

Investigation of User Informational Needs in COVID-19 Fact Check Questions and Answers

Question and Answer Text Analysis

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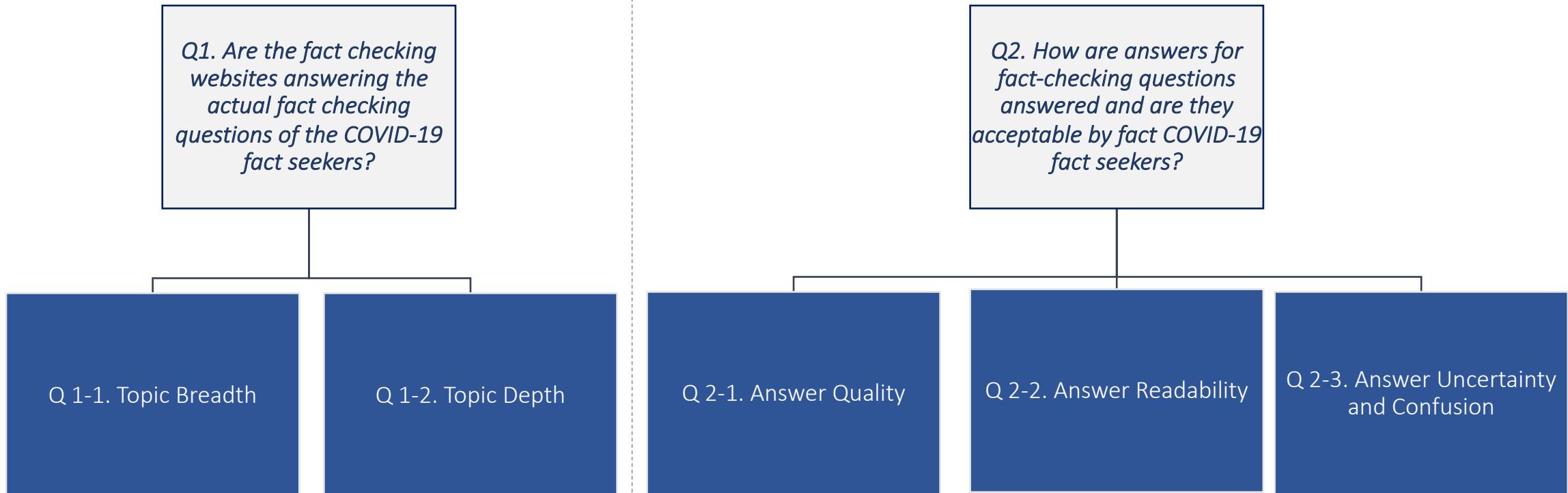


Status Quo

- Fact checking search engine is **non-existent**
- Fact-checking websites **do not adhere** to informational needs of the fact checking users

	Type 1	Type 2	Type 3
(1) Fact Degree Display	0	0	0
(2) Informational Question	0	X	0
(3) Fact Checking Question	0	0	0
(4) Topic Selection	0	X	X
(5) Keyword Search	X	0	0
(6) Immediate User Input Fact Check Availability	X	X	X
Websites	Corona QNA	질병관리본부 코로나19 팩트 & 이슈체크 서울대학교 언론정보연구소	열린소비자포털 행복드림 코로나19 팩트체크

Research Questions



Data Collection

- Naver Kin (네이버 지식인): 158,135
 - Queries were tuned to scrape questions appropriate for fact-check sites

Index	Query	# of Collected Data
1	코로나 + 가능한가요	67425
2	코로나 + 되나요	19673
3	코로나 + 있나요	39661
4	코로나 + 맞나요	6604
5	코로나 + 아닌가요	6684
6	코로나 + 사실인가요	15551
7	코로나 + 팩트인가요	1187
8	코로나 + 거짓인가요	1350

<Scraped Data>

Data Collection

- Aha (아하): 376

[1] Question

[2] Answer

[3] Date

The screenshot shows a question and answer interface. The question [1] is: "코로나19에 찜질방이 매우 좋다고 하는데 효력이 있나요?" (Is it true that sauna rooms are very good for COVID-19?). It was posted by "신일구" on March 21, 2020, at 11:12. The answer [2] is: "안녕하세요. 하이닥 응급의학과 상담의 한재병입니다. 100% 전염 가능성은 있다고 하기는 힘드나, 현재까지 비말로 전염된다고 보고 있어서 굳이 걱정하지 않으셔도 될듯합니다. 우선 경과관찰을 권유합니다." (Hello. I am Han Jae-byeong, a consultant in Emergency Medicine at Hyedak. There is no 100% guarantee of transmission through droplets, but considering the current situation, it is better to be safe than sorry. Please observe your condition). The date [3] is 2020.02.26.

- HiDoc (하이닥): 480

[1] Question title

[2] Question content

[3] Answer

[4] Date

The screenshot shows a question and answer interface on the HiDoc platform. The question [1] is: "코로나 의심증상, 체온계로도 전염이될수있나요?" (Can COVID-19 symptoms be transmitted even if measured with a thermometer?). It was posted on February 26, 2020. The answer [2] is: "코로나 의심증상있어서 보건소 선별진료소가서 귀체온계로 열을쟀는데요 귀체온계가 접촉식인데 여러사람이 이렇게 귀체온계 둘려쓴건데 코로나 괜찮나요? 혹시 체온계로도 전염이될수있나요?" (I measured my temperature with a digital thermometer because I had COVID-19 symptoms. The thermometer is contactless, so many people use it. Is it safe to use a digital thermometer after someone else has used it? Is it possible to transmit COVID-19 through a thermometer?). The date [3] is 2020.03.22, 23:06.

Data Collection

- Fact Checking Sites: 187
- [1] Question
- [2] Question explanation
- [3] Response
- [4] Response explanation
- [5] Date

[3] 대체로 사실 아님

[4] YTN

[5] 최종 등록: 2020.03.24 10:57

수정이유: 논문 사례의 박테리아 정의 구체적으로 적시

검증내용

▲ 검증대상

트위터와 인터넷 커뮤니티에서는 공중화장실 등에서 공동으로 사용하는 고체 비누가 바이러스 확산의 매개체가 될 수 있다는 글이 오래 전부터 올라오고 있다. 감염자가 사용한 비누에는 바이러스가 묻기 때문에, 그 비누를 다시 쓰면 오히려 코로나19에 걸릴 수 있다느 얘기다.

검증기사

비누가 불안하다? 귀 온도계는 위험하다?

<Scraped Data>



[1] 공중화장실 비누로 바이러스 전파 가능하다

출처 : 트위터·인터넷 카페 등

SNS와 커뮤니티 이용자

기타 | 사회, 기타, 코로나 바이러스

[2] 보충 설명

"비누로 30초 이상 손을 꼼꼼하게 씻는다." 코로나19 감염을 막는 가장 기본적인 위생 수칙이다. 그런데 트위터와 인터넷 커뮤니티에서는 공중화장실 등에서 공동으로 사용하는 고체 비누가 바이러스 확산의 매개체가 될 수 있다는 글이 오래 전부터 올라오고 있다. 감염자가 사용한 비누에는 바이러스가 묻기 때문에, 그 비누를 다시 쓰면 오히려 코로나19에 걸릴 수 있다는 얘기다.

