Lesson 1 Hands-on Workshop: SAS® Visual Text Analytics in SAS® Viya®

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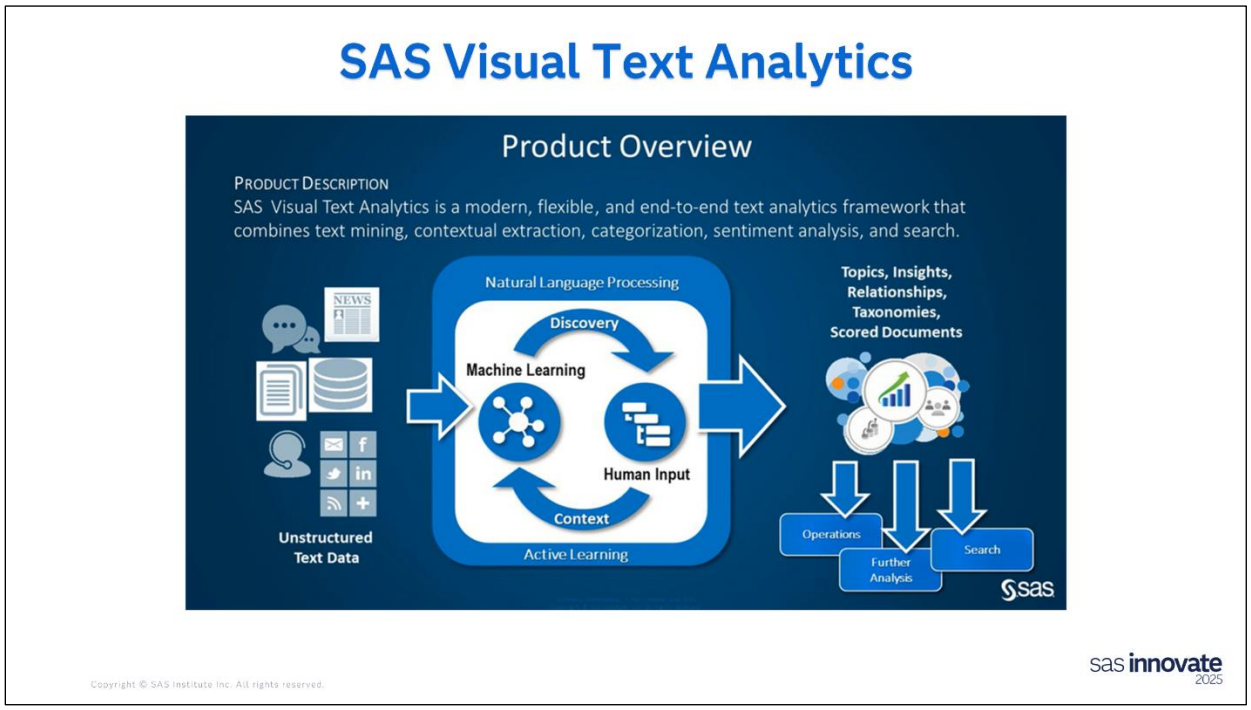
1.1 Introduction to SAS Visual Text Analytics



SAS Visual Text Analytics is a high-end software product that simplifies the use of text analytics for many types of users, from business analysts to document librarians. By choosing intelligent parameter settings, or by using machine-learning tools to “learn” an appropriate setting, Visual Text Analytics frees the user to concentrate on the immediate task. The downside to making the software powerful and easy to use is that users who try to explore specific algorithmic details for educational purposes are limited in the experiments that can be designed to help understand algorithmic choices.

SAS Visual Text Analytics is a web-based, text analytics application that enables you to identify key terms and concepts in your document collections, build concept and topic models, and use linguistic rules to categorize documents.

SAS Visual Text Analytics can be accessed via a point-and-click interface included in SAS Viya called Model Studio. Model Studio will be used to access Visual Text Analytics in the following demonstrations. Visual Text Analytics procedures and CAS actions can also be used for those more comfortable working with code. SAS Studio can be used as a code-editor interface in such cases.

SAS Visual Text Analytics helps the text analyst face the big, unstructured text data challenges effectively in a timely manner by providing powerful tools in the fields of text data exploration and visualization, information retrieval, and content categorization.

SAS Visual Text Analytics: Capabilities and Benefits

- Natural language processing: Enhances parsing to add language features and expand the document collection term table; supports topic derivation
- Automated feature extraction with machine-generated topics: Discovers themes and shows related terms and documents for each theme
- Native linguistic support for multiple languages: Supports the global nature of a business (more than 30 world languages)
- Sentiment analysis: Supports business decisions by revealing trending perspectives
- Support for both machine learning and rules-based approaches within a single project: Enables scoring of new documents to reveal emerging trends and identify dominant themes

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SAS Visual Text Analytics: Capabilities and Benefits

- Contextual extraction: Enables non-ambiguous coding of subject matter expertise to extract specific information from within documents
- Flexible deployment: Maximizes the data's value and accelerates the data to the decision timeline
- Facilitation of collaboration in a multi-user environment: Fuels collaboration and information sharing in an open analytics ecosystem

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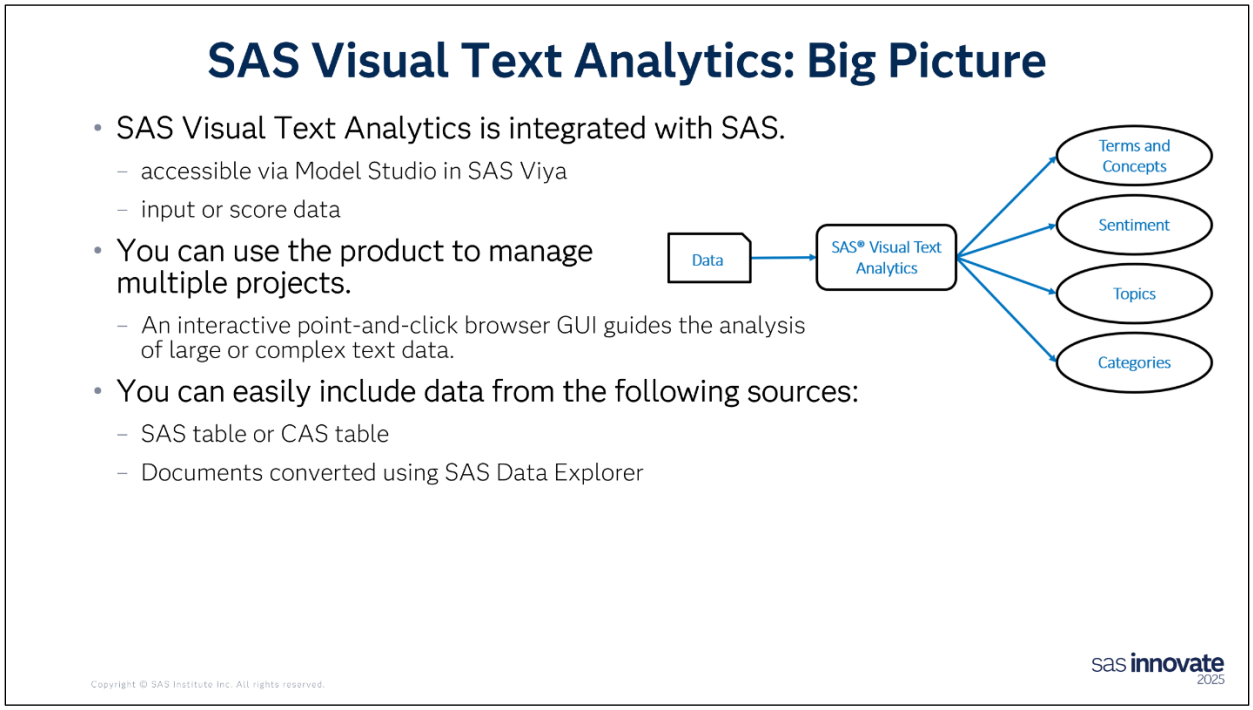


Manual text analysis efforts suffer from inadequacy due to human subjectivity and inconsistency, as well as the time that is required to read each document and classify it. SAS Visual Text Analytics eliminates the need to manually review documents, develop a training corpus, and manually develop taxonomies. After data are registered to the software, natural language processing (NLP) is automatically performed. This includes tokenization, term frequency counts, stemming, and part-of-speech tagging. Combining statistical machine learning with an extensive array of linguistic operators and prebuilt concept definitions, the text analyst is empowered to customize the automatically discovered results within a single, visual, guided application.

From a practical standpoint, SAS Visual Text Analytics is a single application that brings together the techniques that are used in text mining, categorization, contextual extraction, sentiment analysis, and topic derivation. This enables analysts to apply the appropriate analysis to meet their specific use cases without needing to switch applications or move data around. Using SAS Visual Text Analytics is more productive when it is no longer economical to manually review and classify your volume of documents (typically, greater than 500 documents) or when errors associated with manual tagging result in inconsistent, untrustworthy, or misinformed business understanding.

Creating a SAS Visual Text Analytics Project with No Predefined Concepts

This demonstration introduces SAS Visual Text Analytics features that enable users to automatically extract topics and develop tools that automatically classify categories of interest without using any predefined concepts.

This demonstration has four objectives:

- exploring and preparing a document collection
- using the default functionality to create a SAS Visual Text Analytics project with the demonstration data
- exploring the automatically generated topics and the associated documents, and promoting the most intriguing topics to categories
- exploring the rules that are generated by SAS Visual Text Analytics for identifying and categorizing the documents that belong to the relevant categories

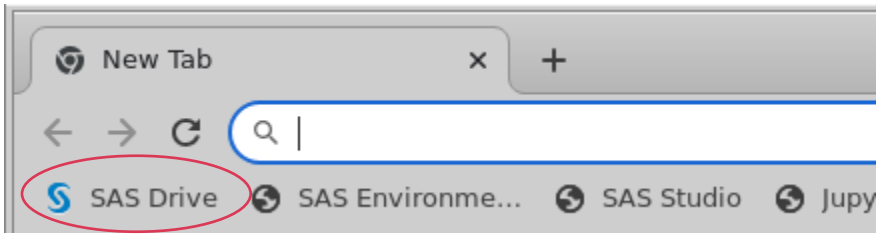
Using SAS tools such as SAS Visual Analytics to explore text data prior to building text models is highly recommended. For brevity, we skip this initial exploration in the current demonstration.

The data set for this demonstration is **drug_reports**. The data set contains 1,414 patient comments about drug side effects. The patients are on prescription drug medications to treat depression and anxiety. The end goal of the analysis is to use the Topics node to search for prevailing themes within the patient feedback documents and promote any topics related to positive patient recovery as categories.

Creating a SAS Visual Text Analytics Project (Step 1 of 3)

Follow the steps below to create the Visual Text Analytics project (step 1).

1. Open Google Chrome from the virtual computer desktop.
2. Using the shortcuts at the top of the browser window, select **SAS Drive**.



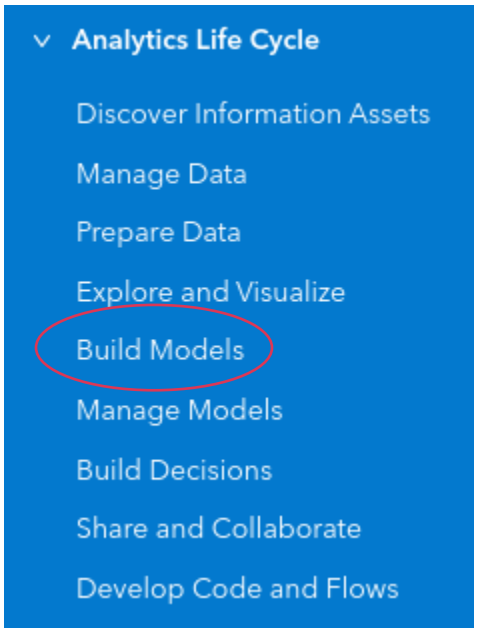
3. Sign in using these credentials:

   User ID: **student**

   Password: **Metadata0**

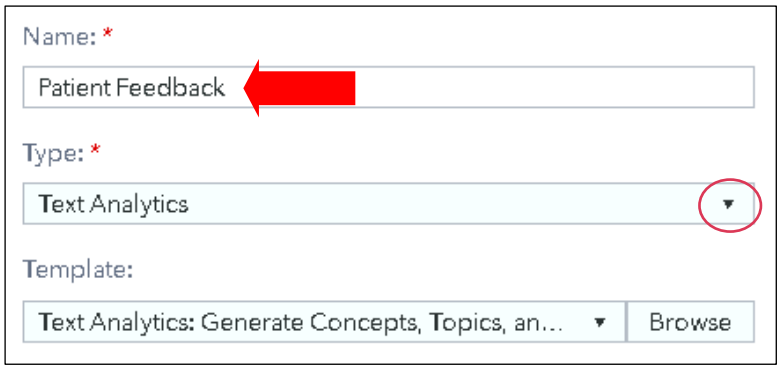
4. Click **Yes** to opt in to assumable groups.

