

Thesis Survey Data analysis

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This data analysis is conducted using the R language and the data is stored in a .csv file.

Session Info:

```
## R version 3.6.3 (2020-02-29)
## Platform: x86_64-pc-linux-gnu (64-bit)
## Running under: Linux Mint 20.3
##
## Matrix products: default
## BLAS:   /usr/lib/x86_64-linux-gnu/blas/libblas.so.3.9.0
## LAPACK: /usr/lib/x86_64-linux-gnu/lapack/liblapack.so.3.9.0
##
## locale:
##  [1] LC_CTYPE=en_US.UTF-8      LC_NUMERIC=C              LC_TIME=en_US.UTF-8
##  [4] LC_COLLATE=en_US.UTF-8    LC_MONETARY=az_IR         LC_MESSAGES=en_US.UTF-8
##  [7] LC_PAPER=az_IR           LC_NAME=C                 LC_ADDRESS=C
## [10] LC_TELEPHONE=C           LC_MEASUREMENT=az_IR      LC_IDENTIFICATION=C
##
## attached base packages:
## [1] stats      graphics  grDevices  utils      datasets  methods    base
##
## other attached packages:
## [1] GGally_2.1.2  ggplot2_3.3.5
##
## loaded via a namespace (and not attached):
##  [1] Rcpp_1.0.8.3      plyr_1.8.6         pillar_1.7.0       compiler_3.6.3
##  [5] RColorBrewer_1.1-2 tools_3.6.3         digest_0.6.29      evaluate_0.15
##  [9] lifecycle_1.0.1   tibble_3.1.6       gtable_0.3.0       pkgconfig_2.0.3
## [13] rlang_1.0.2       cli_3.2.0          yaml_2.3.5         xfun_0.30
## [17] fastmap_1.1.0     withr_2.5.0        stringr_1.4.0      dplyr_1.0.8
## [21] knitr_1.38        generics_0.1.2     vctrs_0.3.8        grid_3.6.3
## [25] tidyselect_1.1.2  reshape_0.8.8      glue_1.6.2         R6_2.5.1
## [29] fansi_1.0.2       rmarkdown_2.13     purrr_0.3.4        magrittr_2.0.2
## [33] scales_1.1.1      ellipsis_0.3.2     htmltools_0.5.2    colorspace_2.0-3
## [37] utf8_1.2.2        stringi_1.7.6      munsell_0.5.0      crayon_1.5.0
```

Dataset

Aggregated data from teams that participated

	team	org	team_size	response_rate	response_count	age	tenure
## 1	VxWVZYy	qX0d3XD	3	0.67	2	26.00	7.00
## 2	OlVA1P1	ml4MwXj	4	0.75	3	25.33	6.00
## 3	5x0nMXW	oXoqeP0	3	1.00	3	24.00	4.00
## 4	JlBq3PN	Kl3zeP6	4	0.75	3	25.00	2.00

## 5	rX1wnPb	ylrepPL	6	0.83	5	29.20	4.00
## 6	5x0nqXW	2PJKk10	3	0.67	2	29.50	9.50
## 7	KPjegx7	VxWvAXy	4	0.75	3	24.33	3.00
## 8	WXz0pPm	0xAoG1Q	4	0.75	3	28.67	4.67
## 9	zP7KKP8	5x02qXW	6	0.67	4	24.00	3.75
## 10	5P88oP9	5x02qXW	7	0.86	6	26.50	6.42
## 11	4xdmYPE	5P8oox9	3	1.00	3	29.67	8.33
## 12	YXmyDXN	k71kqx D	3	0.67	2	25.00	3.00
## 13	DPpkGx8	k71kqx D	4	0.75	3	23.00	1.67
## 14	8xNAJXm	yEXnYlg	5	1.00	5	23.80	5.00
## 15	m14MwXj	GVX26X9	5	0.80	4	22.75	4.00
## 16	gxwyalv	M8xNJxm	3	1.00	3	28.67	4.00
## 17	ylrepPL	M8xNJxm	3	0.67	2	30.00	4.50
## 18	2PJKk10	M8xNJxm	3	1.00	3	23.00	0.33
## 19	VxWvAXy	M8xNJxm	6	0.83	5	30.20	7.20
## 20	0xAoG1Q	3B16N1b	3	0.67	2	27.00	4.50
## 21	rX1dn1b	3B16N1b	5	0.80	4	26.25	5.75
## 22	5x02qXW	3B16N1b	6	0.50	3	24.67	3.33
## 23	J1BJY1N	3B16N1b	6	1.00	6	35.33	6.25
##	overconfidence history voice_behavior coordination effectiveness						
## 1		4.00	6.50	3.92	3.80		5.30
## 2		4.00	12.67	4.72	4.53		6.83
## 3		5.67	20.33	3.45	3.33		4.67
## 4		7.33	14.00	3.28	3.40		5.87
## 5		3.20	11.60	3.77	2.56		4.76
## 6		6.50	6.00	4.08	4.00		4.85
## 7		6.67	8.33	4.55	2.80		4.90
## 8		4.33	11.67	3.61	2.93		4.57
## 9		3.25	4.25	4.17	4.15		6.35
## 10		5.83	19.67	4.28	3.20		5.85
## 11		3.33	5.00	4.33	3.67		6.27
## 12		6.00	14.00	4.17	3.80		6.00
## 13		4.67	5.67	3.78	4.00		5.33
## 14		4.00	32.40	3.57	4.04		5.70
## 15		6.00	29.50	3.62	2.80		5.48
## 16		6.33	11.00	4.33	3.07		5.60
## 17		5.00	19.00	3.83	3.50		5.25
## 18		4.33	3.00	4.39	3.87		6.17
## 19		4.60	13.40	4.07	3.52		5.42
## 20		5.50	12.00	4.92	2.80		5.45
## 21		5.00	38.00	3.88	3.90		6.18
## 22		3.33	21.33	3.33	2.80		4.13
## 23		5.67	34.83	3.50	3.17		4.68

Data from actual survey responses

##	id	team	eff_q1	eff_q2	eff_q3	eff_q4	eff_q5	eff_q6	eff_q7	eff_q8
## 1	KPjex7	VxWVZXy	6	7	6	6	6	6	6	6
## 2	8XM1vXy	VxWVZXy	5	3	5	6	3	5	6	6
## 3	WXz0NPm	0lvA1P1	7	7	7	7	7	7	7	7
## 4	GxD15PN	0lvA1P1	7	2	7	7	7	7	7	7
## 5	YxeoL19	0lvA1P1	7	7	7	7	7	7	7	7
## 6	zP7KkP8	J1Bq3PN	7	5	7	7	7	6	7	6
## 7	5P88MP9	5x0nMXW	6	5	3	4	4	2	3	2
## 8	RXKYnPe	5x0nMXW	6	5	4	7	2	5	5	6
## 9	0xAJGPQ	J1Bq3PN	6	6	7	7	7	4	6	6
## 10	5x0nqXW	J1Bq3PN	6	6	6	7	6	5	4	5
## 11	J1BqYPN	5x0nMXW	6	6	5	7	4	5	5	6
## 12	8XM1qXy	ml4MwXj	6	5	7	7	6	6	3	6
## 13	WXz0pPm	ml4MwXj	5	6	7	7	7	4	6	4
## 14	Yxeo019	0xAoG1Q	6	6	6	6	5	4	5	5
## 15	zP7KKP8	5x02qXW	7	6	6	7	5	4	3	5
## 16	5P88oP9	J1BJY1N	7	7	6	7	5	4	3	5
## 17	RXKY8Pe	DPpkGx8	6	4	6	7	6	6	5	6
## 18	BXqe5Xb	rX1wnPb	6	1	6	7	5	5	6	6
## 19	EXnKYxg	rX1wnPb	7	1	6	7	3	7	5	7
## 20	NP97vXA	YXmyDXN	7	3	6	7	5	6	5	6
## 21	GlgNzPg	YXmyDXN	6	7	7	7	7	6	7	6
## 22	oPGYjXz	DPpkGx8	6	6	5	6	4	5	5	4
## 23	VX2m619	8xNAJXm	7	7	7	7	5	6	7	7
## 24	JPRoK1y	8xNAJXm	7	6	7	7	4	3	5	5
## 25	YXmyDXN	8xNAJXm	6	5	6	6	1	6	5	6
## 26	DPpkGx8	8xNAJXm	6	5	6	5	4	5	6	5
## 27	2Py0wXW	8xNAJXm	6	5	5	5	4	4	6	5
## 28	mPZ9Yxv	5x0nqXW	6	3	5	6	4	6	5	6
## 29	8xNAJXm	KPjex7	3	6	6	7	5	4	3	5
## 30	W1QnRX0	5x0nqXW	5	1	5	7	3	6	6	6
## 31	B16eNPb	rX1wnPb	6	6	3	7	2	2	5	5
## 32	qX0d3XD	gxwyalv	7	1	5	7	4	7	6	7
## 33	ml4MwXj	gxwyalv	6	2	7	7	7	4	6	7
## 34	71EA91Q	rX1wnPb	5	5	6	7	5	6	5	5
## 35	oXoqeP0	VxWvAXy	6	6	3	6	6	5	6	2
## 36	jXVAW1e	zP7KKP8	7	5	7	7	6	6	7	7
## 37	8PYv81L	zP7KKP8	6	6	7	7	6	7	7	7
## 38	ePbaqxJ	5P88oP9	7	4	7	7	6	6	6	5
## 39	r1LNAx2	5P88oP9	6	2	7	6	6	6	6	7
## 40	gxwyalv	5P88oP9	6	6	7	7	6	6	6	6
## 41	ylrepPL	5P88oP9	6	4	7	7	7	5	6	5
## 42	2PJKk10	5P88oP9	7	6	7	7	6	5	6	4
## 43	RX5ybX0	zP7KKP8	7	6	7	7	6	7	7	7
## 44	VxWvAXy	zP7KKP8	7	2	7	7	6	7	6	6
## 45	0lv9DP1	KPjex7	7	5	7	7	5	6	1	7
## 46	0xAoG1Q	KPjex7	7	6	6	7	4	5	4	5
## 47	rX1dn1b	5P88oP9	7	7	7	7	5	5	4	6
## 48	5x02qXW	rX1dn1b	6	7	6	7	6	5	6	6
## 49	J1BJY1N	WXz0pPm	7	7	1	6	1	6	5	1
## 50	KPjEgx7	VxWvAXy	7	6	7	7	6	6	4	6
## 51	WXzqplm	5x02qXW	5	3	5	6	2	3	4	5