Question 1-1 Methods: Topic Breadth

	Komoran	Kkma	Okt	Mecab
인해	(‘인해’, ‘NNP’)	(‘인하’, ‘VV’), (‘어’, ‘ECS’)	(‘인해’, ‘Adjective’)	(‘인해’, ‘VV+EC’)
찜질방	(‘찜질방’, ‘NNP’)	(‘찜질’, ‘NNG’), (‘방’, ‘NNG’)	(‘찜질방’, ‘Noun’)	(‘찜질방’, ‘NNG’)
이면	(‘이면’, ‘NNP’)	(‘이’, ‘VCP’), (‘면’, ‘ECE’)	(‘이면’, ‘Noun’)	(‘이’, ‘VCP’), (‘면’, ‘EC’)
의사 권유로	(‘의사’, ‘NNG’), (‘권’, ‘NNB’), (‘유로’, ‘NNP’)	(‘의사’, ‘NNG’), (‘권유’, ‘NNG’), (‘로’, ‘JKM’)	(‘의사’, ‘Noun’), (‘권유’, ‘Noun’), (‘로’, ‘Josa’)	(‘의사’, ‘NNG’), (‘권유’, ‘NNG’), (‘로’, ‘JKB’)
포비아란	(‘포비아’, ‘NNP’), (‘란’, ‘JX’)	(‘포’, ‘NNG’), (‘비아’, ‘NNG’), (‘란’, ‘JX’)	(‘포비’, ‘Noun’), (‘아란’, ‘Noun’)	(‘포비’, ‘NNG’), (‘아란’, ‘NNG’)
온습도	(‘온’, ‘MM’), (‘습도’, ‘NNP’)	(‘온습도’, ‘NNG’)	(‘온’, ‘Modifier’), (‘습도’, ‘Noun’)	(‘온습도’, ‘NNG’)

	Komoran	Kkma	Okt	Mecab
동선도	(‘동’, ‘MM’), (‘선도’, ‘NNP’)	(‘동선’, ‘NNG’), (‘도’, ‘JX’)	(‘동선’, ‘Noun’), (‘도’, ‘Josa’)	(‘동선’, ‘NNG’), (‘도’, ‘JX’)
약 (i.e. 대략)	(‘약’, ‘MM’)	(‘약’, ‘MDN’)	(‘약’, ‘Noun’)	(‘약’, ‘MM’)
이물감	(‘이’, ‘MM’), (‘물감’, ‘NNP’)	(‘이물감’, ‘NNG’)	(‘이’, ‘Determiner’), (‘물감’, ‘Noun’)	(‘이물감’, ‘NNG’)
비정상	(‘비’, ‘XPN’), (‘정상’, ‘NNP’)	(‘비정상’, ‘NNG’)	(‘비정상’, ‘Noun’)	(‘비’, ‘XPN’), (‘정상’, ‘NNG’)

	Komoran	Kkma	Okt	Mecab
식탐	(‘식’, ‘NNG’), (‘탐’, ‘NNG’)	(‘식탐’, ‘NNG’)	(‘식탐’, ‘Noun’)	(‘식탐’, ‘NNG’)
문의	(‘문’, ‘NNG’), (‘의’, ‘JKG’)	(‘문의’, ‘NNG’)	(‘문의’, ‘Noun’)	(‘문의’, ‘NNG’)
대만	(‘대만’, ‘NNP’)	(‘대’, ‘NNG’), (‘만’, ‘JX’)	(‘대만’, ‘Noun’)	(‘대만’, ‘NNP’)
항체	(‘항체’, ‘NNP’)	(‘항’, ‘NNG’), (‘체’, ‘NNG’)	(‘항체’, ‘Noun’)	(‘항체’, ‘NNG’)
우한	(‘우하’, ‘VA’), (‘ㄴ’, ‘ETM’)	(‘우’, ‘NNG’), (‘하’, ‘XSV’), (‘ㄴ’, ‘ETD’)	(‘우한’, ‘Noun’)	(‘우한’, ‘NNG’)

Dataset	Optimal Tokenizer
Aha	Mecab
HiDoc	Kkma
Naver Kin	Mecab
Fact Checking Sites	Mecab