5. In the top left of SAS Drive, click the **applications menu** button and select **Build Models**. This action invokes Model Studio. Note that the Model Studio interface also has an applications menu button.

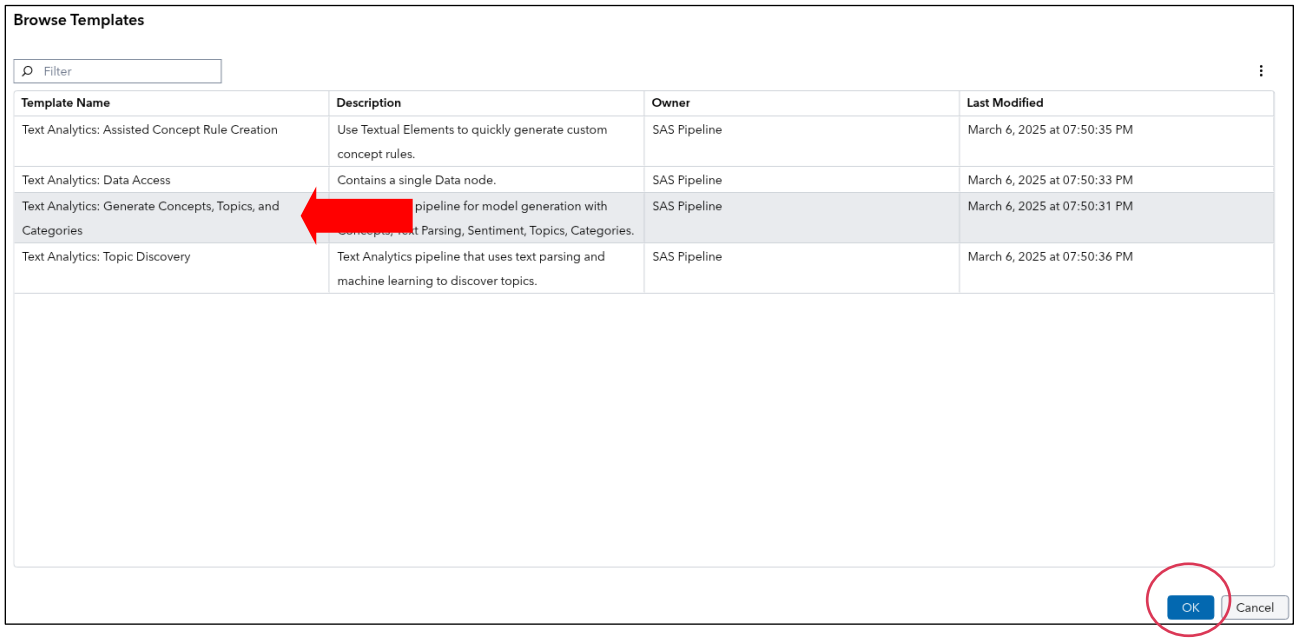


6. In Model Studio, click **New Project** in the upper right corner.

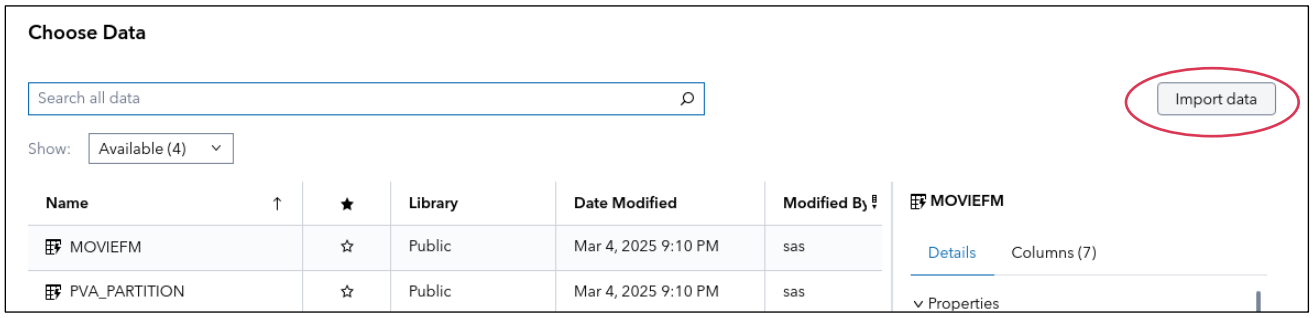
7. Enter **Patient Feedback** for **Name** and select **Text Analytics** from the drop-down menu under **Type**.



8. Select **Browse** under **Template**. In the Browse Template window, select the Template Named **Text Analytics: Generate Concepts, Topics, and Categories**. Click **OK**.



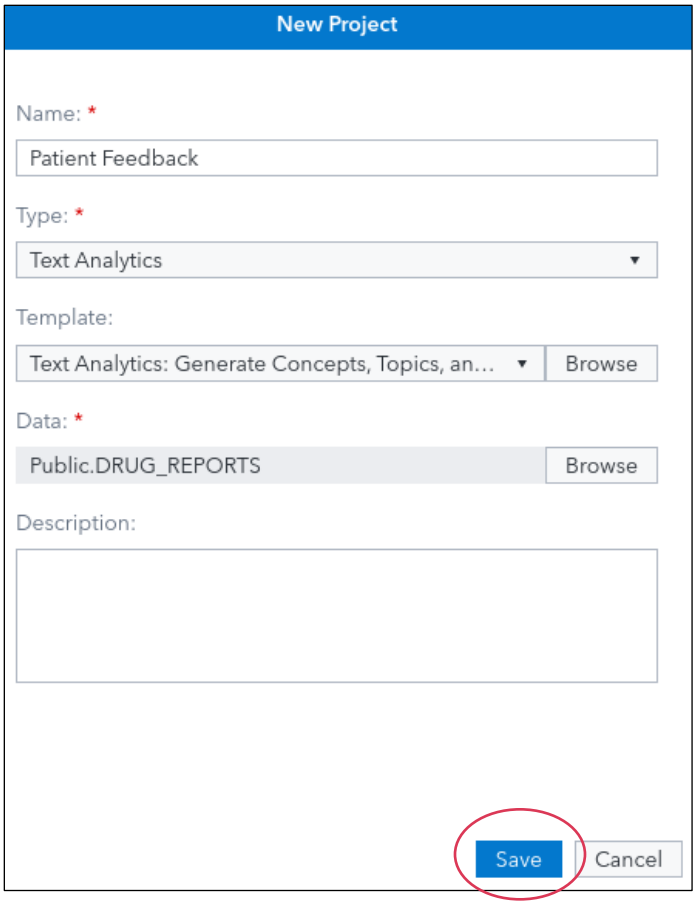
9. Select **Browse** under **Data**. The Choose Data window appears, showing available data, that is pre-loaded into CAS memory. We must import our data set. Click **Import data**.



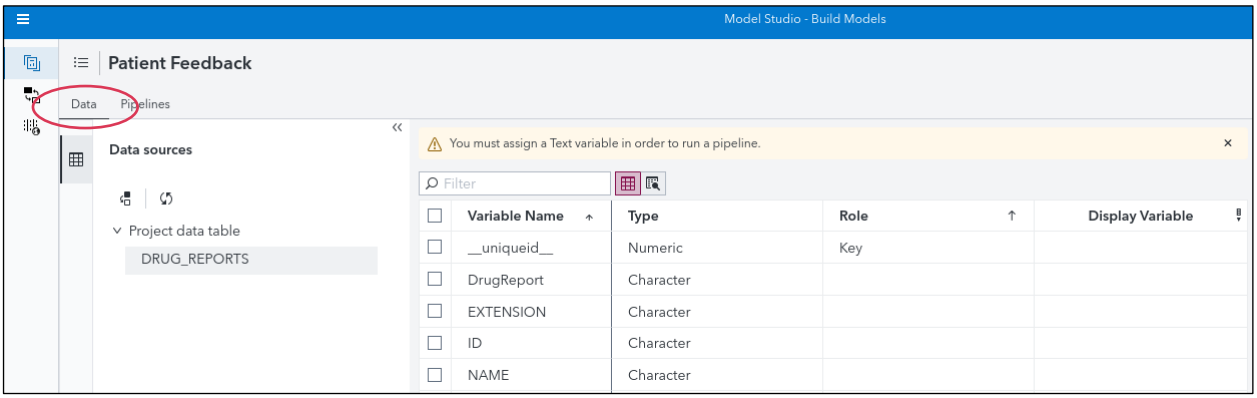
10. Select **Local Files**.
11. Navigate to **workshop** > **SIWTAS_Text**. Select **drug_reports.sas7bdat** and click **Open**.
12. In the Import Data window, click **Import Item**. The green check mark indicates that the data were successfully loaded into memory.

13. Click **Add**. Select **DRUG_REPORTS** from the Available list and then click **OK**.

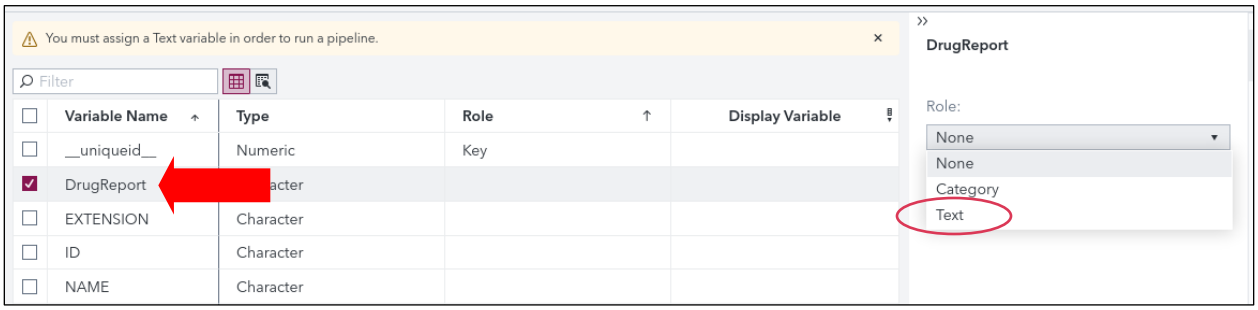
The New Project window should appear as follows. Click **Save**.



14. Once the project is saved, it appears on the Data tab. The Data tab displays the variables of the input data and enables you to assign certain metadata roles. Model Studio shows a warning at the top of the page indicating that a Text variable must be assigned.

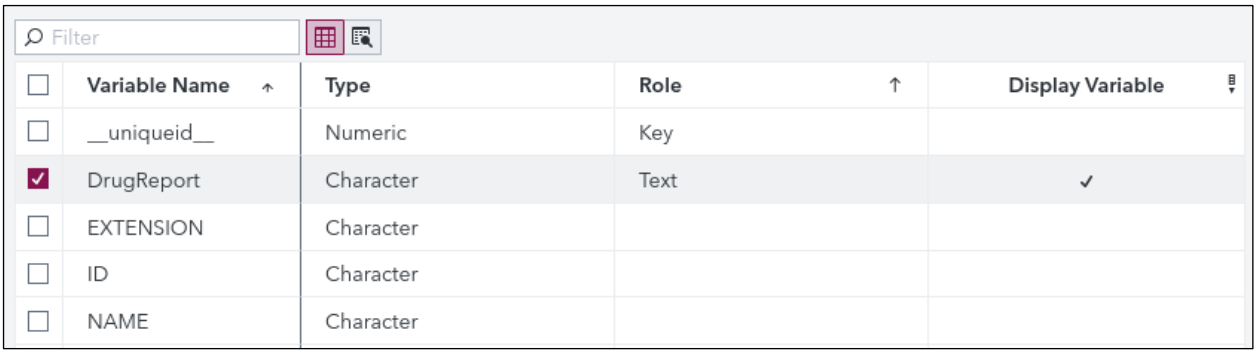


15. Select **DrugReport** by clicking the check box next to the variable name. Using the pane on the right, assign the role **Text** for this variable. Keep all other properties in the properties pane at their default settings.