## 52	GxDEwPN	WXzOpPm	5	5	6	7	4	5	4	6
## 53	Yxe40X9	WXzOpPm	5	5	6	6	3	4	5	4
## 54	k7lkqx	D J1BJY1N	6	6	6	7	4	5	3	5
## 55	5GlgzPg	4xdmYPE	7	7	7	7	6	6	6	5
## 56	roPGjxz	4xdmYPE	6	3	7	6	5	6	6	6
## 57	GVX26X9	4xdmYPE	7	7	7	7	7	7	7	7
## 58	D4xdYPE	J1BJY1N	1	1	1	1	1	1	1	1
## 59	wJPRKly	gxwyalv	7	2	7	7	7	7	5	7
## 60	VYXmD1N	DPpkGx8	6	3	6	7	5	6	5	6
## 61	M8xNJxm	ml4MwXj	5	4	7	7	6	4	4	6
## 62	3B16N1b	ml4MwXj	6	7	7	7	5	6	5	6
## 63	zml4wPj	rX1wnPb	6	2	1	7	1	1	4	4
## 64	N71E91Q	ylrepPL	6	6	6	7	4	5	6	6
## 65	1oXoeP0	VxWvAXy	6	5	6	6	6	5	6	5
## 66	aK13ex6	VxWvAXy	6	5	5	7	2	5	6	6
## 67	eYXaMXq	J1BJY1N	6	6	6	7	6	7	7	6
## 68	yjXVWxe	ylrepPL	6	5	5	7	2	5	5	5
## 69	E8PY8xL	2PJKk10	7	6	6	7	6	7	7	7
## 70	1ePbqxJ	2PJKk10	7	7	7	7	7	1	6	6
## 71	GylrpxL	2PJKk10	7	6	6	7	5	6	5	6
## 72	7RX5bx0	VxWvAXy	6	5	7	7	5	5	6	5
## 73	oVxWAlY	5x02qXW	5	3	2	7	1	5	4	5
## 74	e0lvDx1	0xAoG1Q	7	4	7	7	6	7	4	7
## 75	y0xAG1Q	rX1dn1b	6	6	7	7	6	6	6	6
## 76	ZrX1nxb	rX1dn1b	7	7	7	7	7	7	7	6
## 77	K5x0q1W	J1BJY1N	6	5	4	7	5	5	5	6
## 78	mJ1BYPN	rX1dn1b	6	6	6	6	5	6	5	4
## 79	mKPjgl7	J1BJY1N	7	5	6	7	5	5	5	6
##	eff_q9	eff_q10	coord_q1	coord_q2	coord_q3	coord_q4	coord_q5	voice_q1		
## 1	6	4	5	2	3	4	4	4		
## 2	5	3	5	4	4	4	3	5		
## 3	7	7	5	4	5	5	4	5		
## 4	7	7	5	4	4	5	4	4		
## 5	7	7	5	4	5	5	4	5		
## 6	6	6	4	1	2	4	4	2		
## 7	2	5	4	4	2	5	4	3		
## 8	6	4	3	2	2	4	2	3		
## 9	4	6	4	2	4	4	3	4		
## 10	4	4	3	4	4	4	4	4		
## 11	5	5	4	4	4	3	3	4		
## 12	3	4	2	3	1	4	2	5		
## 13	6	4	1	3	5	2	3	2		
## 14	3	5	3	2	3	3	2	5		
## 15	2	4	3	4	2	3	2	5		
## 16	1	4	3	2	2	3	2	5		
## 17	6	5	4	4	4	4	3	3		
## 18	4	4	4	3	3	4	2	3		
## 19	4	6	5	3	3	4	2	4		
## 20	5	6	4	3	4	3	3	4		
## 21	5	6	4	4	5	4	4	5		
## 22	5	6	5	4	3	4	4	4		
## 23	6	7	5	3	4	5	5	3		
## 24	6	7	5	3	5	5	4	5		
## 25	5	7	4	3	5	4	2	2		

## 26	7	6	4	4	5	4	3	5
## 27	7	7	4	3	4	4	4	3
## 28	4	6	4	4	4	4	4	4
## 29	2	3	4	3	4	2	3	5
## 30	4	3	4	4	4	4	4	5
## 31	2	4	2	2	2	2	2	4
## 32	4	6	4	3	2	4	2	4
## 33	4	6	4	2	3	4	5	5
## 34	5	5	4	3	2	3	3	4
## 35	3	5	4	4	4	3	3	5
## 36	7	6	4	4	4	4	3	4
## 37	7	6	4	4	4	4	4	4
## 38	6	6	5	2	4	4	3	5
## 39	4	6	4	4	3	4	4	3
## 40	5	5	4	3	4	4	3	4
## 41	4	6	4	2	2	3	2	4
## 42	6	5	3	2	2	4	3	3
## 43	7	7	4	5	5	5	4	5
## 44	1	6	4	4	5	4	4	4
## 45	1	6	4	2	2	3	1	4
## 46	3	4	4	2	2	3	3	4
## 47	5	6	5	2	1	4	2	5
## 48	6	6	5	5	5	3	4	4
## 49	5	1	4	1	4	3	1	4
## 50	4	6	4	4	4	4	4	4
## 51	1	3	2	3	4	2	2	2
## 52	5	4	3	2	2	4	2	4
## 53	3	5	4	3	4	3	4	4
## 54	3	3	3	3	2	2	4	2
## 55	7	6	4	5	2	5	4	4
## 56	6	5	5	3	2	4	2	4
## 57	6	6	5	4	2	4	4	5
## 58	7	1	1	1	5	2	5	5
## 59	4	5	2	4	2	4	1	5
## 60	3	4	4	4	5	4	4	4
## 61	3	4	2	2	3	3	5	4
## 62	4	7	4	1	1	5	4	5
## 63	7	6	1	1	1	2	1	5
## 64	4	5	4	4	4	4	3	3
## 65	5	6	3	3	4	3	4	3
## 66	2	6	4	2	4	2	4	4
## 67	6	5	5	5	2	5	4	4
## 68	4	6	4	3	2	4	3	4
## 69	7	7	4	2	3	4	4	4
## 70	6	6	4	4	3	4	4	5
## 71	4	6	5	5	3	4	5	4
## 72	6	6	5	4	2	4	2	5
## 73	3	3	3	2	4	3	3	3
## 74	3	6	4	2	3	4	2	5
## 75	6	7	4	4	4	4	4	4
## 76	5	7	5	4	1	4	4	4
## 77	5	4	3	4	3	4	3	3
## 78	5	7	4	4	3	4	3	4
## 79	5	3	4	3	4	3	3	4

##	voice_q2	voice_q3	voice_q4	voice_q5	voice_q6	ovconf_q1h	ovconf_q1l
## 1	4	4	4	3	4	33	25
## 2	4	4	3	4	4	30	20
## 3	4	5	4	5	4	33	27
## 4	5	5	5	5	4	35	30
## 5	5	5	5	5	5	31	30
## 6	4	5	3	4	2	40	32
## 7	4	4	5	2	4	60	45
## 8	2	1	4	4	2	35	32
## 9	4	3	3	4	4	25	20
## 10	2	4	3	2	2	35	33
## 11	4	4	4	4	4	36	31
## 12	5	5	4	4	5	32	31
## 13	4	4	3	2	2	40	36
## 14	5	5	5	5	5	40	20
## 15	4	5	5	5	5	40	20
## 16	5	5	5	5	5	25	15
## 17	4	4	4	3	4	35	30
## 18	3	3	4	3	3	30	23
## 19	4	4	4	4	4	34	24
## 20	4	3	3	3	5	35	30
## 21	5	4	4	5	5	31	30
## 22	4	4	4	4	5	32	30
## 23	3	4	4	3	3	35	28
## 24	5	5	4	3	4	38	30
## 25	2	2	2	4	1	33	28
## 26	5	4	3	4	4	33	30
## 27	4	5	4	3	4	33	30
## 28	4	4	4	4	4	28	28
## 29	5	5	5	5	5	31	31
## 30	3	5	3	4	5	32	28
## 31	4	4	4	4	3	29	27
## 32	5	4	4	4	5	35	25
## 33	5	3	4	5	5	31	30
## 34	4	4	3	4	4	31	31
## 35	5	5	4	4	4	33	30
## 36	5	4	4	4	5	36	30
## 37	4	3	4	4	4	32	31
## 38	4	5	4	4	4	34	31
## 39	5	4	4	4	4	32	30
## 40	4	4	4	5	5	34	30
## 41	4	5	4	4	5	35	31
## 42	4	4	4	4	3	35	30
## 43	5	5	4	4	5	34	31
## 44	4	4	4	3	4	35	30
## 45	4	4	4	5	5	33	30
## 46	5	4	4	5	4	37	32
## 47	5	5	5	5	5	34	28
## 48	3	4	4	3	4	32	31
## 49	2	2	3	4	2	40	30
## 50	4	4	4	4	4	35	30
## 51	4	4	3	2	3	35	30
## 52	5	5	4	3	5	30	28
## 53	4	3	4	4	3	33	28

## 54	2	2	3	2	2	32	30
## 55	4	4	4	3	4	31	30
## 56	5	5	5	3	4	33	30
## 57	5	5	4	5	5	33	29
## 58	3	3	1	3	2	9	9
## 59	5	4	4	3	4	33	32
## 60	4	3	3	4	3	35	32
## 61	3	4	3	3	4	33	32
## 62	3	3	3	4	3	40	35
## 63	4	3	4	3	5	32	28
## 64	4	5	4	3	3	40	30
## 65	5	4	4	4	4	100	50
## 66	3	4	4	4	3	50	40
## 67	4	4	4	4	4	32	31
## 68	4	4	4	4	4	37	29
## 69	5	4	4	5	4	34	30
## 70	4	5	5	5	4	40	30
## 71	4	5	4	5	3	34	30
## 72	5	4	3	3	5	32	31
## 73	2	1	3	2	2	32	30
## 74	5	5	4	5	5	30	23
## 75	4	4	4	4	4	31	30
## 76	4	4	3	4	4	33	32
## 77	3	4	3	4	3	33	33
## 78	4	4	4	4	4	33	30
## 79	4	4	3	3	4	35	31
##	ovconf_q2h	ovconf_q2l	ovconf_q3h	ovconf_q3l	ovconf_q4h	ovconf_q4l	ovconf_q5h
## 1	2008	2005	10	5	2003	2000	30
## 2	2000	1992	50	20	2019	2000	10
## 3	2000	1990	50	10	2000	1990	100
## 4	2009	2007	45	20	2005	2000	50
## 5	1995	1990	30	20	2000	1990	20
## 6	2010	2009	45	35	2005	2000	56
## 7	2010	2000	50	40	2000	1995	45
## 8	2000	1950	30	15	2000	1950	5
## 9	1970	1950	25	20	1890	1870	53
## 10	2010	2005	68	56	2005	2002	35
## 11	2005	2002	35	20	2003	2000	30
## 12	2005	1990	10	5	2000	1980	10
## 13	2010	2007	60	30	2002	2000	30
## 14	2000	1990	20	10	2000	1995	20
## 15	2005	1990	20	10	2005	1995	40
## 16	2005	1995	20	10	2000	1996	40
## 17	2000	1980	50	30	2010	1990	35
## 18	2008	2005	22	12	2003	2000	28
## 19	2010	2002	30	20	2010	2000	30
## 20	2012	2010	120	50	2000	1997	15
## 21	2008	2007	60	50	2002	2000	3
## 22	2010	2005	50	30	2005	2000	13
## 23	2011	2010	100	20	2000	1900	100
## 24	2005	1990	40	20	2005	2000	4
## 25	2008	2006	50	30	2004	2000	6
## 26	2005	2003	60	40	2001	1999	2
## 27	2008	2006	40	20	2005	2001	3

