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**INFLUENCE MAXIMISATION TOWARDS TARGET USERS
AND MINIMAL DIFFUSION OF INFORMATION BASED ON
INFORMATION NEEDS**



OLANREWAJU ABDUS-SAMAD TEMITOPE

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Awang Had Salleh
Graduate School
of Arts And Sciences

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Dr. Azizi Ab Aziz

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Nama Penyelia/Penyelia-penyelia:
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Abstrak

Pemaksimuman pengaruh amat penting bagi perniagaan moden. Masalah pemaksimuman pengaruh (IMP) melibatkan pemilihan mempengaruhi yang minimum yang membawa kepada penularan maksimum dalam rangkaian sambal meminimumkan kos difusi (DC). Model IMP terdahulu tidak mempertimbangkan kos difusi (DC) dalam penyebaran maklumat kepada pengguna sasaran. Tambahan pula, pemilihan nod berpengaruh untuk keperluan maklumat yang pelbagai tidak diambil kira mengakibatkan pertindanan pengaruh dan penyingkiran nod yang lemah. Kajian ini mencadangkan Algoritma Difusi Maklumat kepada Pengguna Sasaran (IDTU) untuk diperbaiki pengenpastian mempengaruhi berkaitan semasa menurunkan DC. IDTU dibangunkan berdasarkan pendekatan tamak dengan menggunakan sketsa graf untuk meningkatkan pemilihan nod berpengaruh yang memaksimumkan pengaruh tersebar ke set pengguna sasaran. Selain itu, pengenpastian nod berpengaruh berdasarkan keperluan spesifik dilaksanakan menggunakan model berdaya tambah umum berdasarkan empat ciri berpusat. Kaedah eksperimen digunakan dengan menggunakan lima kumpulan data rangkaian sosial termasuk Epinions, Wiki-Vote, SlashDot, Facebook dan Twitter dari repositori data Stanford. Penilaian terhadap IDTU dilakukan terhadap 3 algoritma penanda aras tamak dan 6 heuristik. IDTU mengenal pasti semua nod sasaran yang ditentukan manakala DC dikurangkan sehingga 79%. Masalah pertindanan pengaruh dikurangkan dalam algoritma heuristik dengan mengurangkan saiz set benih dengan purata enam kali. Hasil kajian menunjukkan bahawa pemilihan nod berpengaruh menggunakan kombinasi metrik lebih efektif dalam pengurangan kos difusi dan memaksimumkan penyebaran sehingga 77% dan 32%. IDTU yang dicadangkan telah dapat memaksimumkan penyebaran maklumat sambil meminimumkan DC. Ia memperlihatkan pendekatan yang lebih seimbang dan bernuansa mengenai pemilihan nod berpengaruh. Ini berguna untuk pemasar media sosial dan perniagaan dalam memanfaatkan aktiviti promosi mereka.

Kata kunci: Rangkaian sosial, Difusi maklumat, Kos difusi maklumat, Pemilihan Pengaruh, Pemasaran Media Sosial

Abstract

Influence maximisation within social network is essential to the modern business. Influence Maximisation Problem (IMP) involves the minimal selection of influencers that leads to maximum contagion while minimizing Diffusion Cost (DC). Previous models of IMP do not consider DC in spreading information towards target users. Furthermore, influencer selection for varying information needs was not considered which leads to influence overlaps and elimination of weak nodes. This study proposes the Information Diffusion towards Target Users (IDTU) algorithm to enhance influencer selection while minimizing the DC. IDTU was developed on greedy approach by using graph sketches to improve the selection of influencers that maximize influence spread to a set of target users. Moreover, the influencer identification based on specific needs was implemented using a General Additive Model on four fundamental centralities. Experimental method was used by employing five social network datasets including Epinions, Wiki-Vote, SlashDot, Facebook and Twitter from Stanford data repository. Evaluation on IDTU was performed against 3 greedy and 6 heuristics benchmark algorithms. IDTU identified all the specified target nodes while lowering the DC by up to 79%. In addition, the influence overlap problem was reduced by lowering up to an average of six times of the seed set size. Results showed that selecting the top influencers using a combination of metrics is effective in minimizing DC and maximizing contagion up to 77% and 32% respectively. The proposed IDTU has been able to maximize information diffusion while minimizing DC. It demonstrates a more balanced and nuanced approach regarding influencer selection. This will be useful for business and social media marketers in leveraging their promotional activities.

Keywords: Social networks, Information diffusion, Diffusion Cost, Social influencer, Social media marketing

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List of Abbreviations

Abbreviation	Meaning
AHP	analytic hierarchy process
IDTU	information diffusion towards target users
DCF	diffusion cost function
FSC	fan-out co-efficient of the seed nodes
FVC	fan-out co-efficient of viral nodes
GAM	general additive model
IC	independent cascade
ICM	independent cascade model
IMP	influence maximisation problem
IRIE	influence ranking influence estimation
LDCF	lowest diffusion cost function
LT	linear threshold
LTM	linear threshold model
MCDM	multi-criteria decision making
MITU	minimal influencer for target user
PMIA	prefix excluding maximum influence arborescence
SAW	simple additive weightage
SI	susceptible-infected
SIR	susceptible-infected-recovered
TOPSIS	technique for order of preference by similarity to ideal solution
W-TOPSIS	weighted-technique for order of preference by similarity to ideal solution
WC	weighted cascade model

CHAPTER ONE

INTRODUCTION

1.1 Research Background

Social networks, especially social media are extensively used by businesses to reach out to their client and future customers. Lister (2018) reported that over 2 million businesses advertise on social media with USD 51.3 billion being spent on social media advertisement in 2018 (Cooper, 2018). Specifically, USD 2 billion was spent on influencer marketing in 2017 with an expected rise to USD 10 billion by 2020 (Bevilacqua & Del-Giudice, 2018). Influencer and viral marketing have become essential elements for small businesses to engage customers and promote their products on popular social media platforms (Mei et al., 2017; Olanrewaju, Whiteside, et al., 2018).

Imagine a business producing maternity wears with their primary customer acquisition and retention strategy centred on social networks which includes social media. A major obstacle to be faced while promoting the product is the identification of influencers that would help to market the product. Businesses engage influencers to diffuse information regarding their product to the target users/audience in the shortest period and minimising the hiring cost of influencers. This challenge is increasingly evident on social networking platforms as evidenced by practitioner literature (Barker, 2017b, 2017d; Geysler, 2017b) and it is gaining traction in the academics (e.g. Calìo et al., 2018; Khairnar & Shinde, 2017; Lee & Chung, 2015; Nguyen et al., 2016).

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Appendices

Appendix 1: Data collection mail

From: Jong-Ryul Lee <hellcodes.kaist@gmail.com>
Sent: Friday, April 21, 2017 5:58 AM
To: Olanrewaju Abdus-Samad Temitope
Subject: Re: IMAX enquiry and guidance

Dear Abdus-samad,

The results are as following.

Wiki-Vote:

IMAX: 84.5026666666667, PMIA 84.3445666666667, IRIE: 82.5756666666667

Slashdot:

IMAX: 1022.41, PMIA: 1039.1, IRIE: 993.931

Epinions:

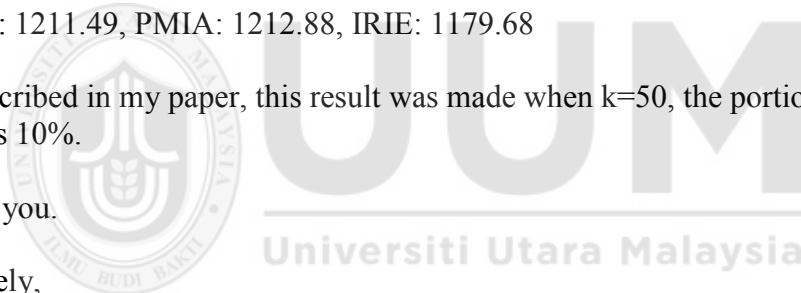
IMAX: 1211.49, PMIA: 1212.88, IRIE: 1179.68

As described in my paper, this result was made when $k=50$, the portion of target users is 10%.

Thank you.

Sincerely,

Jong-Ryul Lee



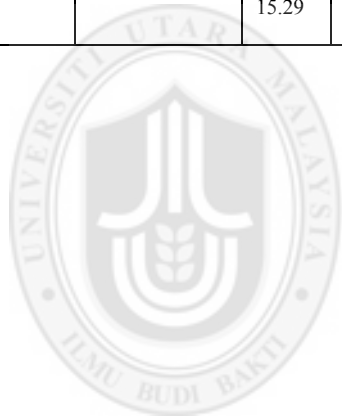
Appendix 2: Raw data for IDTU and heuristic algorithms

Wiki-Vote	WC					Uniform					Trivalency				
	DCF	Found nodes	Sketch generation time	Influencer detection time	DCF/Node	DCF	Found nodes	Sketch generation time	Influencer detection time	DCF/Node	DCF	Found nodes	Sketch generation time	Influencer detection time	DCF/Node
IDTU	6960	225	61.31	10.69	30.93	10542	225	80.44	7.90	46.85	10955	225	106.46	11.43	48.69
Degree	10251	45	16.75	16.75	227.80	2050	17	15.05	15.06	120.59	26650	116	23.37	23.41	229.74
Betweenness	12903	48	16.56	16.58	268.81	1450	13	12.63	12.65	111.54	13600	72	16.73	16.74	188.89
Closeness	10761	53	17.06	17.07	203.04	1900	17	13.69	13.69	111.76	27700	119	25.53	25.56	232.77
PageRank	18819	68	21.95	22.00	276.75	13.69 12	12	13.69		1.14	9150	61	18.41	18.43	150.00
Random	5800	20	13.22	13.23	290.00	0	0	12.64	12.64	0.00	3300	18	13.03	13.03	183.33
E-Degree	3417	45			75.93	574	17			33.76	16523	116			142.44
E-Betweenness	5313	48			110.69	290	13			22.31	5440	72			75.56
E-Closeness	4642	53			87.58	608	17			35.76	13850	119			116.39
E-PageRank	5535	68			81.40	350	12			29.17	4758	61			78.00
E-Random	348	20			17.40	0	0			0.00	264	18			14.67
Facebook															
IDTU	4690	404	32.93	15.97	11.61	4521	404	26.93	9.90	11.19	4980	404	30.03	16.02	12.33
Degree	32895	160	8.08	8.14	205.59	918	9	4.28	4.28	102.00	2550	24	3.96	3.96	106.25
Betweenness	20808	89	10.69	10.77	233.80	408	4	7.61	7.61	102.00	1785	17	7.77	7.77	105.00
Closeness	115464	247	20.42	20.54	467.47	1275	11	7.96	7.96	115.91	8364	51	8.60	8.61	164.00
PageRank	45543	215	14.11	14.19	211.83	510	5	6.29	6.30	102.00	9741	51	7.25	7.27	191.00

