Final\_Proj

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if ( !dir.exists( here::here("Final\_project", "data\_raw") ) ) {  
 dir.create( here::here("Final\_project", "data\_raw", "output", ".R"), recursive = TRUE )  
}

# Divorce rate trend and Marriage Rate Trend Comparison.

## Research Questions.

Is the differences between the marriage trend and dicorve trend throughout the years significant enough for us to reconsider what is the criteria for a committed marriage? This is also a follow-up to the original study.

url <- "https://raw.githubusercontent.com/fivethirtyeight/data/master/marriage/divorce.csv"  
bothsexes <- "https://raw.githubusercontent.com/fivethirtyeight/data/master/marriage/both\_sexes.csv"  
men <- "https://raw.githubusercontent.com/fivethirtyeight/data/master/marriage/men.csv"  
women <- "https://raw.githubusercontent.com/fivethirtyeight/data/master/marriage/women.csv"

Major\_data <- read.csv(url,  
 na = c("NA", " ", "-999"))  
both\_gender <- read.csv(bothsexes,  
 na = c("NA", " ", "-999"))  
men\_data <- read.csv(men,  
 na = c("NA", " ", "-999"))  
women\_data <- read.csv(women,  
 na = c("NA", " ", "-999"))

write.csv(Major\_data,  
 here::here("Final\_project", "data\_raw", "Major\_data.csv"))  
write.csv(both\_gender,  
 here::here("Final\_project", "data\_raw", "Both\_gender.csv"))  
write.csv(men\_data,  
 here::here("Final\_project", "data\_raw", "Men\_data.csv"))  
write.csv(women\_data,  
 here::here("Final\_project", "data\_raw", "Women\_data.csv"))

read.csv(  
 here::here("Final\_Project", "data\_raw", "Major\_data.csv"))

## X.1 X year date all\_3544 HS\_3544 SC\_3544 BAp\_3544  
## 1 1 1 1960 1960-01-01 0.03444454 0.03488887 0.03366938 0.02751277  
## 2 2 2 1970 1970-01-01 0.04925600 0.04999984 0.04870549 0.04125945  
## 3 3 3 1980 1980-01-01 0.10600503 0.10415128 0.11269947 0.09777208  
## 4 4 4 1990 1990-01-01 0.15080495 0.15938095 0.16967005 0.11495533  
## 5 5 5 2000 2000-01-01 0.15684099 0.17544616 0.17380324 0.10561772  
## 6 6 6 2001 2001-01-01 0.15730639 0.17411604 0.17816906 0.10703886  
## 7 7 7 2002 2002-01-01 0.15650825 0.17476931 0.17929419 0.10344219  
## 8 8 8 2003 2003-01-01 0.15384351 0.17254483 0.17697536 0.10254990  
## 9 9 9 2004 2004-01-01 0.15484096 0.17756455 0.17707955 0.10033665  
## 10 10 10 2005 2005-01-01 0.15291994 0.17516353 0.17674265 0.09948066  
## 11 11 11 2006 2006-01-01 0.16188986 0.18943673 0.18412098 0.10383550  
## 12 12 12 2007 2007-01-01 0.16046887 0.18721641 0.18496086 0.10392942  
## 13 13 13 2008 2008-01-01 0.16115876 0.18837663 0.18944998 0.10201919  
## 14 14 14 2009 2009-01-01 0.16049309 0.18698758 0.19013626 0.10194261  
## 15 15 15 2010 2010-01-01 0.16365109 0.18989580 0.19726945 0.10306385  
## 16 16 16 2011 2011-01-01 0.16630283 0.19239892 0.20045883 0.10776053  
## 17 17 17 2012 2012-01-01 0.16548645 0.19020633 0.20317649 0.10740666  
## BAo\_3544 GD\_3544 poor\_3544 mid\_3544 rich\_3544 all\_4554 HS\_4554  
## 1 0.02751277 NA 0.07195136 0.02122530 0.02256233 0.03965056 0.04007142  
## 2 0.04125945 NA 0.11373582 0.03030104 0.02192707 0.05062562 0.05056576  
## 3 0.09777208 NA 0.24164705 0.07367154 0.03501521 0.08818511 0.08566351  
## 4 0.11853432 0.10914537 0.32694839 0.11190969 0.04972527 0.14572572 0.14077914  
## 5 0.11053969 0.09590347 0.34308859 0.11658371 0.04939497 0.17958060 0.18477676  
## 6 0.11186064 0.09719692 0.34283554 0.12278063 0.04057431 0.18265130 0.19023658  
## 7 0.10968956 0.09076255 0.34108826 0.11992642 0.03879621 0.18065043 0.19209040  
## 8 0.11068292 0.08638486 0.33310488 0.12104747 0.03926215 0.18469755 0.19489113  
## 9 0.10598952 0.08911388 0.33432769 0.12193014 0.03679592 0.18411122 0.19373941  
## 10 0.10711496 0.08499205 0.32907368 0.12240404 0.03707052 0.18432461 0.19721310  
## 11 0.11085833 0.09050269 0.33716665 0.12610861 0.05789479 0.19614988 0.21070770  
## 12 0.11188233 0.08905043 0.33523025 0.12220858 0.05816887 0.19496022 0.21274409  
## 13 0.11115289 0.08519438 0.33373946 0.12471831 0.06033570 0.19763060 0.21682432  
## 14 0.11183907 0.08439307 0.33001493 0.12468418 0.05997526 0.19764930 0.21797512  
## 15 0.11163171 0.08816742 0.32872407 0.13381959 0.05776135 0.20350999 0.22431650  
## 16 0.11728367 0.09188349 0.32954144 0.13836406 0.05881448 0.20329632 0.22563247  
## 17 0.11529188 0.09431368 0.33156037 0.13307736 0.05635499 0.20738890 0.22866852  
## SC\_4554 BAp\_4554 BAo\_4554 GD\_4554 poor\_4554 mid\_4554 rich\_4554  
## 1 0.03870331 0.03188568 0.03188568 NA 0.07537252 0.02933657 0.02350489  
## 2 0.05147270 0.04831053 0.04831053 NA 0.11249624 0.03386947 0.02123280  
## 3 0.09500947 0.09103488 0.09103488 NA 0.19867321 0.06300866 0.02791567  
## 4 0.16633103 0.13436974 0.13566093 0.1327413 0.30661378 0.11498064 0.04577501  
## 5 0.20110350 0.14904161 0.15369313 0.1425498 0.38213542 0.14224209 0.05152510  
## 6 0.20573707 0.14863163 0.15326921 0.1417453 0.39003850 0.14651347 0.04522236  
## 7 0.19804840 0.14643862 0.15288797 0.1367771 0.38379508 0.14624231 0.04608881  
## 8 0.20679189 0.14734955 0.15122316 0.1414393 0.39131512 0.15124003 0.04269424  
## 9 0.20831171 0.14563041 0.15184099 0.1357963 0.39119899 0.15075508 0.04106048  
## 10 0.20527615 0.14348225 0.14739462 0.1373049 0.38939432 0.15080202 0.04277300  
## 11 0.21940146 0.15039808 0.15688045 0.1397258 0.40197026 0.15917424 0.06352994  
## 12 0.21656401 0.14659658 0.15319831 0.1355411 0.40641894 0.15482069 0.06371342  
## 13 0.21963499 0.14663108 0.15138763 0.1385107 0.40912531 0.15600069 0.06670997  
## 14 0.21947344 0.14445703 0.14993037 0.1351115 0.40676466 0.15796943 0.06757658  
## 15 0.22446156 0.15059022 0.15816419 0.1372541 0.40980069 0.16715608 0.06969512  
## 16 0.22444827 0.14875082 0.15538913 0.1370357 0.40742403 0.16900667 0.06762650  
## 17 0.23181683 0.15247471 0.16008278 0.1393165 0.41006916 0.17446516 0.07038130

read.csv(  
 here::here("Final\_Project", "data\_raw", "Both\_gender.csv"))

