Success of Cultural Products and Fundamental Social Motives

by

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A Dissertation Presented in Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

Approved April 2022 by the
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ARIZONA STATE UNIVERSITY

May 2022

ABSTRACT

Which evolutionarily important social motives are cultural products about? Songs from the 2020 Billboard Hot 100 year-end chart were rated in terms of their relevance to the fundamental social motives. These songs were thought to be about seeking a romantic partner, followed by maintaining romantic relationships, breakups, and acquiring or maintaining status. Songs were thought to be least about avoiding infectious diseases and caring for children. Relative success of a song was found to be largely unassociated with which motive it reflects but significantly related to simplicity of the lyrics and prestige associated with the artist.

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CHAPTER 1

INTRODUCTION

"I've been tryna call/ I've been on my own for long enough/ Maybe you can show me how to love, maybe" (The Weeknd, 2019)

"When the bones are good, the rest don't matter/ Yeah, the paint could peel, the glass could shatter/ Let it rain 'cause you and I remain the same" (Maren Morris, 2019)

"I was out back where the stash at/ Cruise the city in a bulletproof Cadillac" (Roddy Ricch, 2019)

These are excerpts from the lyrics of some of the most popular songs in the U.S. during the year 2020. What makes these songs so popular? Aside from the features that are considered the basic requirements of a successful song, such as a catchy melody, a trendy beat, and the artist's reputation or fan base, do these songs provide some content that has particular appeal to the listeners? The three songs above seem to be telling very different stories about social life, ranging from finding love and avoiding being alone to maintaining a relationship, navigating a dangerous environment, and signaling wealth. Given that these themes also occur, albeit to varying degrees, in the lives of the consumers across the U.S., there may be good reasons that such themes are a common occurrence in popular cultural products. Here, I examine which widely shared social motives successful pop songs seem to address and whether a song's success can be predicted by the degree to which it exploits a particular social motive.

What makes a cultural product successful?

Process

Research on cultural evolution has shed light on the processes by which a cultural product might become popular. Cultural evolutionary theory views culture to evolve according to Darwinian principles, in a way that resembles biological evolution (R. Boyd & Richerson, 2005; Mesoudi, 2009). That is, cultural traits (e.g., ideas, beliefs, skills) vary within and between groups of individuals, and the persistence of a trait can be explained by the process in which people selectively inherit or acquire certain traits by social learning. This process is influenced by evolved biases that serve as heuristics for choosing a cultural trait when people are uncertain which trait is more adaptive, thus allowing them to adopt a trait without individually assessing the costs and benefits of the trait relative to the alternatives.

Social learning biases are especially pertinent to the choice of cultural products, such as books, films, and movies, as it is often difficult to predict whether a product will be enjoyable. In addition, the large number of choices available means that the costs of individual exploration likely exceed the benefits of enjoyment maximized by choosing the right product (Muthukrishna et al., 2016; Nakahashi et al., 2012). Therefore, it may be a somewhat naïve assumption that the success of a cultural product is a direct reflection of individual preferences, but rather successful cultural products might possess certain features that make them more likely to be transmitted or might be held by those who are more likely to be copied (Mesoudi, 2009).

For example, success of a cultural product may partly be attributed to people's evolved tendency to disproportionately favor cultural traits that are most frequent in the society (Henrich & Boyd, 1998). This "conformist" bias suggests that, once a cultural product crosses a certain threshold of popularity, thus perceived as more prevalent than

the alternatives, it is likely to become even more popular. Marketers of products often take advantage of this bias, such as by using word-of-mouth strategies to increase sales (Beck, 2007; De Bruyn & Lilien, 2008).

People also have a tendency to preferentially learn from successful individuals (Henrich & Gil-White, 2001). This heuristic assumes that success of individuals (e.g., prestige, status) can be attributed to some adaptive trait and that copying successful individuals will, on average, lead to acquiring more adaptive traits than maladaptive ones. Thus, this strategy does not need to distinguish exactly which trait causes success, nor does it try to determine whether the successful individual has any knowledge about the quality of a cultural product. This bias explains why celebrity endorsements, regardless of their expertise on the product, is thought to be an effective strategy to increase sales. For example, being selected by Oprah's Book Club was enough to propel previously little-known books into the bestseller list (Butler et al., 2005). Models in which individuals copy high-status individuals have been used to demonstrate how fads or fashions might emerge, in which cultural products gain popularity in a relatively rapid manner (e.g., Tassier, 2004).

