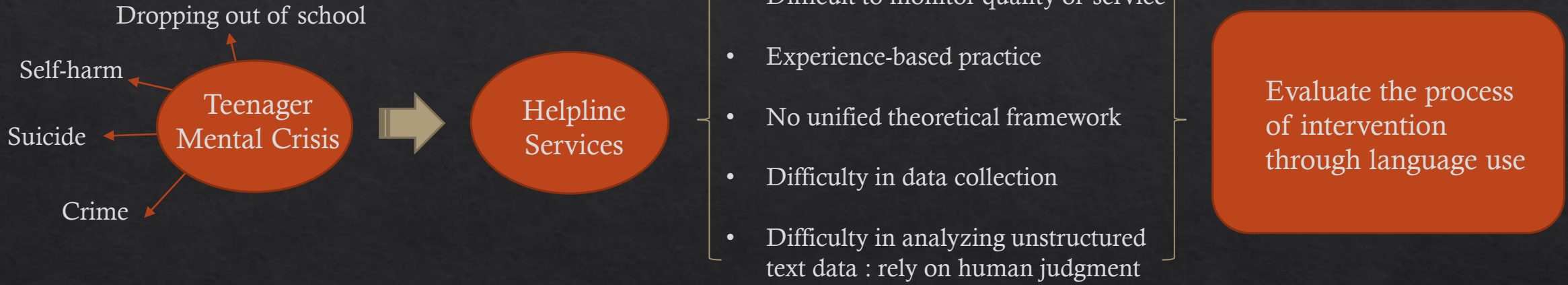


Language Use in Teenage Crisis Intervention and the Immediate Outcome

A Machine Automated Analysis of Large Scale Text Data

Research Motivation



Research Questions

- In the case of helpline intervention for teenagers, are certain language use patterns correlated with the immediate outcome of the treatment?
- How do language use patterns vary across subgroups of the counselor and the teenager?
- Can we predict intervention outcomes based on language use patterns?

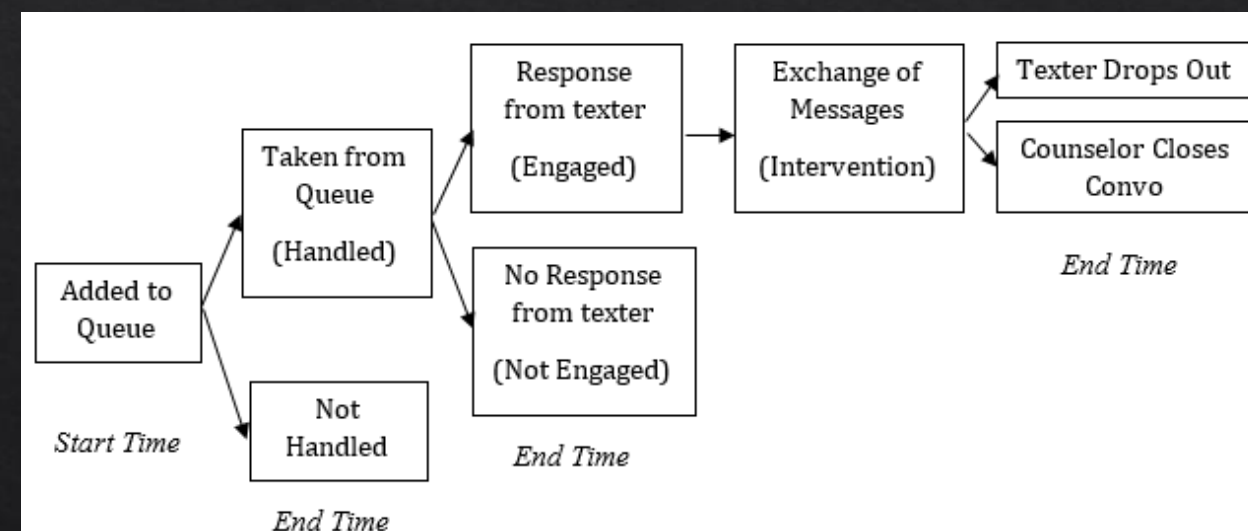
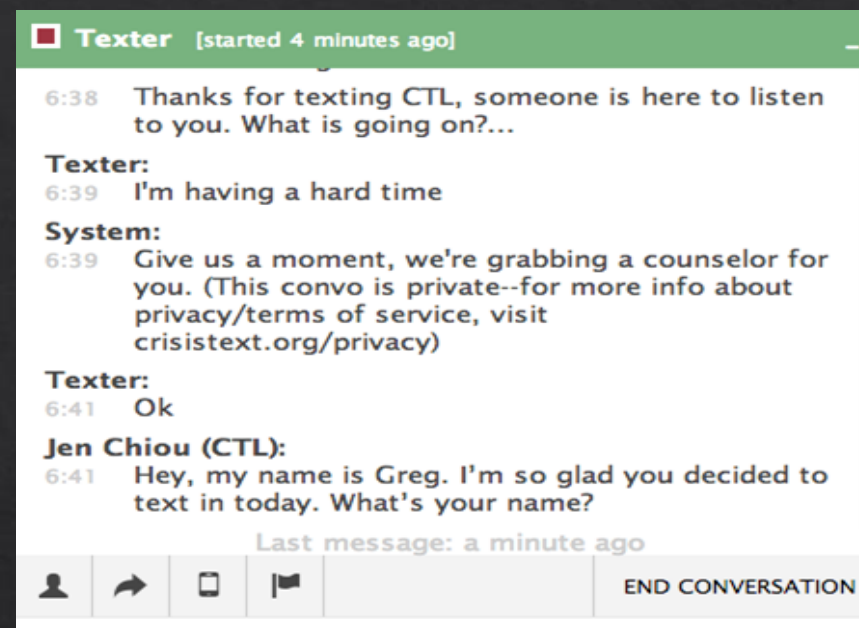
Intervention Process & Data