## X.1 X year date all\_2534 HS\_2534 SC\_2534 BAp\_2534 BAo\_2534  
## 1 1 1 1960 1960-01-01 0.1233145 0.1095332 0.1522818 0.2389952 0.2389952  
## 2 2 2 1970 1970-01-01 0.1269715 0.1094000 0.1495096 0.2187031 0.2187031  
## 3 3 3 1980 1980-01-01 0.1991767 0.1617313 0.2236916 0.2881646 0.2881646  
## 4 4 4 1990 1990-01-01 0.2968306 0.2777491 0.2780912 0.3612968 0.3656655  
## 5 5 5 2000 2000-01-01 0.3450087 0.3316545 0.3249205 0.3874906 0.3939579  
## 6 6 6 2001 2001-01-01 0.3527767 0.3446069 0.3341101 0.3835686 0.3925148  
## 7 7 7 2002 2002-01-01 0.3535249 0.3490367 0.3361595 0.3774328 0.3870840  
## 8 8 8 2003 2003-01-01 0.3620345 0.3581877 0.3418930 0.3873806 0.4000039  
## 9 9 9 2004 2004-01-01 0.3673247 0.3708102 0.3450748 0.3847357 0.3976124  
## 10 10 10 2005 2005-01-01 0.3793451 0.3870680 0.3596663 0.3886096 0.4029116  
## 11 11 11 2006 2006-01-01 0.4147656 0.4312162 0.3912177 0.4147960 0.4298668  
## 12 12 12 2007 2007-01-01 0.4269222 0.4441386 0.4084929 0.4209586 0.4389750  
## 13 13 13 2008 2008-01-01 0.4394414 0.4599162 0.4235094 0.4297510 0.4473568  
## 14 14 14 2009 2009-01-01 0.4625638 0.4845018 0.4469940 0.4518141 0.4743768  
## 15 15 15 2010 2010-01-01 0.4697332 0.4942221 0.4544084 0.4561005 0.4768130  
## 16 16 16 2011 2011-01-01 0.4833335 0.5115703 0.4685570 0.4658246 0.4901602  
## 17 17 17 2012 2012-01-01 0.4943453 0.5235212 0.4799344 0.4766357 0.5022621  
## GD\_2534 White\_2534 Black\_2534 Hisp\_2534 NE\_2534 MA\_2534 Midwest\_2534  
## 1 NA 0.1164848 0.1621855 0.1393736 0.1504184 0.1628934 0.1121467  
## 2 NA 0.1179043 0.1855163 0.1298769 0.1517231 0.1640680 0.1153741  
## 3 NA 0.1824126 0.3137500 0.1885440 0.2414327 0.2505925 0.1828339  
## 4 0.3474505 0.2639256 0.4838556 0.2962372 0.3500384 0.3623321 0.2755046  
## 5 0.3691740 0.3127149 0.5144994 0.3180681 0.4091852 0.4175565 0.3308022  
## 6 0.3590304 0.3183506 0.5437985 0.3321214 0.4200581 0.4294281 0.3344332  
## 7 0.3512848 0.3196691 0.5403976 0.3312613 0.4078044 0.4290529 0.3397041  
## 8 0.3538130 0.3256812 0.5568954 0.3417513 0.4311918 0.4479922 0.3475709  
## 9 0.3517729 0.3306283 0.5724015 0.3485789 0.4490854 0.4494016 0.3523802  
## 10 0.3514251 0.3438759 0.5751731 0.3589544 0.4509719 0.4638508 0.3624805  
## 11 0.3757228 0.3753122 0.6207795 0.3953588 0.4814884 0.4975251 0.3941999  
## 12 0.3752763 0.3867121 0.6355313 0.4096196 0.4914396 0.5061395 0.4074371  
## 13 0.3849744 0.3982802 0.6431092 0.4286496 0.5095196 0.5210837 0.4191507  
## 14 0.3956936 0.4222356 0.6588438 0.4528061 0.5289023 0.5446246 0.4506093  
## 15 0.4058705 0.4304896 0.6657126 0.4564257 0.5450851 0.5491727 0.4511969  
## 16 0.4071756 0.4414346 0.6807420 0.4766545 0.5413288 0.5625737 0.4655502  
## 17 0.4164583 0.4539900 0.6847088 0.4874031 0.5643478 0.5754134 0.4720884  
## South\_2534 Mountain\_2534 Pacific\_2534 poor\_2534 mid\_2534 rich\_2534  
## 1 0.1090562 0.09152117 0.1198758 0.1371597 0.07514929 0.2066776  
## 2 0.1126220 0.10293602 0.1374964 0.1717202 0.08159207 0.1724093  
## 3 0.1688435 0.17434230 0.2334279 0.3100591 0.14825303 0.1851082  
## 4 0.2639794 0.25264326 0.3319579 0.4199108 0.24320008 0.2783226  
## 5 0.3099712 0.30621032 0.3753061 0.5033676 0.30202036 0.2717386  
## 6 0.3182688 0.30980779 0.3844799 0.5178771 0.31716118 0.2532041  
## 7 0.3230276 0.29686569 0.3836922 0.5174252 0.31824041 0.2534724  
## 8 0.3250139 0.31071886 0.3946902 0.5297279 0.32823175 0.2516064  
## 9 0.3341527 0.31078861 0.3972153 0.5367582 0.33561274 0.2522545  
## 10 0.3473821 0.34127770 0.4038807 0.5519224 0.34766829 0.2620452  
## 11 0.3847213 0.37115592 0.4464473 0.5730500 0.37075821 0.3442543  
## 12 0.4001335 0.37737599 0.4572573 0.5904736 0.38129486 0.3543571  
## 13 0.4082158 0.40015715 0.4723882 0.6053676 0.39423085 0.3626483  
## 14 0.4273097 0.41776053 0.4956330 0.6213246 0.42399221 0.3775050  
## 15 0.4434588 0.41018505 0.4968328 0.6301818 0.43190949 0.3846912  
## 16 0.4584298 0.43050717 0.5078316 0.6430845 0.44452945 0.4007966  
## 17 0.4649634 0.44282191 0.5288999 0.6531721 0.45612887 0.4106040  
## all\_3544 HS\_3544 SC\_3544 BAp\_3544 BAo\_3544 GD\_3544 White\_3544  
## 1 0.07058157 0.06860309 0.06663695 0.1326265 0.1326265 NA 0.06825586  
## 2 0.06732520 0.06511964 0.06271724 0.1116899 0.1116899 NA 0.06250372  
## 3 0.06883378 0.06429102 0.06531333 0.1056102 0.1056102 NA 0.05966739  
## 4 0.11191800 0.11210043 0.09699372 0.1285172 0.1258567 0.1328018 0.09611312  
## 5 0.15605881 0.16993703 0.13800404 0.1541238 0.1536299 0.1550970 0.13207032  
## 6 0.15642529 0.16870156 0.13986044 0.1548151 0.1524923 0.1595169 0.13287455  
## 7 0.15967630 0.16963608 0.14551591 0.1592764 0.1598992 0.1580095 0.13429516  
## 8 0.16089927 0.17417009 0.14725088 0.1554106 0.1551795 0.1558697 0.13547343  
## 9 0.16515941 0.18235854 0.14932870 0.1563267 0.1573123 0.1543631 0.13836500  
## 10 0.16859543 0.18697637 0.15489782 0.1563589 0.1578731 0.1534703 0.14393044  
## 11 0.19023319 0.22050747 0.16879323 0.1678529 0.1703584 0.1630544 0.15928999  
## 12 0.19350017 0.22589739 0.17468243 0.1668970 0.1704744 0.1601205 0.16121407  
## 13 0.19841872 0.23530549 0.18052867 0.1690407 0.1709024 0.1655896 0.16386453  
## 14 0.20303760 0.24681017 0.18553105 0.1650282 0.1673079 0.1609548 0.16633994  
## 15 0.20717662 0.25251765 0.19103915 0.1668872 0.1712057 0.1592707 0.16749425  
## 16 0.21223063 0.26267964 0.19665025 0.1669555 0.1734778 0.1558495 0.17118001  
## 17 0.21601743 0.26875607 0.20471722 0.1667594 0.1737169 0.1549444 0.17471037  
## Black\_3544 Hisp\_3544 NE\_3544 MA\_3544 Midwest\_3544 South\_3544  
## 1 0.08836728 0.07307651 0.09194322 0.09347468 0.06863360 0.06026353  
## 2 0.10290904 0.07070500 0.08570110 0.09040725 0.06156272 0.05966057  
## 3 0.13140081 0.08110790 0.07997323 0.09744428 0.06070641 0.05914089  
## 4 0.22010298 0.12194206 0.12785915 0.14354989 0.10157576 0.09637035  
## 5 0.30239381 0.15469520 0.17327422 0.18819256 0.14539201 0.14230600  
## 6 0.30857796 0.14953050 0.16653497 0.18315109 0.14794407 0.14312592  
## 7 0.30969793 0.16445917 0.17898838 0.19382928 0.14770720 0.14461094  
## 8 0.32264197 0.15220492 0.17519576 0.19448544 0.14939285 0.14936826  
## 9 0.31890557 0.16955859 0.18414649 0.19578831 0.15015105 0.15413926  
## 10 0.32319204 0.16559780 0.18871570 0.20219385 0.15405839 0.15472515  
## 11 0.36554962 0.18732624 0.21054281 0.22890075 0.17759199 0.17503217  
## 12 0.36562848 0.19918875 0.21241883 0.22687429 0.18021324 0.17931002  
## 13 0.37545234 0.20685314 0.20630379 0.23814693 0.18293040 0.18091848  
## 14 0.38737104 0.21543700 0.21295003 0.24450515 0.18692975 0.18754509  
## 15 0.39011860 0.22186685 0.22056743 0.24625241 0.19219061 0.19384278  
## 16 0.39898340 0.22889257 0.22055699 0.25116645 0.19866122 0.20062204  
## 17 0.40443495 0.23339748 0.22781766 0.25783642 0.20166514 0.20386508  
## Mountain\_3544 Pacific\_3544 poor\_3544 mid\_3544 rich\_3544 all\_4554  
## 1 0.04739747 0.05822486 0.1019749 0.04717272 0.08553870 0.07254649  
## 2 0.04651163 0.06347796 0.1117548 0.04566838 0.06499159 0.05968794  
## 3 0.04880077 0.07552538 0.1291426 0.05050321 0.04445951 0.05250871  
## 4 0.09189904 0.13134638 0.2012208 0.09024739 0.06573916 0.05947824  
## 5 0.13584194 0.17480047 0.2813137 0.12815751 0.08622046 0.08804394  
## 6 0.13943820 0.17694864 0.2919112 0.13267625 0.06803283 0.08823342  
## 7 0.13424491 0.18279935 0.2904300 0.13723226 0.07153439 0.09284694  
## 8 0.12944378 0.17966719 0.2967686 0.13791654 0.06949005 0.09697308  
## 9 0.14747310 0.18352067 0.3093457 0.14135814 0.06831169 0.10122315  
## 10 0.15373470 0.18953543 0.3109604 0.14779424 0.06748470 0.10662702  
## 11 0.16895836 0.21015593 0.3249777 0.15914336 0.11569227 0.12103717  
## 12 0.18078215 0.21410237 0.3312172 0.16285122 0.11440856 0.12384535  
## 13 0.18757482 0.22688119 0.3365459 0.16896701 0.11605049 0.13152025  
## 14 0.18828732 0.22784468 0.3496431 0.17244237 0.11756528 0.13501453  
## 15 0.19108540 0.22778952 0.3546618 0.18026517 0.11337928 0.13959298  
## 16 0.18522098 0.23348876 0.3625130 0.18539783 0.11453429 0.14304580  
## 17 0.19704369 0.23329586 0.3697311 0.18851171 0.11696924 0.14277444  
## HS\_4554 SC\_4554 BAp\_4554 BAo\_4554 GD\_4554 White\_4554 Black\_4554  
## 1 0.06840792 0.07903755 0.15360889 0.15360889 NA 0.07246692 0.06913249  
## 2 0.05833439 0.05443478 0.10466047 0.10466047 NA 0.05754799 0.07899168  
## 3 0.05036563 0.04816180 0.08623774 0.08623774 NA 0.04765354 0.08624602  
## 4 0.05988244 0.04654087 0.07301884 0.06416529 0.08394886 0.05092552 0.11617699  
## 5 0.09442809 0.07558786 0.09208417 0.09097472 0.09362802 0.07578174 0.17587334  
## 6 0.09189007 0.07795481 0.09333365 0.09313480 0.09362876 0.07516912 0.18154531  
## 7 0.09643854 0.08306868 0.09774631 0.09538124 0.10126627 0.07981317 0.19016881  
## 8 0.10239419 0.08792957 0.09862367 0.10060391 0.09558541 0.08245469 0.20647371  
## 9 0.10788466 0.08963523 0.10357879 0.10329650 0.10402542 0.08645367 0.20771006  
## 10 0.11484062 0.09508869 0.10674746 0.10662773 0.10693644 0.09066988 0.21916060  
## 11 0.13837819 0.10274427 0.11375107 0.11507863 0.11155674 0.10225579 0.24824541  
## 12 0.14028359 0.10882804 0.11430427 0.11509627 0.11297479 0.10456815 0.25453217  
## 13 0.15372721 0.11401492 0.11824703 0.12050429 0.11436655 0.11012764 0.27099059  
## 14 0.15752525 0.11944163 0.11858562 0.11936765 0.11724710 0.11223367 0.28096514  
## 15 0.16388316 0.12440802 0.11944427 0.12121992 0.11630024 0.11562675 0.28513013  
## 16 0.16982634 0.12659248 0.12071090 0.12148219 0.11934643 0.11795529 0.29214253  
## 17 0.17031739 0.12699908 0.11963615 0.12044763 0.11822916 0.11777651 0.28755933  
## Hisp\_4554 NE\_4554 MA\_4554 Midwest\_4554 South\_4554 Mountain\_4554  
## 1 0.06636058 0.10236412 0.09264788 0.07285321 0.05977295 0.04754183  
## 2 0.05810740 0.08028082 0.07860635 0.05791163 0.05174462 0.03970134  
## 3 0.06522951 0.06930253 0.07508466 0.04807290 0.04485348 0.03374438  
## 4 0.07613556 0.07047502 0.08373134 0.05398391 0.05043636 0.04459411  
## 5 0.09418009 0.10232170 0.11269659 0.08302437 0.07631858 0.07637774  
## 6 0.09409896 0.09868408 0.10953635 0.08207629 0.07886513 0.07405971  
## 7 0.09355163 0.11413791 0.11532002 0.08644366 0.08204975 0.07438075  
## 8 0.09711265 0.10465173 0.12399003 0.09064136 0.08723427 0.07795987  
## 9 0.10120759 0.11384244 0.12797441 0.09621022 0.08903165 0.08817004  
## 10 0.10641539 0.11183182 0.12988635 0.10191284 0.09767396 0.09133001  
## 11 0.12378356 0.13370246 0.14916874 0.11348236 0.11118562 0.10728260  
## 12 0.12252028 0.13414844 0.15188039 0.11455438 0.11381007 0.10946415  
## 13 0.13359136 0.13732297 0.16162714 0.12366494 0.12089332 0.11741370  
## 14 0.14091564 0.13876761 0.16259252 0.12704716 0.12517044 0.12191276  
## 15 0.14521494 0.15218312 0.16764592 0.13166901 0.12882830 0.12520883  
## 16 0.14879752 0.14734766 0.16798237 0.13351252 0.13508745 0.13222762  
## 17 0.14989592 0.14812372 0.16695511 0.13429927 0.13322756 0.13048803  
## Pacific\_4554 poor\_4554 mid\_4554 rich\_4554 nokids\_all\_2534 kids\_all\_2534  
## 1 0.05996993 0.1030055 0.05364421 0.07908591 0.4640564 0.002820625  
## 2 0.04826312 0.1016489 0.04221637 0.05142867 0.4309043 0.009868596  
## 3 0.04958992 0.1003011 0.03830266 0.03311296 0.4464304 0.025285667  
## 4 0.06461875 0.1148335 0.04562332 0.03136386 0.5425242 0.060277451  
## 5 0.09896832 0.1718976 0.07055672 0.03897342 0.5714531 0.099472713  
## 6 0.10119511 0.1759369 0.07407508 0.02857320 0.5852213 0.110178467  
## 7 0.10675206 0.1828889 0.07842791 0.03081968 0.5856645 0.114273009  
## 8 0.10859397 0.1942962 0.08114524 0.03107760 0.5957148 0.117551349  
## 9 0.11306075 0.2013479 0.08576868 0.03189265 0.6003825 0.123881027  
## 10 0.11754656 0.2142219 0.09036515 0.03143213 0.6101307 0.129535759  
## 11 0.13089337 0.2275240 0.09632472 0.06391938 0.6363970 0.140389909  
## 12 0.13790977 0.2335990 0.09822227 0.06459323 0.6507955 0.146259281  
## 13 0.14439232 0.2455776 0.10504851 0.06848618 0.6632332 0.153805908  
## 14 0.14863330 0.2525637 0.10728056 0.07176305 0.6798672 0.164460200  
## 15 0.15321952 0.2569910 0.11598316 0.06923784 0.6823566 0.171682712  
## 16 0.15614318 0.2633654 0.11852684 0.07082620 0.6955806 0.179056985  
## 17 0.15909078 0.2599432 0.11838148 0.07166507 0.7018935 0.183617898  
## nokids\_HS\_2534 nokids\_SC\_2534 nokids\_BAp\_2534 nokids\_BAo\_2534 nokids\_GD\_2534  
## 1 0.4430148 0.5000402 0.5619099 0.5619099 NA  
## 2 0.4246779 0.4333479 0.4554766 0.4554766 NA  
## 3 0.4319342 0.4505900 0.4719700 0.4719700 NA  
## 4 0.5464881 0.5238446 0.5560765 0.5633301 0.5332628  
## 5 0.5711395 0.5700042 0.5729677 0.5862213 0.5367160  
## 6 0.6045475 0.5810912 0.5698644 0.5864967 0.5258800  
## 7 0.6113802 0.5797569 0.5655596 0.5803788 0.5261892  
## 8 0.6184635 0.5898916 0.5783368 0.5938324 0.5368052  
## 9 0.6273909 0.5984615 0.5769733 0.5964202 0.5278827  
## 10 0.6388691 0.6097085 0.5823727 0.6028875 0.5294043  
## 11 0.6639349 0.6342076 0.6065015 0.6261511 0.5554962  
## 12 0.6840204 0.6516210 0.6128466 0.6346525 0.5569431  
## 13 0.6941614 0.6670976 0.6271665 0.6498793 0.5694129  
## 14 0.7196120 0.6801782 0.6411242 0.6656776 0.5784722  
## 15 0.7209222 0.6845041 0.6436993 0.6671254 0.5859443  
## 16 0.7374853 0.6953988 0.6564493 0.6819246 0.5932762  
## 17 0.7452868 0.7017514 0.6629644 0.6895415 0.5986941  
## kids\_HS\_2534 kids\_SC\_2534 kids\_BAp\_2534 kids\_BAo\_2534 kids\_GD\_2534  
## 1 0.003318886 0.001150824 0.0005751073 0.0005751073 NA  
## 2 0.012465915 0.003699982 0.0014683425 0.0014683425 NA  
## 3 0.031930752 0.018135401 0.0062544364 0.0062544364 NA  
## 4 0.078470444 0.052032702 0.0171241042 0.0181766027 0.01374234  
## 5 0.127193577 0.097625310 0.0370024452 0.0401009875 0.02761467  
## 6 0.141395652 0.110030662 0.0399801447 0.0445838012 0.02645041  
## 7 0.142396369 0.122975412 0.0401394410 0.0456155547 0.02476523  
## 8 0.148438624 0.121567813 0.0465659693 0.0519827566 0.03236212  
## 9 0.164142127 0.120965583 0.0475636764 0.0526741991 0.03415370  
## 10 0.170866790 0.129908780 0.0457983665 0.0509958079 0.03211735  
## 11 0.181778335 0.142473295 0.0539347182 0.0600303703 0.03816660  
## 12 0.184767757 0.155116002 0.0581480863 0.0656551560 0.03950290  
## 13 0.198615543 0.164813991 0.0566813342 0.0647008616 0.03627726  
## 14 0.211655895 0.179635918 0.0610458890 0.0705495114 0.03860255  
## 15 0.223023029 0.187071183 0.0633667664 0.0724272016 0.04213194  
## 16 0.233145341 0.197134202 0.0673978749 0.0788645265 0.04133594  
## 17 0.239106785 0.203470173 0.0710019644 0.0830437336 0.04444571  
## nokids\_poor\_2534 nokids\_mid\_2534 nokids\_rich\_2534 kids\_poor\_2534  
## 1 0.4933061 0.4100080 0.4921184 0.008722711  
## 2 0.5097742 0.3764538 0.4288948 0.029974945  
## 3 0.5740402 0.3998250 0.3848089 0.077926214  
## 4 0.6546908 0.5186604 0.4750156 0.170763774  
## 5 0.7055451 0.5690228 0.4458023 0.256281918  
## 6 0.7147334 0.5864741 0.4461111 0.280146488  
## 7 0.7184674 0.5828348 0.4514212 0.285886461  
## 8 0.7269085 0.5959607 0.4520324 0.292612788  
## 9 0.7327161 0.5997563 0.4564143 0.306079680  
## 10 0.7375492 0.6089676 0.4712793 0.323611416  
## 11 0.7468818 0.6247988 0.5506332 0.340847665  
## 12 0.7653970 0.6380303 0.5624543 0.351409502  
## 13 0.7749383 0.6523622 0.5740094 0.370663052  
## 14 0.7919703 0.6737724 0.5827993 0.380555402  
## 15 0.7961426 0.6732602 0.5900338 0.388775404  
## 16 0.8041693 0.6851240 0.6103339 0.403183972  
## 17 0.8093071 0.6913995 0.6180258 0.414788653  
## kids\_mid\_2534 kids\_rich\_2534  
## 1 0.0007532065 0.0008027331  
## 2 0.0033771145 0.0030435661  
## 3 0.0102368871 0.0068317224  
## 4 0.0274655254 0.0182329127  
## 5 0.0597845173 0.0295644698  
## 6 0.0677954572 0.0336540502  
## 7 0.0713847593 0.0320926293  
## 8 0.0759463407 0.0293706202  
## 9 0.0803520789 0.0326262310  
## 10 0.0852490071 0.0313263996  
## 11 0.0934225771 0.0385415051  
## 12 0.0991533159 0.0411343798  
## 13 0.1035361283 0.0421522159  
## 14 0.1130189841 0.0444453027  
## 15 0.1241587721 0.0481944170  
## 16 0.1308866666 0.0493472789  
## 17 0.1319637968 0.0499119586

read.csv(  
 here::here("Final\_Project", "data\_raw", "Men\_data.csv"))