In some cases, prestige associated with a cultural product contributes to success by serving as a somewhat valid signal of quality (Gemser et al., 2008). For example, when judging picture books for their children, parents preferred books that had remained in print for a long time or received some recognition or award (Wagner, 2017). Similarly, an Oscar nomination for a film is generally thought to be an indicator of its quality, conferring prestige and boosting box-office sales (English, 2014). However, one caveat here is that the causal direction between prestige and popularity is often obscure. For

example, it is difficult to rule out the effect of pre-Oscars sales on the voting process (i.e., nomination may reflect probability of commercial success) or the possibility that the film would have succeeded regardless of the nomination. It is worth noting that infamy, as a potential signal of bad qualities, can also lead to success of a cultural product—for example, while positive reviews by critics increase book sales, as one would expect, negative reviews can also increase sales, albeit to a lesser extent (Sorensen & Rasmussen, 2004). Moreover, conflicting reviews and extreme opinions may be even more effective than a positive review (Clement et al., 2007), consistent with the notion that controversy can be effective in generating interest (Chen & Berger, 2013). For instance, despite the contention over the 2007 Newbery Medal winner, "The Higher Power of Lucky", for its usage of the word "scrotum" in a children's book, the book enjoyed many weeks on the New York Times Best Seller list.

Finally, another possibility is that the success of a cultural product is randomly determined. "Neutral" models of evolution suggest that changes in the frequency distribution of genetic material can sometimes be parsimoniously explained by the process in which new variants are constantly introduced into a population and random choice determines which variants persist, when no selective forces are present because the variants have little to no bearing on the success of the organism (Leroi et al., 2020). Neutral models have been applied to cultural evolution and have demonstrated how some cultural traits can enjoy relatively brief popularity (i.e., fads or fashions) when individuals simply copy each other randomly (i.e., unbiased transmission; e.g., Bentley et al., 2004; Hahn & Bentley, 2003). Of course, unbiased transmission is not always a reasonable assumption, but neutral models provide a baseline or null hypothesis against

which other models involving competition and selection of traits can be tested. For example, increasing popularity of song lyrics conveying negative emotion can partly be explained by prestige and success bias, but only until unbiased transmission was included in the model (Brand et al., 2019). In contrast, when examining turnover rates in ranked lists of baby names, usage of color terms, and musical groups, a neutral model modified to include different transmission biases fit the data better than a neutral model alone (Acerbi & Bentley, 2014).

These accounts suggest that the success of a cultural product depends relatively little on its actual content. Random copying and "context-dependent" social learning strategies, such as conformist, success, or prestige bias (Rendell et al., 2011) explain *how* cultural products become successful—after they have already gained some popularity or been associated with status or prestige. However, they do not explain why certain cultural products might appeal to people in the first place or which kinds of cultural products might see prolonged versus brief success. Then, what features of the cultural product itself might predict success?

Form

Other accounts focus more on the form or structure of the cultural product. For example, narratives that feature minimally counterintuitive elements are more likely to be remembered and faithfully transmitted than narratives that do not contain any unusual elements or contain too many (Norenzayan et al., 2006). This suggests that books and songs that mostly follow an existing schema but also contain the right number of twists may be more successful than those very similar to, or too different from, previous popular works. In our opening example, a counterintuitive idea may be that dragons, who are

known to consume humans, in fact prefer tacos, which is an element of the narrative that could contribute to its memorability.

Previous research has also examined whether people prefer cultural products that are simple or complex. Simpler cultural products may hold an advantage, especially when there is much competition, as they are repeated more easily, more memorable, and thus transmitted with more ease and fidelity. For example, in the music industry, characterized by high rates of turnover, pop songs with simpler lyrics tend to be more successful (Varnum et al., 2021). Similarly for books, parents prefer and think their children prefer picture books with fewer words per page, for the ease with which they can be repeated and used to facilitate language acquisition (Wagner, 2017). Simplicity in narratives also help convey a message in a clear and concise way without the distraction of details, which may explain the persistence of fables and parables (e.g., Aesop's fables, parable of the Good Samaritan; B. Boyd, 2009). Adhering to a conventional narrative structure could have a similar effect to simplicity by appealing to an existing schema and reducing cognitive load. Indeed, traditional narratives tend to share a common structure (R. L. Boyd et al., 2020) akin to Freytag's dramatic arc (i.e., exposition, rising action, climax, falling action, denouement).