## 28	2008	2004	30	20	2001	2001	5
## 29	2007	2007	25	20	2010	2005	5
## 30	1970	1950	15	10	1980	1970	5
## 31	2008	2006	50	30	2003	2000	20
## 32	2005	2000	80	50	2003	2001	130
## 33	2006	2004	39	10	2000	1996	4
## 34	2010	2005	50	45	2001	2000	25
## 35	2008	2006	30	25	2002	2000	25
## 36	2000	1990	60	40	2005	2000	7
## 37	2008	2007	44	44	2001	2000	23
## 38	2000	1995	15	10	1995	1985	5
## 39	2008	2004	25	15	2004	1998	20
## 40	2007	2007	100	80	2004	2002	4
## 41	2005	2000	80	50	2005	2000	30
## 42	1390	1384	100	40	1385	1378	5
## 43	2010	1998	45	35	2005	1990	7
## 44	2010	2005	30	20	2010	2000	15
## 45	2002	2000	20	10	2012	2008	15
## 46	2004	2002	10	5	2002	2000	250
## 47	2005	2002	24	17	2002	2000	4
## 48	2008	2007	30	20	2004	2002	7
## 49	2010	2000	60	10	2002	1990	40
## 50	2002	2000	150	100	2000	1995	30
## 51	2011	2007	40	30	2003	1998	10
## 52	2010	2005	14	10	2000	1990	15
## 53	2006	2002	21	15	2000	1995	3
## 54	2012	2010	50	30	2005	2000	50
## 55	2011	2009	50	40	2002	2000	23
## 56	2007	2007	70	50	2003	2002	7
## 57	2010	2005	60	40	2010	2005	30
## 58	8	8	9	9	9	9	9
## 59	2000	1990	60	50	2000	1990	60
## 60	2010	2000	15	10	2010	2000	8
## 61	2005	2000	12	9	2002	1996	3
## 62	2009	2006	30	20	2003	2000	3
## 63	2008	2005	35	25	2000	1999	5
## 64	2000	1990	25	15	1389	1385	12
## 65	1998	1994	10	5	2000	1985	4
## 66	2012	2005	60	40	2000	1990	12
## 67	2005	2000	15	7	2005	1997	3
## 68	2008	2004	50	30	2002	1998	12
## 69	2009	2005	50	40	2005	1990	2
## 70	2015	2000	40	25	2008	2000	4
## 71	2005	1995	180	100	1999	1995	18
## 72	2002	2000	25	22	2003	2001	10
## 73	2009	2005	120	90	2005	2002	25
## 74	2005	2000	25	20	2000	1998	50
## 75	2007	2006	8	5	2000	1995	30
## 76	1980	1960	6	5	2000	1996	2
## 77	2008	2007	27	26	2011	2002	23
## 78	2004	2000	110	60	2000	1996	15
## 79	2005	1998	100	50	2005	1998	4
##	ovconf_q5l	ovconf_q6h	ovconf_q6l	ovconf_q7h	ovconf_q7l	ovconf_q8h	ovconf_q8l
## 1	20	2000	1960	2005	1990	33	20

## 2	3	2000	1993	2000	1993	35	29
## 3	10	2000	1980	2005	1990	33	28
## 4	20	1990	1980	2008	2000	32	28
## 5	10	1970	1960	1980	1960	32	30
## 6	44	2000	1996	2000	1990	33	23
## 7	35	1970	1960	2000	1990	35	25
## 8	2	2000	1950	2000	1950	34	30
## 9	47	1900	1890	1990	1980	32	28
## 10	25	2000	1994	1999	1996	33	30
## 11	20	1985	1970	1985	1970	36	30
## 12	5	1990	1980	1995	1980	36	32
## 13	20	1970	1940	1990	1970	34	34
## 14	10	2000	1980	2000	1990	34	30
## 15	20	1990	1970	2005	1990	34	30
## 16	20	1990	1970	2000	1990	34	30
## 17	25	2000	1980	2000	1980	32	28
## 18	20	1990	1980	1995	1990	32	20
## 19	20	1990	1980	1985	1980	34	28
## 20	10	1990	1950	1990	1960	33	30
## 21	2	2000	1990	1998	1995	32	28
## 22	10	2000	1995	2005	2000	34	32
## 23	40	2000	1990	2000	1980	35	25
## 24	2	2000	1980	1999	1997	30	26
## 25	2	1996	1980	1996	1980	32	28
## 26	2	2000	1998	2000	1990	35	30
## 27	2	2000	1998	2000	1995	35	30
## 28	3	1980	1950	1998	1998	32	32
## 29	2	1960	1950	1990	1980	32	28
## 30	1	1920	1910	1990	1980	32	1
## 31	10	1995	1990	1997	1990	34	32
## 32	60	1930	1850	1965	1950	34	30
## 33	2	1990	1970	2030	1971	34	27
## 34	15	2000	1990	1990	1985	33	30
## 35	20	1990	1985	1995	1990	32	28
## 36	3	1990	1980	1995	1985	34	30
## 37	20	1992	1991	1994	1993	32	32
## 38	3	1990	1950	2000	1990	38	34
## 39	10	1970	1950	1980	1970	32	28
## 40	2	1995	1990	1998	1995	32	28
## 41	20	1960	1930	1990	1980	32	30
## 42	2	1385	1378	1385	1378	32	26
## 43	3	2005	1985	2000	1985	34	30
## 44	10	2000	1980	2010	2000	32	32
## 45	10	1998	1980	1998	1980	35	30
## 46	150	19900	1970	2000	1995	32	30
## 47	2	1980	1960	1985	1980	38	34
## 48	4	1995	1985	2000	1998	32	28
## 49	10	1980	1940	2000	1990	35	30
## 50	20	1950	1950	1950	1950	32	32
## 51	4	2000	1990	2000	1990	32	28
## 52	8	1980	1950	1990	1970	24	20
## 53	2	1990	1980	2001	1987	34	30
## 54	40	2000	1990	2000	1990	32	32
## 55	20	1990	1989	1993	1992	32	30

## 56	5	1986	1985	1999	1996	32	28
## 57	20	1995	1985	1995	1990	32	28
## 58	9	9	8	9	9	9	9
## 59	50	2000	1980	1900	1880	32	32
## 60	5	2000	1990	1985	1980	32	30
## 61	2	1990	1987	1996	1984	33	32
## 62	2	2000	1995	2002	1995	30	15
## 63	4	1996	1990	1998	1990	32	32
## 64	8	1978	1975	1967	1960	32	31
## 65	2	2001	1990	2000	1950	35	30
## 66	8	2000	1990	2000	1990	36	36
## 67	2	1987	1980	1995	1988	34	32
## 68	3	1990	1960	1985	1970	32	32
## 69	2	2000	1990	1996	1980	32	30
## 70	3	2005	1990	2010	1990	32	28
## 71	10	1980	1890	1998	1960	33	27
## 72	5	1995	1990	1995	1990	32	32
## 73	10	1990	1970	1990	1975	32	28
## 74	40	2000	1995	1990	1980	32	32
## 75	20	2000	1991	1970	1960	32	29
## 76	2	1960	1950	1960	1960	36	32
## 77	10	1991	1989	1963	1960	32	28
## 78	5	1996	1990	1996	1990	32	30
## 79	2	2005	2000	2003	1990	32	28
##	ovconf_q9h	ovconf_q9l	ovconf_q10h	ovconf_q10l			
## 1	700	600	15	8			
## 2	1000	700	50	40			
## 3	1500	1000	70	40			
## 4	1200	800	60	40			
## 5	800	600	15	10			
## 6	3000	2000	26	25			
## 7	1400	1000	90	80			
## 8	1200	900	250	150			
## 9	990	870	45	30			
## 10	4000	3000	28	25			
## 11	1300	1000	80	60			
## 12	1000	900	30	20			
## 13	800	700	20	15			
## 14	1000	800	50	40			
## 15	1000	800	50	40			
## 16	1000	800	50	40			
## 17	1200	1000	60	40			
## 18	1000	800	54	18			
## 19	900	700	56	46			
## 20	1200	700	30	20			
## 21	1600	1400	70	60			
## 22	1100	1000	50	40			
## 23	1500	720	100	40			
## 24	1200	800	70	50			
## 25	10000	800	75	45			
## 26	1100	1000	60	50			
## 27	1200	900	55	45			
## 28	950	900	60	50			
## 29	700	650	50	40			

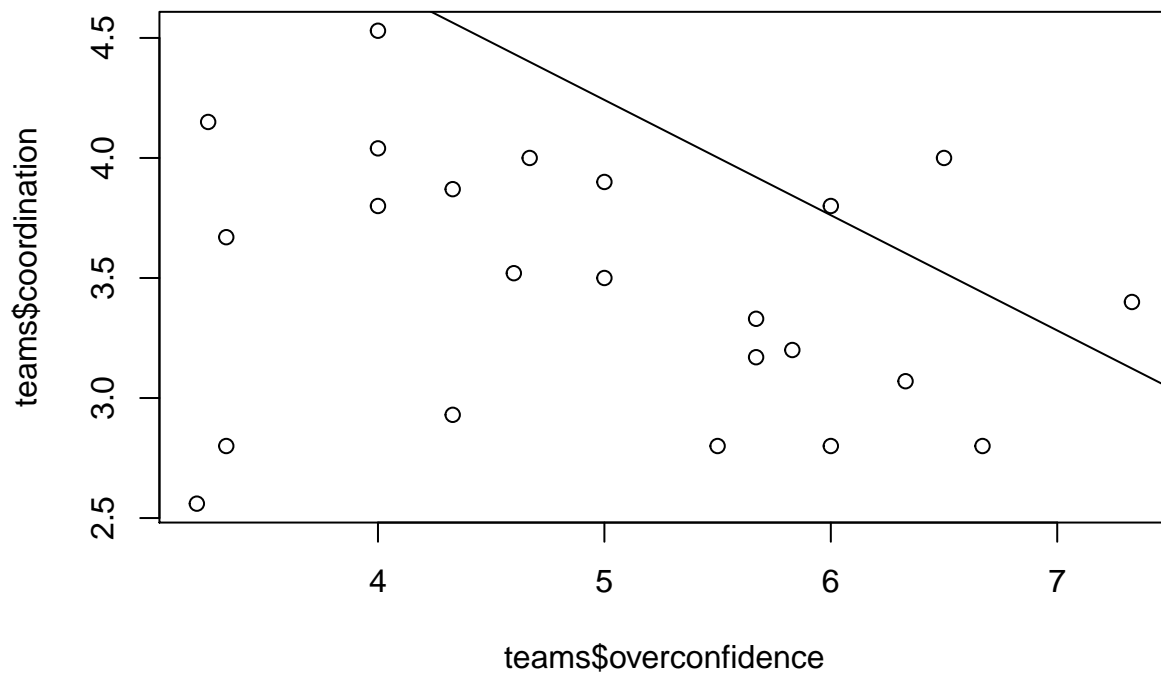
## 30	1200	900	80	70
## 31	1200	900	60	50
## 32	1000	600	45	30
## 33	1000	900	50	40
## 34	1200	800	55	50
## 35	1000	800	45	40
## 36	1200	800	110	70
## 37	1000	500	60	50
## 38	2200	1900	65	45
## 39	1200	1100	70	50
## 40	1000	800	60	50
## 41	1000	900	100	70
## 42	250	120	80	50
## 43	1100	900	95	80
## 44	1800	1500	50	40
## 45	1000	80	120	80
## 46	25000	20000	100	80
## 47	650	400	55	43
## 48	1000	800	60	50
## 49	13000	900	60	40
## 50	1000	900	50	45
## 51	1200	900	55	45
## 52	500	100	8	3
## 53	900	700	50	40
## 54	900	800	50	40
## 55	1000	998	55	45
## 56	1000	900	60	50
## 57	950	900	53	48
## 58	9	9	9	9
## 59	1000	999	60	59
## 60	900	800	150	100
## 61	650	400	50	40
## 62	600	400	60	50
## 63	1000	900	17	16
## 64	1000	700	100	90
## 65	30000	5000	1400	89
## 66	1200	700	60	50
## 67	1000	900	62	59
## 68	1200	800	75	50
## 69	1100	950	60	50
## 70	1000	900	100	40
## 71	1100	950	130	70
## 72	1000	900	50	40
## 73	950	890	80	50
## 74	1000	999	60	50
## 75	920	850	52	45
## 76	750	700	40	30
## 77	900	890	55	52
## 78	990	900	55	40
## 79	1800	1200	85	75