## X.1 X year date all\_2534 HS\_2534 SC\_2534 BAp\_2534 BAo\_2534  
## 1 1 1 1960 1960-01-01 0.1624552 0.1500654 0.1844804 0.2247803 0.2247803  
## 2 2 2 1970 1970-01-01 0.1554093 0.1412231 0.1723210 0.1990768 0.1990768  
## 3 3 3 1980 1980-01-01 0.2373002 0.2081500 0.2564393 0.2834162 0.2834162  
## 4 4 4 1990 1990-01-01 0.3491950 0.3394680 0.3329204 0.3902470 0.4033273  
## 5 5 5 2000 2000-01-01 0.3919130 0.3797128 0.3778607 0.4290485 0.4434001  
## 6 6 6 2001 2001-01-01 0.3997402 0.3931643 0.3851544 0.4255137 0.4426400  
## 7 7 7 2002 2002-01-01 0.3969647 0.3954700 0.3814238 0.4152810 0.4295553  
## 8 8 8 2003 2003-01-01 0.4073297 0.4033001 0.3946632 0.4265825 0.4478791  
## 9 9 9 2004 2004-01-01 0.4106667 0.4115010 0.3942030 0.4260731 0.4475950  
## 10 10 10 2005 2005-01-01 0.4232072 0.4301459 0.4087442 0.4270559 0.4502465  
## 11 11 11 2006 2006-01-01 0.4655376 0.4817844 0.4436976 0.4591193 0.4791522  
## 12 12 12 2007 2007-01-01 0.4771489 0.4940523 0.4616199 0.4631180 0.4878777  
## 13 13 13 2008 2008-01-01 0.4910558 0.5098585 0.4783502 0.4739166 0.5000644  
## 14 14 14 2009 2009-01-01 0.5145486 0.5359545 0.5001706 0.4966576 0.5262635  
## 15 15 15 2010 2010-01-01 0.5237112 0.5479877 0.5084420 0.5028799 0.5314435  
## 16 16 16 2011 2011-01-01 0.5363616 0.5640678 0.5216475 0.5110970 0.5418315  
## 17 17 17 2012 2012-01-01 0.5471991 0.5736859 0.5317139 0.5258772 0.5581823  
## GD\_2534 White\_2534 Black\_2534 Hisp\_2534 NE\_2534 MA\_2534 Midwest\_2534  
## 1 NA 0.1546184 0.2038079 0.1781672 0.1905106 0.2035246 0.1504002  
## 2 NA 0.1472610 0.2085357 0.1488897 0.1811852 0.1930910 0.1410137  
## 3 NA 0.2235127 0.3336488 0.2203287 0.2821226 0.2896680 0.2172150  
## 4 0.3530395 0.3214475 0.5061360 0.3464324 0.4051620 0.4153163 0.3246596  
## 5 0.3887851 0.3692564 0.5026865 0.3656800 0.4632922 0.4656934 0.3792976  
## 6 0.3789383 0.3759960 0.5368544 0.3797119 0.4810127 0.4772367 0.3799867  
## 7 0.3762871 0.3721486 0.5348759 0.3795271 0.4569608 0.4719392 0.3809301  
## 8 0.3665768 0.3802885 0.5567342 0.3862265 0.4672596 0.5006199 0.3921255  
## 9 0.3686910 0.3843541 0.5665888 0.3922100 0.5014430 0.4947119 0.3939880  
## 10 0.3633421 0.3982223 0.5668813 0.4036243 0.4973286 0.5097833 0.4079576  
## 11 0.4030854 0.4342086 0.6266390 0.4486738 0.5355459 0.5453346 0.4412848  
## 12 0.3949797 0.4462286 0.6410367 0.4567011 0.5457227 0.5538261 0.4561210  
## 13 0.4014752 0.4584933 0.6458251 0.4809746 0.5643938 0.5708399 0.4683018  
## 14 0.4145299 0.4813773 0.6658792 0.5071182 0.5775987 0.5948112 0.5027447  
## 15 0.4255125 0.4911099 0.6755120 0.5137699 0.5984977 0.5982593 0.5056798  
## 16 0.4279739 0.5012574 0.6954136 0.5281077 0.5972280 0.6084213 0.5201843  
## 17 0.4417571 0.5146803 0.6875885 0.5419415 0.6179577 0.6311091 0.5227495  
## South\_2534 Mountain\_2534 Pacific\_2534 poor\_2534 mid\_2534 rich\_2534  
## 1 0.1433263 0.1253605 0.1723997 0.1691268 0.09853111 0.2832276  
## 2 0.1378478 0.1290712 0.1785456 0.1902049 0.09848081 0.2345648  
## 3 0.2014094 0.2178175 0.2863211 0.3512889 0.17398037 0.2499094  
## 4 0.3106607 0.3093316 0.3959841 0.4681596 0.28108261 0.3628140  
## 5 0.3512265 0.3573308 0.4286650 0.5427294 0.34177342 0.3381133  
## 6 0.3600261 0.3576243 0.4394720 0.5608381 0.35970812 0.3178537  
## 7 0.3638691 0.3501786 0.4311888 0.5547931 0.35964518 0.3134414  
## 8 0.3661167 0.3555023 0.4480201 0.5714181 0.37177605 0.3143356  
## 9 0.3708849 0.3666303 0.4487246 0.5681082 0.37652753 0.3181458  
## 10 0.3858477 0.3863403 0.4544302 0.5841509 0.39060141 0.3260890  
## 11 0.4345862 0.4233887 0.5046793 0.6028222 0.41372181 0.4318176  
## 12 0.4480938 0.4325466 0.5132335 0.6182747 0.41583461 0.4438815  
## 13 0.4566306 0.4603495 0.5301122 0.6414282 0.43031649 0.4559096  
## 14 0.4767700 0.4746125 0.5524068 0.6519310 0.46879040 0.4685735  
## 15 0.4961660 0.4686558 0.5550770 0.6626101 0.47509762 0.4783764  
## 16 0.5092174 0.4898112 0.5659575 0.6758537 0.48710160 0.4920533  
## 17 0.5149799 0.5007364 0.5857865 0.6869242 0.49967797 0.5023505  
## all\_3544 HS\_3544 SC\_3544 BAp\_3544 BAo\_3544 GD\_3544 White\_3544  
## 1 0.08243479 0.08630430 0.06241863 0.09106427 0.09106427 NA 0.07871712  
## 2 0.07871039 0.08142809 0.06760621 0.08491729 0.08491729 NA 0.07351478  
## 3 0.07716289 0.07791617 0.07113207 0.08703188 0.08703188 NA 0.06959443  
## 4 0.12699145 0.13810194 0.11297722 0.12617636 0.13190092 0.1175482 0.11413086  
## 5 0.17844515 0.19914259 0.16112916 0.16050005 0.16939290 0.1446990 0.16058137  
## 6 0.17693747 0.19507167 0.16234127 0.16099906 0.16715032 0.1496757 0.16217620  
## 7 0.18045478 0.19424783 0.17065300 0.16759278 0.17575326 0.1522540 0.16441046  
## 8 0.18087002 0.19557686 0.17307396 0.16508941 0.17422093 0.1484948 0.16406809  
## 9 0.18737801 0.20781407 0.17379950 0.16844904 0.18080287 0.1458118 0.16931613  
## 10 0.18873362 0.21031016 0.17792383 0.16581006 0.17824171 0.1434667 0.17316518  
## 11 0.21513596 0.25129971 0.19475515 0.17583935 0.18743526 0.1548969 0.19276040  
## 12 0.21849034 0.25588384 0.19914576 0.17788750 0.19142941 0.1529171 0.19394409  
## 13 0.22438647 0.26631821 0.20659086 0.17956761 0.19185997 0.1571513 0.19722216  
## 14 0.22892524 0.27855486 0.20937609 0.17479198 0.18692689 0.1534755 0.20084704  
## 15 0.23381134 0.28282511 0.21791244 0.17781863 0.19338089 0.1501711 0.20286665  
## 16 0.23780663 0.29360228 0.22043222 0.17544966 0.19021154 0.1503097 0.20490389  
## 17 0.24321246 0.30124916 0.23054739 0.17607913 0.19305924 0.1468218 0.20863158  
## Black\_3544 Hisp\_3544 NE\_3544 MA\_3544 Midwest\_3544 South\_3544  
## 1 0.1104383 0.08831283 0.09697895 0.1023668 0.08314678 0.07043171  
## 2 0.1218325 0.07249579 0.09561030 0.1020665 0.07185493 0.07084953  
## 3 0.1346331 0.08707939 0.08773967 0.1038532 0.06752588 0.06560268  
## 4 0.2244957 0.13287260 0.14299707 0.1569279 0.11343382 0.10887554  
## 5 0.2958440 0.17507309 0.19558106 0.2084897 0.16707942 0.16156916  
## 6 0.2974411 0.16335730 0.18448767 0.2036940 0.16713055 0.15855096  
## 7 0.2880306 0.18444106 0.21134605 0.2088468 0.17193563 0.15927204  
## 8 0.3059850 0.16790735 0.20039623 0.2134319 0.16980301 0.16471217  
## 9 0.3029722 0.18768898 0.20980677 0.2137960 0.17083359 0.17441349  
## 10 0.3036639 0.18292569 0.20648737 0.2179507 0.17405096 0.17211761  
## 11 0.3562756 0.21122655 0.24121711 0.2511726 0.20294797 0.19685554  
## 12 0.3542542 0.22594073 0.23291619 0.2506463 0.20538188 0.20046728  
## 13 0.3682532 0.23408682 0.22946935 0.2614858 0.20827632 0.20313371  
## 14 0.3767141 0.24009127 0.23876982 0.2681507 0.21185216 0.21147372  
## 15 0.3833258 0.24721694 0.24771308 0.2725322 0.21926479 0.21814834  
## 16 0.3848913 0.25597956 0.24787316 0.2793305 0.22217992 0.22305453  
## 17 0.3980283 0.26469209 0.25406339 0.2863682 0.22695728 0.22848514  
## Mountain\_3544 Pacific\_3544 poor\_3544 mid\_3544 rich\_3544 all\_4554  
## 1 0.05991856 0.07661253 0.1200160 0.05166820 0.10625275 0.07423062  
## 2 0.05367465 0.07927886 0.1251624 0.05142480 0.08200513 0.06472858  
## 3 0.05970337 0.09251594 0.1427040 0.05326116 0.05886337 0.05945755  
## 4 0.11134259 0.15608609 0.2286886 0.09549800 0.08788959 0.06497534  
## 5 0.16365111 0.20471890 0.3152439 0.14109942 0.11291785 0.09680419  
## 6 0.16746295 0.20789987 0.3268184 0.14609992 0.08853809 0.09460835  
## 7 0.16198771 0.21067257 0.3257244 0.15325937 0.08902332 0.10113674  
## 8 0.15426628 0.20620232 0.3246768 0.15396583 0.08848617 0.10479424  
## 9 0.18080204 0.20994891 0.3430968 0.15846801 0.08820150 0.10895909  
## 10 0.18172902 0.21690749 0.3420351 0.16302059 0.08652770 0.11593673  
## 11 0.19743124 0.24016541 0.3535911 0.17513538 0.15375040 0.13607668  
## 12 0.21361091 0.24620738 0.3636079 0.17863667 0.15266787 0.13903682  
## 13 0.22193485 0.26075093 0.3708003 0.18562079 0.15535804 0.14846077  
## 14 0.22007521 0.25822810 0.3868755 0.18723963 0.15412988 0.15355426  
## 15 0.21489442 0.26048790 0.3867598 0.19541287 0.15264058 0.15853732  
## 16 0.21380299 0.26506274 0.3963450 0.19798474 0.15299298 0.16315454  
## 17 0.22998839 0.26554288 0.4055360 0.20594262 0.15486496 0.16283209  
## HS\_4554 SC\_4554 BAp\_4554 BAo\_4554 GD\_4554 White\_4554 Black\_4554  
## 1 0.07666119 0.05617047 0.08253483 0.08253483 NA 0.07249921 0.07997291  
## 2 0.06863381 0.04860576 0.06414956 0.06414956 NA 0.06191279 0.09193725  
## 3 0.06186857 0.05107673 0.06409239 0.06409239 NA 0.05499592 0.09552072  
## 4 0.07205799 0.05103726 0.06418488 0.06369828 0.06471800 0.05795968 0.11791637  
## 5 0.11285739 0.08586423 0.08649472 0.09268534 0.07808600 0.08766032 0.17162581  
## 6 0.10550340 0.08566612 0.08882399 0.09465068 0.08045772 0.08589174 0.16765134  
## 7 0.11200742 0.09482469 0.09272539 0.09763173 0.08558254 0.09329730 0.18264873  
## 8 0.11739181 0.09773590 0.09447670 0.10385864 0.08086492 0.09512437 0.18835885  
## 9 0.12077051 0.09856815 0.10227846 0.10932241 0.09141578 0.09990682 0.19330902  
## 10 0.13132816 0.10688184 0.10226049 0.10973739 0.09102078 0.10627257 0.19981758  
## 11 0.16162464 0.12037016 0.11130046 0.11961815 0.09825038 0.12271753 0.24442171  
## 12 0.16367020 0.12441682 0.11378336 0.12346437 0.09825273 0.12412328 0.25499668  
## 13 0.17894671 0.13114061 0.11889352 0.12951490 0.10162415 0.13276967 0.27079843  
## 14 0.18529314 0.13925303 0.11713909 0.12480877 0.10463208 0.13567017 0.28186122  
## 15 0.19246567 0.14182531 0.11923663 0.12955055 0.10213551 0.13952250 0.28987186  
## 16 0.19963559 0.14520291 0.12108017 0.13000561 0.10613849 0.14382602 0.29311524  
## 17 0.19820893 0.14703800 0.12174550 0.13105643 0.10646297 0.14392798 0.28702962  
## Hisp\_4554 NE\_4554 MA\_4554 Midwest\_4554 South\_4554 Mountain\_4554  
## 1 0.07627002 0.09295742 0.08865437 0.07621888 0.06154283 0.05511070  
## 2 0.05837104 0.07913778 0.08026880 0.06462472 0.05659543 0.04317181  
## 3 0.06629932 0.07367659 0.08014610 0.05614671 0.05074620 0.04010103  
## 4 0.07873757 0.07463668 0.08720203 0.05831660 0.05543922 0.05201251  
## 5 0.09964396 0.10876888 0.11826273 0.09096061 0.08385871 0.09065770  
## 6 0.09773137 0.10452687 0.11419361 0.09000584 0.08361944 0.08381691  
## 7 0.08818890 0.11667271 0.12277514 0.09643540 0.08778694 0.08350016  
## 8 0.10291853 0.10864154 0.12769136 0.09655348 0.09439799 0.09107088  
## 9 0.10078386 0.12148409 0.12750642 0.10518777 0.09473067 0.10431172  
## 10 0.11051499 0.12033198 0.13612051 0.11132849 0.10511494 0.10660890  
## 11 0.13110558 0.15310991 0.16081967 0.12863134 0.12345240 0.12611566  
## 12 0.13442188 0.14836184 0.16181888 0.13148496 0.12757123 0.12743584  
## 13 0.14290037 0.15563540 0.17905920 0.14019045 0.13533762 0.14116992  
## 14 0.15385140 0.15543585 0.17720843 0.14374110 0.14283253 0.14550066  
## 15 0.15977941 0.17221785 0.18509042 0.14994607 0.14675299 0.14798884  
## 16 0.16332617 0.16563091 0.18419195 0.15447925 0.15438879 0.15329450  
## 17 0.16439868 0.16726511 0.18259958 0.15636022 0.15150111 0.15465290  
## Pacific\_4554 poor\_4554 mid\_4554 rich\_4554 work\_2534 nowork\_2534  
## 1 0.07205891 0.1192298 0.04667209 0.08280438 0.1170822 0.2666715  
## 2 0.05773524 0.1205495 0.04057439 0.05668550 0.1124301 0.2779161  
## 3 0.06112238 0.1218260 0.03824243 0.03951719 0.1871591 0.3430719  
## 4 0.07503743 0.1330727 0.04357153 0.03864742 0.2951745 0.4613049  
## 5 0.11319671 0.2003619 0.06969988 0.04740201 0.3505183 0.4771512  
## 6 0.10937645 0.1993260 0.07244677 0.03235229 0.3612731 0.4986793  
## 7 0.12059477 0.2144197 0.07713152 0.03492139 0.3571799 0.4896124  
## 8 0.12344654 0.2243188 0.08008971 0.03431807 0.3658999 0.5044183  
## 9 0.12731155 0.2272383 0.08608566 0.03576925 0.3700946 0.5034834  
## 10 0.13142544 0.2456834 0.09088034 0.03521133 0.3794774 0.5216550  
## 11 0.15202433 0.2623228 0.09914671 0.08270898 0.4150328 0.5700206  
## 12 0.15740201 0.2678043 0.10193781 0.08422339 0.4241258 0.5846536  
## 13 0.16368890 0.2824405 0.10965101 0.08828034 0.4375201 0.6287854  
## 14 0.17354988 0.2951164 0.11228985 0.09301568 0.4571573 0.6331593  
## 15 0.17490299 0.2972516 0.12328431 0.08993390 0.4641527 0.6348470  
## 16 0.18049115 0.3070525 0.12631088 0.09266700 0.4721497 0.6596089  
## 17 0.18282296 0.3014994 0.12704650 0.09426383 0.4859955 0.6733876  
## work\_HS\_2534 work\_SC\_2534 work\_BAp\_2534 work\_BAo\_2534 work\_GD\_2534  
## 1 0.1061811 0.1328140 0.1738686 0.1738686 NA  
## 2 0.1010393 0.1256073 0.1498056 0.1498056 NA  
## 3 0.1545269 0.2068706 0.2294678 0.2294678 NA  
## 4 0.2707082 0.2844077 0.3486640 0.3615751 0.3096602  
## 5 0.3316990 0.3364633 0.3913264 0.4058396 0.3472810  
## 6 0.3497756 0.3469631 0.3925642 0.4075975 0.3488069  
## 7 0.3565499 0.3411949 0.3743288 0.3870211 0.3382123  
## 8 0.3594027 0.3485465 0.3921255 0.4143523 0.3248057  
## 9 0.3686633 0.3534789 0.3884678 0.4108972 0.3256985  
## 10 0.3761708 0.3683305 0.3955540 0.4173083 0.3319744  
## 11 0.4189001 0.4008595 0.4235911 0.4431749 0.3662760  
## 12 0.4265453 0.4143370 0.4303674 0.4531664 0.3634563  
## 13 0.4402768 0.4340402 0.4375790 0.4645113 0.3608877  
## 14 0.4631237 0.4488669 0.4585265 0.4885872 0.3743817  
## 15 0.4738341 0.4564816 0.4607772 0.4891431 0.3832122  
## 16 0.4859853 0.4615054 0.4674330 0.4980411 0.3843791  
## 17 0.4937655 0.4766588 0.4867023 0.5187712 0.4021703  
## nowork\_HS\_2534 nowork\_SC\_2534 nowork\_BAp\_2534 nowork\_BAo\_2534 nowork\_GD\_2534  
## 1 0.2401532 0.3595446 0.3460750 0.3460750 NA  
## 2 0.2522162 0.3392832 0.2965813 0.2965813 NA  
## 3 0.2988959 0.3904443 0.4061055 0.4061055 NA  
## 4 0.4429248 0.4625251 0.5253176 0.5483019 0.4709593  
## 5 0.4478891 0.4918412 0.5471801 0.5715391 0.4928484  
## 6 0.4844663 0.4992075 0.5285036 0.5607791 0.4566424  
## 7 0.4707244 0.4898934 0.5286493 0.5522575 0.4708276  
## 8 0.4876329 0.5160420 0.5274131 0.5535646 0.4670031  
## 9 0.4907001 0.5000940 0.5345985 0.5590892 0.4775029  
## 10 0.5267333 0.5146075 0.5180357 0.5516849 0.4399976  
## 11 0.5824345 0.5480486 0.5625523 0.5888974 0.4976302  
## 12 0.5995810 0.5736965 0.5573011 0.5945661 0.4712309  
## 13 0.6348150 0.6153551 0.6295795 0.6583728 0.5583906  
## 14 0.6352857 0.6248705 0.6391337 0.6686430 0.5599587  
## 15 0.6402812 0.6163310 0.6476917 0.6786003 0.5666379  
## 16 0.6640919 0.6487114 0.6637383 0.6955264 0.5787443  
## 17 0.6835769 0.6556006 0.6723322 0.7079114 0.5837733  
## work\_White\_2534 work\_Black\_2534 work\_Hisp\_2534 nowork\_White\_2534  
## 1 0.1136486 0.1407836 0.1140376 0.2621638  
## 2 0.1079399 0.1495991 0.1041348 0.2737311  
## 3 0.1795875 0.2536728 0.1742623 0.3313281  
## 4 0.2789572 0.4112256 0.2985894 0.4334726  
## 5 0.3316046 0.4521391 0.3424136 0.4789056  
## 6 0.3412224 0.4918639 0.3491137 0.4785823  
## 7 0.3340113 0.4857209 0.3494063 0.4715591  
## 8 0.3434119 0.4829653 0.3613465 0.4786120  
## 9 0.3475874 0.5078834 0.3683083 0.4779802  
## 10 0.3577041 0.5097586 0.3736403 0.5017587  
## 11 0.3885166 0.5495717 0.4179644 0.5426220  
## 12 0.3986344 0.5545541 0.4255643 0.5555383  
## 13 0.4104633 0.5692408 0.4451114 0.6024901  
## 14 0.4299245 0.5847299 0.4683643 0.6073236  
## 15 0.4368436 0.5912645 0.4746091 0.6077654  
## 16 0.4413809 0.6176909 0.4848449 0.6364810  
## 17 0.4580409 0.6073805 0.4989302 0.6514156  
## nowork\_Black\_2534 nowork\_Hisp\_2534 work\_poor\_2534 work\_mid\_2534  
## 1 0.2704102 0.2744016 0.1084669 0.07267347  
## 2 0.2990281 0.2333771 0.1274835 0.07824687  
## 3 0.4228192 0.2831595 0.3018516 0.15558897  
## 4 0.6049357 0.4032055 0.4412935 0.25480427  
## 5 0.5601073 0.3932597 0.5286271 0.32125664  
## 6 0.6201385 0.4513603 0.5382594 0.34285799  
## 7 0.6189003 0.4460992 0.5327039 0.34232418  
## 8 0.6701223 0.4438283 0.5437659 0.35650773  
## 9 0.6584419 0.4480181 0.5518239 0.35981114  
## 10 0.6532933 0.4701977 0.5626743 0.37261933  
## 11 0.7152710 0.5164828 0.5786681 0.39190716  
## 12 0.7418233 0.5250021 0.5947742 0.39092935  
## 13 0.7542426 0.5758983 0.6198118 0.40337458  
## 14 0.7587843 0.5828649 0.6336758 0.44193449  
## 15 0.7598293 0.5874061 0.6511437 0.44971119  
## 16 0.7742661 0.6095642 0.6591534 0.45572839  
## 17 0.7767221 0.6314776 0.6678057 0.46890643  
## work\_rich\_2534 nowork\_poor\_2534 nowork\_mid\_2534 nowork\_rich\_2534  
## 1 0.2146922 0.2336305 0.1834525 0.4810894  
## 2 0.1736223 0.2794634 0.1832325 0.4330209  
## 3 0.1816584 0.3921112 0.2311773 0.4525407  
## 4 0.2860001 0.4905731 0.3669207 0.5599855  
## 5 0.2950026 0.5548276 0.4085239 0.4415362  
## 6 0.2824853 0.5850361 0.4188387 0.4660131  
## 7 0.2770121 0.5761209 0.4128068 0.4582591  
## 8 0.2758369 0.5972857 0.4207452 0.4642623  
## 9 0.2758130 0.5833825 0.4281421 0.4799447  
## 10 0.2803805 0.6035135 0.4459893 0.4945944  
## 11 0.3438570 0.6277665 0.4811284 0.6166785  
## 12 0.3533019 0.6439089 0.4913588 0.6276348  
## 13 0.3650890 0.6688419 0.5429809 0.6815129  
## 14 0.3687110 0.6683944 0.5561041 0.6920238  
## 15 0.3711866 0.6716263 0.5499191 0.7024407  
## 16 0.3825873 0.6892770 0.5841473 0.7221796  
## 17 0.4002069 0.7037153 0.6026948 0.7256260  
## nokids\_all\_2534 kids\_all\_2534 nokids\_HS\_2534 nokids\_SC\_2534 nokids\_BAp\_2534  
## 1 0.4953211 0.001965039 0.4785360 0.5224941 0.5577148  
## 2 0.4418216 0.003092397 0.4429481 0.4402916 0.4405253  
## 3 0.4680412 0.006422215 0.4599055 0.4731126 0.4756003  
## 4 0.5753674 0.025429089 0.5820636 0.5605984 0.5798064  
## 5 0.5976578 0.057820654 0.5922546 0.6001173 0.6032651  
## 6 0.6216301 0.055467563 0.6401739 0.6156347 0.6028826  
## 7 0.6209600 0.055819930 0.6447267 0.6119159 0.5974026  
## 8 0.6297985 0.060004312 0.6506788 0.6237418 0.6079258  
## 9 0.6317648 0.064330123 0.6528465 0.6302884 0.6056479  
## 10 0.6412916 0.070424218 0.6653612 0.6414951 0.6078994  
## 11 0.6668990 0.077646071 0.6882649 0.6587011 0.6391756  
## 12 0.6817338 0.082047173 0.7057243 0.6828975 0.6414124  
## 13 0.6938533 0.088148552 0.7163993 0.6978684 0.6546833  
## 14 0.7121804 0.095718975 0.7443269 0.7071740 0.6712049  
## 15 0.7143681 0.099109158 0.7446008 0.7122668 0.6733962  
## 16 0.7262468 0.104734219 0.7616938 0.7199049 0.6837642  
## 17 0.7322899 0.108765348 0.7651173 0.7281644 0.6928862  
## nokids\_BAo\_2534 nokids\_GD\_2534 kids\_HS\_2534 kids\_SC\_2534 kids\_BAp\_2534  
## 1 0.5577148 NA 0.002346439 0.0011159985 0.0002387723  
## 2 0.4405253 NA 0.004270388 0.0009175905 0.0003859812  
## 3 0.4756003 NA 0.008426836 0.0048412662 0.0020450343  
## 4 0.5926138 0.5418297 0.036455813 0.0174149274 0.0069626599  
## 5 0.6202891 0.5547487 0.079918992 0.0472979777 0.0194722473  
## 6 0.6243083 0.5438029 0.076408081 0.0464108287 0.0194738218  
## 7 0.6139220 0.5514254 0.076435455 0.0505269729 0.0161316937  
## 8 0.6272141 0.5499933 0.079273849 0.0560965793 0.0224895596  
## 9 0.6262803 0.5475132 0.090142245 0.0512558483 0.0256221224  
## 10 0.6314199 0.5397463 0.100479073 0.0575401629 0.0215819368  
## 11 0.6594258 0.5802225 0.108941379 0.0635889514 0.0266508445  
## 12 0.6643305 0.5743915 0.112105345 0.0732276595 0.0271458615  
## 13 0.6810130 0.5781744 0.124578403 0.0784651432 0.0271471359  
## 14 0.6972633 0.5934899 0.133109295 0.0896508063 0.0299317822  
## 15 0.7002347 0.5964434 0.140904316 0.0911283092 0.0302767892  
## 16 0.7081832 0.6119746 0.147369591 0.1024198509 0.0300670774  
## 17 0.7204469 0.6158738 0.155860083 0.1001138002 0.0364799756  
## kids\_BAo\_2534 kids\_GD\_2534 nokids\_poor\_2534 nokids\_mid\_2534 nokids\_rich\_2534  
## 1 0.0002387723 NA 0.5248380 0.4334994 0.5294592  
## 2 0.0003859812 NA 0.5204040 0.3698070 0.4594730  
## 3 0.0020450343 NA 0.5877015 0.4066570 0.4363188  
## 4 0.0079488701 0.004377092 0.6758054 0.5349988 0.5357610  
## 5 0.0217592543 0.013285706 0.7224354 0.5867130 0.4866898  
## 6 0.0216400099 0.013764715 0.7353691 0.6090364 0.5103593  
## 7 0.0189902319 0.008631830 0.7354470 0.6083349 0.5115564  
## 8 0.0261930440 0.013380113 0.7490870 0.6180960 0.5112946  
## 9 0.0293250229 0.016852518 0.7389924 0.6216812 0.5198765  
## 10 0.0249579226 0.013313066 0.7508735 0.6296566 0.5315198  
## 11 0.0303976230 0.017102746 0.7573969 0.6427825 0.6138831  
## 12 0.0317178256 0.016227721 0.7758673 0.6523409 0.6245178  
## 13 0.0328090485 0.013144921 0.7911834 0.6654269 0.6357049  
## 14 0.0356655664 0.016681307 0.8070169 0.6951388 0.6441414  
## 15 0.0357235658 0.017586188 0.8099401 0.6922644 0.6519993  
## 16 0.0371027755 0.014757303 0.8187954 0.7044361 0.6666621  
## 17 0.0445270874 0.019242941 0.8251913 0.7106832 0.6747142  
## kids\_poor\_2534 kids\_mid\_2534 kids\_rich\_2534  
## 1 0.004020248 0.001163337 0.001543276  
## 2 0.006932626 0.001739975 0.001929704  
## 3 0.018501971 0.003669058 0.002136578  
## 4 0.069201375 0.015199581 0.008945653  
## 5 0.142259765 0.041290334 0.020636444  
## 6 0.137530433 0.042096444 0.024350704  
## 7 0.147034911 0.040652880 0.019092692  
## 8 0.144776437 0.049622320 0.020295646  
## 9 0.156383316 0.050979074 0.024793118  
## 10 0.174229807 0.057616021 0.021771151  
## 11 0.188768241 0.060444477 0.023534569  
## 12 0.191428959 0.061155801 0.030958356  
## 13 0.216686102 0.065368851 0.030042479  
## 14 0.222786085 0.074652321 0.031016987  
## 15 0.223740359 0.080232481 0.032188222  
## 16 0.239814681 0.083688640 0.034257801  
## 17 0.250936459 0.087732258 0.034300482