It may be worth noting here that success may be at least somewhat distinct from preference—for instance, when asked why they dislike certain songs, people listed lyric quality, the "earworm" effect (i.e., getting a song stuck in the head), and overexposure as part of the reasons (Cunningham et al., 2005). Thus, simpler forms might be successful in the sense that they are frequently observed but not necessarily widely liked or critically acclaimed.

Content and Function

A popular notion is that creative works are primarily in the service of entertainment. That is, creative works hold little functional value but successfully co-opt cognitive mechanisms designed for adaptive behavior in the real world. For example, fictional works that feature imaginary worlds (e.g., Harry Potter, Lord of the Rings) may be taking advantage of the preference for exploration (Dubourg & Baumard, 2021). From this perspective, the extent to which cultural products exploit evolved cognitive features would affect the level of enjoyment and thus predict the success of the cultural product. Similarly, some have suggested that music is merely an evolutionary byproduct serving no important function (Pinker, 2007).

In contrast, others have argued that cultural products persist because they actually confer some benefit for the individual or the group. For example, fiction is commonly thought to have originated from oral storytelling, which can be used to convey fitness-relevant information (B. Boyd, 2018). In foraging societies, subsistence-related information is transmitted through narratives (Scalise Sugiyama, 2001), which helps individuals avoid the potential costs associated with trying to gather the same information through direct experience. Such practices can also be adaptive in that people are also more likely to remember information embedded in narratives (Bower & Clark, 1969). Thus, storytelling, rather than a mere byproduct of capacity for language (Pinker, 2007), may in fact be a useful tool for transmission of information or ideas important for survival.

Cultural products may also play a key role in socialization by helping transmit cultural values. Cultural researchers have noted that cultural products reflect various

cultural dimensions (Morling & Lamoreaux, 2008). For example, children's stories from different cultures convey what affective state is valued in that culture (Tsai, Louie, et al., 2007). A meta-analysis of studies that examined various cultural products, including books, song lyrics, and advertisements, found that cultural products from Western societies, primarily the U.S., reflected more individualism compared to cultural products from more collectivistic societies (e.g., East Asian countries, Mexico). Thus, cultural products may facilitate adaptive outcomes to the extent that understanding, internalizing, and aligning one's actions with the dominant values of one's society helps one achieve desirable outcomes by successfully navigating social situations.

Previous research has also provided insight into how individuals might extract fitness-relevant information from narratives. In the case of fiction, providing immersive, simulative experiences may be key (B. Boyd, 2009; Mar & Oatley, 2008). Simulation can be an effective way to convey important information without exposing the learner to risks, when directly acquiring that information may simply be impossible or poses physical or social threat. Here, it may be worth noting that realism is not a necessary condition. Unrealistic scenarios may actually serve to capture people's attention, thus facilitating immersive simulation, and to emphasize the focal message (B. Boyd, 2009). Extreme scenarios may too be beneficial because they broaden the range of possibilities for unknown future events (Wilbanks et al., 2021). For example, although dangerous scenarios depicted in horror films are often highly unlikely, exploring such a wide range of scenarios and contingencies may in fact better prepare individuals for novel situations posing physical threat, such as a pandemic (Scrivner et al., 2021). Similarly, songs often

feature dangerous scenarios (e.g., gangster rap) or social situations that are experienced relatively infrequently in life (e.g., infidelity).

The Present Study

The content of cultural products should be constrained by the features of the human mind, which has been designed to solve particular adaptive problems (Nettle, 2005). In other words, the content of cultural products, at least those that appeal to many, cannot be about everything under the sun. For instance, even fantastic imaginary worlds share the same features as the real world, with characters that resemble humans and their sociality, seemingly dealing with the same challenges that we face in our own lives.