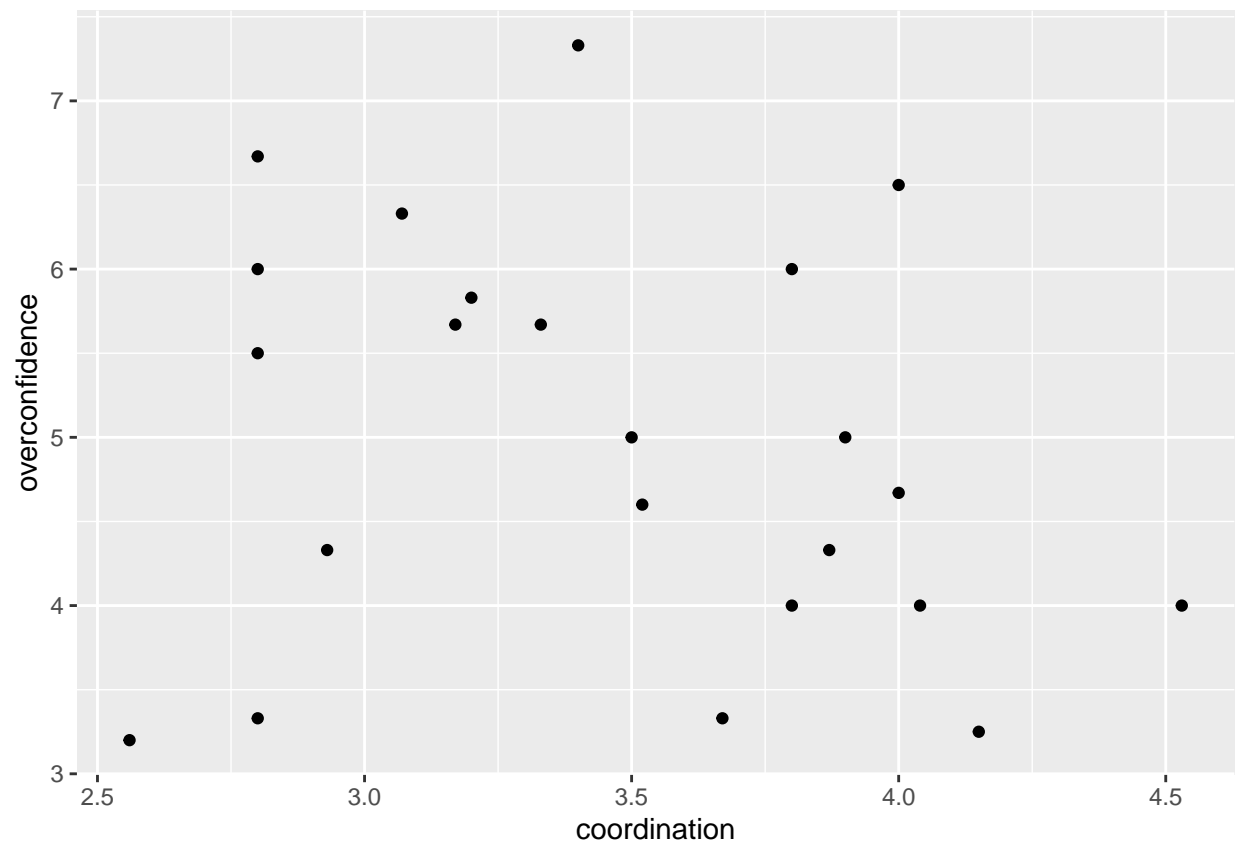
Hypothesis testing

Hypothesis No. 1

H1: Team Overconfidence has a negative effect on team coordination

```
##
## Call:
## lm(formula = overconfidence ~ coordination, data = teams)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.21342 -0.76037  0.03795  0.71286  2.31994
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   6.6427     1.6803   3.953 0.000726 ***
## coordination  -0.4802     0.4798  -1.001 0.328300
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.208 on 21 degrees of freedom
## Multiple R-squared:  0.04553,    Adjusted R-squared:  7.595e-05
## F-statistic: 1.002 on 1 and 21 DF,  p-value: 0.3283
```

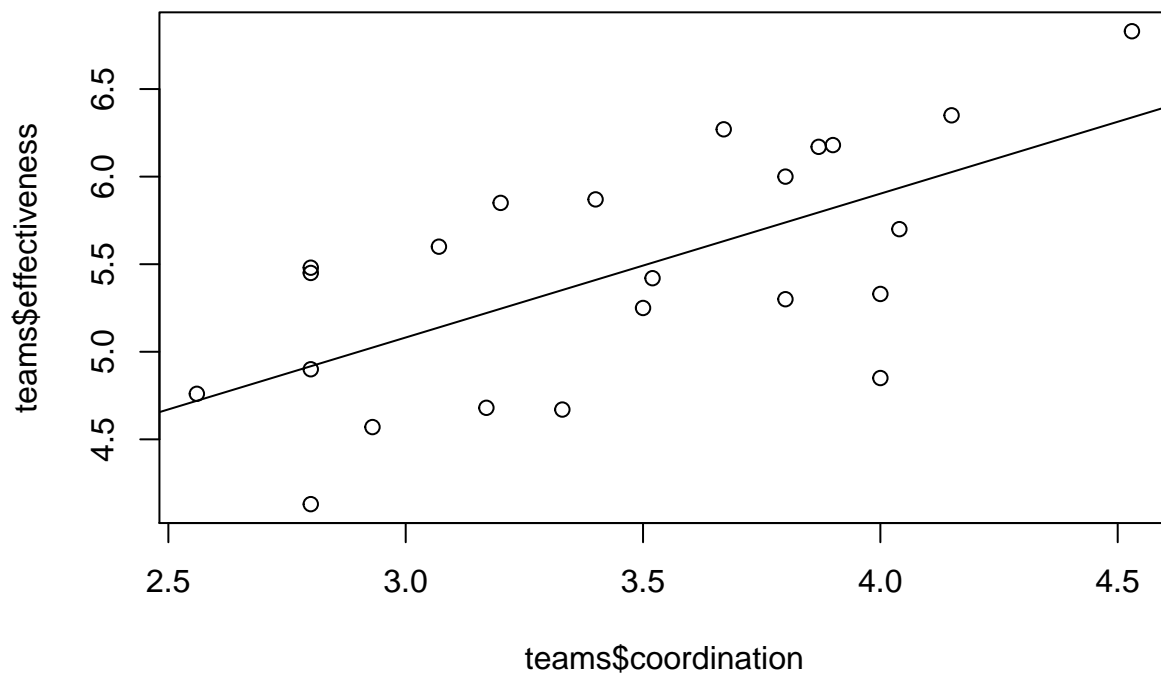


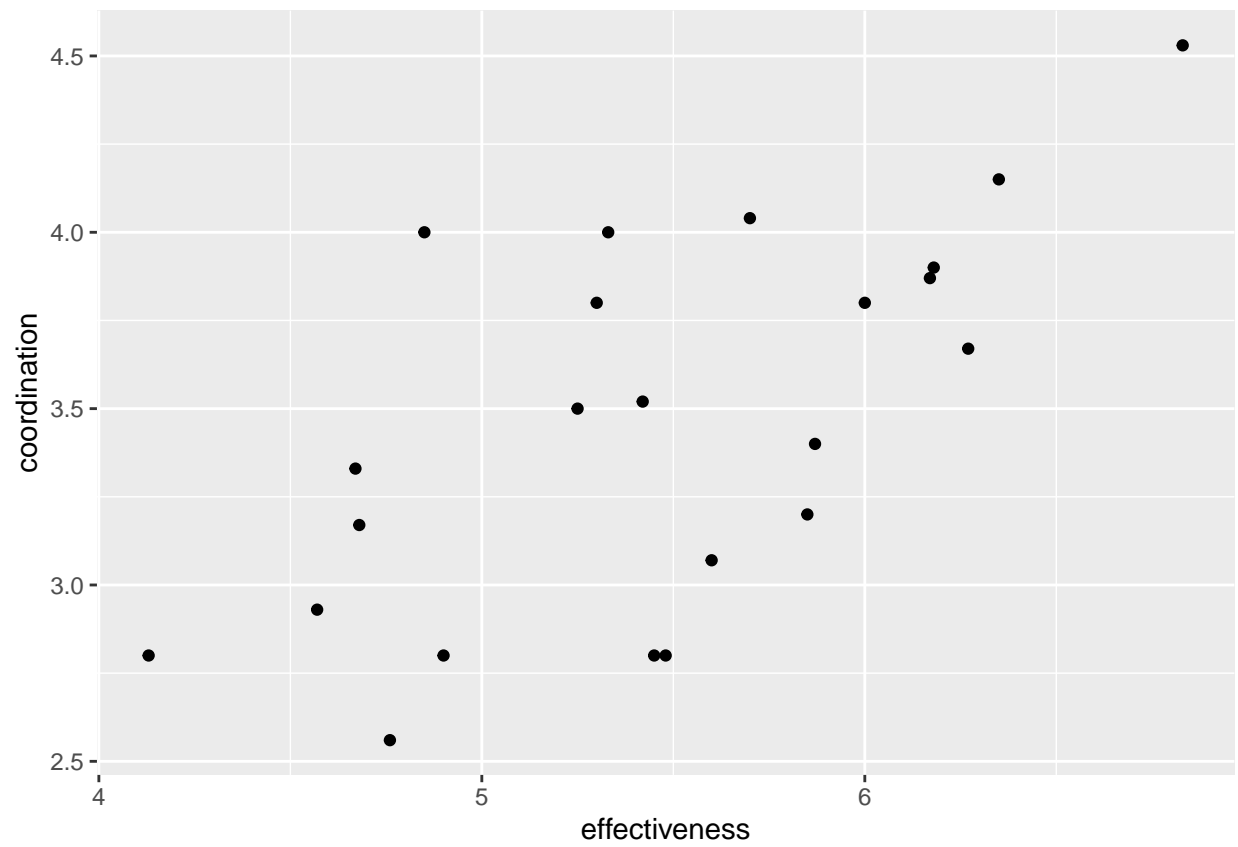


Hypothesis No. 2

H2: Team Coordination has a positive effect on team effectiveness

```
##
## Call:
## lm(formula = effectiveness ~ coordination, data = teams)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.05262 -0.44615  0.03993  0.46061  0.63838
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   2.6177     0.7321   3.576 0.001784 **
## coordination   0.8212     0.2090   3.928 0.000771 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.5264 on 21 degrees of freedom
## Multiple R-squared:  0.4236, Adjusted R-squared:  0.3961
## F-statistic: 15.43 on 1 and 21 DF,  p-value: 0.0007709
```