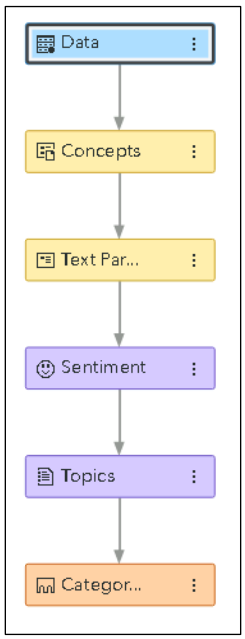
Note: The other variable role is for Category. No Category variables exist in the **Drug_Reports** data, so this role assignment is not needed for this project.

The updated variables list should appear as follows.

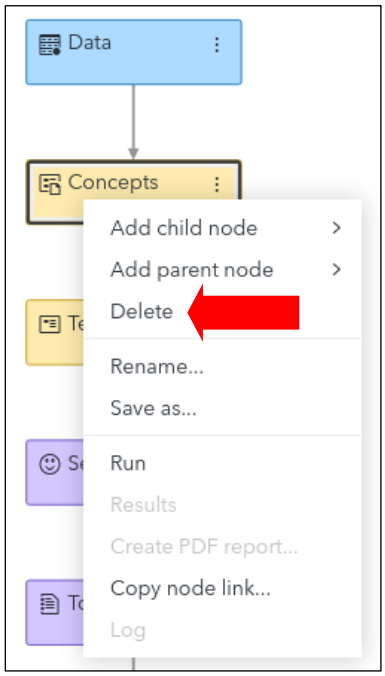


16. Select **Pipelines** (in the upper left of the window and to the right of **Data**). The default Text Analytics pipeline appears. If you set up your project to be the Text Analytics type, you can access SAS Visual Text Analytics with Model Studio.

Default Text Analytics Pipeline

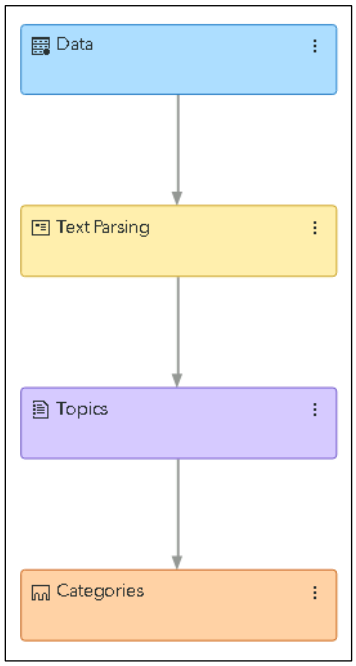


17. For this project, no concepts are used, and sentiment analysis is not relevant for this analysis on patient feedback. Delete the **Concepts** and **Sentiment** nodes. To delete a node, right-click the node or click the three vertical dots next to the name of the node, and then select **Delete**.



18. Click **Delete** again in the confirmation window that appears. The remaining nodes are reconnected automatically.

Modified Custom Text Analytics Pipeline

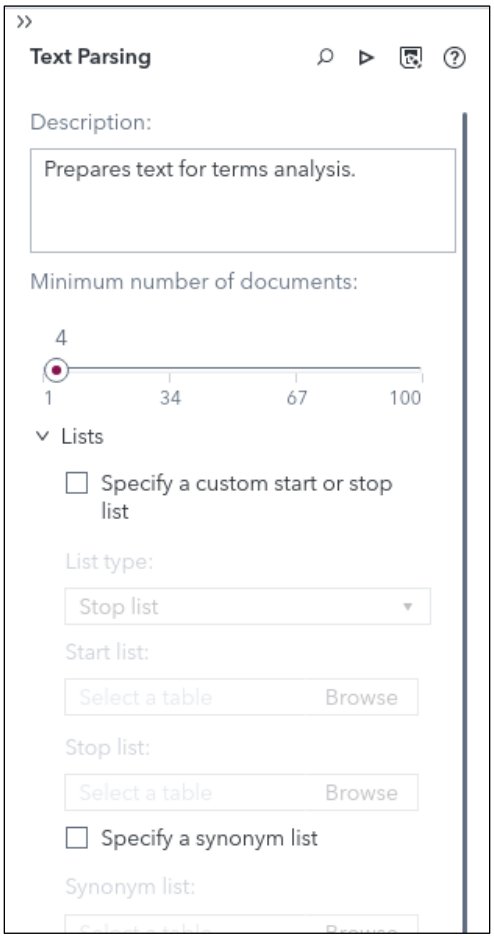


Defining Lists (Step 2 of 3)

Now you select optional term lists to include in your project. Start lists and stop lists enable you to control which terms are used or which terms are not used, respectively. In SAS Visual Text Analytics, you can use a start list or a stop list, but not both.

Note: A *start list* is a data set that contains a list of terms to include in the analysis results. If you use a start list, then only the terms that are included in that list are used in the analysis. A *stop list* is a data set that includes a list of terms to exclude from the analysis results, such as terms that contain little information or that are outside the realm of your analysis. A default stop list is provided for each of the languages that SAS Visual Text Analytics supports.

1. Select the **Text Parsing** node. The Text Parsing options appear to the right of the pipeline. If the options do not appear, click **Options**. The options menu is shown below.



With the default settings, a default stop list is used for the language that is selected for the project. There is no default synonym table. Also, the **Minimum number of documents** property specifies the minimum number of documents that must contain a term before that term can be in the start list. The default value is 4, so if a term appears in only three documents, it is automatically assigned to the stop list, regardless of membership in either the specified start or stop list.

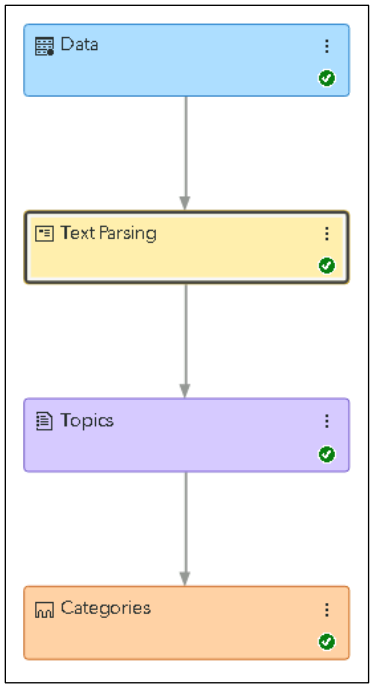
Note: A *synonym list* is a SAS data set that identifies pairs of terms that should be treated as a single term for analysis. The data set can include both a term and different forms of that term, including misspellings or abbreviations. For example, you can specify that the words *advert* and *advertising* should be treated as the term *advertisement*. You do not use a synonym list for this project, so do not select the **Specify a synonym list** check box.

2. Default settings are used, so no further steps are required.

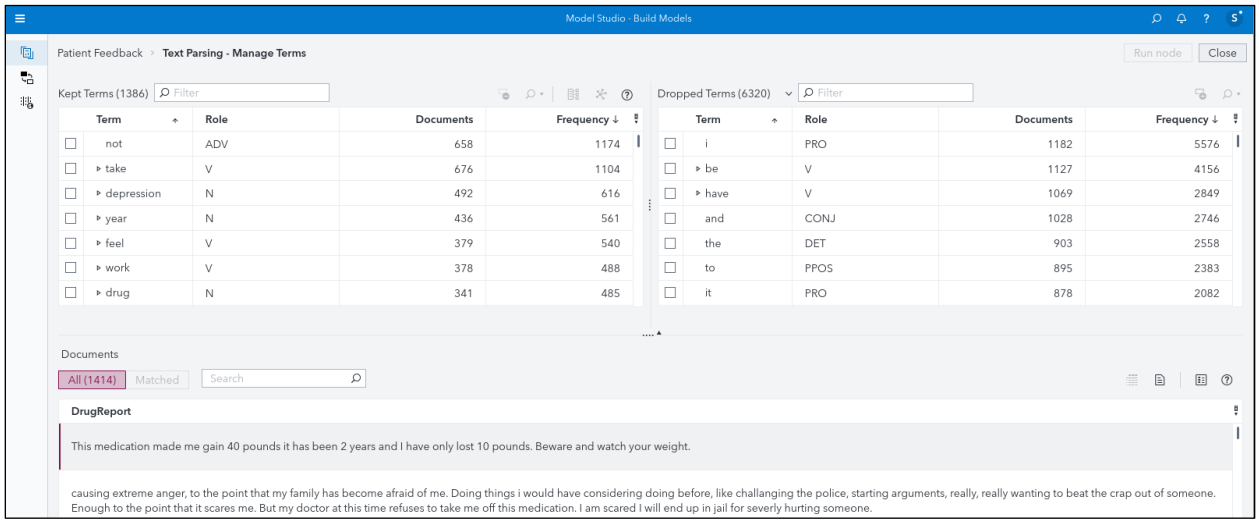
Running the Pipeline and Examining the Results (Step 3 of 3)

1. Run the entire pipeline. Right-click the last node and click **Run**. You can also click the **Run Pipeline** button.

When the run is complete, a message appears. If the run is successful, all the nodes display a green circle with a white check mark.



2. Right-click the **Text Parsing** node and click **Open**.



The Kept Terms pane contains the start list. These 1,389 terms are used in the terms table, which will be used in subsequent nodes in the analysis. The Dropped Terms pane contains the

6,378 terms that will be ignored in the analysis. These dropped terms make up the stop list. All terms within the document collection are accounted for.

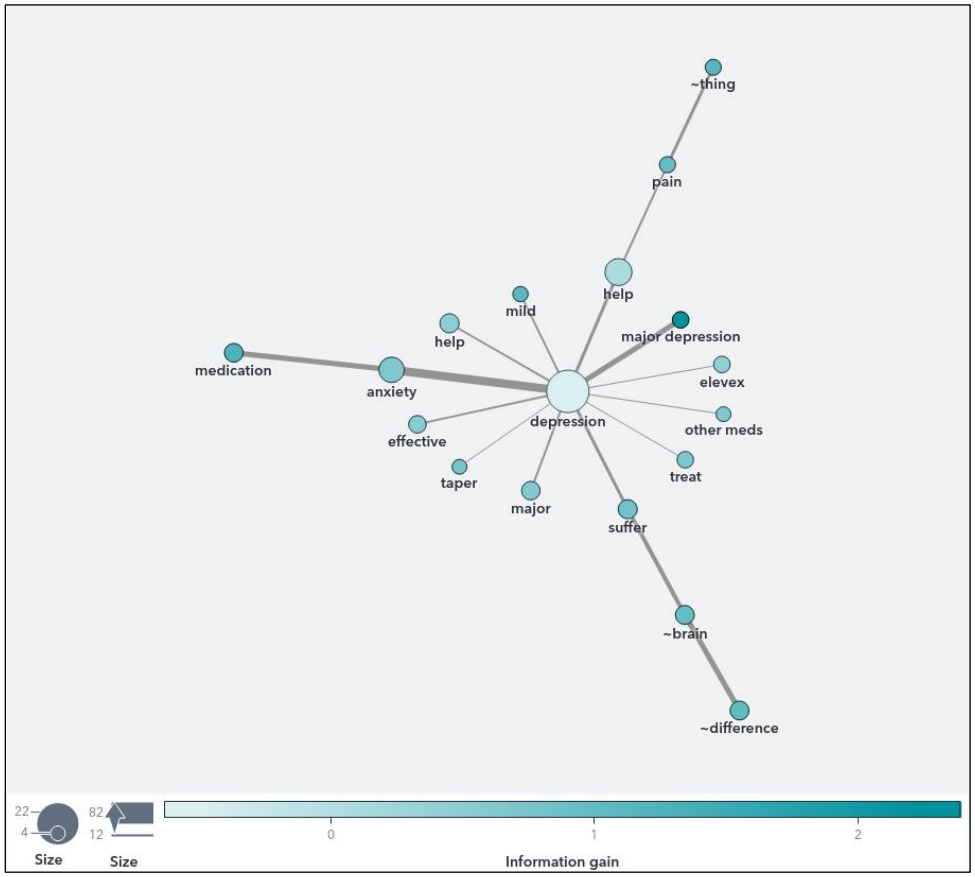
3. In the Kept Terms pane, select the check box next to the noun (N) form of **depression**.

