Lyrical Content of Contemporary Popular Music (1999-2018) and the Role of Healthcare Providers in Media Education of Children and Adolescents

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Abstract

Music can affect the behavior and emotion of children and adolescents. We conducted a content and trend analysis of Billboard's top 10 songs, 1999-2018, with particular attention to adult and positive themes. There was a total of 3633 total references, 3298 (90.8%) adult themes, and 335 (9.2%) positive themes. The most common adult themes were "sexually suggestive lyrics" (32.2%), "sexually suggestive dancing" (15.6%), "use of swear words" (13.7%), "alcohol use" (4.7%), and "use of guns/deadly weapons" (4.7%). The most common positive theme was "improvement" (62.3%). These were greater references per minute for adult themes (4.6 vs. 3.7 references per minute) and positive themes (0.3 vs. 0.5 references per minute). The 2009-2018 study period as compared with the 1999-2008 study period. We encourage pediatric healthcare providers to be active participants in the promotion of media education, and we encourage parents to be mindful of the level of media exposure.

Introduction

Music is an important aspect in the socialization of children and adolescents, often providing entertainment, frameworks for self-identity and the acquisition of morals, distraction from stressors, simple cues for boredom or loneliness, and structure for the development of relationships [1-4].

There have been several studies examining the lyrical content of music from a variety of genres. These studies have focused on risk-taking behaviors such as substance use/abuse [5-7], suicide [8], and unsafe sexual practices [9-10].

There have been no published studies looking at the lyrical content of contemporary popular music from a variety of genres over two decades, focusing on both adult themes and positive themes.

Materials And Methods

We conducted a content analysis study during the summer of 2019, examining adult and positive themes found in a select number of popular songs. We analyzed the top 10 songs identified by Billboard’s year-end "Hot 100 Songs" (https://www.billboard.com/charts/year-end) for each year between 1999 and 2018, for a total of 200 songs. Billboard rankings of the "Hot 100 Songs" were based on national radio airplay, streaming online data, digital sales data, and YouTube views. Data abstracted for each song included the year of release, artist or artists, genre (Popular (Pop), Hip Hop/Rap, Rhythm & Blues (R&B)/Soul, Rock, Country, House, Alternative Indie, and Electronic); several songs were categorized with more than one genre), and song length (minute/seconds).

Access to music is readily available (purchasing albums or compact discs have been replaced with downloadable or streaming music on portable handheld electronic devices or "Wi-Fi" home devices) and free of cost (such as Pandora, Spotify, or YouTube). Oftentimes, a child or adolescents’ choice of music is private due to the use of headphones or lack of parental supervision. Although there are parental locks for most electronic devices, tech-savvy children and adolescents are finding ways around them. In addition, while many social media and streaming services have "restriction mode" to block mature content, it requires the parent/guardian to be familiar with and activate the option. While radio stations and music streaming radio services often "censor" songs, what words/lyrics are deleted or modified is dependent on the specific station and not always regulated. When searching for popular songs on the internet, the "clean" censored version will appear; unfortunately, these versions may only censure specific vulgar words and not general adult themes or mature overtones.

Several studies have examined the content and effect of music on children and adolescents and have concluded that exposure to music can affect behavior and emotion [8] and can increase risk-taking behaviors such as aggression/violence [9-10], suicide [11-13], use of tobacco, alcohol, and illicit drugs [14-16], and unsafe sexual practices [17-18].

The effect of music is based on the age of the child or adolescent, the emotional and developmental stage of the listener, the level of exposure, and the genre of music [1]. Media education has been shown to reduce the harmful effects of media and strengthen the positive effects [19-20]. Media education enables the child or adolescent to limit his or her use of media, to make positive media choices, to select alternatives to media consumption, and to develop critical thinking and viewing skills [21].

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image, empowerment, camaraderie, and positive romantic relationships.

Written lyrics were accessed for each of the 200 songs from Lyric Find (https://lyricfind.com/). The three reviewers (E.K, E.K., and N.Q) collectively completed the data collection instrument for each song, noting each time that an adult and positive theme was stated or implied (defined as a "reference"). Each reference could be included in more than one themed category based on the reviewers' collective interpretation of the lyrics.

The total number of references for each of the adult and positive themes were determined for all 200 songs in the sample and then determined for each of the 20 years during the study period, as well as stratified into two study periods: 1999-2008 and 2009-2018. The percentages, with 95% confidence intervals, of major adult and positive themes were calculated for the entire study period (1999-2018) and then for each of the two study periods, 1999-2008 and 2009-2018. A t-test was used to compare the means of two groups of continuous data. In addition, the number of references per minute for major adult and positive themes was determined for all 200 songs in the sample, for each of the 20 years during the study sample, and for the two stratified study periods (1999-2008 and 2009-2018).

The Institutional Review Board at the Pennsylvania State Hershey Medical Center deemed the study exempt.

