Appendix 1. Treatment of synonyms

|  |  |  |  |
| --- | --- | --- | --- |
| Before | After | Before | After |
| #covid | #covid19 | #harris | #kamalaharris |
| #covid\_\_19 | #makiyahbryant | #makhiabryant |
| #covid\_19 | #makiahbryant |
| #corona | #mikayahbryant |
| #coronavirus | #mahkiabryant |
| #covid19virus | #barackobama | #obama |
| #duantewright | #dauntewright | #republican | #republicans |
| #dantewright | #conservative | #conservatives |
| #daunte | #lgbtqia | #lgbtq |
| #duanewright | #antifas | #antifa |
| #dautewright | #asianlivesmattertoo | #asianlivesmatter |
| #duanewright | #asianlivesmatters |
| #daunewright | #whitesupremacist | #whitesupremacists |
| #dauntewrite | #aapis | #aapi |
| #joebiden | #biden | #democrat | #democrats |
| #presidentbiden | #guncontrolnow | #guncontrol |
| #bidenharris | #gunreformnow | #gunreform |
| #donaldjtrump | #trump | #asianhatecrime | #asianhatecrimes |
| #donaldtrump | #defundingthepolice | #defundthepolice |
| #floyd | #georgefloyd | #protests | #protest |
| #breonna | #breonnataylor | #stopasianhatecrime | #stopasianhatecrimes |
| #briannataylor | *#*racist | #racists |
| #chauvin | #derekchauvin | #policereform  (only P6,7,8) | #policereformnow |
| #derrickchauvin | #tiktoks | #tiktok |
| #derickchauvin | #tiktoker | #tiktokers |
| #harryandmeghanonoprah | #oprahmeghanharry | #meghan | #meghanmarkle |
| #oprahharrymeghan | #meganmarkle |
| #meghanandharryonoprah |  |  |

Appendix 2. Top 30 high-frequency hashtags by group in P1(3.2-3.8)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Rank | Group S (11685) | frequency | Group B (32814) | frequency | Group SB (94) | frequency |
| 1 | #stopasianhate | 13486 | #blacklivesmatter | 20368 | #stopasianhate | 94 |
| 2 | #noracisminmedia | 2222 | #blm | 14163 | #blacklivesmatter | 52 |
| 3 | #saynotoracism | 2202 | #ethiopia | 2745 | #blm | 45 |
| 4 | #asiansarehuman | 1835 | #tigraygenocide | 2698 | #asiansarehuman | 10 |
| 5 | #rassismus\_deutschemedien | 834 | #eritrea | 2657 | #asianlivesmatter | 7 |
| 6 | #racism\_germenmedia | 778 | #tigray | 2656 | #racismisnotanopinion | 6 |
| 7 | #notoracistmedia | 723 | #standwithtigray | 2636 | #lgbtq | 6 |
| 8 | #nosilence | 566 | #amhara | 2634 | #stopaapihate | 4 |
| 9 | #stopaapihate | 460 | #biden | 1534 | #racists | 4 |
| 10 | #notoracism | 442 | #mlk | 1074 | #racism | 4 |
| 11 | #germanmedia\_racism | 394 | #oprahmeghanharry | 1049 | #georgefloyd | 4 |
| 12 | #racismisnotanopinion | 372 | #resist | 1034 | #tiktok | 4 |
| 13 | #bayern3\_racism | 366 | #grenfelltower | 1030 | #protectasianlives | 4 |
| 14 | #nochanceforracism | 361 | #holocaustmemorialday | 1024 | #spreadlovestophate | 4 |
| 15 | #rageagainstracism | 349 | #covid19 | 929 | #tiktokers | 4 |
| 16 | #army\_help | 190 | #fbr | 925 | #notoracism | 3 |
| 17 | #bayern3racist | 186 | #georgefloyd | 915 | #black | 3 |
| 18 | #stopasianhatecrimes | 185 | #lgbtq | 882 | #blacktwitter | 3 |
| 19 | #asiansarehumans | 160 | #blacktwitter | 832 | #asian | 3 |
| 20 | #neinzurassismus | 145 | #antifa | 727 | #rageagainstracism | 2 |
| 21 | #wecantbesilenced | 137 | #miamibeach | 657 | #poc | 2 |
| 22 | #covid19 | 133 | #python | 648 | #diversity | 2 |
| 23 | #deutschemedien\_rassismus | 118 | #beachlife | 625 | #awareness | 2 |
| 24 | #asianlivesmatter | 115 | #racism | 618 | #asianamerican | 2 |
| 25 | #racism\_germanmedia | 98 | #motivation | 556 | #socialjustice | 2 |
| 26 | #aapi | 94 | #adwa125 | 556 | #tiktokviral | 2 |
| 27 | #hateisavirus | 90 | #noh8 | 544 | #asia | 2 |
| 28 | #btsarmy | 90 | #grassroots | 533 | #choosetochallenge | 2 |
| 29 | #racistgermanmedia | 79 | #ethiopiaprevails | 529 | #lgbt | 2 |
| 30 | #bayern3\_rassismus | 77 | #tweetuk | 527 | #allblacklivesmatter | 2 |

Appendix 2. Top 30 high-frequency hashtags by group in P2(3.9-3.15)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Rank | Group S (4060) | frequency | Group B (41979) | frequency | Group SB (147) | frequency |
| 1 | #stopasianhate | 4103 | #blacklivesmatter | 27168 | #stopasianhate | 148 |
| 2 | #stopaapihate | 426 | #blm | 17477 | #blacklivesmatter | 108 |
| 3 | #stopasianhatecrimes | 240 | #freesenegal | 2747 | #asianlivesmatter | 52 |
| 4 | #cancelmortgage | 147 | #breonnataylor | 2340 | #stopaapihate | 50 |
| 5 | #asiansarehuman | 114 | #endsars | 2172 | #stopthehate | 49 |
| 6 | #asianlivesmatter | 100 | #georgefloyd | 1788 | #savemyanmar | 47 |
| 7 | #cancelpropertytax | 89 | #biden | 1490 | #blm | 46 |
| 8 | #aapi | 79 | #sayhername | 1402 | #whatshappeninginmyanmar | 45 |
| 9 | #hateisavirus | 76 | #oprahmeghanharry | 1332 | #crimesagainsthumanity | 45 |
| 10 | #stoptheattacks | 74 | #mlk | 1009 | #poclivesmatter | 45 |
| 11 | #rentrelief | 73 | #grenfelltower | 986 | #erasinghate | 45 |
| 12 | #standforasians | 67 | #holocaustmemorialday | 975 | #shameonchina | 39 |
| 13 | #asianamericans | 46 | #racism | 907 | #biden | 9 |
| 14 | #asianamerican | 41 | #covid19 | 904 | #stopasianhatecrimes | 7 |
| 15 | #covid19 | 36 | #antifa | 873 | #stopracism | 6 |
| 16 | #stopracism | 35 | #blacktwitter | 857 | #maskup | 6 |
| 17 | #racism | 35 | #justiceforbreonnataylor | 820 | #1a | 6 |
| 18 | #worldnews | 35 | #lgbtq | 816 | #2a | 6 |
| 19 | #breakingnews | 35 | #resist | 812 | #nra | 6 |
| 20 | #metoo | 35 | #fbr | 712 | #doj | 6 |
| 21 | #blacklivesmaters | 34 | #policebrutality | 664 | #yanggang | 6 |
| 22 | #justiceforgeorge | 34 | #derekchauvin | 559 | #ubi | 6 |
| 23 | #meganmarkel | 34 | #minneapolis | 556 | #whiteprivilege | 6 |
| 24 | #asian | 31 | #miamibeach | 506 | #covid19 | 5 |
| 25 | #antiasianracism | 28 | #motivation | 500 | #racistroyals | 5 |
| 26 | #stophate | 28 | #python | 498 | #virus | 5 |
| 27 | #racismisavirus | 27 | #grassroots | 491 | #hateisavirus | 4 |
| 28 | #racists | 25 | #beachlife | 485 | #blacktwitter | 4 |
| 29 | #stopthehate | 24 | #tigray | 482 | #asiansarehuman | 4 |
| 30 | #enoughisenough | 21 | #noh8 | 479 | #racismisnotanopinion | 4 |

Appendix 2. Top 30 high-frequency hashtags by group in P3(3.16-3.22)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Rank | Group S (330685) | frequency | Group B (32465) | frequency | Group SB (4191) | frequency |
| 1 | #stopasianhate | 339202 | #blacklivesmatter | 20584 | #stopasianhate | 4242 |
| 2 | #asiansarehuman | 104594 | #blm | 13607 | #blacklivesmatter | 3316 |
| 3 | #racismisnotcomedy | 50467 | #asianlivesmatter | 2101 | #blm | 1048 |
| 4 | #stopasianhatecrimes | 21585 | #biden | 1205 | #asianlivesmatter | 400 |
| 5 | #stopaapihate | 20212 | #lgbtq | 897 | #stopaapihate | 345 |
| 6 | #racismisntcomedy | 10441 | #oprahmeghanharry | 872 | #stopasianhatecrimes | 333 |
| 7 | #asianlivesmatter | 8904 | #mlk | 862 | #asiansarehuman | 163 |
| 8 | #aapi | 2146 | #grenfelltower | 830 | #stopracism | 113 |
| 9 | #toppsracist | 1856 | #holocaustmemorialday | 829 | #racismisnotcomedy | 86 |
| 10 | #bighitprotectyourartists | 1813 | #racism | 794 | #whitesupremacy | 73 |
| 11 | #protectasianlives | 1708 | #antifa | 759 | #endracism | 71 |
| 12 | #atlanta | 1702 | #resist | 746 | #endwhitesupremacy | 68 |
| 13 | #stopracism | 1447 | #covid19 | 701 | #lgbtq | 65 |
| 14 | #asiansarehumans | 1352 | #fbr | 673 | #racism | 64 |
| 15 | #apologize\_to\_bts | 1333 | #ethiopiaprevails | 667 | #atlanta | 58 |
| 16 | #bighitdoaction | 1182 | #eritreaprevails | 662 | #transrightsarehumanrights | 51 |
| 17 | #asianarehuman | 1120 | #ethiopia | 637 | #stopthehate | 49 |
| 18 | #hateisavirus | 977 | #stopasianhatecrimes | 614 | #protectasianlives | 49 |
| 19 | #weloveyoubts | 842 | #usa | 567 | #stophate | 49 |
| 20 | #racismisnotanopinion | 834 | #blacktwitter | 565 | #stopwhiteterrorism | 47 |
| 21 | #racismisnotjoke | 815 | #miamibeach | 543 | #aapi | 44 |
| 22 | #covid19 | 797 | #python | 524 | #hateisavirus | 42 |
| 23 | #stophate | 757 | #motivation | 523 | #womenslivesmatter | 41 |
| 24 | #racism | 745 | #beachlife | 511 | #fightracism | 40 |
| 25 | #toppsxenophobic | 605 | #noh8 | 508 | #biden | 38 |
| 26 | #stpatricksday | 565 | #grassroots | 508 | #solidarity | 34 |
| 27 | #stopthehate | 561 | #stopaapihate | 505 | #stopwhitesupremacy | 33 |
| 28 | #asian | 559 | #tweetuk | 500 | #translivesmatter | 33 |
| 29 | #bts | 497 | #worldsspotlight | 499 | #metoo | 32 |
| 30 | #endracism | 485 | #weekdayuk | 498 | #antiracism | 30 |