	Term	Role	Documents	Frequency
☐	not	ADV	658	1174
☐	take	V	676	1104
☑	depression	N	492	616
☐	year	N	436	561

Note: In certain cases, using the filter at the top of the list can save time. It is not needed in this case because the term that we want appears at the top of the Kept Terms list.

4. Click **Show term map** .

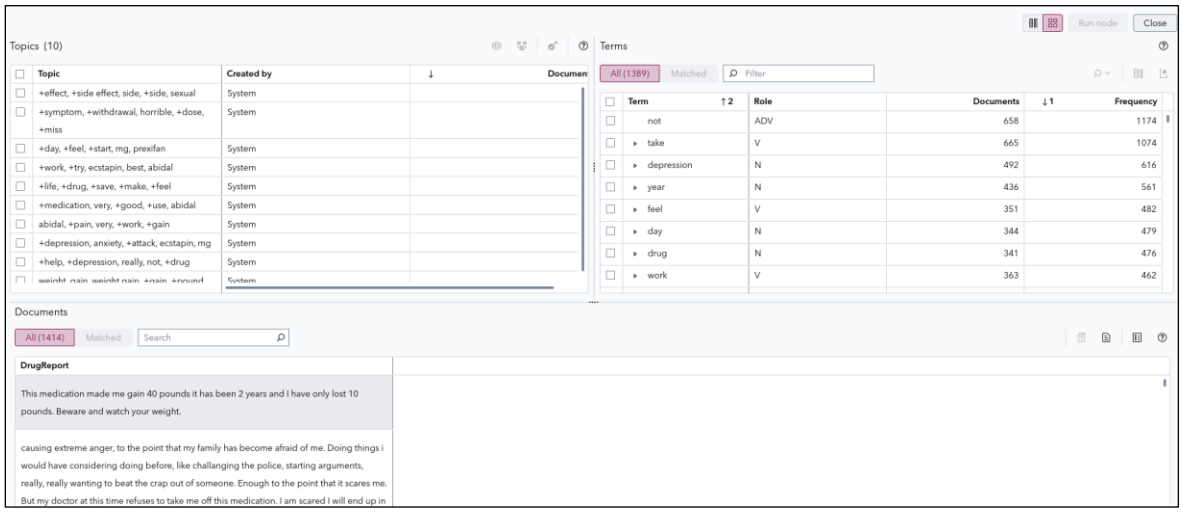
Note: Depending on your screen resolution, if you do not see the shortcut button for **Show term map**, click the **More options** button (the three vertical dots) next to the Filter window and then select **Show term map** from the drop-down menu.



A term map is useful for identifying associations between terms. The term map is most useful when it identifies associations that were previously unknown. Even when associations are known, a measure called ***information gain*** can be calculated to estimate the strength of the

association. The thickness of the connectors between terms visually displays the relative information gain. Thicker lines imply higher information gain, which suggests a stronger association. Multiple other terms are related to the term *depression*. Related terms with the strongest associations are *anxiety*, *major depression*, and *suffer*.

5. Close the term map by clicking **Close** in the upper right corner of the window.
6. Close the Text Parsing window.
7. Right-click the **Topics** node and click **Open**. You can see that 10 machine-generated topics are generated by the Topics node.



The 10 machine-generated topics are shown below.

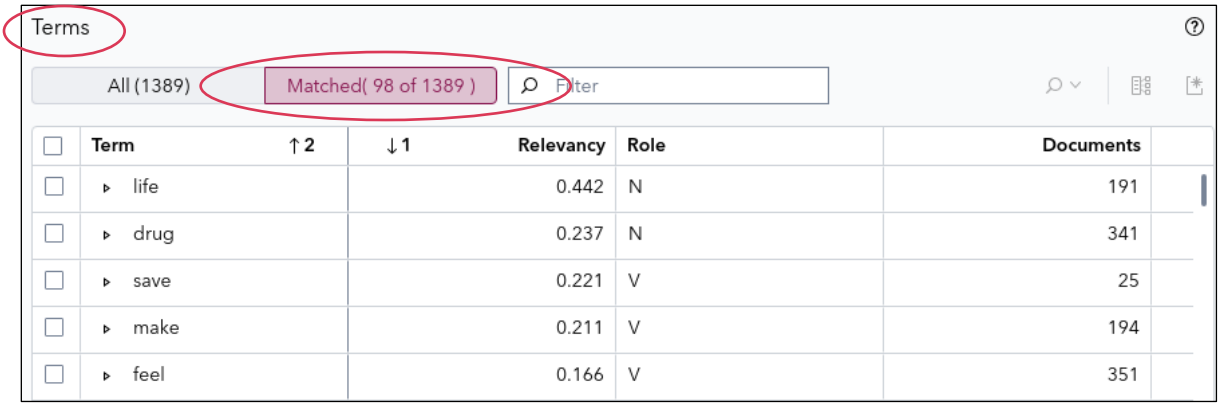
Topics (10)

Topic	Created by	↓ Documents
+effect, +side effect, side, +side, sexual	System	238
+symptom, +withdrawal, horrible, +dose, +miss	System	220
+day, +feel, +start, mg, prexifan	System	202
+work, +try, ecstapin, best, abidal	System	200
+life, +drug, +save, +make, +feel	System	189
+medication, very, +good, +use, abidal	System	188
abidal, +pain, very, +work, +gain	System	186
+depression, anxiety, +attack, ecstapin, mg	System	158
+help, +depression, really, not, +drug	System	140
weight, gain, weight gain, +gain, +pound	System	117

8. Select the **+life, +drug, +save, +make, +feel** check box. This topic could be related to positive patient recovery, and discovering such themes was stated as the primary goal of the analysis.

   Topics are identified using the five terms that have the largest relevancy score within that topic.

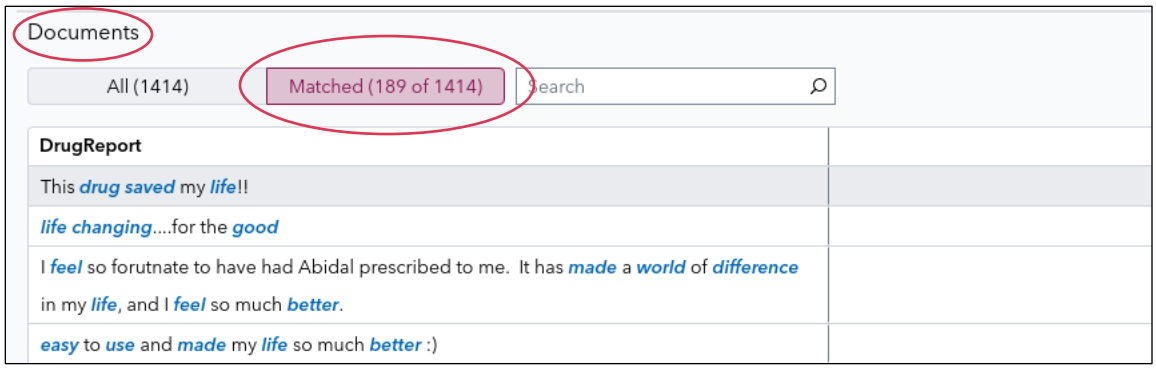
9. In the Terms window, click **Matched**.



In the start list for this collection, 98 of the 1,389 terms have relevancy weights that are greater than the term cutoff that is specified in the Topics settings window. Terms are sorted by descending relevancy score. As expected, the top five relevancy scores correspond to the terms that are used to name the topic. Terms with a plus sign have stemmed terms that are indicated in the Terms table by a right arrow. If you click the arrow, the stemmed terms are displayed, and if a synonym list is used, the synonyms are also displayed.

10. Click the right arrow next to the term **life** in the Terms table to see its stemmed versions.

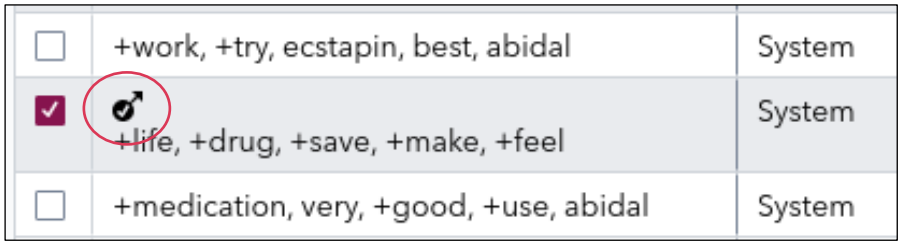
11. Examine the Documents table for the selected topic. Click **Matched.**



Out of the 1,414 total documents, 189 documents are identified as belonging to the topic, based on the document relevancy score cutoff that is specified in the Topics node settings. Any of the 98 terms that are used to identify the topic that appears in the document are highlighted. Documents are sorted by the descending document relevancy score.

Three actions are available for topics: Split topics, Merge topics, and Add topics as categories.

12. Click **Add topics as categories** . Adding a topic as a category is also called *promoting* the topic. A message briefly appears, and it indicates that a topic was added as a category, and the Add topics as categories icon appears next to the promoted topic's name

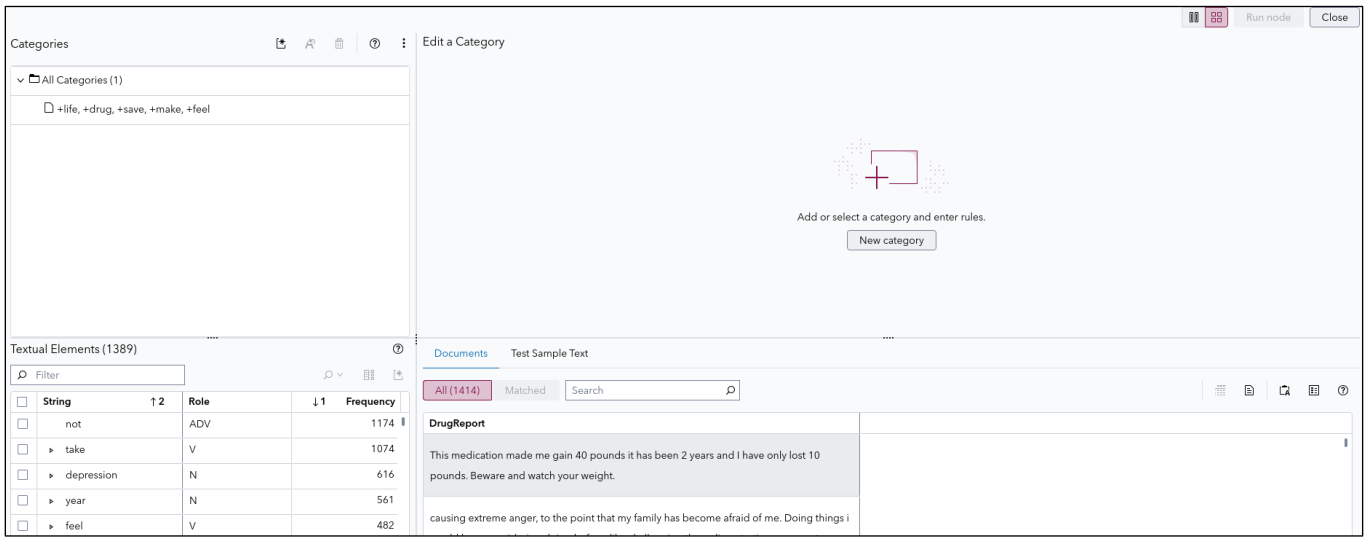


13. Close the Topics node window.

    In the pipeline, the green circle around the check mark next to the Categories node has been replaced by a gray circle. This indicates that the node needs to be rerun to accommodate the new information about a topic promoted to a category.

