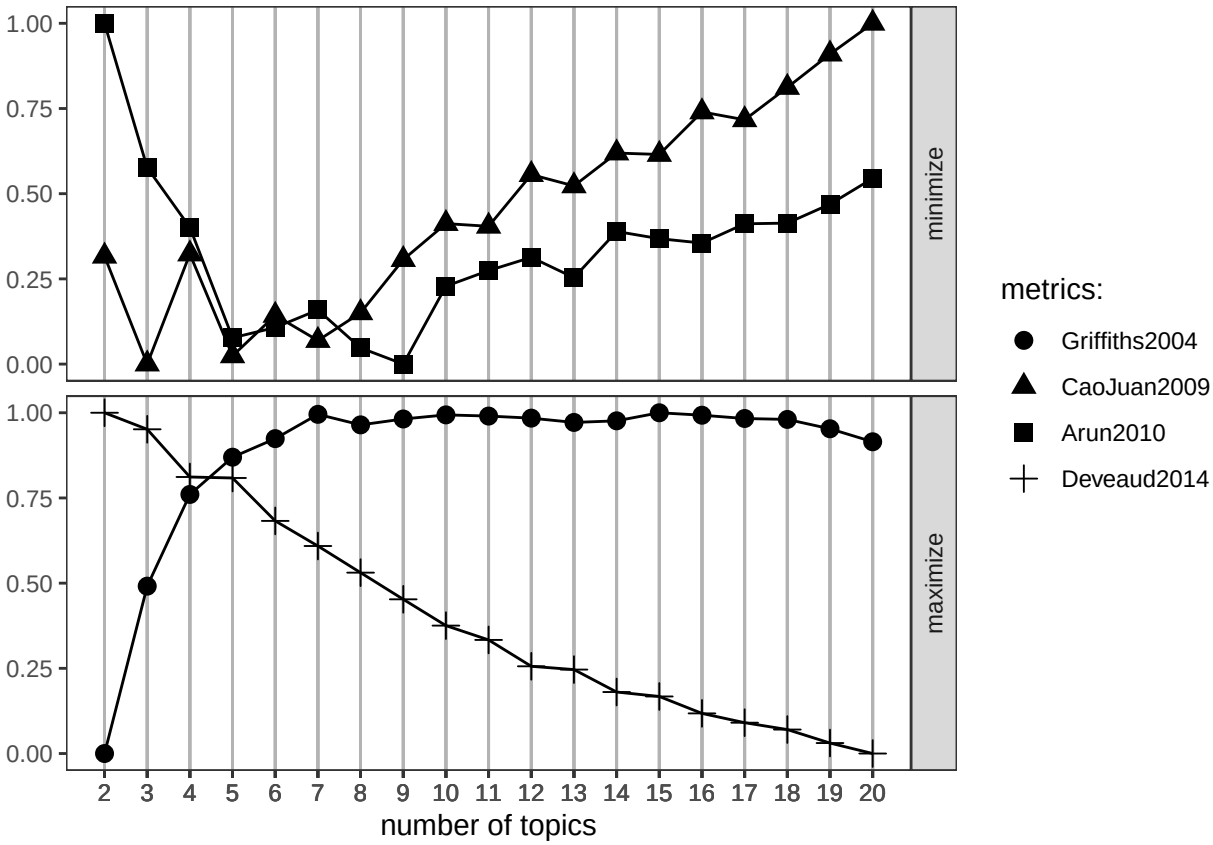
```
##   stori              69
##   unit               53
```



From this, we can see that the stem "immigr" is very commonly found. The words "United" and "States" are paired together, along with "life"/"experience" and "culture"/"story". Grouped with the first two pairs is "live", and grouped with the other pair is "read" and "family".

Topics Model

Topics modeling is a form of unsupervised learning that classifies words without having any references for potential grouping. Topics models are often fitted using latent Dirichlet allocation (LDA), which treats text as a mixture of topics, topics as a mixture of words, and mathematically determines which words make up a topic and which topics make up a text.



By finding the intersection of the "maximize" graph above, we see that the optimal number of topics is 5.

```
##      Topic 1      Topic 2       Topic 3    Topic 4         Topic 5
## [1,] "family"     "back"        "american" "another"       "think"
## [2,] "immigrants" "maria"       "mother"   "know"          "immigrant"
## [3,] "united"     "immigration" "talk"     "understanding" "experiences"
## [4,] "life"       "america"     "xidan"    "story"         "way"
## [5,] "states"     "freedom"     "like"     "fact"          "live"
```

The model organizes important words into these 5 themes. Topic 1 gives a broad overview, topics 2 and 3 focus on Maria and Xidan specifically, topic 4 highlights more personal words like "understanding" and "story", and topic 5 includes "experiences", "way", and "live".

VI. Conclusion

Through this project, we analyzed the common themes of what different groups got from Susan Philips's book and talk. Based on her name coming up often, Xidan's immigration story seemed to resonate among groups even though her chapter of the book was not given. Each group took away something slightly different, but common themes included women, education, freedom, and culture.

VII. Shortcomings and Suggestions

One shortcoming is the small sample size we were working with. An analysis of all papers that have ever been written in this class for this book may provide a more thorough insight into what students learn from this lesson. Additionally, because of the open-endedness of the questions asked for the reflection paper, groups took very different approaches in their answers. For example, some groups focused more on Susan Philips's presentation, while others only wrote about things they read in her book. Finally, textual data is not as

straightforward to analyze as numerical data, so the models and conclusions in our analysis are somewhat abstract. A suggestion we have moving forward would be for the reflection paper questions to ask each individual not just about the chapters they read but also about the talk itself. Many groups chose to write about the talk in response to the group question about what they learned, so they may have had more to say individually about the talk and discussion.