Appendix 2. Top 30 high-frequency hashtags by group in P4(3.23-3.29)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Rank | Group S (51947) | frequency | Group B (31194) | frequency | Group SB (2152) | frequency |
| 1 | #stopasianhate | 52784 | #blacklivesmatter | 19624 | #stopasianhate | 2344 |
| 2 | #stopasianracism | 8400 | #blm | 13619 | #blacklivesmatter | 1678 |
| 3 | #protectasianlives | 7918 | #georgefloyd | 1819 | #stopasianhatecrimes | 730 |
| 4 | #stopaapihate | 5633 | #africa | 1383 | #blm | 562 |
| 5 | #stopasianhatecrimes | 4626 | #lgbtq | 917 | #stopracism | 457 |
| 6 | #asianlivesmatter | 1092 | #derekchauvintrial | 865 | #asianlivesmatter | 342 |
| 7 | #aapi | 939 | #racism | 816 | #stopaapihate | 171 |
| 8 | #asiansarehuman | 925 | #resist | 746 | #lgbtq | 54 |
| 9 | #asianamericans | 426 | #justiceforgeorgefloyd | 734 | #gunreform | 52 |
| 10 | #stopracism | 346 | #eritreaprevails | 667 | #racism | 46 |
| 11 | #hateisavirus | 337 | #ethiopiaprevails | 646 | #aapi | 44 |
| 12 | #muslimban | 334 | #covid19 | 645 | #guncontrol | 42 |
| 13 | #i\_want\_my\_miracle\_back | 333 | #blacktwitter | 641 | #whitesupremacy | 41 |
| 14 | #covid19 | 298 | #asianlivesmatter | 638 | #biden | 39 |
| 15 | #racism | 297 | #antifa | 618 | #asiansarehuman | 37 |
| 16 | #bbb21 | 266 | #fbr | 613 | #stophate | 37 |
| 17 | #protectasianlive | 256 | #biden | 599 | #endracism | 29 |
| 18 | #endracism | 225 | #motivation | 529 | #politicalcartoons | 24 |
| 19 | #asianamerican | 209 | #grassroots | 520 | #gopliesabouteverything | 23 |
| 20 | #restorethesnyderverse | 208 | #tweetuk | 517 | #biglie | 22 |
| 21 | #follotrick | 204 | #weekdayuk | 516 | #gopcowards | 21 |
| 22 | #stophate | 193 | #worldsspotlight | 516 | #trumpvirus | 21 |
| 23 | #solidarity | 186 | #noh8 | 512 | #donothinggop | 21 |
| 24 | #racismisnotcomedy | 183 | #weekenduk | 510 | #qpac | 21 |
| 25 | #folllow | 181 | #miamibeach | 491 | #guiltygop | 21 |
| 26 | #asian | 180 | #python | 472 | #gophypocrisy | 21 |
| 27 | #standwithasians | 172 | #usa | 469 | #karma | 21 |
| 28 | #grammys | 165 | #beachlife | 462 | #itiswhatitis | 21 |
| 29 | #asianhate | 152 | #derekchauvin | 405 | #antiasian | 20 |
| 30 | #chinaisnotourenemy | 150 | #eritrea | 336 | #bekind | 20 |

Appendix 2. Top 30 high-frequency hashtags by group in P5(3.30-4.5)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Rank | Group S (279329) | frequency | Group B (37062) | frequency | Group SB (1991) | frequency |
| 1 | #stopasianhate | 283904 | #blacklivesmatter | 24109 | #stopasianhate | 2043 |
| 2 | #stopaapihate | 215918 | #blm | 15282 | #blacklivesmatter | 1527 |
| 3 | #stopasianhatecrimes | 72005 | #georgefloyd | 3312 | #blm | 636 |
| 4 | #wewillstandtogether | 2242 | #derekchauvintrial | 2357 | #stopaapihate | 304 |
| 5 | #asianlivesmatter | 1791 | #justiceforgeorgefloyd | 1650 | #stopasianhatecrimes | 173 |
| 6 | #bts | 1340 | #racksterli | 1355 | #asianlivesmatter | 120 |
| 7 | #tachaspeaks | 1144 | #derekchauvin | 1209 | #biden | 57 |
| 8 | #racismisnotcomedy | 997 | #georgefloydtrial | 965 | #stopracism | 50 |
| 9 | #asiansarehuman | 991 | #lgbtq | 912 | #asiansarehuman | 47 |
| 10 | #weloveyoubts | 925 | #music | 892 | #aajc | 42 |
| 11 | #whatshappeninginmyanmar | 670 | #resist | 819 | #asianamericansadvancingjustice | 42 |
| 12 | #aapi | 551 | #racism | 796 | #debate | 42 |
| 13 | #stopracism | 507 | #fbr | 739 | #educationforall | 42 |
| 14 | #btsarmy | 489 | #blacktwitter | 611 | #lgbtq | 37 |
| 15 | #apr4coup | 479 | #motivation | 608 | #georgefloyd | 36 |
| 16 | #milkteaalliance | 457 | #noh8 | 604 | #transrightsarehumanrights | 35 |
| 17 | #covid19 | 442 | #asianlivesmatter | 603 | #racism | 34 |
| 18 | #racismisnotjoke | 399 | #biden | 602 | #cancelculture | 28 |
| 19 | #stopaaplhate | 390 | #grassroots | 599 | #metoo | 27 |
| 20 | #stopasianracism | 364 | #worldsspotlight | 598 | #asianhate | 26 |
| 21 | #ttrpg | 353 | #tweetuk | 597 | #trump | 26 |
| 22 | #방탄소년단 | 260 | #weekdayuk | 592 | #woke | 26 |
| 23 | #stophate | 228 | #weekenduk | 591 | #maga | 26 |
| 24 | #racksterli | 218 | #covid19 | 559 | #transdayofvisibility | 26 |
| 25 | #racism | 213 | #antifa | 539 | #guncontrol | 25 |
| 26 | #asianhate | 212 | #derekchauvinisguilty | 490 | #stophate | 24 |
| 27 | #protectasianlives | 205 | #icantbreathe | 434 | #newsmax | 24 |
| 28 | #army | 202 | #policebrutality | 427 | #oann | 24 |
| 29 | #bts\_twt | 197 | #nojusticenopeace | 421 | #trump2024 | 24 |
| 30 | #youtube | 197 | #msnbc | 402 | #foxnews | 23 |

Appendix 2. Top 30 high-frequency hashtags by group in P6(4.6-4.12)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Rank | Group S (19646) | frequency | Group B (509722) | frequency | Group SB (1155) | frequency |
| 1 | #stopasianhate | 20531 | #blacklivesmatter | 33319 | #stopasianhate | 1163 |
| 2 | #mibarriomega | 4885 | #blm | 21552 | #blacklivesmatter | 900 |
| 3 | #stopasianhatecrimes | 4470 | #dauntewright | 5383 | #blm | 540 |
| 4 | #racismisnotcomedy | 4027 | #georgefloyd | 2270 | #echopark | 201 |
| 5 | #stopaapihate | 2285 | #justicefordauntewright | 2230 | #bluecheck | 201 |
| 6 | #megaculiao | 1082 | #derekchauvintrial | 1325 | #bluechecks | 201 |
| 7 | #elracismonoescomedia | 1023 | #policebrutality | 1172 | #echoparkriseup | 136 |
| 8 | #asianlivesmatter | 549 | #lgbtq | 1084 | #derekchauvin | 106 |
| 9 | #whatshappeninginmyanmar | 363 | #defundthepolice | 1051 | #generalstrike | 102 |
| 10 | #internetshutdown | 338 | #derekchauvin | 1017 | #nationalstrike | 102 |
| 11 | #ttrpg | 326 | #blacktwitter | 1002 | #nationalboycott | 102 |
| 12 | #milkteaalliance | 298 | #racism | 947 | #fuckcensorship | 102 |
| 13 | #racismlsnotcomedy | 286 | #justiceforgeorgefloyd | 874 | #freeassangenow | 102 |
| 14 | #aapi | 279 | #resist | 832 | #actionforassange | 102 |
| 15 | #spreadlove | 171 | #covid19 | 777 | #breaking | 101 |
| 16 | #apr9coup | 171 | #biden | 738 | #joemanchin | 99 |
| 17 | #youtube | 169 | #sayhisname | 714 | #boycotts | 99 |
| 18 | #covid19 | 168 | #brooklyncenter | 709 | #m4a | 99 |
| 19 | #spreadlovenotfear | 165 | #fbr | 676 | #fightfor15 | 99 |
| 20 | #spreadpeace | 165 | #antifa | 655 | #endthefilibuster | 99 |
| 21 | #racismonoeshumor | 165 | #policereformnow | 649 | #stopasianhatecrimes | 72 |
| 22 | #ttrpgsolidarity | 162 | #minneapolis | 647 | #berniebros | 65 |
| 23 | #fantastictalesofadventure | 161 | #acab | 639 | #berniesanders | 65 |
| 24 | #asiansarehuman | 126 | #motivation | 572 | #stopaapihate | 47 |
| 25 | #mibarrio | 116 | #noh8 | 560 | #biden | 39 |
| 26 | #racism | 100 | #grassroots | 556 | #asianlivesmatter | 36 |
| 27 | #stopracism | 93 | #tweetuk | 553 | #lgbtq | 30 |
| 28 | #forceavote | 85 | #weekdayuk | 553 | #racism | 25 |
| 29 | #stophate | 84 | #weekenduk | 545 | #georgefloyd | 23 |
| 30 | #rihanna | 76 | #worldsspotlight | 544 | #transrightsarehumanrights | 22 |

