

Evaluacion de la Interaccion de Farmacos a Traves de Text Mining-Analisis de Topicos

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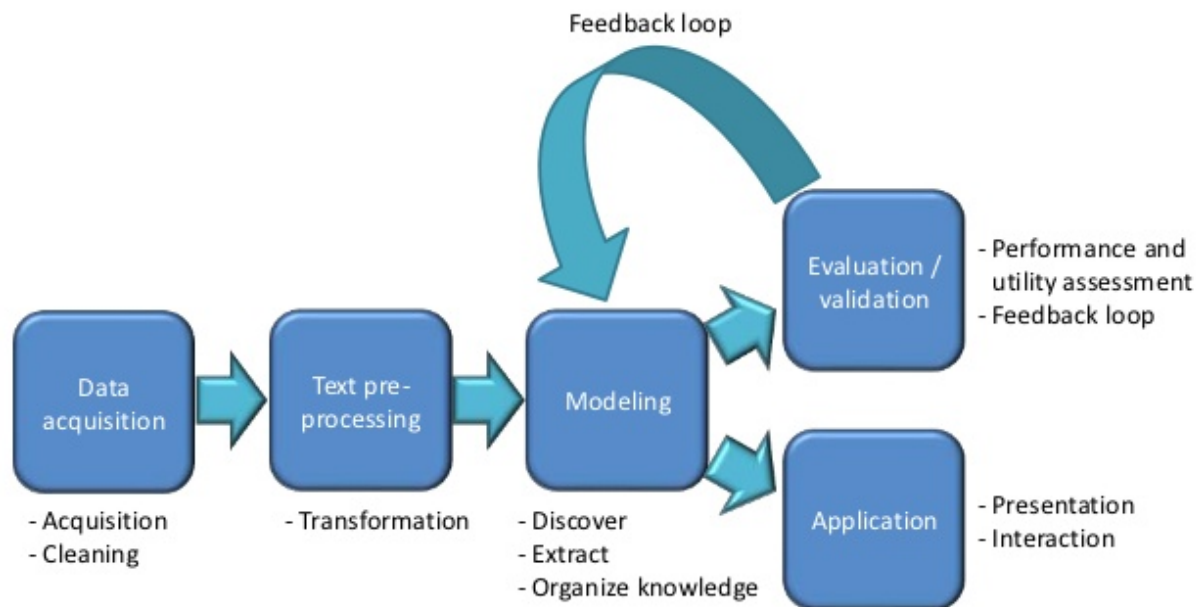
```
rm(list=ls())  
setwd("~/Interaccion")
```

PROCESAMIENTO DE TEXTOS

PART I • PART II

INTRO • BOW • ML • EVAL • APP

Typical text mining process



Lucca, Oct 2012

Miha Grčar: Text and text stream mining

5

Figure 1: Caption

OBJETIVO 1. CONSTRUIR UN DATA FRAME CON INFORMACION

DE CADA MEDICAMENTO #####Evaluar writeLines como ejmplo

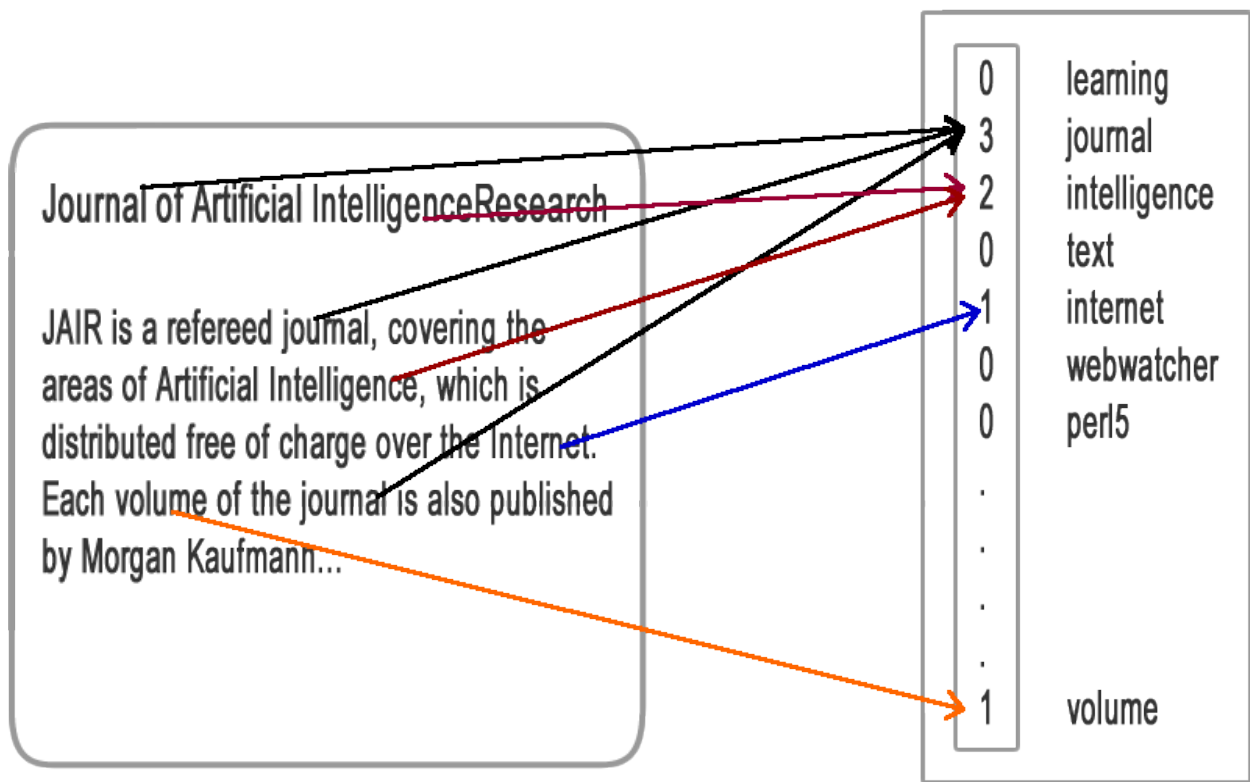


Figure 2: Caption

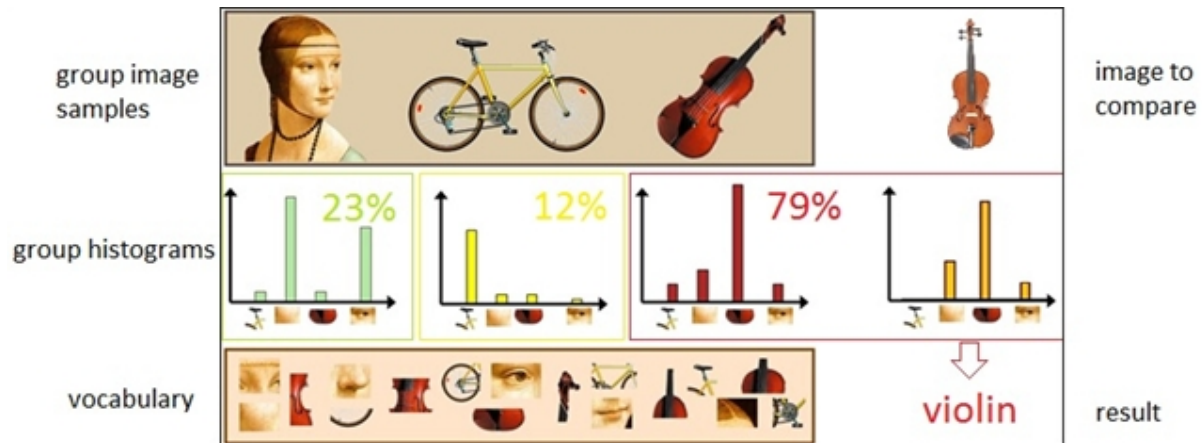


Figure 3: Caption

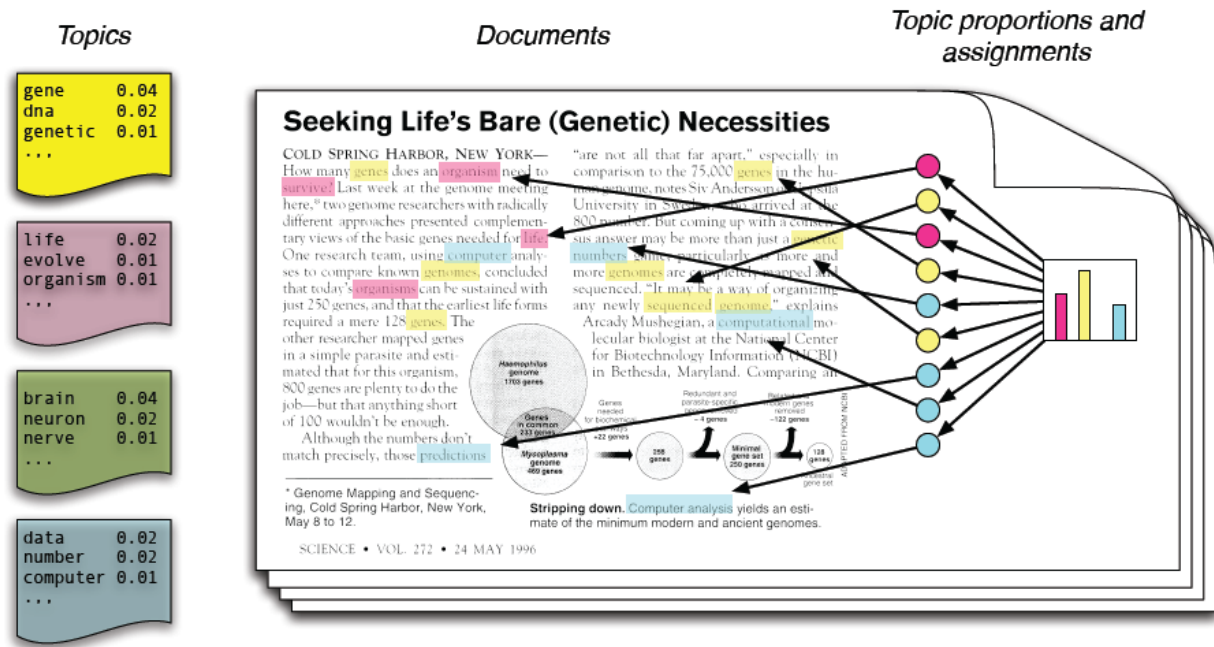


Figure 4: Caption

```
require(tm)
```

```
## Loading required package: tm
```

```
## Loading required package: NLP
```

```
drugs<- VCorpus(DirSource(directory = "~/Interaccion/TEXT_DRUGBANK",
  encoding = "UTF-8",
  recursive = TRUE,
  mode = "text"))
```

```
writeLines(as.character(drugs[[2]]))
```

```
## Pharmacokinetic properties of abacavir were not altered by the addition
## of either lamivudine or
## zidovudine or the combination of lamivudine and zidovudine. No
## clinically significant changes to lamivudine or
## zidovudine pharmacokinetics were observed following concomitant
## administration of abacavir.
## Abacavir has no effect on the pharmacokinetic properties of ethanol.
## Ethanol decreases the elimination of abacavir
## causing an increase in overall exposure .
## The addition of methadone has no clinically significant effect on the
## pharmacokinetic properties of abacavir. In a
## study of 11 HIV-infected patients receiving methadone-maintenance
## therapy (40 mg and 90 mg daily) with 600 mg of
## ZIAGEN twice daily (twice the currently recommended dose), oral
## methadone clearance increased 22% (90% CI 6% to 42%).
```

```
## This alteration will not result in a methadone dose modification in the
## majority of patients; however, an increased
## methadone dose may be required in a small number of patients.
```