**Results**

Analysis was performed on 200 songs. (Table 1) The most common genres associated with our sample of songs was Pop (42.2%), R&B/Soul (17.2%), and Hip hop/Rap (16.6%). (Table 2)

| Year of release | Song title          | Song artist       | Genre(s)     | Song length in minutes |
|-----------------|---------------------|-------------------|--------------|------------------------|
| 1999            | Believe             | Cher              | Pop          | 3:50                   |
| 1999            | No Scrubs           | TLC               | R&B          | 4:00                   |
| 1999            | Angel of Mine       | Monica            | R&B/Soul     | 4:10                   |
| 1999            | Heartbreak Hotel    | Whitney Houston   | Rock         | 4:40                   |
| 1999            | Baby One More Time | Britney Spears    | Pop          | 3:31                   |
| 1999            | Kiss Me             | Snoop Dogg Nutha   | Pop          | 3:31                   |
| 1999            | Ginie In A Bottle   | Christina Aguilera| Pop          | 3:40                   |
| 1999            | Every Morning       | Sugar Ray         | Rock         | 3:39                   |
| 1999            | Nobody's Supposed To Be Here | Deborah Cox | R&B Pop | 4:22 |
| 1999            | Livin La Vida Loca  | Ricky Martin       | Pop          | 4:03                   |
| 2000            | Breath              | Faith Hill        | House        | 4:09                   |
| 2000            | Smooth              | Santana ft. Rob Thomas | Rock, Pop      | 4:56                   |
| 2000            | Maria Maria         | Santana ft. The Product Gaby | Rock, Pop | 4:23                   |
| 2000            | I Wanna Know        | Joe               | Rock, Pop    | 4:56                   |
| 2000            | Everything You Want | Vertical Horizons | Alternative, Indie, Pop | 4:17 |
| 2000            | Say My Name         | Destiny's Child    | Electronic   | 4:31                   |
| 2000            | I Knew I Loved You  | Savage Garden     | Rap          | 4:10                   |
| 2000            | Amazed              | 'Lonestar'        | Country      | 4:29                   |
| 2000            | Bent                | Matchbox Twenty   | Electronic   | 4:16                   |
| 2000            | He Wasn't Man Enough| Toni Braxton      | R&B, Pop     | 4:21                   |
| 2001            | Hanging By A Moment | Lifehouse        | Rock         | 3:36                   |
| 2001            | Fallin              | Alicia Keys       | R&B/Soul     | 3:30                   |
| 2001            | All For You         | Janet Jackson     | Rock         | 3:31                   |
| 2001            | Drops Of Jupiter    | Train             | Pop, Rock    | 4:20                   |
| 2001            | I'm Real            | Jennifer Lopez ft. Ja Rule | Pop, Hip Hop/Rap | 5:58 |
| 2001            | If You're Gone      | Matchbox Twenty   | Rock         | 4:54                   |
| 2001            | Let Me Blow Ya Mind | Eve ft. Gwen Stefani | Hip Hop/Rap  | 3:51                   |
| 2001            | Thank You           | Dido              | Pop          | 3:44                   |
| 2001            | Again               | Lenny Kravitz     | Rock         | 3:50                   |
| 2002            | Independent Women Part 1 | Destiny's Child | Pop        | 3:37                   |
| 2002            | How You Remind Me   | Nickelback        | Rock         | 3:43                   |
| 2002            | Foolish             | Ashanti           | R&B          | 3:47                   |
| 2002            | Hot In Here         | 'Nelly'           | Pop          | 3:49                   |
| 2002            | Dilemmas            | 'Nelly' ft. Kelly Rowland | Hip Hop/R&B  | 4:49                   |
| 2002            | Wherever You Will Go| The Calling       | Rock         | 3:29                   |
| 2002            | A Thousand Miles    | Vanessa Carlton   | Pop, Rock    | 3:57                   |
| 2002            | In The End          | Linkin Park       | Rock         | 3:38                   |
| Year | Title               | Artist                      | Genre         | Duration |
|------|---------------------|-----------------------------|---------------|----------|
| 2002 | What's Luv          | Fat Joe ft. Ashanti         | Hip Hop/Rap   | 4:52     |
| 2002 | U Got It Bad        | Usher                       | R&B/Soul      | 4:07     |
| 2002 | Blury               | Puddle of Mudd              | Rock          | 5:04     |
| 2003 | In Da Club          | 50 Cent                     | Hip Hop/Rap   | 3:13     |
| 2003 | Ignition            | R. Kelly                    | R&B           | 3:16     |
| 2003 | Get Busy            | Sean Paul                   | Hip Hop       | 3:32     |
| 2003 | Crazy In Love       | Beyoncé ft. Jay-Z           | R&B Pop       | 4:56     |
| 2003 | When I'm Gone       | 3 Doors Down                | Hip Hop/Rap   | 4:20     |
| 2003 | Unwell              | Matchbox Twenty             | Rock          | 3:48     |
| 2003 | Right Thurr         | Chingy                      | Hip Hop/Rap   | 4:10     |
| 2003 | Miss You            | Aaliyah                     | Rock          | 4:05     |
| 2003 | Picture             | Kid Rock ft. Sheryl Crow    | Country       | 4:56     |
| 2003 | Bring Me To Life    | Evanescence ft. Paul McCoy  | Rock          | 3:56     |
| 2004 | Yeah!               | Usher ft. Lil Jon and Ludacris | Hip Hop/R&B | 4:10     |
| 2004 | Burh               | Usher                       | R&B           | 4:15     |
| 2004 | If I Ain't Got You  | Akita Keys                  | R&B/Soul      | 3:48     |
| 2004 | This Love           | Maroon 5                    | Pop           | 4:25     |
| 2004 | The Way You Move    | OutKast ft. Sleepy Brown    | Hip Hop/Rap   | 3:55     |
| 2004 | The Reason          | Hootie & the Blowfish       | Rock          | 3:53     |
| 2004 | I Don't Wanna Know  | Mario Winans ft. Enya and P.Diddy | R&B/Soul | 4:17     |
| 2004 | Hey Ya             | Outkast                      | Hip Hop/Rap   | 3:55     |
| 2004 | Goodies             | Ciara ft. Petey Pablo       | R&B           | 3:43     |
| 2004 | Lean Back           | Terror Squad                | Hip Hop/Rap   | 4:07     |
| 2005 | We Belong Together  | Mariah Carey                | R&B Pop       | 3:21     |
| 2005 | Hollaback Girl      | Gwen Stefani                | Pop           | 3:19     |
| 2005 | Let Me Love You     | Mario                       | Electronic    | 4:09     |
| 2005 | Since U Been Gone   | Kelly Clarkson              | Pop           | 3:06     |
| 2005 | 1, 2 Step           | Ciara ft. Missy Elliot     | R&B           | 3:22     |
| 2005 | Gold Digger         | Kanye West ft. Jamie Foxx  | Hip Hop/Rap   | 3:28     |
| 2005 | Boulevard of Broken Dreams | Green Day     | Alternative    | 4:21     |