Q1 Optimized Model Selection

Aha

LDA Model

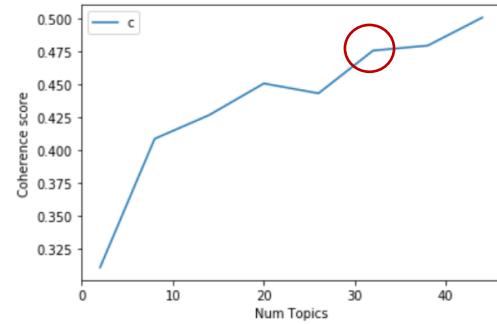
Number of Topics*

Coherence Score

Mallet

38

0.493



Naver Kin

LDA Model

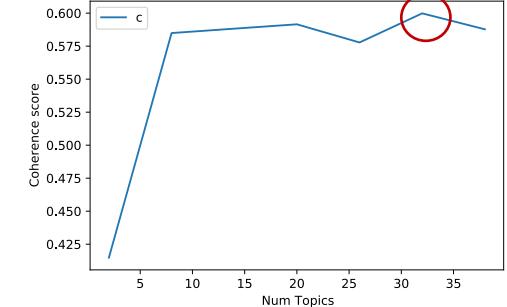
Number of Topics

Coherence Score

Mallet

32

0.602



HiDoc

LDA Model

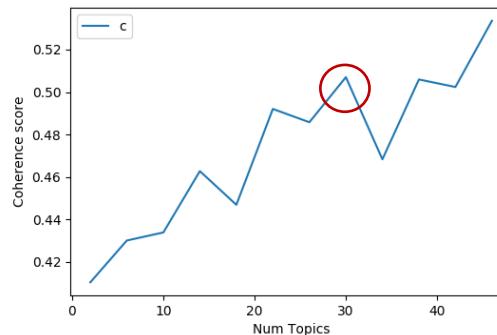
Number of Topics

Coherence Score

Mallet

30

0.507



Fact Checking Sites

LDA Model

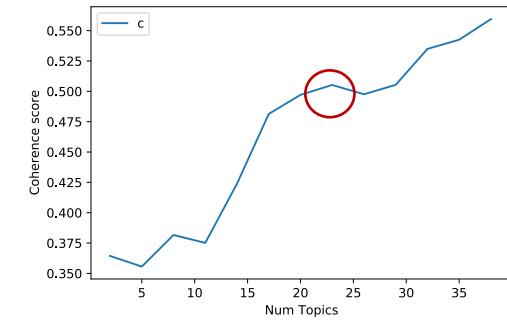
Number of Topics

Coherence Score

Mallet

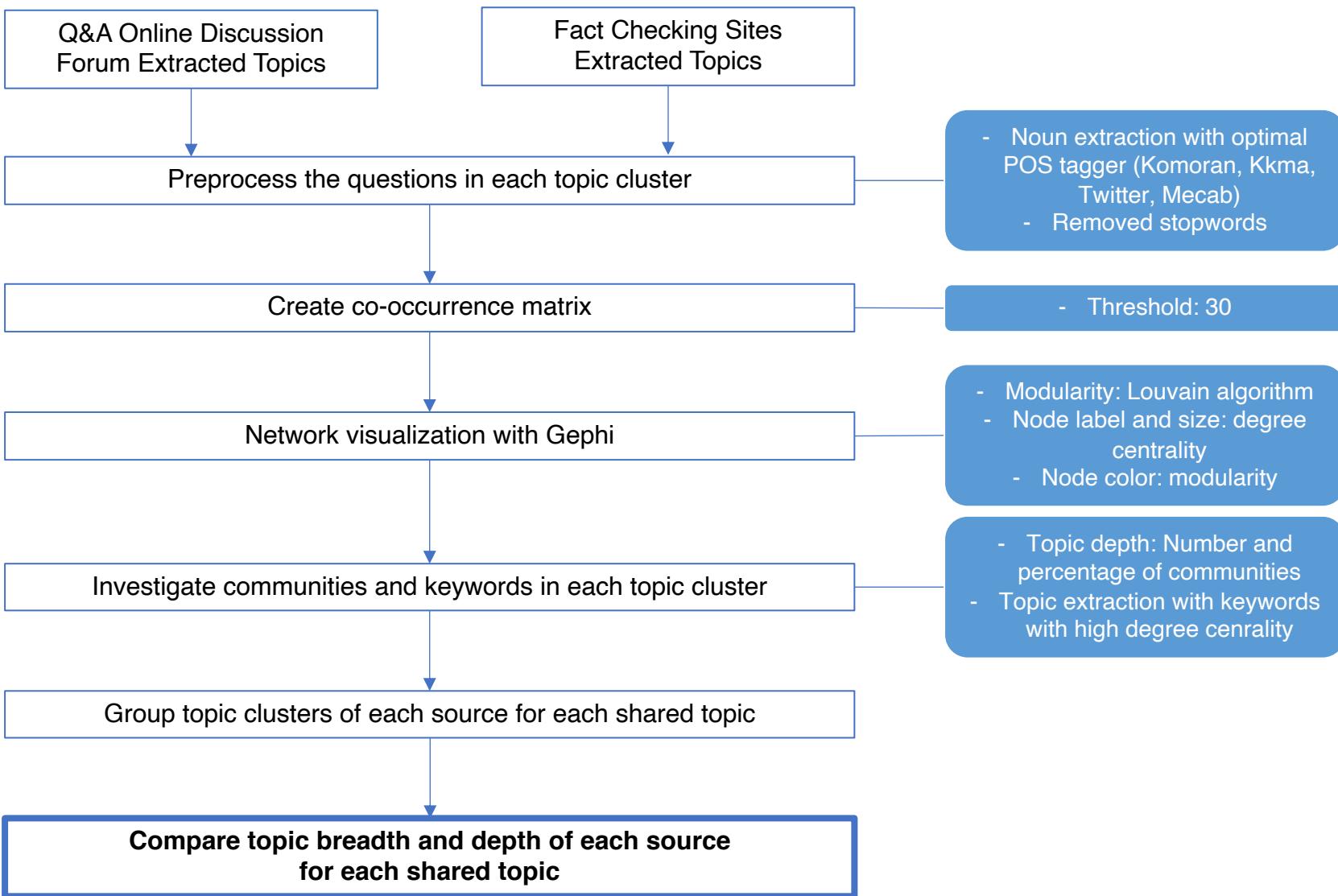
23

0.507

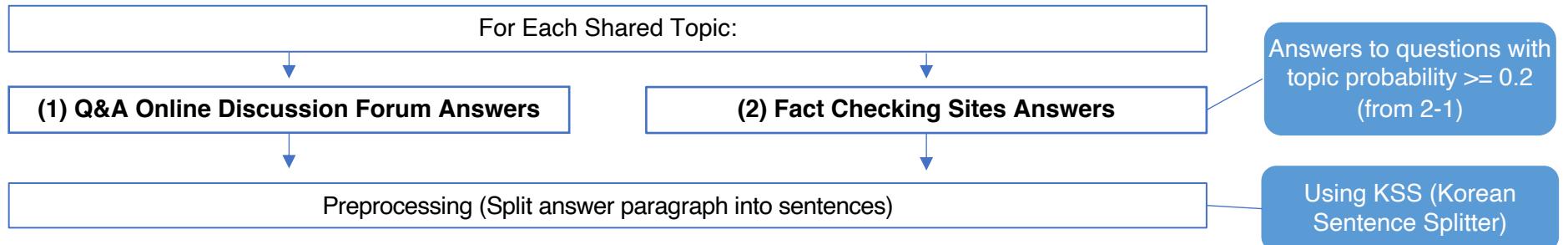


* We found the optimal number of topics by selecting the model with the highest coherence score after iterating the model over a range of topic numbers

Question 1-2 Methods: Topic Depth



Question 2 Methods: Answer Analysis



[1] Quality

A. Answer Length

- (i) Count by characters

[2] Readability

A. Key Sentence Location

- (i) Find key sentence*
- (ii) Calculate key sentence location**

[3] Uncertainty

A. Answer Ambiguity

- (i) Count the # of ambiguous sentences
- (ii) Calculate the percentage of ambiguous sentences in an answer

B. Key Sentence Ambiguity

- (i) Find Key Sentence*
- (ii) Determine key sentence ambiguity [1,0]

*Key Sentence Summarizer from **TextRank**
(Komoran Tokenizer, TextRank Similarity)

**Key Sentence Location:

$$\frac{\text{Key Sentence Index}}{(\text{Total } \# \text{ of Sentences}) - 1}$$

Answer Ambiguity

$$\frac{\# \text{ of Sentences that contain ambiguous phrases}}{\text{Total } \# \text{ of Sentences}} * 100$$

Ambiguous phrases = [생각됩니다, 라고 합니다, 다고 합니다, 라고 말할, 라고 말하, 라고 할 수, 것 같, 생각합니다, 사료됩니다, 수도, 아닐까 싶습니다, 을 겁니다, 일 겁니다, 수 있습니다, 수 있어요, 듯 합니다]

