Andrea Antenan

Python for Bible

Dr. Bandstra

21 April 2016

Project Paper

For my project, I set out to create a python program, using the NLTK toolkit, that analyzed and provided data on the Institution of the Last Supper in the Synoptic Gospels, the Bread of Life Discourse in the Gospel of John, and Paul’s Eucharistic exhortation to the Corinthian church in 1 Corinthians 11. My purpose in creating this program was to identify trends in vocabulary in each text that may indicate certain theological themes. I did not find anything particularly revolutionary as far as the biblical and theological scholarship is concerned; while I did not formulate new conclusions about the text, my program did reveal data unfamiliar to me that support preexisting claims about the Institution Narratives.

My first task was creating the appropriate .txt files for my program. First, I created .txt files for the entirety of all five of my books: Mark, Matthew, Luke, John, and Corinthians. I named them as Mark.txt, Matt.txt, etc. Next, I created .txt files for each of my selected texts: Mark 14:12-26, Matthew 26:17-30, Luke 22:7-39, John 6:25-59, 1 Corinthians 11:17-34. I named these as BOOKmark.txt, BOOKmatt.txt, etc.

Then, I worked on one .py file that, when invoked with a command line argument specifying a .txt file of a text selection (e.g. John.txt) and another argument specifying the .txt file of the entire corresponding book (e.g. BOOKjohn.txt), would perform various functions from the NLTK toolkit. The functions I utilized are as follows:

1. Collocations of text selection
2. Frequency Distribution of terms that occurred more than twice
3. Frequency plot of the twenty most frequently used words
4. Concordance of the terms given in frequency distribution
5. “Similar” to process terms used in similar context as the words given in frequency distribution above
6. Dispersion plot of the words from above frequency distribution

Before writing the code for the appropriate functions, I made sure to make my .txt files into corpora so that the given NLTK functions could be used on my texts. I also applied “stopwords” to my files so that words such as “a”, “an”, “the”, etc. would not be figured into my data.

Instead of running all of my data in the terminal, I decided to run my program so that all of the results would be saved into a .txt, so that I could easily compare the different results from my various texts. To do this, I simply ran my command line with a greater than sign (“>”) followed by the name of .txt file that I wanted to save the data in. For example, I entered the following to run my program on the Gospel of John and save it into a new .txt file:

python PrintTexts.py John.txt BOOKjohn.txt>JohnDATA.txt

I carried out this task with all five of my texts, saving each plot as a .png along with the file. Once I had all of my new .txt files saved (JohnDATA.txt, MattDATA.txt, etc.), I examined my data so as to hypothesize

The common collocations of each text tend to reveal the thematic content of each book most succinctly. In the case of the Synoptics, we get “may eat” (Mark), “gave thanks” (Matthew), and “may eat” and “given thanks” (Luke). This reveals the cut-and-dry liturgical formulation of the last supper in the Synoptics, which was most likely written in Mark first, and then copied in Matthew and Luke. Christ takes the bread, gives thanks, breaks the bread, and gives the bread to his disciples; and in the same way he takes the cup, gives thanks, and gives the cup to his disciples.

For John and Corinthians, on the other hand, the collocations suggest more striking theological themes. For my text selection in John, there are *ten* common text collocations. The greater number of collocations could be attributed immediately to the fact that my text selection for John is larger than all the other text selections; and a couple of these are uninteresting (for example: “said therefore” and “therefore said”). However, a good deal of the other collocations reveals the thematic focus of the text: “last days”, “eternal life”, “fathers ate”, “live forever”, and “Father gives.” All of these indicate John’s harkening back to the Jewish past while simultaneously promising for an eschatological future.

In Corinthians, there is only one collocation, but it could not be more fitting for the nature of Paul’s instruction to the Corinthian church—“come together.” It does not take much reading of Paul’s letter before you realize the divisive nature of the Corinthian church. Paul writes to Corinthians to address their division and provide not only theological, but pastoral counsel. (insert research something) Paul’s recollection of the institution narrative is not only highlighting the Christ’s model of Eucharistic celebration or teaching the theological significance, but also emphasizing that the Eucharist instituted by Christ has real implications on how we are as a church body. “Coming together” in a liturgical celebration is not as simple as being in the same space and doing the same thing; “coming together” must be a reconciliation with God and each other.