Appendix 2. Top 30 high-frequency hashtags by group in P7(4.13-4.19)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Rank | Group S (12420) | frequency | Group B (74492) | frequency | Group SB (1217) | frequency |
| 1 | #stopasianhate | 12527 | #blacklivesmatter | 52747 | #stopasianhate | 1235 |
| 2 | #stopasianhatecrimes | 1855 | #blm | 27566 | #blacklivesmatter | 915 |
| 3 | #stopaapihate | 1279 | #dauntewright | 9294 | #blm | 418 |
| 4 | #asianlivesmatter | 852 | #georgefloyd | 3293 | #stopasianhatecrimes | 76 |
| 5 | #racismisnotcomedy | 339 | #justicefordauntewright | 2647 | #covid19 | 63 |
| 6 | #elracismonoescomedia | 265 | #derekchauvintrial | 2317 | #dauntewright | 59 |
| 7 | #aapi | 224 | #defundthepolice | 2028 | #racism | 58 |
| 8 | #whatshappeninginmyanmar | 177 | #policereformnow | 1831 | #stopaapihate | 49 |
| 9 | #milkteaalliance | 149 | #justiceforgeorgefloyd | 1427 | #lgbtq | 44 |
| 10 | #internetshutdown | 132 | #policebrutality | 1411 | #asianlivesmatter | 37 |
| 11 | #stopracism | 126 | #blacktwitter | 1378 | #defundthepolice | 36 |
| 12 | #covid19 | 124 | #brooklyncenter | 1348 | #transrightsarehumanrights | 35 |
| 13 | #apr15coup | 123 | #antifa | 1303 | #guncontrol | 34 |
| 14 | #savemyanmar | 110 | #acab | 1236 | #justicefordauntewright | 32 |
| 15 | #weneedr2pinmyanmar | 106 | #racism | 1187 | #biden | 29 |
| 16 | #trumpvirus | 97 | #adamtoledo | 1184 | #aapi | 28 |
| 17 | #asiansarehuman | 97 | #biden | 1080 | #stopracism | 27 |
| 18 | #indianapolis | 96 | #derekchauvin | 972 | #georgefloyd | 25 |
| 19 | #racism | 82 | #nojusticenopeace | 968 | #justice | 21 |
| 20 | #resist | 79 | #minneapolis | 934 | #racists | 21 |
| 21 | #fbr | 78 | #sayhisname | 912 | #votersuppression | 21 |
| 22 | #fbrparty | 77 | #abolishthepolice | 910 | #acab | 21 |
| 23 | #staceyabrams | 77 | #covid19 | 828 | #stophate | 20 |
| 24 | #wearegeorgefloyd | 77 | #lgbtq | 773 | #politicalcartoons | 20 |
| 25 | #mibarriomega | 76 | #police | 704 | #solidarity | 18 |
| 26 | #releasethedetainees | 69 | #breonnataylor | 694 | #gophypocrisy | 18 |
| 27 | #asian | 65 | #resist | 657 | #karma | 18 |
| 28 | #stophate | 62 | #minnesota | 641 | #buildbackbetter | 18 |
| 29 | #racismonoescomedia | 62 | #mlk | 641 | #fuckcensorship | 18 |
| 30 | #asianhate | 61 | #usa | 621 | #freeassangenow | 18 |

Appendix 2. Top 30 high-frequency hashtags by group in P8(4.20-4.26)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Rank | Group S (12026) | frequency | Group B (142587) | frequency | Group SB (1247) | frequency |
| 1 | #stopasianhate | 12950 | #blacklivesmatter | 107047 | #stopasianhate | 1247 |
| 2 | #stopaapihate | 1679 | #blm | 43862 | #blacklivesmatter | 994 |
| 3 | #stopasianhatecrimes | 1608 | #georgefloyd | 14848 | #blm | 423 |
| 4 | #justiceforponzu | 1432 | #justiceforgeorgefloyd | 12243 | #stopasianhatecrimes | 143 |
| 5 | #bannon | 750 | #remembermynoah | 7235 | #georgefloyd | 126 |
| 6 | #drlimengyan1 | 742 | #noahsarmy | 6760 | #justice | 101 |
| 7 | #闫丽梦 | 718 | #derekchauvintrial | 6709 | #stopracism | 94 |
| 8 | #limengyan | 683 | #week44 | 6642 | #policereformnow | 92 |
| 9 | #郭文贵 | 673 | #thenoahdonohoefoundation | 5828 | #justiceforgeorgefloyd | 89 |
| 10 | #yanlimeng | 635 | #georgefloydtrial | 5400 | #racists | 87 |
| 11 | #stop | 523 | #makhiabryant | 5058 | #covid19 | 86 |
| 12 | #hissapologizetobts | 388 | #derekchauvin | 4443 | #love | 81 |
| 13 | #standwithsikhs | 285 | #derekchauvinisguilty | 3847 | #equality | 74 |
| 14 | #asianlivesmatter | 219 | #guilty | 3073 | #endracism | 73 |
| 15 | #covid19 | 202 | #justice | 2665 | #nojusticenopeace | 71 |
| 16 | #indianapolis | 181 | #sayhername | 2477 | #station19 | 70 |
| 17 | #aapi | 173 | #derekchauvinverdict | 2034 | #policebrutality | 69 |
| 18 | #asiansarehuman | 155 | #policereformnow | 1987 | #lgbtq | 65 |
| 19 | #weloveyoubts | 151 | #defundthepolice | 1884 | #protest | 65 |
| 20 | #trumpvirus | 86 | #georgefloydverdict | 1807 | #stopaapihate | 64 |
| 21 | #oscars | 86 | #blacktwitter | 1551 | #black | 64 |
| 22 | #resist | 72 | #antifa | 1539 | #racism | 63 |
| 23 | #ethnicity | 72 | #policebrutality | 1433 | #antiracism | 63 |
| 24 | #fbr | 71 | #racism | 1352 | #racisminamerica | 61 |
| 25 | #ccp | 71 | #dauntewright | 1352 | #blackhistory | 61 |
| 26 | #fbrparty | 69 | #nojusticenopeace | 1169 | #usa | 57 |
| 27 | #staceyabrams | 69 | #abolishthepolice | 1075 | #politics | 52 |
| 28 | #wearegeorgefloyd | 69 | #acab | 1049 | #biden | 39 |
| 29 | #unrestrictedbioweapon | 64 | #verdict | 1034 | #transrightsarehumanrights | 33 |
| 30 | #亚裔歧视 | 64 | #saytheirnames | 1000 | #blacktwitter | 33 |

Appendix 3. Centrality measures of Group S in P1 and P2

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Rank | P1(3.2-3.8) | | | | P2(3.9-3.15) | | | |
| hashtag | Degree | hashtag | Betweenness | hashtag | Degree | hashtag | Betweenness |
| 1 | #stopasianhate | 8.538368 | #stopasianhate | 0.951625 | #stopasianhate | 3.028055 | #stopasianhate | 0.952313 |
| 2 | #noracisminmedia | 3.232633 | #stopaapihate | 0.005664 | #stopaapihate | 0.624688 | #stopaapihate | 0.012463 |
| 3 | #saynotoracism | 3.21042 | #asiansarehuman | 0.004847 | #asiansarehuman | 0.389027 | #stopasianhatecrimes | 0.003019 |
| 4 | #asiansarehuman | 2.094507 | #covid19 | 0.004139 | #stopasianhatecrimes | 0.370948 | #asiansarehuman | 0.002314 |
| 5 | #rassismus\_deutschemedien | 1.365913 | #fortnite | 0.001199 | #asianlivesmatter | 0.352868 | #asianlivesmatter | 0.002027 |
| 6 | #racism\_germenmedia | 1.269386 | #notoracism | 0.00119 | #cancelmortgage | 0.292394 | #asian | 0.001893 |
| 7 | #bayern3\_racism | 1.107835 | #ada | 0.001183 | #standforasians | 0.264963 | #hateisavirus | 0.001694 |
| 8 | #notoracism | 1.046446 | #aapi | 0.000916 | #cancelpropertytax | 0.220075 | #asianamerican | 0.00161 |
| 9 | #racismisnotanopinion | 0.982633 | #racism | 0.000856 | #hateisavirus | 0.211347 | #stoptheattacks | 0.001437 |
| 10 | #germanmedia\_racism | 0.976575 | #love | 0.000757 | #stoptheattacks | 0.203865 | #covid19 | 0.001377 |
| 11 | #notoracistmedia | 0.956785 | #stopasianhatecrimes | 0.000755 | #metoo | 0.203865 | #stopracism | 0.001177 |
| 12 | #rageagainstracism | 0.774233 | #asianlivesmatter | 0.000731 | #worldnews | 0.202618 | #aapi | 0.001029 |
| 13 | #nosilence | 0.772617 | #bayern3racist | 0.000676 | #breakingnews | 0.202618 | #antiasianracism | 0.001006 |
| 14 | #covid19 | 0.771002 | #bts | 0.000639 | #blacklivesmaters | 0.199501 | #racism | 0.000894 |
| 15 | #nochanceforracism | 0.760097 | #hateisavirus | 0.000433 | #justiceforgeorge | 0.199501 | #asianamericans | 0.000889 |
| 16 | #stopaapihate | 0.516559 | #breakingnews | 0.000427 | #meganmarkel | 0.199501 | #grammys | 0.000564 |
| 17 | #asiansarehumans | 0.494346 | #asianamerican | 0.000419 | #rentrelief | 0.19015 | #racismisavirus | 0.000513 |
| 18 | #neinzurassismus | 0.469709 | #asian | 0.000411 | #asianamerican | 0.171446 | #enoughisenough | 0.000441 |
| 19 | #bayern3racist | 0.46042 | #cpac2021 | 0.000382 | #asian | 0.163965 | #usa | 0.000398 |
| 20 | #wecantbesilenced | 0.428918 | #drseuss | 0.000357 | #aapi | 0.144638 | #nyc | 0.000326 |
| 21 | #deutschemedien\_rassismus | 0.390953 | #india | 0.000342 | #asianamericans | 0.117207 | #racists | 0.000324 |
| 22 | #siguemeytesigo | 0.383683 | #instagram | 0.000337 | #racismisavirus | 0.11409 | #share | 0.000304 |
| 23 | #lifestyle | 0.383683 | #noracisminmedia | 0.000317 | #stopracism | 0.110973 | #standforasians | 0.000274 |
| 24 | #army\_help | 0.352181 | #saynotoracism | 0.000306 | #covid19 | 0.109726 | #meghanmarkle | 0.000265 |
| 25 | #vintage | 0.306543 | #trump | 0.000303 | #antiasianracism | 0.106608 | #equality | 0.000255 |
| 26 | #bayern3\_rassismus | 0.301292 | #usa | 0.000288 | #racism | 0.101621 | #retweet | 0.000229 |
| 27 | #gh | 0.300889 | #stoptheattacks | 0.00028 | #enoughisenough | 0.087282 | #asianhate | 0.000209 |
| 28 | #racistgermanmedia | 0.300081 | #metoo | 0.000274 | #seattle | 0.073566 | #stophate | 0.000177 |
| 29 | #germanmedia\_racist | 0.28958 | #gh | 0.000269 | #stopthehate | 0.072319 | #chinatown | 0.000176 |
| 30 | #btsarmy | 0.246365 | #ethereum | 0.000269 | #stophate | 0.062968 | #california | 0.000175 |