Compare Answer [1] Quality [2] Readability [3] Uncertainty for each shared topic

Q1 Topic Breadth Results

Topic #	Online Q&A Forum Topic	Hidoc	Aha	Naver
[1]	Transmission	19, 22, 29(4)	15	31
[2]	COVID-19 Preventive Measures	9, 15	20, 26	2
[3]	General Inquiries on Prevention	29(2)	13	6
[4]	Mass Spread of COVID-19 in Daegu		8, 19	29
[5]	Self-Isolation Instructions		23	
[6]	Income Reduction		14, 27, 28	
[7]	Employment Instability		18, 29, 32	10
[8]	Financial Market Instability		1, 7, 10	
[9]	Individual Financial Distress			14, 26
[10]	Emergency Disease Financial Relief Funds		35	0
[11]	Demand to Close Borders to Chinese Arrivals		11	1
[12]	Postponing of Public Events		2	12
[13]	Testing Procedures and Costs			16
[14]	Changes in Academic Calendars			7
[15]	Travel Restrictions		9	5, 9, 20
[16]	Financial Distress on Small Businesses		5, 6	17, 18
[17]	COVID-19 Related Rumors		37	22

Topic #	Fact Checking Site Topic
[1]	Virus Mutation
[2]	Racial Discrimination and COVID-19
[3]	COVID-19 Examination
[4]	Effects of COVID-19 on Lungs
[5]	Employee Payment Concerns
[6]	Preventative Measures
[7]	Contactless Spread of COVID-19
[8]	Masks
[9]	Chinese and COVID-19
[10]	Factors Affecting Faster Infection of COVID-19
[11]	Spreading COVID-19 Rumors

Q1 Topic Breadth Results: Shared Topics

Online Q&A Discussion Forum Topic Cluster	Shared Topic	Fact Checking Site Topic Cluster
1	[1] COVID-19 Transmission	7
3	[2] COVID-19 Preventative Measures	6,8,10
6,7	[3] Payment Reduction and Employment Instability	5
11	[4] Racial Discrimination	2
13	[5] COVID-19 Examination	3
17	[6] COVID-19 Related Rumors	11

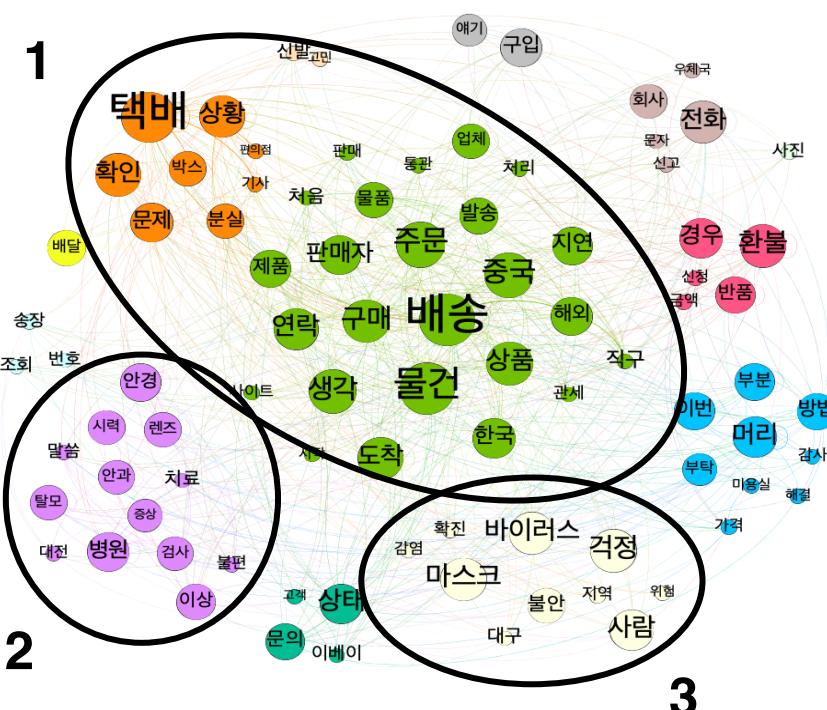
**Non-shared topics

- Online Q&A Discussion Forum Topic Cluster: 2, 4, 5, 8, 10, 12, 14, 15, 16
- Fact Checking Site Topic Cluster: 1, 4, 9

Q1 Topic Depth Results: Shared Topic [1] COVID-19 Transmission

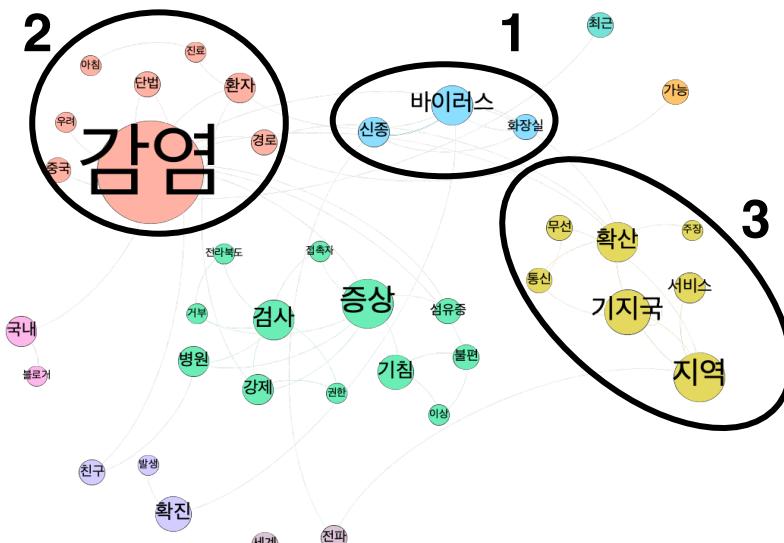
Online Q&A Forum

Label	Sub-Topic	Total %	%
1	Possibility of COVID-19 Spread by Delivery	9.47	21.7
2	Reluctance to Visit Hospitals (Scare of Transmission)	16.36	37.5
3	Location Overlap with the Infected	17.81	40.8



Fact Checking Site

Label	Sub-Topic	Total %	%
1	Path of Infection	18.57	53.05
2	Spread of COVID-19 in Restrooms	6.43	18.37
3	Spread through Mobile Communication	10	28.57