Conversation Level Summary

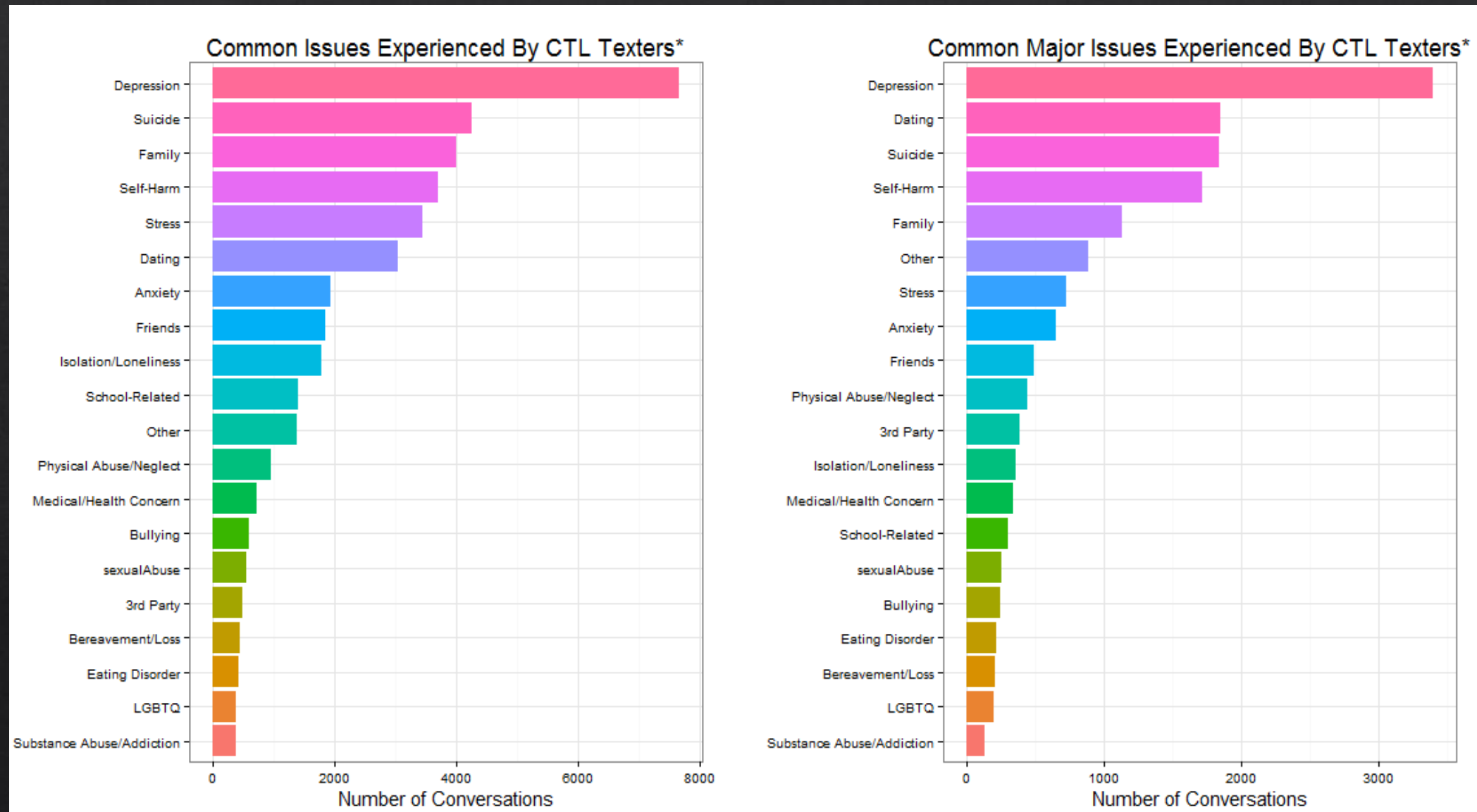
- 15187 rated conversations 09/26/2013 – 12/01/2014
- 27970 unique texters, 509 unique specialists, 12 crisis centers
- Important Variables
 - Post-convo survey questions: risk assessment,
 - Specialist rating for the conversation
 - Texter rating & description