14. Run the **Categories** node. Because the Categories node is the last node in the pipeline, all out-of-date nodes preceding the Categories node are run. The promoted topic is added as a category, and category rules are derived for the topic.

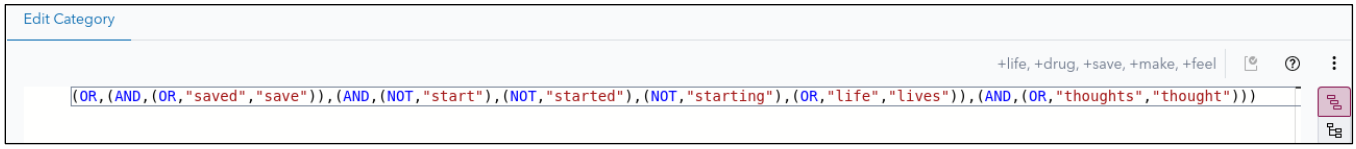
15. Open the **Categories** node.



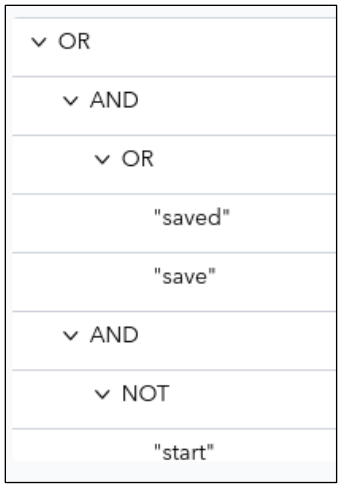
    Only a single categorical entry is present. It is related to the binary topic category that was promoted from the Topics node. If variables on the Data tab had an assigned role of Category, the variables along with their categorical levels would also appear.

16. Select **+life, +drug, +save, +make, +feel**.

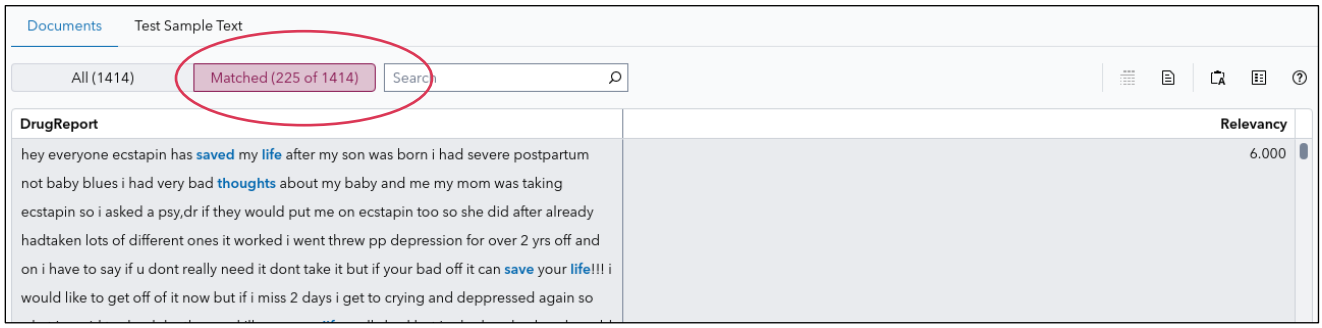
    The category Boolean rule shown below was generated by SAS Visual Text Analytics software for the promoted topic.



17. To the right of the Edit Category window, click **Tree view**  to see the rule tree hierarchy that can help you understand the rule.



18. In the Documents window, click **Matched**. The matched documents results associated with **+life, +drug, +save, +make, +feel** appear.

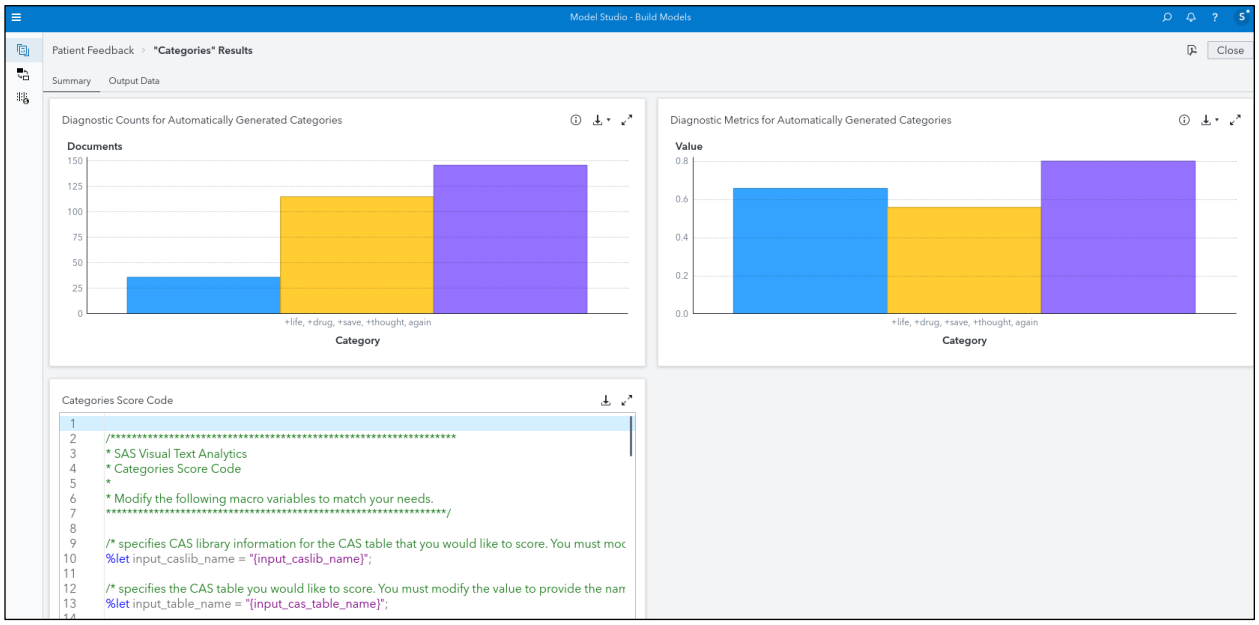


A total of 225 documents satisfy the category definition for this topic. Earlier, you saw that a total of 189 documents exceeded the relevancy score cutoff in the Topics node for the topic. At least 36 documents were misclassified by the Category node.

Examining these documents could cause you to change the relevancy cutoff (the Topics node) or to modify the category Boolean script (the Categories node).

19. Close the Categories window.

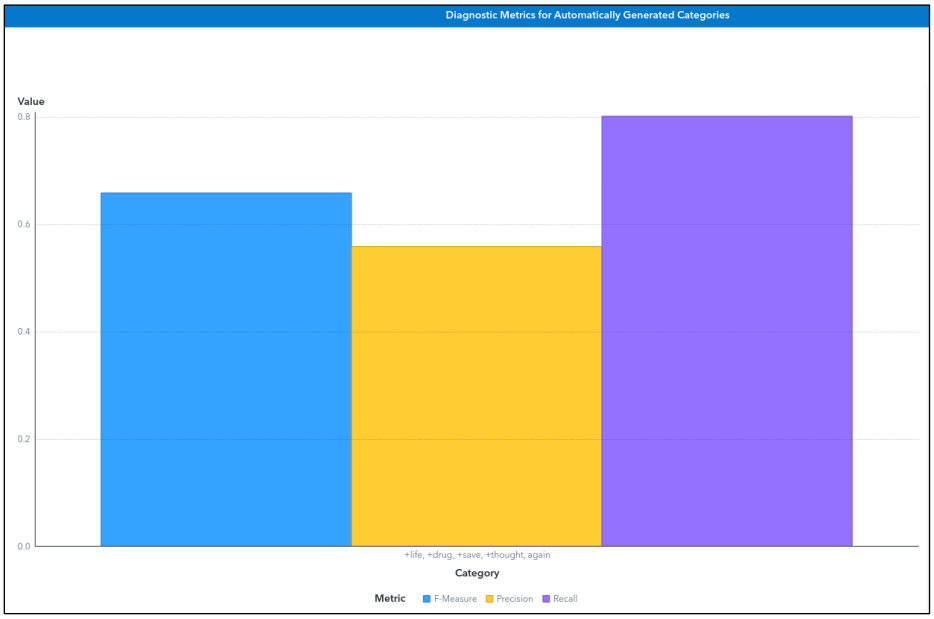
20. Right-click the **Categories** node and select **Results**. (If a gray circle still appears on the Categories node and the Results option is not available from the pop-up menu, run the node again and then open the results.)



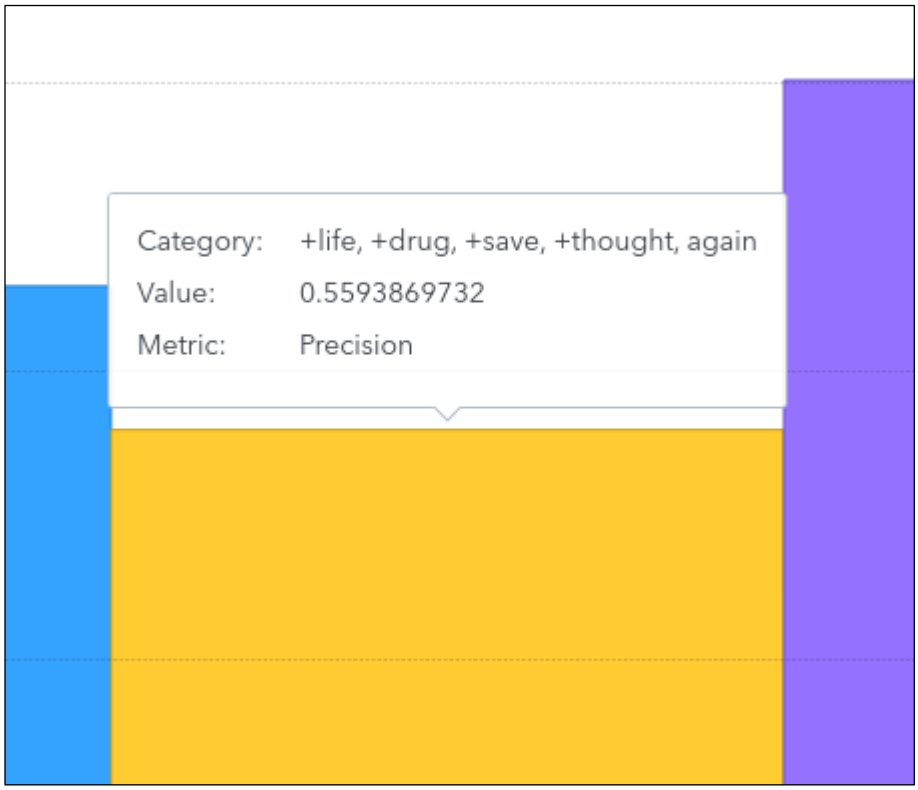
Three panes appear: Diagnostic Counts, Diagnostic Metrics, and Categories Score Code. The Diagnostic Counts pane shows bars representing false negatives, false positives, and true positives. True negatives are not shown because for the typical situation where negatives outnumber positives, the number of true negatives tends to dwarf the other bars. The following plots show visual representation of misclassified and correctly classified documents to illustrate why plotting true negatives is ill advised.

The Diagnostic Metrics pane shows a bar chart with bars for F-Measure (F1 statistic), precision, and recall.