| 2005 | Candy Shop          | 50 Cent ft. Olivia          | Hip Hop/Rap   | 3:20     |
| 2005 | Don't Cha           | The Pussycat Dolls ft. Busta Rhymes | Pop   | 4:32     |
| 2005 | Behind These Hazel Eyes | Kelly Clarkson              | Pop Rock      | 3:19     |
| 2006 | Bad Day             | Daniel Powter               | Pop           | 3:54     |
| 2006 | Temperature         | Sean Paul                   | R&B/Soul      | 3:36     |
| 2006 | Promiscuous         | Nelly Furtado ft. Timbaland | Pop          | 4:02     |
| 2006 | You're Beautiful    | James Blunt                 | Pop           | 3:32     |
| 2006 | Hips Don't Lie      | Shakira ft. Wyclef Jean     | Pop           | 3:38     |
| 2006 | Unwritten           | Natasha Bedingfield         | Pop           | 4:18     |
| 2006 | Crazy               | Grails Berkeley             | R&B/Soul Pop  | 2:58     |
| 2006 | Ride It            | Chamillionaire ft. Krayzie Bone | Hip Hop/Rap | 5:02     |
| 2006 | Sexynack           | Justin Timberlake           | Pop           | 4:02     |
| 2006 | Check On It         | Beyoncé ft. Slim Thug       | R&B/Soul Pop  | 3:30     |
| 2007 | Irreplaceable       | Beyoncé                     | R&B/Soul Pop  | 3:47     |
| 2007 | Umbrella            | Rihanna ft. Jay-Z           | Pop           | 4:46     |
| 2007 | The Sweet Escape    | Gwen Stefani ft. Akon       | Pop           | 4:06     |
| 2007 | Big Girls Don't Cry | Fergie                     | R&B/Soul Pop  | 4:28     |
| 2007 | Buy U A Drank       | T-Pain ft. Yung Joc         | R&B/Soul      | 3:48     |
| 2007 | Before He Cheats    | Carrie Underwood            | Country       | 3:19     |
| 2007 | Hey There Delilah   | Plain White T's             | Alternative   | 3:52     |
| 2007 | I Wanna Love You    | Akon ft. Snoop Dogg         | Hip Hop/Rap R&B/Soul | 4:07 |
| 2007 | Say It Right        | Nelly Furtado               | Pop           | 3:43     |
| 2007 | Glamorous           | Fergie ft. Ludacris         | Hip Hop Pop   | 4:05     |
| Year | Song Title               | Artist(s)                      | Genre                          | Duration |
|------|--------------------------|--------------------------------|--------------------------------|----------|
| 2008 | Low                      | Flo Rida ft. T-Pain            | Hip Hop/Rap                    | 3:50     |
| 2008 | Bleeding Love            | Leona Lewis                    | Pop                            | 4:22     |
| 2008 | No One                  | Alicia Keys                   | R&B/Soul Rock                  | 4:10     |
| 2008 | Apologies               | Timbaland ft. OneRepublic      | Pop Hip Hop/Rap                | 3:04     |
| 2008 | No Air                  | Jordin Sparks and Chris Brown | Pop                            | 4:23     |
| 2008 | Love Song               | Sara Bareilles                | Pop                            | 4:18     |
| 2008 | Love In This Club        | Usher ft. Young Jeezy         | R&B                            | 4:19     |
| 2008 | With You                | Chris Brown                   | Pop                            | 4:12     |
| 2008 | Forever                 | Chris Brown                   | Dance                          | 4:38     |
| 2009 | Boom Boom Pow           | The Black Eyed Peas           | Pop                            | 5:08     |
| 2009 | Poker Face              | Lady Gaga                     | Pop Rock                       | 3:58     |
| 2009 | Just Dance              | Lady Gaga ft. Colby O'Donis   | Pop Rock                       | 4:01     |
| 2009 | I Gotta Feeling         | The Black Eyed Peas           | Pop                            | 4:50     |
| 2009 | Love Story              | Taylor Swift                  | Country Pop                    | 3:57     |
| 2009 | Right Round             | Flo Rida                      | Hip Hop/Rap                    | 3:27     |
| 2009 | I'm Yours               | Jason Mraz                    | Pop                            | 4:03     |
| 2009 | Single Ladies (Put A Ring On It) | Beyoncé      | R&B Pop                        | 3:13     |
| 2009 | Heartless               | Kanye West                    | Pop R&B Hip Hop/Rap            | 3:33     |
| 2009 | Gives You Hell          | The All-American Rejects      | Alternative/Indie              | 3:09     |
| 2010 | Tik Tok                 | Ke$ha                        | Pop                            | 3:00     |
| 2010 | Need You Now            | Lady Antebellum               | Country                        | 4:37     |
| 2010 | Hey, Soul Sister        | Train                         | Pop Rock                       | 3:37     |
| 2010 | California Gurls        | Katy Perry ft. Snoop Dogg     | Pop Rock                       | 3:56     |
| 2010 | OMG                     | Usher ft. will.i.am           | Pop                            | 4:28     |
| 2010 | Airplanes               | B.O.B ft. Hayley Williams     | Hip Hop/Rap                    | 3:01     |
| 2010 | Love The Way You Lie   | Eminem ft. Rihanna            | Hip Hop/Rap                    | 4:23     |
| 2010 | Bad Romance             | Lady Gaga                     | Pop Rock                       | 4:04     |
| 2010 | Dynamite                | Taio Cruz                     | Pop                            | 3:22     |
| 2010 | Break Your Heart        | Taio Cruz ft. Ludacris        | Pop                            | 3:23     |
| 2011 | Rolling In The Deep     | Adele                         | Pop                            | 3:48     |
| 2011 | Party Rock Anthem      | LMFAO ft. Lauren Bennett and GoonRock | Pop | 4:23     |
| 2011 | Firework                | Katy Perry                    | Pop Rock                       | 3:47     |
| 2011 | E.T.                    | Katy Perry ft. Kanye West    | Pop Rock                       | 3:51     |
| 2011 | Give Me Everything     | Pitbull ft. Ne-Yo, Afrojack and Nayer | Hip Hop/Rap | 4:12     |
| 2011 | Grenade                 | Bruno Mars                    | Pop                            | 3:42     |
| 2011 | Fuck You                | Cee Lo Green                  | Pop                            | 3:41     |
| 2011 | Super Bass              | Nicki Minaj                   | Pop Hip Hop/Rap                | 3:30     |
| 2011 | Moves Like Jagger      | Maroon 5 ft. Christina Aguilera | Electronic Pop | 3:21     |
| 2011 | Just Can't Get Enough  | The Black Eyed Peas           | Pop                            | 3:39     |
| 2012 | Somebody That I Used To Know | Gotye ft. Kimbra          | Alternative/Indie Pop          | 4:04     |
| 2012 | Call Me Maybe           | Carly Rae Jepsen               | Pop                            | 3:13     |
| 2012 | We Are Young           | Fun. ft. Janelle Monae        | Alternative/Indie Pop          | 4:10     |
| 2012 | Payphone                | Maroon 5 ft. Wiz Khalifa      | Pop Electronic                | 3:51     |