Message Level Summary

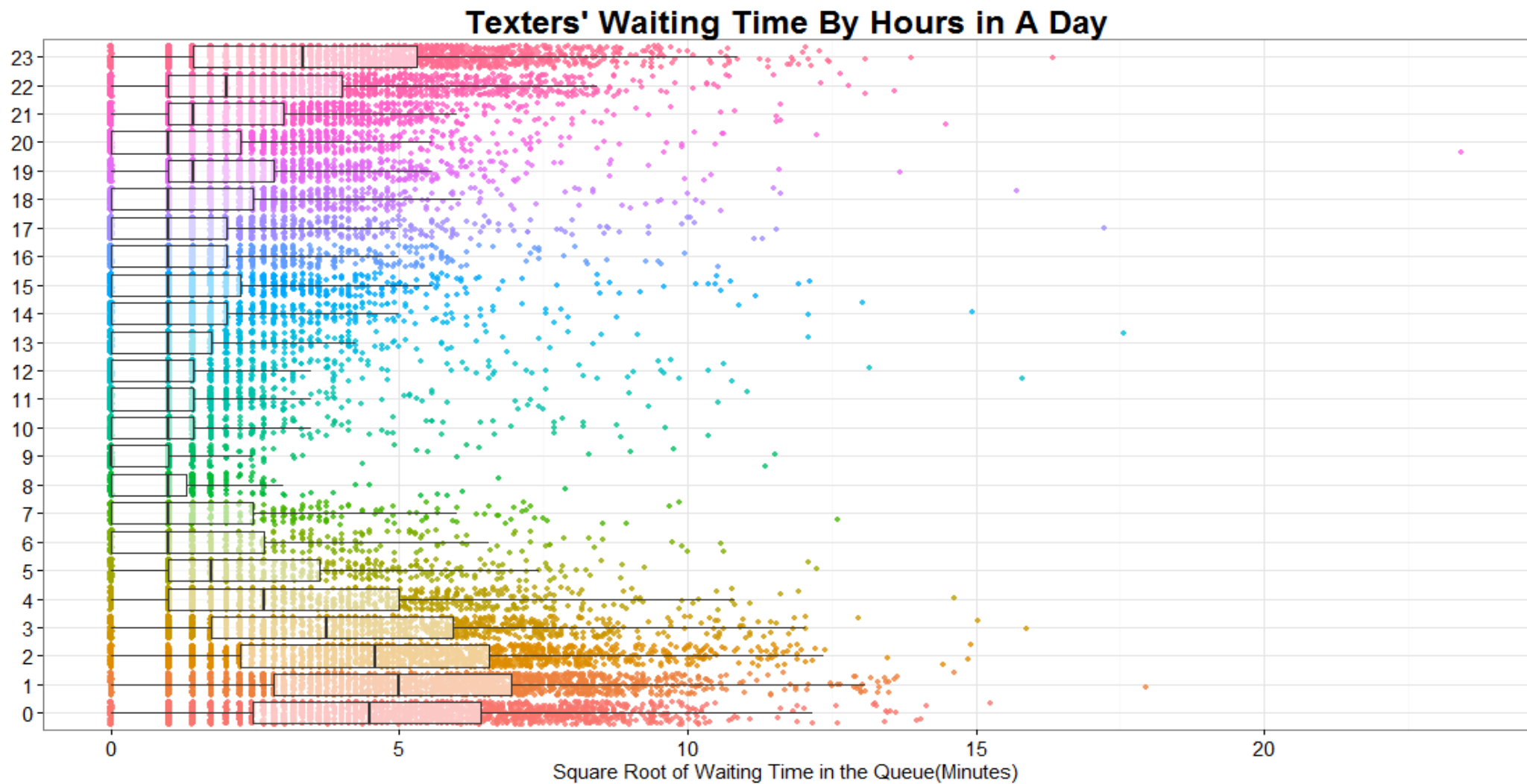
- 3,665,063 messages, roughly half-half between S and T