Convertir el cuerpo de documentos a data frame

qdap (Quantitative Discourse Analysis Package) is an R package designed to assist in quantitative discourse analysis



Figure 5: Caption

```
require(qdap)

## Loading required package: qdap

## Loading required package: qdapDictionaries

## Loading required package: qdapRegex

## Loading required package: qdapTools

## Loading required package: RColorBrewer

##
## Attaching package: 'qdap'

## The following objects are masked from 'package:tm':
##
##   as.DocumentTermMatrix, as.TermDocumentMatrix

## The following object is masked from 'package:NLP':
##
##   ngrams
```

```
## The following object is masked from 'package:base':  
##  
##      Filter
```

```
drugDF<-as.data.frame(drugs)  
save(drugDF, file="drugDF.Rdata")  
load("drugDF.Rdata")  
  
drugsDF$Description<-as.character(drugsDF$Description)  
drugsDF$drugs<-as.character(drugsDF$drugs)
```

Cargar paquete Structural Topic Model

<http://www.margaretroberts.net/> link

```
require(stm)
```

```
## Loading required package: stm
```

```
## stm v1.1.3 (2016-01-14) successfully loaded. See ?stm for help.
```

```
drugsText<-textProcessor(documents=drugsDF$Description,metadata=drugsDF,  
                          lowercase=TRUE, removestopwords=TRUE,    removenumbers=TRUE,  
removepunctuation=TRUE, stem=TRUE, wordLengths=c(3,Inf),  
sparselevel=1, language="en",  
verbose=TRUE, onlycharacter= TRUE, stripthtml=FALSE,  
customstopwords=stopwords("SMART"), onlytxtfiles=TRUE)
```

```
## Building corpus...  
## Converting to Lower Case...  
## Removing stopwords...  
## Remove Custom Stopwords...  
## Removing numbers...  
## Removing punctuation...  
## Stemming...  
## Creating Output...
```

```
meta<-drugsText$meta  
vocab<-drugsText$vocab  
docs<-drugsText$documents  
drugsPrep<-prepDocuments(docs, vocab, meta)
```

```
## Removing 2664 of 5530 terms (2664 of 54034 tokens) due to frequency  
## Removing 1 Documents with No Words  
## Your corpus now has 986 documents, 2866 terms and 51370 tokens.
```

```
drugSTM<-stm(docs, vocab,K=0,init.type = "Spectral",seed=1234)
```

	CTM	CTM (alt)	STM	STM (alt)
# of Iterations	38	18	30	7
Total Time	4527.1 min	142.6 min	14.3 min	5.3 min
Time Per Iteration*	119.1 min	7.9 min	0.5 min	0.8 min
Heldout Log-Likelihood	-7.11	-7.10	-6.81	-6.86

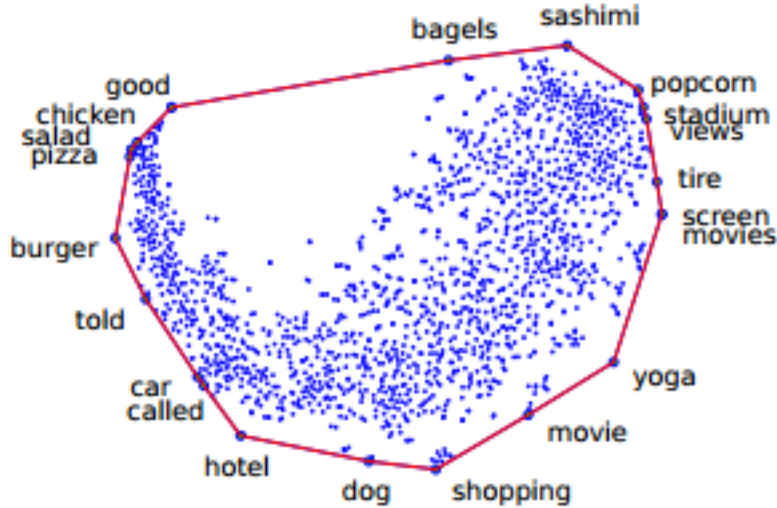


Figure 1: 2D t -SNE projection of a Yelp review corpus and its convex hull. The words corresponding to vertices are anchor words for topics, whereas non-anchor words correspond to the interior points.

```
load("drugSTM.Rdata")
drugSTM
```

```
## A topic model with 95 topics, 987 documents and a 5503 word dictionary.
```

```
str(drugSTM)
```

```
## List of 11
## $ mu      :List of 2
## ..$ mu    : num [1:94, 1] 0.857 0.472 -0.837 -0.234 1.381 ...
## ..$ gamma: NULL
## $ sigma   : num [1:94, 1:94] 13.57 4.33 3.09 5.02 2.45 ...
## $ beta    :List of 1
```

```

## ..$ logbeta:List of 1
## .. ..$ : num [1:95, 1:5503] -Inf -650.52 -6.71 -Inf -Inf ...
## $ settings :List of 13
## ..$ dim :List of 5
## .. ..$ K : int 95
## .. ..$ A : int 1
## .. ..$ V : int 5503
## .. ..$ N : int 987
## .. ..$ wcounts:List of 2
## .. .. ..$ Group.1: int [1:5503] 1 2 3 4 5 6 7 8 9 10 ...
## .. .. ..$ x : int [1:5503] 10 1 1 1 1 4 1 7 6 6 4 ...
## ..$ verbose : logi TRUE
## ..$ topicreportevery: num 5
## ..$ convergence :List of 2
## .. ..$ max.em.its : num 500
## .. ..$ em.converge.thresh: num 1e-05
## ..$ covariates :List of 3
## .. ..$ X : NULL
## .. ..$ betaindex : num [1:987] 1 1 1 1 1 1 1 1 1 1 ...
## .. ..$ yvarlevels: NULL
## ..$ gamma :List of 3
## .. ..$ mode : chr "CTM"
## .. ..$ prior: NULL
## .. ..$ enet : num 1
## ..$ sigma :List of 1
## .. ..$ prior: num 0
## ..$ kappa :List of 5
## .. ..$ LDAbeta : logi TRUE
## .. ..$ interactions : logi FALSE
## .. ..$ fixedintercept: logi TRUE
## .. ..$ mstep :List of 2
## .. .. ..$ tol : num 0.001
## .. .. ..$ maxit: num 3
## .. ..$ contrast : logi FALSE
## ..$ tau :List of 7
## .. ..$ mode : chr "L1"
## .. ..$ tol : num 1e-05
## .. ..$ enet : num 1
## .. ..$ nlambdas : num 250
## .. ..$ lambda.min.ratio: num 0.001
## .. ..$ ic.k : num 2
## .. ..$ maxit : num 10000
## ..$ init :List of 8
## .. ..$ mode : chr "Spectral"
## .. ..$ nits : num 50
## .. ..$ burnin : num 25
## .. ..$ alpha : num Inf
## .. ..$ eta : num 0.01
## .. ..$ s : num 0.05
## .. ..$ p : num 3000
## .. ..$ d.group.size: num 2000
## ..$ seed : num 1234
## ..$ ngroups : num 1
## ..$ call : language stm(documents = docs, vocab = vocab, K = 0, init.type = "Spectral",

```

```
## $ vocab      : chr [1:5503] "abacavir" "abatacept" "abbrevi" "abcb" ...
## $ convergence:List of 4
## ..$ bound    : num [1:109] -606532 -559198 -541279 -533612 -529738 ...
## ..$ its       : num 109
## ..$ converged: logi TRUE
## ..$ stopits   : logi TRUE
## $ theta      : num [1:987, 1:95] 0.001951 0.000108 0.000645 0.000316 0.002697 ...
## $ eta        : num [1:987, 1:94] 0.553 -0.532 1.565 0.489 2.247 ...
## $ invsigma   : num [1:94, 1:94] 0.37621 0.0245 0.00362 0.01294 0.03209 ...
## $ time       : Named num 1842
## ..- attr(*, "names")= chr "elapsed"
## $ version    : chr "1.1.3"
## - attr(*, "class")= chr "STM"
```

```
#Un topico
```

```
temas<-labelTopics(drugSTM, n=7, frexweight = 0.5)
temas
```

```
## Topic 1 Top Words:
## Highest Prob: lithium, diuret, potassium, increas, concomit, serum, effect
## FREX: ace, potassium, lithium, diuret, meloxicam, prinivil, oxaprozin
## Lift: aceon, univasc, accupril, aceiarb, acetyldigoxin, atacand, bank
## Score: abciximab, aberr, abil, abolish, abrad, absorb, acceler
## Topic 2 Top Words:
## Highest Prob: topiram, dose, day, pharmacokinet, studi, decreas, clinic
## FREX: topiram, adjunct, desloratadin, metformin, hrs, betaseron, copaxon
## Lift: desloratadin, hydroxydesloratadin, lucenti, myasthen, acellular, adjunct, ask
## Score: abacavir, abatacept, abciximab, abdomen, aberr, abil, abolish
## Topic 3 Top Words:
## Highest Prob: inhibitor, kaletra, dose, reyataz, administ, increas, recommend
## FREX: reyataz, kaletra, atazanavir, ritonavir, tenofovir, proteas, lopinavir
## Lift: virolog, reyataz, ageneras, altast, avium, dihydroergotamin, drughiv
## Score: abacavir, aberr, abil, abort, abrad, abstain, abus
## Topic 4 Top Words:
## Highest Prob: observ, agent, receiv, close, oral, control, hypoglycemia
## FREX: hypoglycemia, loss, prandin, starlix, withdrawn, close, colestipol
## Lift: colestid, nateglinid, repaglinid, allium, burid, carbamezapin, cinogen
## Score: aberr, abil, abolish, abort, abrad, absorb, abus
## Topic 5 Top Words:
## Highest Prob: barbitur, anticoagul, effect, phenobarbit, metabol, decreas, dosag
## FREX: barbitur, phenobarbit, doxycyclin, anticoagul, valproic, griseofulvin, microsom
## Lift: acenocouranol, anadrol, bishydroxycoumarin, heartbeat, posicor, vaiproat, know
## Score: abdomen, aberr, abil, abolish, abort, abrad, abrupt
## Topic 6 Top Words:
## Highest Prob: administr, trovafloxacin, azithromycin, auc, hour, dose, administ
## FREX: trovafloxacin, azithromycin, videx, sparfloxacin, morphin, hour, aluminum
## Lift: acidsodium, andcmax, bicitra, chewabledispers, citric, cours, light
## Score: abil, absorb, acceler, accentu, account, ace, acetest
## Topic 7 Top Words:
## Highest Prob: valproat, increas, administr, clearanc, dose, decreas, interact
## FREX: valproat, fraction, arava, reveal, ethosuximid, free, bid
## Lift: acr, angioedema, arava, biopsi, carba, concentrat, cokinet
## Score: abacavir, abil, abolish, abrad, absorb, abund, abus
## Topic 8 Top Words:
```