| 2012 | Lights                  | Ellie Goulding                | Pop Electronic                | 3:32     |
| 2012 | Glad You Came           | The Wanted                    | Pop                            | 3:18     |
| 2012 | Stronger (What Doesn't Kill You) | Kelly Clarkson   | Pop                            | 3:42     |
| 2012 | We Found Love           | Rihanna ft. Calvin Harris     | Electronic Pop                 | 3:35     |
| 2012 | Starships               | Nicki Minaj                   | R&B Hip Hop/Rap                | 3:30     |
| 2012 | What Makes You Beautiful | One Direction                | Pop                            | 3:18     |
| 2013 | Thrift Shop             | Macklemore and Ryan Lewis ft. Wanz | Hip Hop/Rap | 3:55     |
| 2013 | Blurred Lines          | Robin Thicke ft. T.I. and Pharrell | R&B Pop | 4:25     |
| Year | Title                  | Artist(s)                        | Genre            | Duration |
|------|------------------------|----------------------------------|------------------|----------|
| 2013 | Radioactive            | Imagine Dragons                  | Electronic Rock  | 3:05     |
| 2013 | Harlem Shake           | Baauer                           | Electronic       | 3:16     |
| 2013 | Can’t Hold Us         | Macklemore & Ryan Lewis ft. Ray  | Pop              | 4:18     |
| 2013 | Mirrors                | Justin Timberlake                | Pop & R&B        | 8:05     |
| 2013 | Just Give Me A Reason  | P. Diddy ft. Nate Ruess         | Pop              | 4:02     |
| 2013 | When I Was Your Man    | Bruno Mars                       | Pop              | 3:34     |
| 2013 | Cruises                | Florida Georgia Line ft. Nelly   | Country          | 3:29     |
| 2013 | Roar                   | Katy Perry                       | Pop              | 3:42     |
| 2013 | Happy                  | Pharrell Williams                | Pop              | 3:53     |
| 2013 | Dark Horse             | Katy Perry ft. Juicy J           | Pop              | 3:35     |
| 2013 | All of Me              | John Legend                      | R&B/Soul         | 4:29     |
| 2013 | Fancy                  | Iggy Azalea ft. Charli XCX       | House Pop        | 3:19     |
| 2014 | Counting Stars         | OneRepublic                      | Pop              | 4:19     |
| 2014 | Talk Dirty             | Jason Derulo ft. 2 Chainz        | Pop              | 2:58     |
| 2014 | Rude                   | Magic!                           | Pop              | 3:44     |
| 2014 | All About That Bass    | Meghan Trainor                   | Pop              | 3:08     |
| 2014 | Problem                | Ariana Grande ft. Iggy Azalea    | Pop & R&B        | 3:14     |
| 2014 | Stay With Me           | Sam Smith                        | Soul Pop         | 2:52     |
| 2015 | Uptown Funk!           | Mark Ronson ft. Bruno Mars       | R&B              | 4:30     |
| 2015 | Thinking Out Loud      | Ed Sheeran                       | Soul Pop         | 4:41     |
| 2015 | See You Again          | Wiz Khalifa ft. Charlie Puth     | Hip Hop/Rap      | 3:49     |
| 2015 | Trap Queen             | Fetty Wap                        | Hip Hop/Rap      | 3:35     |
| 2015 | Sugar                  | Maroon 5                         | Electronic Pop   | 3:55     |
| 2015 | Shut Up And Dance      | Walk The Moon                    | Alternative/Indie| 3:17     |
| 2015 | Blank Space            | Taylor Swift                     | Electronic Pop   | 3:51     |
| 2015 | Watch Me               | Silento                          | House Electronic | 3:05     |
| 2015 | Earned It              | The Weekend                      | Pop              | 4:10     |
| 2015 | The Hills              | The Weekend                      | R&B              | 4:02     |
| 2016 | Love Yourself          | Justin Bieber                    | R&B Pop          | 3:53     |
| 2016 | Sorry                  | Justin Bieber                    | R&B Pop          | 3:20     |
| 2016 | One Dance              | Drake ft. Wizkid & Kyla          | Hip Hop/Rap      | 2:54     |
| 2016 | Work                   | Rihanna ft. Drake                | R&B              | 3:39     |
| 2016 | Stressed Out           | Twenty One Pilots               | Rock Hip Hop/Rap | 3:22     |
| 2016 | Panda                  | Designer                         | Hip Hop/Rap      | 4:06     |
| 2016 | Hello                  | Adele                            | Pop              | 4:55     |
| 2016 | Don’t Let Me Down      | Chainsmokers ft. Days            | Pop Electronic   | 3:28     |
| 2016 | Can’t Stop The Feeling | Justin Timberlake                | Pop              | 3:56     |
| 2016 | Closer                 | Chainsmokers ft. Halevy          | Electronic Pop   | 4:04     |
| 2017 | Shape Of You           | Ed Sheeran                       | Pop              | 3:53     |
| 2017 | Despacito              | Luka Fosai & Danny Yankee ft. Justin Bieber | Pop | 3:47 |
| 2017 | That’s What I Like     | Bruno Mars                       | R&B/Soul Hip Hop | 3:35     |
| 2017 | Humble                 | Kendrick Lamar                   | Hip Hop/Rap      | 3:57     |
| 2017 | Something Just Like This | Coldplay & The Chainsmokers    | Electronic       | 4:08     |
| 2017 | Bad and Boujee         | Lil Uzi Vert                     | Hip Hop/Rap      | 5:43     |
| 2017 | Closer                 | The Chainsmokers ft. Halevy     | Electronic Pop   | 4:04     |
| 2017 | Body Like A Back Road  | Sam Hunt                         | Country          | 2:40     |
| 2017 | Believer               | Imagine Dragons                  | Pop Rock/Alternative/Indie | 3:24  |
| 2017 | Congratulations        | Post Malone                      | Hip Hop/Rap      | 3:40     |
| 2018 | God’s Plan             | Drake                            | Pop Rap          | 3:18     |
| 2018 | Perfect                | Ed Sheeran                       | Pop              | 4:23     |
| 2018 | Meant To Be            | Bebe Rexha & Florida Georgia Line | Country Pop R&B  | 2:43     |
| 2018 | Havana                 | Camila Cabello ft. Young Thug    | Pop              | 3:36     |
There was a total of 3633 total references in our sample of 200 songs, 3298 (90.8%) adult themes and 335 (9.2%) positive themes (Table 3). When comparing adult and positive themes, there were greater references per minute for adult themes (4.2 references per minute) compared with positive themes (0.4 references per minute), and this difference was statistically significant (p<0.0001, mean difference 3.8, 95% confidence interval [2.5-5.0]) (Table 3).
### Table 3: Total references and references per minute for adult and positive themes in our sample of 200 songs, then stratified by 1999-2008 and 2009-2018. Major themes (in italics) presented as total number (percentage [95% confidence interval])