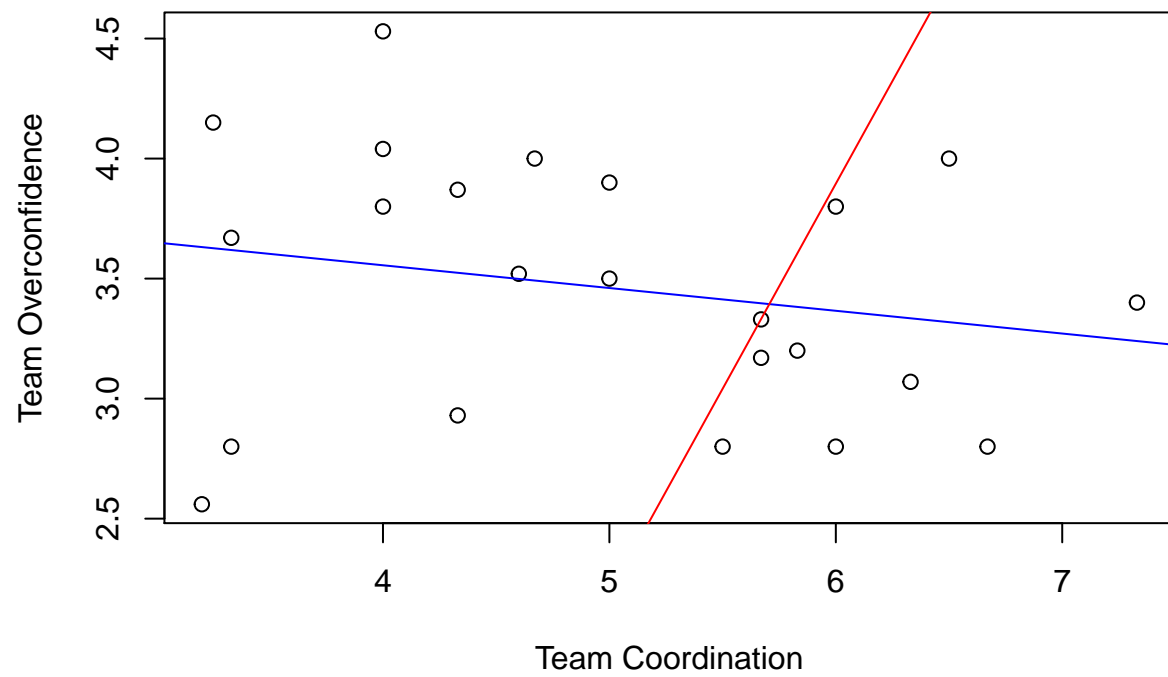


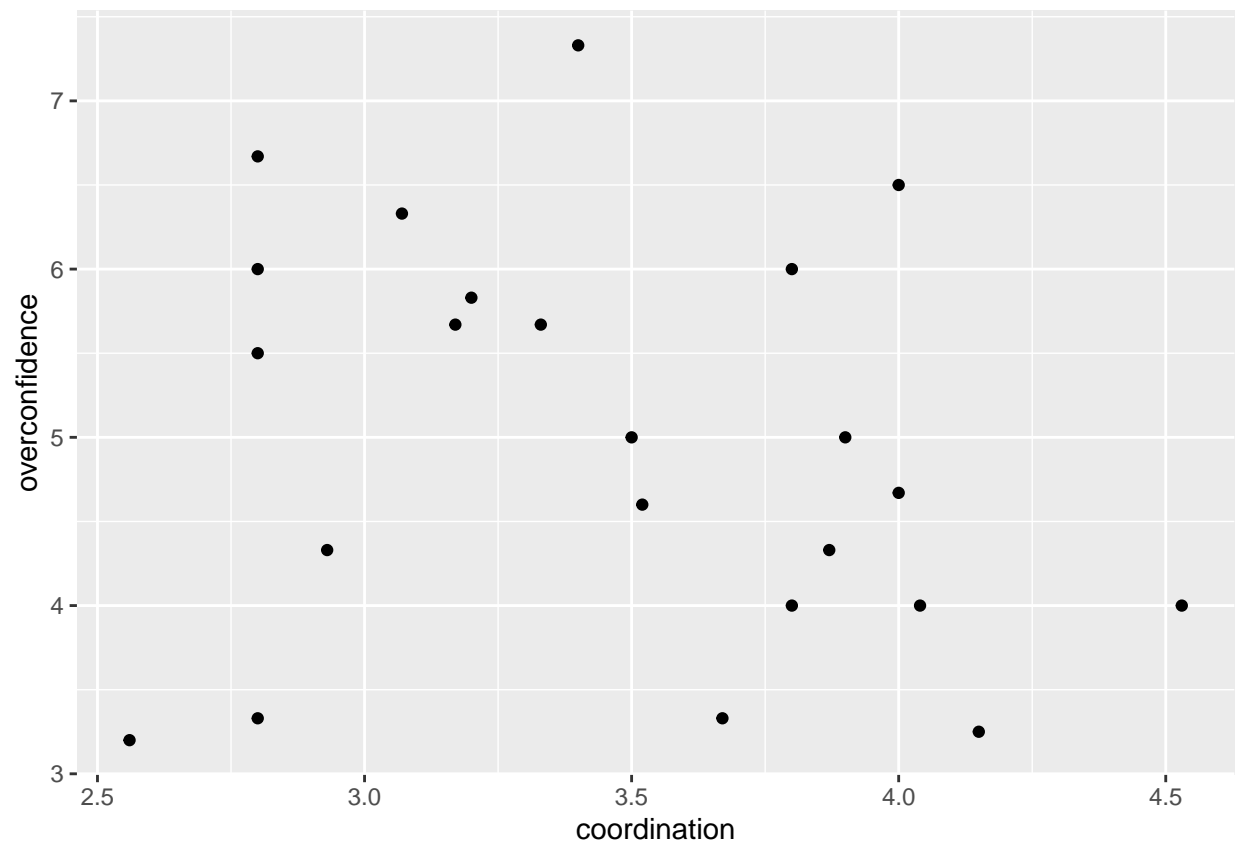


Hypothesis No. 3

H3: Voice Behavior has a moderator effect on the relationship between overconfidence and team coordination

```
##
## Call:
## lm(formula = coordination ~ overconfidence + voice_behavior +
##      inter, data = teams_voice_interaction)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.8892 -0.2471 -0.0404  0.3102  0.7715
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   -6.3579     3.8966  -1.632   0.1192
## overconfidence  1.7089     0.7269   2.351   0.0297 *
## voice_behavior  2.6272     0.9888   2.657   0.0156 *
## inter         -0.4614     0.1846  -2.499   0.0218 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4807 on 19 degrees of freedom
## Multiple R-squared:  0.3075, Adjusted R-squared:  0.1982
## F-statistic: 2.813 on 3 and 19 DF,  p-value: 0.06707
##
## Warning in abline(lm_voice_coordination, col = "red"): only using the first two
## of 4 regression coefficients
```

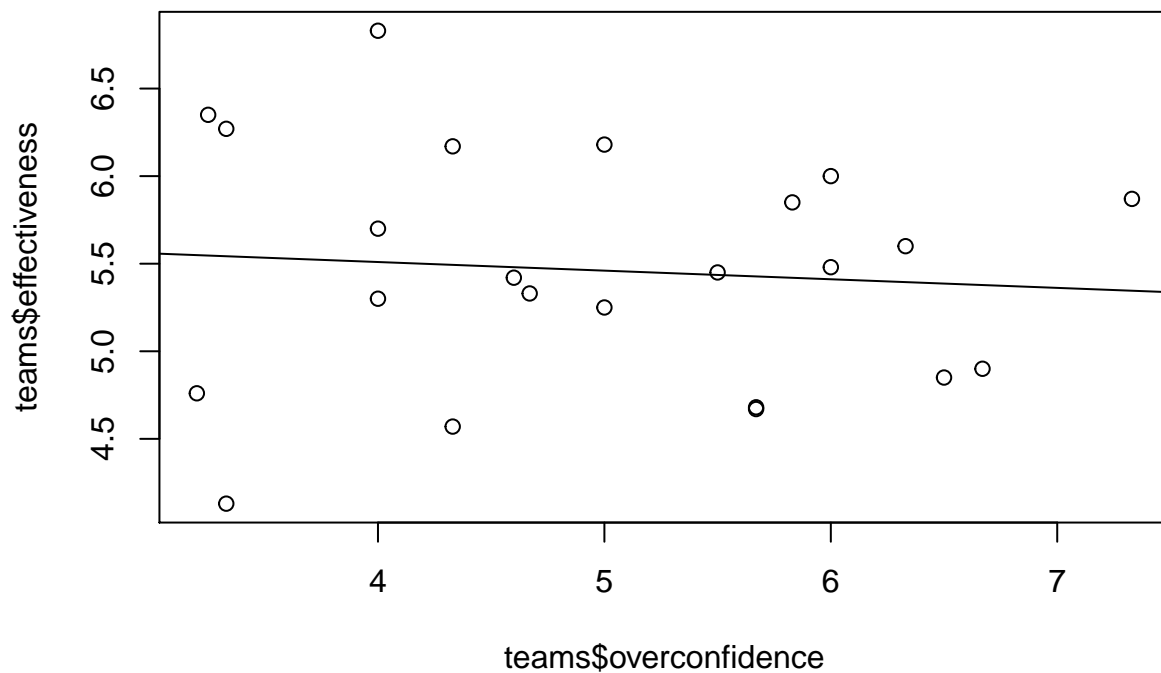


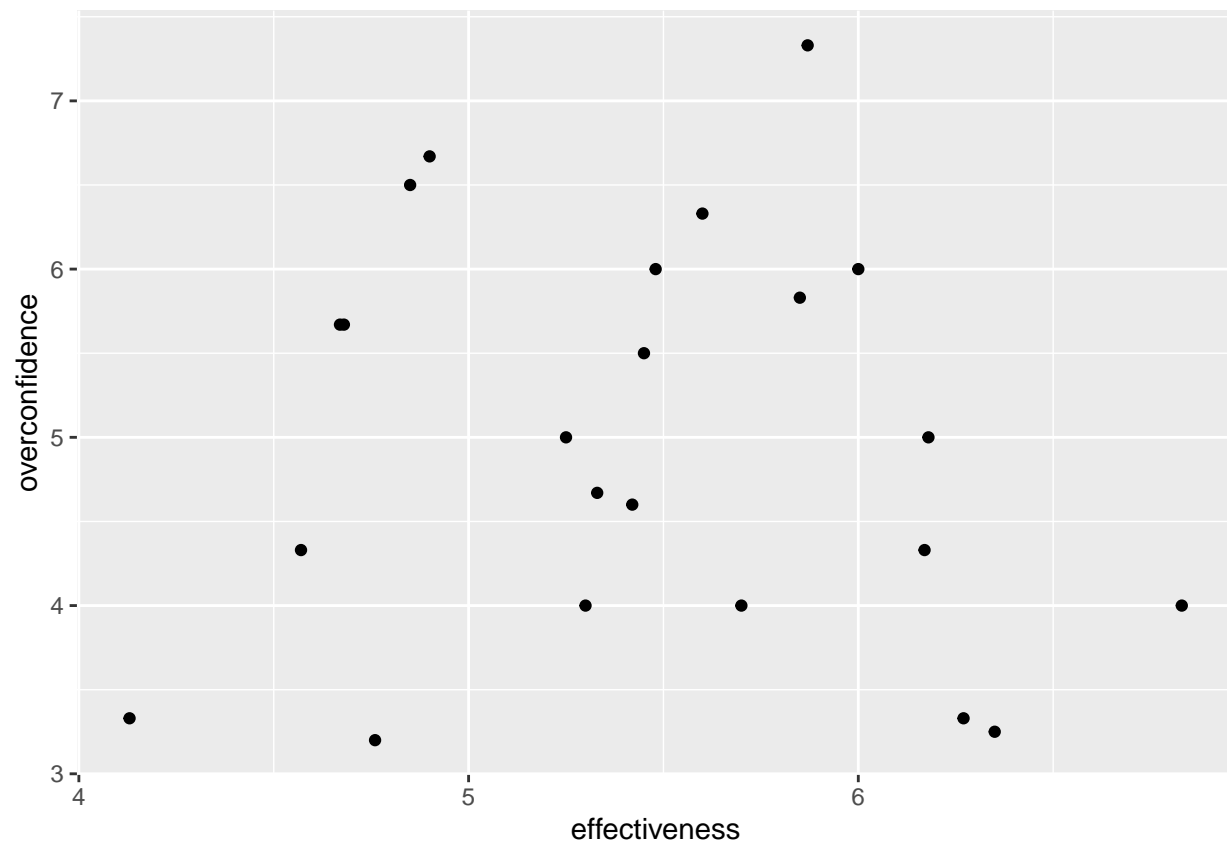
Extra Hypotheses

Hypothesis No. 1 - a

Hx1a: Team Overconfidence has a negative effect on team Effectiveness

```
##  
## Call:  
## lm(formula = effectiveness ~ overconfidence, data = teams)  
##  
## Residuals:  
##      Min       1Q   Median       3Q      Max   
## -1.4125 -0.5073  0.0143  0.5566  1.3204   
##  
## Coefficients:  
##              Estimate Std. Error t value Pr(>|t|)      
## (Intercept)   5.70648    0.62380   9.148  9e-09 ***  
## overconfidence -0.04923    0.12188  -0.404   0.69      
## ---  
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1  
##  
## Residual standard error: 0.6906 on 21 degrees of freedom  
## Multiple R-squared:  0.00771,    Adjusted R-squared:  -0.03954   
## F-statistic: 0.1632 on 1 and 21 DF,  p-value: 0.6903
```