Learning about Data: DIG! DIG! DIG!

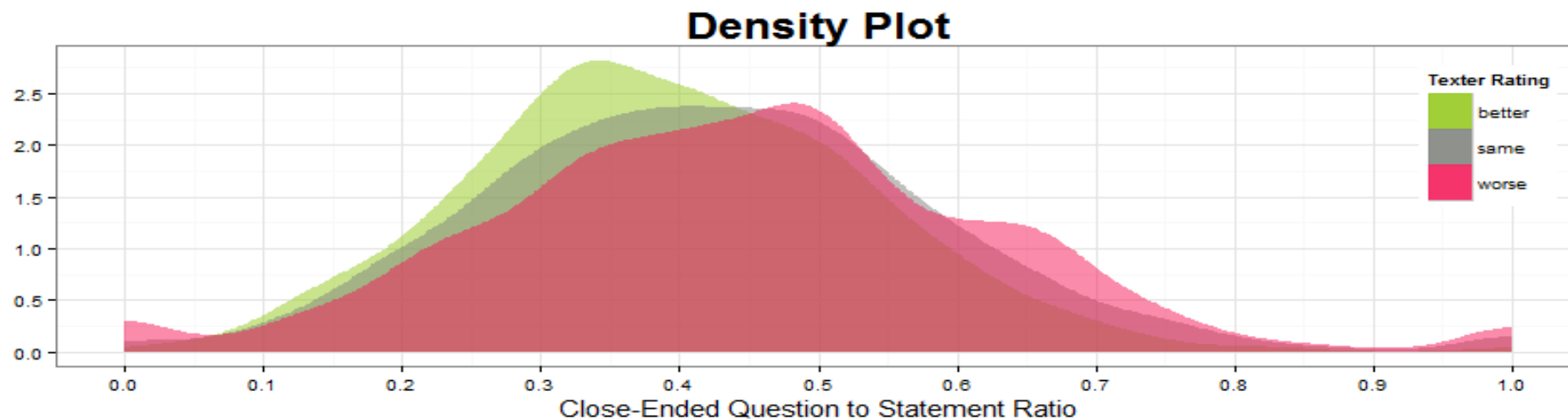
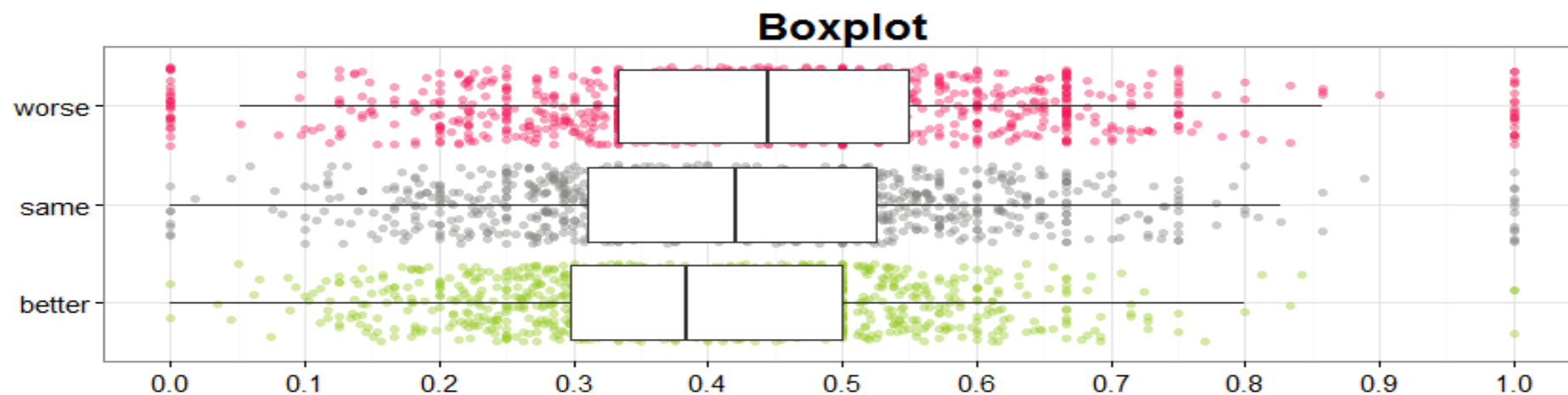