Highest Prob: effect, cns, depress, anticholinerg, alcohol, medic, antihistamin
 ## FREX: cns, antihistamin, depress, anticholinerg, alcohol, antimyasthen, maprotilin
 ## Lift: antimyasthen, dextbrompheniramin, diethylpropion, ethinam, ethopropazin, habitu, hyaluron
 ## Score: abacavir, abciximab, abdomin, abil, abolish, abort, abrad
 ## Topic 9 Top Words:
 ## Highest Prob: valproat, increas, administr, felbam, phenytoin, clearanc, dose
 ## FREX: valproat, felbam, epilepsi, ethosuximid, epoxid, phenobarbit, trough
 ## Lift: meropenem, proat, val, antinuclear, cialli, dipyrone, epiderm
 ## Score: abil, absorb, abstain, abus, acceler, accentu, accompani
 ## Topic 10 Top Words:
 ## Highest Prob: effect, decreas, increas, thiazid, respons, diuret, potenti
 ## FREX: apomorphin, prazosin, proamatin, metolazon, thiazid, hypokalemia, colchicin
 ## Lift: metolazon, cylert, demeclocylin, desglymidodrin, diphenidol, hydroflumethiazid, irrespec
 ## Score: abdomin, abil, abolish, absorb, abstain, abus, acceler
 ## Topic 11 Top Words:
 ## Highest Prob: contracept, oral, increas, ethinyl, estradiol, isoniazid, level
 ## FREX: ethinyl, estradiol, breakthrough, isoniazid, contracept, substanc, john
 ## Lift: simulect, abstain, aczon, aprd, astramorph, atgalg, atromid
 ## Score: abil, abolish, abort, absorb, abstain, abus, acceler
 ## Topic 12 Top Words:
 ## Highest Prob: protein, warfarin, plasma, bound, bind, high, report
 ## FREX: bound, protein, bind, warfarin, high, displac, vitro
 ## Lift: marinol, neulasta, benzthiazid, decitabin, discov, etidron, evista
 ## Score: abacavir, abatacept, abciximab, abdomin, aberr, abil, abolish
 ## Topic 13 Top Words:
 ## Highest Prob: amphetamin, effect, increas, agent, urinari, absorpt, inhibit
 ## FREX: amphetamin, acidifi, urinari, veratrum, acetazolamid, stimul, norepinephrin
 ## Lift: ammonium, diamox, stimulatori, strike, antisept, bitolterol, calculus
 ## Score: abdomin, abil, abolish, absorb, abus, acceler, accentu
 ## Topic 14 Top Words:
 ## Highest Prob: depress, sedat, analges, narcot, system, barbitur, effect
 ## FREX: narcot, sedat, nervous, tranquil, hypnot, respiratori, depress
 ## Lift: anileridin, anticholinerg, atarax, bradyarrhythmia, circulatori, coadminstr, contempl
 ## Score: abacavir, abdomin, abil, abolish, abort, abrad, abrupt
 ## Topic 15 Top Words:
 ## Highest Prob: report, inhibitor, zolmitriptan, agonist, hour, ergot, effect
 ## FREX: zolmitriptan, rizatriptan, vasospast, ergot, agonist, almotriptan, ssris
 ## Lift: moclobemid, zolmitriptan, acetest, amerg, axert, brown, cefizox
 ## Score: abacavir, abdomin, abil, abolish, abrad, absorb, abstain
 ## Topic 16 Top Words:
 ## Highest Prob: renal, probenecid, increas, secret, tubular, excret, function
 ## FREX: probenecid, renal, tubular, secret, bumetanid, excret, life
 ## Lift: color, telbivudin, alimta, analyt, ancobon, arabinosid, autom
 ## Score: abacavir, abatacept, abdomin, aberr, abil, abolish, abrad
 ## Topic 17 Top Words:
 ## Highest Prob: allopurinol, receiv, increas, concomit, report, dose, concurr
 ## FREX: allopurinol, anakinra, tnfr, mercaptopurin, enbrel, marrow, azathioprin
 ## Lift: avastin, ifl, orencia, riboflavin, abatacept, acromegal, alkeran
 ## Score: abacavir, abatacept, abdomin, abil, abolish, abrad, absorb
 ## Topic 18 Top Words:
 ## Highest Prob: concentr, increas, dose, prezistartv, recommend, plasma, interact
 ## FREX: prezistartv, posaconazol, darunavir, rabeprazol, alprazolam, triazolam, ritonavir
 ## Lift: rabeprazol, antimigrain, categor, certainti, cutan, genotyp, glucuronosyl
 ## Score: abacavir, abil, abort, abrad, absorb, abstain, abus

Topic 19 Top Words:
 ## Highest Prob: anti, bezalip, action, concurr, inflammatori, interfer, retard
 ## FREX: bezalip, retard, rivastigmin, oncaspar, oil, cyclophosphamid, exelon
 ## Lift: oncaspar, ardeparin, bezalip, cholestyramin, clofazimin, cyclopentol, dihydrotachystero.
 ## Score: abacavir, abatacept, abciximab, abdomin, aberr, abil, abolish

Topic 20 Top Words:
 ## Highest Prob: pharmacokinet, effect, olanzapin, dose, increas, clearanc, oral
 ## FREX: olanzapin, quetiapin, risperidon, levetiracetam, tegaserod, pramipexol, bid
 ## Lift: antizol, exemestan, penciclovir, quetiapin, aldehyd, amytriptylin, aricept
 ## Score: abacavir, abil, abrad, absorb, abus, acceler, accentu

Topic 21 Top Words:
 ## Highest Prob: cyp, inhibitor, mesyl, inject, report, macrolid, interact
 ## FREX: mesyl, macrolid, cyp, pimoziid, inject, cisplatin, alkaloid
 ## Lift: ada, adagen, aloxi, antiemeticsantinaus, antispasmod, azopt, bovin
 ## Score: abacavir, abatacept, abciximab, abdomin, aberr, abil, abolish

Topic 22 Top Words:
 ## Highest Prob: quinidin, interact, antiarrhythm, procainamid, phenothiazin, block, tricycl
 ## FREX: antiarrhythm, procainamid, quinidin, diphenhydramin, chlorpromazin, promazin, procyclidi
 ## Lift: aprotinin, brompheniramin, cardioquin, clemastin, diason, diethyleth, endep
 ## Score: abacavir, abciximab, abdomin, aberr, abil, abolish, abort

Topic 23 Top Words:
 ## Highest Prob: increas, decreas, concentr, level, thyroid, test, hormon
 ## FREX: tbg, globulin, uptak, vii, viii, free, thyroid
 ## Lift: shbg, angiotensinogenrenin, antigen, antitrypsin, ceruloplasmin, creas, depo
 ## Score: abil, abolish, absorb, abstain, abus, acarbos, acceler

Topic 24 Top Words:
 ## Highest Prob: dose, kgday, increas, clinic, dutasterid, exposur, studi
 ## FREX: dutasterid, eletriptan, duagen, mrdd, kgday, albendazol, fetal
 ## Lift: eletriptan, leydig, praziquantel, relpax, semin, sperm, abbrevi
 ## Score: abbrevi, aberr, ace, acyclovir, adenoma, adolesc, adren

Topic 25 Top Words:
 ## Highest Prob: concomit, potenti, amphotericin, toxic, monitor, therapi, agent
 ## FREX: amphotericin, pentamidin, foscavir, isocarboxazid, foscarnet, trental, nephrotox
 ## Lift: foscavir, alprostadil, anaphylactoid, apokyn, aredia, ayerst, banana
 ## Score: abacavir, abciximab, abdomin, abil, abolish, absorb, abstin

Topic 26 Top Words:
 ## Highest Prob: metabol, inhibit, cytochrom, vitro, enzym, cyp, studi
 ## FREX: cytochrom, cyp, vitro, metabol, mediat, enzym, cypc
 ## Lift: lenalidomid, aminopyrin, concomitantus, docetaxel, enfuvirtid, ethoxycoumarin, green
 ## Score: abacavir, abatacept, abciximab, abdomin, aberr, abil, abilifi

Topic 27 Top Words:
 ## Highest Prob: sodium, cerivastatin, heparin, administr, concomit, warfarin, meclofenam
 ## FREX: cerivastatin, sodium, meclofenam, buspiron, heparin, incompat, dantrolen
 ## Lift: doxil, acidsequest, admixtur, antiovlatori, asept, betablock, chloralos
 ## Score: abacavir, abciximab, abdomin, aberr, abil, abolish, abrad

Topic 28 Top Words:
 ## Highest Prob: theophyllin, increas, decreas, clearanc, dose, similar, effect
 ## FREX: theophyllin, clearanc, similar, larger, busulfan, busulfex, adenosin
 ## Lift: carbimazol, glutathion, actual, april, busulfan, busulfex, emet
 ## Score: abacavir, abdomin, aberr, abil, abolish, abort, abrad

Topic 29 Top Words:
 ## Highest Prob: sildenafil, effect, supplement, citrat, camptosar, food, report
 ## FREX: camptosar, sildenafil, epa, citrat, supplement, arginin, calcitonin
 ## Lift: akathisia, antinaturet, camptosar, chlorotrianisen, detriment, fertinextm, gastroparesi

Score: abacavir, abdomin, aberr, abil, abolish, abrad, absorb

Topic 30 Top Words:

Highest Prob: phenytoin, increas, level, plasma, serum, interact, concentr

FREX: cerebyx, tarceva, phosphatas, erlotinib, phenytoin, salicyl, fosphenytoin

Lift: cerebyx, tarceva, abund, chboramphenicol, chromium, creatin, eosinophilia

Score: abacavir, abil, abolish, abort, abrad, absorb, abstain

Topic 31 Top Words:

Highest Prob: dose, digoxin, pharmacokinet, warfarin, singl, administr, healthi

FREX: digoxin, singl, warfarin, cimetidin, healthi, pharmacokinet, volunt

Lift: falciparum, singl, digoxin, healthi, cimetidin, volunt, pharmacodynam

Score: abacavir, abatacept, abciximab, abdomin, aberr, abil, abilifi

Topic 32 Top Words:

Highest Prob: ketoconazol, plasma, concomit, increas, cisaprid, itraconazol, erythromycin

FREX: cisaprid, itraconazol, ketoconazol, telithromycin, erythromycin, terfenadin, loratadin

Lift: iressa, asmanex, bexaroten, desmethylastemizol, desmethylastermizol, dicyclomin, fibrul

Score: abacavir, abil, abolish, abrad, absorb, abus, acceler

Topic 33 Top Words:

Highest Prob: cyclosporin, report, concomit, increas, concentr, administr, proleukin

FREX: proleukin, epirubicin, glutamin, cyclosporin, chemotherapi, contrast, colchicin

Lift: ellenc, media, adjuv, affair, amelior, aminohippur, atyp

Score: abil, abolish, absorb, acceler, accentu, account, accumul

Topic 34 Top Words:

Highest Prob: product, ciprofloxacin, levodopa, concomit, ropinirol, administr, effect

FREX: ropinirol, acampros, requip, levodopa, ciprofloxacin, carbidopa, trihexyphenidyl

Lift: differin, dopa, renova, abras, acampros, antidyskinet, apraclonidin

Score: abacavir, abdomin, aberr, abil, abolish, abort, abrad

Topic 35 Top Words:

Highest Prob: metabol, inhibitor, cypa, enzym, duloxetine, effect, alosetron

FREX: duloxetine, sprycel, tolcapon, alosetron, riluzol, modafinil, dasatinib

Lift: dextroamphetamin, diphenoxyl, hctz, mirtazapin, namenda, remeronsoltab, riluzol

Score: abacavir, abil, abolish, abort, abrad, absorb, abus

Topic 36 Top Words:

Highest Prob: metformin, studi, ibandron, treat, actonel, similar, aspirin

FREX: ibandron, actonel, metformin, felden, glumetza, cation, upper

Lift: cephalixin, aris, aspirinnonsteroid, bmd, endpoint, felden, forti

Score: abdomin, aberr, abil, abolish, abrad, absorb, abstain

Topic 37 Top Words:

Highest Prob: bleed, heparin, increas, platelet, anticoagul, risk, aspirin

FREX: argatroban, remodulin, bleed, lodin, heparin, platelet, etodolac

Lift: activas, aggrastat, angiomax, artifact, aspirinacetaminophen, atp, bexxar

Score: abacavir, abciximab, abdomin, abil, abolish, abrupt, absorb

Topic 38 Top Words:

Highest Prob: concurr, tetracyclin, penicillin, administr, effect, monitor, sever

FREX: penicillin, oxytoc, bacteriostat, bactericid, tetracyclin, navelbin, render

Lift: accid, cerebrovascular, navelbin, advantag, bactercid, bretylium, chloroprocain

Score: abacavir, abdomin, abil, abolish, abort, abrad, abrupt

Topic 39 Top Words:

Highest Prob: verapamil, effect, agent, block, concomit, beta, therapi

FREX: verapamil, ventricular, bepridil, block, left, dopamin, atrioventricular

Lift: angl, atrial, cardiomyopathi, chronotrop, hydrocarbon, mesenter, pupil

Score: abciximab, abil, abolish, abrupt, absorb, abus, acceler

Topic 40 Top Words:

Highest Prob: insulin, glucos, blood, effect, level, test, oral

FREX: acitretin, acarbos, extran, novolog, insulin, glucos, oxyphenbutazon

Lift: acitretin, novoseven, plenaxi, soriatan, velcad, absent, aminocapro
 ## Score: abciximab, aberr, abil, abolish, abrad, abrupt, absent
 ## Topic 41 Top Words:
 ## Highest Prob: quinidin, level, metabol, increas, propafenon, plasma, theophyllin
 ## FREX: mexitil, propafenon, quinidin, tacrin, disopyramid, mexiletin, extens
 ## Lift: cognex, norpac, widen, anticoagulatori, antituss, compassion, constitut
 ## Score: aberr, abil, abolish, abort, abrad, absorb, abstain
 ## Topic 42 Top Words:
 ## Highest Prob: venlafaxin, metabol, inhibit, pharmacokinet, cypd, activ, increas
 ## FREX: venlafaxin, odv, cypd, find, diazepam, mediat, haloperidol
 ## Lift: desmethylvenlafaxin, effexor, inducedbi, moiety, neurotransmitt, odv, psychometr
 ## Score: abacavir, abil, abolish, abrad, absorb, abus, acceler
 ## Topic 43 Top Words:
 ## Highest Prob: inform, informatuion, section, therapi, pharmacolog, concomit, effect
 ## FREX: inform, informatuion, gemzar, butenafin, mentax, neupogen, thiamin
 ## Lift: inform, informatuion, section, pharmacolog, therapi, concomit, effect
 ## Score: abacavir, abatacept, abbrevi, abcb, abciximab, abdomen, abdomen
 ## Topic 44 Top Words:
 ## Highest Prob: sirolimus, oral, cyclosporin, solut, dose, administr, capsul
 ## FREX: sirolimus, solut, modifi, capsul, cyclosporin, neoral, gelatin
 ## Lift: interchang, andtmax, aucwer, bcg, cyclosporinecmax, desacetyldiltiazem, desmethyldiltiazem
 ## Score: abil, absorb, acceler, ace, acyclovir, adrenerg, affin
 ## Topic 45 Top Words:
 ## Highest Prob: mofetil, mycophenol, auc, administ, renal, vaccin, mpa
 ## FREX: mofetil, myfort, mpag, mycophenol, mpa, cellcept, vaccin
 ## Lift: acyclovirganciclovir, azathioprinemycophenol, coexist, desogestrel, disrupt, intersubject
 ## Score: abil, abrad, absorb, acceler, accentu, ace, acetylsalicyl
 ## Topic 46 Top Words:
 ## Highest Prob: agent, anticholinerg, concomit, effect, administ, increas, absorpt
 ## FREX: symlin, terazosin, doxazosin, sanctura, anticholinerg, intraocular, motil
 ## Lift: achlorhydria, akineton, analgesicanti, anticholinergicsympathomimet, antiglaucoma, azosin
 ## Score: abacavir, abatacept, abciximab, abdomen, aberr, abil, abolish
 ## Topic 47 Top Words:
 ## Highest Prob: effect, anagrelid, medicin, interact, product, procainamid, aspirin
 ## FREX: anagrelid, minoxidil, phospholin, guanethidin, iodid, misoprostol, procainamid
 ## Lift: minoxidil, phospholin, amp, amrinon, antivag, bentoquatam, carbam
 ## Score: abacavir, abatacept, abciximab, abdomen, abil, abolish, abrad
 ## Topic 48 Top Words:
 ## Highest Prob: concomit, quinolon, theophyllin, level, caffein, report, warfarin
 ## FREX: quinolon, enoxacin, caffein, esomeprazol, sucralf, grepafloxacin, theophyllin
 ## Lift: antimicrobi, esomeprazol, theobromin, campath, cinoxacin, complexometr, fenbufen
 ## Score: abacavir, abil, abolish, abrad, absorb, abus, acceler
 ## Topic 49 Top Words:
 ## Highest Prob: interact, concomit, potenti, lettuc, administ, oral, effect
 ## FREX: interact, concomit, potenti, administ, oral, effect, advers
 ## Lift: lettuc, interact, potenti, concomit, administ, oral, advers
 ## Score: abacavir, abatacept, abbrevi, abcb, abciximab, abdomen, abdomen
 ## Topic 50 Top Words:
 ## Highest Prob: interact, concomit, potenti, liothyronin, administ, oral, effect
 ## FREX: interact, concomit, potenti, administ, oral, effect, advers
 ## Lift: liothyronin, interact, potenti, concomit, administ, oral, advers
 ## Score: abacavir, abatacept, abbrevi, abcb, abciximab, abdomen, abdomen
 ## Topic 51 Top Words:
 ## Highest Prob: effect, side, medicin, chanc, blood, increas, oral

```

##      FREX: chanc, side, sulfapyridin, neomycin, mephenytoin, thinner, medicin
##      Lift: acetohydroxam, acetophenazin, aldomet, anabolin, anavar, aquamephyton, aralen
##      Score: abdomin, abil, abolish, absorb, abstain, abus, acceler
## Topic 52 Top Words:
##      Highest Prob: quinin, sulfat, oral, receiv, concomit, day, dose
##      FREX: quinin, sulfat, mefloquin, halofantrin, cypd, substrat, healthi
##      Lift: cinchona, digo, hydroxyquinin, leg, malaria, methoxyphenamin, nobarbit
##      Score: abacavir, aberr, abil, abolish, abort, abrad, absorb
## Topic 53 Top Words:
##      Highest Prob: beta, agonist, inhal, effect, administ, adrenerg, concomit
##      FREX: inhal, asthma, serev, agonist, albuterol, copd, beta
##      Lift: inhalationsday, nonpotassium, accept, aerolizertm, airway, alup, artifici
##      Score: abacavir, abciximab, abdomin, abil, abolish, abrad, abrupt
## Topic 54 Top Words:
##      Highest Prob: agent, includ, receiv, concurr, medic, caution, antibiot
##      FREX: agent, includ, antibiot, medic, receiv, concurr, caution
##      Lift: cylat, ketoconazoleitraconazol, lovenox, meprobam, sali, includ, agent
##      Score: abacavir, abatacept, abciximab, abdomen, abdomin, aberr, abil
## Topic 55 Top Words:
##      Highest Prob: effect, anticholinerg, administr, increas, medicin, medic, potassium
##      FREX: botulinum, toxin, serotyp, chlorid, auranofin, doxylamin, elspar
##      Lift: botulinum, serotyp, toxin, acetohexamid, asparagin, attapulgit, auranofin
##      Score: abacavir, abciximab, abdomin, abil, abolish, abrad, abrupt
## Topic 56 Top Words:
##      Highest Prob: neuromuscular, block, succinylcholin, effect, relax, muscl, administ
##      FREX: nimbox, sevofluran, mivacron, toradol, succinylcholin, nondepolar, neuromuscular
##      Lift: mac, andtolbutamid, anestheticssedativeshypnoticsopioid, cardiorespiratori, cerezym, col
##      Score: abacavir, abciximab, abdomin, abil, abolish, abrupt, absorb
## Topic 57 Top Words:
##      Highest Prob: corticosteroid, increas, effect, decreas, aspirin, anticoagul, steroid
##      FREX: corticosteroid, steroid, androgen, aspirin, methylprednisolon, salicyl, maintain
##      Lift: apt, benzothiadiazin, cortico, hypopro, hypoprothrombinemia, link, methandrostenson
##      Score: abciximab, abdomin, aberr, abil, abolish, abrad, absorb
## Topic 58 Top Words:
##      Highest Prob: acid, potenti, therapi, decreas, risk, caution, oral
##      FREX: acid, risk, therapi, advis, bile, caution, potenti
##      Lift: obvious, acid, bile, hot, advis, electrolyt, loop
##      Score: abacavir, abatacept, abcb, abciximab, abdomen, abdomin, aberr
## Topic 59 Top Words:
##      Highest Prob: beta, blocker, hypotens, effect, block, addit, catecholamin
##      FREX: brevibloc, catecholamin, beta, anaphylact, deplet, reserpin, clonidin
##      Lift: betapac, brevibloc, depletor, fenoldopam, fluothan, reactiv, accident
##      Score: abciximab, abdomin, abil, abolish, abrad, abrupt, absent
## Topic 60 Top Words:
##      Highest Prob: fluvastatin, dose, increas, auc, level, pravastatin, kgday
##      FREX: fluvastatin, pravastatin, dog, kgday, rosuvastatin, coa, hmg
##      Lift: perivascular, bilater, cataract, cholestyraminecolestipol, cimetidineranitidineomeprazol
##      Score: aberr, abil, abrad, absorb, abus, acceler, account
## Topic 61 Top Words:
##      Highest Prob: methadon, increas, voriconazol, dose, inhibit, monitor, studi
##      FREX: methadon, voriconazol, vfend, frequent, withdraw, fondaparinux, mainten
##      Lift: addison, adjustmentcom, antiretroviraldrug, arrhythmogen, asus, atiii, auct
##      Score: abacavir, abdomin, abil, abrad, abrupt, abstin, abus
## Topic 62 Top Words:

```

Highest Prob: methotrex, concomit, diflunis, increas, level, administr, naproxen
 ## FREX: diflunis, methotrex, naproxen, sulindac, sulfid, normal, tolectin
 ## Lift: tolectin, dfcr, dfur, diflunisalacetaminophen, dorzolamid, fbal, hepatotoxin
 ## Score: aberr, abil, abolish, absorb, abus, acceler, accentu
 ## Topic 63 Top Words:
 ## Highest Prob: tadalafil, effect, dose, signific, studi, aripiprazol, cypa
 ## FREX: aripiprazol, tadalafil, zolpidem, norvasc, aliskiren, estazolam, nisoldipin
 ## Lift: flomax, systolicdiastol, aliskiren, beat, bendrofluazid, cimetidinezolpidem, core
 ## Score: abacavir, abil, abilifi, abolish, abrad, abrupt, absorb
 ## Topic 64 Top Words:
 ## Highest Prob: iron, test, concomit, administr, cefdinir, result, aminoglycosid
 ## FREX: cefdinir, iron, fortifi, omnicef, aminoglycosid, cephalosporin, nephrotox
 ## Lift: femara, fortifi, glutam, omnicef, bacilli, benthiromid, benzocain
 ## Score: abacavir, abciximab, abdomen, abil, abolish, abrad, absolut
 ## Topic 65 Top Words:
 ## Highest Prob: interact, concomit, potenti, administ, permit, oral, effect
 ## FREX: interact, concomit, potenti, administ, oral, effect, advers
 ## Lift: permit, interact, potenti, concomit, administ, oral, advers
 ## Score: abacavir, abatacept, abbrevi, abcb, abciximab, abdomen, abdomen
 ## Topic 66 Top Words:
 ## Highest Prob: test, laborator, posit, fals, glucos, reaction, urin
 ## FREX: labetalol, fals, posit, guanfacin, test, pheochromocytoma, amoxicillin
 ## Lift: cefotan, chromatograph, adsorpt, amoxil, analyz, antiasthm, antiglobulin
 ## Score: abdomen, aberr, abil, abolish, abrad, absorb, abus
 ## Topic 67 Top Words:
 ## Highest Prob: effect, benzodiazepin, phenothiazin, phenmetrazin, increas, antidepress, romazicon
 ## FREX: phenmetrazin, romazicon, benzodiazepin, levomepromazin, phenothiazin, bromocriptin, flumazenil
 ## Lift: noradrenalin, amyl, antiminth, brevit, clidinium, demser, ephedrineamphetamin
 ## Score: abacavir, abdomen, abil, abolish, abrad, abrupt, absorb
 ## Topic 68 Top Words:
 ## Highest Prob: time, day, prothrombin, concomit, dose, anticoagul, inhibitor
 ## FREX: xenic, miglitol, inr, prothrombin, simvastatin, time, rimantadin
 ## Lift: xenic, zolinza, calan, casodex, daptomycin, eulexin, forego
 ## Score: abil, abolish, abrad, absorb, abus, acceler, accentu
 ## Topic 69 Top Words:
 ## Highest Prob: agent, sodium, hypothyroid, thyroid, hormon, increas, effect
 ## FREX: hypothyroid, levothyroxin, hyperthyroid, thyroid, euthyroid, hormon, iodin
 ## Lift: catablo, cholestograph, cytokin, epiphys, flour, gender, hydoxid
 ## Score: abdomen, abdomen, abil, abolish, abrad, absorb, abus
 ## Topic 70 Top Words:
 ## Highest Prob: potenti, evalu, inhibitor, administ, administr, increas, concomit
 ## FREX: evalu, potenti, inhibitor, administr, administ, dosag, hypotens
 ## Lift: prick, evalu, detect, potenti, hypotens, inhibitor, dosag
 ## Score: abacavir, abatacept, abcb, abciximab, abdomen, abdomen, aberr
 ## Topic 71 Top Words:
 ## Highest Prob: sertraline, hydrochlorid, dose, paroxetin, effect, studi, clinic
 ## FREX: sertraline, paxil, paroxetin, hydrochlorid, tambacor, disord, tca
 ## Lift: assumpt, diathesi, final, govern, postdos, unlik, address
 ## Score: abil, abolish, abrupt, absorb, abus, acceler, accompani
 ## Topic 72 Top Words:
 ## Highest Prob: clarithromycin, theophyllin, terfenadin, increas, concentr, concomit, administr
 ## FREX: clarithromycin, terfenadin, isradipin, zyflo, troglitazon, dirithromycin, theophyllin
 ## Lift: zyflo, accol, biliti, coadministratjon, dirithromycin, empir, fix
 ## Score: abil, abolish, abrad, absorb, abstain, abus, acarbos

Topic 73 Top Words:
 ## Highest Prob: tinidazol, report, level, increas, effect, anticoagul, metronidazol
 ## FREX: tinidazol, metronidazol, tamoxifen, melatonin, mellaril, thioridazin, coumarin
 ## Lift: melatonin, nolvadex, suboxon, adenin, advic, afterward, alanin
 ## Score: abdomin, abil, abolish, absorb, abstain, abus, acceler

Topic 74 Top Words:
 ## Highest Prob: antidepress, metabol, tricycl, inhibit, plasma, dose, tca
 ## FREX: tca, antidepress, tricycl, poor, caucasian, popul, tcas
 ## Lift: african, asian, hexalen, pyridoxin, advanc, altretamin, antiarrhythrn
 ## Score: abil, abolish, abort, abrad, abrupt, absorb, abstain

Topic 75 Top Words:
 ## Highest Prob: nifedipin, digoxin, increas, level, rapamun, effect, sirolimus
 ## FREX: nifedipin, rapamun, eprosartan, mycamin, digoxin, releas, irbesartan
 ## Lift: eprosartan, micafungin, mycamin, rapamun, substratesinhibitor, sulphenazol, irbesartan
 ## Score: abacavir, abciximab, aberr, abil, abolish, abort, abrad

Topic 76 Top Words:
 ## Highest Prob: nefazodon, effect, pharmacokinet, concentr, increas, auc, dose
 ## FREX: nefazodon, ganciclovir, felbatol, felodipin, serzon, cmin, steady
 ## Lift: hydroxynefazodon, caspofungin, chlorophenylpiperazin, chr, cmaxvalu, coadmin, dion
 ## Score: abil, abrad, acceler, accentu, accompani, accumul, ace

Topic 77 Top Words:
 ## Highest Prob: rifampin, increas, fluconazol, concentr, rifabutin, phenytoin, plasma
 ## FREX: diflucan, rifabutin, fluconazol, rifampin, mifepriston, disulfiram, trimetrex
 ## Lift: chirocain, diflucan, flucon, mepron, agentsclass, antiacid, antiestrogen
 ## Score: abacavir, aberr, abil, abolish, abort, abrad, absorb

Topic 78 Top Words:
 ## Highest Prob: flurbiprofen, ibuprofen, effect, aspirin, studi, inflammatori, anti
 ## FREX: flurbiprofen, ibuprofen, nonsteroid, inflammatori, aspirin, anti, coumarin
 ## Lift: flurbiprofen, phenformin, diuresi, eleven, kaliuresi, sativum, substant
 ## Score: aberr, abil, abolish, abrad, absorb, abstain, abus

Topic 79 Top Words:
 ## Highest Prob: provid, separ, concomit, take, effect, advers, pharmacolog
 ## FREX: provid, separ, butenafin, mentax, isuprel, digi, intravascular
 ## Lift: provid, separ, take, concomit, effect, pharmacolog, advers
 ## Score: abacavir, abatacept, abbrevi, abcb, abciximab, abdomin, aberr

Topic 80 Top Words:
 ## Highest Prob: effect, furosemid, clonidin, concomit, receiv, inject, combin
 ## FREX: clonidin, baclofen, chlorprothixen, revia, hydralazin, epidur, furosemid
 ## Lift: ankl, antidiarrh, approx, baclofen, barbitu, cabergolin, caudal
 ## Score: abdomin, abil, abolish, absorb, abstain, abus, acceler

Topic 81 Top Words:
 ## Highest Prob: administ, cypa, rozerem, cypc, caution, increas, inhibitor
 ## FREX: rozerem, lapatinib, lansoprazol, cypc, strong, skelid, cevimelin
 ## Lift: abcb, azlocillin, cefprozil, cevimelin, coeffici, conivaptan, daytim
 ## Score: abacavir, abcb, abil, abolish, abort, abrad, absorb

Topic 82 Top Words:
 ## Highest Prob: specif, oseltamivir, interact, dose, plasma, neumega, pharmacokinet
 ## FREX: specif, oseltamivir, neumega, xigri, carboxyl, csf, safeti
 ## Lift: eloxatin, ibutilid, natreacor, novantron, oseltamivir, xigri, capac
 ## Score: abacavir, abatacept, abbrevi, abciximab, abdomen, abdomin, aberr

Topic 83 Top Words:
 ## Highest Prob: photosensit, decreas, concomit, agent, pdt, activ, reaction
 ## FREX: visudyn, photosensit, pdt, photofrin, radic, griseofulvin, methyl
 ## Lift: photofrin, radic, visudyn, actin, aminolevulin, anthralin, bengal

Score: abacavir, abatacept, abciximab, abdomin, abil, abolish, abrad

Topic 84 Top Words:

Highest Prob: nsaid, increas, concomit, level, aspirin, methotrex, effect

FREX: nsaid, ketoprofen, diclofenac, methotrex, prostaglandin, aspirin, lithium

Lift: teniposid, adefovir, adhes, baraclud, benzylpenicillin, celontin, chlortetracyclin

Score: abciximab, aberr, abil, abolish, abrad, absorb, abstain

Topic 85 Top Words:

Highest Prob: diuret, thiazid, lithium, effect, reduc, steroid, anti

FREX: colestipol, diuret, natriuret, loop, thiazid, telmisartan, doctor

Lift: advil, aldacton, alev, anaprox, arthropan, asubnorm, azulfidin

Score: abdomin, aberr, abil, abolish, abort, abrad, absorb

Topic 86 Top Words:

Highest Prob: antacid, oral, fexofenadin, administr, aluminum, effect, dose

FREX: fexofenadin, ceftibuten, tizanidin, aluminum, antacid, cefditoren, exjad

Lift: ethambutol, appl, factiv, gemifloxacin, terazol, allegra, aucss

Score: abacavir, aberr, abil, abolish, abort, abrad, absorb

Topic 87 Top Words:

Highest Prob: cypa, inhibitor, ketoconazol, increas, concentr, metabol, dose

FREX: cypa, ketoconazol, ritonavir, gleevec, potent, itraconazol, amprenavir

Lift: atomoxetin, strattera, andcmin, cinacalcet, css, gleevec, historicalcontrol

Score: abacavir, abdomin, aberr, abil, abilifi, abolish, abort

Topic 88 Top Words:

Highest Prob: interact, studi, clinic, conduct, observ, trial, formal

FREX: studi, conduct, clinic, formal, interact, trial, radioiodin

Lift: anidulafungin, aranesp, cetrotid, chlorambucil, clofarabin, clolar, cyanokit

Score: abacavir, abatacept, abbrevi, abcb, abciximab, abdomin, aberr

Topic 89 Top Words:

Highest Prob: vitamin, absorpt, phosphat, calcium, contracept, accutan, cholestyramin

FREX: accutan, vitamin, phosphat, hypercalcemia, fat, analogu, cholestyramin

Lift: accord, biweek, calcidiol, calcitriol, calcitriolergocalcitriol, estrogenprogestin, hydr

Score: aberr, abil, abolish, abort, abrad, absolut, absorb

Topic 90 Top Words:

Highest Prob: dose, studi, rat, rifapentin, pregnanc, effect, time

FREX: ezetimib, tazaroten, demadex, rifapentin, amev, nurs, reproduct

Lift: retapamulin, abort, abortifaci, abrad, agenesi, alefacept, altabax

Score: aberr, abil, abort, abortifaci, abrad, absorb, abus

Topic 91 Top Words:

Highest Prob: dose, administ, ziprasidon, effect, pharmacokinet, montelukast, interv

FREX: ziprasidon, montelukast, renagel, stadol, butorphanol, dolasetron, hydrodolasetron

Lift: hydrodolasetron, montelukast, solifenacin, arsenic, beadminist, benztropin, cytadren

Score: abacavir, abil, abolish, abrad, absorb, abstain, abus

Topic 92 Top Words:

Highest Prob: lamotrigin, dose, lamict, effect, concentr, studi, day

FREX: lamict, lamotrigin, highest, fetal, rat, mcg, pregnanc

Lift: amniocentesi, bipolar, cytogenet, dihydrofol, feed, field, gastaut

Score: abbrevi, aberr, absorb, accentu, ace, acellular, acetylsalicyl

Topic 93 Top Words:

Highest Prob: inhibitor, mao, concomit, take, sibutramin, sympathomimet, serotonin

FREX: sibutramin, azilect, dexfenfluramin, mao, serotonin, sympathomimet, serotoninerg

Lift: escitalopram, obes, phenylalanin, sibutramin, wait, aramin, arecolin

Score: abacavir, abdomin, abil, abolish, abrad, abrupt, absorb

Topic 94 Top Words:

Highest Prob: coumadin, agent, ptinr, botan, effect, properti, anticoagul

FREX: ptinr, botan, coumadin, botant, antiplatelet, ginseng, name


```
##      Lift: agrimoni, angelica, bogbean, botan, bromelain, capsicum, cassia
##      Score: abdomen, abdomin, abil, absorb, abus, acceler, accentu
## Topic 95 Top Words:
##      Highest Prob: antagon, action, thiopent, etomid, diazoxid, effect, report
##      FREX: etomid, thiopent, antagon, diazoxid, action, antinocicept, zimelidin
##      Lift: antinocicept, etomid, zimelidin, thiopent, synerg, diazoxid, aminophyllin
##      Score: abacavir, abatacept, abcb, abciximab, abdomen, abdomin, aberr
```

CUATRO TIPOS DIFERENTES DE WORD-WEIGHTINGS:

1.HIGHEST PROB: Palabras dentro de cada topico con la mas alta probabilidad inferido de de una Distribucion multinomial con parametro beta.