Appendix 3. Centrality measures of Group S in P3 and P4

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Rank | P3(3.16-3.22) | | | | P4(3.23-3.29) | | | |
| hashtag | Degree | hashtag | Betweenness | hashtag | Degree | hashtag | Betweenness |
| 1 | #stopasianhate | 15.52203 | #stopasianhate | 0.947619 | #stopasianhate | 6.515073 | #stopasianhate | 0.952614 |
| 2 | #asiansarehuman | 7.565466 | #stopasianhatecrimes | 0.012079 | #stopasianracism | 1.668111 | #stopaapihate | 0.019293 |
| 3 | #racismisnotcomedy | 4.619857 | #stopaapihate | 0.011814 | #protectasianlives | 1.593277 | #stopasianhatecrimes | 0.008833 |
| 4 | #stopasianhatecrimes | 2.164041 | #asiansarehuman | 0.005323 | #stopaapihate | 1.329866 | #aapi | 0.002212 |
| 5 | #stopaapihate | 1.957254 | #racismisnotcomedy | 0.004317 | #stopasianhatecrimes | 1.218241 | #asianlivesmatter | 0.001678 |
| 6 | #asianlivesmatter | 1.120884 | #asianlivesmatter | 0.002854 | #asianlivesmatter | 0.379081 | #covid19 | 0.001125 |
| 7 | #racismisntcomedy | 1.003699 | #atlanta | 0.001422 | #asiansarehuman | 0.334104 | #love | 0.000831 |
| 8 | #bighitprotectyourartists | 0.381468 | #covid19 | 0.001412 | #aapi | 0.291438 | #racism | 0.000772 |
| 9 | #apologize\_to\_bts | 0.306617 | #stpatricksday | 0.001239 | #covid19 | 0.203987 | #asiansarehuman | 0.000678 |
| 10 | #atlanta | 0.295474 | #aapi | 0.00069 | #bbb21 | 0.176828 | #asian | 0.000619 |
| 11 | #covid19 | 0.291684 | #love | 0.000472 | #stopracism | 0.161418 | #hateisavirus | 0.000457 |
| 12 | #bighitdoaction | 0.277527 | #stopracism | 0.000446 | #hateisavirus | 0.148801 | #stopracism | 0.000427 |
| 13 | #aapi | 0.273371 | #racism | 0.000426 | #racism | 0.145237 | #usa | 0.000415 |
| 14 | #toppsracist | 0.259396 | #asian | 0.000424 | #work | 0.126071 | #asianamerican | 0.000405 |
| 15 | #stopracism | 0.194684 | #snydercut | 0.00042 | #love | 0.118174 | #stophate | 0.000382 |
| 16 | #asiansarehumans | 0.177102 | #wednesdaythought | 0.000333 | #follotrick | 0.11644 | #china | 0.000207 |
| 17 | #protectasianlives | 0.17354 | #asians | 0.000283 | #asian | 0.116344 | #asianamericans | 0.000205 |
| 18 | #asian | 0.164269 | #stophate | 0.000254 | #asianamericans | 0.108061 | #asianhate | 0.0002 |
| 19 | #stpatricksday | 0.163219 | #asianamericans | 0.000239 | #asianamerican | 0.105942 | #asians | 0.000166 |
| 20 | #racism | 0.159657 | #usa | 0.000215 | #blasianbusinessowner | 0.101897 | #america | 0.000163 |
| 21 | #hateisavirus | 0.141755 | #stopthehate | 0.000209 | #fashion | 0.098719 | #stopthehate | 0.00015 |
| 22 | #asianarehuman | 0.130292 | #hateisavirus | 0.000207 | #fashionista | 0.093422 | #atlanta | 0.000133 |
| 23 | #weloveyoubts | 0.12367 | #asianamerican | 0.000157 | #folllow | 0.089955 | #antiracism | 0.000128 |
| 24 | #racismisnotjoke | 0.11924 | #bts | 0.000156 | #stop | 0.088221 | #stopasianracism | 0.000127 |
| 25 | #asians | 0.11787 | #endracism | 0.000151 | #asianhate | 0.087643 | #canada | 0.000126 |
| 26 | #stophate | 0.115267 | #cashappbitcoin | 0.000132 | #stophate | 0.087547 | #guncontrol | 0.000126 |
| 27 | #asianamericans | 0.114902 | #justice | 9.54E-05 | #workingmom | 0.085621 | #enoughisenough | 0.000109 |
| 28 | #bts | 0.112755 | #zacksnydersjusticeleague | 9.30E-05 | #grammys | 0.084561 | #racists | 0.000109 |
| 29 | #snydercut | 0.112253 | #アベヒル | 9.13E-05 | #fashionstyle | 0.083309 | #tiktok | 0.000105 |
| 30 | #racismisnotanopinion | 0.108873 | #china | 8.70E-05 | #buyblack4life | 0.081961 | #biden | 0.000104 |

Appendix 3. Centrality measures of Group S in P5 and P6

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Rank | P5(3.30-4.5) | | | | P6(4.6-4.12) | | | |
| hashtag | Degree | hashtag | Betweenness | hashtag | Degree | hashtag | Betweenness |
| 1 | #stopasianhate | 28.05216 | #stopasianhate | 0.942198 | #stopasianhate | 6.695011 | #stopasianhate | 0.964262 |
| 2 | #stopaapihate | 25.11772 | #stopaapihate | 0.032695 | #mibarriomega | 2.870357 | #stopaapihate | 0.009409 |
| 3 | #stopasianhatecrimes | 12.48772 | #stopasianhatecrimes | 0.008126 | #stopasianhatecrimes | 2.697378 | #stopasianhatecrimes | 0.007178 |
| 4 | #asianlivesmatter | 0.573182 | #covid19 | 0.002172 | #racismisnotcomedy | 2.467589 | #covid19 | 0.003548 |
| 5 | #bts | 0.393195 | #asianlivesmatter | 0.000984 | #stopaapihate | 1.160597 | #asianlivesmatter | 0.001728 |
| 6 | #wewillstandtogether | 0.377227 | #satanshoes | 0.000808 | #megaculiao | 0.85488 | #aapi | 0.001066 |
| 7 | #racismisnotcomedy | 0.354357 | #bts | 0.000778 | #asianlivesmatter | 0.518572 | #racism | 0.000625 |
| 8 | #weloveyoubts | 0.347376 | #aapi | 0.000698 | #whatshappeninginmyanmar | 0.379461 | #asian | 0.000605 |
| 9 | #covid19 | 0.275558 | #asian | 0.000384 | #internetshutdown | 0.365076 | #asianamerican | 0.000363 |
| 10 | #asiansarehuman | 0.267212 | #asiansarehuman | 0.000345 | #milkteaalliance | 0.325018 | #usa | 0.000359 |
| 11 | #whatshappeninginmyanmar | 0.262478 | #love | 0.000318 | #elracismonoescomedia | 0.319192 | #art | 0.000308 |
| 12 | #apr4coup | 0.190419 | #tuesdayvibe | 0.000282 | #covid19 | 0.2815 | #stophate | 0.000276 |
| 13 | #milkteaalliance | 0.185364 | #usa | 0.000267 | #ttrpg | 0.23598 | #asiansarehuman | 0.00027 |
| 14 | #btsarmy | 0.163537 | #racism | 0.000256 | #apr9coup | 0.182811 | #love | 0.000252 |
| 15 | #racismisnotjoke | 0.153507 | #racksterli | 0.000234 | #aapi | 0.168791 | #stopracism | 0.000238 |
| 16 | #aapi | 0.135291 | #stopracism | 0.000226 | #youtube | 0.165331 | #biden | 0.000215 |
| 17 | #bbb21 | 0.127106 | #stanworld | 0.000222 | #racismlsnotcomedy | 0.155135 | #bts | 0.000203 |
| 18 | #stopracism | 0.119804 | #asianamerican | 0.000205 | #ttrpgsolidarity | 0.146759 | #nyc | 0.000166 |
| 19 | #ttrpg | 0.113625 | #btsarmy | 0.000189 | #fantastictalesofadventure | 0.146577 | #china | 0.000161 |
| 20 | #satanshoes | 0.109533 | #tuesdaymotivations | 0.000157 | #asiansarehuman | 0.113438 | #asianhate | 0.000142 |
| 21 | #tachaspeaks | 0.10857 | #stophate | 0.000137 | #forceavote | 0.09705 | #california | 0.000133 |
| 22 | #방탄소년단 | 0.092281 | #asianhate | 0.000125 | #spreadlove | 0.093773 | #racismisnotcomedy | 0.000112 |
| 23 | #youtube | 0.090676 | #kpop | 0.000124 | #spreadlovenotfear | 0.090131 | #lgbtq | 0.000112 |
| 24 | #jungkook | 0.089071 | #bbb21 | 0.000111 | #spreadpeace | 0.090131 | #asianamericans | 0.000104 |
| 25 | #love | 0.08875 | #china | 0.000107 | #racismonoeshumor | 0.08394 | #newyork | 9.77E-05 |
| 26 | #stanworld | 0.087145 | #quotes | 0.000107 | #asian | 0.082666 | #btsarmy | 9.43E-05 |
| 27 | #tuesdayvibe | 0.086904 | #pakistan | 0.000106 | #racism | 0.082484 | #beautiful | 9.29E-05 |
| 28 | #racksterli | 0.084497 | #instagramdown | 0.000106 | #bts | 0.077749 | #dogecoin | 9.11E-05 |
| 29 | #usa | 0.08217 | #trending | 8.94E-05 | #sangeberat | 0.071012 | #stopthehate | 9.04E-05 |
| 30 | #asianhate | 0.078398 | #godzillavskong | 8.76E-05 | #cat | 0.067917 | #asians | 7.49E-05 |