21. Expand the diagnostics metrics pane by clicking **Expand**  .



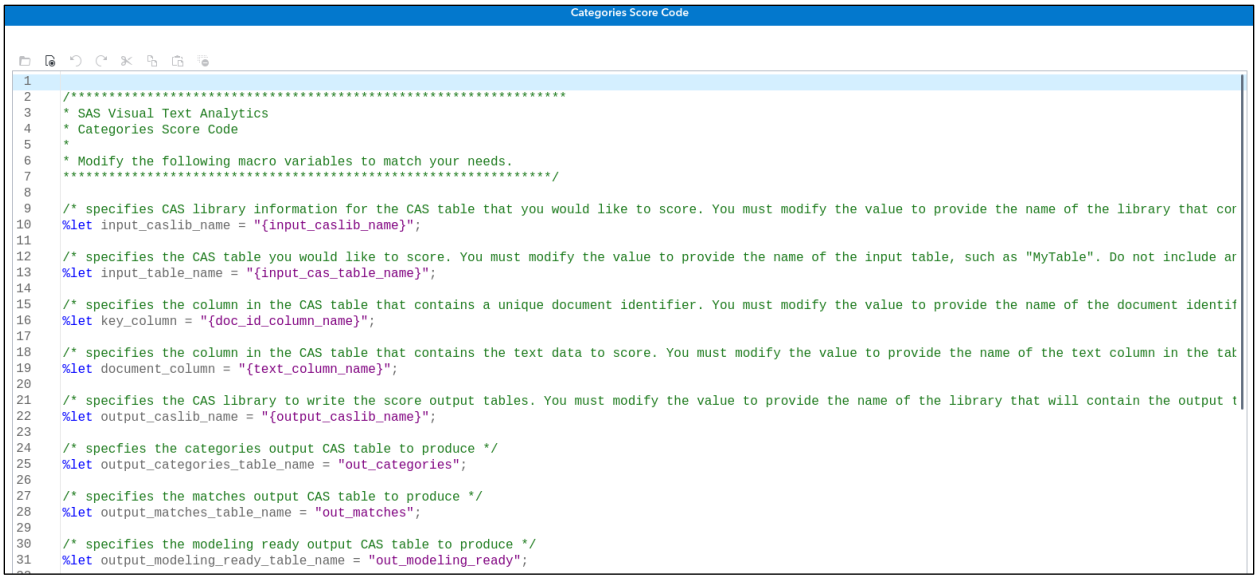
If you position the cursor on a bar, you see the numeric value of the statistic that is represented by the bar. The pop-up statistic for precision appears in the following screenshot:



The precision for the category rule based on the promoted topic **+life, +drug, +save, +make, +feel** is 0.5511.

22. Restore the Diagnostic Metrics plot by clicking **Close** (the X).

23. Expand the Categories Score Code window.



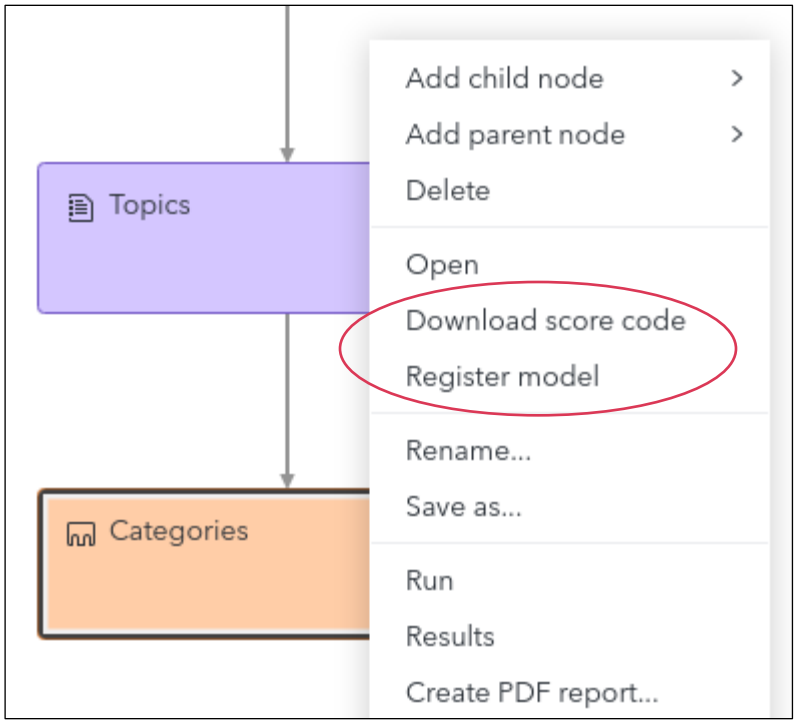
This score code is automatically generated and is quite simple to use. The code uses macro variables within the first several lines to take in key information for scoring such as input and output libraries, the unique document identifier (ID), and the table of documents to be scored. This portion of the code is easy to edit by simply replacing items inside braces with the relevant information needed for scoring.

Running the score code produces three output tables: **out_categories**, **out_matches**, and **out_modeling_ready**. Typically, these three output tables should be renamed to be specific for the analysis at hand and to avoid ambiguities with scored output from other Visual Text Analytics projects.

We show in the next steps how the score code can be downloaded as a ZIP file or how the model can be registered directly into SAS Model Manager for scoring.

24. Restore the Score Code window and close the results.

25. Right-click the **Categories** node and observe the pop-up window that appears.



By selecting **Download score code**, the web browser creates a ZIP file of the score code, which makes the code easily transportable depending on the scoring environment. For the Categories node, the download file is generically named CategoriesScoreCode.zip. (A best practice is to rename this ZIP file to be specific to the analysis at hand.) Within the Categories node zipped score code file is the SAS DATA step score code. This ScoreCode.sas file has preliminary commented entries to guide you about how to complete the program for scoring a specific data set on your system. Use SAS Studio to edit and run the program. The ScoreCode.sas file is the same score code observed earlier that is visible within the results window of the node.

Score code is available for concepts, sentiment, topics, and categories. You can score any document collection that has a document variable with the same name as the document variable that is used to generate the score code.

Some of the nodes in the Visual Text Analytics pipeline that produce score code produce both DATA step and ASTORE score code files.

By selecting **Register model**, the text analytic model in the form of score code is registered to SAS Model Manager for deployment and other ModelOps activities.

For the sake of brevity, we will not run the score code in this demonstration.

End of Demonstration

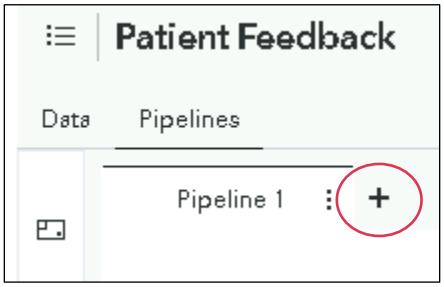
Using Predefined and Custom Concepts in a SAS Visual Text Analytics Project

This demonstration illustrates the advanced functionality of SAS Visual Text Analytics and specifically focuses on the Concepts node. Both predefined and custom concepts are considered.

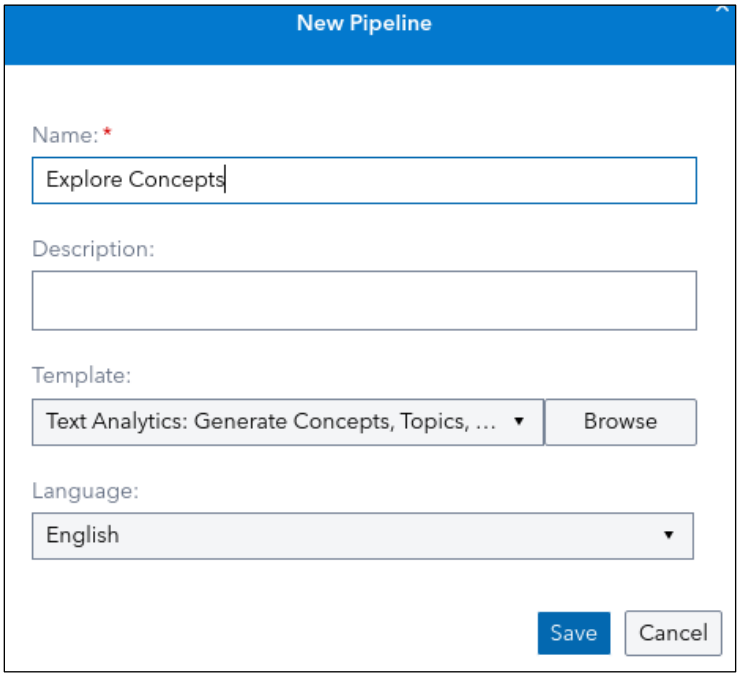
This demonstration continues to use the **drug_reports** data and is performed within the Patient Feedback project created earlier. The primary goal is to extract specific drug dosages from the patient feedback documents.

Extracting Drug Dosages using Concepts

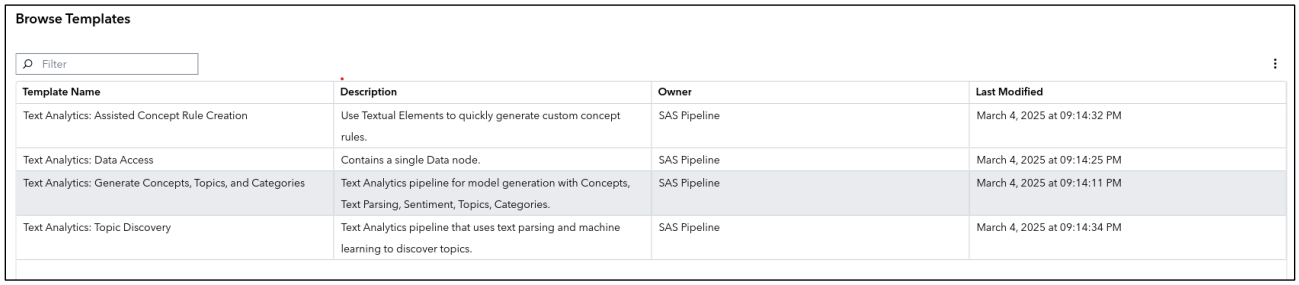
1. Make sure that the **Patient Feedback** project created in the earlier demonstration is opened and on the Pipelines tab.
2. Click the **Add new pipeline** (**+**) button found next to the tab for Pipeline 1.



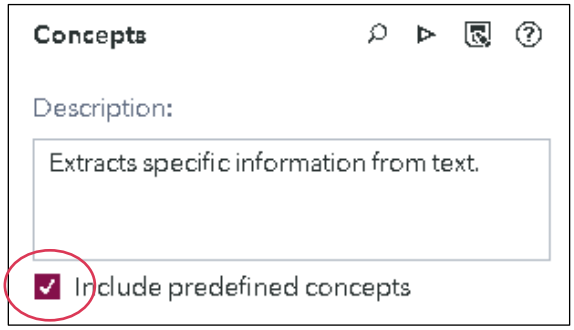
3. Enter **Explore Concepts** as the name for the pipeline. The default text analytics pipeline template will be used.



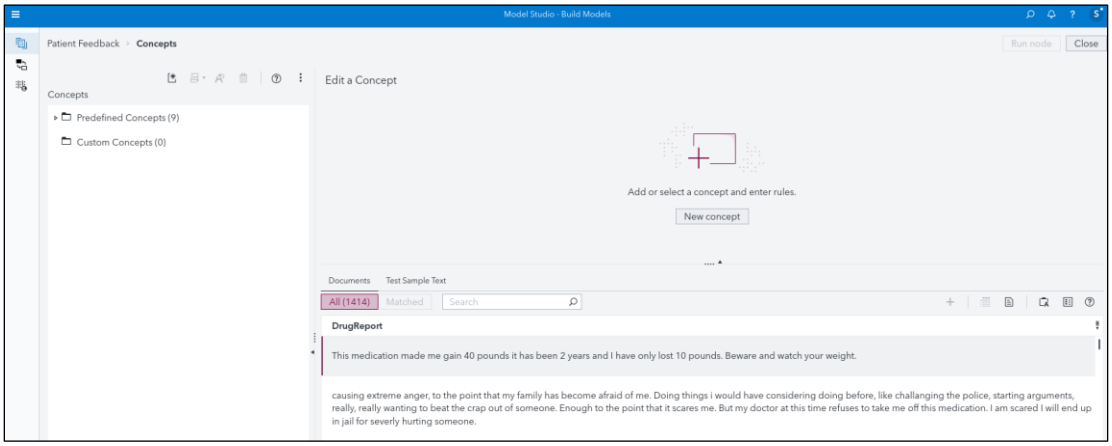
4. Click **Browse** next to Template. A full list of all available Visual Text Analytics templates is shown. Select the template with the name **Text Analytics: Generate Concepts, Topics, and Categories**. This is the default template.



5. Click **OK**. Click **Save** in the New Pipeline window.
6. Select the **Concepts** node and observe the properties pane on the right. There is a single property for the node, which indicates to include predefined concepts. Select the check box next to **Include predefined concepts**.