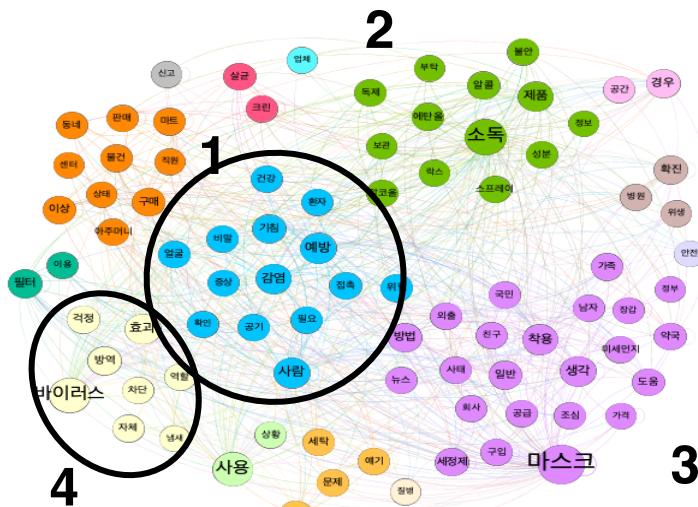


**same subtopics
[1] 1,2,3 := 1,2

Q1 Topic Depth Results: [2] COVID-19 Preventative Measures

Online Q&A Forum

Label	Sub-Topic	Total %	%
1	COVID-19 Transmission through Air	9.11	20.83
2	Effectiveness of Disinfectant Spray	9.86	22.54
3	Effectiveness of Face Masks	17.1	39.09
4	Effectiveness of Quarantine	7.67	17.54

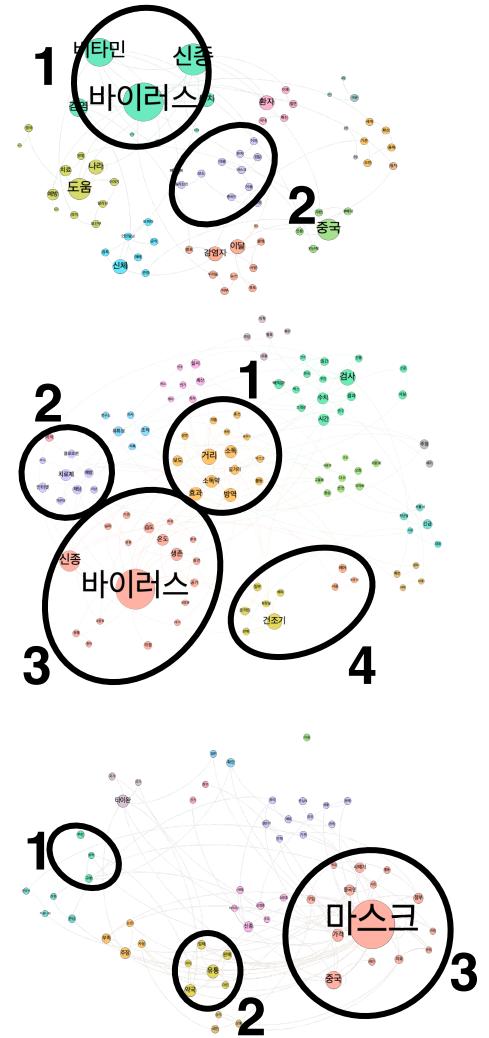


Fact Checking Site

Label	Sub-Topic	Total %	%
1	Vitamins Preventing Infection	15.94	57.9
2	Citron Peel Used as Masks	11.59	42.09

Label	Sub-Topic	Total %	%
1	Street Disinfectants	8.8	19.61
2	Chloroquine	10.56	23.53
3	Heat and Humidity Effects on COVID-19	12.9	28.74
4	Killing Coronavirus with Dryers	12.61	28.1

Label	Sub-Topic	Total %	%
1	Duplicate Purchase	11.54	28.38
2	Margins of Pharmacies from Selling Masks	10.44	25.67
3	Hoarding of Masks by the Chinese	18.68	45.94

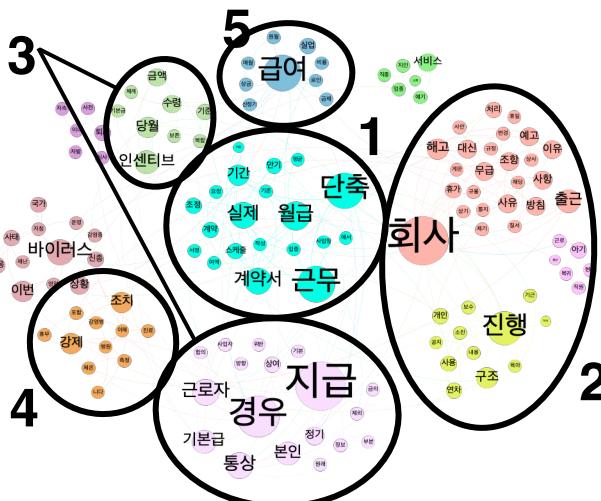


**same subtopics
[2] 1,2,3 := 2-1, 2-2, 2-3, 2-4

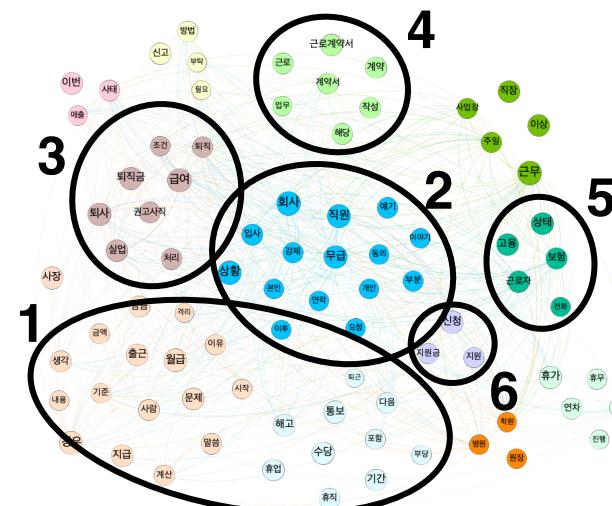
Q1 Topic Depth Results: [3] Payment Reduction and Employment Instability

Online Q&A Forum

Label	Sub-Topic	Total %	%
1	Income Reduction due to Reduced Working Hours	16.56	20.5
2	Unpaid Leave	31.79	39.35
3	Payment of Wages during Time-Off due to COVID-19	18.54	22.95
4	Forced Closure of Businesses due to COVID-19	7.28	9.01
5	Qualifications for Unemployed Benefits	6.62	8.19

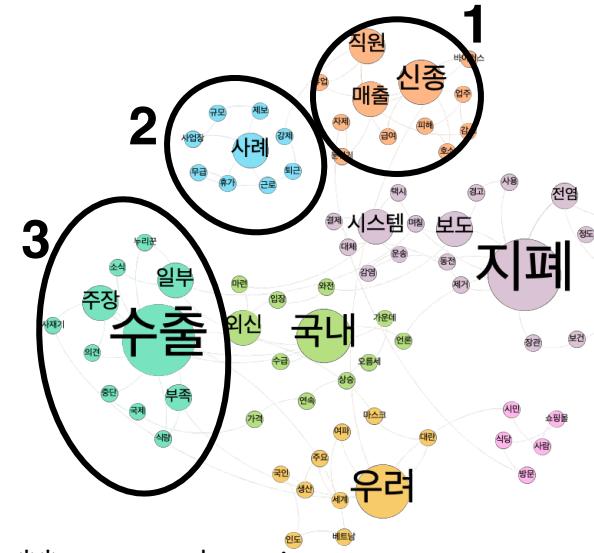


Label	Sub-Topic	Topic %	%
1	Salary Payment in Case of: Layoffs, Time-Offs, Dismissal	18.45	33.79
2	Income Reduction without Employee Consent	11.21	20.53
3	Resignation under Instruction and Severance Pay	6.8	12.45
4	Salary Payment Rules by Employment Contract	7.81	14.3
5	Employment Insurance Coverage	7.24	13.26
6	Support Fund Application	3.1	5.68