Appendix 3. Centrality measures of Group S in P7 and P8

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Rank | P7(4.13-4.19) | | | | P8(4.20-4.26) | | | |
| hashtag | Degree | hashtag | Betweenness | hashtag | Degree | hashtag | Betweenness |
| 1 | #stopasianhate | 3.799125 | #stopasianhate | 0.963004 | #stopasianhate | 6.920965 | #stopasianhate | 0.962438 |
| 2 | #stopasianhatecrimes | 0.95249 | #stopaapihate | 0.010474 | #stopasianhatecrimes | 2.258874 | #stopaapihate | 0.009259 |
| 3 | #stopaapihate | 0.70348 | #stopasianhatecrimes | 0.007374 | #stopaapihate | 2.245622 | #stopasianhatecrimes | 0.007964 |
| 4 | #asianlivesmatter | 0.459679 | #aapi | 0.00184 | #bannon | 1.739707 | #covid19 | 0.002554 |
| 5 | #whatshappeninginmyanmar | 0.20921 | #covid19 | 0.001413 | #drlimengyan1 | 1.711311 | #aapi | 0.001255 |
| 6 | #racismisnotcomedy | 0.182538 | #asianlivesmatter | 0.001329 | #闫丽梦 | 1.688121 | #asianlivesmatter | 0.001148 |
| 7 | #milkteaalliance | 0.180871 | #asian | 0.001151 | #limengyan | 1.535495 | #asian | 0.000922 |
| 8 | #internetshutdown | 0.17462 | #racism | 0.000859 | #郭文贵 | 1.500947 | #oscars | 0.000745 |
| 9 | #aapi | 0.162951 | #stopracism | 0.000456 | #yanlimeng | 1.45504 | #justiceforponzu | 0.000556 |
| 10 | #savemyanmar | 0.159617 | #asianamerican | 0.000418 | #stop | 1.159252 | #racism | 0.000459 |
| 11 | #weneedr2pinmyanmar | 0.150448 | #blinkvsarmys | 0.000417 | #justiceforponzu | 0.545433 | #asianamerican | 0.000348 |
| 12 | #trumpvirus | 0.150031 | #stophate | 0.000366 | #covid19 | 0.422149 | #china | 0.000344 |
| 13 | #apr15coup | 0.143363 | #viral | 0.000315 | #ethnicity | 0.216044 | #stopracism | 0.000246 |
| 14 | #covid19 | 0.142321 | #asiansarehuman | 0.000295 | #ccp | 0.207761 | #viral | 0.000219 |
| 15 | #elracismonoescomedia | 0.128152 | #love | 0.000265 | #unrestrictedbioweapon | 0.196403 | #usa | 0.000203 |
| 16 | #asian | 0.107522 | #trending | 0.00026 | #亚裔歧视 | 0.196403 | #love | 0.000203 |
| 17 | #asiansarehuman | 0.104814 | #racists | 0.000247 | #unrestrictedbiowarfare | 0.1938 | #makhiabryant | 0.000196 |
| 18 | #releasethedetainees | 0.104397 | #usa | 0.000245 | #asianlivesmatter | 0.178893 | #fashion | 0.000162 |
| 19 | #resist | 0.101896 | #asianhate | 0.000233 | #trumpvirus | 0.177473 | #dragrace | 0.000161 |
| 20 | #fbr | 0.099604 | #china | 0.000207 | #hissapologizetobts | 0.173213 | #biden | 0.000154 |
| 21 | #fbrparty | 0.098771 | #equality | 0.000176 | #aapi | 0.17132 | #asiansarehuman | 0.00014 |
| 22 | #staceyabrams | 0.098771 | #stopthehate | 0.000145 | #fbr | 0.139849 | #art | 0.000124 |
| 23 | #wearegeorgefloyd | 0.098771 | #endracism | 0.000136 | #resist | 0.138429 | #เราชนะ | 0.000124 |
| 24 | #racism | 0.086685 | #bts | 0.000135 | #fbrparty | 0.135589 | #nyc | 0.000123 |
| 25 | #stopracism | 0.086476 | #peace | 0.000126 | #staceyabrams | 0.135589 | #india | 0.000112 |
| 26 | #asianamerican | 0.07189 | #biden | 0.000117 | #wearegeorgefloyd | 0.135589 | #instagram | 0.000108 |
| 27 | #love | 0.070223 | #stopbullying | 0.000115 | #standwithsikhs | 0.13204 | #joshhawley | 0.000104 |
| 28 | #protectasianlives | 0.069181 | #asians | 0.000111 | #asiansarehuman | 0.119025 | #asianamericans | 0.000103 |
| 29 | #foxnews | 0.067097 | #life | 9.47E-05 | #yanlimengyou | 0.114529 | #indianapolis | 9.90E-05 |
| 30 | #maga | 0.064388 | #cancelexamspakistan2021 | 9.40E-05 | #039 | 0.114529 | #georgefloyd | 9.11E-05 |

Appendix 3. Centrality measures of Group B in P1 and P2

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Rank | P1(3.2-3.8) | | | | P2(3.9-3.15) | | | |
| hashtag | Degree | hashtag | Betweenness | hashtag | Degree | hashtag | Betweenness |
| 1 | #blacklivesmatter | 3.687942 | #blacklivesmatter | 0.54584 | #blacklivesmatter | 3.83581 | #blacklivesmatter | 0.570304 |
| 2 | #blm | 2.697746 | #blm | 0.44351 | #blm | 2.722938 | #blm | 0.421268 |
| 3 | #ethiopia | 0.827724 | #covid19 | 0.008743 | #biden | 0.467808 | #covid19 | 0.00854 |
| 4 | #tigraygenocide | 0.817263 | #blacktwitter | 0.008638 | #georgefloyd | 0.45196 | #blacktwitter | 0.006639 |
| 5 | #tigray | 0.807964 | #antifa | 0.005078 | #lgbtq | 0.397811 | #racism | 0.0065 |
| 6 | #eritrea | 0.805892 | #racism | 0.00495 | #resist | 0.396066 | #georgefloyd | 0.005905 |
| 7 | #standwithtigray | 0.801749 | #georgefloyd | 0.003925 | #breonnataylor | 0.388567 | #antifa | 0.004618 |
| 8 | #amhara | 0.800889 | #blackhistorymonth | 0.003904 | #covid19 | 0.375784 | #breonnataylor | 0.004171 |
| 9 | #resist | 0.558015 | #biden | 0.003893 | #fbr | 0.349795 | #biden | 0.003028 |
| 10 | #biden | 0.515363 | #lgbtq | 0.003385 | #oprahmeghanharry | 0.32489 | #lgbtq | 0.002733 |
| 11 | #lgbtq | 0.49717 | #love | 0.002998 | #motivation | 0.279374 | #racists | 0.002358 |
| 12 | #fbr | 0.47645 | #womenshistorymonth | 0.002952 | #grassroots | 0.278147 | #love | 0.002294 |
| 13 | #covid19 | 0.424399 | #usa | 0.002929 | #freesenegal | 0.27244 | #usa | 0.002275 |
| 14 | #motivation | 0.35476 | #black | 0.002336 | #endsars | 0.27178 | #black | 0.002202 |
| 15 | #noh8 | 0.347989 | #art | 0.002158 | #noh8 | 0.267346 | #metoo | 0.001866 |
| 16 | #grassroots | 0.342682 | #internationalwomensday | 0.00201 | #tweetuk | 0.26645 | #sayhername | 0.001866 |
| 17 | #tweetuk | 0.339448 | #metoo | 0.001915 | #worldsspotlight | 0.26645 | #blackownedbusiness | 0.001618 |
| 18 | #worldsspotlight | 0.339448 | #trump | 0.001629 | #weekdayuk | 0.265365 | #defundthepolice | 0.001615 |
| 19 | #weekenduk | 0.338892 | #blackownedbusiness | 0.001572 | #weekenduk | 0.263289 | #policebrutality | 0.00158 |
| 20 | #weekdayuk | 0.338791 | #america | 0.001435 | #racism | 0.255318 | #womenshistorymonth | 0.001529 |
| 21 | #blacktwitter | 0.281079 | #racists | 0.001415 | #mlk | 0.239611 | #blackhistorymonth | 0.001411 |
| 22 | #mlk | 0.259248 | #blackexcellence | 0.001413 | #derekchauvin | 0.233432 | #blackgirlmagic | 0.001364 |
| 23 | #oprahmeghanharry | 0.252325 | #equality | 0.001295 | #grenfelltower | 0.232772 | #meghanmarkle | 0.001318 |
| 24 | #grenfelltower | 0.242925 | #democrats | 0.001201 | #minneapolis | 0.231782 | #grammys | 0.001257 |
| 25 | #holocaustmemorialday | 0.241813 | #blackgirlmagic | 0.00114 | #holocaustmemorialday | 0.230272 | #trump | 0.001254 |
| 26 | #followback | 0.241055 | #socialjustice | 0.001138 | #blacktwitter | 0.228385 | #oprahmeghanharry | 0.001189 |
| 27 | #wed | 0.239539 | #hiphop | 0.001116 | #sayhername | 0.208245 | #justice | 0.001132 |
| 28 | #georgefloyd | 0.209824 | #africa | 0.001102 | #breaking | 0.198953 | #acab | 0.001109 |
| 29 | #racism | 0.208258 | #lgbt | 0.001062 | #icantbreathe | 0.198151 | #justiceforbreonnataylor | 0.001108 |
| 30 | #antifa | 0.174196 | #nyc | 0.00105 | #minnesota | 0.193812 | #democrats | 0.001047 |