Learning about Data: DIG! DIG! DIG!

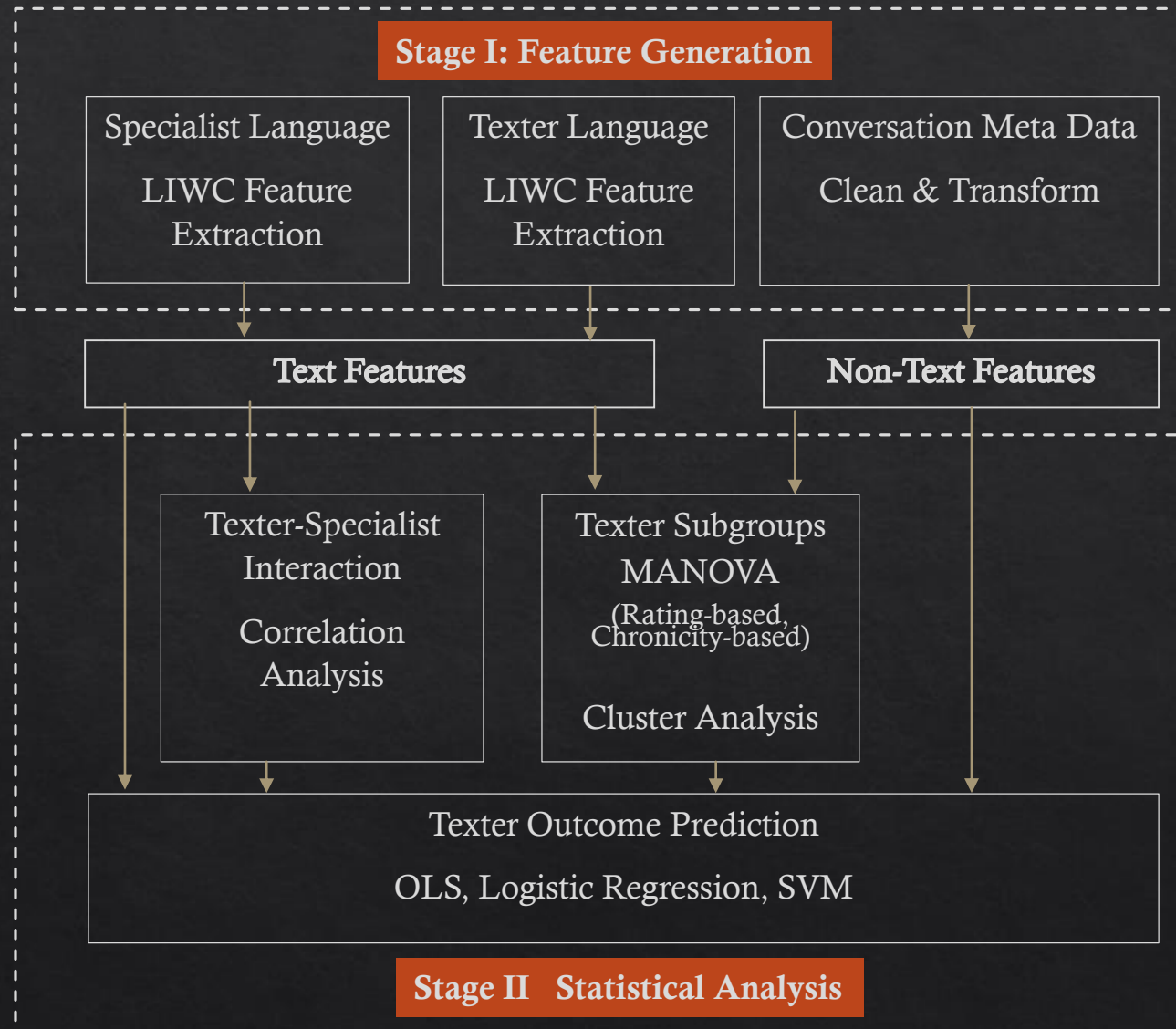


Learning about Data: DIG! DIG! DIG!

Close-Ended Question to Statement Ratio and Texter Rating



Methodology: It's a painfully sweet iterative process!



- In the case of helpline intervention for teenagers, are certain language use patterns correlated with the immediate outcome of the treatment?
- How do language use patterns vary across subgroups of the counselor and the teenager?
- Can we predict intervention outcomes based on language use patterns?

What is LIWC?

22 Swear	121 Social		122 Family	123 Friends	124 Humans
arse	acquainta*	gives	persons	aunt*	adult
arsehole*	admit	giving	person's	bro	adults
arses	admits	gossip*	persua*	bro	babe*
ass	admitted	grandchil*	phone*	brother*	babies
asses	admitting	granddad*	phoning	cousin*	baby*
asshole*	adult	granddau*	prais*	dad*	bambino*
bastard*	adults	grandf*	private	daughter*	boy
bitch*	advice	grandkid*	provide	ex	boy's
bloody	advis*	grandm*	public	exes	boys*
boob*	affair*	grandpa*	question*	exhubby*	chick
butt	amigo*	grandson*	reassur*	exhusband*	chick*
butts	anybod*	granny	receiv*	exwife*	chicks
cock	anyone*	group*	refus*	exwife*	child
