Qualitative to Quantitative Sub Theme Model

*Aaron Quinton, Ayla Pearson, Fan Nie*

June 2019

Introduction

Quantitative studies generate data in numerical forms that can be analyzed, summarized and expressed by statistics. Qualitative studies generate data that is often not numerical and more descriptive. Generally, these forms of data are analyzed separately because they can be difficult to relate. In recent years mixed methods research has been developed to combine these types of data which can give a better overall picture of the results.

The BC Public Service conducts a Work Environment Survey (WES) with the goals of understanding their employees' experience, celebrating their successes and identifying their areas for improvement. WES collects quantitative data through 80 multiple-choice questions and qualitative data through a single written response question "What one thing would you like your organization to focus on to improve your work environment?".

We are investigating how the sentiment between the qualitative and quantitative data agree based on the topics addressed within the WES. This will help to determine how well the multiple-choice questions are capturing what improvements employees are wanting. We are hoping this can lead to improvement to the WES structure and ensure the voices of the employees are being heard. It may also help to give more detail and context to the multiple-choice responses.

Methods

To relate the sentiment of the written response question to the multiple-choice questions at the sub-theme level each multiple-choice question was given a sub-theme code. This was done by reading the multiple-choice questions and matching them to the written response sub-themes. Not all multiple-choice questions matched to a sub-theme and others questions matched to multiple sub-themes. Three independent raters coded the multiple-choice questions and inter-rater agreement was calculated. The comments from the written response questions all have negative sentiment that relates to the sub-theme topics. One of the sub-theme codes relates to positive comments but these do not correspond to specific topics and were filtered out of the data set. The multiple-choice questions can range from positive to negative sentiment based on a five-point rating scale.
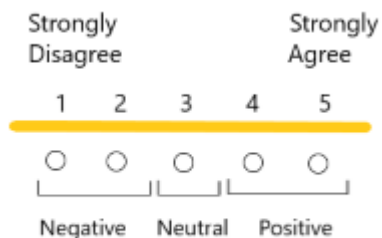
Since there is only one written response per person with a maximum of five sub-themes to determine the level of agreement the written response sentiment was matched to the related multiple-choice questions. There are three levels of agreement strong, medium and weak as shown in table 2.

Table 1. Level of Agreement from Qualitative and Quantitative Sentiment

Qualitative Sentiment	Quantitative Sentiment	Level of Agreement
negative	negative	strong
negative	neutral	weak
negative	positive	none

To determine the level of agreement for the main themes the sub-themes data was aggregated and generalized.

add changes that you did to method tonight, ie loss function penalty thign

Discussion

- do not start writing until inter-rater stuff done and final sub-theme mc done
- discuss sub-theme–mc matching
    - visualization to show which sub-themes appeared multiple times to which didn't at all
    - lack of flexible work mc

Results & Recommendations

- summary table showing top 5 strong and top 5 weak

Literature

Wisdom J and Creswell JW. Mixed Methods: Integrating Quantitative and Qualitative Data Collection and Analysis While Studying Patient-Centered Medical Home Models. Rockville, MD: Agency for Healthcare Research and Quality. February 2013. AHRQ Publication No. 13-0028-EF

- Talks about validating findings using qual and quant data (Wisdom & Creswell, 2013)