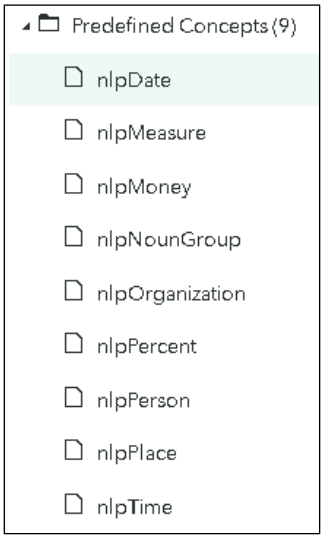


7. Right-click the **Concepts** node and select **Run**.
8. When the run is complete, right-click the **Concepts** node and select **Open**.

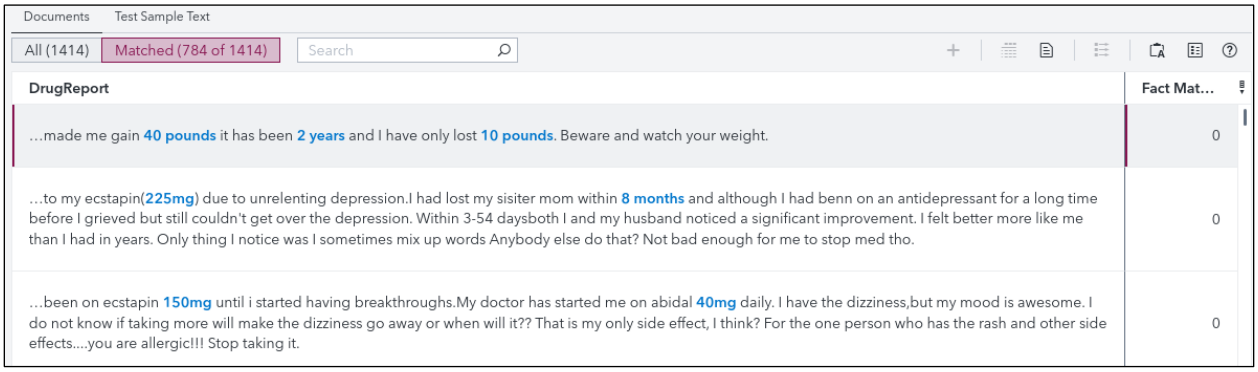


In the Concepts pane (upper left corner), notice that nine predefined concepts have been used.

9. Click the arrow to the left of **Predefined Concepts (9)**. The nine predefined concepts are shown, each with an **nlp** prefix. Information within each of the concepts is extracted using natural language processing.



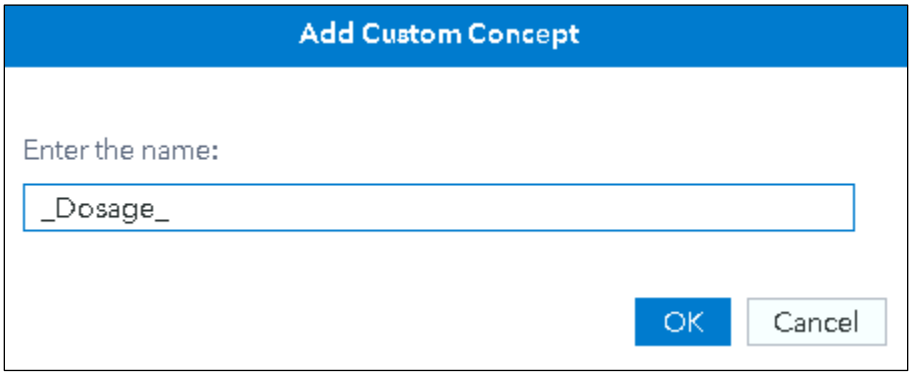
10. Select **nlpMeasure**. This concept relates to measures. The LITI (language interpretation for textual information) code used to define the nlpMeasure concept is not displayed in the Edit Concept window. The software does not reveal the code for any of the predefined concepts.
11. The Documents pane is in the lower right corner of the display. In the documents pane, click **Matched**.



Note that the nlpMeasure concept finds numerical measurements such as *weight* and *time* (the blue highlighted terms within the documents). It also discovers dosage amounts such as *225mg* found in the second document shown above. The nlpMeasure concept finds measures in 784 of the 1,414 total documents. Some documents might contain more than a single measure.

The goal of the analysis is to extract drug dosages. The nlpMeasure predefined concept found drug dosages, but other numeric measures are also extracted. This predefined measure does not address the analysis goal. Because the LITI code to discover the measures is not shown nor can it be edited, we must create a custom concept to extract only dosages.

12. Select **Custom Concepts (0)** on the left. Click the **New Concept** button in the Edit a Concept pane. A data entry window appears. Enter the name **_Dosage_** for the new custom concept.



Note: You can also create a custom concept by clicking the **New concept** shortcut button .

When selecting a concept name, you want to avoid ambiguities and unexpected results. See the "Create a Custom Concept" subsection in Chapter 6 in *SAS Visual Text Analytics*: *User's Guide*. For example, avoid using names that are actual words that might appear in the term table. In this case, we have used the underscores (_) to differentiate the concept name from the term *dosage* that might appear within documents.

13. Click **OK**. The _Dosage_ concept name is highlighted in the Concepts pane on the left, and the Edit Concept pane is now active.
14. Enter the following rules in the Edit Concept window. The code call also be copied from the file **Drug_Dosage.txt** located at **workshop** > **SIWTAS_Text**.

```
REGEX:[0-9]+[\.][0-9]+\s?mg\.?
REGEX:\d+\s?mg\.?
```

Although details about writing LITI code are beyond the scope of this workshop, an explanation of the first regular expression is as follows:

a) [0-9]: match any single digit

b) +: match the previous character one or more times (The previous character is a digit.)

c) [\.]: match a period (decimal point). Note that the square brackets are not required.

d) [0-9]: match any single digit

e) +: match the previous character one or more times (The previous character is a digit.)

f) \s: match any whitespace character (for example, space, tab)

g) ?: make the previous character optional (The previous character is a whitespace character.)

h) mg: match the letters mg

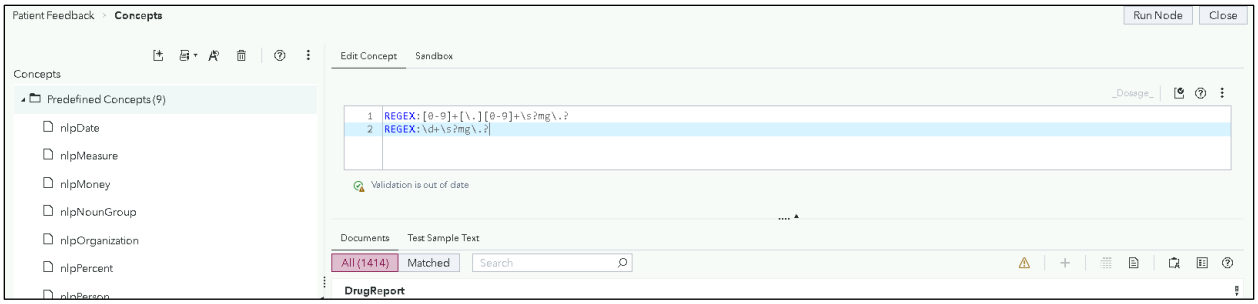
i) \.: match a period (signifying that *mg* is an abbreviation for milligrams)

j) ?: make the previous character optional (The previous character is a period.)

The second line of LITI code is similar to the first except that it does not look for decimal values.

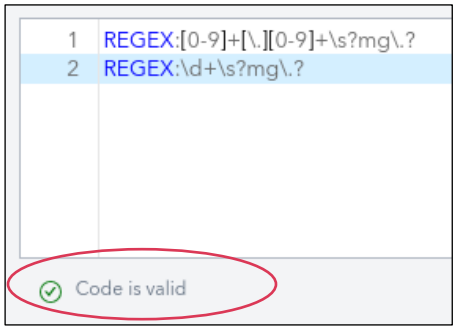
Note: There are additional LITI rules that can do complex content categorization and concept matching beyond what we are showing with this simple REGEX example. The purpose here is to provide a quick sample of what is possible when working with concepts in Visual Text Analytics.

15. After entering the LITI code, the Concepts window appears as follows:



Several steps are still required to use the new _Dosage_ concept.

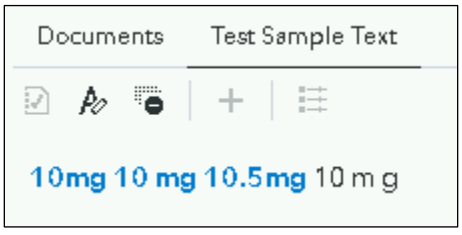
16. The message **Validation is out of date** means that you should validate the script before you submit it. To do so, click the **Validate Rules** shortcut button in the upper right of the Edit Concept window. If you are successful, you see a new message, **Code is valid**.



17. Because document collections can be large, you might want to test the script on example text rather than run it on the entire data set. You can use the Test Sample Text feature to supply a few documents (or just a few lines of text) to test the rules that you supplied. Click the **Test Sample Text** tab (next to the Documents tab) and enter the following text:

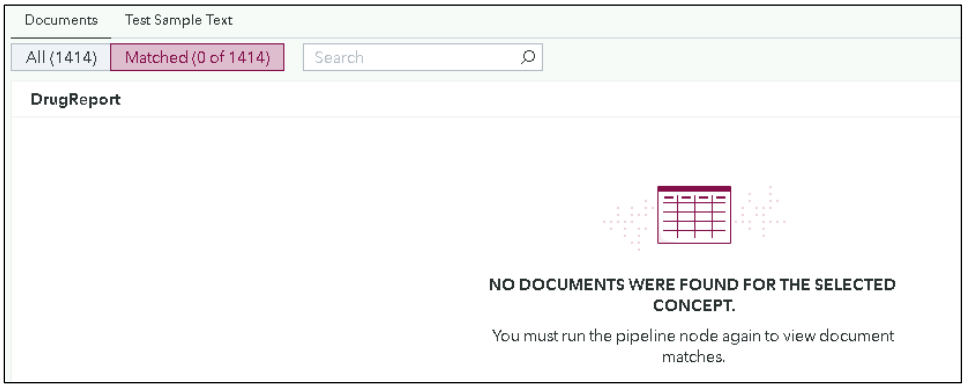
```
10mg 10 mg 10.5mg 10 m g
```

18. Click the **Test Sample Text** shortcut button.



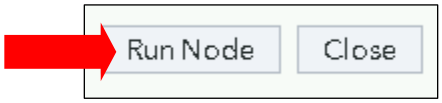
Three of the four dosages are matched. The last dosage is not matched due to the space between the *m* and the *g*.

19. Click the **Documents** tab and then select **Matched** in the Documents pane.



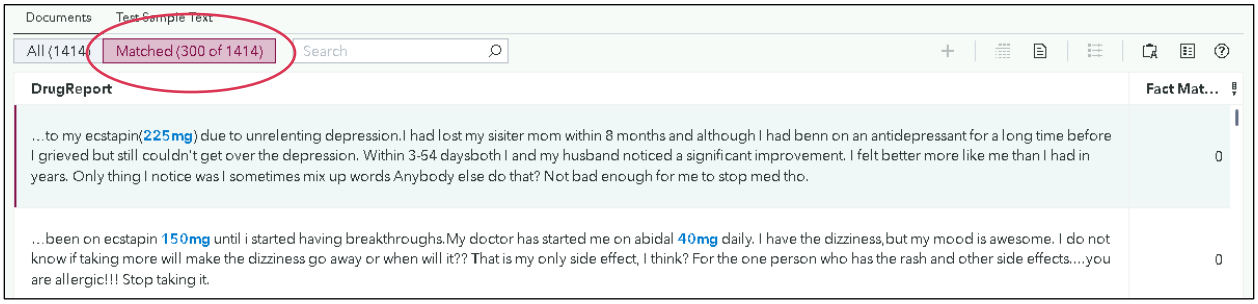
Note that the window shows that 0 of 1,414 documents matched. We know that the LITI code was validated and tested, so why were no documents found with matches for the _Dosage_ concept? The Concepts node must be run.