Fact Checking Site

Label	Sub-Topic	Total %	%
1	Decrease in Sales and Inability to Pay Employees	14.63	36.35
2	Being Forced to Leave Work	12.2	30.31
3	Lack of Export	13.41	33.32

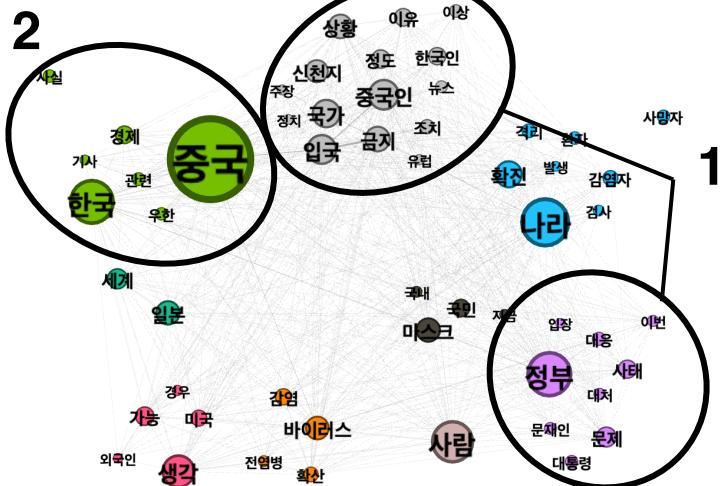


**same subtopics
[3] 2-2 := 1

Q1 Topic Depth Results: [4] Racial Discrimination

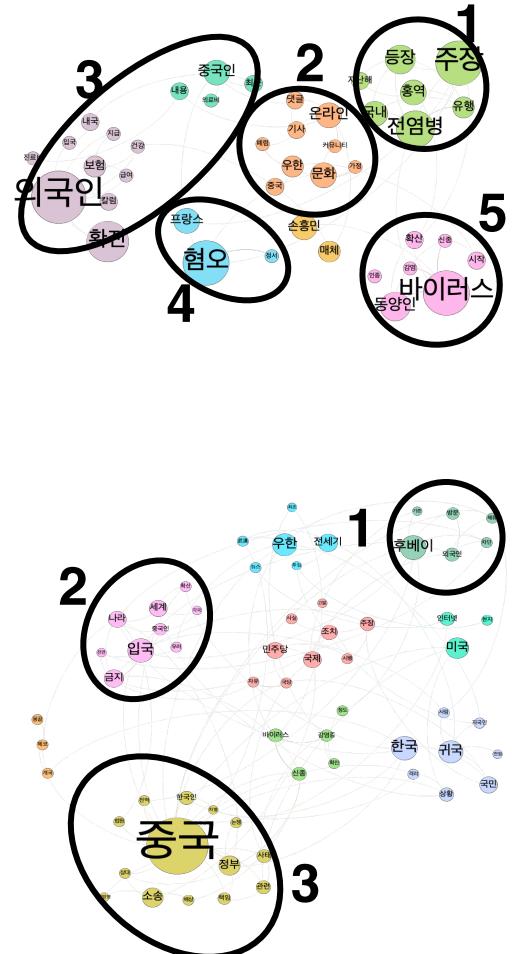
Online Q&A Forum

Label	Sub-Topic	Total %	%
1	Government Actions on Closing Borders to Chinese Arrivals	16.61	59.49
2	China and Korea's Economy	11.31	40.5



Fact Checking Site

Label	Sub-Topic	Total %	%
1	Spread of Measles in Korea	14.65	17.42
2	Blaming China for COVID-19 via “Wuhan Pneumonia”	14.65	17.42
3	Foreigner Health Insurance and Medical Costs	34.39	40.9
4	Aversion of French Towards Asians	11.46	13.63
5	Blaming Asians for Initiation and Spread of COVID-19	8.92	10.61



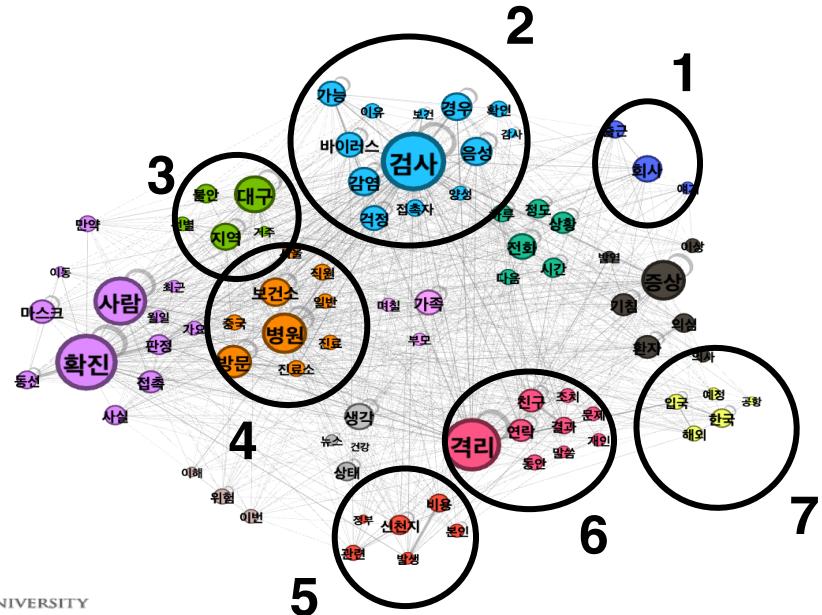
**same subtopics

[4] 1 := 2-1, 2-2, 2-3

Q1 Topic Depth Results: [5] COVID-19 Examination

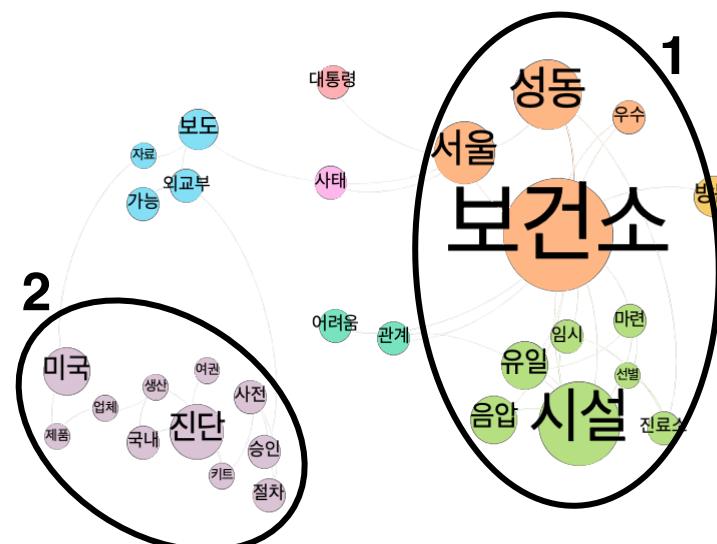
Online Q&A Forum

Label	Sub-Topic	Total %	%
1	Going to Work	3.49	6.4
2	Testing Positive or Negative for COVID-19	11.97	21.97
3	Daegu COVID-19 Testing	12.19	22.37
4	COVID-19 Testing in Clinic After Visiting China	7.98	14.65
5	Testing Costs Related to Shincheonji Involvement	6.04	11.08
6	Isolation and Contact with Others	7.7	14.13
7	Planning to Come Back to Korea from Overseas	5.1	9.36