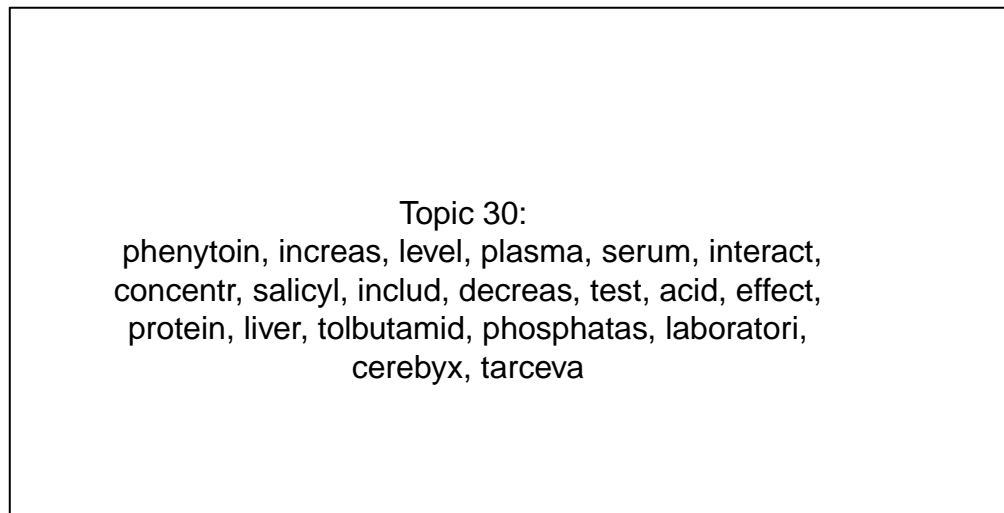
2.FREX: Palabras que son tanto mas frecuentes y exclusivas. Se calcula tomando la media armonica del rango de probabilidad dentro del topico(frecuencia) y el rango de distribucion de topicos $p(z|w = v)$ (exclusividad)

3.LIFT: respuesta objetivo dividido por resp promedio

4.SCORE: Numero de desviaciones estandar sobre la media

Figure 6: Caption

```
plot(drugSTM,topics=c(30),width = 60, type="labels", labeltype=c("prob"), xlim = 5, ylim = 6)
```

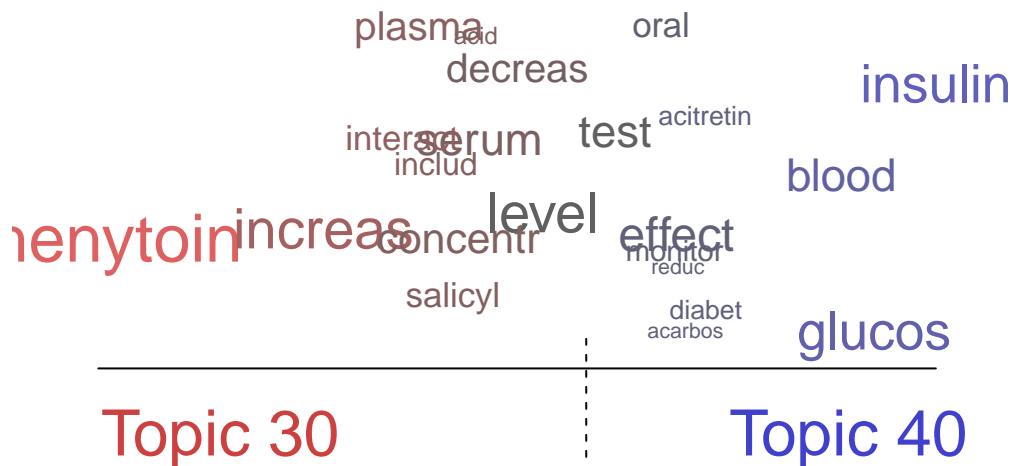


```
#Varios topicos
labelTopics(drugSTM, topics=c(30,40), n = 7, frexweight = 0.5)
```

```
## Topic 30 Top Words:
##      Highest Prob: phenytoin, increas, level, plasma, serum, interact, concentr
##      FREX: cerebyx, tarceva, phosphatas, erlotinib, phenytoin, salicyl, fosphenytoin
```

```
##      Lift: cerebyx, tarceva, abund, chboramphenicol, chromium, creatin, eosinophilia
##      Score: abacavir, abil, abolish, abort, abrad, absorb, abstain
## Topic 40 Top Words:
##      Highest Prob: insulin, glucos, blood, effect, level, test, oral
##      FREX: acitretin, acarbos, extran, novolog, insulin, glucos, oxyphenbutazon
##      Lift: acitretin, novoseven, plenaxi, soriatan, velcad, absent, aminocapro
##      Score: abciximab, aberr, abil, abolish, abrad, abrupt, absent
```

```
plot(drugSTM,topics=c(30,40),width = 60, type="perspective", labeltype=c("prob"), xlim = 5, ylim = 6)
```



```
plot(drugSTM,topics=c(1,40,50), type="labels", labeltype=c("prob"), xlim = 10, ylim = 10)
```

<p>Topic 1:</p> <p>um, diuret, potassium, increas, concomit, serum, effect, ace, inhibitor, erapi, agent, monitor, receiv, toxic, caution, level, spare, blood, risk, initi</p>
<p>Topic 40:</p> <p>ulin, glucos, blood, effect, level, test, oral, diabet, acitretin, monitor, bos, reduc, extran, novolog, laborator, treatment, adjust, clinic, result, mix</p>
<p>Topic 50:</p> <p>interact, concomit, potenti, liothyronin, administ, oral, effect, increas, vers, therapi, caution, report, administr, occur, result, medic, requir, combin, evalu, decreas</p>

```
##Encontrar topicos
findTopic(drugSTM, c("cyp"), type="prob")
```

```
## 3 topics contained 1 words in the list: 21, 26, 35
```

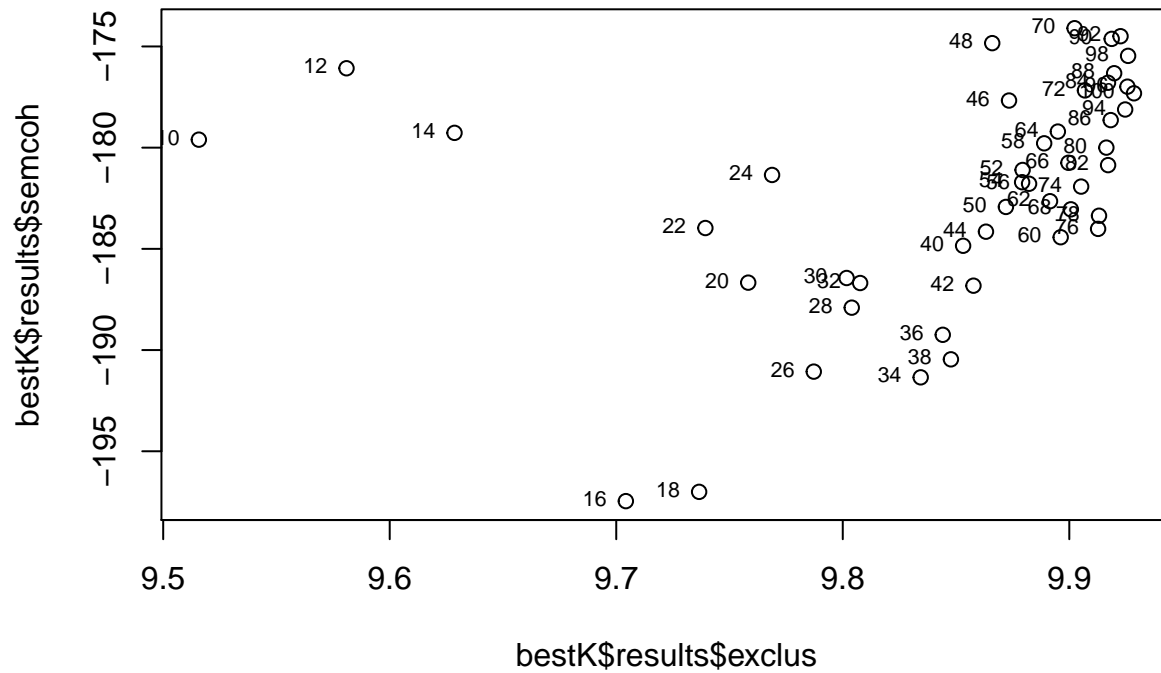
```
n_topics <-seq(from = 10, to = 100, by = 1)
```

```
bestK <- searchK(docs,vocab, K = n_topics, data = meta)
```

Seleccionar el mejor numero de topicos que maximize exclusividad

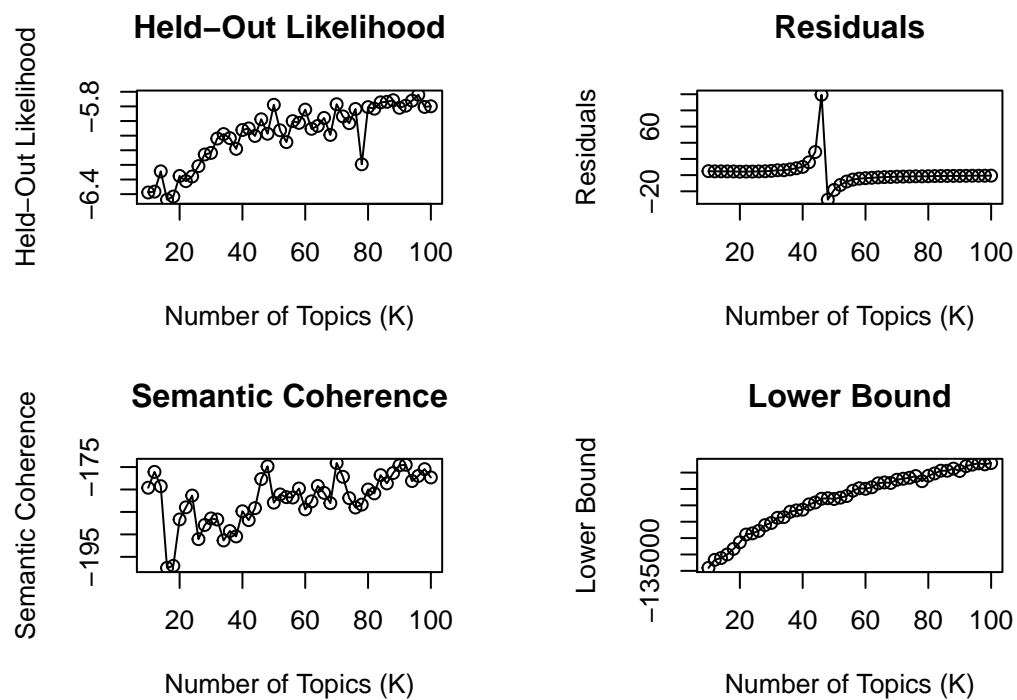
y coherencia semantica

```
load("bestK.Rdata")
plot(bestK$results$exclus, bestK$results$semcoh)
text(bestK$results$exclus, bestK$results$semcoh, labels=bestK$results$K,
      cex= 0.7, pos = 2)
```



```
plot.searchK(bestK)
```