Then, what kind of fitness-relevant information do cultural products convey? Perhaps the most prominent explanation for the prevalence of fiction is that stories often convey important *social* information (B. Boyd, 2009; Mar & Oatley, 2008; Zunshine, 2006). It has been argued that fiction helps people develop empathy (Mar et al., 2009) and theory of mind (Kidd & Castano, 2013; Panero et al., 2016; Zunshine, 2006), preparing them for future social interactions. Here, simulative experience provided by fiction also helps people process complex social scenarios. Fiction necessarily distills the complex social world to fit the story into a limited number of pages. This process of selection and simplification (Mar & Oatley, 2008) allows one to focus on the key characters, relationship dynamics, causal events, etc. Especially when told through third-person omniscient narration, stories provide a sort of training wheels for simulation by providing insight into the characters' private thoughts, relevant backgrounds, and the like, thus clarifying causal processes that would be much more complex and obscure in the real social world.

The privileged status of social information is well represented in cultural products. For example, popular shows on television are overwhelmingly about social situations, and it has been argued that such shows provide "surrogate" social experiences, increasing a sense of belonging for the viewers who vicariously experience the social world depicted in the show (Derrick et al., 2009). Further, developmental research has found that children prefer stories with social information (Barnes & Bloom, 2014) and stories with causal information (Shavlik et al., 2020), suggesting that the preference for social themes in cultural products appears to be innate.

Fundamental Social Motives

Provided that successful cultural products tend to be about the social world, which aspects of social life might they address? As the "ultrasocial" species, to improve reproductive success, all humans must successfully manage various threats and opportunities provided by group living, such as protecting themselves from dangerous others, avoiding getting sick, making friends, rising in social status, seeking romantic partners, taking care of family, and raising children. Given that our ancestors have had to successfully address such challenges in order to survive and reproduce, humans should be endowed by natural selection with a motivational system that drives adaptive behavior in each of these conceptually distinct domains of social life. This domain-specific approach to human motivation is referred to as the *fundamental social motives* framework (Kenrick, Griskevicius, et al., 2010), which has been useful for examining how functionally specific motivational states influence the way people perceive stimuli, process information, and behave in social contexts (Cook et al., 2021; Kenrick, Neuberg, et al., 2010; Neuberg & Schaller, 2015). It has been useful for understanding various

phenomena, including conformity, decision-making, and social categorization (e.g., Griskevicius et al., 2006; Li et al., 2012; Maner et al., 2012). It has also been applied to examine people's perception of self-actualization and meaning in life (Krems et al., 2017), as well as perception of cultural ideas, such as social norms (Kwon et al. 2022).

Kenrick and colleagues (2010) proposed seven motives that are fundamental in the sense that they have important implications for reproductive fitness: Self-Protection, Disease Avoidance, Affiliation, Status, Mate Seeking, Mate Retention, and Kin Care. In the current study, I used a more specific version including subfactors of some motives, resulting in eleven motives (see Table 1), as proposed by Neel et al. (2016).

Table 1

Descriptors of the Eleven Fundamental Social Motives

Motives	Descriptor
Self-Protection	Keeping yourself safe from danger posed by others (e.g., dangerous people)
Disease Avoidance	Avoiding getting sick; staying away from places and people that might carry diseases
Affiliation (Group)	Getting along with people around you, and being part of a social group
Affiliation (Exclusion Avoidance)	Avoiding exclusion from the group or rejection from other people
Affiliation (Independence)	Spending time alone and being by yourself
Status	Being respected, having high social status, and maintaining your rank or position
Mate Acquisition	Finding someone to be in a romantic or causal/sexual relationship with
Mate Retention (General)	Making sure your partner is romantically, emotionally, and sexually loyal, and invested in your relationship
Mate Retention (Breakup Avoidance)	Making sure you and your partner don't break up, and that your partner doesn't leave you
Kin Care (Family)	Being close to, caring for, and investing (e.g., time) in family/relatives
Kin Care (Children)	Caring for, protecting, and investing (e.g., time) in children

It is not difficult to find examples of cultural products that reflect each of these fundamental social motives. For example, books and movies often tap into people's self-preservation motives by featuring a villain who poses physical threats to the main character (think of any superhero films). Some villains, with grotesque features (e.g., Voldemort in the Harry Potter series), may also trigger people's disease avoidance

motives. Many cultural products often promote being a good member of society. For example, most stories in hunter-gatherer societies in the Philippines are about decisions in social and moral dilemmas (Smith et al., 2017), and similar themes can be found in relatively modern Western novels (e.g., Carroll et al., 2012). Pop songs are often about romantic relationships (both short-term and long-term) and breakups—a study that examined the content of chart-topping songs in the U.S. across five decades showed that a large portion of pop songs since 1960 have consistently been about romantic and sexual relationships (Christenson et al., 2019). Christenson and colleagues (2019) have also shown that songs about status and wealth have increased in the 2000s. Finally, family relationships, such as becoming a sibling, is a recurrent theme in children's books (Kramer et al., 1999).