|                         | 1999-2008 (n=200 songs, 738.0 minutes) | 1999-2008 (n=100 songs, 389.0 minutes) | 2009-2018 (n=100 songs, 382.2 minutes) |
|-------------------------|----------------------------------------|----------------------------------------|----------------------------------------|
| **Violent crime**        |                                        |                                        |                                        |
| Physical assault         | 236 (7.2% [6.3-8.0])                   | 92 (8.2% [5.1-7.6])                    | 144 (7.0% [6.7-9.3])                   |
| Sexual assault           | 48                                     | 28                                     | 20                                     |
| Murder                   | 0                                      | 0                                      | 0                                      |
| Self-harm                | 8                                      | 0                                      | 8                                      |
| Use of guns/deadly weapons | 155                                 | 63                                     | 92                                     |
| Total                    | 651 (20.0% [18.7-21.4])                | 228 (15.5% [13.5-17.2])                | 435 (23.3% [22.0-25.9])                |
| **Nonviolent crime**     |                                        |                                        |                                        |
| Theft                    | 147 (4.5% [3.8-5.2])                   | 31 (2.1% [1.5-3.0])                    | 116 (6.4% [5.3-7.6])                   |
| Gambling                 | 44                                     | 8                                      | 25                                     |
| Glorification of Prison  | 5                                      | 2                                      | 3                                      |
| Gang glorification       | 34                                     | 8                                      | 26                                     |
| Vandalism                | 31                                     | 13                                     | 18                                     |
| Use of inappropriate language | 651                                 | 228 (15.3% [13.5-17.2])                | 435 (23.3% [22.0-25.9])                |
| Use of swear words       | 453                                    | 142                                    | 311                                    |
| Racism                   | 88                                     | 49                                     | 33                                     |
| Homophobia               | 4                                      | 3                                      | 1                                      |
| Sexual harassment        | 116                                    | 32                                     | 94                                     |
| Total                    | 1202 (36.4% [24.8-38.1])               | 672 (45.5% [42.3-48.0])                | 530 (29.1% [27.1-31.3])                |
| **Sexuality**            |                                        |                                        |                                        |
| Sexually suggestive lyrics| 1062                                  | 571                                    | 491                                    |
| Performing sexual acts   | 77                                     | 42                                     | 35                                     |
| Infidelity               | 60                                     | 58                                     | 2                                      |
| Prostitution             | 3                                      | 1                                      | 2                                      |
| Total                    | 354 (10.7% [9.7-11.8])                 | 83 (9.6% [8.6-9.6])                    | 271 (14.9% [13.3-16.6])                |
| Alcohol use              | 155                                    | 59                                     | 96                                     |
| Selling drugs            | 78                                     | 3                                      | 75                                     |
| Drug use                 | 121                                    | 21                                     | 100                                    |
| Total                    | 696 (21.2% [19.8-22.6])                | 374 (25.2% [23.2-27.5])                | 324 (17.8% [16.1-20.0])                |
| **Partying**             |                                        |                                        |                                        |
| Sexually suggestive dancing | 514                                 | 248                                    | 265                                    |
| Partying/dosbarging      | 184                                    | 126                                    | 58                                     |
| Total references -adult themes (references per minute) | 3288 (4.2 references per minute)   | 1478 (3.7 references per minute)       | 1820 (4.8 references per minute)       |
| **Positive themes**      |                                        |                                        |                                        |
| Positive body image      | 28 (8.2% [8.0-11.8])                   | 11 (9.0% [5.0-15.6])                   | 17 (8.0% [5.0-12.5])                   |
| Empowerment              | 210 (62.3% [57.4-67.7])                | 93 (65.2% [68.0-80.0])                 | 117 (64.9% [48.2-61.5])                |
| Camaraderie              | 18 (5.4% [3.4-8.4])                    | 18 (4.8 [9.5-22.2])                    | 0                                      |
| Positive romantic relationship | 79 (23.6% [19.3-28.4])               | 0                                      | 79 (27.1% [20.8-45.0])                 |
| Total references – positive themes (references per minute) | 335 (6.4 references per minute) | 122 (3.3 references per minute)       | 213 (6.6 references per minute)       |