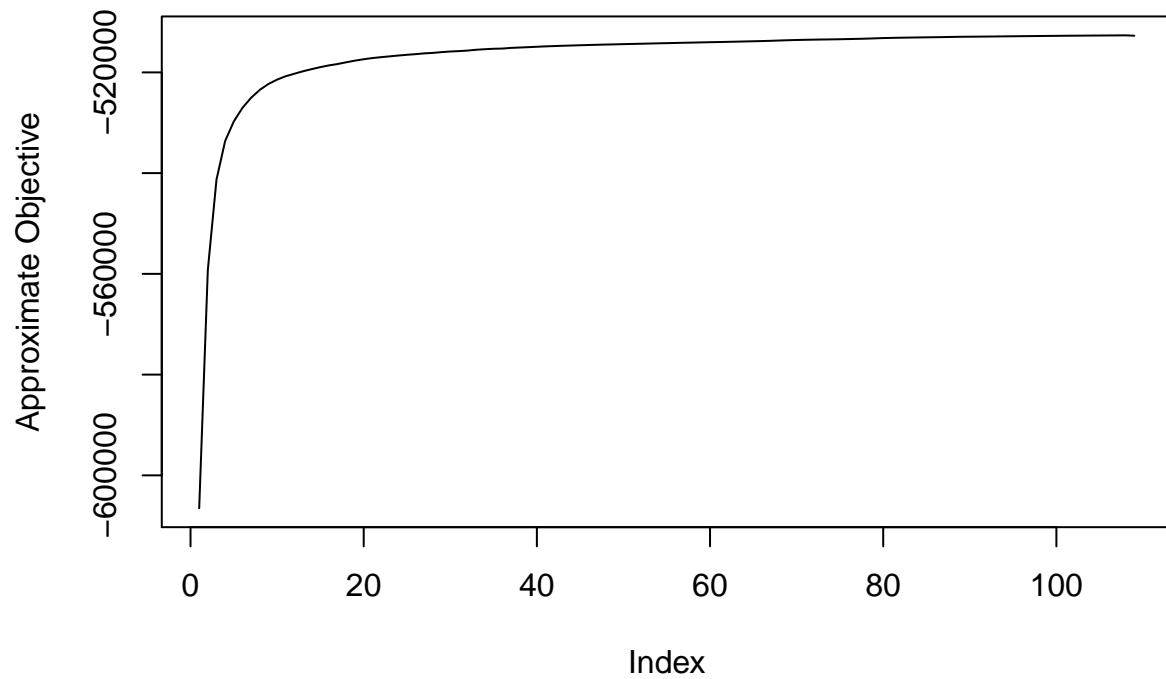
Diagnostic Values by Number of Topics



Convergencia del modelo

```
plot(drugSTM$convergence$bound, type="l", ylab="Approximate Objective", main="Convergence")
```

Convergence

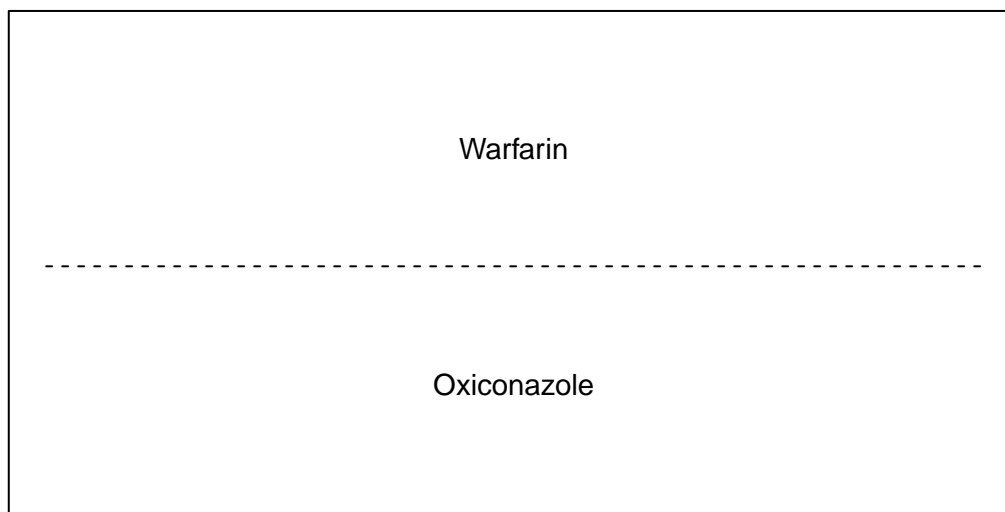


Relacionar topicos con documentos

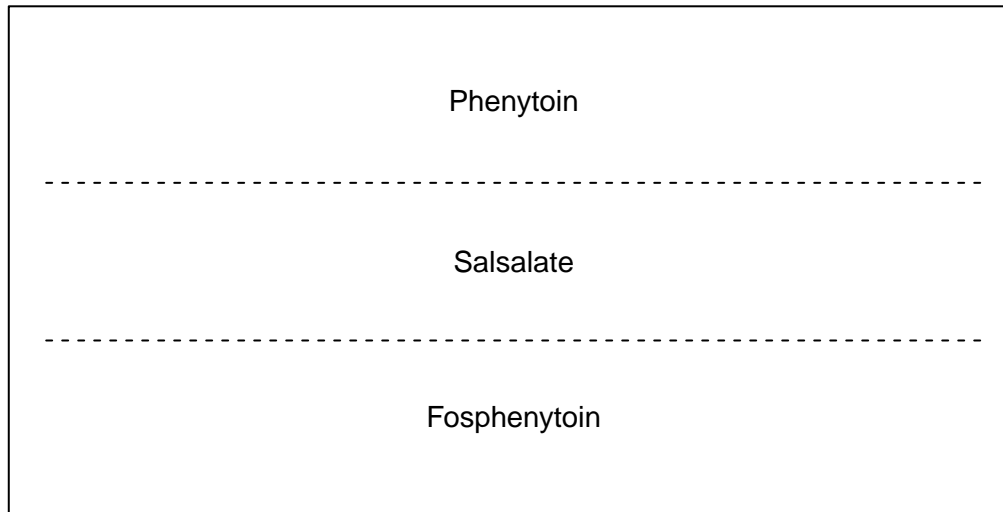
```
#Por nombre de documento= Nombre de farmaco
thoughts <- findThoughts(drugSTM, texts =drugsText$meta$drugs,n = 2, topics = c(50))$docs[[1]]
thoughts
```

```
## [1] "Warfarin"      "Oxiconazole"
```

```
plotQuote(thoughts, width = 30,text.cex=0.9)
```



```
thoughts <- findThoughts(drugSTM, texts =drugsText$meta$drugs,n = 3, topics = c(30,40))$docs[[1]]
View(as.data.frame(thoughts))
plotQuote(thoughts, width = 30,text.cex=0.9)
```



```
thoughts <- findThoughts(drugSTM, texts =drugsText$meta$Description,n = 3, topics = c(30,40))$docs[[1]]
thoughts
```

```
## [1] "There are many drugs which may increase or decrease phenytoin levels or which phenytoin may aff
## [2] "Salicylates antagonize the uricosuric action of . drugs used to treat gout. ASPIRIN AND OTHER S
## [3] "No drugs are known to interfere with the conversion of fosphenytoin to phenytoin. Conversion co
```

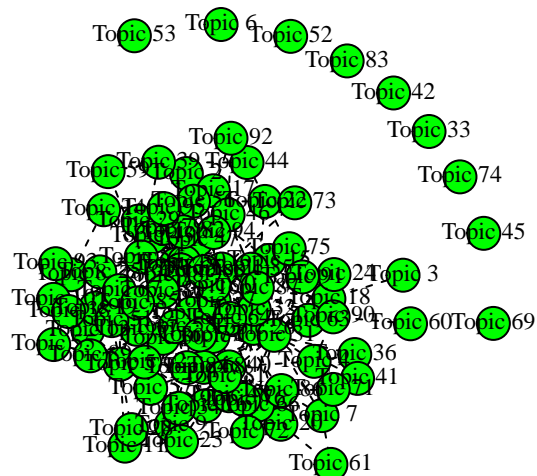
```
((as.data.frame(thoughts)))#guardar en csv
```

```
##
## 1
## 2
## 3 No drugs are known to interfere with the conversion of fosphenytoin to phenytoin. Conversion could
```

<https://www.drugs.com/cdi/salsalate.html> link

Correlacion de topicos

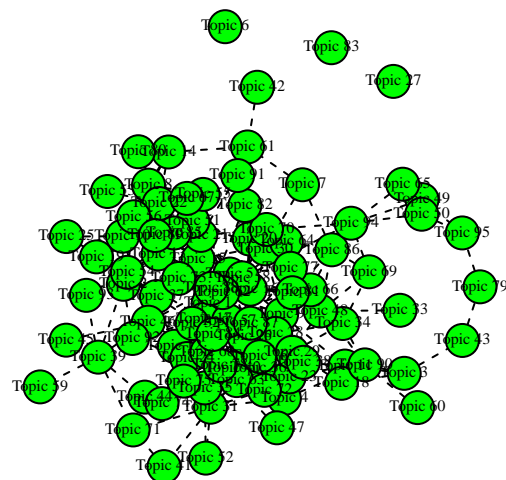
```
corrdrug<-topicCorr(drugSTM, method = c("simple"),
  cutoff = 0.01, verbose = TRUE)
plot(corrdrug)
```



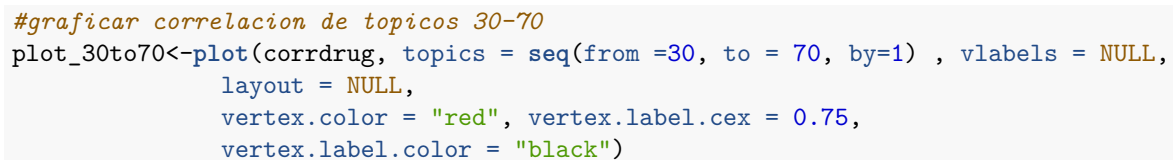
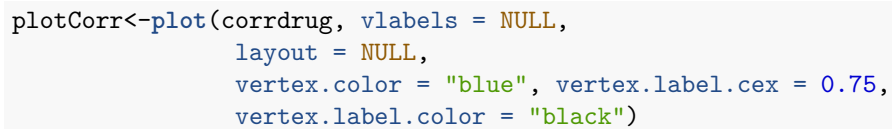
```
corrrdrug<-topicCorr(drugSTM, method = c("huge"),
  cutoff = 0.01, verbose = TRUE)
```