While the Institutions Narratives in the Synoptics are less theologically colorful when compared to John and 1 Corinthians, Matthew, Mark, and Luke still give unique voice to the Christ’s Passover meal. Mark and Matthew relay the Last Supper almost identically. Many arguments could be made, and have been made, concerning the uniqueness of each account despite its similarities. While each gospel’s account of the Passover meal is more or less the same, each author provides unique authorial voice and places the Institution within a dramatic context all its own. There were the slightest indications of this in my running of the “similar” function with each text. Again, with this function, I was able to identify the most frequently used words in each Institution narrative and test what other terms occur in similar contexts throughout the entirety of that specific gospel. For example, each of the two narratives use the term Passover a few times and with the similar function, I saw a couple similarities and differences in the context that Passover usually takes in each gospel. In both Matthew and Mark, the words “temple”, “multitude[s]”, and “house[holds]” occur frequently in the same context. In Mark, “Jews”, “wilderness”, “poor”, “mountain[s]”, and “Pharisees” occur in similar contexts with “Passover.” In Matthew, “Sabbath”, “flesh”, and “prophets” occur in contexts with “Passover.”

Ultimately, this kind of differentiation is beyond the scope of my python program. Instead, my program was much more adept at identifying unique aspects of the Synoptics concerning the gospel of Luke. The selection from the Gospel of Luke that I chose was almost double the length of Matthew or Mark; the selection from Luke is thirty-two verses long while Matthew and Mark is thirteen and fourteen verses respectively. This was not a discrimination against Matthew and Mark on my part. I began and ended each of the three Synoptics at identical points in the narrative. Each begins with some form of indicating the first day of Unleavened Bread and Jesus’ instructions to his disciples shortly afterward:

On the first day of unleavened bread, when they sacrificed the Passover, his disciples asked him, "Where do you want us to go and make ready that you may eat the Passover?"[[1]](#footnote-1)

Now on the first day of unleavened bread, the disciples came to Jesus, saying to him, "Where do you want us to prepare for you to eat the Passover?”[[2]](#footnote-2)

The day of unleavened bread came, on which the Passover must be sacrificed. He sent Peter and John, saying, "Go and prepare the Passover for us, that we may eat."[[3]](#footnote-3)

Likewise, each of three close with Jesus and the disciples singing the hymns and going up to the Mount of Olives:

When they had sung a hymn, they went out to the Mount of Olives.[[4]](#footnote-4)

When they had sung a hymn, they went out to the Mount of Olives.[[5]](#footnote-5)

He came out, and went, as his custom was, to the Mount of Olives. His disciples also followed him.[[6]](#footnote-6)

If each of three Synoptics begin and end with the declarations of the Passover and the going to the Mount of Olives, it necessarily follows that the length of Luke’s gospel indicates more content within his account of the Last Supper. So the question is: What accounts for this content? Is Luke simply more loquacious in his articulation of identical points?

My program answered the latter question with, “No, Luke is not more loquacious. But *Jesus* is.” In the list of most frequently used words, “said” took the highest number of occurrences with thirteen and “saying” occurred three time, giving the root of this speaking verb a combined value of sixteen. Once you peek at the concordance of “said” and “saying,” you see that there are only three occurrences of “said” in which Jesus is *not* speaking. Now, in Mark and Matthew, “said” holds a high number of occurrences relative to count of words (Mark with six and Matthew with five); but by and large the excess content of Luke seems to be constitutive of words spoken by Jesus.