The most common adult themes in our sample of 200 songs were "sexually suggestive lyrics" (n=1062, 32.2%), "sexually suggestive dancing" (n=354, 10.7%), "use of swear words" (n=453, 13.7%), "alcohol use" (n=155, 4.7%), and "use of guns/deadly weapons" (n=155, 4.7%). The most common positive theme in our sample of 200 songs was "empowerment" (n=210, 62.3%).
When comparing our two stratified study periods, there was a greater absolute number of total adult (1820 vs. 1470) and positive (213 vs. 122) references in the 2009-2018 study period compared with the 1999-2008 study period. (Table 3) When comparing our two stratified study periods, there were greater references per minute for adult themes (4.8 vs. 3.7 references per minute) and positive themes (0.6 vs. 0.3 reference per minute) in the 2009-2018 study period compared with the 1999-2008 study period, this was not statistically significant (p=0.58 for adult themes and p=0.41 for positive themes). (Table 3) When comparing our two stratified study periods, there was an increase over time in the total number of major adult themes except for "sexuality" and "partying". Lastly, when comparing our two stratified study periods, there was an increase over time in the total number of positive themes except for "camaraderie".

Table 4 demonstrates the total number of references for the adult and positive themes, as well as the references per minute, stratified by each year during the 20-year study period. Variability can be seen in the total number of references and references per minute during the 20-year study period.