Appendix 3. Centrality measures of Group B in P3 and P4

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Rank | P3(3.16-3.22) | | | | P4(3.23-3.29) | | | |
| hashtag | Degree | hashtag | Betweenness | hashtag | Degree | hashtag | Betweenness |
| 1 | #blacklivesmatter | 3.363673 | #blacklivesmatter | 0.594358 | #blacklivesmatter | 3.234943 | #blacklivesmatter | 0.565262 |
| 2 | #blm | 2.242832 | #blm | 0.399175 | #blm | 2.438216 | #blm | 0.43485 |
| 3 | #lgbtq | 0.446485 | #asianlivesmatter | 0.010684 | #lgbtq | 0.497018 | #blacktwitter | 0.007353 |
| 4 | #resist | 0.396147 | #covid19 | 0.007292 | #resist | 0.415783 | #racism | 0.006823 |
| 5 | #biden | 0.393395 | #racism | 0.006512 | #africa | 0.376775 | #covid19 | 0.006134 |
| 6 | #fbr | 0.355367 | #antifa | 0.004878 | #georgefloyd | 0.356083 | #georgefloyd | 0.004956 |
| 7 | #asianlivesmatter | 0.352865 | #blacktwitter | 0.004569 | #fbr | 0.350435 | #lgbtq | 0.004093 |
| 8 | #motivation | 0.30653 | #lgbtq | 0.00375 | #motivation | 0.316706 | #asianlivesmatter | 0.00387 |
| 9 | #grassroots | 0.297473 | #biden | 0.003414 | #grassroots | 0.311164 | #antifa | 0.003324 |
| 10 | #noh8 | 0.296372 | #georgefloyd | 0.002459 | #tweetuk | 0.308947 | #biden | 0.00274 |
| 11 | #covid19 | 0.295271 | #stopasianhatecrimes | 0.002295 | #weekdayuk | 0.308894 | #black | 0.002252 |
| 12 | #tweetuk | 0.294521 | #love | 0.002196 | #worldsspotlight | 0.308894 | #usa | 0.00178 |
| 13 | #worldsspotlight | 0.29387 | #usa | 0.001923 | #noh8 | 0.306677 | #love | 0.00158 |
| 14 | #weekdayuk | 0.29327 | #black | 0.001882 | #weekenduk | 0.305674 | #blackownedbusiness | 0.001546 |
| 15 | #weekenduk | 0.285514 | #saytheirnames | 0.001872 | #racism | 0.303246 | #racists | 0.001487 |
| 16 | #racism | 0.261396 | #art | 0.001627 | #covid19 | 0.277382 | #equality | 0.001402 |
| 17 | #ethiopiaprevails | 0.247486 | #racists | 0.001588 | #biden | 0.275323 | #america | 0.001387 |
| 18 | #eritreaprevails | 0.247185 | #protectblackwomen | 0.001527 | #blacktwitter | 0.237213 | #art | 0.001373 |
| 19 | #usa | 0.228121 | #blackownedbusiness | 0.001405 | #eritreaprevails | 0.235577 | #womenshistorymonth | 0.00136 |
| 20 | #oprahmeghanharry | 0.22652 | #atlanta | 0.001341 | #ethiopiaprevails | 0.227712 | #metoo | 0.001291 |
| 21 | #ethiopia | 0.224919 | #stopaapihate | 0.001312 | #usa | 0.194194 | #justice | 0.00128 |
| 22 | #mlk | 0.219164 | #equality | 0.001311 | #derekchauvintrial | 0.175719 | #whitesupremacy | 0.001267 |
| 23 | #grenfelltower | 0.207856 | #metoo | 0.001231 | #antifa | 0.171285 | #acab | 0.001174 |
| 24 | #holocaustmemorialday | 0.207406 | #womenshistorymonth | 0.001212 | #america | 0.153655 | #blackgirlmagic | 0.001138 |
| 25 | #africa | 0.169677 | #sayhername | 0.001204 | #asianlivesmatter | 0.149116 | #whiteprivilege | 0.001132 |
| 26 | #blacktwitter | 0.168827 | #africa | 0.001156 | #justiceforgeorgefloyd | 0.137926 | #trump | 0.001091 |
| 27 | #antifa | 0.160771 | #asiansarehuman | 0.001115 | #women | 0.122882 | #policebrutality | 0.001091 |
| 28 | #georgefloyd | 0.157368 | #blackexcellence | 0.001072 | #hoa | 0.114384 | #cnn | 0.001076 |
| 29 | #tplfisaterroristgroup | 0.148611 | #blackgirlmagic | 0.001063 | #african | 0.114384 | #democrats | 0.001013 |
| 30 | #love | 0.129797 | #policebrutality | 0.00105 | #cnn | 0.113486 | #africa | 0.000994 |

Appendix 3. Centrality measures of Group B in P5 and P6

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Rank | P5(3.30-4.5) | | | | P6(4.6-4.12) | | | |
| hashtag | Degree | hashtag | Betweenness | hashtag | Degree | hashtag | Betweenness |
| 1 | #blacklivesmatter | 3.379027 | #blacklivesmatter | 0.582867 | #blacklivesmatter | 3.675687 | #blacklivesmatter | 0.585857 |
| 2 | #blm | 2.695652 | #blm | 0.406444 | #blm | 2.887954 | #blm | 0.414904 |
| 3 | #georgefloyd | 0.72178 | #georgefloyd | 0.011365 | #dauntewright | 0.616997 | #georgefloyd | 0.007926 |
| 4 | #derekchauvintrial | 0.548729 | #covid19 | 0.005748 | #lgbtq | 0.605989 | #covid19 | 0.005257 |
| 5 | #lgbtq | 0.481153 | #racism | 0.005599 | #georgefloyd | 0.50596 | #racism | 0.005255 |
| 6 | #resist | 0.44432 | #derekchauvintrial | 0.004234 | #resist | 0.411459 | #dauntewright | 0.004783 |
| 7 | #fbr | 0.413272 | #blacktwitter | 0.003828 | #covid19 | 0.376754 | #blacktwitter | 0.00456 |
| 8 | #motivation | 0.360459 | #lgbtq | 0.003673 | #fbr | 0.351086 | #antifa | 0.003123 |
| 9 | #noh8 | 0.3564 | #antifa | 0.003666 | #racism | 0.344165 | #policebrutality | 0.00299 |
| 10 | #grassroots | 0.354726 | #asianlivesmatter | 0.003588 | #motivation | 0.318545 | #usa | 0.002725 |
| 11 | #worldsspotlight | 0.35432 | #justiceforgeorgefloyd | 0.003321 | #noh8 | 0.311575 | #lgbtq | 0.002703 |
| 12 | #tweetuk | 0.353813 | #derekchauvin | 0.002603 | #grassroots | 0.308306 | #biden | 0.002642 |
| 13 | #weekdayuk | 0.350819 | #georgefloydtrial | 0.002364 | #tweetuk | 0.30696 | #black | 0.002262 |
| 14 | #weekenduk | 0.350464 | #love | 0.002265 | #weekdayuk | 0.30696 | #derekchauvintrial | 0.002218 |
| 15 | #derekchauvin | 0.341789 | #usa | 0.002056 | #weekenduk | 0.302682 | #asianlivesmatter | 0.001919 |
| 16 | #justiceforgeorgefloyd | 0.298615 | #biden | 0.00197 | #worldsspotlight | 0.302201 | #defundthepolice | 0.001844 |
| 17 | #biden | 0.261783 | #blackownedbusiness | 0.001866 | #biden | 0.286099 | #derekchauvin | 0.001584 |
| 18 | #racism | 0.260159 | #black | 0.001716 | #derekchauvintrial | 0.274611 | #love | 0.001532 |
| 19 | #covid19 | 0.255137 | #art | 0.001477 | #blacktwitter | 0.257691 | #justiceforgeorgefloyd | 0.001403 |
| 20 | #georgefloydtrial | 0.252296 | #justice | 0.001447 | #policebrutality | 0.254182 | #art | 0.00137 |
| 21 | #blacktwitter | 0.19517 | #policebrutality | 0.001361 | #derekchauvin | 0.250385 | #trump | 0.001349 |
| 22 | #msnbc | 0.182183 | #racists | 0.001333 | #justicefordauntewright | 0.243415 | #acab | 0.001326 |
| 23 | #icantbreathe | 0.168129 | #music | 0.001231 | #justiceforgeorgefloyd | 0.182273 | #america | 0.0013 |
| 24 | #usa | 0.150424 | #equality | 0.001217 | #defundthepolice | 0.167179 | #justice | 0.001277 |
| 25 | #racksterli | 0.14327 | #africa | 0.001116 | #la | 0.167035 | #racists | 0.001223 |
| 26 | #music | 0.138349 | #nojusticenopeace | 0.001112 | #imaslave4you | 0.161507 | #dmx | 0.001152 |
| 27 | #policebrutality | 0.138248 | #metoo | 0.001097 | #msnbc | 0.151509 | #blackownedbusiness | 0.001145 |
| 28 | #justice | 0.136218 | #trump | 0.001084 | #minneapolis | 0.147664 | #nojusticenopeace | 0.001065 |
| 29 | #love | 0.133935 | #easter | 0.001056 | #usa | 0.144203 | #police | 0.001057 |
| 30 | #antifa | 0.13013 | #blackgirlmagic | 0.001046 | #antifa | 0.137137 | #justicefordauntewright | 0.000977 |

Appendix 3. Centrality measures of Group B in P7 and P8

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Rank | P7(4.13-4.19) | | | | P8(4.20-4.26) | | | |
| hashtag | Degree | hashtag | Betweenness | hashtag | Degree | hashtag | Betweenness |
| 1 | #blacklivesmatter | 4.617955 | #blacklivesmatter | 0.629739 | #blacklivesmatter | 6.210308 | #blacklivesmatter | 0.60371 |
| 2 | #blm | 2.889891 | #blm | 0.350832 | #blm | 3.152119 | #blm | 0.362417 |
| 3 | #dauntewright | 1.264278 | #dauntewright | 0.01676 | #georgefloyd | 1.564458 | #georgefloyd | 0.026797 |
| 4 | #georgefloyd | 0.641267 | #georgefloyd | 0.006926 | #remembermynoah | 1.208556 | #justiceforgeorgefloyd | 0.009458 |
| 5 | #derekchauvintrial | 0.398755 | #covid19 | 0.005105 | #noahsarmy | 1.151515 | #derekchauvintrial | 0.005287 |
| 6 | #justicefordauntewright | 0.358204 | #blacktwitter | 0.004721 | #week44 | 1.128403 | #derekchauvin | 0.005257 |
| 7 | #defundthepolice | 0.340664 | #racism | 0.004113 | #justiceforgeorgefloyd | 0.972023 | #makhiabryant | 0.00443 |
| 8 | #policebrutality | 0.317012 | #antifa | 0.003784 | #thenoahdonohoefoundation | 0.857216 | #justice | 0.004427 |
| 9 | #usa | 0.302226 | #defundthepolice | 0.003056 | #derekchauvintrial | 0.749872 | #antifa | 0.004142 |
| 10 | #lgbtq | 0.29951 | #justicefordauntewright | 0.002733 | #derekchauvin | 0.637965 | #georgefloydtrial | 0.004135 |
| 11 | #biden | 0.297812 | #policereformnow | 0.002673 | #georgefloydtrial | 0.557479 | #blacktwitter | 0.003965 |
| 12 | #msnbc | 0.293474 | #derekchauvintrial | 0.002506 | #makhiabryant | 0.505604 | #racism | 0.003588 |
| 13 | #covid19 | 0.289363 | #lgbtq | 0.002197 | #derekchauvinisguilty | 0.398078 | #covid19 | 0.003032 |
| 14 | #policereformnow | 0.289098 | #usa | 0.00218 | #justice | 0.373093 | #policereformnow | 0.002425 |
| 15 | #cnn | 0.288457 | #policebrutality | 0.002065 | #guilty | 0.352005 | #biden | 0.002344 |
| 16 | #racism | 0.287137 | #america | 0.001795 | #policereformnow | 0.268014 | #usa | 0.002211 |
| 17 | #blacktwitter | 0.27069 | #acab | 0.001734 | #blacktwitter | 0.259404 | #defundthepolice | 0.002171 |
| 18 | #brooklyncenter | 0.240777 | #racists | 0.001691 | #biden | 0.258588 | #policebrutality | 0.001883 |
| 19 | #acab | 0.235345 | #police | 0.00156 | #racism | 0.256413 | #love | 0.00159 |
| 20 | #resist | 0.234364 | #love | 0.001539 | #dauntewright | 0.249101 | #nojusticenopeace | 0.001578 |
| 21 | #justiceforgeorgefloyd | 0.232139 | #minneapolis | 0.001522 | #policebrutality | 0.24898 | #police | 0.001548 |
| 22 | #minneapolis | 0.215013 | #adamtoledo | 0.001432 | #derekchauvinverdict | 0.2375 | #racists | 0.00153 |
| 23 | #fbr | 0.211316 | #justice | 0.001432 | #defundthepolice | 0.225626 | #guilty | 0.001515 |
| 24 | #derekchauvin | 0.203055 | #justiceforgeorgefloyd | 0.00141 | #lgbtq | 0.219433 | #lgbtq | 0.001483 |
| 25 | #adamtoledo | 0.193248 | #nojusticenopeace | 0.001384 | #usa | 0.218708 | #america | 0.001477 |
| 26 | #antifa | 0.189891 | #biden | 0.001373 | #resist | 0.214478 | #dauntewright | 0.001346 |
| 27 | #trump | 0.185213 | #minnesota | 0.001334 | #covid19 | 0.204598 | #derekchauvinisguilty | 0.00132 |
| 28 | #abolishthepolice | 0.180724 | #black | 0.001319 | #sayhername | 0.197045 | #accountability | 0.001274 |
| 29 | #police | 0.18046 | #cnn | 0.001209 | #georgefloydverdict | 0.189009 | #black | 0.001187 |
| 30 | #motivation | 0.178876 | #saytheirnames | 0.001131 | #police | 0.183178 | #acab | 0.001177 |