read.csv(  
 here::here("Final\_Project", "data\_raw", "Women\_data.csv"))

## X.1 X year date all\_2534 HS\_2534 SC\_2534 BAp\_2534 BAo\_2534  
## 1 1 1 1960 1960-01-01 0.08594174 0.07501998 0.1146281 0.2882222 0.2882222  
## 2 2 2 1970 1970-01-01 0.09997836 0.08307902 0.1251594 0.2700100 0.2700100  
## 3 3 3 1980 1980-01-01 0.16197333 0.12249418 0.1892959 0.2952480 0.2952480  
## 4 4 4 1990 1990-01-01 0.24448143 0.21128474 0.2296344 0.3319387 0.3294701  
## 5 5 5 2000 2000-01-01 0.29756106 0.27379411 0.2774183 0.3506060 0.3502802  
## 6 6 6 2001 2001-01-01 0.30670747 0.28942418 0.2884819 0.3467877 0.3487494  
## 7 7 7 2002 2002-01-01 0.31073909 0.29408223 0.2967044 0.3447053 0.3502065  
## 8 8 8 2003 2003-01-01 0.31709338 0.30528912 0.2943780 0.3532717 0.3571160  
## 9 9 9 2004 2004-01-01 0.32448209 0.32148668 0.3015154 0.3499114 0.3546175  
## 10 10 10 2005 2005-01-01 0.33569178 0.33462916 0.3150642 0.3566786 0.3624953  
## 11 11 11 2006 2006-01-01 0.36221284 0.36400704 0.3435716 0.3782479 0.3876603  
## 12 12 12 2007 2007-01-01 0.37490322 0.37714490 0.3599842 0.3865649 0.3974012  
## 13 13 13 2008 2008-01-01 0.38595258 0.39148037 0.3727014 0.3938719 0.4026639  
## 14 14 14 2009 2009-01-01 0.40865243 0.41316592 0.3968364 0.4157115 0.4302428  
## 15 15 15 2010 2010-01-01 0.41548364 0.42218257 0.4046777 0.4195566 0.4316792  
## 16 16 16 2011 2011-01-01 0.42976824 0.44061048 0.4192479 0.4301479 0.4469747  
## 17 17 17 2012 2012-01-01 0.44072163 0.45451558 0.4314137 0.4378585 0.4557896  
## GD\_2534 White\_2534 Black\_2534 Hisp\_2534 NE\_2534 MA\_2534 Midwest\_2534  
## 1 NA 0.07957708 0.1272774 0.09921131 0.1111626 0.1253855 0.07508184  
## 2 NA 0.08938374 0.1668679 0.11269228 0.1236779 0.1376509 0.09093277  
## 3 NA 0.14146360 0.2967224 0.15697904 0.2025455 0.2141267 0.14917833  
## 4 0.3407277 0.20590074 0.4640693 0.24064387 0.2955242 0.3105237 0.22718271  
## 5 0.3515367 0.25564359 0.5251041 0.26365790 0.3570074 0.3710336 0.28179548  
## 6 0.3413665 0.26100751 0.5492472 0.27935208 0.3614757 0.3839271 0.28977355  
## 7 0.3299065 0.26754177 0.5448233 0.27701564 0.3604990 0.3888835 0.29874445  
## 8 0.3435395 0.27126308 0.5570252 0.29098184 0.3966419 0.3984112 0.30347778  
## 9 0.3382639 0.27717953 0.5769156 0.29813506 0.3988961 0.4067014 0.31119395  
## 10 0.3422177 0.28987207 0.5818617 0.30670462 0.4061238 0.4192519 0.31724448  
## 11 0.3552825 0.31557175 0.6153729 0.32993314 0.4265718 0.4494927 0.34579655  
## 12 0.3608097 0.32624501 0.6304658 0.35160598 0.4377092 0.4582117 0.35725802  
## 13 0.3729651 0.33742139 0.6405705 0.36428312 0.4545576 0.4706518 0.36869859  
## 14 0.3824887 0.36192542 0.6522749 0.38692662 0.4790906 0.4934967 0.39726383  
## 15 0.3924977 0.36871019 0.6569364 0.39400830 0.4930990 0.5006612 0.39612828  
## 16 0.3929783 0.38051019 0.6674188 0.41957704 0.4863462 0.5174373 0.41036719  
## 17 0.3989284 0.39204787 0.6820589 0.42699105 0.5109514 0.5199415 0.42097323  
## South\_2534 Mountain\_2534 Pacific\_2534 poor\_2534 mid\_2534 rich\_2534  
## 1 0.07711953 0.05816801 0.06675144 0.1112791 0.05304507 0.1291919  
## 2 0.08867830 0.07833787 0.09690067 0.1519919 0.06646076 0.1136176  
## 3 0.13718070 0.12977193 0.17985244 0.2735697 0.12694453 0.1200904  
## 4 0.21786740 0.19476233 0.26377136 0.3799156 0.20640323 0.1852014  
## 5 0.26843876 0.25152555 0.31910462 0.4725698 0.25896748 0.1966976  
## 6 0.27794947 0.25974539 0.32842014 0.4821863 0.27708747 0.1902416  
## 7 0.28355126 0.24051951 0.33478126 0.4891720 0.27928766 0.1945052  
## 8 0.28477184 0.26293785 0.33905061 0.5029748 0.28721591 0.1903929  
## 9 0.29841437 0.25153911 0.34388840 0.5159225 0.29670420 0.1880111  
## 10 0.30991015 0.29385707 0.35109610 0.5299569 0.30607843 0.1979927  
## 11 0.33354130 0.31494194 0.38399308 0.5454390 0.32768555 0.2479168  
## 12 0.35120172 0.31704410 0.39651359 0.5655499 0.33778220 0.2550363  
## 13 0.35890297 0.33455094 0.40945837 0.5783397 0.35175616 0.2614364  
## 14 0.37669269 0.35625205 0.43419804 0.5953209 0.37493015 0.2800219  
## 15 0.39134345 0.34905927 0.43642529 0.5967890 0.38745178 0.2845937  
## 16 0.40793422 0.36771300 0.44676205 0.6105374 0.40049228 0.3017905  
## 17 0.41504572 0.38123261 0.46882672 0.6258622 0.41337408 0.3094321  
## all\_3544 HS\_3544 SC\_3544 BAp\_3544 BAo\_3544 GD\_3544 White\_3544  
## 1 0.05935197 0.05300833 0.07123038 0.2483918 0.2483918 NA 0.05829575  
## 2 0.05661831 0.05154840 0.05732065 0.1858546 0.1858546 NA 0.05195589  
## 3 0.06085068 0.05306300 0.05936245 0.1426848 0.1426848 NA 0.04993165  
## 4 0.09716271 0.08918832 0.08176402 0.1313048 0.1190505 0.1526890 0.07808895  
## 5 0.13399085 0.13768342 0.11842408 0.1479073 0.1392989 0.1667306 0.10356337  
## 6 0.13665009 0.14065005 0.12126835 0.1487980 0.1391005 0.1703938 0.10398829  
## 7 0.13965191 0.14351894 0.12477541 0.1511391 0.1451759 0.1642721 0.10461814  
## 8 0.14158925 0.15082619 0.12593176 0.1461883 0.1380744 0.1637681 0.10729172  
## 9 0.14362262 0.15440803 0.12926487 0.1447086 0.1360148 0.1635165 0.10782990  
## 10 0.14901651 0.16096840 0.13571726 0.1475263 0.1395851 0.1635607 0.11506543  
## 11 0.16549120 0.18425403 0.14711941 0.1604814 0.1552009 0.1711682 0.12576913  
## 12 0.16857031 0.19025899 0.15395614 0.1568370 0.1516337 0.1669411 0.12842015  
## 13 0.17231874 0.19717716 0.15820271 0.1594589 0.1520357 0.1734292 0.13023410  
## 14 0.17705292 0.20780332 0.16478493 0.1562844 0.1499417 0.1677932 0.13162708  
## 15 0.18086355 0.21570093 0.16766007 0.1574194 0.1519049 0.1670840 0.13182065  
## 16 0.18694957 0.22485978 0.17581982 0.1596469 0.1590781 0.1606153 0.13717784  
## 17 0.18907303 0.22839407 0.18189546 0.1588051 0.1570431 0.1617606 0.14038416  
## Black\_3544 Hisp\_3544 NE\_3544 MA\_3544 Midwest\_3544 South\_3544  
## 1 0.06912995 0.05732185 0.08720192 0.08532941 0.05469559 0.05070571  
## 2 0.08750048 0.06901016 0.07629469 0.07969534 0.05178684 0.04927161  
## 3 0.12875051 0.07555785 0.07254874 0.09157553 0.05415224 0.05298086  
## 4 0.21632850 0.11093757 0.11303815 0.13079563 0.08989674 0.08428739  
## 5 0.30817424 0.13327141 0.15196516 0.16859285 0.12394957 0.12345133  
## 6 0.31759660 0.13515544 0.14961704 0.16369145 0.12936278 0.12845366  
## 7 0.32693331 0.14353351 0.14854385 0.17961019 0.12431512 0.13064352  
## 8 0.33628727 0.13571471 0.15143774 0.17646660 0.12946540 0.13478055  
## 9 0.33176027 0.15015521 0.15984714 0.17854311 0.12993883 0.13485887  
## 10 0.33905646 0.14686632 0.17202470 0.18715562 0.13451532 0.13806262  
## 11 0.37352983 0.16089994 0.18127480 0.20729159 0.15234506 0.15362778  
## 12 0.37566081 0.16926214 0.19291529 0.20369169 0.15507129 0.15841809  
## 13 0.38174626 0.17603621 0.18372044 0.21520651 0.15739930 0.15892937  
## 14 0.39670944 0.18736201 0.18795162 0.22127438 0.16185315 0.16396014  
## 15 0.39616903 0.19563259 0.19478880 0.22087409 0.16539968 0.17001825  
## 16 0.41159369 0.20060635 0.19445089 0.22386089 0.17523834 0.17869818  
## 17 0.41019859 0.20063482 0.20259437 0.23014111 0.17634926 0.17975042  
## Mountain\_3544 Pacific\_3544 poor\_3544 mid\_3544 rich\_3544 all\_4554  
## 1 0.03511308 0.04017857 0.08579661 0.04330663 0.06531464 0.07091650  
## 2 0.03959607 0.04806786 0.09751344 0.03993586 0.04867572 0.05502268  
## 3 0.03793265 0.05847829 0.11647505 0.04808592 0.03072439 0.04606683  
## 4 0.07230507 0.10634010 0.17672679 0.08429512 0.04330842 0.05424004  
## 5 0.10744340 0.14453595 0.24828362 0.11375255 0.05867921 0.07962155  
## 6 0.11175699 0.14598612 0.25863005 0.11966738 0.04802342 0.08218911  
## 7 0.10626736 0.15516730 0.26198794 0.12059488 0.05467437 0.08495305  
## 8 0.10466474 0.15313614 0.27035474 0.12262303 0.05070464 0.08950282  
## 9 0.11409433 0.15697251 0.27755399 0.12117623 0.04885290 0.09383564  
## 10 0.12528137 0.16200718 0.28348101 0.12997167 0.04891310 0.09771600  
## 11 0.13952210 0.17906654 0.30037117 0.14364868 0.07427808 0.10648537  
## 12 0.14673263 0.18084491 0.30408909 0.14672111 0.07628447 0.10909704  
## 13 0.15171316 0.19134902 0.30731093 0.15359081 0.07469162 0.11508000  
## 14 0.15463103 0.19600797 0.31934210 0.15427261 0.07958281 0.11698954  
## 15 0.16666761 0.19452928 0.32579369 0.16164760 0.07432601 0.12122715  
## 16 0.15563073 0.20161161 0.33218448 0.16800592 0.07615769 0.12351790  
## 17 0.16307571 0.20068468 0.34047639 0.16900582 0.07774441 0.12331171  
## HS\_4554 SC\_4554 BAp\_4554 BAo\_4554 GD\_4554 White\_4554 Black\_4554  
## 1 0.06050736 0.09950307 0.28462394 0.28462394 NA 0.07243566 0.05920761  
## 2 0.04951338 0.06073811 0.19156968 0.19156968 NA 0.05348648 0.06789655  
## 3 0.04099964 0.04504505 0.13254434 0.13254434 NA 0.04070583 0.07886140  
## 4 0.04978537 0.04239025 0.08536382 0.06473976 0.1155298 0.04409467 0.11472790  
## 5 0.07767424 0.06626295 0.09827117 0.08912122 0.1113509 0.06410282 0.17947806  
## 6 0.07969066 0.07099310 0.09819193 0.09154634 0.1084142 0.06470450 0.19269513  
## 7 0.08208544 0.07240599 0.10300530 0.09306653 0.1181445 0.06663807 0.19630164  
## 8 0.08815225 0.07917501 0.10290417 0.09739246 0.1118694 0.07008496 0.22151049  
## 9 0.09525795 0.08196321 0.10491196 0.09724171 0.1173725 0.07333545 0.21984547  
## 10 0.09830831 0.08496491 0.11124461 0.10362745 0.1238764 0.07538720 0.23508126  
## 11 0.11404108 0.08783578 0.11616918 0.11077192 0.1255675 0.08211174 0.25155642  
## 12 0.11527777 0.09575459 0.11481150 0.10721716 0.1281419 0.08529250 0.25412909  
## 13 0.12629572 0.09978131 0.11761812 0.11208878 0.1276613 0.08781346 0.27115876  
## 14 0.12674908 0.10304415 0.11996656 0.11435255 0.1300356 0.08916076 0.28018009  
## 15 0.13172271 0.11022651 0.11963873 0.11377147 0.1306989 0.09207637 0.28093349  
## 16 0.13615650 0.11133316 0.12036752 0.11385807 0.1324990 0.09243851 0.29127516  
## 17 0.13870951 0.11035977 0.11770746 0.11111575 0.1297328 0.09197823 0.28803114  
## Hisp\_4554 NE\_4554 MA\_4554 Midwest\_4554 South\_4554 Mountain\_4554  
## 1 0.05619584 0.11105847 0.09641542 0.06954857 0.05808965 0.03957893  
## 2 0.05784879 0.08134711 0.07711355 0.05160635 0.04731498 0.03638151  
## 3 0.06424870 0.06523337 0.07055209 0.04050138 0.03945381 0.02758750  
## 4 0.07367984 0.06651057 0.08053145 0.04986344 0.04569739 0.03734240  
## 5 0.08885294 0.09614167 0.10746452 0.07529343 0.06913666 0.06231914  
## 6 0.09061081 0.09312532 0.10524218 0.07439440 0.07443033 0.06446721  
## 7 0.09880943 0.11175174 0.10833265 0.07674397 0.07666820 0.06545569  
## 8 0.09128743 0.10086458 0.12051153 0.08491981 0.08047344 0.06514654  
## 9 0.10162130 0.10655739 0.12841424 0.08748798 0.08365973 0.07248733  
## 10 0.10229747 0.10367354 0.12403649 0.09278220 0.09064886 0.07631249  
## 11 0.11633345 0.11525390 0.13803294 0.09861438 0.09946287 0.08877199  
## 12 0.11017293 0.12051194 0.14225954 