Random	53750	212	6.84	6.91	253.54	400	4	2.89	2.89	100.00	1250	9	2.26	2.26	138.89
E-Degree	8385	160			52.41	108	9			12.00	600	24			25.00
E-Betweenness	6528	89			73.35	24	4			6.00	490	17			28.82
E-Closeness	33960	247			137.49	150	11			13.64	2132	51			41.80
E-PageRank	19646	212			92.67	40	5			8.00	2483	51			48.69
E-Random	8600	212			40.57	32	4			8.00	125	9			13.89
Epinions															
IDTU Full	10749398	5195	79797.03	6800.09	2069.18	16454345	5195	56179.07	1531.08	3167.34	19651085	5195	83085.51	4719.13	3782.69
IDTU (n=50)	461450	4058	79797.03	6800.09	113.71	100800	1591	56179.07	1531.08	63.36	188600	2043	83085.51	4719.13	92.32
Degree	16116	77	938.08	938.45	209.30	3111	27	875.36	875.49	115.22	174063	781	1239.71	1243.22	222.87
Betweenness	33660	119	1084.59	1085.66	282.86	3927	33	921.57	921.94	119.00	78846	391	1240.35	1242.63	201.65
Closeness	21675	80	1043.77	1044.93	270.94	3672	30	907.54	907.77	122.40	290292	1109	1647.26	1651.66	261.76
PageRank	36924	136	1034.20	1034.92	271.50	3060	25	928.65	928.77	122.40	402135	1511	1646.94	1652.11	266.14
Random	158250	150	1354.90	1358.23	1055.00	200	1	722.83	722.83	200.00	79600	280	837.60	841.24	284.29
E-Degree	3792	77			49.25	1037	27			38.41	102390	781			131.10
E-Betweenness	14520	119			122.02	1771	33			53.67	47926	391			122.57
E-Closeness	6375	80			79.69	1080	30			36.00	147992	1109			133.45
E-PageRank	14480	136			106.47	1080	25			43.20	244435	1511			161.77
E-Random	31650	150			211.00	4	1			4.00	4776	280			17.06

Twitter															
IDTU Full	19706332	8130	159780.24	13296.93	2423.90	15411760	8130	127276.69	4055.96	1895.67	23296496	8130	164371.39	12086.96	2865.50
IDTU (n=50)	481250	4380	159780.24	13296.93	109.87	129400	1976	127276.69	4055.96	65.49	290500	2851	164371.39	12086.96	101.89
Degree	3315	18	1469.02	1469.20	184.17	3111	24	1452.90	1453.13	129.63	4488	41	1448.10	1448.72	109.46
Betweenness	12699	68	1575.90	1577.08	186.75	5253	42	1423.49	1423.89	125.07	1047999	3537	6242.13	6263.17	296.30
Closeness	3315	17	1438.74	1438.96	195.00	3111	25	1415.64	1415.96	124.44	125664	594	2405.39	2409.17	211.56
PageRank	11322	65	1541.18	1541.58	174.18	3162	23	1432.93	1433.17	137.48	387090	1457	3143.91	3151.17	265.68
Random	82900	200	1847.33	1849.42	414.50	100	1	1275.70	1275.73	100.00	228000	883	2199.70	2205.74	258.21
E-Degree	455	18			25.28	915	24			38.13	1584	41			38.63
E-Betweenness	4233	68			62.25	2472	42			58.86	595921	3537			168.48
E-Closeness	520	17			30.59	1037	25			41.48	54208	594			91.26
E-PageRank	1776	65			27.32	744	23			32.35	182160	1457			125.02
E-Random	39792	200			198.96	2	1			2.00	45600	883			51.64213
Slashdot															
IDTU Full	10749323	7736	285190.95	8050.41	1389.52	34726600	7736	194718.83	1611.23	4488.96	38123328	7736	262694.58	8339.49	4928.04
IDTU (n=50)	757150	6716	285190.95	8050.41	112.74	193400	2488	194718.83	1611.23	77.73	498300	4260	262694.58	8339.49	116.97
Degree	19788	99	1429.78	1430.84	199.88	9629	74	1410.56	1411.18	130.12	241791	1059	2857.41	2866.99	228.32
Betweenness	17085	89	1346.34	1347.02	191.97	8364	61	1266.25	1267.12	137.11	202113	969	2406.46	2415.03	208.58
Closeness	12597	70	1390.72	1391.38	179.96	10200	80	1361.03	1361.50	127.50	900201	3528	5631.32	5656.03	255.16
PageRank	18921	87	1365.68	1366.79	217.48	9180	68	1300.68	1301.37	135.00	642039	2461	4853.04	4871.92	260.89
Random	138850	200	2046.53	2053.08	694.25	0	0	746.13	746.13	0.00	801500	2703	4490.52	4513.40	296.52

E-Degree	8148	99			82.30	6426	74			86.84	208604	1059			196.98
E-Betweenness	8040	89			90.34	4756	61			77.97	142668	969			147.23
E-Closeness	5434	70			77.63	6600	80			82.50	758993	3528			215.13
E-PageRank	8904	87			102.34	5940	68			87.35	503560	2461			204.62
E-Random	3057	200			15.29	0	0			0.00	64120	2703			23.72

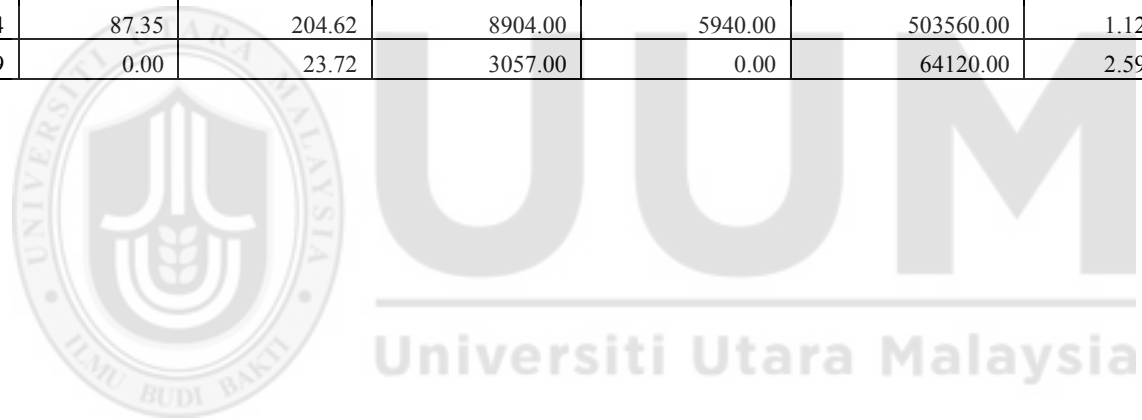


Plotted data of IDTU and heuristic data result

Wkivote	DCF/Node			DCF			Percentage of found nodes		
	WC	Uniform	Trivalency	WC	Uniform	Trivalency	WC	Uniform	Trivalency
IDTU	30.93	46.85	48.69	6960.00	10542.00	10955.00	100.00	100.00	100.00
Degree	227.80	120.59	229.74	10251.00	2050.00	26650.00	20.00	7.56	51.56
Betweenness	268.81	111.54	188.89	12903.00	1450.00	13600.00	21.33	5.78	32.00
Closeness	203.04	111.76	232.77	10761.00	1900.00	27700.00	23.56	7.56	52.89
PageRank	276.75	1.14	150.00	18819.00	13.69	9150.00	30.22	5.33	27.11
Random	290.00	0.00	183.33	5800.00	0.00	3300.00	8.89	0.00	8.00
E-Degree	75.93	33.76	142.44	3417.00	574.00	16523.00	20.00	7.56	51.56
E-Betweenness	110.69	22.31	75.56	5313.00	290.00	5440.00	21.33	5.78	32.00
E-Closeness	87.58	35.76	116.39	4642.00	608.00	13850.00	23.56	7.56	52.89
E-PageRank	81.40	29.17	78.00	5535.00	350.00	4758.00	30.22	5.33	27.11
E-Random	17.40	0.00	14.67	348.00	0.00	264.00	8.89	0.00	8.00
Facebook									
IDTU	11.61	11.19	12.33	4690.00	4521.00	4980.00	100.00	100.00	100.00
Degree	205.59	102.00	106.25	32895.00	918.00	2550.00	39.60	2.23	5.94
Betweenness	233.80	102.00	105.00	20808.00	408.00	1785.00	22.03	0.99	4.21
Closeness	467.47	115.91	164.00	115464.00	1275.00	8364.00	61.14	2.72	12.62
PageRank	211.83	102.00	191.00	45543.00	510.00	9741.00	53.22	1.24	12.62
Random	253.54	100.00	138.89	53750.00	400.00	1250.00	52.48	0.99	2.23
E-Degree	52.41	12.00	25.00	8385.00	108.00	600.00	39.60	2.23	5.94
E-Betweenness	73.35	6.00	28.82	6528.00	24.00	490.00	22.03	0.99	4.21
E-Closeness	137.49	13.64	41.80	33960.00	150.00	2132.00	61.14	2.72	12.62
E-PageRank	92.67	8.00	48.69	19646.00	40.00	2483.00	52.48	1.24	12.62
E-Random	40.57	8.00	13.89	8600.00	32.00	125.00	52.48	0.99	2.23