20. Click the **Run Node** button in the upper right corner of the window.

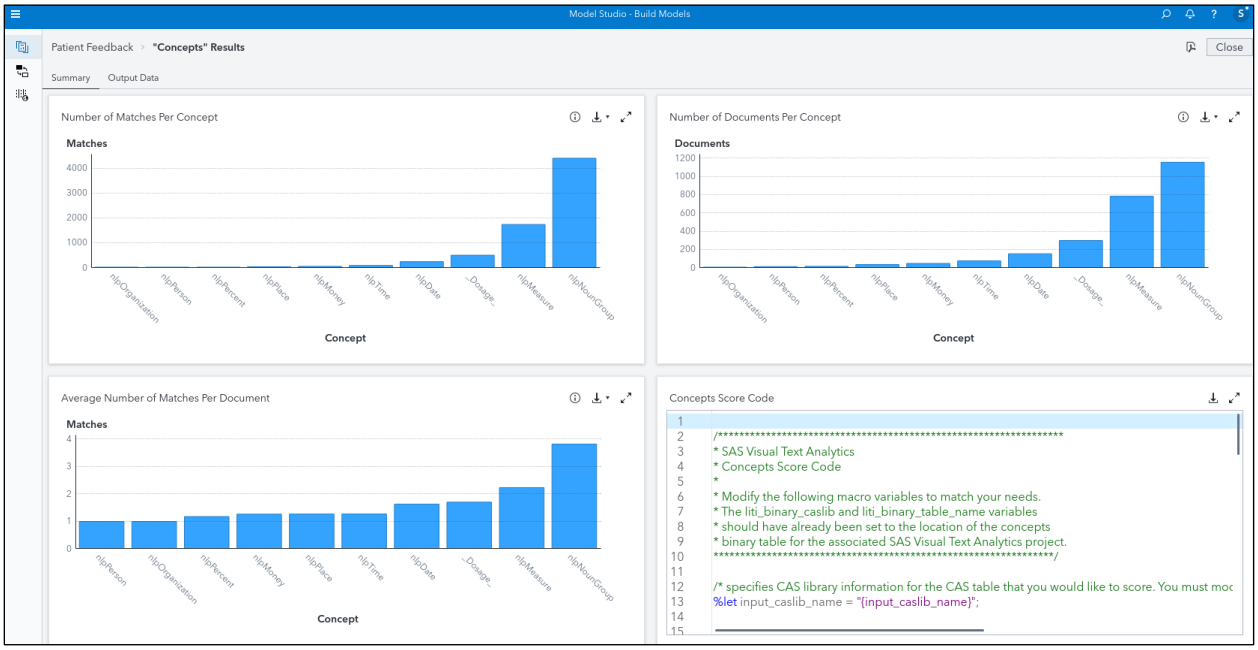


Note: You can also close the Concepts window and run the node as usual directly from the pipeline.

You now see that there were 300 total documents that contained matches to the _Dosage_ concept.



21. Close the Concepts window.
22. Right-click the **Concepts** node and select **Results**. A summary of the results of the Concepts node is shown.



The Number of Matches Per Concept plot shows the total number of matches for each concept, whether predefined or custom. The plot rank orders the results from fewest matches to most. Keep in mind that a single document could contain several matches per concept. The concept nlpNounGroup has the greatest number of matches at 4649. The custom _Dosage_ concept has the third most matches with 511.

The Number of Documents Per Concept plot shows the total number of documents in which each concept is found. The concept nlpNounGroup appears in more document than the other concepts. It appears in 1,165 documents (out of the 1,414 total). The _Dosage_ concept is again in third place (from the concept with the most). appearing in 300 documents. This is the same number of matches that we saw earlier when creating the custom concept.

The Average Number of Matches Per Document plot shows the average number of appearances within a single document for each concept. These values are calculated by taking the total number of matches for a concept and dividing by the total number of documents in which the concept appears. nlpNounGroup has the largest average at 3.99 matches per document. _Dosage_ is in third place with an average of 1.7.

The Concepts Score Code window provides the SAS DATA step score code for the Concepts node.

To score new documents, the Concepts score code could be accessed and used in multiple ways, similar to what was discussed in the prior demonstration for the Categories node. The score code could be copied directly from the Concepts Score Code window and pasted into a desired location, a ZIP file could be downloaded from the pipeline, and the score code can be uploaded as desired, or the model could be registered directly to SAS Model Manager. As stated before, macro variables embedded within the score code would need to be updated with the correct information for your specific analysis.

For the sake of brevity, we will not run the score code for this demonstration.

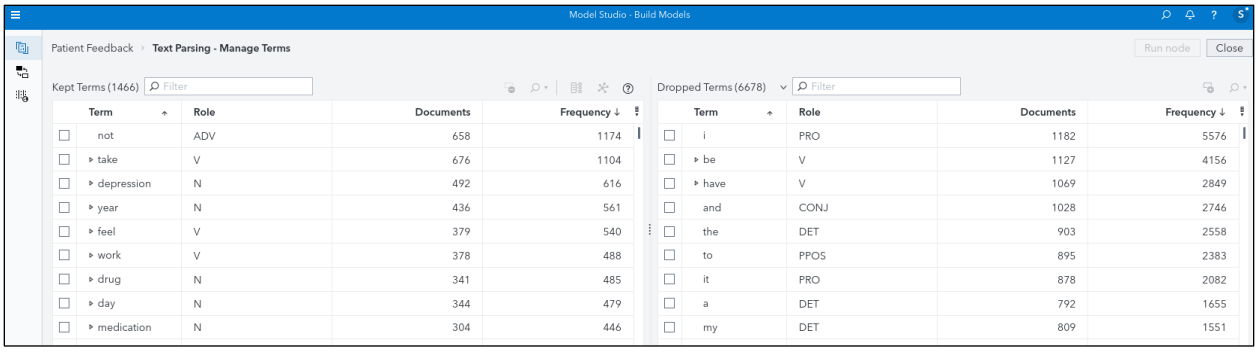
23. Close the results of the Concepts node.

24. The goal of extracting dosage amounts from the patient feedback documents has been achieved. The remainder of this demonstration is to illustrate how the use of concepts at the beginning of a pipeline can affect the terms table and, thus, affect the results of the analysis.

Illustrating That Using Concepts Affects the Analysis Results

Because the Concepts node comes before the Text Parsing node in the pipeline, concepts can appear in the terms table. As stated above, whether concepts are used can affect the terms table and, thus, affect the analysis. Let's explore this.

1. Right-click and select **Run** on the Text Parsing node.
2. When the run is complete, right-click the **Text Parsing** node and select **Open**.



Term	Role	Documents	Frequency
not	ADV	658	1174
take	V	676	1104
depression	N	492	616
year	N	436	561
feel	V	379	540
work	V	378	488
drug	N	341	485
day	N	344	479
medication	N	304	446

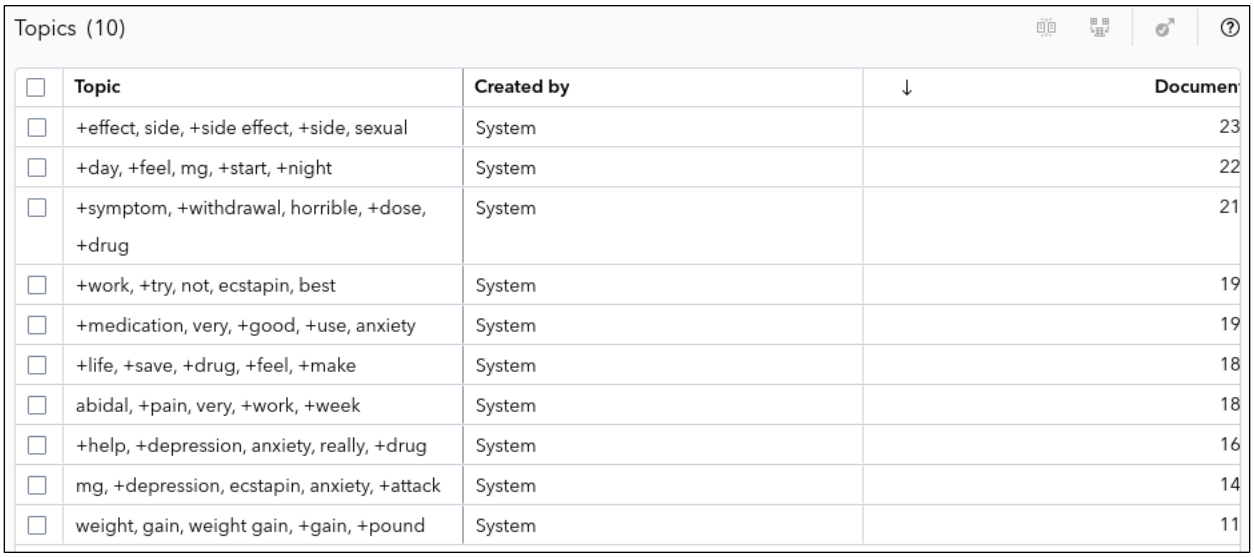
Term	Role	Documents	Frequency
i	PRO	1182	5576
be	V	1127	4156
have	V	1069	2849
and	CONJ	1028	2746
the	DET	903	2558
to	PPOS	895	2383
it	PRO	878	2082
a	DET	792	1655
my	DET	809	1551

Notice that there are now 1,469 kept terms. When no concepts were used, there were 1,389 kept terms. Using concepts in the analysis has affected the terms table because it will now contain concepts.

3. Scroll down in the Kept Terms pane to look for a term with a role of a Concept. Below you see that *side effect* appears with a role of nlpNounGroup.

Term	Role	Documents	Frequency
help	V	294	341
very	ADV	253	332
side effect	nlpNounGroup	268	329
side	A	271	318

4. Close the Text Parsing window.
5. Right-click the **Topics** node and select **Run**.
6. When the run is complete, right-click the **Text Parsing** node and select **Open**.



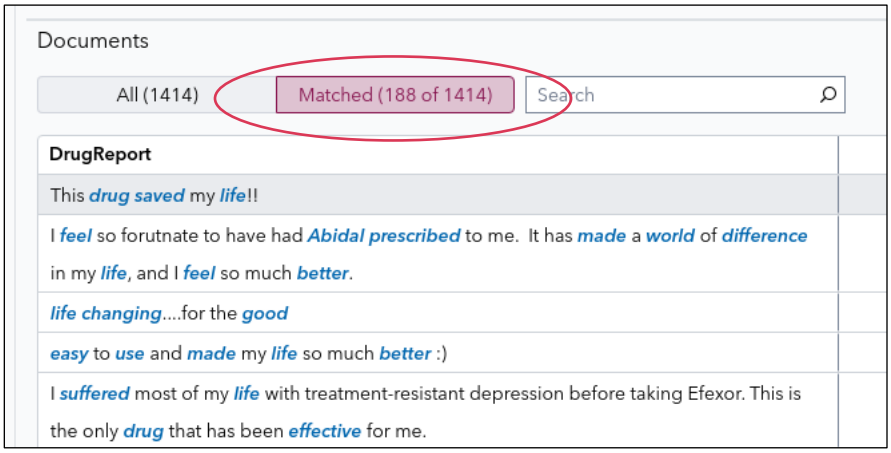
Topic	Created by	Documen
+effect, side, +side effect, +side, sexual	System	23
+day, +feel, mg, +start, +night	System	22
+symptom, +withdrawal, horrible, +dose, +drug	System	21
+work, +try, not, ecstapin, best	System	19
+medication, very, +good, +use, anxiety	System	19
+life, +save, +drug, +feel, +make	System	18
abidal, +pain, very, +work, +week	System	18
+help, +depression, anxiety, really, +drug	System	16
mg, +depression, ecstapin, anxiety, +attack	System	14
weight, gain, weight gain, +gain, +pound	System	11

There are still 10 system-generated topics, but they might have changed from what was seen in the previous demonstration.

Recall that the goal of the first demonstration was to look for themes within the patient feedback documents, specifically looking for documents that might contain a theme of positive patient recovery. The topic discovered earlier was based on the five key terms **+life, +drug, +save, +make, +feel**, and that topic appeared in 189 documents.

In the new analysis, that topic does not exist, but it likely has been replaced with the topic **+life, +save, +drug, +feel, +make**.

7. Select the topic **+life, +save, +drug, +feel, +make**. In the Document pane, select **Matched**.



Notice that the new topic appears in 188 documents.

End of Demonstration