But what exactly is Jesus saying? Luke, Mark, and Matthew all have Jesus instructing his disciples on Passover preparations, notifying them of his betrayal, and speaking the words of Institution over the meal. The gospel of Luke, however, has a couple lessons given by Jesus to the disciples during the meal and an eschatological prophecy and promise immediately before and after the words of institution. We can identify the first lesson by looking at the second most frequently used word in Luke’s Last Supper—“one.” When you look at the concordance for the entry “one” in the LukeDATA.txt file my program created, you realize that all six occurrences of “one” happen in quick succession over the course of two verses. You also find out that the commonly used word “serves” occurs within these same verses. The verses are as follows: “But one who is the greater among you, let him become as the younger, and one who is governing, as one who serves. For who is greater, one who sits at the table, or one who serves? Isn't it he who sits at the table? But I am in the midst of you as one who serves.”[[7]](#footnote-7) These verses typify the Christ of the lowly, who serves and heals the poor and oppressed, that is often associated with the gospel of Luke. And in this lesson during the Last Supper, this Christ is instructing his disciples to embody this spirit of service and love.

The last instance of Jesus’ loquacity that my program was able to observe is an eschatological refrain just before and just after Luke’s account of the Institution of the Lord’s Supper. I was able to identify this by looking at the frequently used word “Kingdom”, which happens three times during Christ’s blessing, breaking, and giving of the bread. The instances of Kingdom are as follows (in context):

He said to them, "I have earnestly desired to eat this Passover with you before I suffer, for I tell you, *I will no longer by any means eat of it until it is fulfilled in the Kingdom of God*." He received a cup, and when he had given thanks, he said, "Take this, and share it among yourselves, for I tell you, *I will not drink at all again from the fruit of the vine, until the Kingdom of God comes*.”[[8]](#footnote-8)

…

*“I confer on you a kingdom*, even as my Father conferred on me, *that you may eat and drink at my table in my Kingdom*. You will sit on thrones, judging the twelve tribes of Israel.”[[9]](#footnote-9)

In the first passage, Christ is prophesying the eschatological reality that his coming death and resurrection will ensure. He is instituting a practice prior to his own death and resurrection, which will make the continued Christian practice of the Lord’s Supper valid, and begin a cosmic arc toward a table and banquet at the end of time. In the second passage, Christ extends the inheritance of His Father’s kingdom to the disciples (and in turn to the many that they will baptize and nurture in faith). He paints a prophetic picture familiar to the Jewish imagination, yet repurposed in a Christian eschatology.[[10]](#footnote-10)

Now, we move on to the gospel of John, which is different than the Synoptics in countless ways. In terms of my research, the most relevant difference is John’s lack of a Last Supper Narrative. However, while John does not have an Institution of the Lord’s Supper, it does not mean he does not have a theology of the Eucharist that connects Christ’s sacrifice on the cross as a new Passover sacrifice for all people. In fact, John constructs his narrative so that the killing of the Passover lamb happen a day prior to Good Friday, but instead on Good Friday itself. John’s account indicates that the morning of Christ’s crucifixion is the day of the Passover:

“It was early morning. They themselves did not enter the governor's headquarters, so that they would not be defiled, but could eat the Passover.”[[11]](#footnote-11) In this way, John is not ignoring the relevance of Christ as the Passover lamb, but emphasizing it to the utmost.

While John may be emphasizing Christ as the Passover Lamb just as much, if not more, than the Synoptics, it has remained to be seen that he sees the practice of the Lord’s Supper as essential. This is where the text that I chose to run through my script comes in. For my John.txt file, I used the Bread of Life discourse for John’s version of the “Institution.” The Bread of Life discourse comes after Jesus feeds the multitude in the Book of Signs in chapter six of John. While other arguments over the subject matter of the text have been made, I find that the text seems to undeniably refer to Eucharistic practice and offers a more theological commentary on the practice indicated explicitly in the Synoptics. In fact, while this is not exactly synonymous to the meal in the Synoptic, it still occurs around the time of the Passover and the text makes a point to emphasize that just before the feeding of the multitude: “Now the Passover, the feast of the Jews, was at hand.”[[12]](#footnote-12) The Bread of Life discourse occurs the following day,[[13]](#footnote-13) thereby even closer to the event of the Passover that is so central to the Synoptic Eucharistic accounts.