Epinions									
IDTU	113.71	63.36	92.32	461450.00	100800.00	188600.00	78.11	30.63	39.33
Degree	209.30	115.22	222.87	16116.00	3111.00	174063.00	1.48	0.52	15.03
Betweenness	282.86	119.00	201.65	33660.00	3927.00	78846.00	2.29	0.64	7.53
Closeness	270.94	122.40	261.76	21675.00	3672.00	290292.00	1.54	0.58	21.35
PageRank	271.50	122.40	266.14	36924.00	3060.00	402135.00	2.62	0.48	29.09
Random	1055.00	200.00	284.29	158250.00	200.00	79600.00	2.89	0.02	5.39
E-Degree	49.25	38.41	131.10	3792.00	1037.00	102390.00	1.48	0.52	15.03
E-Betweenness	122.02	53.67	122.57	14520.00	1771.00	47926.00	2.29	0.64	7.53
E-Closeness	79.69	36.00	133.45	6375.00	1080.00	147992.00	1.54	0.58	21.35
E-PageRank	106.47	43.20	161.77	14480.00	1080.00	244435.00	2.62	0.48	29.09
E-Random	211.00	4.00	17.06	31650.00	4.00	4776.00	2.89	0.02	5.39
Twitter									
IDTU	109.87	65.49	101.89	481250.00	129400.00	290500.00	53.87	24.31	35.07
Degree	184.17	129.63	109.46	3315.00	3111.00	4488.00	0.22	0.30	0.50
Betweenness	186.75	125.07	296.30	12699.00	5253.00	1047999.00	0.84	0.52	43.51
Closeness	195.00	124.44	211.56	3315.00	3111.00	125664.00	0.21	0.31	7.31
PageRank	174.18	137.48	265.68	11322.00	3162.00	387090.00	0.80	0.28	17.92
Random	414.50	100.00	258.21	82900.00	100.00	228000.00	2.46	0.01	10.86
E-Degree	25.28	38.13	38.63	455.00	915.00	1584.00	0.22	0.30	0.50
E-Betweenness	62.25	58.86	168.48	4233.00	2472.00	595921.00	0.84	0.52	43.51
E-Closeness	30.59	41.48	91.26	520.00	1037.00	54208.00	0.21	0.31	7.31
E-PageRank	27.32	32.35	125.02	1776.00	744.00	182160.00	0.80	0.28	17.92
E-Random	198.96	2.00	51.64	39792.00	2.00	45600.00	2.46	0.01	10.86
Slashdot									
IDTU	112.74	77.73	116.97	757150.00	193400.00	498300.00	86.81	32.16	55.07
Degree	199.88	130.12	228.32	19788.00	9629.00	241791.00	1.28	0.96	13.69

Betweenness	191.97	137.11	208.58	17085.00	8364.00	202113.00	1.15	0.79	12.53
Closeness	179.96	127.50	255.16	12597.00	10200.00	900201.00	0.90	1.03	45.60
PageRank	217.48	135.00	260.89	18921.00	9180.00	642039.00	1.12	0.88	31.81
Random	694.25	0.00	296.52	138850.00	0.00	801500.00	2.59	0.00	34.94
E-Degree	82.30	86.84	196.98	8148.00	6426.00	208604.00	1.28	0.96	13.69
E-Betweenness	90.34	77.97	147.23	8040.00	4756.00	142668.00	1.15	0.79	12.53
E-Closeness	77.63	82.50	215.13	5434.00	6600.00	758993.00	0.90	1.03	45.60
E-PageRank	102.34	87.35	204.62	8904.00	5940.00	503560.00	1.12	0.88	31.81
E-Random	15.29	0.00	23.72	3057.00	0.00	64120.00	2.59	0.00	34.94



Appendix 3: Raw data for simulation of the influencer selection based on information needs

Wiki-Vote														
$n=10$	seed node λ	overall message λ	FSC	FVC (initial)	FVC	Seed node R_0	R_0	Number of activated nodes	Number of initial viral nodes	Total viral nodes	Number of informed nodes	Initial DCF	Overall DCF	% drop
Criteria 1	0.011	0.014	161.1	20.654	16.608	0.182	0.227	1611	78	97	1600	25.152	4.987	80.173
Criteria 2	0.006	0.008	125.1	29.786	22.745	0.134	0.176	1251	42	55	1230	4.176	1.705	59.170
Criteria 3	0.011	0.015	152.6	19.075	14.673	0.165	0.215	1526	80	104	1511	22.710	4.797	78.875
Criteria 4	0.012	0.020	173.7	19.966	11.979	0.147	0.244	1737	87	145	1711	27.143	8.666	68.072
Criteria 5	0.013	0.017	161.2	18.112	13.322	0.167	0.227	1612	89	121	1598	29.991	6.229	79.232
Criteria 6	0.012	0.016	164.3	19.560	14.670	0.173	0.231	1643	84	112	1620	28.299	5.989	78.836
Criteria 7	0.010	0.014	155.8	21.639	15.737	0.159	0.219	1558	72	99	1537	18.129	4.760	73.741
Criteria 8	0.017	0.022	162.4	13.533	10.410	0.176	0.229	1624	120	156	1599	57.871	8.150	85.917
Criteria 9	0.013	0.016	169.1	19.000	15.098	0.189	0.238	1691	89	112	1675	35.654	6.344	82.206
Criteria 10	0.010	0.014	161.2	23.706	16.283	0.156	0.227	1612	68	99	1589	16.349	5.096	68.830
Criteria 11	0.014	0.020	168.3	17.351	11.769	0.161	0.237	1683	97	143	1664	35.811	8.024	77.594
Criteria 12	0.010	0.014	158	21.644	15.490	0.159	0.222	1580	73	102	1557	18.861	5.044	73.256
Criteria 13	0.011	0.017	158.8	19.850	13.124	0.148	0.224	1588	80	121	1578	21.138	6.044	71.404
Criteria 14	0.011	0.014	156.6	20.880	15.660	0.165	0.220	1566	75	100	1546	20.495	4.858	76.296
Criteria 15	0.011	0.016	157.4	19.675	13.687	0.154	0.222	1574	80	115	1562	21.850	5.644	74.170
Criteria 16	0.010	0.016	166.1	23.394	14.830	0.148	0.234	1661	71	112	1636	17.465	6.121	64.952
Criteria 17	0.011	0.017	162.7	21.130	13.336	0.145	0.229	1627	77	122	1611	19.623	6.397	67.398
Criteria 18	0.011	0.014	159.8	19.975	15.667	0.176	0.225	1598	80	102	1573	25.392	5.160	79.680
Criteria 19	0.012	0.016	166.4	18.909	14.596	0.181	0.234	1664	88	114	1630	32.789	6.253	80.930
Criteria 20	0.012	0.015	157.5	19.207	14.858	0.171	0.222	1575	82	106	1563	25.560	5.209	79.622
$n=50$														
Criteria 1	0.038	0.049	41.04	7.628	5.983	0.228	0.290	2052	269	343	2031	95.747	28.935	69.780
Criteria 2	0.021	0.029	38.38	12.966	9.226	0.193	0.272	1919	148	208	1899	22.997	15.346	33.271

Criteria 3	0.038	0.055	43.06	7.974	5.535	0.212	0.305	2153	270	389	2130	93.980	36.125	61.560
Criteria 4	0.036	0.048	42.24	8.414	6.286	0.223	0.299	2112	251	336	2087	84.115	30.026	64.303
Criteria 5	0.036	0.053	42.36	8.241	5.648	0.205	0.300	2118	257	375	2097	81.363	33.702	58.578
Criteria 6	0.041	0.057	43.02	7.417	5.337	0.219	0.304	2151	290	403	2113	112.195	37.356	66.704
Criteria 7	0.038	0.052	42.9	8.034	5.861	0.221	0.304	2145	267	366	2124	95.877	33.737	64.812
Criteria 8	0.039	0.056	41.88	7.560	5.301	0.208	0.296	2094	277	395	2062	94.537	34.700	63.295
Criteria 9	0.038	0.052	41.62	7.853	5.670	0.213	0.295	2081	265	367	2055	87.988	31.841	63.812
Criteria 10	0.033	0.045	42.52	9.124	6.749	0.223	0.301	2126	233	315	2095	72.726	28.524	60.779
Criteria 11	0.040	0.054	41.76	7.404	5.452	0.218	0.296	2088	282	383	2058	102.286	33.453	67.295
Criteria 12	0.041	0.057	43	7.465	5.322	0.217	0.304	2150	288	404	2126	109.516	37.414	65.837
Criteria 13	0.037	0.049	41.18	7.919	5.951	0.219	0.291	2059	260	346	2019	86.290	29.388	65.943
Criteria 14	0.031	0.044	40.92	9.300	6.516	0.203	0.290	2046	220	314	2015	56.879	26.334	53.702
Criteria 15	0.040	0.056	41.52	7.310	5.269	0.212	0.294	2076	284	394	2044	100.397	34.019	66.115
Criteria 16	0.036	0.050	40.88	7.984	5.790	0.210	0.289	2044	256	353	2020	79.563	29.547	62.864
Criteria 17	0.039	0.052	43.18	7.851	5.835	0.227	0.306	2159	275	370	2121	104.980	34.553	67.086
Criteria 18	0.041	0.056	41.32	7.124	5.217	0.214	0.292	2066	290	396	2028	105.333	33.863	67.851
Criteria 19	0.038	0.055	43.06	8.064	5.506	0.208	0.305	2153	267	391	2118	90.417	36.311	59.840
Criteria 20	0.038	0.056	43.06	8.034	5.410	0.205	0.305	2153	268	398	2126	89.829	36.961	58.854
n=100														
Criteria 1	0.059	0.083	21.64	5.202	3.731	0.221	0.308	2164	416	580	2143	118.117	55.193	53.272
Criteria 2	0.030	0.045	20.84	9.830	6.533	0.197	0.297	2084	212	319	2062	26.361	28.153	-6.801
Criteria 3	0.063	0.082	22.25	5.068	3.863	0.242	0.317	2225	439	576	2202	147.766	57.946	60.785
Criteria 4	0.057	0.077	22.21	5.553	4.098	0.234	0.317	2221	400	542	2190	118.365	54.330	54.099
Criteria 5	0.057	0.080	22.31	5.606	3.963	0.225	0.318	2231	398	563	2200	113.262	56.945	49.723
Criteria 6	0.056	0.080	22.29	5.629	3.959	0.223	0.318	2229	396	563	2193	111.363	56.843	48.958
Criteria 7	0.054	0.076	22.11	5.818	4.172	0.226	0.315	2211	380	530	2187	102.848	52.650	48.808
Criteria 8	0.062	0.086	22.26	5.153	3.704	0.228	0.317	2226	432	601	2199	135.074	60.516	55.198