Study Overview

If the success of cultural products is partly a function of how effective they are at capturing people's attention, then they may do so by appealing to the most salient part of people's social motivation. For example, storytellers are motivated to make their stories more interesting not only by enhancing expressivity, but also by embellishing the story or adding features that are likely to elicit emotional responses (B. Boyd, 2009; 2018). In order to elicit such responses, cultural products should be attuned to people's chronic concerns about the various threats and opportunities that exist in their social world, at a given time and place.

In the present work, I will use pop songs in the U.S. to examine whether, as a whole, songs tend to be more about certain fundamental social motives than others, and whether relative success of a song can be predicted by which fundamental social motive

it conveys. I will present participants with excerpts of lyrics from songs on the Billboard Hot 100 chart. I will then ask people to rate to what extent the cultural product addresses each of the fundamental social motives.

CHAPTER 2

METHOD

Participants

Participants were 379 undergraduate psychology students at Arizona State University, who were offered course credit in exchange for participation. Data from 26 participants were excluded because they did not complete the study, resulting in a final sample size of 353. Mean age was 19.4 (*SD* = 1.9), 58% were female, and the racial/ethnic breakdown was predominantly White/European American (52%), followed by Mexican/Latin American (18%), African American (7%), East Asian (6%), Southeast Asian (6%), and Middle Eastern (2%).

Materials

Songs were selected from the Billboard Year-End Hot 100 chart, a ranked list of bestselling singles in the U.S. The list is based on physical and digital sales, airplay, and streaming data. For each song, I obtained the lyrics from Genius.com. The stimulus consisted of the first verse and the chorus. Potentially offensive words were censored using asterisks. Each set of lyrics was accompanied by an embedded link to listen to the song, with 78 tracks from SoundCloud and 22 tracks from YouTube. Song success was operationalized as reversed position on the Billboard chart, so that the #1 song was given a success score of 100 and the #100 song was given a success score of 1.

Other features of the songs were included for exploratory analysis. Song duration was included as shorter songs may benefit from more repetition on streaming services. Beats per minute (BPM) was included based on the observation that the BPM of the top-

20 popular songs has been increasing over the past decade, reaching 122 in 2020. Song duration and BPM were obtained from songbpm.com.

Based on previous work suggesting that songs conveying negative emotions (Brand et al., 2019) and second-person pronouns (i.e., "you"; Packard & Berger, 2020) tend to be more successful, I conducted a textual analysis on the complete lyrics of each song using the Linguistic Inquiry and Word Count (LIWC) program (Pennebaker et al., 2015). I obtained the percentage of words in each song conveying positive emotions and negative emotions, as well as the percentage of second-person pronouns used in each song.

Given that songs performed by a successful artist are likely to enjoy more publicity, I also determined whether an artist had won a Grammy Award prior to when the year-end chart was published in December 2020. Because the Grammy Awards are held at the beginning of the year, 2020 Grammy Awards was included in the count. A dummy-coded variable was created, with 1 indicating that the artist had previously won a Grammy Award and 0 indicating that the artist had yet to win one.

Previous work also shows that pop songs with simpler lyrics tend to be more successful (Varnum et al., 2021). Simplicity of lyrics was operationalized as the degree to which each song's lyrics can be compressed using the Lempel–Ziv–Markov chain algorithm (LZMA), which is used to conduct lossless data compression. Compression was performed using the *memCompress* function in base R, and compressibility was measured as the ratio of the size of the compressed text to the size of the raw text, subtracted from 1. The song with the simplest lyrics was "ily" by Surf Mesa (82%

compressibility), a remix of the chorus from “Can’t Take My Eyes Off You” by Frankie Valli, repeating the phrase “I love you” 20 times throughout the song.