Appendix 3. Centrality measures of Group SB in P1 and P2

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Rank | P1(3.2-3.8) | | | | P2(3.9-3.15) | | | |
| hashtag | Degree | hashtag | Betweenness | hashtag | Degree | hashtag | Betweenness |
| 1 | #stopasianhate | 2.170213 | #stopasianhate | 0.578913 | #stopasianhate | 3.883333 | #stopasianhate | 0.59373 |
| 2 | #blacklivesmatter | 1.425532 | #blacklivesmatter | 0.218208 | #blacklivesmatter | 2.9625 | #blacklivesmatter | 0.211637 |
| 3 | #blm | 1.085106 | #blm | 0.081362 | #asianlivesmatter | 2.095833 | #blm | 0.098282 |
| 4 | #racists | 0.553191 | #asianlivesmatter | 0.012002 | #stopaapihate | 1.979167 | #asianlivesmatter | 0.008904 |
| 5 | #tiktok | 0.553191 | #racismisnotanopinion | 0.009804 | #stopthehate | 1.958333 | #stopracism | 0.005061 |
| 6 | #tiktokers | 0.553191 | #racism | 0.009106 | #savemyanmar | 1.9 | #stopaapihate | 0.003779 |
| 7 | #asiansarehuman | 0.531915 | #stopaapihate | 0.004863 | #whatshappeninginmyanmar | 1.854167 | #blacktwitter | 0.003361 |
| 8 | #asianlivesmatter | 0.51773 | #asiansarehuman | 0.003388 | #crimesagainsthumanity | 1.854167 | #stopthehate | 0.002928 |
| 9 | #racism | 0.404255 | #asian | 0.00302 | #poclivesmatter | 1.854167 | #breonnataylor | 0.002322 |
| 10 | #asian | 0.361702 | #lgbtq | 0.002793 | #erasinghate | 1.854167 | #hateisavirus | 0.001656 |
| 11 | #racismisnotanopinion | 0.347518 | #asianamerican | 0.002526 | #shameonchina | 1.625 | #biden | 0.001549 |
| 12 | #awareness | 0.29078 | #lgbt | 0.002004 | #blm | 1.095833 | #policebrutality | 0.001452 |
| 13 | #asia | 0.29078 | #black | 0.001533 | #biden | 0.533333 | #stopasianhatecrimes | 0.001311 |
| 14 | #tiktokvideo | 0.29078 | #blacktwitter | 0.001442 | #1a | 0.4125 | #love | 0.001304 |
| 15 | #tiktokviral | 0.29078 | #poc | 0.000245 | #2a | 0.4125 | #maskup | 0.001242 |
| 16 | #blacklivesstillmatter | 0.29078 | #socialjustice | 0.000203 | #nra | 0.4125 | #savemyanmar | 0.001073 |
| 17 | #allblacklivesmatter | 0.29078 | #notoracism | 9.29E-05 | #doj | 0.4125 | #racism | 0.000815 |
| 18 | #blacktwitter | 0.248227 | #awareness | 3.80E-05 | #yanggang | 0.4125 | #streetwear | 0.000697 |
| 19 | #asianamerican | 0.219858 | #racists | 3.80E-05 | #ubi | 0.4125 | #virus | 0.000586 |
| 20 | #lgbtq | 0.184397 | #asia | 3.80E-05 | #whiteprivilege | 0.4125 | #xenophobe | 0.000586 |
| 21 | #stopaapihate | 0.177305 | #tiktok | 3.80E-05 | #maskup | 0.3625 | #imperialmenmag | 0.000479 |
| 22 | #black | 0.141844 | #tiktokers | 3.80E-05 | #virus | 0.354167 | #nike | 0.000479 |
| 23 | #lgbt | 0.141844 | #tiktokvideo | 3.80E-05 | #racistroyals | 0.35 | #airjordan | 0.000479 |
| 24 | #help | 0.141844 | #tiktokviral | 3.80E-05 | #vaccines | 0.291667 | #football | 0.000479 |
| 25 | #asiantwitter | 0.141844 | #blacklivesstillmatter | 3.80E-05 | #stopasianhatecrimes | 0.2875 | #running | 0.000479 |
| 26 | #georgefloyd | 0.113475 | #allblacklivesmatter | 3.80E-05 | #hateisavirus | 0.2625 | #sport | 0.000479 |
| 27 | #protectasianlives | 0.113475 | #rageagainstracism | 3.38E-05 | #violence | 0.229167 | #racismisnotanopinion | 0.000433 |
| 28 | #poc | 0.092199 | #spreadlovestophate | 3.38E-05 | #stopracism | 0.204167 | #1a | 0.000355 |
| 29 | #notoracism | 0.085106 | #protectminorities | 0 | #xenophobe | 0.204167 | #2a | 0.000355 |
| 30 | #womensday | 0.085106 | #sayhername | 0 | #racists | 0.166667 | #nra | 0.000355 |

Appendix 3. Centrality measures of Group SB in P3 and P4

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Rank | P3(3.16-3.22) | | | | P4(3.23-3.29) | | | |
| hashtag | Degree | hashtag | Betweenness | hashtag | Degree | hashtag | Betweenness |
| 1 | #stopasianhate | 4.708413 | #stopasianhate | 0.601644 | #stopasianhate | 4.958038 | #stopasianhate | 0.61978 |
| 2 | #blacklivesmatter | 3.670727 | #blacklivesmatter | 0.286577 | #blacklivesmatter | 3.559128 | #blacklivesmatter | 0.253569 |
| 3 | #blm | 1.37343 | #blm | 0.066577 | #stopasianhatecrimes | 1.822888 | #blm | 0.092878 |
| 4 | #asianlivesmatter | 0.736962 | #asianlivesmatter | 0.007491 | #blm | 1.367302 | #stopaapihate | 0.003975 |
| 5 | #stopasianhatecrimes | 0.660069 | #stopaapihate | 0.006627 | #stopracism | 1.213624 | #stopasianhatecrimes | 0.002723 |
| 6 | #stopaapihate | 0.642558 | #stopasianhatecrimes | 0.005703 | #asianlivesmatter | 0.962943 | #lgbtq | 0.002668 |
| 7 | #asiansarehuman | 0.38523 | #atlanta | 0.001488 | #stopaapihate | 0.518256 | #asianlivesmatter | 0.002247 |
| 8 | #stopracism | 0.245908 | #asiansarehuman | 0.001436 | #biden | 0.323706 | #racism | 0.001382 |
| 9 | #biden | 0.201751 | #covid19 | 0.000983 | #gunreform | 0.304632 | #stopracism | 0.000827 |
| 10 | #atlanta | 0.181576 | #racism | 0.000887 | #guncontrol | 0.245777 | #gunreform | 0.000775 |
| 11 | #racismisnotcomedy | 0.16673 | #stophate | 0.000852 | #politicalcartoons | 0.222343 | #biden | 0.000654 |
| 12 | #racism | 0.135516 | #stopracism | 0.00081 | #biglie | 0.215259 | #aapi | 0.000566 |
| 13 | #stophate | 0.129425 | #lgbtq | 0.000761 | #gopliesabouteverything | 0.214714 | #stophate | 0.000561 |
| 14 | #lgbtq | 0.128283 | #biden | 0.000686 | #donothinggop | 0.207084 | #guncontrol | 0.000497 |
| 15 | #endracism | 0.116863 | #stopthehate | 0.000666 | #qpac | 0.207084 | #womenshistorymonth | 0.0004 |
| 16 | #womenslivesmatter | 0.115341 | #racismisnotcomedy | 0.000546 | #guiltygop | 0.207084 | #asiansarehuman | 0.000377 |
| 17 | #covid19 | 0.114579 | #endracism | 0.00054 | #gophypocrisy | 0.207084 | #endracism | 0.000305 |
| 18 | #whitesupremacy | 0.112295 | #love | 0.000447 | #gopcowards | 0.207084 | #blacktwitter | 0.000291 |
| 19 | #votersuppression | 0.109631 | #asian | 0.000447 | #karma | 0.207084 | #whitesupremacy | 0.000287 |
| 20 | #politicalcartoons | 0.10925 | #antiracism | 0.000403 | #itiswhatitis | 0.207084 | #love | 0.000278 |
| 21 | #stopthehate | 0.106966 | #whitesupremacy | 0.000365 | #trumpvirus | 0.207084 | #covid19 | 0.000272 |
| 22 | #gopcowards | 0.105824 | #snydercut | 0.000298 | #lgbtq | 0.191826 | #bipoc | 0.000253 |
| 23 | #protectasianlives | 0.10354 | #hateisavirus | 0.000284 | #gunsafety | 0.182016 | #latino | 0.000185 |
| 24 | #donothinggop | 0.100876 | #endwhitesupremacy | 0.00025 | #racism | 0.157493 | #antiracism | 0.000184 |
| 25 | #guiltygop | 0.100876 | #metoo | 0.000234 | #aapi | 0.154223 | #lgbt | 0.000181 |
| 26 | #gophypocrisy | 0.100876 | #translivesmatter | 0.0002 | #votersuppression | 0.149319 | #unity | 0.000148 |
| 27 | #trumpvirus | 0.100876 | #grammys | 0.000183 | #stophate | 0.1297 | #acab | 0.000146 |
| 28 | #gopliesabouteverything | 0.100495 | #alm | 0.00018 | #asiansarehuman | 0.123161 | #justice | 0.000123 |
| 29 | #qpac | 0.098211 | #aapi | 0.000176 | #whitesupremacy | 0.108447 | #translivesmatter | 0.000118 |
| 30 | #trumpterroists | 0.098211 | #wearamask | 0.000159 | #justice | 0.099183 | #solidarity | 0.000114 |