Criteria 9	0.058	0.085	22.24	5.464	3.719	0.216	0.317	2224	407	598	2199	113.317	60.106	46.958
Criteria 10	0.054	0.073	21.97	5.751	4.283	0.233	0.313	2197	382	513	2168	106.580	50.318	52.789
Criteria 11	0.052	0.075	22.05	6.008	4.200	0.220	0.314	2205	367	525	2183	93.025	51.871	44.240
Criteria 12	0.059	0.080	22.19	5.334	3.970	0.235	0.316	2219	416	559	2185	128.863	55.933	56.595
Criteria 13	0.054	0.072	21.51	5.631	4.251	0.231	0.307	2151	382	506	2133	103.577	47.575	54.068
Criteria 14	0.051	0.072	21.98	6.140	4.352	0.222	0.313	2198	358	505	2177	89.199	49.578	44.418
Criteria 15	0.058	0.079	22.03	5.440	3.955	0.228	0.314	2203	405	557	2178	117.621	54.932	53.297
Criteria 16	0.063	0.088	22.35	5.068	3.628	0.228	0.319	2235	441	616	2208	141.330	62.529	55.757
Criteria 17	0.057	0.078	22.14	5.577	4.025	0.228	0.316	2214	397	550	2187	113.321	54.785	51.655
Criteria 18	0.061	0.084	22.25	5.174	3.784	0.232	0.317	2225	430	588	2192	136.029	59.154	56.514
Criteria 19	0.057	0.083	22.23	5.585	3.820	0.217	0.317	2223	398	582	2204	108.780	58.445	46.272
Criteria 20	0.059	0.078	22.18	5.383	4.055	0.238	0.316	2218	412	547	2190	127.812	54.683	57.216
n=200														
Criteria 1	0.075	0.105	11.335	4.368	3.114	0.234	0.328	2267	519	728	2242	103.195	78.244	24.179
Criteria 2	0.058	0.080	11.155	5.591	4.027	0.232	0.323	2231	399	554	2203	59.675	57.667	3.366
Criteria 3	0.086	0.116	11.31	3.795	2.813	0.242	0.327	2262	596	804	2236	140.881	86.031	38.933
Criteria 4	0.083	0.111	11.335	3.929	2.940	0.245	0.328	2267	577	771	2244	133.894	82.865	38.111
Criteria 5	0.078	0.106	11.325	4.210	3.094	0.241	0.328	2265	538	732	2225	114.119	78.535	31.181
Criteria 6	0.085	0.115	11.34	3.851	2.864	0.244	0.328	2268	589	792	2241	138.769	85.198	38.605
Criteria 7	0.079	0.109	11.305	4.141	3.007	0.237	0.327	2261	546	752	2231	115.704	80.396	30.516
Criteria 8	0.080	0.102	11.31	4.090	3.199	0.256	0.327	2262	553	707	2229	127.975	75.652	40.886
Criteria 9	0.083	0.106	11.315	3.963	3.083	0.255	0.327	2263	571	734	2226	135.821	78.611	42.122
Criteria 10	0.076	0.103	11.325	4.306	3.186	0.242	0.328	2265	526	711	2232	109.802	76.282	30.528
Criteria 11	0.074	0.102	11.345	4.432	3.214	0.238	0.328	2269	512	706	2242	102.343	76.013	25.727
Criteria 12	0.080	0.117	11.345	4.088	2.798	0.225	0.328	2269	555	811	2240	113.478	87.318	23.053
Criteria 13	0.079	0.111	11.375	4.159	2.966	0.235	0.329	2275	547	767	2252	115.482	83.018	28.112
Criteria 14	0.077	0.101	11.275	4.239	3.221	0.248	0.326	2255	532	700	2228	114.371	74.440	34.913

Criteria 15	0.083	0.118	11.285	3.918	2.763	0.230	0.326	2257	576	817	2240	124.593	87.036	30.144
Criteria 16	0.089	0.126	11.44	3.720	2.633	0.234	0.331	2288	615	869	2263	146.522	95.137	35.070
Criteria 17	0.080	0.103	11.285	4.096	3.170	0.253	0.326	2257	551	712	2229	125.148	75.851	39.391
Criteria 18	0.086	0.121	11.325	3.807	2.709	0.233	0.328	2265	595	836	2237	135.166	89.693	33.642
Criteria 19	0.072	0.097	11.235	4.494	3.354	0.242	0.325	2247	500	670	2224	98.498	70.745	28.176
Criteria 20	0.090	0.118	11.335	3.645	2.782	0.250	0.328	2267	622	815	2231	158.673	87.594	44.796
Facebook														
$n=10$	seed node λ	overall message λ	FSC	FVC (initial)	FVC	Seed node R_0	R_0	Number of activated nodes	Number of initial viral nodes	Total viral nodes	Number of informed nodes	Initial DCF	Overall DCF	% drop
Criteria 1	0.099	0.108	235.5	5.888	5.414	0.537	0.585	2355	400	435	2010	5026.643	148.620	97.043
Criteria 2	0.014	0.020	92.6	16.836	11.575	0.158	0.230	926	55	80	884	10.986	4.226	61.533
Criteria 3	0.114	0.134	279.1	6.054	5.188	0.594	0.693	2791	461	538	2492	8738.676	258.171	97.046
Criteria 4	0.071	0.074	208.9	7.253	7.010	0.501	0.518	2089	288	298	1825	2154.981	80.112	96.282
Criteria 5	0.114	0.133	297.3	6.463	5.567	0.636	0.738	2973	460	534	2572	9924.932	290.761	97.070
Criteria 6	0.129	0.154	295.3	5.668	4.748	0.614	0.733	2953	521	622	2717	12213.922	334.136	97.264
Criteria 7	0.112	0.117	282.6	6.252	5.987	0.672	0.701	2826	452	472	2484	9625.495	232.216	97.587
Criteria 8	0.122	0.143	288.2	5.846	4.995	0.611	0.715	2882	493	577	2553	10625.720	295.236	97.221
Criteria 9	0.120	0.130	300.7	6.213	5.739	0.689	0.746	3007	484	524	2606	12052.499	291.880	97.578
Criteria 10	0.069	0.073	209	7.545	7.085	0.487	0.519	2090	277	295	1835	1938.721	79.382	95.905
Criteria 11	0.114	0.119	288.7	6.290	6.027	0.687	0.717	2887	459	479	2476	10365.770	245.943	97.627
Criteria 12	0.115	0.139	278.8	6.035	4.961	0.569	0.692	2788	462	562	2542	8401.960	269.108	96.797
Criteria 13	0.119	0.128	290.4	6.050	5.628	0.670	0.721	2904	480	516	2480	11134.551	268.070	97.592
Criteria 14	0.117	0.138	288	6.102	5.161	0.605	0.715	2880	472	558	2475	9629.023	285.118	97.039
Criteria 15	0.121	0.129	293.9	6.010	5.663	0.687	0.729	2939	489	519	2523	11988.473	276.167	97.696

Criteria 16	0.115	0.122	283.2	6.090	5.744	0.663	0.703	2832	465	493	2429	10076.3 65	243.57 8	97.583
Criteria 17	0.113	0.120	288.6	6.329	5.951	0.673	0.716	2886	456	485	2463	10031.1 54	248.85 1	97.519
Criteria 18	0.120	0.127	288	5.938	5.647	0.680	0.715	2880	485	510	2460	11429.9 80	260.59 2	97.720
Criteria 19	0.109	0.111	330.2	7.505	7.371	0.805	0.820	3302	440	448	2892	12771.4 33	300.91 1	97.644
Criteria 20	0.120	0.126	282	5.814	5.573	0.671	0.700	2820	485	506	2387	11045.3 22	247.88 7	97.756
<i>n=50</i>														
Criteria 1	0.148	0.166	57.72	4.892	4.366	0.646	0.723	2886	590	661	2534	3252.73 9	345.99 2	89.363
Criteria 2	0.107	0.119	52.12	6.132	5.486	0.585	0.653	2606	425	475	2292	1379.50 7	202.72 8	85.304
Criteria 3	0.135	0.148	68.46	6.351	5.782	0.781	0.858	3423	539	592	3052	3895.47 4	435.92 1	88.810
Criteria 4	0.144	0.162	58.78	5.111	4.550	0.656	0.737	2939	575	646	2540	3195.00 9	350.67 4	89.024
Criteria 5	0.138	0.162	58.28	5.289	4.497	0.621	0.731	2914	551	648	2620	2755.24 9	345.80 1	87.449
Criteria 6	0.149	0.160	58.78	4.931	4.592	0.686	0.737	2939	596	640	2621	3591.36 8	347.41 7	90.326
Criteria 7	0.141	0.156	69.64	6.174	5.589	0.790	0.873	3482	564	623	3092	4388.42 5	474.69 8	89.183
Criteria 8	0.145	0.164	57.68	4.998	4.410	0.638	0.723	2884	577	654	2518	3070.73 3	341.85 4	88.867
Criteria 9	0.143	0.159	60.08	5.252	4.746	0.681	0.753	3004	572	633	2578	3353.40 6	358.98 4	89.295
Criteria 10	0.142	0.168	57.6	5.070	4.299	0.612	0.722	2880	568	670	2567	2851.39 3	349.24 6	87.752
Criteria 11	0.143	0.160	58.18	5.095	4.552	0.652	0.729	2909	571	639	2537	3098.82 3	339.82 9	89.034
Criteria 12	0.142	0.157	58.78	5.183	4.695	0.667	0.737	2939	567	626	2637	3161.37 4	339.81 7	89.251
Criteria 13	0.149	0.178	58.88	4.948	4.152	0.619	0.738	2944	595	709	2673	3236.54 9	386.18 4	88.068
Criteria 14	0.148	0.167	60.18	5.083	4.511	0.670	0.754	3009	592	667	2644	3539.85 6	379.52 7	89.278
Criteria 15	0.152	0.177	57.6	4.760	4.074	0.618	0.722	2880	605	707	2552	3265.37 9	368.53 3	88.714
Criteria 16	0.148	0.165	59.48	5.032	4.513	0.669	0.746	2974	591	659	2584	3482.25	366.30	89.481