There are countless theological profundities in the Bread of Life discourse; for the purpose of my research, I will only highlight a couple elements that were accentuated by my python script. The two different components I gathered were very much two sides of the same coin. The first trend in John’s discourse is Jesus’ focus on the people of Israel being sustained by manna from heaven in the wilderness. The second trend is Jesus’ continued emphasis on him being sent by the Father from heaven to the world as the Bread of Life.

The collocations function brought the first trend to my attention. I mentioned above that one of the common collocations in the Bread of Life discourse was “fathers ate.” When you look down to the frequency distribution list, the words “fathers” and “ate” and “manna”, with their relatively low values of three, four, and three respectively, are lost amidst the slew of frequent words with high values in the discourse. However, the collocations were essential in bringing this word pair to my attention. After it was brought to my attention, I visited the concordance of “fathers” (and by extension “ate”) and identified the frequent word “manna” within the same contexts. The verses are as follows:

*“Our fathers ate the manna in the wilderness*. As it is written, 'He gave them bread out of heaven to eat.'" Jesus therefore said to them, "Most certainly, I tell you, it wasn't Moses who gave you the bread out of heaven, but my Father gives you the true bread out of heaven.”[[14]](#footnote-14)

…

“I am the bread of life.

*Your fathers ate the manna in the wilderness, and they died*.

This is the bread which comes down out of heaven, that anyone may eat of it and not die.”[[15]](#footnote-15)

…

“As the living Father sent me, and I live because of the Father; so he who feeds on me, he will also live because of me. This is the bread which came down out of heaven--*not as our fathers ate the manna, and died*. He who eats this bread will live forever."[[16]](#footnote-16)

It also becomes clear that half of the occurrences of “heaven” are also in these passages about the eating of manna by the fathers of Israel. In these passages, Jesus is using the history of Israel in the wilderness as a parallel to his lesson on the new bread sent from heaven; however, this parallel diverges on one essential point: the fathers of Israel ate manna and died, but the new bread sent by the Father from heaven brings eternal life (another common collocation identified by my program).

This brings us to the next trend identified by my script—Jesus repeatedly emphasizes how the Father sent him from heaven. “Father” was a more easily identified word in my list of frequently used words, clocking in with a value of ten and tying for second place behind “bread” and alongside “heaven”, which is usually in a similar context with Father in the Bread of Life discourse. Three of the eleven instances of “Father” have the either of two formulations spoken by Jesus “Father gives me” or “Father sent me”:

“This is the will of *my Father who sent me*, that of all he has given to me I should lose nothing, but should raise him up at the last day.”[[17]](#footnote-17)

…

“No one can come to me unless *the Father who sent me* draws him, and I will raise him up in the last day.”[[18]](#footnote-18)

…

“As *the living Father sent me*, and I live because of the Father; so he who feeds on me, he will also live because of me.”[[19]](#footnote-19)

These passages and others indicated by the concordance in my program emphasize Christ’s role as the Son of God, sent by the Father to do his will and act as a mediator between the Father and His children on earth. The other instances of “Father” occur alongside the reference to the “fathers” of Israel who ate manna sent by “Father;” however, the emphasized action of the “Father” is usually on his giving of the true bread from heaven (“Father gives” is another common collocation indicated by my program):

Our fathers ate the manna in the wilderness. As it is written, 'He gave them bread out of heaven to eat.'" Jesus therefore said to them, "Most certainly, I tell you, it wasn't Moses who gave you the bread out of heaven, *but my Father gives you the true bread out of heaven. For the bread of God is that which comes down out of heaven, and gives life to the world.*"[[20]](#footnote-20)

*As the living Father sent me, and I live because of the Father; so he who feeds on me, he will also live because of me. This is the bread which came down out of heaven*—not as our fathers ate the manna, and died. He who eats this bread will live forever."[[21]](#footnote-21)

The Synoptics’ Last Supper narratives provide a liturgical model—with Luke’s added lessons in service and eschatology—and John’s Bread of Life packs a theological punch. It could be said that 1 Corinthians approach provides practical pastoral implications of communion in the church. I indicated above that the collocation “come together” was all that printed for 1 Corinthians and rightfully so. It seems appropriate that Paul’s exhortations for communion or the agape meal (whichever is in practice in this congregation) would fit the tone of correction and instruction that the rest of the letter has.