0.09777267 0.10071254 0.09179954  
## 13 0.12398373 0.11991886 0.14485428 0.10743972 0.10706244 0.09412055  
## 14 0.12739449 0.12271691 0.14849813 0.11058146 0.10829673 0.09857386  
## 15 0.13051034 0.13297794 0.15106080 0.11369230 0.11164257 0.10261375  
## 16 0.13416920 0.12991441 0.15250972 0.11301621 0.11651416 0.11132516  
## 17 0.13525983 0.12988002 0.15205981 0.11267938 0.11566143 0.10659075  
## Pacific\_4554 poor\_4554 mid\_4554 rich\_4554 work\_2534 nowork\_2534  
## 1 0.04761833 0.08638496 0.06081675 0.07542950 0.2543888 0.05053594  
## 2 0.03924662 0.08649719 0.04357194 0.04598105 0.2112686 0.06649195  
## 3 0.03852374 0.08178484 0.03780845 0.02685915 0.2299219 0.12138336  
## 4 0.05427074 0.09773985 0.04764402 0.02392795 0.2846006 0.20720645  
## 5 0.08509821 0.14630808 0.07073782 0.03054915 0.3323771 0.26159096  
## 6 0.09332673 0.15607719 0.07425989 0.02414598 0.3533049 0.25521157  
## 7 0.09340435 0.15501332 0.07892709 0.02687835 0.3512024 0.26913444  
## 8 0.09419733 0.16871689 0.08051683 0.02818732 0.3598102 0.27283622  
## 9 0.09929060 0.17830016 0.08411807 0.02721121 0.3641512 0.28399722  
## 10 0.10402128 0.18703813 0.08782653 0.02815393 0.3798864 0.29138513  
## 11 0.11008485 0.19525522 0.09220497 0.04603603 0.4020464 0.32134707  
## 12 0.11867883 0.20141006 0.09402482 0.04518861 0.4147077 0.33331316  
## 13 0.12520991 0.21367937 0.09856865 0.04943475 0.4194337 0.33941135  
## 14 0.12385685 0.21421595 0.10145159 0.05068606 0.4409799 0.36504072  
## 15 0.13185101 0.22161696 0.10657460 0.05012952 0.4437223 0.37880700  
## 16 0.13192409 0.22491782 0.10910715 0.05000175 0.4606725 0.39063183  
## 17 0.13554341 0.22434705 0.11009768 0.04865180 0.4667453 0.40657375  
## work\_HS\_2534 work\_SC\_2534 work\_BAp\_2534 work\_BAo\_2534 work\_GD\_2534  
## 1 0.2251156 0.3415641 0.4775844 0.4775844 NA  
## 2 0.1752440 0.2805774 0.3956504 0.3956504 NA  
## 3 0.1703760 0.2671158 0.3708933 0.3708933 NA  
## 4 0.2229378 0.2680119 0.3927440 0.3950810 0.3838921  
## 5 0.2919316 0.3083852 0.3938717 0.3967317 0.3851399  
## 6 0.3251631 0.3282061 0.4054239 0.4110768 0.3889979  
## 7 0.3206992 0.3345791 0.3952533 0.4044817 0.3689250  
## 8 0.3453872 0.3259347 0.4048772 0.4109659 0.3888157  
## 9 0.3465702 0.3400656 0.4010601 0.4103898 0.3764919  
## 10 0.3677492 0.3536857 0.4137545 0.4236003 0.3878982  
## 11 0.3937160 0.3801535 0.4288221 0.4422027 0.3940504  
## 12 0.4069931 0.3966319 0.4368028 0.4510929 0.4015658  
## 13 0.4182685 0.4026175 0.4356563 0.4495128 0.4027652  
## 14 0.4399884 0.4276603 0.4526435 0.4727852 0.4068362  
## 15 0.4455773 0.4321883 0.4520952 0.4719326 0.4087336  
## 16 0.4670537 0.4480673 0.4671565 0.4905125 0.4165084  
## 17 0.4678392 0.4605718 0.4709499 0.4960743 0.4172214  
## nowork\_HS\_2534 nowork\_SC\_2534 nowork\_BAp\_2534 nowork\_BAo\_2534 nowork\_GD\_2534  
## 1 0.04453740 0.06218812 0.2246402 0.2246402 NA  
## 2 0.05625722 0.07504911 0.2247817 0.2247817 NA  
## 3 0.09868831 0.13117080 0.2449682 0.2449682 NA  
## 4 0.20365373 0.18462503 0.2519181 0.2404086 0.2898060  
## 5 0.26161747 0.23740627 0.2895494 0.2819732 0.3093137  
## 6 0.26083514 0.23574683 0.2662841 0.2604534 0.2813530  
## 7 0.27450866 0.24991196 0.2806023 0.2788742 0.2849267  
## 8 0.27495870 0.25647599 0.2863306 0.2853836 0.2886060  
## 9 0.30328029 0.25569196 0.2846228 0.2805073 0.2940547  
## 10 0.31182530 0.26946639 0.2825262 0.2802141 0.2878890  
## 11 0.34297951 0.30025524 0.3095065 0.3102832 0.3077625  
## 12 0.35581536 0.31602719 0.3167096 0.3207838 0.3075013  
## 13 0.36918838 0.32543221 0.3057650 0.3040412 0.3098797  
## 14 0.39204954 0.35166106 0.3378953 0.3410520 0.3305973  
## 15 0.40461227 0.36594662 0.3535659 0.3516291 0.3580789  
## 16 0.42143821 0.38143040 0.3545027 0.3595303 0.3429650  
## 17 0.44481532 0.39206825 0.3669082 0.3707024 0.3583967  
## work\_White\_2534 work\_Black\_2534 work\_Hisp\_2534 nowork\_White\_2534  
## 1 0.2619845 0.1978542 0.2806276 0.04239417  
## 2 0.2092236 0.2081880 0.2472198 0.05477252  
## 3 0.2200424 0.2957331 0.2166452 0.09370792  
## 4 0.2615846 0.4354951 0.2787007 0.14816418  
## 5 0.2976319 0.5158516 0.3128413 0.20347631  
## 6 0.3094064 0.5552683 0.3313710 0.20229863  
## 7 0.3116118 0.5423802 0.3197982 0.21789004  
## 8 0.3168475 0.5510830 0.3513466 0.21928263  
## 9 0.3214787 0.5697732 0.3449572 0.22798414  
## 10 0.3373378 0.5795955 0.3668489 0.23682925  
## 11 0.3602008 0.6034241 0.3867926 0.26433547  
## 12 0.3671024 0.6261072 0.4122498 0.27900821  
## 13 0.3734768 0.6319870 0.4114216 0.28172088  
## 14 0.3993990 0.6390646 0.4332814 0.30549710  
## 15 0.4011908 0.6474108 0.4310889 0.32026002  
## 16 0.4161291 0.6550137 0.4631812 0.32875023  
## 17 0.4234139 0.6669075 0.4638031 0.34419749  
## nowork\_Black\_2534 nowork\_Hisp\_2534 work\_poor\_2534 work\_mid\_2534  
## 1 0.1082019 0.06621751 0.3037944 0.2296081  
## 2 0.1494383 0.08065995 0.3156291 0.1849315  
## 3 0.2973738 0.13201875 0.3800185 0.2292454  
## 4 0.4868529 0.21963997 0.4633569 0.2839844  
## 5 0.5344913 0.23607961 0.5601876 0.3341214  
## 6 0.5407533 0.24155218 0.5712565 0.3588919  
## 7 0.5477390 0.24526568 0.5833420 0.3586627  
## 8 0.5641839 0.24723356 0.5901272 0.3753559  
## 9 0.5851830 0.26180794 0.6028912 0.3844577  
## 10 0.5843491 0.26383769 0.6209867 0.3984500  
## 11 0.6279721 0.28670666 0.6280888 0.4128932  
## 12 0.6353610 0.30343037 0.6461683 0.4248946  
## 13 0.6537959 0.31696657 0.6594107 0.4304673  
## 14 0.6705313 0.34005223 0.6807590 0.4534914  
## 15 0.6691341 0.35809665 0.6765276 0.4656344  
## 16 0.6826861 0.37882177 0.7012532 0.4811948  
## 17 0.7010989 0.39126447 0.7039869 0.4893808  
## work\_rich\_2534 nowork\_poor\_2534 nowork\_mid\_2534 nowork\_rich\_2534  
## 1 0.2547813 0.08080936 0.02485176 0.07797550  
## 2 0.1830420 0.11428029 0.03575916 0.07979238  
## 3 0.1437159 0.23315320 0.06615427 0.09865401  
## 4 0.1991858 0.34593364 0.12253658 0.16438359  
## 5 0.2069532 0.43109299 0.16671931 0.18049345  
## 6 0.2190416 0.43416690 0.17012253 0.14393777  
## 7 0.2142759 0.44472828 0.18183929 0.16413279  
## 8 0.2128830 0.46304126 0.17773832 0.15467959  
## 9 0.2068195 0.47698690 0.18987583 0.15814993  
## 10 0.2217104 0.49064199 0.19368359 0.16173233  
## 11 0.2598408 0.50671330 0.22062112 0.23054901  
## 12 0.2635674 0.52487689 0.22801999 0.24240907  
## 13 0.2599725 0.52769699 0.21389270 0.26439778  
## 14 0.2763962 0.54489527 0.23845835 0.28727170  
## 15 0.2777674 0.55474359 0.25555031 0.29819110  
## 16 0.2973170 0.56417439 0.26903950 0.31068471  
## 17 0.3006024 0.58454684 0.28443920 0.32711729  
## nokids\_all\_2534 kids\_all\_2534 nokids\_HS\_2534 nokids\_SC\_2534 nokids\_BAp\_2534  
## 1 0.4155188 0.003509671 0.3917740 0.4624880 0.5735953  
## 2 0.4139814 0.015201183 0.3971595 0.4232097 0.4876033  
## 3 0.4142490 0.038973267 0.3854186 0.4196074 0.4667965  
## 4 0.4932558 0.083856348 0.4721611 0.4753723 0.5295801  
## 5 0.5324327 0.127180369 0.5232374 0.5270778 0.5421241  
## 6 0.5329074 0.146143063 0.5284312 0.5312869 0.5366519  
## 7 0.5348388 0.153140121 0.5369489 0.5338278 0.5342174  
## 8 0.5458988 0.155580608 0.5481327 0.5389723 0.5486196  
## 9 0.5544923 0.162927477 0.5675838 0.5520792 0.5487915  
## 10 0.5647238 0.168424001 0.5789115 0.5624299 0.5577370  
## 11 0.5896280 0.180332294 0.6043972 0.5973369 0.5752854  
## 12 0.6038875 0.187513747 0.6309558 0.6055173 0.5856717  
## 13 0.6165775 0.195409101 0.6387142 0.6203946 0.6009409  
## 14 0.6317955 0.207878225 0.6582557 0.6389827 0.6131489  
## 15 0.6357733 0.214868564 0.6632565 0.6430095 0.6166960  
## 16 0.6510059 0.223390805 0.6792925 0.6586152 0.6312878  
## 17 0.6580344 0.228206894 0.6974948 0.6622693 0.6354165  
## nokids\_BAo\_2534 nokids\_GD\_2534 kids\_HS\_2534 kids\_SC\_2534 kids\_BAp\_2534  
## 1 0.5735953 NA 0.004018088 0.001185838 0.001968465  
## 2 0.4876033 NA 0.018092929 0.006234189 0.004911591  
## 3 0.4667965 NA 0.046223196 0.029090513 0.012995610  
## 4 0.5316151 0.5227292 0.106656400 0.073028913 0.025815504  
## 5 0.5507688 0.5194288 0.161440677 0.126738078 0.048958599  
## 6 0.5475857 0.5089062 0.187547470 0.146520304 0.053880717  
## 7 0.5465282 0.5029459 0.191148379 0.163471611 0.056534219  
## 8 0.5582184 0.5255429 0.198928469 0.158567549 0.062706703  
## 9 0.5652477 0.5113223 0.218685327 0.160362741 0.061583086  
## 10 0.5736008 0.5208965 0.222868105 0.171352168 0.061121174  
## 11 0.5923703 0.5353326 0.234823424 0.184560845 0.070865084  
## 12 0.6043748 0.5430817 0.238535328 0.199941998 0.076906260  
## 13 0.6180118 0.5624552 0.253746672 0.211605635 0.074260326  
## 14 0.6338011 0.5671544 0.270406233 0.227933713 0.079475311  
## 15 0.6345001 0.5781281 0.279993419 0.236494969 0.081957582  
## 16 0.6554483 0.5795411 0.293440899 0.245839749 0.088372083  
## 17 0.6587606 0.5856362 0.298229980 0.256692870 0.090094618  
## kids\_BAo\_2534 kids\_GD\_2534 nokids\_poor\_2534 nokids\_mid\_2534 nokids\_rich\_2534  
## 1 0.001968465 NA 0.4522772 0.3745562 0.4273072  
## 2 0.004911591 NA 0.4869025 0.3863267 0.3829927  
## 3 0.012995610 NA 0.5488929 0.3985014 0.3059603  
## 4 0.026134257 0.02457333 0.6181608 0.4988261 0.3780774  
## 5 0.052013848 0.03891943 0.6812555 0.5408232 0.3791846  
## 6 0.059409739 0.03632574 0.6801496 0.5565187 0.3638889  
## 7 0.063251683 0.03675702 0.6918940 0.5487882 0.3744780  
## 8 0.068760932 0.04611842 0.6971603 0.5656469 0.3754273  
## 9 0.066898492 0.04665358 0.7224433 0.5714017 0.3741786  
## 10 0.066935955 0.04508176 0.7159319 0.5815826 0.3916732  
## 11 0.078293831 0.05146825 0.7277774 0.5966067 0.4557598  
## 12 0.085817282 0.05423478 0.7472930 0.6076317 0.4670798  
## 13 0.083440150 0.05050194 0.7492406 0.6254043 0.4807782  
## 14 0.090999733 0.05190579 0.7676190 0.6396318 0.4916977  
## 15 0.092991543 0.05601158 0.7704858 0.6453338 0.4964501  
## 16 0.101840339 0.05699257 0.7773208 0.6576422 0.5244677  
## 17 0.104044820 0.05882554 0.7846424 0.6664233 0.5299101  
## kids\_poor\_2534 kids\_mid\_2534 kids\_rich\_2534  
## 1 0.01307559 0.000449884 0.0002564386  
## 2 0.04712625 0.005124914 0.0038405716  
## 3 0.11562991 0.017400612 0.0101361923  
## 4 0.22934910 0.039402368 0.0240950115  
## 5 0.31625331 0.076837252 0.0355788441  
## 6 0.34858047 0.092702396 0.0407740735  
## 7 0.35579078 0.101326651 0.0416039658  
## 8 0.37065894 0.103266281 0.0361718136  
## 9 0.38101191 0.109908568 0.0382416476  
## 10 0.39988476 0.112309450 0.0383521764  
## 11 0.40800259 0.125309723 0.0490431273  
## 12 0.42265155 0.131104255 0.0491654516  
## 13 0.44228365 0.138982554 0.0492576444  
## 14 0.45253128 0.145973624 0.0553155079  
## 15 0.45358347 0.158754323 0.0592654148  
## 16 0.46873056 0.167411672 0.0600712258  
## 17 0.48548762 0.170726887 0.0613038363