												7	2	
Criteria 17	0.145	0.171	58.46	5.057	4.273	0.619	0.733	2923	578	684	2626	3031.705	367.270	87.886
Criteria 18	0.148	0.177	68.46	5.802	4.855	0.718	0.858	3423	590	705	3105	4290.250	519.128	87.900
Criteria 19	0.150	0.164	58.82	4.926	4.490	0.672	0.737	2941	597	655	2533	3531.618	356.044	89.918
Criteria 20	0.139	0.170	58.78	5.305	4.341	0.603	0.737	2939	554	677	2622	2726.727	367.502	86.522
<i>n</i> =100														
Criteria 1	0.153	0.189	29.89	4.949	4.017	0.616	0.759	2989	604	744	2659	1705.367	428.403	74.879
Criteria 2	0.146	0.165	29.41	5.106	4.525	0.662	0.747	2941	576	650	2551	1638.974	362.353	77.892
Criteria 3	0.147	0.161	28.8	4.983	4.528	0.664	0.731	2880	578	636	2501	1623.078	339.993	79.053
Criteria 4	0.150	0.169	29.64	5.024	4.457	0.668	0.752	2964	590	665	2579	1748.714	376.536	78.468
Criteria 5	0.150	0.168	29.48	4.997	4.446	0.666	0.748	2948	590	663	2551	1735.104	371.361	78.597
Criteria 6	0.148	0.172	28.8	4.932	4.242	0.629	0.731	2880	584	679	2580	1568.129	362.980	76.853
Criteria 7	0.152	0.167	29.42	4.920	4.464	0.678	0.747	2942	598	659	2554	1810.221	367.620	79.692
Criteria 8	0.150	0.172	28.86	4.892	4.269	0.639	0.733	2886	590	676	2629	1630.910	362.884	77.750
Criteria 9	0.140	0.184	30.17	5.456	4.173	0.586	0.766	3017	553	723	2714	1372.195	424.148	69.090
Criteria 10	0.155	0.195	30.02	4.921	3.909	0.605	0.762	3002	610	768	2853	1716.634	446.078	74.014
Criteria 11	0.155	0.177	28.8	4.721	4.132	0.640	0.731	2880	610	697	2587	1740.884	372.603	78.597
Criteria 12	0.152	0.184	30.13	5.038	4.162	0.632	0.765	3013	598	724	2740	1728.189	423.609	75.488
Criteria 13	0.157	0.168	29.39	4.763	4.440	0.695	0.746	2939	617	662	2530	1975.262	368.540	81.342
Criteria 14	0.155	0.189	34.82	5.718	4.686	0.725	0.884	3482	609	743	3198	2375.465	580.596	75.559
Criteria 15	0.153	0.171	29.95	4.983	4.444	0.678	0.760	2995	601	674	2620	1862.024	389.656	79.074
Criteria 16	0.159	0.194	34.23	5.451	4.469	0.712	0.869	3423	628	766	3121	2441.698	578.456	76.309

Criteria 17	0.155	0.170	29.39	4.826	4.393	0.679	0.746	2939	609	669	2529	1879.54 6	372.43 7	80.185
Criteria 18	0.153	0.173	29.56	4.910	4.341	0.663	0.750	2956	602	681	2565	1804.17 7	383.51 6	78.743
Criteria 19	0.145	0.161	28.8	5.053	4.535	0.656	0.731	2880	570	635	2529	1559.06 4	339.45 9	78.227
Criteria 20	0.147	0.170	28.8	4.974	4.299	0.632	0.731	2880	579	670	2574	1548.72 4	358.16 9	76.873
n=200														
Criteria 1	0.155	0.176	17.41	5.852	5.151	0.798	0.907	3482	595	676	3086	1281.72 7	556.11 9	56.612
Criteria 2	0.159	0.185	17.41	5.718	4.897	0.777	0.907	3482	609	711	3169	1306.69 3	584.91 3	55.237
Criteria 3	0.157	0.184	15	4.983	4.249	0.666	0.781	3000	602	706	2678	943.542	431.13 3	54.307
Criteria 4	0.157	0.176	14.4	4.776	4.267	0.670	0.750	2880	603	675	2639	914.044	379.88 5	58.439
Criteria 5	0.155	0.191	14.4	4.848	3.929	0.608	0.750	2880	594	733	2602	804.589	412.52 7	48.728
Criteria 6	0.157	0.172	17.115	5.677	5.194	0.816	0.892	3423	603	659	3018	1322.55 6	523.91 8	60.386
Criteria 7	0.149	0.191	14.935	5.231	4.069	0.605	0.778	2987	571	734	2728	767.744	444.35 5	42.122
Criteria 8	0.159	0.185	14.81	4.840	4.172	0.665	0.772	2962	612	710	2596	960.948	422.66 1	56.016
Criteria 9	0.155	0.173	14.4	4.832	4.337	0.673	0.750	2880	596	664	2466	897.200	373.69 5	58.349
Criteria 10	0.162	0.176	14.695	4.740	4.354	0.703	0.766	2939	620	675	2514	1034.67 6	395.61 0	61.765
Criteria 11	0.148	0.190	14.98	5.284	4.104	0.606	0.780	2996	567	730	2728	760.403	444.60 1	41.531
Criteria 12	0.158	0.173	14.925	4.926	4.482	0.707	0.778	2985	606	666	2592	1010.10 4	402.64 9	60.138
Criteria 13	0.159	0.192	14.98	4.895	4.054	0.646	0.780	2996	612	739	2675	944.555	450.08 2	52.350
Criteria 14	0.145	0.165	14.705	5.271	4.631	0.673	0.766	2941	558	635	2645	802.884	372.67 3	53.583
Criteria 15	0.159	0.183	15.02	4.933	4.273	0.678	0.782	3004	609	703	2700	983.626	430.44 6	56.239
Criteria 16	0.159	0.176	14.705	4.821	4.364	0.693	0.766	2941	610	674	2546	988.220	395.56 1	59.972
Criteria 17	0.157	0.181	14.495	4.808	4.183	0.657	0.755	2899	603	693	2579	902.088	395.17	56.193

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Criteria 18	0.157	0.179	14.725	4.900	4.287	0.671	0.767	2945	601	687	2565	929.760	404.288	56.517
Criteria 19	0.162	0.188	14.42	4.652	4.000	0.646	0.751	2884	620	721	2538	932.748	406.902	56.376
Criteria 20	0.154	0.186	14.4	4.865	4.039	0.623	0.750	2880	592	713	2617	818.831	401.271	50.995
Epinions														
$n=10$	seed node λ	overall message λ	FSC	FVC (initial)	FVC	Seed node R 0	Seed node R 01	Number of activated nodes	Number of initial viral nodes	Total viral nodes	Number of informed nodes	Initial DCF	Overall DCF	% drop
Criteria 1	0.012	0.017	647.5	7.227	4.996	0.059	0.085	6475	896	1296	5650	404.268	9.440	97.665
Criteria 2	0.000	0.001	96.6	33.310	20.125	0.008	0.013	966	29	48	938	0.008	0.008	5.531
Criteria 3	0.017	0.023	690.2	5.334	3.882	0.066	0.091	6902	1294	1778	5701	1008.538	14.715	98.541
Criteria 4	0.020	0.032	927.1	6.067	3.844	0.077	0.122	9271	1528	2412	7912	2208.601	36.017	98.369
Criteria 5	0.013	0.021	719.6	7.055	4.572	0.061	0.095	7196	1020	1574	6263	606.526	14.160	97.665
Criteria 6	0.022	0.033	913.1	5.365	3.695	0.083	0.120	9131	1702	2471	7589	2890.107	35.792	98.762
Criteria 7	0.012	0.019	665.1	7.610	4.704	0.054	0.088	6651	874	1414	5843	362.852	10.867	97.005
Criteria 8	0.020	0.029	816.6	5.323	3.714	0.075	0.108	8166	1534	2199	6753	1901.695	25.475	98.660
Criteria 9	0.022	0.031	876.4	5.360	3.739	0.081	0.116	8764	1635	2344	7255	2488.122	31.278	98.743
Criteria 10	0.014	0.020	706	6.821	4.679	0.064	0.093	7060	1035	1509	6140	636.228	13.067	97.946
Criteria 11	0.012	0.018	655.9	6.963	4.739	0.059	0.086	6559	942	1384	5701	451.402	10.344	97.709
Criteria 12	0.014	0.021	736.3	7.176	4.542	0.061	0.097	7363	1026	1621	6427	627.538	15.267	97.567
Criteria 13	0.013	0.020	745.3	7.691	4.802	0.061	0.098	7453	969	1552	6565	565.735	14.977	97.353
Criteria 14	0.013	0.019	693.8	7.257	4.710	0.059	0.091	6938	956	1473	6070	496.033	12.318	97.517
Criteria 15	0.020	0.027	780.6	5.152	3.742	0.075	0.103	7806	1515	2086	6412	1764.623	22.082	98.749
Criteria 16	0.021	0.030	883.4	5.677	3.854	0.079	0.116	8834	1556	2292	7428	2228.436	31.074	98.606
Criteria 17	0.012	0.018	660.4	7.539	4.932	0.057	0.087	6604	876	1339	5796	380.380	10.145	97.333

Criteria 18	0.020	0.029	811	5.215	3.698	0.076	0.107	8110	1555	2193	6898	1959.14 0	25.058	98.721
Criteria 19	0.014	0.021	705.6	6.714	4.532	0.063	0.093	7056	1051	1557	6108	644.923	13.467	97.912
Criteria 20	0.020	0.029	832.3	5.447	3.756	0.076	0.110	8323	1528	2216	6922	1937.45 4	26.669	98.624
<i>n=50</i>														
Criteria 1	0.028	0.044	236.52	5.607	3.543	0.099	0.156	11826	2109	3338	10004	1367.03 1	81.188	94.061
Criteria 2	0.002	0.005	74	20.442	9.920	0.024	0.049	3700	181	373	3573	0.757	0.888	-17.315
Criteria 3	0.036	0.053	264.38	4.889	3.277	0.117	0.174	13219	2704	4034	10986	2978.79 6	122.59 2	95.885
Criteria 4	0.050	0.076	331.58	4.349	2.885	0.145	0.219	16579	3812	5746	13495	9216.56 4	274.67 0	97.020
Criteria 5	0.039	0.059	286.44	4.839	3.181	0.124	0.189	14322	2960	4502	11831	4109.94 8	160.59 9	96.092
Criteria 6	0.046	0.068	317.36	4.551	3.093	0.142	0.209	15868	3487	5131	12956	7236.98 3	224.68 6	96.895
Criteria 7	0.029	0.046	257.12	5.852	3.706	0.107	0.170	12856	2197	3469	11109	1757.34 5	99.712	94.326
Criteria 8	0.030	0.047	250.06	5.484	3.507	0.105	0.165	12503	2280	3565	10568	1807.72 7	96.921	94.639
Criteria 9	0.045	0.065	308.6	4.510	3.135	0.141	0.203	15430	3421	4922	12629	6736.10 4	203.79 9	96.975
Criteria 10	0.032	0.057	291.86	6.058	3.365	0.107	0.192	14593	2409	4337	12741	2387.64 3	160.62 3	93.273
Criteria 11	0.024	0.039	236.4	6.607	4.042	0.095	0.156	11820	1789	2924	10357	951.586	71.046	92.534
Criteria 12	0.030	0.048	260.8	5.697	3.576	0.108	0.172	13040	2289	3647	11363	1944.98 4	107.85 0	94.455
Criteria 13	0.024	0.037	227.06	6.190	4.012	0.097	0.150	11353	1834	2830	9807	977.220	63.436	93.509
Criteria 14	0.020	0.036	212.12	6.987	3.924	0.079	0.140	10606	1518	2703	9391	506.328	52.878	89.556
Criteria 15	0.031	0.050	267.34	5.666	3.516	0.109	0.176	13367	2359	3802	11411	2145.84 8	118.14 3	94.494
Criteria 16	0.048	0.075	334.12	4.610	2.955	0.141	0.220	16706	3624	5653	13834	8173.15 8	274.38 1	96.643
Criteria 17	0.031	0.048	266.2	5.698	3.670	0.113	0.176	13310	2336	3627	11664	2165.64 1	111.74 6	94.840
Criteria 18	0.040	0.061	293.28	4.862	3.166	0.126	0.193	14664	3016	4631	12197	4430.81 4	173.18 5	96.091
Criteria 19	0.044	0.070	324.7	4.911	3.057	0.133	0.214	16235	3306	5311	13785	6237.29	243.45	96.097