Fact Checking Site

Label	Sub-Topic	Total %	%
1	Negative Pressure Isolation Room	24.75	44.65
2	Self-Examination Kit	30.69	55.35

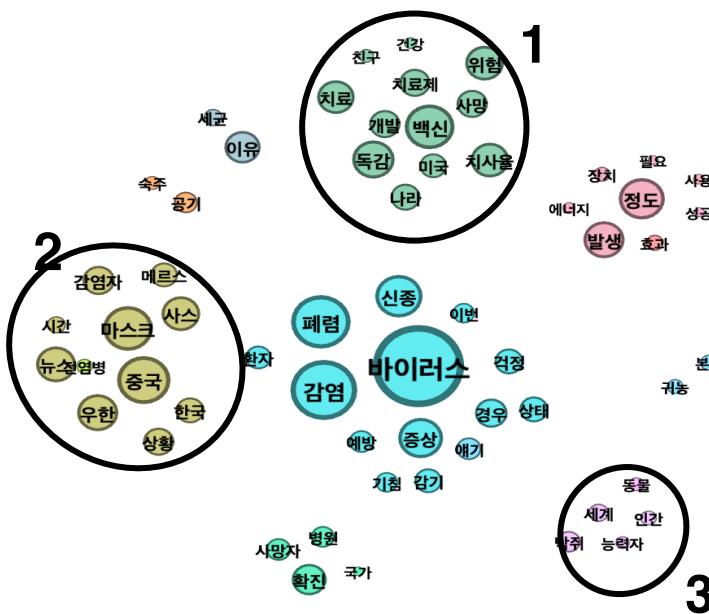


**same subtopics
[5] 2,3,4,5 := 2

Q1 Topic Depth Results: [6] COVID-19 Related Rumors

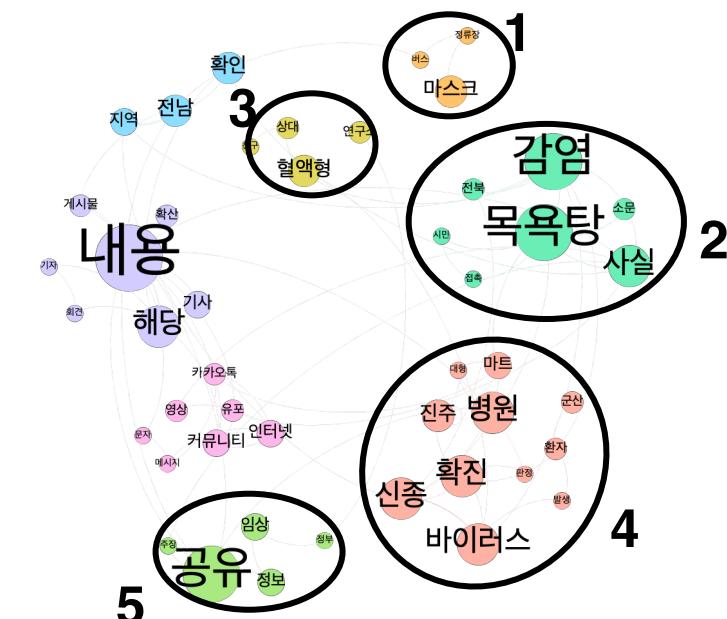
Online Q&A Forum

Label	Sub-Topic	Total %	%
1	Vaccine Inventions	2.43	4.89
2	Relations with Other Pandemics and China	35.02	70.57
3	Relations with Bats	12.17	24.52



Fact Checking Site

Label	Sub-Topic	Total %	%
1	Masks and Bus Stations	9.94	17.02
2	Public Bath Rumors	12.42	21.27
3	Blood Type and COVID-19	10.56	18.08
4	Path of COVID-19 Confirmed	16.77	28.72
5	Seemingly Official Clinical Information	8.7	14.89



**same subtopics
[6] x

Q1 Topic Depth Comparison

Shared Topic	Number of Subtopics		Weight in Same Subtopics	
	Online Q&A	Fact Checking Site	Online Q&A	Fact Checking Site
[1] COVID-19 Transmission	3	3	43.64%	25.00%
[2] COVID-19 Preventative Measures	4	9	36.07%	34.31%
[3] Payment Reduction and Employment Instability	11	3	11.21%	14.63%
[4] Racial Discrimination	2	8	16.61%	29.39%
[5] COVID-19 Examination	7	2	38.18%	30.69%
[6] COVID-19 Related Rumors	3	5	-	-

**Same Subtopics

- | | | | |
|-------------|--------|-----------|-----------------------|
| [1] 1,2,3 | := 1,2 | [2] 1,2,3 | := 2-1, 2-2, 2-3, 2-4 |
| [3] 2-2 | := 1 | [4] 1 | := 2-1, 2-2, 2-3 |
| [5] 2,3,4,5 | := 2 | [6] x | |

Q1 Key Findings

1. **Topic Breadth:** For the 17 topic clusters of online Q&A forums and 11 topic clusters of fact checking sites, there were **only 6 shared topics**.
 - [1] COVID-19 Transmission
 - [2] COVID-19 Preventative Measures
 - [3] Payment Reduction and Employment Instability
 - [4] Racial Discrimination
 - [5] COVID-19 Examination
 - [6] COVID-19 Related Rumors
2. **Topic Depth:** (a) # of sub-topics, (b) % difference of shared sub-topics in each shared topic cluster
 - (a) For topics 1, 3, 5, FC sites have **less topic depth**.
 - (b) For topics 1, 2, 5, FC sites have **less topic depth**.



- ☞ There is a **topic breadth imbalance** in the fact checking questions being asked in online Q&A forums and fact checking sites.
- ☞ Even if COVID-19 fact checking sites widen the topic breadth to incorporate the non-shared topics due to the nature of the questions, **topic depth should be deepened for the topic depth lacking shared topics**.