Before Paul even gets into the nuts and bolts of how to perform the actual rite of the Eucharist in verses 20-28, he seems to state his reason in even explaining the rite. When I looked to the concordance for “come,” and by extension “together,” I was first pointed to verse 18, which proceeds Paul’s explanation of the Last Supper:

But in giving you this command, I don't praise you, that you come together not for the better but for the worse. *For first of all, when you come together in the assembly, I hear that divisions exist among you, and I partly believe it.* For there also must be factions among you, that those who are approved may be revealed among you. When therefore you assemble yourselves together, it is not the Lord's supper that you eat. For in your eating each one takes his own supper first. One is hungry, and another is drunken. What, don't you have houses to eat and to drink in? Or do you despise God's assembly, and put them to shame who don't have? What shall I tell you? Shall I praise you? In this I don't praise you.[[22]](#footnote-22)

In this, Paul is using “come together” in explanation of the manner in which the Corinthians are currently coming together—which is in a state of division and hierarchy. He addresses their error, provides the salve in explaining the rite of the Lord’s supper in the coming verses, and ending with practical pastoral advice:

Therefore, my brothers, *when you come together to eat, wait one for another.*

But if anyone is hungry, let him eat at home, lest your coming together be for judgment. The rest I will set in order whenever I come.[[23]](#footnote-23)

Paul repurposes “come together,” using it to instruct them in a way that embodies the heart of the communion they are receiving—a loving communion between a recipient and God, but also a communion between the recipients within the church.

Overall, my script using the NLTK toolkit helped me to identify trends in the texts that I may not have otherwise recognized. By using the data provided by collocations, frequency distribution, concordance, and similar function, I gathered new evidence to support pre-existing hypotheses I had regarding each text’s approach to the Lord’s Supper. The Synoptics tend to provide a more cut-and-dry liturgical model for the Lord’s Supper—with Luke’s account providing added lessons in service and eschatology—while John feeds in theological complexity and Paul incorporates pastoral concern. These texts provide unique and essential components to robust and well-balanced understanding of the Christian Eucharist.

1. Mark 14:12 [↑](#footnote-ref-1)
2. Matthew 26:17 [↑](#footnote-ref-2)
3. Luke 22:7-8 [↑](#footnote-ref-3)
4. Mark 14:26 [↑](#footnote-ref-4)
5. Matthew 26:30 [↑](#footnote-ref-5)
6. Luke 22:39 [↑](#footnote-ref-6)
7. Luke 22:26-27 [↑](#footnote-ref-7)
8. Luke 22:15-18 [↑](#footnote-ref-8)
9. Luke 22:29-30 [↑](#footnote-ref-9)
10. See Revelation 21:12 for an eschatological vision of the twelve tribes of Israel. [↑](#footnote-ref-10)
11. John 18:28 [↑](#footnote-ref-11)
12. John 6:4 [↑](#footnote-ref-12)
13. John 6:22 [↑](#footnote-ref-13)
14. John 6:31-32 [↑](#footnote-ref-14)
15. John 6:48-50 [↑](#footnote-ref-15)
16. John 6:57-58 [↑](#footnote-ref-16)
17. John 6:39 [↑](#footnote-ref-17)
18. John 6:44 [↑](#footnote-ref-18)
19. John 6:57 [↑](#footnote-ref-19)
20. John 6:31-33 [↑](#footnote-ref-20)
21. John 6:57-58 [↑](#footnote-ref-21)
22. 1 Corinthians 11:17-22 [↑](#footnote-ref-22)
23. 1 Corinthians 11:33-34 [↑](#footnote-ref-23)