cocks*	apolog*	grownup*	relationship*	families*	children*
crap	argu*	grudge*	relatives	family	child's
crappy	armies	guest*	replie*	father*	citizen
cunt*	army	guy*	reply*	folks	citizen**
damn*	ask	he	request*	grandchil*	citizens

- Linguistic Inquiry Word Count
- A dictionary-based text analysis program
- 70+ linguistic dimensions
- 4 broad categories: linguistic processes, psychological processes, personal concerns, spoken categories
- **Functional words: pronouns and articles**

LIWC2007 Results														
Filename	Segment	funct	pronoun	ppron	i	we	you	shehe	they	ipron	article	verb	auxverb	past pre
1.txt	1.00	44.10	5.86	2.20	0.00	0.08	0.00	1.22	0.90	3.66	8.79	9.93	4.88	6.59
2.txt	1.00	50.09	8.78	3.05	0.28	0.65	0.55	0.46	1.11	5.73	8.32	9.70	7.12	2.77

Some interesting results, I think.

Language Use Patterns Across Texter Subgroups

Treatment Variable	Pillai's Trace	F	Df	Residual df	Pr(>F)
Texter Rating	0.34	57.55	2	18280	$< 2.2e^{-16}$

Significant Multivariate Effects for Texter Rating

Treatment Variable	Pillai's Trace	F	df	Residual df	Pr(>F)
Texter Chronicity	0.08	12.05	2	18280	$< 2.2e^{-16}$

Significant Multivariate Effects for Texter Chronicity

Some interesting results, I think.