Q2 Answer Acceptance Determinants

[1] Quality (Toba et al., 2013; Gkotis et al., 2014)	[2] Readability (Wang, 2009; Pitler & Nenkova, 2008)	[3] Uncertainty (Kleinjans & Soest, 2014)
<p>1. Answer length</p> <ul style="list-style-type: none">Amongst shallow linguistic features and other intuitively useful info (user background), length is the most useful answer quality determinant . <p><i>→ Longer answers are more likely to be accepted and perceived as higher quality in CQA.</i></p>	<p>1. Key sentence index</p> <ul style="list-style-type: none">The “initial sentence = main sentence” belief makes readers dictated the readers’ attention to find the main idea in the 1st sentence. <p><i>→ Readability increases when key sentence is placed early in the answer.</i></p>	<p>1. Overall answer uncertainty (main answer + explanations)</p> <ul style="list-style-type: none">For difficult or less well-defined events, focal answers and crude rounding will be prevalent, creating confusion for answer receivers. <p><i>→ Less % of sentences using uncertainty expressions = Less uncertainty and confusion passed on to the readers</i></p>
<p>2. Average # of noun phrases</p> <ul style="list-style-type: none">Factoid questions require several facts or evidences in the answers, which can be observed with # of nouns. <p><i>→ Higher average # of noun phrases = Higher quality answer</i></p>	<p>2. Average # of verb phrases</p> <ul style="list-style-type: none">Syntactic features, esp. average # of verb phrases have high permutation importance in readability classifiers. + More verbs in each sentence increases complexity. <p><i>→ Lower average # of verb phrases increases readability</i></p>	<p>2. Key sentence uncertainty</p> <ul style="list-style-type: none">Uncertainty in main sentences create more confusion than uncertainty in explanations. <p><i>→ Less % of sentences using uncertainty expressions in answers = Less uncertainty and confusion passed on to the readers</i></p>

Q2 Answer Acceptance Analysis [1]: Quality

[1] Answer Length (Explanations)

Topic	A. Online Q&A	B. Fact Check
1	491.33	1177.86
2	451.11	1371.26
3	419.38	1174.50
4	295.05	1587.56
5	246.29	1223.60
6	187.42	1168.46
All	348.43	1283.87

☞ Explanations: Fact Check > Online Q&A

☞ Online Q&A answer length needs to be increased for improvement of answer quality (especially for topics 4 and 6).

[2] Average # of Noun Phrases (Facts/Evidences)

Topic	A. Online Q&A	B. Fact Check
1	10.69	27.33
2	9.68	30.72
3	10.69	25.44
4	6.10	13.98
5	6.91	12.62
6	5.71	22.77
All	8.30	22.14

☞ Facts/Evidences: Fact Check > Online Q&A

☞ Online Q&A average # of noun phrases should be increased for answer quality improvement (especially for topics 2 and 6).

**[1] Quality: Online Q&A << Fact Check

Q2 Answer Acceptance Analysis [2]: Readability

[1] Key Sentence Index (Main Idea Comprehension)

Topic	A. Online Q&A	B. Fact Check
1	0.66	0.51
2	0.57	0.36
3	0.58	0.67
4	0.59	0.47
5	0.59	0.49
6	0.63	0.46
All	0.60	0.49

☞ Comprehension of Main Idea:

Fact Check > Online Q&A

☞ Main ideas need to be placed earlier on in the answers for both sources, but more so for online Q&A sites for better readability (except for topic 2 of FC sites).

[2] Average # of Verb Phrases (Sentence Complexity)

Topic	A. Online Q&A	B. Fact Check
1	2.41	5.36
2	2.85	7.07
3	2.42	6.00
4	2.41	3.01
5	2.39	3.11
6	2.11	5.15
All	2.43	4.95

☞ Sentence Complexity: **Fact Check > Online Q&A**

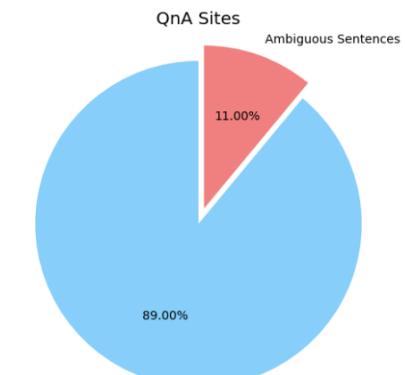
☞ FC sites need to reduce the usage of verbs per sentence and thus decrease sentence complexity for better readability (especially for topic 2).

[2] Readability: **Online Q&A > Fact Check

Q2 Answer Acceptance Analysis [3] : Uncertainty

[1] Overall Answer Uncertainty (Confusion in Sentence and Explanations)

Topic	A. Online Q&A	B. Fact Check
1	13.7%	1.0%
2	12.8%	2.0%
3	10.4%	0.0%
4	10.5%	4.0%
5	10.4%	1.0%
6	11.3%	5.2%
All	11.5%	2.2%



- ☞ Confusion in Sentence + Explanations:
Online Q&A > Fact Check
- ☞ However, since the overall answer uncertainty is on average 11.5% for even online Q&A, **overall answer uncertainty may not be labeled problematic.**

[2] Key Sentence Uncertainty (Confusion in Main Idea Comprehension)

Topic	A. Online Q&A	B. Fact Check
1	33.3%	23.5%
2	13.8%	0.0%
3	19.4%	0.0%
4	20.6%	22.2%
5	14.5%	0.0%
6	16.5%	0.0%
All	19.7%	7.6%

- ☞ Confusion in Main Idea Comprehension:
Online Q&A > Fact Check
- ☞ **Uncertainty of key sentences need to be reduced for online Q&A sites** to decrease confusion for the readers (except for topics 1 and 4).

[3] Uncertainty: **Online Q&A >> Fact Check

Q2 Answer Acceptance Analysis Key Findings

	[1] Quality				[2] Readability				[3] Uncertainty and Confusion			
	Answer length		Average # of noun phrases		Key sentence index		Average # of verb phrases		Overall uncertainty		Key sentence uncertainty	
Topic	Q&A	FC	Q&A	FC	Q&A	FC	Q&A	FC	Q&A	FC	Q&A	FC
1	↑	-	↑	-	↓	↓	-	↓	-	-	-	-
2	↑	-	↑↑	-	↓	-	-	↓↓	-	-	↓	-
3	↑	-	↑	-	↓	↓	-	↓	-	-	↓	-
4	↑↑	-	↑	-	↓	↓	-	↓	-	-	-	-
5	↑	-	↑	-	↓	↓	-	↓	-	-	↓	-
6	↑↑	-	↑↑	-	↓	↓	-	↓	-	-	↓	-
Improvement Requiring Source	Q&A				Q&A + FC		FC		Q&A			



**Answer Acceptance: Online Q&A << Fact Check

[1] Quality: Online Q&A << Fact Check

[2] Readability: Online Q&A > Fact Check

[3] Uncertainty: Online Q&A >> Fact Check

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Thank You

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