| Violent crime (7.2%) | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|---------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Physical assault (20.3%) | 0    | 0    | 1    | 0    | 2    | 5    | 5    | 6    | 0    | 9    | 0    | 7    | 2    | 0    | 2    | 0    | 0    | 0    |
| Sexual assault 0% | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Murder (5.4%) | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 8    |
| Self-harm (10.6%) | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 23   | 0    | 0    | 0    | 0    | 0    | 0    |
| Use of guns/deadly weapons (8.7%) | 1    | 1    | 2    | 0    | 1    | 0    | 0    | 57   | 0    | 1    | 2    | 6    | 0    | 0    | 2    | 0    | 2    |
| Non-violent crime (4.5%) | 1    | 2    | 0    | 2    | 1    | 9    | 1    | 12   | 0    | 49   | 4    | 1    | 10   | 5    | 1    | 0    | 12   |
| Theft (22.4%) | 1    | 2    | 0    | 2    | 0    | 3    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 3    | 0    | 0    | 12   |
| Gambling (2%) | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Gratification of prison (5.4%) | 0    | 0    | 0    | 0    | 1    | 0    | 1    | 0    | 0    | 0    | 0    | 1    | 0    | 2    | 0    | 0    | 0    | 0    |
| Gang glorification (22.1%) | 0    | 0    | 0    | 0    | 5    | 1    | 2    | 0    | 0    | 0    | 2    | 0    | 1    | 0    | 0    | 0    | 0    | 0    |
| Vandalism (21.1%) | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 12   | 0    | 5    | 2    | 0    | 8    | 0    | 1    | 0    |
| Use of inappropriate language (59%) | 11   | 9    | 19   | 11   | 38   | 37   | 54   | 25   | 12   | 10   | 42   | 15   | 40   | 21   | 43   | 7    | 33   | 34   |
| Use of swear words (88.5%) | 2    | 7    | 16   | 9    | 16   | 14   | 52   | 13   | 8    | 5    | 42   | 12   | 36   | 21   | 41   | 6    | 31   | 16   |
| Racism (3.5%) | 0    | 1    | 3    | 1    | 10   | 19   | 2    | 7    | 1    | 5    | 0    | 0    | 2    | 0    | 0    | 0    | 1    |
| Homophobia (0.8%) | 0    | 0    | 0    | 0    | 2    | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sexual harassment (17.6%) | 9    | 1    | 0    | 1    | 10   | 3    | 0    | 5    | 3    | 0    | 0    | 3    | 2    | 0    | 2    | 1    | 1    | 10   |
| Sexuality (36.4%) | 41   | 35   | 36   | 56   | 110  | 67   | 76   | 62   | 65   | 124  | 36   | 22   | 94   | 5    | 47   | 58   | 56   | 16   |
| Sexually suggestive lyrics (88.3%) | 32   | 6    | 36   | 36   | 102  | 47   | 76   | 62   | 56   | 118  | 36   | 18   | 93   | 3    | 27   | 58   | 55   | 16   |
| Performing sexual acts (8.4%) | 0    | 18   | 0    | 7    | 7    | 3    | 0    | 0    | 1    | 6    | 0    | 4    | 1    | 2    | 18   | 0    | 1    |
| Infidelity (0.5%) | 9    | 11   | 0    | 13   | 0    | 17   | 0    | 0    | 8    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Prostitution (0.3%) | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 2    | 0    | 0    | 0    |
| Substance use (10.7%) | 2    | 0    | 1    | 4    | 20   | 3    | 5    | 13   | 22   | 13   | 10   | 16   | 33   | 17   | 7    | 12   | 42   |
| Alcohol use (43.8%) | 0    | 0    | 1    | 4    | 11   | 2    | 3    | 8    | 18   | 12   | 10   | 13   | 26   | 15   | 2    | 7    | 3    |
| Selling drugs (22%) | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 2    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 14   |
| Drug use (34.2%) | 2    | 0    | 0    | 0    | 9    | 1    | 1    | 5    | 2    | 1    | 0    | 3    | 6    | 2    | 5    | 5    | 25   |
| Partyng (21.2%) | 1    | 0    | 15   | 2    | 41   | 104  | 22   | 31   | 14   | 144  | 58   | 40   | 29   | 7    | 12   | 2    | 49   | 90   |
TABLE 4: Total number of adult and positive theme references, stratified by each year (1999 to 2018)

| Theme                      | References | Per Minute |
|----------------------------|------------|------------|
| Positive body image (8.3%) | 36         | 0.9        |
| Empowerment (62.7%)        | 31         | 1.1        |
| Camaraderie (5.4%)         | 5          | 0.2        |
| Positive romantic relationship (23.8%) | 0     | 0.0        |

Discussion

Based on our sample of contemporary popular music, there were more adult theme references than positive theme references. The most common adult themes in our sample were “sexually suggestive lyrics,” “sexually suggestive dancing,” “use of swear words,” “alcohol use,” and “use of guns/deadly weapons.” The most common positive theme in our sample was “empowerment.” When comparing our two stratified study periods, there was an increase over time in the total number of adult themes except for “sexuality” and “partying.” Lastly, when comparing our two stratified study periods, there was an increase over time in the total number of positive themes except for “camaraderie.”