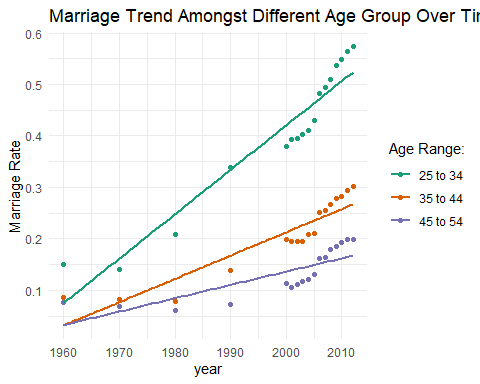
Our main objective for this project is to perform a follow-up study to examine the trend of marriage across education level for both gender across time, along with measurint it against the divorce rate trend.

## Summarizing data and observing the marriage trend for Individuals with a High School Diploma or Less.

### Men Marriage Trend Data for individuals with only a high school diploma and less.

m <- men\_data %>%  
 select(  
 year,  
 starts\_with("HS\_"))   
  
m\_long <- m %>%  
 pivot\_longer(  
 cols = -year,  
 names\_sep = "\_",  
 names\_to = c("edu", "age"),  
 values\_to = "rate"  
)  
  
m\_long\_trim <-   
 m\_long %>%   
 mutate(  
 age\_range = case\_when(  
 age == "2534" ~ "25 to 34",  
 age == "3544" ~ "35 to 44",  
 age == "4554" ~ "45 to 54"  
 ))  
  
m\_plot <- m\_long\_trim %>%   
 ggplot(aes(  
 x=year,  
 y=rate,  
 color = age\_range)) +  
 geom\_point() +  
 scale\_color\_brewer(  
 palette = "Dark2") +  
 geom\_smooth(  
 method = "lm", se = FALSE) +  
 labs(  
 title = "Marriage Trend Amongst Different Age Group Over Time for Men with only High School Diploma.",  
 x = "year",  
 y = "Marriage Rate",  
 color = "Age Range:"  
 ) +  
 theme\_minimal()+  
 theme(  
 legend.position = "right")  
  
m\_plot

## `geom\_smooth()` using formula 'y ~ x'

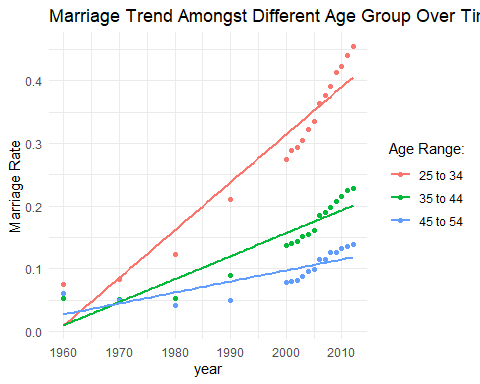


The marriage trends among the different age groups of individuals who obtained only a high school diploma or less are significant. From 1960 to 2010, individuals age ranged from twenty-five to thirty-four years old experienced the highest increase of marraige trend followed by thirty-five to fourty-four years olds, then fourty-five to fifty-four years old. The marriage trend for all three groups started gaining traction starting in 1980 with the orange age group exponentially increased their marriage rate trend when compared to other group’s marriage trend. Overall, the older an individual who only has a high school diploma is, the lower the chance of them marrying, but marriage rate for every age group is still increasing throughout the years.

### women Marriage Data for individuals with only a high school diploma and less.

w <- women\_data %>%  
 select(year, starts\_with("HS\_"))   
  
w\_long <- w %>% pivot\_longer(  
 cols = -year,  
 names\_sep = "\_",  
 names\_to = c("edu", "age"),  
 values\_to = "rate"  
)  
  
w\_long\_trim <-   
 w\_long %>%   
 mutate(age\_range = case\_when(  
 age == "2534" ~ "25 to 34",  
 age == "3544" ~ "35 to 44",  
 age == "4554" ~ "45 to 54"  
 ))  
  
w\_plot <- w\_long\_trim %>%   
 ggplot(aes(  
 x=year,  
 y=rate,  
 color = age\_range)) +  
 geom\_point() +  
 geom\_smooth(  
 method = "lm",  
 se = FALSE) +  
 labs(title = "Marriage Trend Amongst Different Age Group Over Time for Women with only High School Diploma.",  
 x = "year",  
 y = "Marriage Rate",  
 color = "Age Range:"  
 ) +  
 theme\_minimal() +  
 theme(  
 legend.position = "right")  
  
w\_plot

## `geom\_smooth()` using formula 'y ~ x'

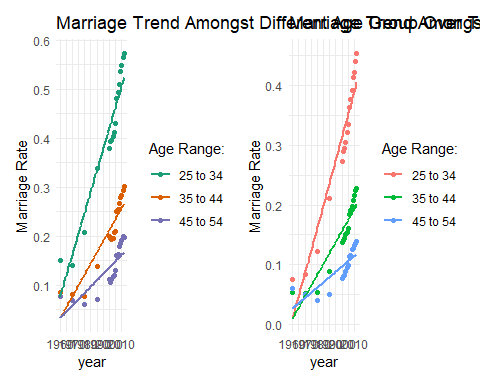


Overall, the trend of marriage rate for women also matches up with the men, although the rate is not as high. The increasing pattern is similar that of the men with the noticeable increase in the trend starting in the 1990s.

## Comparing graphs of marriage trend for men and women who only have a high school diploma or less.

combined\_w\_m\_plot <- m\_plot + w\_plot  
combined\_w\_m\_plot

## `geom\_smooth()` using formula 'y ~ x'  
## `geom\_smooth()` using formula 'y ~ x'



The comparative visual above is a better look into the comparison of the trends between two genders.

ggsave(here::here("Final\_project", "output", "figure",  
 "Marriage Trend Amongst Different Age Group Over Time for Men with High School diploma or less.svg"),  
 m\_plot,  
 height = 6,  
 width = 6)

## `geom\_smooth()` using formula 'y ~ x'

ggsave(here::here("Final\_project", "output", "figure",  
 "Marriage Trend Amongst Different Age Group Over Time for Women with High School diploma or less.svg"),  
 w\_plot,  
 height = 10,  
 width = 10)

## `geom\_smooth()` using formula 'y ~ x'

ggsave(here::here("Final\_project", "output", "figure",  
 "Comparative Marriage Trend Amongst Different Age Group Over Time for both gender with High School diploma or less.svg"),  
 combined\_w\_m\_plot,  
 height = 20,  
 width = 20)

## `geom\_smooth()` using formula 'y ~ x'  
## `geom\_smooth()` using formula 'y ~ x'

## Data summary of both gender for individuals with a high school diploma or less.

First, I want to create a list of all of the age range of individuals holding a high school diploma or less.