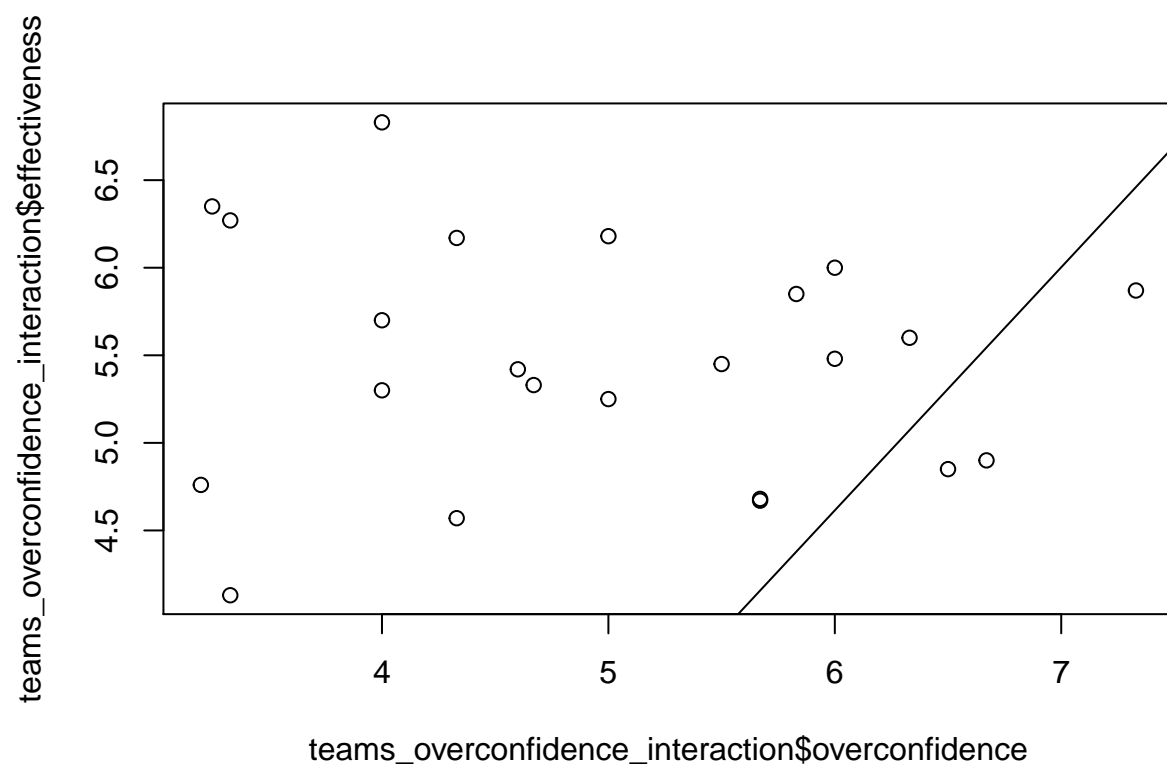


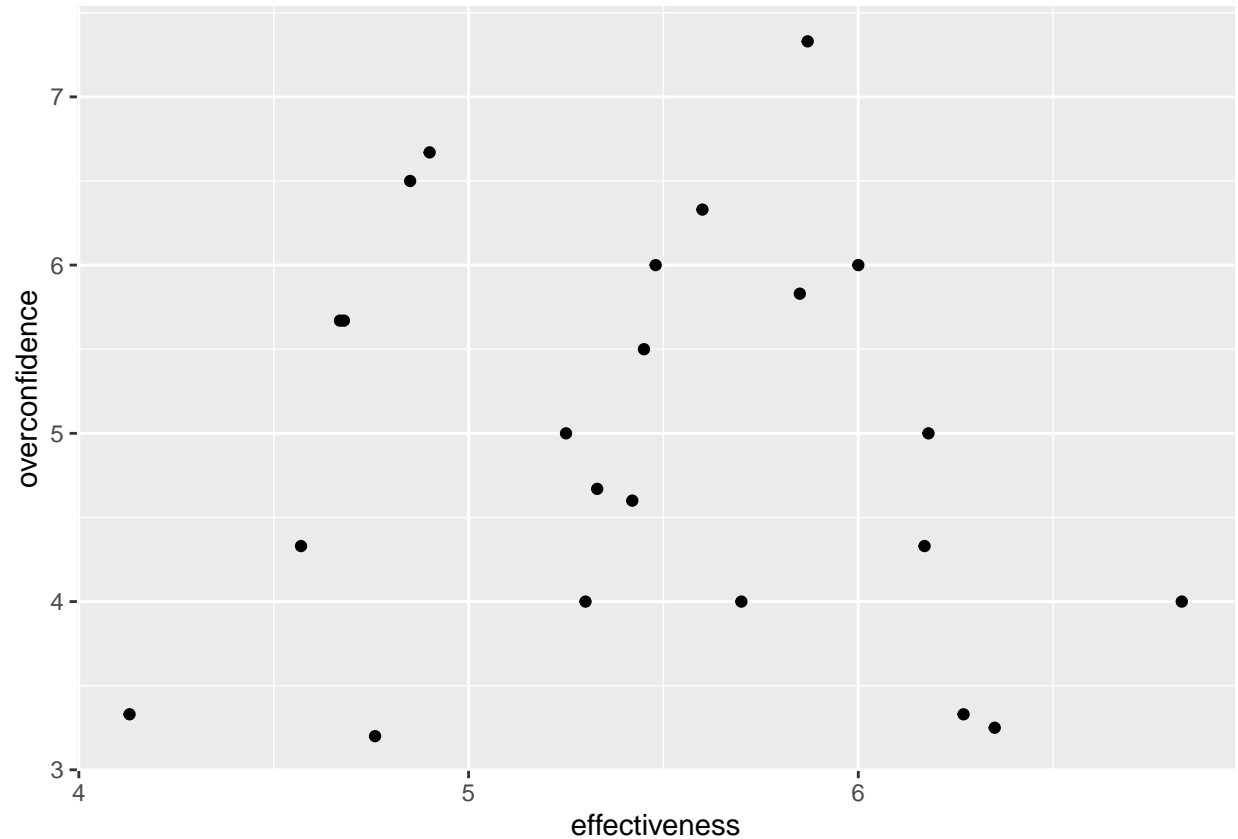


Hypothesis No. 1 - b

Hx1b: Team Overconfidence has a reverse effect on team Effectiveness mediated by team Coordination

```
##
## Call:
## lm(formula = effectiveness ~ overconfidence + coordination +
##     inter2, data = teams_overconfidence_interaction)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.67371 -0.46438 -0.02151  0.43862  0.55177
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   -3.7121     2.7257  -1.362  0.18917
## overconfidence  1.3878     0.5773   2.404  0.02658 *
## coordination   2.6678     0.7947   3.357  0.00331 **
## inter2        -0.4076     0.1713  -2.380  0.02796 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4846 on 19 degrees of freedom
## Multiple R-squared:  0.558, Adjusted R-squared:  0.4882
## F-statistic: 7.997 on 3 and 19 DF, p-value: 0.001197
##
## Warning in abline(lm_overconfidence_effectiveness_coordination): only using the
## first two of 4 regression coefficients
```





Analysis of Internal Reliability

Cronbach's Alpha is used to determine the reliability of the survey used for each variable.

Team Effectiveness

```
##
## Cronbach's alpha for the 'eff_survey' data-set
##
## Items: 10
## Sample units: 79
## alpha: 0.823
##
## Bootstrap 95% CI based on 1000 samples
## 2.5% 97.5%
## 0.707 0.886
```

Team Coordination

```
##
## Cronbach's alpha for the 'coord_survey' data-set
##
## Items: 5
## Sample units: 79
## alpha: 0.67
```

```
##  
## Bootstrap 95% CI based on 1000 samples  
## 2.5% 97.5%  
## 0.495 0.781
```

Team Voice Behavior

```
##  
## Cronbach's alpha for the 'voice_survey' data-set  
##  
## Items: 6  
## Sample units: 79  
## alpha: 0.85  
##  
## Bootstrap 95% CI based on 1000 samples  
## 2.5% 97.5%  
## 0.782 0.894
```

Overconfidence

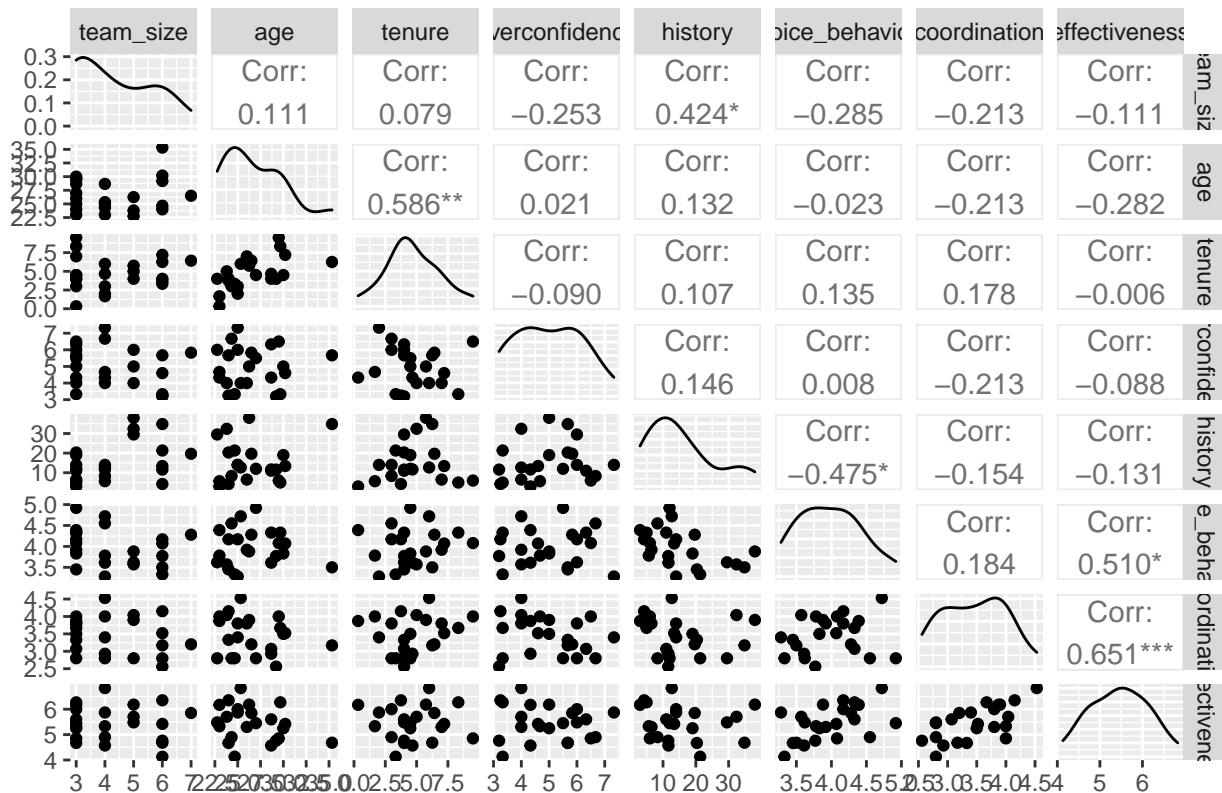
```
##  
## Cronbach's alpha for the 'ovconf_survey' data-set  
##  
## Items: 20  
## Sample units: 79  
## alpha: 0.607  
##  
## Bootstrap 95% CI based on 1000 samples  
## 2.5% 97.5%  
## 0.249 0.761
```