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Criteria 20	0.041	0.059	282.52	4.542	3.145	0.129	0.186	14126	3110	4491	11496	4648.746	155.851	96.647
<i>n</i> =100														
Criteria 1	0.033	0.052	136.84	5.471	3.465	0.114	0.181	13684	2501	3949	11744	1291.761	128.770	90.031
Criteria 2	0.004	0.009	54.23	17.053	7.585	0.032	0.072	5423	318	715	5255	2.303	3.662	-58.976
Criteria 3	0.050	0.073	163.69	4.334	2.965	0.148	0.216	16369	3777	5521	13321	4553.756	257.611	94.343
Criteria 4	0.071	0.106	208.38	3.850	2.594	0.185	0.275	20838	5412	8033	16948	14921.412	607.424	95.929
Criteria 5	0.046	0.075	172.13	4.938	3.024	0.139	0.227	17213	3486	5693	14476	3839.338	293.736	92.349
Criteria 6	0.056	0.084	182.87	4.342	2.869	0.159	0.241	18287	4212	6375	15224	6826.091	371.251	94.561
Criteria 7	0.034	0.052	145.8	5.590	3.696	0.127	0.192	14580	2608	3945	12642	1664.535	146.037	91.227
Criteria 8	0.045	0.071	159.92	4.658	2.980	0.135	0.211	15992	3433	5366	13489	3357.984	238.978	92.883
Criteria 9	0.054	0.084	186.1	4.579	2.910	0.156	0.246	18610	4064	6396	16088	6329.183	385.748	93.905
Criteria 10	0.043	0.073	170.05	5.208	3.070	0.132	0.224	17005	3265	5539	14520	3164.271	278.925	91.185
Criteria 11	0.030	0.051	141.36	6.285	3.682	0.109	0.187	14136	2249	3839	12550	1031.111	133.590	87.044
Criteria 12	0.048	0.077	176.75	4.857	3.043	0.146	0.233	17675	3639	5808	14864	4513.783	315.971	93.000
Criteria 13	0.033	0.055	145.5	5.785	3.478	0.115	0.192	14550	2515	4184	12732	1401.685	154.248	88.996
Criteria 14	0.029	0.052	141.86	6.431	3.601	0.105	0.187	14186	2206	3940	12558	954.866	138.076	85.540
Criteria 15	0.042	0.074	169.86	5.389	3.026	0.126	0.224	16986	3152	5614	14534	2802.662	282.070	89.936
Criteria 16	0.064	0.099	204.48	4.234	2.723	0.174	0.270	20448	4829	7510	16981	10917.812	546.819	94.991
Criteria 17	0.047	0.078	173.43	4.859	2.923	0.138	0.229	17343	3569	5933	14538	4013.433	310.760	92.257
Criteria 18	0.051	0.078	172.98	4.449	2.924	0.150	0.228	17298	3888	5915	14281	5177.476	308.211	94.047
Criteria 19	0.054	0.087	189.09	4.616	2.856	0.154	0.250	18909	4096	6621	15863	6462.427	412.252	93.621

Criteria 20	0.051	0.078	171.1	4.445	2.894	0.147	0.226	17110	3849	5912	14481	4917.12 9	301.39 5	93.870
<i>n</i> =200														
Criteria 1	0.054	0.087	93.865	4.616	2.847	0.153	0.248	18773	4067	6595	16120	3138.29 9	405.81 8	87.069
Criteria 2	0.009	0.020	40.975	11.707	5.482	0.051	0.108	8195	700	1495	7796	13.451	17.530	-30.322
Criteria 3	0.066	0.103	101.21 5	4.046	2.607	0.172	0.267	20243	5003	7764	16769	5769.98 9	555.50 1	90.373
Criteria 4	0.095	0.146	126.97	3.546	2.301	0.218	0.336	25394	7162	11036	20613	18740.1 35	1242.5 77	93.369
Criteria 5	0.059	0.096	99.945	4.445	2.756	0.164	0.264	19989	4497	7253	17176	4373.73 4	505.99 8	88.431
Criteria 6	0.074	0.120	113.32	4.023	2.491	0.185	0.299	22664	5633	9100	19019	8807.85 6	816.13 8	90.734
Criteria 7	0.050	0.086	95.03	5.019	2.906	0.145	0.251	19006	3787	6541	16976	2618.43 9	412.54 8	84.244
Criteria 8	0.060	0.101	102.82 5	4.548	2.682	0.160	0.272	20565	4522	7667	17408	4452.89 9	566.15 1	87.286
Criteria 9	0.067	0.110	109.35	4.337	2.627	0.175	0.289	21870	5043	8325	18630	6432.79 1	695.23 4	89.192
Criteria 10	0.058	0.099	100.74 5	4.559	2.702	0.158	0.266	20149	4420	7456	17352	4104.75 4	528.52 1	87.124
Criteria 11	0.043	0.079	89.015	5.415	2.995	0.130	0.235	17803	3288	5944	15558	1654.71 1	328.93 8	80.121
Criteria 12	0.062	0.101	103.94 5	4.433	2.715	0.168	0.275	20789	4690	7656	17986	5083.97 1	577.72 1	88.636
Criteria 13	0.055	0.092	100.19 5	4.812	2.890	0.159	0.265	20039	4164	6933	17154	3650.75 2	486.09 7	86.685
Criteria 14	0.042	0.073	86.835	5.470	3.137	0.132	0.229	17367	3175	5536	15483	1522.31 3	291.53 8	80.849
Criteria 15	0.061	0.097	99.17	4.288	2.704	0.165	0.262	19834	4625	7334	16551	4632.70 0	503.74 5	89.126
Criteria 16	0.084	0.132	120.68 5	3.812	2.411	0.202	0.319	24137	6332	10012	20103	12896.9 70	1018.4 43	92.103
Criteria 17	0.061	0.102	102.75 5	4.425	2.671	0.164	0.272	20551	4644	7694	17395	4799.65 0	567.37 1	88.179
Criteria 18	0.065	0.106	107.57 5	4.391	2.693	0.174	0.284	21515	4900	7989	18015	5951.10 7	645.69 0	89.150
Criteria 19	0.070	0.112	111.64	4.215	2.644	0.185	0.295	22328	5297	8446	18587	7658.74 7	735.19 1	90.401
Criteria 20	0.069	0.107	105.83	4.059	2.624	0.181	0.280	21166	5214	8066	17312	6873.08 4	630.93 6	90.820

Twitter														
$n=10$	seed node λ	overall message λ	FSC	FVC (initial)	FVC	Seed node R_0	R_0	Number of activated nodes	Number of initial viral nodes	Total viral nodes	Number of informed nodes	Initial DCF	Overall DCF	% drop
Criteria 1	0.004	0.005	521.6	17.802	11.909	0.043	0.064	5216	293	438	4971	23.641	1.803	92.373
Criteria 2	0.001	0.001	137.1	22.850	17.354	0.013	0.017	1371	60	79	1313	0.078	0.022	71.106
Criteria 3	0.003	0.006	648.3	23.154	12.662	0.044	0.080	6483	280	512	6225	27.266	3.256	88.058
Criteria 4	0.006	0.011	1011.3	20.267	11.299	0.069	0.124	10113	499	895	9713	214.833	13.850	93.553
Criteria 5	0.004	0.006	662.5	22.083	13.041	0.048	0.081	6625	300	508	6354	35.297	3.374	90.442
Criteria 6	0.004	0.007	729	21.192	12.948	0.055	0.090	7290	344	563	6978	58.141	4.527	92.214
Criteria 7	0.003	0.004	482.3	22.433	13.939	0.037	0.059	4823	215	346	4616	10.110	1.218	87.954
Criteria 8	0.004	0.007	740.9	23.299	14.006	0.055	0.091	7409	318	529	7128	50.490	4.394	91.298
Criteria 9	0.005	0.008	828	19.809	12.035	0.062	0.102	8280	418	688	7921	110.119	7.137	93.519
Criteria 10	0.002	0.005	482.6	24.497	12.767	0.031	0.059	4826	197	378	4638	7.128	1.332	81.311
Criteria 11	0.003	0.005	443.6	21.225	11.174	0.029	0.055	4436	209	397	4240	6.847	1.182	82.736
Criteria 12	0.003	0.007	674.3	24.974	12.305	0.041	0.083	6743	270	548	6498	24.710	3.770	84.743
Criteria 13	0.003	0.006	554.3	20.530	12.373	0.041	0.068	5543	270	448	5308	20.425	2.083	89.803
Criteria 14	0.001	0.003	403.8	47.506	17.633	0.018	0.050	4038	85	229	3964	0.662	0.565	14.609
Criteria 15	0.004	0.008	701.8	20.051	10.983	0.047	0.086	7018	350	639	6704	50.002	4.762	90.476
Criteria 16	0.006	0.010	821.4	18.173	9.861	0.055	0.101	8214	452	833	7811	113.173	8.504	92.486
Criteria 17	0.003	0.005	532.3	21.727	14.157	0.043	0.065	5323	245	376	5096	16.768	1.612	90.387
Criteria 18	0.005	0.011	932.1	22.958	10.497	0.052	0.115	9321	406	888	8968	99.072	11.673	88.217
Criteria 19	0.004	0.007	627.6	19.861	11.644	0.045	0.077	6276	316	539	5984	34.890	3.212	90.793
Criteria 20	0.003	0.007	590	21.933	11.132	0.037	0.073	5900	269	530	5659	19.344	2.792	85.569
$n=50$												0.000	0.000	
Criteria 1	0.009	0.016	258.86	18.464	10.151	0.088	0.159	12943	701	1275	12490	137.099	32.350	76.404
Criteria 2	0.004	0.009	150.92	23.076	10.142	0.041	0.093	7546	327	744	7245	8.106	6.416	20.846
Criteria 3	0.010	0.019	277.14	17.086	9.128	0.091	0.171	13857	811	1518	13285	204.385	44.147	78.400
Criteria 4	0.012	0.023	353.4	17.939	9.305	0.113	0.217	17670	985	1899	17014	475.966	89.802	81.133