HS\_all\_age <- both\_gender %>%   
 select(c(  
 "year",  
 "HS\_2534",  
 "HS\_3544",  
 "HS\_4554"))

Then I calculated the data.

sum\_for\_both\_gend <- HS\_all\_age %>%   
 group\_by(year) %>%   
 summarise\_all(  
 funs(n(),  
 mean,  
 median))

## Warning: `funs()` is deprecated as of dplyr 0.8.0.  
## Please use a list of either functions or lambdas:   
##   
## # Simple named list:   
## list(mean = mean, median = median)  
##   
## # Auto named with `tibble::lst()`:   
## tibble::lst(mean, median)  
##   
## # Using lambdas  
## list(~ mean(., trim = .2), ~ median(., na.rm = TRUE))  
## This warning is displayed once every 8 hours.  
## Call `lifecycle::last\_warnings()` to see where this warning was generated.

sum\_for\_both\_gend

## # A tibble: 17 x 10  
## year HS\_2534\_n HS\_3544\_n HS\_4554\_n HS\_2534\_mean HS\_3544\_mean HS\_4554\_mean  
## \* <int> <int> <int> <int> <dbl> <dbl> <dbl>  
## 1 1960 1 1 1 0.110 0.0686 0.0684  
## 2 1970 1 1 1 0.109 0.0651 0.0583  
## 3 1980 1 1 1 0.162 0.0643 0.0504  
## 4 1990 1 1 1 0.278 0.112 0.0599  
## 5 2000 1 1 1 0.332 0.170 0.0944  
## 6 2001 1 1 1 0.345 0.169 0.0919  
## 7 2002 1 1 1 0.349 0.170 0.0964  
## 8 2003 1 1 1 0.358 0.174 0.102   
## 9 2004 1 1 1 0.371 0.182 0.108   
## 10 2005 1 1 1 0.387 0.187 0.115   
## 11 2006 1 1 1 0.431 0.221 0.138   
## 12 2007 1 1 1 0.444 0.226 0.140   
## 13 2008 1 1 1 0.460 0.235 0.154   
## 14 2009 1 1 1 0.485 0.247 0.158   
## 15 2010 1 1 1 0.494 0.253 0.164   
## 16 2011 1 1 1 0.512 0.263 0.170   
## 17 2012 1 1 1 0.524 0.269 0.170   
## # ... with 3 more variables: HS\_2534\_median <dbl>, HS\_3544\_median <dbl>,  
## # HS\_4554\_median <dbl>

write.csv(  
 sum\_for\_both\_gend,  
 here::here(  
 "Final\_project",  
 "output",  
 "Sum\_both\_gend.csv"))

Sum\_both\_gend\_corr <- sum\_for\_both\_gend %>%   
 correlation::correlation(  
 select = c(  
 "HS\_2534\_mean",  
 "HS\_3544\_mean",  
 "HS\_4554\_mean")) %>%   
 summary()  
  
both\_gend\_tab <- full\_join(  
 sum\_for\_both\_gend,  
 Sum\_both\_gend\_corr)

## Joining, by = c("HS\_3544\_mean", "HS\_4554\_mean")

both\_gend\_tab

## # A tibble: 19 x 11  
## year HS\_2534\_n HS\_3544\_n HS\_4554\_n HS\_2534\_mean HS\_3544\_mean HS\_4554\_mean  
## <int> <int> <int> <int> <dbl> <dbl> <dbl>  
## 1 1960 1 1 1 0.110 0.0686 0.0684  
## 2 1970 1 1 1 0.109 0.0651 0.0583  
## 3 1980 1 1 1 0.162 0.0643 0.0504  
## 4 1990 1 1 1 0.278 0.112 0.0599  
## 5 2000 1 1 1 0.332 0.170 0.0944  
## 6 2001 1 1 1 0.345 0.169 0.0919  
## 7 2002 1 1 1 0.349 0.170 0.0964  
## 8 2003 1 1 1 0.358 0.174 0.102   
## 9 2004 1 1 1 0.371 0.182 0.108   
## 10 2005 1 1 1 0.387 0.187 0.115   
## 11 2006 1 1 1 0.431 0.221 0.138   
## 12 2007 1 1 1 0.444 0.226 0.140   
## 13 2008 1 1 1 0.460 0.235 0.154   
## 14 2009 1 1 1 0.485 0.247 0.158   
## 15 2010 1 1 1 0.494 0.253 0.164   
## 16 2011 1 1 1 0.512 0.263 0.170   
## 17 2012 1 1 1 0.524 0.269 0.170   
## 18 NA NA NA NA NA 0.989 0.935   
## 19 NA NA NA NA NA NA 0.969   
## # ... with 4 more variables: HS\_2534\_median <dbl>, HS\_3544\_median <dbl>,  
## # HS\_4554\_median <dbl>, Parameter <chr>

write.csv(both\_gend\_tab,  
 here::here("Final\_project", "output", "Both\_Genders\_Marriage\_Table\_Data\_for\_HS\_output.csv"))

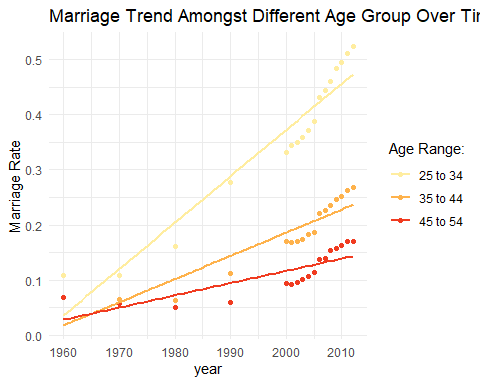
Hm, this looks really wrong. I am not supposed to get a correlation of anything higher than .7 realistically speaking. But, the correlation I provided is my attempt at trying to figure out whether age has any correlation with marriage rate for both genders for individuals who have a high school diploma or less. The data (which is extremely flawed and I need to find a way to update, fix this) indicated there is a strong correlation between age and marriage rate for individuals with a high school diploma or less throughout the years.

### Both-Gender Dataset Comparison With the Individual Gender Dataset.

Now, we will look at the dataset for both gender and observe their marriage trend for individuals with only a high school diploma or less. To check our two previous datasets and see if the provided combined dataset of both gender matches with our previous one.

bg <- both\_gender %>%  
 select(  
 year,  
 starts\_with("HS\_"))   
  
  
bg\_long <- bg %>%   
 pivot\_longer(  
 cols = -year,  
 names\_sep = "\_",  
 names\_to = c("edu", "age"),  
 values\_to = "rate"  
)   
  
  
bg\_long\_trim <-   
 bg\_long %>%   
 mutate(age\_range = case\_when(  
 age == "2534" ~ "25 to 34",  
 age == "3544" ~ "35 to 44",  
 age == "4554" ~ "45 to 54"  
 ))  
  
bg\_plot <- bg\_long\_trim %>%   
 ggplot(aes(x=year,y=rate, color = age\_range)) +  
 geom\_point() +  
 geom\_smooth(method = "lm", se = FALSE) +  
 scale\_color\_brewer(palette = "YlOrRd") +  
 labs(  
 title = "Marriage Trend Amongst Different Age Group Over Time for Men and Women with only High School Diploma.",  
 x = "year",  
 y = "Marriage Rate",  
 color = "Age Range:"  
 ) +  
 theme\_minimal() +  
 theme(legend.position = "right")  
  
  
bg\_plot

## `geom\_smooth()` using formula 'y ~ x'



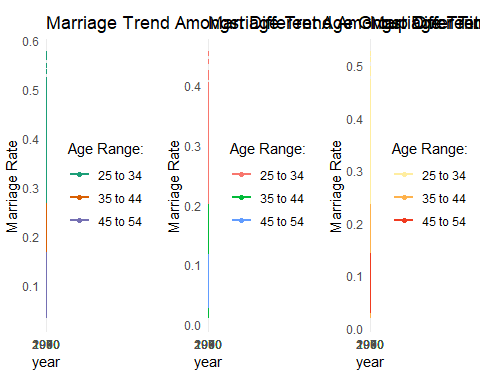
ggsave(here::here("Final\_project",  
 "output",  
 "figure",  
 "Marriage Trend Amongst Different Age Group Over Time for both gender with High School diploma or less.svg"),  
 bg\_plot,  
 height = 10,  
 width = 10)

## `geom\_smooth()` using formula 'y ~ x'

This dataset seems very similar to the two individually produced gendered datasets mentioned above.

main\_compared\_data <- m\_plot + w\_plot + bg\_plot  
main\_compared\_data

## `geom\_smooth()` using formula 'y ~ x'  
## `geom\_smooth()` using formula 'y ~ x'  
## `geom\_smooth()` using formula 'y ~ x'



ggsave(  
 here::here(  
 "Final\_project",  
 "output",  
 "figure",  
 "Comparison of Marriage Trend of Men and Women versus Combined who only have High School Diploma.svg"),  
 main\_compared\_data,  
 height = 25,  
 width = 25)

## `geom\_smooth()` using formula 'y ~ x'  
## `geom\_smooth()` using formula 'y ~ x'  
## `geom\_smooth()` using formula 'y ~ x'

At this rate, it can be safely assumed that the dataset with both gender approximately matches with the two individual gender dataset. WE will use the dataset with both genders in the future due to its conveinency for future comparison with divorce rate, etc.

We are going to transform the “Both gender” dataset into a Tibble here and save everytihng.

tibble\_both\_gender <- as\_tibble(  
 both\_gender)  
  
  
print(tibble\_both\_gender)

## # A tibble: 17 x 75  
## X year date all\_2534 HS\_2534 SC\_2534 BAp\_2534 BAo\_2534 GD\_2534  
## <int> <int> <chr> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>  
## 1 1 1960 1960~ 0.123 0.110 0.152 0.239 0.239 NA   
## 2 2 1970 1970~ 0.127 0.109 0.150 0.219 0.219 NA   
## 3 3 1980 1980~ 0.199 0.162 0.224 0.288 0.288 NA   
## 4 4 1990 1990~ 0.297 0.278 0.278 0.361 0.366 0.347  
## 5 5 2000 2000~ 0.345 0.332 0.325 0.387 0.394 0.369  
## 6 6 2001 2001~ 0.353 0.345 0.334 0.384 0.393 0.359  
## 7 7 2002 2002~ 0.354 0.349 0.336 0.377 0.387 0.351  
## 8 8 2003 2003~ 0.362 0.358 0.342 0.387 0.400 0.354  
## 9 9 2004 2004~ 0.367 0.371 0.345 0.385 0.398 0.352  
## 10 10 2005 2005~ 0.379 0.387 0.360 0.389 0.403 0.351  
## 11 11 2006 2006~ 0.415 0.431 0.391 0.415 0.430 0.376  
## 12 12 2007 2007~ 0.427 0.444 0.408 0.421 0.439 0.375  
## 13 13 2008 2008~ 0.439 0.460 0.424 0.430 0.447 0.385  
## 14 14 2009 2009~ 0.463 0.485 0.447 0.452 0.474 0.396  
## 15 15 2010 2010~ 0.470 0.494 0.454 0.456 0.477 0.406  
## 16 16 2011 2011~ 0.483 0.512 0.469 0.466 0.490 0.407  
## 17 17 2012 2012~ 0.494 0.524 0.480 0.477 0.502 0.416  
## # ... with 66 more variables: White\_2534 <dbl>, Black\_2534 <dbl>,  
## # Hisp\_2534 <dbl>, NE\_2534 <dbl>, MA\_2534 <dbl>, Midwest\_2534 <dbl>,  
## # South\_2534 <dbl>, Mountain\_2534 <dbl>, Pacific\_2534 <dbl>, poor\_2534 <dbl>,  
## # mid\_2534 <dbl>, rich\_2534 <dbl>, all\_3544 <dbl>, HS\_3544 <dbl>,  
## # SC\_3544 <dbl>, BAp\_3544 <dbl>, BAo\_3544 <dbl>, GD\_3544 <dbl>,  
## # White\_3544 <dbl>, Black\_3544 <dbl>, Hisp\_3544 <dbl>, NE\_3544 <dbl>,  
## # MA\_3544 <dbl>, Midwest\_3544 <dbl>, South\_3544 <dbl>, Mountain\_3544 <dbl>,  
## # Pacific\_3544 <dbl>, poor\_3544 <dbl>, mid\_3544 <dbl>, rich\_3544 <dbl>,  
## # all\_4554 <dbl>, HS\_4554 <dbl>, SC\_4554 <dbl>, BAp\_4554 <dbl>,  
## # BAo\_4554 <dbl>, GD\_4554 <dbl>, White\_4554 <dbl>, Black\_4554 <dbl>,  
## # Hisp\_4554 <dbl>, NE\_4554 <dbl>, MA\_4554 <dbl>, Midwest\_4554 <dbl>,  
## # South\_4554 <dbl>, Mountain\_4554 <dbl>, Pacific\_4554 <dbl>, poor\_4554 <dbl>,  
## # mid\_4554 <dbl>, rich\_4554 <dbl>, nokids\_all\_2534 <dbl>,  
## # kids\_all\_2534 <dbl>, nokids\_HS\_2534 <dbl>, nokids\_SC\_2534 <dbl>,  
## # nokids\_BAp\_2534 <dbl>, nokids\_BAo\_2534 <dbl>, nokids\_GD\_2534 <dbl>,  
## # kids\_HS\_2534 <dbl>, kids\_SC\_2534 <dbl>, kids\_BAp\_2534 <dbl>,  
## # kids\_BAo\_2534 <dbl>, kids\_GD\_2534 <dbl>, nokids\_poor\_2534 <dbl>,  
## # nokids\_mid\_2534 <dbl>, nokids\_rich\_2534 <dbl>, kids\_poor\_2534 <dbl>,  
## # kids\_mid\_2534 <dbl>, kids\_rich\_2534 <dbl>

write.csv(tibble\_both\_gender,   
 here::here(  
 "Final\_project",  
 "data",  
 "tibble\_both\_gender.csv"))

write.csv(m\_long\_trim,  
 here::here("Final\_project", "output", "Men\_Marriage\_Rate\_Trimmed\_for\_HS\_output.csv"))  
write.csv(w\_long\_trim,  
 here::here("Final\_project", "output", "Women\_Marriage\_Rate\_Trimmed\_for\_HS\_output.csv"))  
write.csv(bg\_long\_trim,  
 here::here("Final\_project", "output", "Both\_Genders\_Marriage\_Rate\_Trimmed\_for\_HS\_output.csv"))

### Marriage Rate and Trend of Individuals with a Bachelor Degree or higher.

Let’s calculate the maximum output for individuals with a Bachelor or higher.

tibble\_both\_gender\_output1 <- tibble\_both\_gender %>%  
 select(  
 year,  
 date,  
 BAp\_2534) %>%   
 group\_by(year) %>%  
 filter(  
 BAp\_2534 == max(BAp\_2534))  
  
tibble\_both\_gender\_output1

## # A tibble: 17 x 3  
## # Groups: year [17]  
## year date BAp\_2534  
## <int> <chr> <dbl>  
## 1 1960 1960-01-01 0.239  
## 2 1970 1970-01-01 0.219  
## 3 1980 1980-01-01 0.288  
## 4 1990 1990-01-01 0.361  
## 5 2000 2000-01-01 0.387  
## 6 2001 2001-01-01 0.384  
## 7 2002 2002-01-01 0.377  
## 8 2003 2003-01-01 0.387  
## 9 2004 2004-01-01 0.385  
## 10 2005 2005-01-01 0.389  
## 11 2006 2006-01-01 0.415  
## 12 2007 2007-01-01 0.421  
## 13 2008 2008-01-01 0.430  
## 14 2009 2009-01-01 0.452  
## 15 2010 2010-01-01 0.456  
## 16 2011 2011-01-01 0.466  
## 17 2012 2012-01-01 0.477

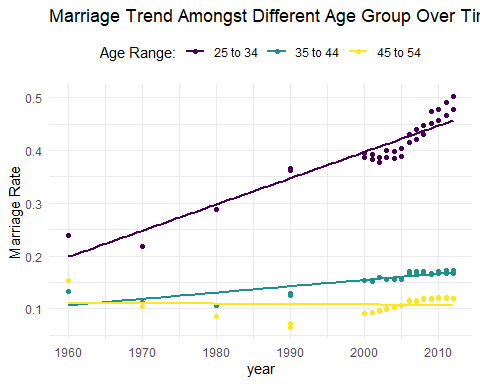
write.csv(tibble\_both\_gender\_output1,  
 here::here("Final\_project", "output", "Max\_change\_in\_years\_for\_higher\_education.csv"))

As we can see here, the maximum marriage population for people with higher level of education seems to increase over time. This of course is just one variable.