Appendix 3. Centrality measures of Group SB in P5 and P6

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Rank | P5(3.30-4.5) | | | | P6(4.6-4.12) | | | |
| hashtag | Degree | hashtag | Betweenness | hashtag | Degree | hashtag | Betweenness |
| 1 | #stopasianhate | 4.507638 | #stopasianhate | 0.597033 | #stopasianhate | 5.061359 | #stopasianhate | 0.609449 |
| 2 | #blacklivesmatter | 3.101645 | #blacklivesmatter | 0.24738 | #blacklivesmatter | 4.108108 | #blacklivesmatter | 0.219883 |
| 3 | #blm | 1.992949 | #blm | 0.107414 | #blm | 3.359386 | #blm | 0.130119 |
| 4 | #stopaapihate | 0.992949 | #stopaapihate | 0.011566 | #echopark | 1.881665 | #stopasianhatecrimes | 0.005871 |
| 5 | #biden | 0.597532 | #asianlivesmatter | 0.002762 | #bluecheck | 1.881665 | #lgbtq | 0.001887 |
| 6 | #stopasianhatecrimes | 0.549354 | #stopasianhatecrimes | 0.002168 | #bluechecks | 1.881665 | #stopaapihate | 0.001758 |
| 7 | #asianlivesmatter | 0.524089 | #biden | 0.001862 | #echoparkriseup | 1.264427 | #covid19 | 0.001738 |
| 8 | #cancelculture | 0.333137 | #stophate | 0.00162 | #derekchauvin | 0.981738 | #biden | 0.001265 |
| 9 | #woke | 0.314924 | #metoo | 0.001468 | #breaking | 0.95179 | #asianlivesmatter | 0.001106 |
| 10 | #trump2024 | 0.300823 | #covid19 | 0.00134 | #generalstrike | 0.941563 | #racism | 0.001077 |
| 11 | #newsmax | 0.295535 | #racism | 0.001143 | #nationalstrike | 0.941563 | #georgefloyd | 0.001025 |
| 12 | #oann | 0.295535 | #lgbtq | 0.000934 | #nationalboycott | 0.941563 | #antiracism | 0.00094 |
| 13 | #abcnews | 0.287897 | #georgefloyd | 0.000657 | #fuckcensorship | 0.941563 | #equality | 0.0008 |
| 14 | #hannity | 0.287897 | #transdayofvisibility | 0.000608 | #freeassangenow | 0.941563 | #humanrights | 0.000508 |
| 15 | #tuckercarlson | 0.287897 | #equality | 0.000599 | #actionforassange | 0.941563 | #metoo | 0.000464 |
| 16 | #americafirst | 0.287897 | #love | 0.000503 | #joemanchin | 0.940102 | #paper | 0.000442 |
| 17 | #foxnews | 0.287897 | #whitesupremacy | 0.000378 | #boycotts | 0.940102 | #stopracism | 0.00042 |
| 18 | #thefive | 0.287897 | #blacktwitter | 0.000376 | #m4a | 0.940102 | #america | 0.000368 |
| 19 | #maga | 0.287897 | #antifa | 0.000368 | #fightfor15 | 0.940102 | #antifa | 0.000343 |
| 20 | #trump | 0.285546 | #stopracism | 0.000367 | #endthefilibuster | 0.940102 | #transrightsarehumanrights | 0.000307 |
| 21 | #cardano | 0.254407 | #bipoc | 0.000362 | #berniebros | 0.617239 | #lgbt | 0.000297 |
| 22 | #guncontrol | 0.240306 | #justiceforgeorgefloyd | 0.000345 | #berniesanders | 0.617239 | #policebrutality | 0.000284 |
| 23 | #politicalcartoons | 0.22738 | #asiansarehuman | 0.000319 | #biden | 0.495982 | #usa | 0.000275 |
| 24 | #cnn | 0.222679 | #antiracism | 0.000272 | #stopasianhatecrimes | 0.36523 | #stophate | 0.000269 |
| 25 | #karma | 0.218566 | #usa | 0.000268 | #votersuppression | 0.252009 | #loveislove | 0.000254 |
| 26 | #reuters | 0.217391 | #america | 0.000257 | #gophypocrisy | 0.244704 | #twitch | 0.000247 |
| 27 | #gophypocrisy | 0.215041 | #guncontrol | 0.000253 | #politicalcartoons | 0.243974 | #votersuppression | 0.000232 |
| 28 | #georgiajimcrow | 0.211516 | #aapi | 0.00022 | #guncontrol | 0.239591 | #endracism | 0.000223 |
| 29 | #gunsafety | 0.211516 | #justice | 0.000213 | #buildbackbetter | 0.233747 | #peace | 0.000223 |
| 30 | #donothinggop | 0.211516 | #bitcoin | 0.000197 | #vaccinessavelives | 0.231556 | #cnn | 0.00022 |

Appendix 3. Centrality measures of Group SB in P7 and P8

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Rank | P7(4.13-4.19) | | | | P8(4.20-4.26) | | | |
| hashtag | Degree | hashtag | Betweenness | hashtag | Degree | hashtag | Betweenness |
| 1 | #stopasianhate | 3.431187 | #stopasianhate | 0.589091 | #stopasianhate | 5.032353 | #stopasianhate | 0.568161 |
| 2 | #blacklivesmatter | 2.577673 | #blacklivesmatter | 0.250679 | #blacklivesmatter | 4.164706 | #blacklivesmatter | 0.272522 |
| 3 | #blm | 1.392794 | #blm | 0.114352 | #blm | 2.591176 | #blm | 0.094178 |
| 4 | #covid19 | 0.520378 | #racism | 0.003581 | #stopasianhatecrimes | 1.501471 | #stopasianhatecrimes | 0.003644 |
| 5 | #racism | 0.33609 | #stopasianhatecrimes | 0.002791 | #racists | 1.186765 | #stopaapihate | 0.003317 |
| 6 | #lgbtq | 0.320732 | #covid19 | 0.002757 | #justice | 1.136765 | #racism | 0.002953 |
| 7 | #biden | 0.303012 | #stopaapihate | 0.002492 | #georgefloyd | 1.094853 | #justiceforgeorgefloyd | 0.002637 |
| 8 | #stopasianhatecrimes | 0.29179 | #dauntewright | 0.002023 | #covid19 | 1.075 | #georgefloyd | 0.002627 |
| 9 | #guncontrol | 0.252806 | #lgbtq | 0.001184 | #love | 1.043382 | #love | 0.002569 |
| 10 | #dauntewright | 0.241583 | #asianlivesmatter | 0.00118 | #stopracism | 1.025735 | #justice | 0.002529 |
| 11 | #stopaapihate | 0.223863 | #biden | 0.000964 | #justiceforgeorgefloyd | 0.966176 | #lgbtq | 0.002393 |
| 12 | #votersuppression | 0.202008 | #stopracism | 0.000938 | #equality | 0.931618 | #biden | 0.002326 |
| 13 | #politicalcartoons | 0.201418 | #love | 0.000921 | #nojusticenopeace | 0.895588 | #covid19 | 0.002087 |
| 14 | #gophypocrisy | 0.193739 | #georgefloyd | 0.000838 | #endracism | 0.881618 | #stopracism | 0.001836 |
| 15 | #karma | 0.187832 | #antifa | 0.000622 | #protest | 0.867647 | #asianlivesmatter | 0.001188 |
| 16 | #buildbackbetter | 0.18606 | #guncontrol | 0.000617 | #black | 0.852206 | #lgbt | 0.001154 |
| 17 | #georgiajimcrow | 0.184288 | #defundthepolice | 0.000506 | #racisminamerica | 0.836029 | #america | 0.001128 |
| 18 | #gunsafety | 0.184288 | #justicefordauntewright | 0.000459 | #blackhistory | 0.836029 | #equality | 0.000852 |
| 19 | #guiltygop | 0.184288 | #justice | 0.000458 | #antiracism | 0.808824 | #antiracism | 0.000726 |
| 20 | #biglie | 0.184288 | #justiceforgeorgefloyd | 0.000437 | #lgbtq | 0.771324 | #justicefordauntewright | 0.000651 |
| 21 | #itiswhatitis | 0.184288 | #maskup | 0.000422 | #usa | 0.755882 | #wearamask | 0.00065 |
| 22 | #aapi | 0.178382 | #aapi | 0.000417 | #politics | 0.725735 | #blacktwitter | 0.000633 |
| 23 | #trumpvirus | 0.178382 | #solidarity | 0.000378 | #racism | 0.657353 | #420day | 0.000623 |
| 24 | #vaccinessavelives | 0.17661 | #stophate | 0.000366 | #biden | 0.457353 | #transrightsarehumanrights | 0.000574 |
| 25 | #infrastructure | 0.17661 | #transrightsarehumanrights | 0.00036 | #aapi | 0.385294 | #oscars | 0.000478 |
| 26 | #racists | 0.168931 | #antiracism | 0.000355 | #lgbt | 0.372059 | #racists | 0.000475 |
| 27 | #qpac | 0.163024 | #abolishthepolice | 0.000329 | #policebrutality | 0.356618 | #policebrutality | 0.000443 |
| 28 | #lgbt | 0.15889 | #humanrights | 0.000304 | #tinhornflats | 0.339706 | #guncontrol | 0.000442 |
| 29 | #defundthepolice | 0.154755 | #brownlivesmatter | 0.000299 | #tinhornflatsburbank | 0.339706 | #usa | 0.000406 |
| 30 | #asianlivesmatter | 0.153574 | #trump | 0.000295 | #burbank | 0.339706 | #youtuber | 0.000393 |