Criteria 5	0.008	0.015	238.02	17.816	9.836	0.081	0.146	11901	668	1210	11412	105.689	25.956	75.441
Criteria 6	0.011	0.023	321.58	18.251	8.677	0.094	0.198	16079	881	1853	15503	288.994	72.558	74.893
Criteria 7	0.005	0.010	192.88	23.017	11.833	0.061	0.119	9644	419	815	9306	25.428	11.481	54.852
Criteria 8	0.010	0.017	276.38	17.339	9.978	0.098	0.170	13819	797	1385	13239	211.445	40.058	81.055
Criteria 9	0.010	0.019	289.64	17.038	9.148	0.096	0.178	14482	850	1583	13932	246.463	50.284	79.598
Criteria 10	0.005	0.011	184.5	20.871	10.677	0.058	0.114	9225	442	864	8841	25.764	11.136	56.775
Criteria 11	0.006	0.011	194.38	21.743	11.095	0.061	0.120	9719	447	876	9380	29.173	12.532	57.041
Criteria 12	0.009	0.015	236.26	17.022	9.787	0.084	0.145	11813	694	1207	11285	117.061	25.510	78.208
Criteria 13	0.008	0.014	251.14	19.806	10.938	0.085	0.155	12557	634	1148	12102	106.027	27.416	74.143
Criteria 14	0.004	0.009	181.42	24.989	11.951	0.053	0.112	9071	363	759	8775	15.708	9.459	39.781
Criteria 15	0.009	0.017	256.04	17.930	9.223	0.081	0.158	12802	714	1388	12278	130.191	34.454	73.536
Criteria 16	0.011	0.023	336.7	18.810	8.922	0.098	0.207	16835	895	1887	16344	326.169	81.000	75.166
Criteria 17	0.008	0.016	238.82	18.120	9.143	0.074	0.147	11941	659	1306	11440	94.648	28.204	70.201
Criteria 18	0.010	0.019	278.88	17.540	9.084	0.089	0.172	13944	795	1535	13379	192.791	45.204	76.553
Criteria 19	0.007	0.013	222.28	19.741	10.769	0.075	0.137	11114	563	1032	10690	64.700	19.307	70.160
Criteria 20	0.009	0.019	276.16	17.932	8.966	0.085	0.170	13808	770	1540	13265	171.211	44.470	74.026
n=100														
Criteria 1	0.012	0.025	163.71	16.241	8.129	0.101	0.202	16371	1008	2014	15770	206.679	81.853	60.396
Criteria 2	0.006	0.011	104.49	20.017	11.445	0.074	0.129	10449	522	913	9996	25.794	15.116	41.396
Criteria 3	0.015	0.031	205.1	16.922	8.191	0.122	0.253	20510	1212	2504	19788	453.554	159.73 1	64.782
Criteria 4	0.019	0.041	230.21	14.843	6.947	0.133	0.283	23021	1551	3314	22162	904.805	266.33 3	70.565
Criteria 5	0.014	0.026	176.19	15.661	8.374	0.116	0.217	17619	1125	2104	16891	318.565	99.045	68.909
Criteria 6	0.015	0.031	199.51	16.654	7.933	0.117	0.246	19951	1198	2515	19370	412.654	151.80 7	63.212
Criteria 7	0.014	0.024	168.99	14.606	8.751	0.125	0.208	16899	1157	1931	16022	347.347	83.623	75.925
Criteria 8	0.014	0.027	185.43	15.972	8.522	0.122	0.228	18543	1161	2176	17859	374.992	113.46 0	69.743
Criteria 9	0.016	0.034	198.86	15.671	7.140	0.112	0.245	19886	1269	2785	19192	440.026	167.01 1	62.045

Criteria 10	0.013	0.020	136.79	13.242	8.528	0.108	0.168	13679	1033	1604	12871	194.998	45.513	76.660
Criteria 11	0.012	0.023	149.13	15.454	8.096	0.096	0.184	14913	965	1842	14216	164.530	62.122	62.243
Criteria 12	0.014	0.026	177.59	16.042	8.567	0.117	0.219	17759	1107	2073	16996	312.971	99.143	68.322
Criteria 13	0.013	0.024	167.78	15.680	8.512	0.112	0.207	16778	1070	1971	16133	265.319	84.138	68.288
Criteria 14	0.011	0.022	148	16.122	8.168	0.092	0.182	14800	918	1812	14074	141.813	60.187	57.559
Criteria 15	0.014	0.028	174.65	14.864	7.811	0.113	0.215	17465	1175	2236	16785	335.585	103.427	69.180
Criteria 16	0.016	0.029	202.55	15.861	8.539	0.134	0.249	20255	1277	2372	19559	546.193	147.572	72.982
Criteria 17	0.015	0.028	180.88	14.851	7.834	0.117	0.223	18088	1218	2309	17236	388.260	114.559	70.494
Criteria 18	0.015	0.029	194.47	15.888	8.332	0.126	0.239	19447	1224	2334	18779	450.580	133.854	70.293
Criteria 19	0.013	0.021	153.86	14.866	8.951	0.114	0.189	15386	1035	1719	14595	231.537	61.709	73.348
Criteria 20	0.015	0.030	191.33	16.065	7.819	0.115	0.236	19133	1191	2447	18442	383.258	135.839	64.557
n=200														
Criteria 1	0.022	0.039	110.46	12.660	6.908	0.149	0.272	22092	1745	3198	21247	616.371	237.270	61.505
Criteria 2	0.020	0.030	93.875	11.504	7.645	0.154	0.231	18775	1632	2456	17418	474.194	131.608	72.246
Criteria 3	0.024	0.044	126.35	13.251	7.033	0.165	0.312	25270	1907	3593	24338	936.849	348.788	62.770
Criteria 4	0.033	0.068	153.05	11.460	5.583	0.184	0.377	30610	2671	5483	29017	2475.108	780.978	68.447
Criteria 5	0.024	0.043	118.77	12.058	6.883	0.167	0.293	23754	1970	3451	22550	950.148	296.014	68.845
Criteria 6	0.024	0.050	135.325	14.052	6.616	0.157	0.334	27065	1926	4091	26135	972.343	455.554	53.149
Criteria 7	0.022	0.037	109.78	12.349	7.285	0.160	0.271	21956	1778	3014	20683	683.317	220.874	67.676
Criteria 8	0.021	0.042	117.535	13.635	6.918	0.147	0.290	23507	1724	3398	22717	633.355	285.438	54.932
Criteria 9	0.022	0.041	117.675	13.163	7.032	0.155	0.290	23535	1788	3347	22688	719.017	281.824	60.804
Criteria 10	0.021	0.031	98.59	11.457	7.784	0.165	0.243	19718	1721	2533	18311	594.699	149.711	74.826
Criteria 11	0.022	0.037	108.105	12.320	7.178	0.155	0.267	21621	1755	3012	20470	637.664	214.043	66.433

Criteria 12	0.023	0.040	115.46 5	12.310	7.079	0.164	0.285	23093	1876	3262	21796	820.426	264.44 7	67.767
Criteria 13	0.022	0.041	120.11	13.309	7.149	0.159	0.296	24022	1805	3360	23133	767.670	294.74 9	61.605
Criteria 14	0.022	0.037	104.36	11.608	6.937	0.154	0.257	20872	1798	3009	19519	639.645	199.27 1	68.847
Criteria 15	0.021	0.041	112	12.926	6.761	0.144	0.276	22400	1733	3313	21546	599.148	252.70 4	57.823
Criteria 16	0.024	0.047	131.02 5	13.370	6.806	0.164	0.323	26205	1960	3850	25232	1020.79 8	401.90 5	60.628
Criteria 17	0.024	0.039	115.91	12.049	7.288	0.173	0.286	23182	1924	3181	21920	914.571	259.87 2	71.585
Criteria 18	0.022	0.043	120.7	13.524	6.891	0.152	0.298	24140	1785	3503	23274	719.139	310.31 9	56.849
Criteria 19	0.024	0.039	111.38	11.681	7.119	0.167	0.275	22276	1907	3129	20899	835.959	236.03 4	71.765
Criteria 20	0.023	0.045	124.24 5	13.490	6.870	0.156	0.306	24849	1842	3617	23955	810.965	339.51 6	58.134
Slashdot														
$n=10$	seed node λ	overall message λ	FSC	FVC (initial)	FVC	Seed node R_0	R_0	Number of activated nodes	Number of initial viral nodes	Total viral nodes	Number of informed nodes	Initial DCF	Overall DCF	% drop
Criteria 1	0.015	0.024	1557.4	13.496	8.346	0.125	0.201	15574	1154	1866	14739	3338.76 2	75.647	97.734
Criteria 2	0.001	0.001	177.5	29.583	19.722	0.015	0.023	1775	60	90	1716	0.126	0.047	62.500
Criteria 3	0.020	0.030	1728.9	11.083	7.392	0.149	0.224	17289	1560	2339	16111	8108.91 4	116.85 6	98.559
Criteria 4	0.021	0.031	1744.1	10.759	7.210	0.151	0.225	17441	1621	2419	16221	8952.31 4	122.98 7	98.626
Criteria 5	0.021	0.030	1578.8	9.886	6.918	0.143	0.204	15788	1597	2282	14600	7435.88 6	95.071	98.721
Criteria 6	0.021	0.032	1703.5	10.356	6.905	0.147	0.220	17035	1645	2467	15818	8751.69 5	119.65 6	98.633
Criteria 7	0.020	0.029	1564.3	10.151	6.996	0.139	0.202	15643	1541	2236	14461	6693.53 6	91.452	98.634
Criteria 8	0.022	0.033	1719.7	10.045	6.660	0.147	0.222	17197	1712	2582	15942	9605.93 8	127.62 7	98.671
Criteria 9	0.021	0.031	1621.2	9.802	6.752	0.144	0.210	16212	1654	2401	14944	8278.79 1	105.47 4	98.726
Criteria 10	0.020	0.031	1627.3	10.425	6.812	0.137	0.210	16273	1561	2389	15088	7047.04 7	105.73 8	98.500
Criteria 11	0.011	0.016	1054.7	12.496	8.596	0.094	0.136	10547	844	1227	9814	911.003	22.813	97.496