Let’s create a graph to observe the marriage trend of individuals possessing a Bachelor or higher.

bg\_Bach\_high <- both\_gender %>%  
 select(year, starts\_with(c("BAo\_", "BAp\_")))   
  
bg\_Bach\_high\_long <- bg\_Bach\_high %>%   
 pivot\_longer(  
 cols = -year,  
 names\_sep = "\_",  
 names\_to = c("edu", "age"),  
 values\_to = "rate"  
)  
  
bg\_Bach\_high\_long\_trim <-   
 bg\_Bach\_high\_long %>%   
 mutate(age\_range = case\_when(  
 age == "2534" ~ "25 to 34",  
 age == "3544" ~ "35 to 44",  
 age == "4554" ~ "45 to 54"  
 ))  
  
bg\_Bach\_high\_plot <- bg\_Bach\_high\_long\_trim %>%   
 ggplot(aes(  
 x=year,  
 y=rate,  
 color = age\_range)) +  
 geom\_point() +  
 geom\_smooth(  
 method = "lm",  
 se = FALSE) +  
 scale\_color\_viridis(  
 discrete = TRUE, option = "D") +  
 scale\_fill\_viridis(  
 discrete = TRUE) +  
 labs(title = "Marriage Trend Amongst Different Age Group Over Time for Men and Women with Bachelor or Higher.",   
 x = "year",   
 y = "Marriage Rate",  
 color = "Age Range:") +  
 theme\_minimal() +  
 theme(legend.position = "top")  
  
bg\_Bach\_high\_plot

## `geom\_smooth()` using formula 'y ~ x'



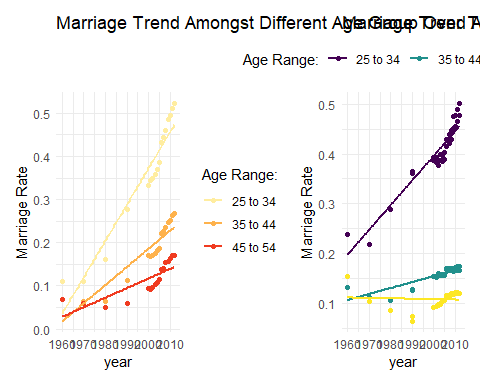
Compared to the marriage rate of individuals who have lower education than the ones who have a bachelor or higher, It can be seen that the marriage rate of individuals who are of higher-level-of-education are not marrying as much. The trend for these individuals plateau around the age of 45 to 54 throughout the years with a slight increase starting in the early 2000s, but plateu and decreased again. The rate of marriage for individuals with a Bachelor Degree or higher seems to be significantly less than the ones who only have high school diploma or less when their age is 35 years old or older. Although higher marriage rate was observed at the beginning of 1960 for Bachelor Degree or higher individuals, no significant differences in the marriage trend of individuals at the age of 25 to 34 can be seen throughhout the years when education is taken into account. This data can be seen down below.

write.csv(bg\_Bach\_high\_long\_trim,  
 here::here(  
 "Final\_project",   
 "output",   
 "Both\_Genders\_Marriage\_Rate\_Trimmed\_for\_BA\_and\_higher\_output.csv"))

Now, let’s observe the trend differences in marriage rate between individuals with only a high school diploma versus individuals with a Bachelor or higher.

comparative\_data\_for\_marriage\_hsBa <- bg\_plot + bg\_Bach\_high\_plot  
  
comparative\_data\_for\_marriage\_hsBa

## `geom\_smooth()` using formula 'y ~ x'  
## `geom\_smooth()` using formula 'y ~ x'



ggsave(  
 here::here(  
 "Final\_project",  
 "output",  
 "figure",  
 "Comparative Data of Marriage Rate for different age groups throughout education level.svg"),  
 comparative\_data\_for\_marriage\_hsBa,  
 height = 25,  
 width = 25)

## `geom\_smooth()` using formula 'y ~ x'  
## `geom\_smooth()` using formula 'y ~ x'

The differences in the trend’s growth in different individuals possessing different education level can be observe here.

### Divorce Rate Calculation.

Now, let’s look at divorce rate among the population throughout the year by education.

Divorce\_sum <- Major\_data %>%   
 summarize(across(c(HS\_3544:BAp\_3544),  
 list(mean = ~ mean(.x, na.rm= TRUE),  
 sd = ~ sd(.x, na.rm = TRUE),  
 min = ~ min(.x, na.rm = TRUE),  
 max = ~ max(.x, na.rm = TRUE))))  
Divorce\_sum

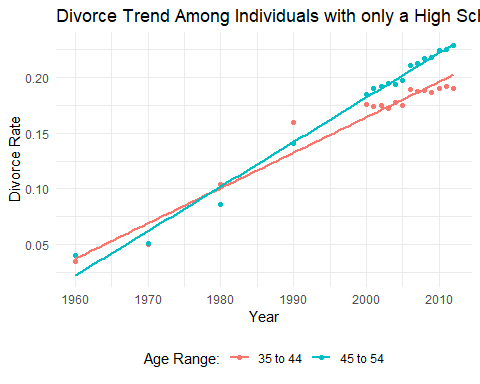
## HS\_3544\_mean HS\_3544\_sd HS\_3544\_min HS\_3544\_max SC\_3544\_mean SC\_3544\_sd  
## 1 0.1601496 0.0488751 0.03488887 0.1923989 0.1633165 0.0500708  
## SC\_3544\_min SC\_3544\_max BAp\_3544\_mean BAp\_3544\_sd BAp\_3544\_min BAp\_3544\_max  
## 1 0.03366938 0.2031765 0.09587785 0.02359412 0.02751277 0.1149553

write.csv(  
 Divorce\_sum,  
 here::here(  
 "Final\_project",  
 "output",  
 "Divorce\_sum.csv"))

The divorce summary data was interesting. Let’s see if we can observe the data in a graph form.

div <- Major\_data %>%  
 select(year, starts\_with("HS\_"))   
  
div\_long <- div %>%   
 pivot\_longer(  
 cols = -year,  
 names\_sep = "\_",  
 names\_to = c("edu", "age"),  
 values\_to = "rate"  
)  
  
div\_long\_trim <-   
 div\_long %>%   
 mutate(age\_range = case\_when(  
 age == "2534" ~ "25 to 34",  
 age == "3544" ~ "35 to 44",  
 age == "4554" ~ "45 to 54"  
 ))  
  
div\_plot <- div\_long\_trim %>%   
 ggplot(aes(x=year,y=rate, color = age\_range)) +  
 geom\_point() +  
 geom\_smooth(method = "lm", se = FALSE) +  
 labs(title = "Divorce Trend Among Individuals with only a High School Diploma.",  
 x = "Year",  
 y = "Divorce Rate",  
 color = "Age Range:") +  
 theme\_minimal()+  
 theme(legend.position = "bottom")  
  
div\_plot

## `geom\_smooth()` using formula 'y ~ x'



ggsave(  
 here::here(  
 "Final\_project",   
 "output",   
 "figure",  
 "Divorce Rate Trend Graph for Individuals possessing a high school diploma or less.svg"),  
 div\_plot,  
 height = 10,  
 width = 10)

## `geom\_smooth()` using formula 'y ~ x'

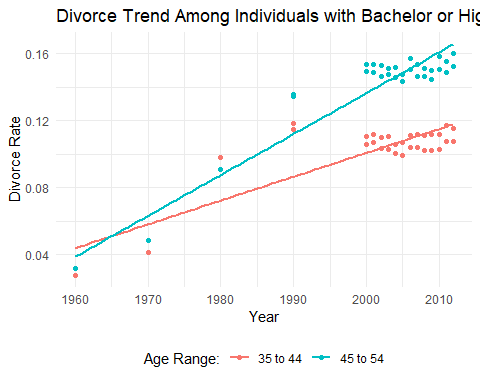
As observed, the divorce trend for individuals with only a high school diploma is significantly different from the marriage trend with the difference being the rate is much higher in divorce than in marriage. Furthermore, the trend is growing even more starting from the early 2000s.

write.csv(  
 div\_long\_trim,  
 here::here(  
 "Final\_project",  
 "output",  
 "Divorce\_Rate\_Trimmed\_for\_HS\_output.csv"))

Let’s calculate divorce rate for individuals with a Bachelor or higher.

div\_high <- Major\_data %>%  
 select(year, starts\_with(c("BAo\_", "BAp\_")))  
  
div\_high\_long <- div\_high %>%   
 pivot\_longer(  
 cols = -year,  
 names\_sep = "\_",  
 names\_to = c("edu", "age"),  
 values\_to = "rate"  
)  
  
  
div\_high\_long\_trim <-   
 div\_high\_long %>%   
 mutate(age\_range = case\_when(  
 age == "3544" ~ "35 to 44",  
 age == "4554" ~ "45 to 54"  
 ))  
  
div\_high\_plot <- div\_high\_long\_trim %>%   
 ggplot(aes(  
 x=year,  
 y=rate,  
 color = age\_range)) +  
 geom\_point() +  
 geom\_smooth(  
 method = "lm",  
 se = FALSE) +  
 labs(title = "Divorce Trend Among Individuals with Bachelor or Higher.",  
 x = "Year",  
 y = "Divorce Rate",  
 color = "Age Range:") +  
 theme\_minimal()+  
 theme(  
 legend.position = "bottom")  
  
div\_high\_plot

## `geom\_smooth()` using formula 'y ~ x'



ggsave(  
 here::here(  
 "Final\_project",   
 "output",   
 "figure",  
 "Divorce Rate Trend Graph for Individuals possessing a Bachelor or higher.svg"),  
 div\_high\_plot,  
 height = 10,  
 width = 10)

## `geom\_smooth()` using formula 'y ~ x'

Let’s calculate the max trend growth we can observe from divorce rate and see if that is an issue.

Max\_Divorce\_trend\_output <- Major\_data %>%  
 select(  
 year,  
 date,  
 BAp\_3544) %>%   
 group\_by(  
 year  
 ) %>%  
 filter(  
 BAp\_3544 == max(  
 BAp\_3544))  
  
  
Max\_Divorce\_trend\_output

## # A tibble: 17 x 3  
## # Groups: year [17]  
## year date BAp\_3544  
## <int> <chr> <dbl>  
## 1 1960 1960-01-01 0.0275  
## 2 1970 1970-01-01 0.0413  
## 3 1980 1980-01-01 0.0978  
## 4 1990 1990-01-01 0.115   
## 5 2000 2000-01-01 0.106   
## 6 2001 2001-01-01 0.107   
## 7 2002 2002-01-01 0.103   
## 8 2003 2003-01-01 0.103   
## 9 2004 2004-01-01 0.100   
## 10 2005 2005-01-01 0.0995  
## 11 2006 2006-01-01 0.104   
## 12 2007 2007-01-01 0.104   
## 13 2008 2008-01-01 0.102   
## 14 2009 2009-01-01 0.102   
## 15 2010 2010-01-01 0.103   
## 16 2011 2011-01-01 0.108   
## 17 2012 2012-01-01 0.107

write.csv(  
 Max\_Divorce\_trend\_output,  
 here::here(  
 "Final\_project",   
 "output",   
 "Max\_Divorce\_trend\_output.csv"))

As indicated within the data for population that are 35 to 44 years of age, and has a college degree or higher, the trend for divorce rate seems to be increasing by the years when looking at their highest divorce rate ( starting to see significant decreasing in the early 2000s).

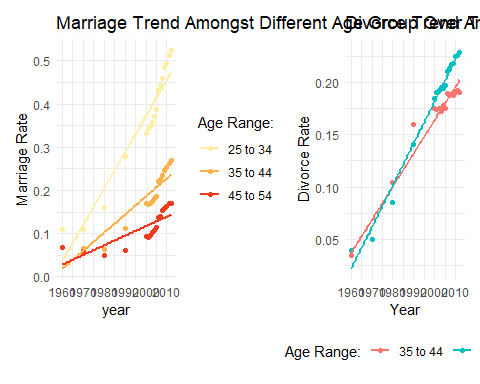
Now, let’s look at additional graphs for the marriage rate versus divorce rate.

### Accumulative Comparative Graph for Divorce Rate vs Marriage Rate.

Let’s first look at some graphs’ comparison between divorce rate and marriage rate.

Comparative\_marriage\_divorce\_highDip <- bg\_plot + div\_plot  
  
Comparative\_marriage\_divorce\_highDip

## `geom\_smooth()` using formula 'y ~ x'  
## `geom\_smooth()` using formula 'y ~ x'



ggsave(  
 here::here(  
 "Final\_project",  
 "output",  
 "figure",  
 "Comparative Data of Marriage Rate Trend and Divorce Rate Trend for Different Age Groups who only Posess High School Diploma or Less.svg"),  
 Comparative\_marriage\_divorce\_highDip,  
 height = 25,  
 width = 25)

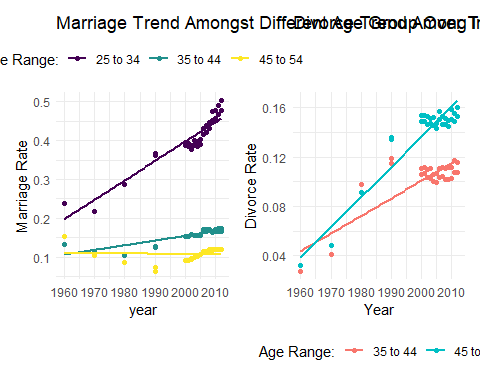
## `geom\_smooth()` using formula 'y ~ x'  
## `geom\_smooth()` using formula 'y ~ x'

Just as expected, for individuals who only have a high school diploma or less, the divorce rate is signiicantly higher than the marriage rate with divorce rate starting at a higher rate than marriage rate since 1960.

Now let’s compare data for marriage rate trend and divorce rate trend for individuals with a Bachelor degree or higher.

Comparative\_marriage\_divorce\_BachHigh <- bg\_Bach\_high\_plot + div\_high\_plot  
  
Comparative\_marriage\_divorce\_BachHigh

## `geom\_smooth()` using formula 'y ~ x'  
## `geom\_smooth()` using formula 'y ~ x'



ggsave(  
 here::here(  
 "Final\_project",  
 "output",  
 "figure",  
 "Comparative Data of Marriage Rate Trend and Divorce Rate Trend for Different Age Groups who posess a Bachelor or Higher.svg"),  
 Comparative\_marriage\_divorce\_BachHigh,  
 height = 25,  
 width = 25)

## `geom\_smooth()` using formula 'y ~ x'  
## `geom\_smooth()` using formula 'y ~ x'

Comparing marriage rate to divorce rate in graphs form indicated that even in higher education, the divorce rate amongst individual who are 35 years or older is still significantly higher than marrirage rate with the drastic increase in the divorce trend growth starting in the 1970s to present. Data for divorce rate for individuals who are 25 years of age to 34 is needed to conduct a more proper assessment.

### Rainfall graph.

I combined the data of marriage rate and divorce rate together to make some graphs.

div\_to\_comb <- Major\_data %>%  
 select(  
 year,   
 starts\_with(c(  
 "HS\_",   
 "BAo\_",   
 "BAp\_")))  
  
bg\_comb <- both\_gender %>%  
 select(  
 year,   
 starts\_with(c(  
 "HS\_",   
 "BAo\_",   
 "BAp\_")))  
  
Joined\_data\_for\_M\_D <- full\_join(  
 div\_to\_comb,  
 bg\_comb,   
 by = "year",   
 suffix = c(  
 "\_Marriage",   
 "\_Divorce"))  
  
Joined\_data\_for\_M\_D\_trim <- Joined\_data\_for\_M\_D %>%   
 select(  
 "year",  
 "HS\_3544\_Marriage",  
 "HS\_3544\_Divorce",  
 "HS\_4554\_Marriage",  
 "HS\_4554\_Divorce",  
 "BAo\_3544\_Marriage",  
 "BAo\_3544\_Divorce",  
 "BAo\_4554\_Marriage",  
 "BAo\_4554\_Divorce",  
 "BAp\_3544\_Marriage",  
 "BAp\_3544\_Divorce",  
 "BAp\_4554\_Marriage",  
 "BAp\_4554\_Divorce")

Oh god. This is an abomination. Okay, nothing to see here. I removed the graph since It was not graphing properly (it was for comedic and practice purposes) Let’s stick to regular graphs.

Overall, the follow-up data indicates that the divorce trend is out-growing the marriage trend. This observed effect needs to be investigated more in order to rectify the absurdly high divorce rate here in the States within the past couple of decates.