Appendix

Appendix 1. Subtheme Code Descriptions

Theme	Code	Description
	11	Improve new employee orientation
	12	Improve performance management process
Career & Personal Development	13	Improve training and development opportunities
	14	Provide opportunities for career advancement
	15	Career & personal development - other
	21	Ensure salary parity across government
	22	Ensure salary parity with other organizations
Compensation & Benefits	23	Improve benefits
	24	Increase salary
	25	Review job classifications and/or reporting levels
	26	Compensation & benefits - other
	31	Act on engagement initiatives
	32	Address discrimination and harassment (including bullying)
Engagement & Workplace Culture	33	Improve morale and workplace culture
	34	Treat employees and colleagues better
	35	Value diversity
	36	Engagement Workplace Culture - other
	41	Improve communication between executives and staff
Executives	42	Improve stability and/or change management
	43	Strengthen quality of executive leadership
	44	Executives - other
	51	Improve and/or expand Leading Workplace Strategies (LWS)
Flexible Work Environment	52	Increase flexibility in work location
	53	Increase flexibility in work schedule
	54	Flexible work environment - other
	61	Ensure hiring and promotions are fair and merit based
Staffing Practices	62	Focus on Human Resources planning (recruitment, retention, succession)
	63	Make hiring process more efficient
	64	Staffing Practices - other
	71	Enable staff to make decisions
	72	Listen to staff input
Recognition & Empowerment	73	Make better use of employees' skills and abilities
	74	Provide more and/or better quality recognition
	75	Recognition Empowerment - other
	81	Cultivate effective teamwork and communication within teams
	82	Hold employees accountable for performance
Supervisors	83	Strengthen quality of supervisory leadership
	84	Improve communication between employees and supervisors
	85	Supervisors - other
	91	Hire more staff
	92	Improve productivity and efficiency
Stress & Workload	93	Review workload expectations
	94	Support a healthy workplace
	95	Stress & workload - other
	101	Ensure safety and security of employees
	102	Improve facilities (e.g. office space, noise levels, air quality, etc.)
	103	Provide better supplies and equipment (e.g., office supplies, field instruments, printers, etc.)
Tools, Equipment & Physical Environment	104	Provide better office furniture (e.g. desks, chairs, etc.)
	105	Provide better computer-based hardware (e.g., desktops, laptops, etc.)
	106	Upgrade/improve software
	107	Tools, equipment & physical environment - other
	111	Assess plans, priorities and strategies for the organization
	112	Improve collaboration between work units or regions
	113	Improve program and/or policy implementation
Vision, Mission & Goals	114	Pay attention to the public interest and service delivery
	115	Review funding or budget allocation to program
	116	Reduce political influence
	117	Vision, mission & goals - other
	121	Other related comments
Other	122	Positive Comments
	123	Survey Feedback
	99	Unrelated Comments

Table 3. Overall Counts of each level of Agreement

Level of Agreement	Count	Total Percentage
strong	14940	47.730
weak	6260	20.000
none	10099	32.270

Table 4. Themes and Subtheme Level of Agreement

| Theme	Sub-theme	Total Number	Strong Agreement (%)	Weak Agreement (%)	No Agreement (%)
Career & Personal Development	12	103	50.490	12.620	36.890
	13	1205	47.970	25.310	26.720
	14	505	47.520	22.180	30.300
Compensation & Benefits	21	147	87.070	9.520	3.400
	23	541	76.710	13.120	10.170
	24	1562	87.520	7.940	4.550
Engagement & Workplace Culture	32	306	63.400	10.460	26.140
	33	362	8.010	14.360	77.620
	34	466	55.360	19.960	24.680
	35	125	31.200	24.800	44.000
Executives	41	799	63.700	21.030	15.270
	42	271	52.400	18.820	28.780
	43	605	68.600	17.520	13.880
Staffing Practices	61	778	66.710	16.070	17.220
Recognition & Empowerment	71	295	34.920	20.340	44.750
	72	443	57.790	22.800	19.410
	73	150	16.000	20.670	63.330
	74	479	56.160	18.790	25.050
Supervisors	81	297	23.570	21.550	54.880
	82	409	63.330	17.600	19.070
	83	1072	53.170	16.420	30.410
	84	491	39.710	21.790	38.490
Stress & Workload	92	513	43.860	25.540	30.600
	93	938	69.300	18.120	12.580
	94	283	52.650	30.040	17.310
Tools, Equipment & Physical Environment	101	413	64.650	16.460	18.890
	102	1359	60.710	20.970	18.320
	103	384	51.560	30.730	17.710
	104	677	55.240	24.670	20.090
	105	616	63.640	22.560	13.800
	106	649	57.940	22.030	20.030
Vision, Mission & Goals	111	598	43.140	29.100	27.760