Criteria 12	0.021	0.032	1689.9	10.496	6.762	0.141	0.218	16899	1610	2499	15925	7970.99 9	119.28 0	98.504
Criteria 13	0.020	0.030	1585.1	10.253	6.786	0.136	0.205	15851	1546	2336	14649	6642.75 6	98.099	98.523
Criteria 14	0.011	0.016	1036	12.558	8.548	0.091	0.134	10360	825	1212	9635	831.109	21.742	97.384
Criteria 15	0.022	0.033	1737	10.321	6.855	0.149	0.225	17370	1683	2534	16122	9486.90 9	127.78 7	98.653
Criteria 16	0.022	0.033	1725.6	10.314	6.848	0.148	0.223	17256	1673	2520	15989	9247.98 1	125.41 8	98.644
Criteria 17	0.020	0.029	1548	9.841	6.859	0.139	0.200	15480	1573	2257	14273	6906.78 4	90.397	98.691
Criteria 18	0.022	0.032	1647.2	9.701	6.707	0.147	0.213	16472	1698	2456	15176	9039.75 6	111.37 8	98.768
Criteria 19	0.021	0.031	1616.2	10.139	6.745	0.139	0.209	16162	1594	2396	14947	7379.85 3	104.60 6	98.583
Criteria 20	0.021	0.030	1648.8	10.084	6.989	0.148	0.213	16488	1635	2359	15276	8418.61 5	107.18 7	98.727
<i>n=50</i>														
Criteria 1	0.033	0.056	519.84	10.205	5.978	0.197	0.336	25992	2547	4348	24437	8590.83 4	491.47 1	94.279
Criteria 2	0.004	0.007	154.22	25.365	14.306	0.056	0.100	7711	304	539	7447	10.371	5.362	48.296
Criteria 3	0.038	0.064	546.62	9.224	5.517	0.211	0.354	27331	2963	4954	25750	13125.2 82	619.15 0	95.283
Criteria 4	0.038	0.062	544.02	9.290	5.675	0.215	0.352	27201	2928	4793	25452	12966.8 41	593.34 3	95.424
Criteria 5	0.031	0.051	481.6	10.029	6.101	0.189	0.311	24080	2401	3947	22502	6804.26 1	382.92 1	94.372
Criteria 6	0.037	0.061	536.26	9.451	5.674	0.208	0.347	26813	2837	4726	25143	11623.4 15	568.47 7	95.109
Criteria 7	0.030	0.047	460.72	10.011	6.390	0.190	0.298	23036	2301	3605	21443	6000.91 4	320.07 2	94.666
Criteria 8	0.035	0.058	529.24	9.819	5.866	0.204	0.342	26462	2695	4511	24846	10167.3 43	528.50 2	94.802
Criteria 9	0.034	0.057	522.2	9.823	5.902	0.203	0.338	26110	2658	4424	24421	9683.27 4	504.61 2	94.789
Criteria 10	0.029	0.046	462.5	10.187	6.492	0.191	0.299	23125	2270	3562	21555	5876.32 5	318.70 3	94.576
Criteria 11	0.022	0.033	384.6	11.372	7.568	0.166	0.249	19230	1691	2541	17955	2354.74 2	157.21 4	93.324
Criteria 12	0.029	0.049	481.7	10.629	6.423	0.188	0.312	24085	2266	3750	22598	6022.82 7	363.96 0	93.957

Criteria 13	0.030	0.050	496.78	10.615	6.385	0.193	0.321	24839	2340	3890	23420	6800.24 9	401.55 6	94.095
Criteria 14	0.020	0.038	432.74	14.310	7.461	0.146	0.280	21637	1512	2900	20593	1867.28 3	227.15 4	87.835
Criteria 15	0.034	0.057	520.34	10.003	5.941	0.200	0.337	26017	2601	4379	24486	9101.63 0	495.92 7	94.551
Criteria 16	0.038	0.061	536.3	9.234	5.704	0.214	0.347	26815	2904	4701	25107	12534.6 97	565.55 5	95.488
Criteria 17	0.031	0.049	493.92	10.416	6.472	0.198	0.319	24696	2371	3816	23199	7128.50 0	389.39 5	94.537
Criteria 18	0.035	0.059	532.22	9.776	5.806	0.204	0.344	26611	2722	4583	24972	10427.8 68	543.00 1	94.793
Criteria 19	0.029	0.047	477.52	10.645	6.504	0.189	0.309	23876	2243	3671	22409	5863.88 2	350.13 6	94.029
Criteria 20	0.037	0.063	551.8	9.527	5.690	0.213	0.357	27590	2896	4849	26044	12758.6 74	617.56 7	95.160
<i>n</i> =100														
Criteria 1	0.046	0.079	317.53	8.970	5.198	0.238	0.411	31753	3540	6109	29847	12265.9 10	1031.8 82	91.587
Criteria 2	0.008	0.013	110.63	18.688	11.220	0.086	0.143	11063	592	986	10579	43.144	20.217	53.141
Criteria 3	0.052	0.091	335.83	8.423	4.800	0.248	0.435	33583	3987	6997	31721	17114.1 92	1322.0 30	92.275
Criteria 4	0.052	0.088	335.69	8.401	4.917	0.254	0.434	33569	3996	6827	31500	17644.6 86	1288.8 35	92.696
Criteria 5	0.043	0.072	302.95	9.103	5.436	0.234	0.392	30295	3328	5573	28535	10169.3 55	856.88 3	91.574
Criteria 6	0.049	0.083	329.5	8.780	5.134	0.249	0.426	32950	3753	6418	31270	14980.8 83	1167.3 50	92.208
Criteria 7	0.037	0.062	279.54	9.663	5.871	0.220	0.362	27954	2893	4761	26155	6657.72 2	623.27 1	90.638
Criteria 8	0.047	0.081	324.17	8.982	5.207	0.243	0.420	32417	3609	6226	30637	13291.9 21	1096.0 88	91.754
Criteria 9	0.047	0.080	315.79	8.723	5.122	0.240	0.409	31579	3620	6165	29730	12855.2 34	1029.9 60	91.988
Criteria 10	0.036	0.058	268.78	9.707	6.005	0.215	0.348	26878	2769	4476	25133	5740.67 9	541.72 0	90.563
Criteria 11	0.035	0.061	274.95	10.064	5.881	0.208	0.356	27495	2732	4675	25867	5524.06 2	592.07 9	89.282
Criteria 12	0.039	0.066	284.82	9.378	5.620	0.221	0.369	28482	3037	5068	26726	7511.54 6	688.76 0	90.831
Criteria 13	0.042	0.075	301.17	9.238	5.170	0.218	0.390	30117	3260	5825	28519	9037.97 0	885.13 6	90.206

Criteria 14	0.027	0.048	246.66	11.819	6.597	0.178	0.319	24666	2087	3739	23376	2477.99 2	381.10 4	84.620
Criteria 15	0.046	0.080	324.85	9.197	5.248	0.240	0.420	32485	3532	6190	30823	12584.2 63	1094.3 27	91.304
Criteria 16	0.051	0.088	328.75	8.325	4.852	0.248	0.426	32875	3949	6775	30885	16457.8 92	1226.6 80	92.547
Criteria 17	0.043	0.072	302.18	9.171	5.412	0.231	0.391	30218	3295	5584	28337	9800.37 9	854.21 5	91.284
Criteria 18	0.048	0.081	320.88	8.710	5.102	0.243	0.415	32088	3684	6289	30162	13713.6 53	1084.8 20	92.089
Criteria 19	0.039	0.067	287.68	9.526	5.523	0.216	0.372	28768	3020	5209	26973	7331.22 3	722.21 1	90.149
Criteria 20	0.052	0.088	329.74	8.202	4.863	0.253	0.427	32974	4020	6780	30871	17453.4 92	1234.9 90	92.924
n=200														
Criteria 1	0.065	0.116	194.94 5	7.721	4.347	0.285	0.505	38989	5050	8969	36746	18331.5 79	2290.0 44	87.508
Criteria 2	0.014	0.025	87.03	16.028	9.123	0.128	0.226	17406	1086	1908	16639	170.803	97.094	43.154
Criteria 3	0.073	0.125	199.83	7.120	4.144	0.301	0.518	39966	5613	9645	37558	24595.1 70	2587.6 12	89.479
Criteria 4	0.075	0.130	203.29	7.023	4.044	0.303	0.527	40658	5789	10054	38230	26788.5 59	2791.5 57	89.579
Criteria 5	0.059	0.103	183.39	8.047	4.606	0.272	0.475	36678	4558	7963	34564	13435.1 68	1799.3 00	86.608
Criteria 6	0.067	0.117	193.55 5	7.436	4.277	0.289	0.502	38711	5206	9052	36373	19616.5 35	2278.3 94	88.385
Criteria 7	0.053	0.088	168.59	8.321	4.988	0.262	0.437	33718	4052	6760	31732	9396.60 1	1290.8 80	86.262
Criteria 8	0.066	0.118	193.59 5	7.567	4.253	0.282	0.502	38719	5117	9103	36487	18530.8 58	2292.1 78	87.630
Criteria 9	0.064	0.110	188.25	7.568	4.439	0.286	0.488	37650	4975	8481	35492	17284.1 38	2019.2 62	88.317
Criteria 10	0.048	0.080	161.15	8.720	5.210	0.250	0.418	32230	3696	6186	30280	7120.19 9	1079.3 10	84.842
Criteria 11	0.054	0.090	170.13 5	8.199	4.899	0.264	0.441	34027	4150	6945	32185	10007.0 24	1350.6 26	86.503
Criteria 12	0.058	0.099	179.25	8.035	4.707	0.272	0.465	35850	4462	7616	33745	12589.9 98	1644.0 72	86.941
Criteria 13	0.061	0.105	183.12 5	7.826	4.537	0.275	0.475	36625	4680	8073	34332	14303.5 37	1818.8 87	87.284
Criteria 14	0.043	0.074	157.18	9.570	5.492	0.234	0.407	31436	3285	5724	29634	5139.80 5	950.10 1	81.515

Criteria 15	0.064	0.116	195.03	7.896	4.356	0.279	0.506	39006	4940	8955	36851	17201.3 94	2288.4 63	86.696
Criteria 16	0.071	0.124	200	7.281	4.197	0.299	0.518	40000	5494	9531	37966	23379.3 83	2561.3 80	89.044
Criteria 17	0.057	0.099	179.29	8.115	4.706	0.270	0.465	35858	4419	7619	33638	12230.1 48	1645.4 54	86.546
Criteria 18	0.068	0.117	195.67	7.439	4.332	0.295	0.507	39134	5261	9033	36921	20733.2 29	2323.5 72	88.793
Criteria 19	0.052	0.088	172.62	8.642	5.062	0.262	0.447	34524	3995	6820	32499	9358.23 1	1365.3 44	85.410
Criteria 20	0.072	0.124	199.51	7.216	4.159	0.298	0.517	39902	5530	9595	37522	23567.0 55	2565.9 60	89.112