Counselor Directivity

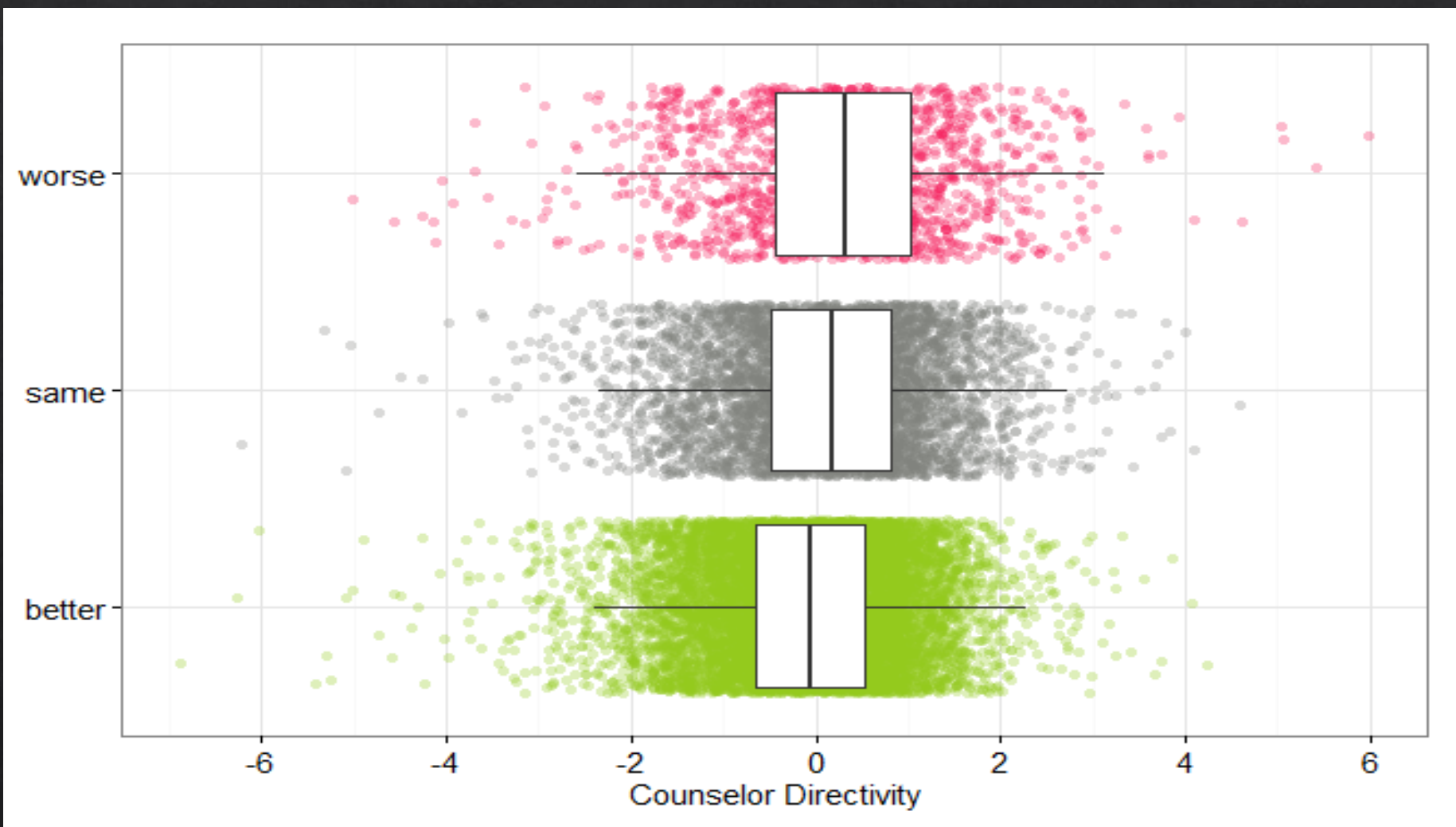
$$Leadership_{simple} = (WordCount_z + we_z + you_z) - (ipron_z + i_z)$$

$$Leadership_{complex} = (WordCount_z + we_z + you_z + social_z) \\ - (ipron_z + i_z + negate_z + swear_z + excl_z)$$

$$CounselorDirectivity_z = (CounselorLeadership_{complex} - TexterLeadership_{complex})_z$$