Multiple Regression Backward Elimination of Variables

Stage 0: All Variables Included

Initial

Pairwise Correlation Matrix



```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.62854 -0.22927 -0.03915  0.16603  0.86074
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -0.49250     2.01881   -0.244  0.81057
## team_size      0.06384     0.09287    0.687  0.50230
## age          -0.01548     0.04384   -0.353  0.72891
## tenure       -0.05607     0.06438   -0.871  0.39754
## overconfidence 0.01759     0.09439    0.186  0.85467
## history       0.01310     0.01287    1.018  0.32502
## voice_behavior 0.83127     0.26915    3.088  0.00749 **
## coordination  0.79609     0.22088    3.604  0.00260 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4735 on 15 degrees of freedom
## Multiple R-squared:  0.6668, Adjusted R-squared:  0.5113
```

F-statistic: 4.289 on 7 and 15 DF, p-value: 0.008611

Eliminating Overconfidence

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_overconfidence)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.59581 -0.23279 -0.03367  0.15673  0.90227
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -0.37168    1.85330  -0.201  0.84358
## team_size      0.05719    0.08310   0.688  0.50121
## age          -0.01540    0.04249  -0.362  0.72179
## tenure       -0.05675    0.06231  -0.911  0.37587
## history        0.01381    0.01191   1.160  0.26313
## voice_behavior  0.83637    0.25955   3.222  0.00532 **
## coordination   0.78602    0.20762   3.786  0.00162 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.459 on 16 degrees of freedom
## Multiple R-squared:  0.6661, Adjusted R-squared:  0.5408
## F-statistic: 5.319 on 6 and 16 DF,  p-value: 0.003449
```

Eliminating Coordination

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_coordination)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.02281 -0.36840  0.09421  0.33216  1.15332
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    3.94306    2.11665   1.863  0.0809 .
## team_size     -0.01723    0.11917  -0.145  0.8868
## age           -0.07396    0.05386  -1.373  0.1886
## tenure         0.02619    0.07962   0.329  0.7464
## overconfidence -0.06557    0.12106  -0.542  0.5955
## history         0.01427    0.01702   0.838  0.4142
## voice_behavior  0.89026    0.35533   2.505  0.0234 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.6263 on 16 degrees of freedom
## Multiple R-squared:  0.3783, Adjusted R-squared:  0.1452
## F-statistic: 1.623 on 6 and 16 DF,  p-value: 0.2048
```

Eliminating Voice Behavior

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_voice_behavior)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.9608 -0.3387  0.0967  0.4294  0.8673
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   2.926057   2.090840   1.399  0.18076
## team_size      0.047799   0.114829   0.416  0.68275
## age          -0.025175   0.054148  -0.465  0.64825
## tenure        -0.015705   0.078070  -0.201  0.84310
## overconfidence  0.047276   0.116287   0.407  0.68972
## history        -0.004059   0.014377  -0.282  0.78129
## coordination   0.837574   0.273034   3.068  0.00736 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.5864 on 16 degrees of freedom
## Multiple R-squared:  0.455, Adjusted R-squared:  0.2506
## F-statistic: 2.226 on 6 and 16 DF, p-value: 0.09416
```

Eliminating History

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_history)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.78325 -0.16354  0.01271  0.13269  0.81803
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -0.17433    1.99666  -0.087  0.93151
## team_size      0.10072    0.08560   1.177  0.25657
## age          -0.01595    0.04388  -0.363  0.72108
## tenure       -0.04642    0.06375  -0.728  0.47703
## overconfidence  0.04624    0.09019   0.513  0.61522
## voice_behavior  0.71306    0.24306   2.934  0.00974 **
## coordination   0.80175    0.22105   3.627  0.00227 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.474 on 16 degrees of freedom
## Multiple R-squared:  0.6438, Adjusted R-squared:  0.5103
## F-statistic: 4.82 on 6 and 16 DF,  p-value: 0.005457
```

Eliminating Tenure

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_tenure)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.81388 -0.18447  0.03224  0.19101  0.92059
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    0.34513     1.76152   0.196  0.84714
## team_size      0.05901     0.09200   0.641  0.53031
## age           -0.04003     0.03332  -1.202  0.24703
## overconfidence  0.02229     0.09352   0.238  0.81460
## history        0.01145     0.01263   0.906  0.37838
## voice_behavior  0.78368     0.26155   2.996  0.00855 **
## coordination    0.72789     0.20497   3.551  0.00266 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4699 on 16 degrees of freedom
## Multiple R-squared:  0.65, Adjusted R-squared:  0.5187
## F-statistic: 4.952 on 6 and 16 DF, p-value: 0.004823
```


Eliminating Age

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_age)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.61751 -0.21310 -0.02139  0.16785  0.85367
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -0.96501    1.46974  -0.657 0.520781
## team_size      0.06461    0.09027   0.716 0.484427
## tenure       -0.07069    0.04794  -1.475 0.159714
## overconfidence  0.01726    0.09177   0.188 0.853173
## history        0.01314    0.01251   1.050 0.309120
## voice_behavior  0.83807    0.26101   3.211 0.005452 **
## coordination   0.82496    0.19950   4.135 0.000777 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4604 on 16 degrees of freedom
## Multiple R-squared:  0.6641, Adjusted R-squared:  0.5381
## F-statistic: 5.271 on 6 and 16 DF,  p-value: 0.003599
```

Eliminating Team Size

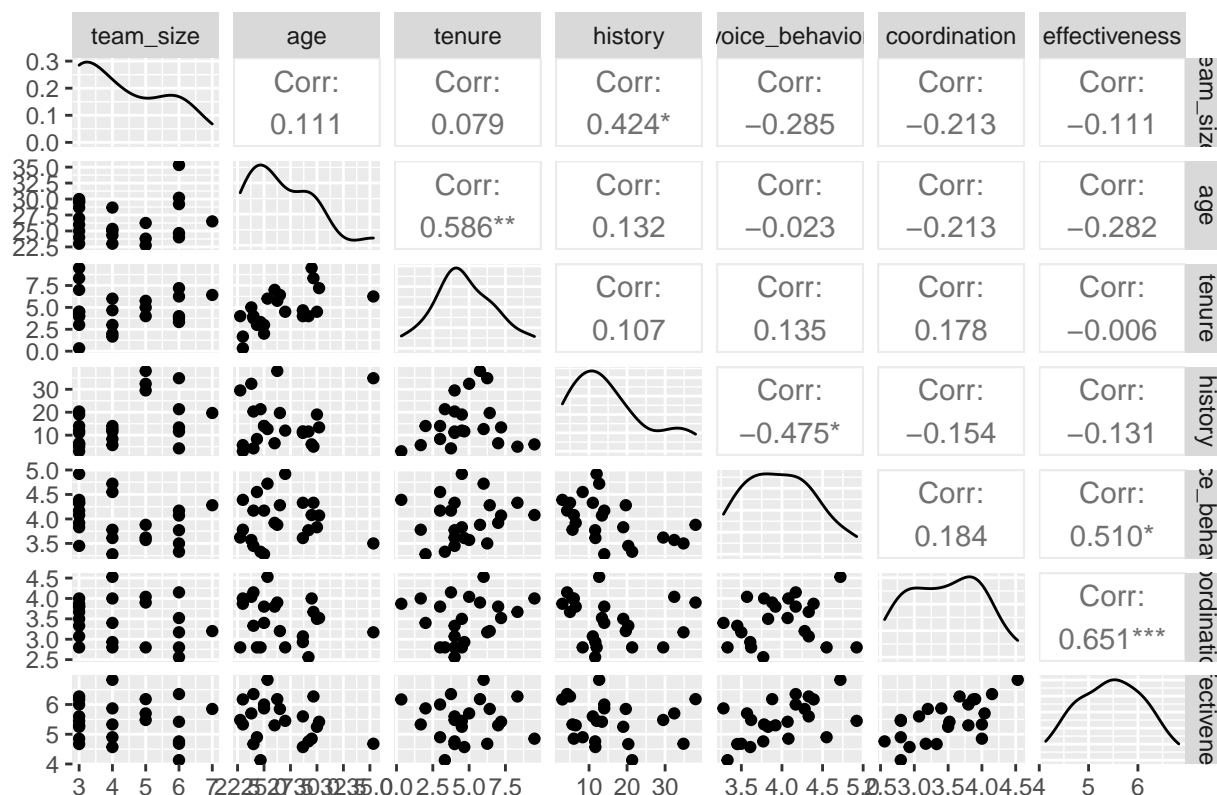
```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_team_size)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.63126 -0.24063 -0.02852  0.21967  0.90123
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   0.028413   1.840108   0.015  0.98787
## age          -0.016190   0.043096  -0.376  0.71209
## tenure       -0.053427   0.063198  -0.845  0.41036
## overconfidence -0.007364   0.085684  -0.086  0.93258
## history       0.016548   0.011653   1.420  0.17476
## voice_behavior  0.820917   0.264264   3.106  0.00679 **
## coordination   0.759307   0.210741   3.603  0.00238 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4656 on 16 degrees of freedom
## Multiple R-squared:  0.6563, Adjusted R-squared:  0.5275
## F-statistic: 5.093 on 6 and 16 DF,  p-value: 0.004234
```

Coordination and Voice Behavior are the most correlated variables with the Effectiveness, so they are kept. Overconfidence is the least correlated with the Effectiveness, so it is eliminated.

Stage 1: Overconfidence is Eliminated

Initial

Pairwise Correlation Matrix



```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.59581 -0.23279 -0.03367  0.15673  0.90227
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -0.37168    1.85330   -0.201  0.84358
## team_size      0.05719    0.08310    0.688  0.50121
## age          -0.01540    0.04249   -0.362  0.72179
## tenure       -0.05675    0.06231   -0.911  0.37587
## history        0.01381    0.01191    1.160  0.26313
## voice_behavior  0.83637    0.25955    3.222  0.00532 **
## coordination   0.78602    0.20762    3.786  0.00162 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.459 on 16 degrees of freedom
## Multiple R-squared:  0.6661, Adjusted R-squared:  0.5408
## F-statistic: 5.319 on 6 and 16 DF, p-value: 0.003449
```

Eliminating History

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_history)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.71318 -0.16321 -0.01143  0.18738  0.82834
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    0.22441    1.79861   0.125  0.90217
## team_size      0.08733    0.07973   1.095  0.28867
## age           -0.01579    0.04292  -0.368  0.71754
## tenure        -0.04688    0.06235  -0.752  0.46235
## voice_behavior  0.70917    0.23762   2.985  0.00833 **
## coordination   0.77362    0.20944   3.694  0.00180 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4636 on 17 degrees of freedom
## Multiple R-squared:  0.638, Adjusted R-squared:  0.5315
## F-statistic: 5.992 on 5 and 17 DF,  p-value: 0.00226
```

Eliminating Tenure

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_tenure)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.77514 -0.20528  0.02038  0.17158  0.97433
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    0.51182    1.57131   0.326  0.74861
## team_size      0.05048    0.08236   0.613  0.54806
## age           -0.04031    0.03236  -1.246  0.22976
## history        0.01233    0.01174   1.050  0.30821
## voice_behavior  0.78944    0.25311   3.119  0.00625 **
## coordination   0.71403    0.19102   3.738  0.00164 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4567 on 17 degrees of freedom
## Multiple R-squared:  0.6487, Adjusted R-squared:  0.5454
## F-statistic: 6.279 on 5 and 17 DF,  p-value: 0.001786
```