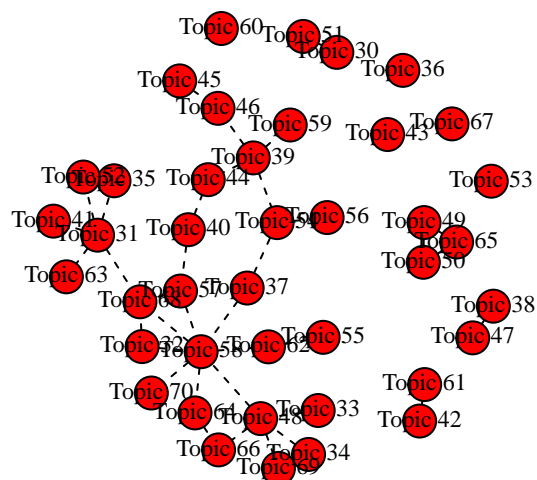
```
## Conducting the nonparanormal (npn) transformation via shrunkun ECDF....done.
## Conducting Meinshausen & Buhlmann graph estimation (mb)....done
## Conducting rotation information criterion (ric) selection....done
## Computing the optimal graph....done
```

```
plot(corrrdrug,vertex.label.cex = 0.5 )
```

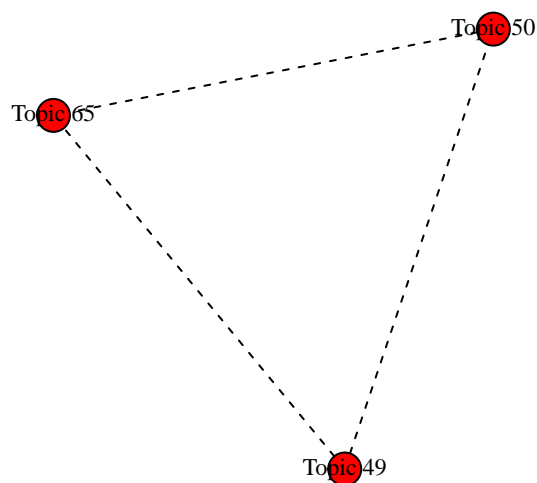


```
plot(corrrdrug,topics=c(1,2,3,4,5,10,11,12,13,40,41,42,50,51,52,53,60,70,80,81,82))
```





```
plot_30to70<-plot(corrdrug, topics = c(49,50,65) , vlabels = NULL,
  layout = NULL,
  vertex.color = "red", vertex.label.cex = 0.75,
  vertex.label.color = "black")
```



```
thoughts <- findThoughts(drugSTM, texts =drugsText$meta$drugs,n = 3, topics = c(49,50,65))$docs[[1]]
```

```
thoughts
```

```
## [1] "Warfarin"      "Oxiconazole"  "Filgrastim"
```

```
labelTopics(drugSTM, topics=c(49,50,65), n = 7, frexweight = 0.5)
```

```
## Topic 49 Top Words:
```

```
## Highest Prob: interact, concomit, potenti, lettuc, administ, oral, effect
## FREX: interact, concomit, potenti, administ, oral, effect, advers
## Lift: lettuc, interact, potenti, concomit, administ, oral, advers
## Score: abacavir, abatacept, abbrevi, abcb, abciximab, abdomen, abdomin
```

```
## Topic 50 Top Words:
##   Highest Prob: interact, concomit, potenti, liothyronin, administ, oral, effect
##   FREX: interact, concomit, potenti, administ, oral, effect, advers
##   Lift: liothyronin, interact, potenti, concomit, administ, oral, advers
##   Score: abacavir, abatacept, abbrevi, abcb, abciximab, abdomen, abdomen
## Topic 65 Top Words:
##   Highest Prob: interact, concomit, potenti, administ, permit, oral, effect
##   FREX: interact, concomit, potenti, administ, oral, effect, advers
##   Lift: permit, interact, potenti, concomit, administ, oral, advers
##   Score: abacavir, abatacept, abbrevi, abcb, abciximab, abdomen, abdomen
```

```
labelTopics(drugSTM, topics=c(64,66), n = 7, frexweight = 0.5)
```

```
## Topic 64 Top Words:
##   Highest Prob: iron, test, concomit, administr, cefdinir, result, aminoglycosid
##   FREX: cefdinir, iron, fortifi, omnicef, aminoglycosid, cephalosporin, nephrotox
##   Lift: femara, fortifi, glutam, omnicef, bacilli, benthiromid, benzocain
##   Score: abacavir, abciximab, abdomen, abil, abolish, abrad, absolut
## Topic 66 Top Words:
##   Highest Prob: test, laborator, posit, fals, glucos, reaction, urin
##   FREX: labetalol, fals, posit, guanfacin, test, pheochromocytoma, amoxicillin
##   Lift: cefotan, chromatograph, adsorpt, amoxil, analyz, antiasthmat, antiglobulin
##   Score: abdomen, aberr, abil, abolish, abrad, absorb, abus
```

Visualizacion de relaciones entre topicos con paquetes adicionales

```
require(stmCorrViz)
```

```
## Loading required package: stmCorrViz
```

```
stmCorrViz(drugSTM, "drugInteraction.html", documents_raw=NULL, documents_matrix=NULL,
           title="STM Model", clustering_threshold=1.5,
           labels_number=10, display=TRUE, verbose=TRUE)
```

```
## Performing hierarchical topic clustering ...
## Generating JSON representation of the model ...
## Generating HTML view ...
```

file:///home/hemostasia/Interaccion/drugInteraction.html link

Visualizacion con TolDavis

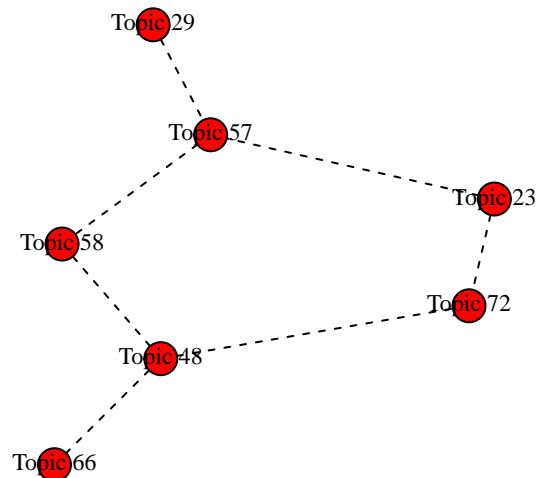
```
require(servr)
```

```
## Loading required package: servr
```

```
drugDAvis<-toLDavis(drugSTM,docs,R=5,plot.opts=list(xlab ="PC1", ylab = "PC2"),lambda.step=.1,out.dir=t
```

EVALUANDO UN CLUSTER

```
plotCluster<-plot(corrdrug, topics = c(23,29,48,57,58,66,72) , vlabels = NULL,
  layout = NULL,
  vertex.color = "red", vertex.label.cex = 0.75,
  vertex.label.color = "black")
```



<http://bmcbioinformatics.biomedcentral.com/articles/10.1186/1471-2105-13-S15-S6> link

MATRIZ DE CORRELACION DE TERMINOS

USO DEL PAQUETE QUANTEDA

```
##corMat <- as.matrix(proxy::simil(as.matrix(drugDataDfm), by_rows = FALSE))
load("corMat.Rdata")
round(head(sort(corMat[, "warfarin"], decreasing = TRUE), 14), 2)
```

##	prothrombin	digoxin	time pharmacokinetics
##	0.46	0.44	0.43
##	effect	significant	resulted
##	0.40	0.40	0.36
##	administration	bleeding	inr
##	0.36	0.36	0.35
##	clinical	protein	
##	0.35	0.34	

```
round(head(sort(corMat[, "cyp"], decreasing = TRUE), 14), 2)
```

##	3a4	1a2	2e1
##	0.47	0.45	0.38

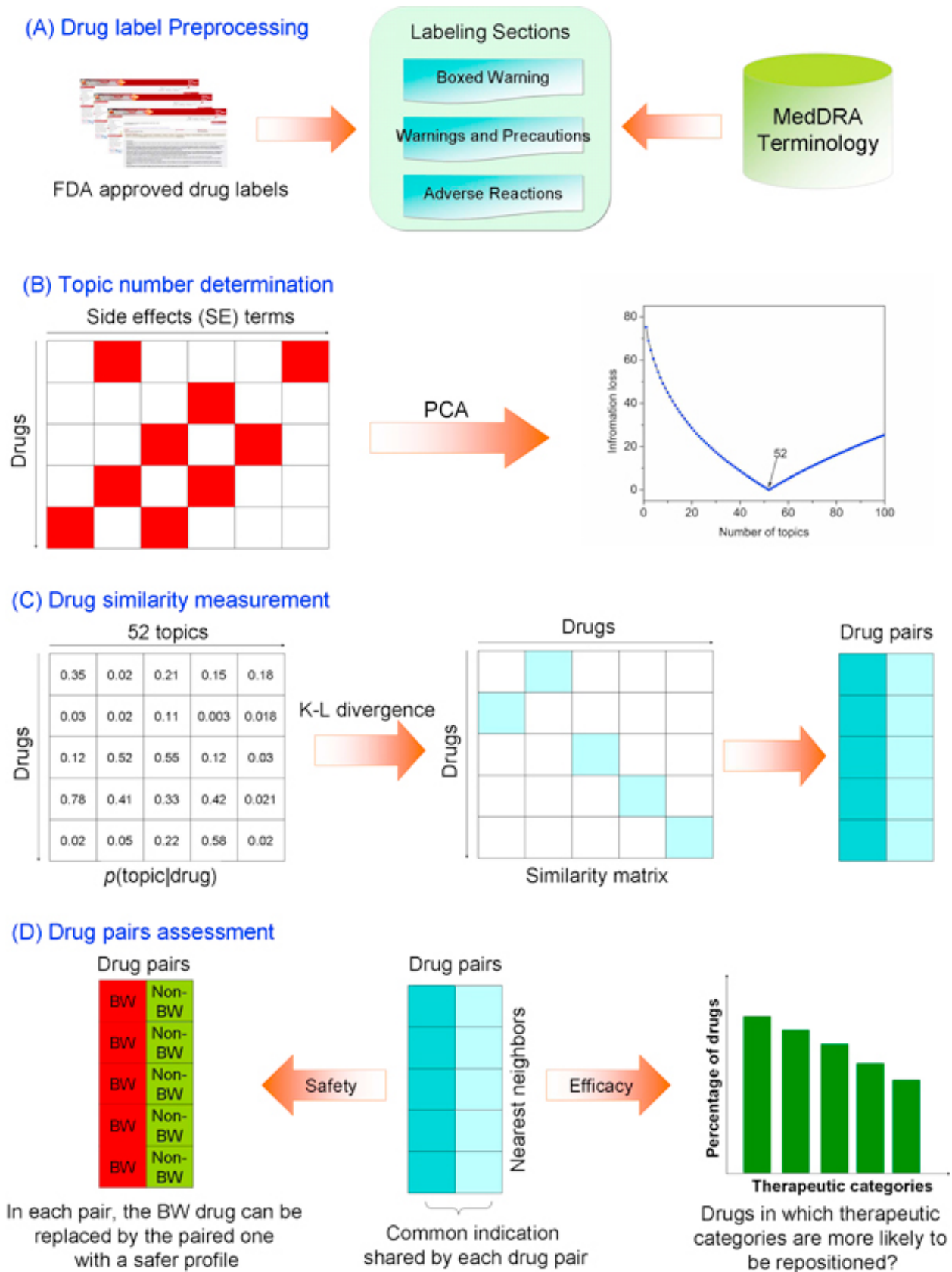


Figure 7: Caption

##	microsome	27-fold n-acetyltransferase	
##	0.36	0.36	0.36
##	explored	intraluminal	alosetron
##	0.36	0.36	0.36
##	macrolide	3a	comt
##	0.34	0.33	0.33
##	telithromycin	probe	
##	0.32	0.32	