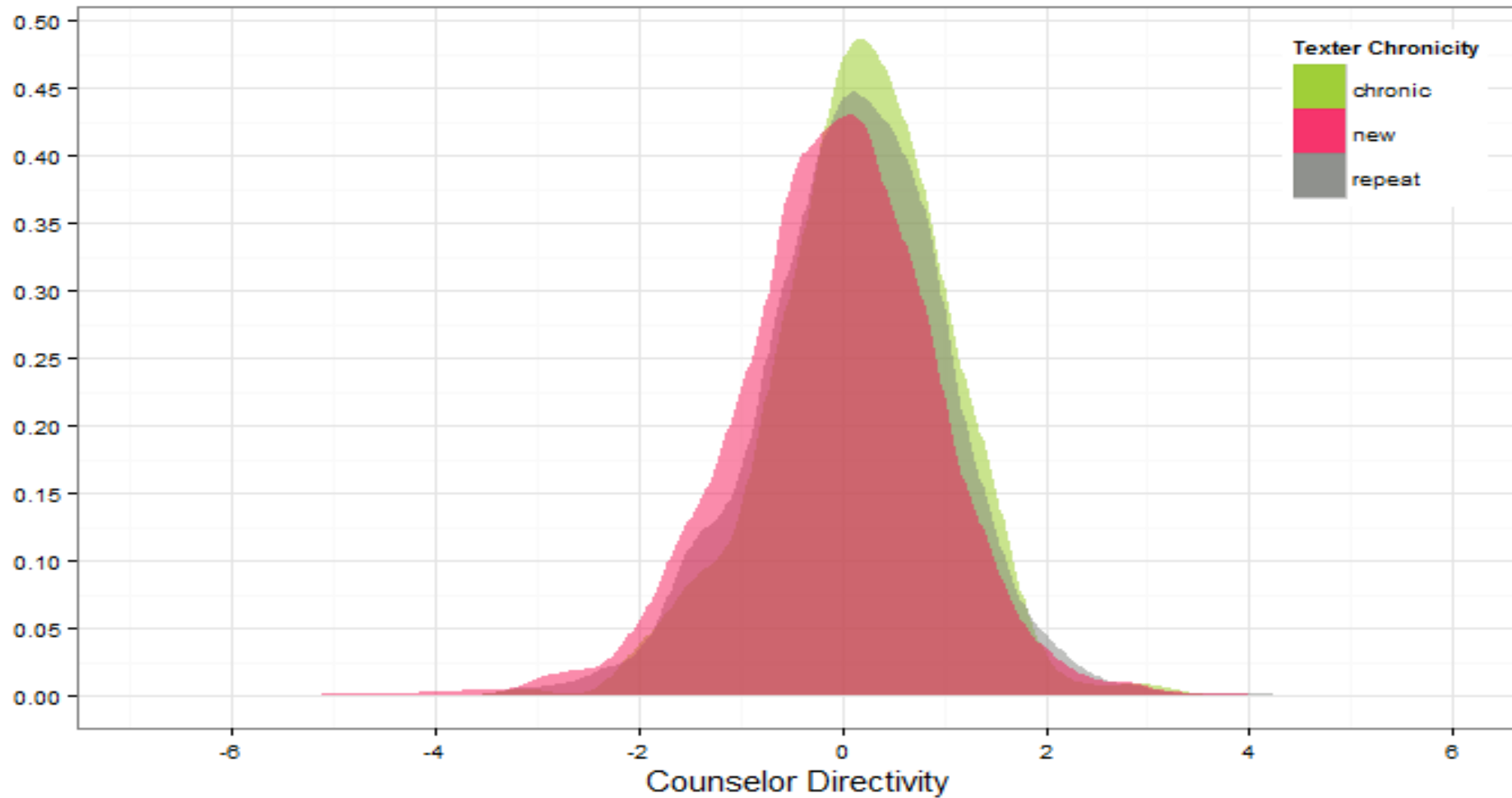
Some interesting results, I think.

Counselor Directivity & Texter Outcome



Some interesting results, I think.

Counselor Directivity & Texter Chronicity



Now it comes to prediction. Nervous...

	Model	Predictors	Dist. Correlation	R_2	Accuracy	Sensitivity	Specificity
1	<i>GLM</i>	D_{meta}	0.323	0.433	0.501	---	---
2	(3 levels)	$D_{meta} \& D_{lan}$	0.601	0.513	0.700	---	---
3	<i>GLM</i> (binary: better)	$D_{meta} \& D_{lan}$	0.654	0.547	0.751	0.473	0.915
4	<i>GLM</i> (binary: worse)		0.658	0.599	0.920	0.996	0.146
5	<i>SVM</i> (3 levels)		0.611	0.543	0.706	---	---
6	<i>SVM</i> (binary: better)		0.649	0.565	0.750	0.460	0.922
7	<i>SVM</i> (binary: worse)		0.659	0.577	0.911	1.000	0.002



No questions?
Perfect!