Procedure

Each participant was presented with excerpts from the lyrics of 10 songs randomly selected from the Billboard chart (see Figure 1 for a sample), providing ratings for 10 percent of the whole list (10 songs out of 100), such that each song received *n*/10 (around 35) sets of ratings. For each lyric excerpt, participants were told “*Rate to what extent this song is related to the following outcomes*” and presented with eleven prompts describing each of the fundamental social motives, each on a 100-point slider scale from 0 = *not at all related*, to 100 = *extremely related* (see Table 1 for the exact motive descriptors). Participants were encouraged to listen to the song while reading the lyrics, though because the tracks were not censored, they were not required to listen to the song. Participants then completed a short demographic survey. The study was administered via Qualtrics.

Figure 1

Sample Stimulus and Rating Scale

Billie Eilish - bad guy

[Verse]
White shirt now red, my bloody nose
Sleepin', you're on your tippy toes
Creepin' around like no one knows
Think you're so criminal
Bruises on both my knees for you
Don't say thank you or please
I do what I want when I'm wanting to
My soul? So cynical

Rate to what extent this song is about the following outcomes.

Not at all — Extremely

0 20 40 60 80 100

Keeping yourself safe from danger posed by others (e.g., dangerous people) [Self-Protection]

Avoiding getting sick; staying away from places and people that might carry diseases [Disease Avoidance]

Getting along with people around you, and being part of a social group [Group Affiliation]

Avoiding exclusion from the group or rejection from other people [Exclusion Avoidance]

CHAPTER 3

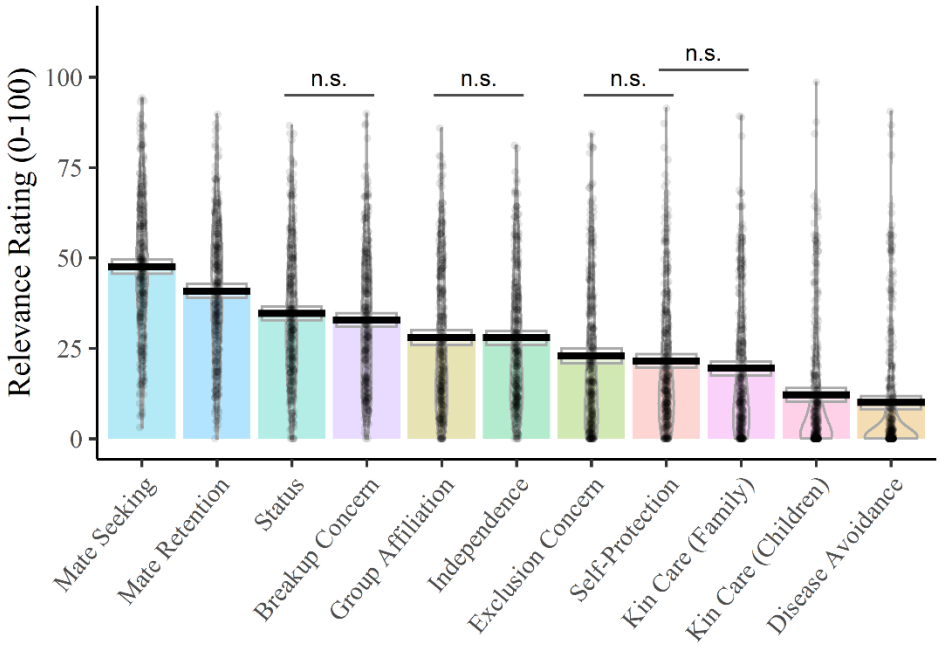
RESULTS

Results

Overall, which fundamental social motive did participants think pop songs were most about? I calculated the mean rating participants gave to each of the fundamental social motives, averaged across all 10 songs presented to them. Each participant provided 110 ratings (10 sets of song lyrics × 11 motives). Figure 2 shows these mean ratings for each of the fundamental social motives, ordered by grand means.

Figure 2

Mean Ratings of Pop Songs on Relevance to Fundamental Social Motives



Note. Dots indicate each participant's mean rating for a given motive, averaged across all songs presented to them. Horizontal black bars indicate grand-mean ratings for each motive, averaged across all participants. Grey boxes indicate 95% confidence intervals.

All pairwise comparisons are significant unless noted by the horizontal lines (after Bonferroni adjustment for multiple comparisons).