Although there have been several other studies examining the lyrical content of music, our study focuses on a variety of genres over two decades (1999-2018), focusing on both adult themes and positive themes. Several studies have focused on alcohol and drug use content. One study analyzing 279 popular songs in 2005 from several genres, focusing on substance use, determined that adolescents were exposed to 53.2 substance references per song-hour, with tobacco and alcohol use being the most common references [21]. A content analysis study examining alcoholic references in 409 rap songs (1975-2009) found significant increases in alcoholic references during their study period, with increases in the association of alcohol with glamour and wealth, drugs, and nightclubs [22]. Another study examining substance use references in 508 Australian top 20 songs (1990-2015) found an increase in references over the study period [23]. Lastly, a study examining 1200 top 40’s songs (1986-2016) found increasing references to opioids, marijuanna, and alcohol over the study period [24].

There have also been studies examining the lyrical content of music, specifically references to violence and sexual behavior. A study examining violence in 540 rap songs (1979-1997) determined that there was an increase in references to violence during the study period, depicted in a positive light by its association with glamour, wealth, masculinity, and personal prowess [23]. One study examining the risk behavior content of 600 top 20 songs (2009-2015) found that 55% of the songs mentioned sexual behaviors and that an association with alcohol and a disregard for consequences was common [23]. Lastly, a study of 279 popular songs in 2005, focusing on degrading and non-degrading sexual references, determined that 35% of songs contained references to sexual activity, often associated with references to substance use, violence, and weapons carrying [25]. Questions on whether children and adolescents who are exposed to music actually listen to and interpret the lyrics have been confirmed by published studies [26].

It has been suggested that pediatric healthcare providers take responsibility in the media education of children and adolescents. The American Academy of Pediatrics’ Council on Communications and Media suggest the following responsibilities: 1) become familiar with the content of contemporary popular music and with the public health risks of music on children and adolescents, 2) include media-related questions at each well-child visit to gauge level of exposure and potential risk factors while promoting healthy media habits, 3) encourage parents/guardians to take an active role in monitoring the types of music and in regulating the duration of music exposure based on the age and emotional/development stage of their child or adolescent, 4) participate in local and national coalitions, including schools, to discuss the effects of music on children and adolescents, 5) encourage stakeholders in the music industry to create and release music promoting positive themes, such as developing healthy relationships, eliminating discrimination, alcohol and drug avoidance, nonviolent conflict resolution, sexual abstinence, pregnancy prevention, and healthy body images [1,19]. Future studies should focus on the level of involvement of pediatric healthcare providers in promoting the media education of children and adolescents and whether this education affects the overall wellbeing and social development of children and adolescents who are exposed to music.

We have identified several limitations. Since our analysis was performed on only 200 songs identified by Billboard, with the majority of the songs categorized as Pop, R&B/Soul, and Hip-Hop/Rap, our conclusions may not be generalizable to music outside our study period, less popular songs on the music charts during our study period, or less represented genres such as Rock, Electronic, Techno, Jazz, Blues, Folk, Country, Alternatives/Indie, Reggae, House, Heavy Metal, Musical theatre, or Christian/Gospel. Secondly, although our objective was to perform a content and trend analysis of contemporary popular music between 1999 and
2018, with particular attention to adult themes and positive themes, we did not examine whether the lyrical content of music in our sample affected pediatric listeners. Despite this limitation, there have been several published studies showing that exposure to music can affect behavior and emotion \[9\] and can increase risk-taking behaviors, such as aggression/violence \[9-10\], suicide \[11-13\], use of tobacco, alcohol, and illicit drugs \[14-16\], and unsafe sexual practices \[17\]. Lastly, data collection for each song in our sample was performed as a group; interpretation of lyrical content may be dependent on each individual’s emotional or developmental stage, background or previous experiences, or demographics, such as age, sex, race, or ethnicity. In order to account for these potential differences, our study design should have included an independent completion of the data collection instrument for each song by multiple reviewers from a diverse background, and discrepancies discussed collectively, with final decisions on the categorization of references based on these discussions.

Conclusions

Based on our sample of contemporary popular music, there were more adult theme references than positive theme references, with the most common adult themes related to sexual behavior and alcohol use, and the most common positive theme related to empowerment. Furthermore, when comparing our two stratified study periods, there was an increase over time in the total number of major adult themes except for “sexuality” and “partying,” and there was an increase over time in the total number of positive themes except for “camaraderie.”

We encourage pediatric healthcare providers to be active participants in the promotion of media education as delineated by the American Academy of Pediatrics. We encourage parents and guardians to be mindful of the level of media exposure of their children and adolescents. We encourage the music industry to create music appropriate for children and adolescents that focuses on positive themes such as developing healthy relationships, eliminating discrimination, alcohol and drug avoidance, nonviolent conflict resolution, sexual abstinence, pregnancy prevention, and healthy body image.

Additional Information

Disclosures

Human subjects: All authors have confirmed that this study did not involve human participants or tissue.

Animal subjects: All authors have confirmed that this study did not involve animal subjects or tissue.

Conflicts of interest: In compliance with the ICMJE uniform disclosure form, all authors declare the following:

Payment/services info: All authors have declared that no financial support was received from any organization for the submitted work.

Financial relationships: All authors have declared that there are no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work.

Other relationships: All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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