Eliminating Age

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_age)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.58544 -0.21699 -0.03302  0.16233  0.89446
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -0.84402    1.28346  -0.658 0.519593
## team_size      0.05808    0.08091   0.718 0.482639
## tenure       -0.07129    0.04645  -1.535 0.143280
## history        0.01385    0.01160   1.194 0.249017
## voice_behavior  0.84305    0.25219   3.343 0.003856 **
## coordination   0.81494    0.18672   4.364 0.000422 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4471 on 17 degrees of freedom
## Multiple R-squared:  0.6633, Adjusted R-squared:  0.5643
## F-statistic: 6.698 on 5 and 17 DF,  p-value: 0.001282
```

Eliminating Team Size

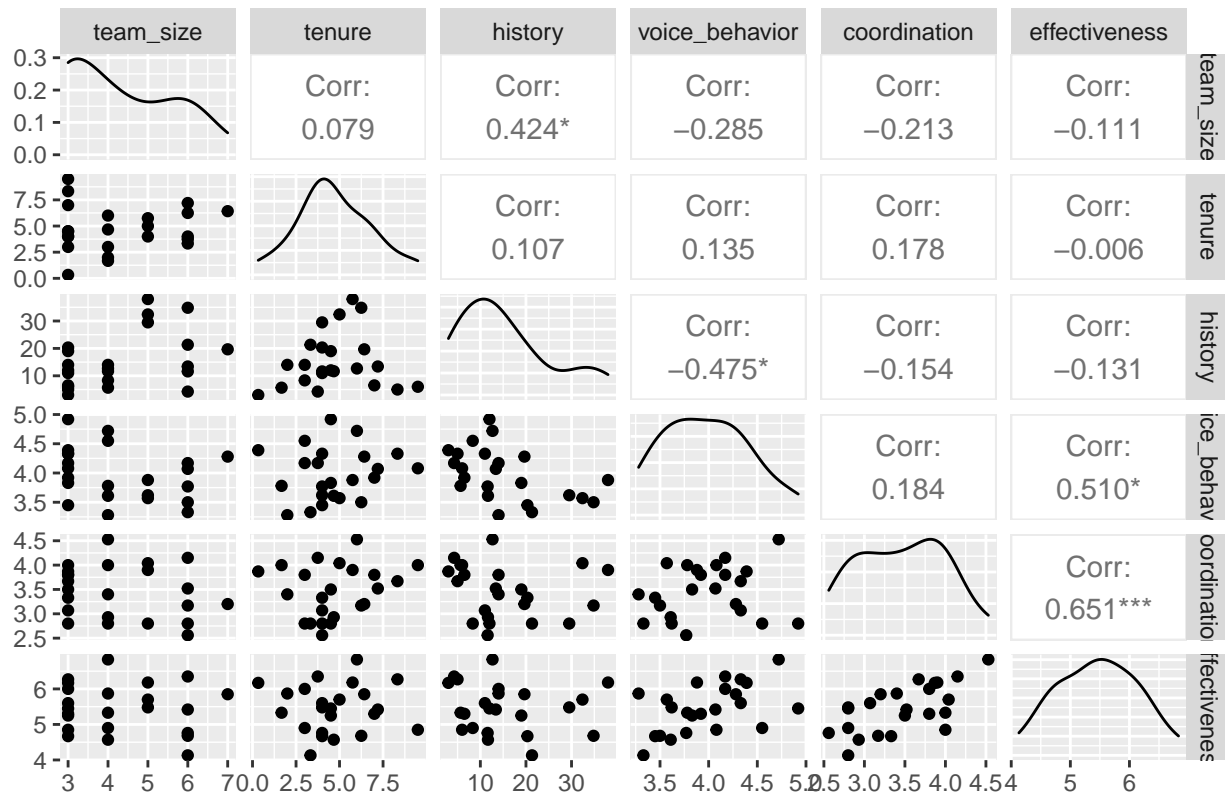
```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_team_size)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.64748 -0.24150 -0.02411  0.22325  0.88290
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -0.004267   1.747035  -0.002  0.99808
## age          -0.016266   0.041810  -0.389  0.70207
## tenure       -0.052954   0.061093  -0.867  0.39813
## history       0.016374   0.011134   1.471  0.15967
## voice_behavior 0.817878   0.254126   3.218  0.00504 **
## coordination  0.762367   0.201558   3.782  0.00149 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4518 on 17 degrees of freedom
## Multiple R-squared:  0.6562, Adjusted R-squared:  0.555
## F-statistic: 6.489 on 5 and 17 DF,  p-value: 0.001511
```

Age has the least correlation with the Effectiveness, so it is eliminated.

Stage 2: Age is Eliminated

Initial

Pairwise Correlation Matrix



```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.58544 -0.21699 -0.03302  0.16233  0.89446
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -0.84402    1.28346  -0.658 0.519593
## team_size      0.05808    0.08091   0.718 0.482639
## tenure       -0.07129    0.04645  -1.535 0.143280
## history        0.01385    0.01160   1.194 0.249017
## voice_behavior  0.84305    0.25219   3.343 0.003856 **
## coordination  0.81494    0.18672   4.364 0.000422 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4471 on 17 degrees of freedom
## Multiple R-squared:  0.6633, Adjusted R-squared:  0.5643
## F-statistic: 6.698 on 5 and 17 DF,  p-value: 0.001282
```


Eliminating History

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_history)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.7028 -0.2035 -0.0311  0.1975  0.8202
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -0.25836    1.19988  -0.215  0.831940
## team_size      0.08832    0.07775   1.136  0.270874
## tenure       -0.06176    0.04630  -1.334  0.198876
## voice_behavior  0.71569    0.23119   3.096  0.006238 **
## coordination   0.80323    0.18865   4.258  0.000473 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4524 on 18 degrees of freedom
## Multiple R-squared:  0.6351, Adjusted R-squared:  0.554
## F-statistic: 7.832 on 4 and 18 DF,  p-value: 0.0007703
```

Eliminating Tenure

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_tenure)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.9340 -0.2412 -0.1023  0.2372  1.0219
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -0.58800     1.31960   -0.446  0.661209
## team_size      0.04679     0.08356    0.560  0.582410
## history        0.01079     0.01185    0.910  0.374719
## voice_behavior  0.76557     0.25622    2.988  0.007890 **
## coordination   0.76085     0.19014    4.002  0.000837 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4636 on 18 degrees of freedom
## Multiple R-squared:  0.6167, Adjusted R-squared:  0.5315
## F-statistic: 7.239 on 4 and 18 DF,  p-value: 0.00117
```

Eliminating Team Size

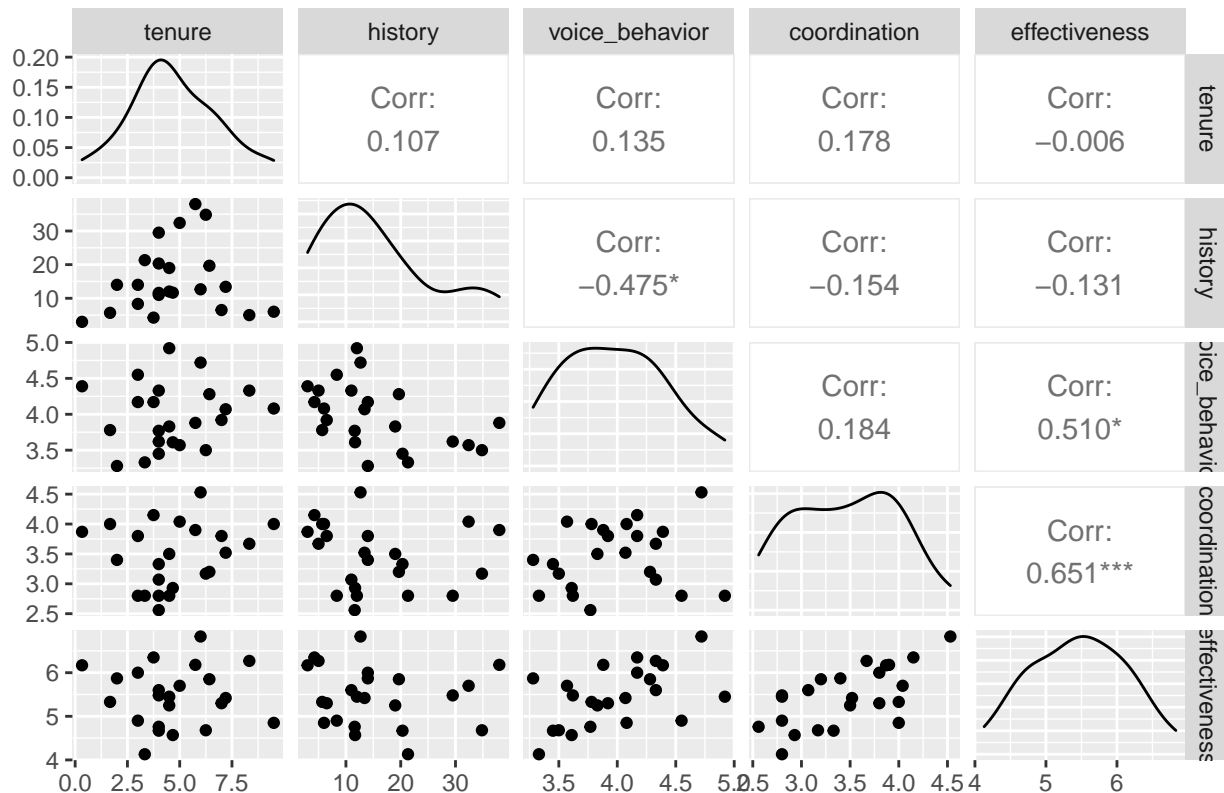
```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_team_size)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.63737 -0.29321 -0.04652  0.19393  0.87433
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -0.49758    1.17312  -0.424 0.676485
## tenure       -0.06826    0.04563  -1.496 0.152049
## history       0.01645    0.01087   1.514 0.147395
## voice_behavior 0.82463    0.24748   3.332 0.003709 **
## coordination  0.79254    0.18160   4.364 0.000374 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4411 on 18 degrees of freedom
## Multiple R-squared:  0.6531, Adjusted R-squared:  0.576
## F-statistic: 8.473 on 4 and 18 DF,  p-value: 0.0005002
```

Team Size seems to have the least correlation with the Effectiveness, so it is eliminated.

Stage 3: Team Size is Eliminated

Initial

Pairwise Correlation Matrix



```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.63737 -0.29321 -0.04652  0.19393  0.87433
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -0.49758    1.17312   -0.424  0.676485
## tenure       -0.06826    0.04563   -1.496  0.152049
## history        0.01645    0.01087    1.514  0.147395
## voice_behavior  0.82463    0.24748    3.332  0.003709 **
## coordination  0.79254    0.18160    4.364  0.000374 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4411 on 18 degrees of freedom
## Multiple R-squared:  0.6531, Adjusted R-squared:  0.576
## F-statistic: 8.473 on 4 and 18 DF,  p-value: 0.0005002
```

Eliminating History

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_history)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.82767 -0.25254 -0.00891  0.18329  0.76261
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    0.51162    0.99762   0.513 0.613972
## tenure        -0.05362    0.04609  -1.163 0.259071
## voice_behavior  0.64421    0.22416   2.874 0.009719 **
## coordination   0.76176    0.18649   4.085 0.000631 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4558 on 19 degrees of freedom
## Multiple R-squared:  0.6089, Adjusted R-squared:  0.5472
## F-statistic: 9.862 on 3 and 19 DF,  p-value: 0.0003884
```

Eliminating Tenure

```
##
## Call:
## lm(formula = effectiveness ~ ., data = core_data_except_tenure)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.9642 -0.2525 -0.1032  0.2415  1.0011
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -0.31542    1.20418  -0.262  0.796190
## history        0.01301    0.01096   1.187  0.249904
## voice_behavior  0.75329    0.25063   3.006  0.007271 **
## coordination   0.74453    0.18447   4.036  0.000706 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.4552 on 19 degrees of freedom
## Multiple R-squared:  0.61, Adjusted R-squared:  0.5484
## F-statistic: 9.906 on 3 and 19 DF,  p-value: 0.0003788
```

The elimination of either History or Tenure seems to reduce the goodness of fit of the model. Therefore both are kept.

Resulting Model

$$\widehat{\text{effectiveness}} = -0.5 - 0.07(\text{tenure}) + 0.02(\text{history}) + 0.82(\text{voice_behavior}) + 0.79(\text{coordination}) \quad (1)$$

Conclusion