Figure 1. Distribution of Agreement per Subtheme
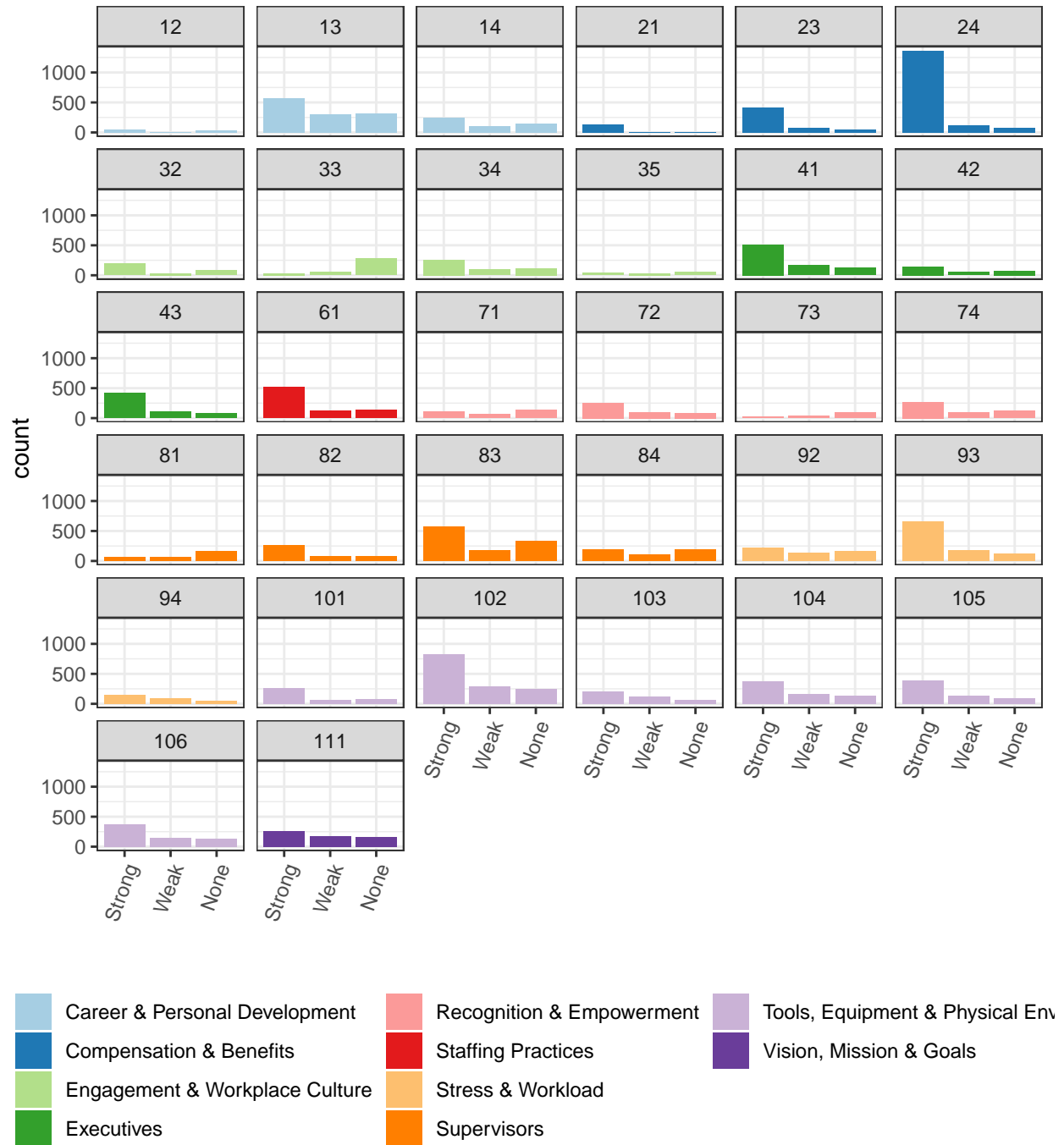
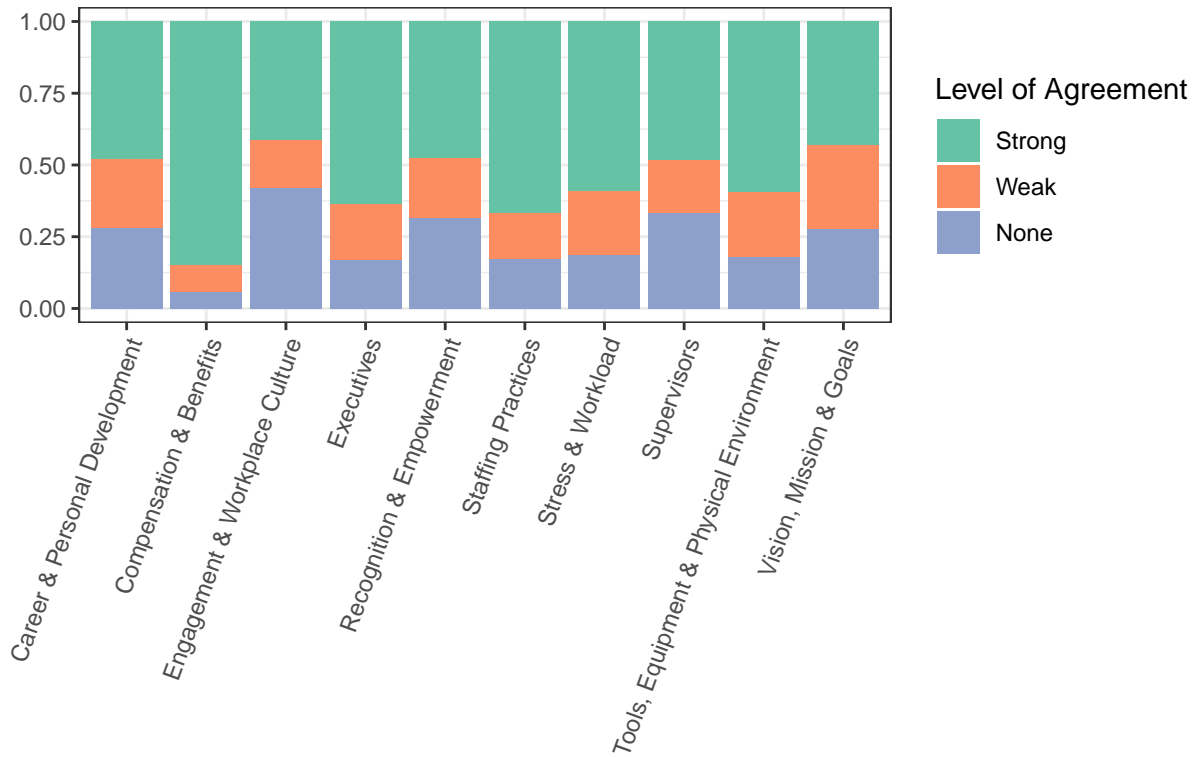## Figure 2.Proportions of Agreeement by Qualitative Theme

Table 5. Themes and Subtheme Level of Agreement

Raters	Kappa
Fan & Aaron	0.120
Fan & Ayla	0.040
Ayla & Aaron	0.600
All	0.240

Comments and To do's

- find references for intro section/put them in
- why does img html tag have to go from back to render properly
- need to look into why some don't agree
  - try unsupervised techniques like topic modelings, n-grams, etc
- ask about agreement wording of "none" vs "no"
- work on vis for kappa values, look at removing some of the NA issues
  - maybe remove some of Fan's results so they are more conservative

- group to main themese or something
- talk about how there are over 60's groups so no adjustment was used because chance agreement here is much lower then when there are binary classes

Exploratory Work

- may be moved to be inbetween things once complete

```
## # A tibble: 2 x 2
##   question     n
##   <chr>    <int>
## 1 has         53
## 2 no          31
```

Matching of Subthemes to Multiple Choice Questions