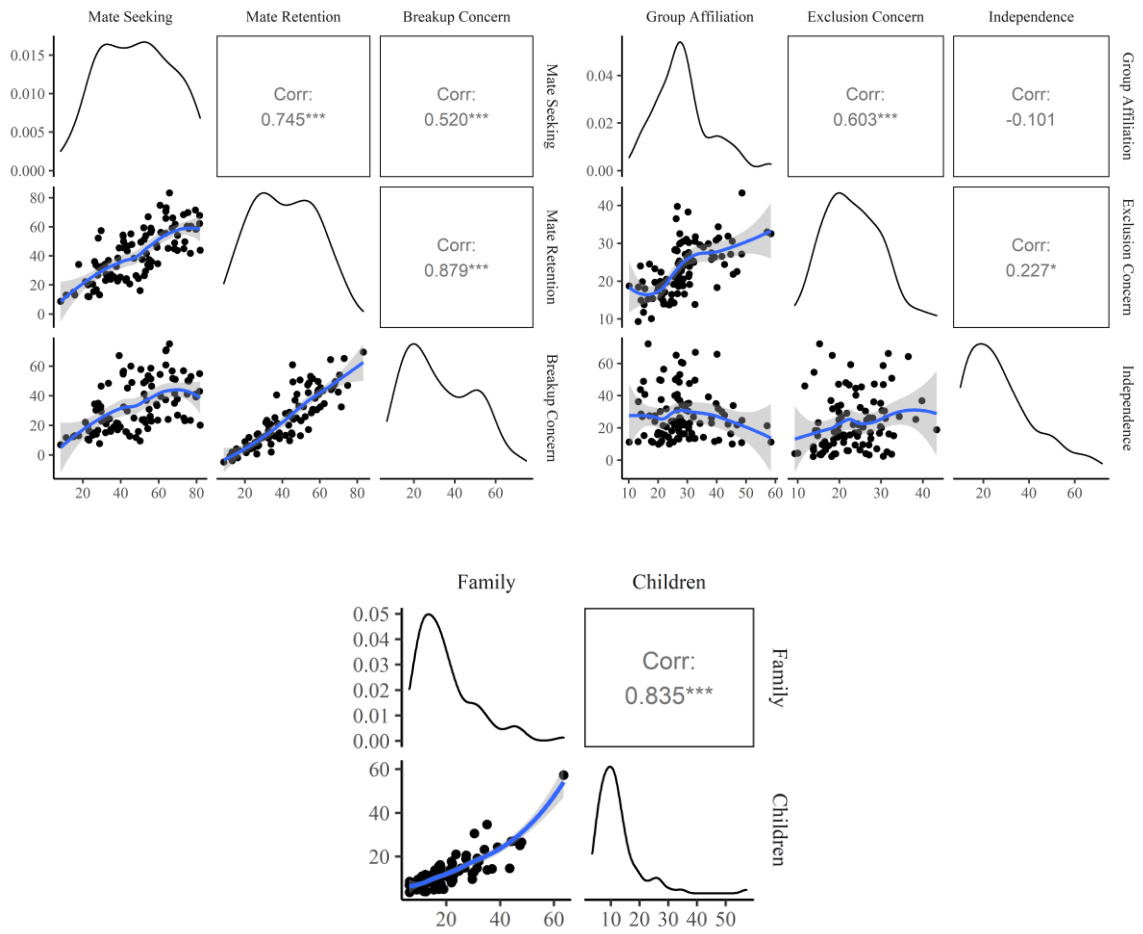
In the following ordinary least squares (OLS) regression, because ratings were significantly clustered within individuals, with intraclass correlation (ICC) of .17, $p < .001$ (Hox, 1998), cluster-robust standard errors were used to account for this violation of the independence assumption (White, 1984; McNeish et al., 2017). Overall, there were statistically significant differences in the ratings on the fundamental social motives, $F(10, 3530) = 139.86$, $p < .001$. This OLS regression was followed by post-hoc pairwise comparisons, with Bonferroni adjustment for multiple comparisons (adjusted alpha = .0009 = .05/55, where 55 is the number of pairwise comparisons between 11 motives). Mean rating on each motive was significantly different from the mean ratings on all other motives unless noted in Figure 2, ts > 4.17, ps < .001 (see Appendix A for details on all pairwise comparisons).

In aggregate, songs were rated as *most* relevant to Mate Seeking, followed by Mate Retention, and then by Status and Breakup Concern. Mate Seeking ($M = 48$, $SD = 19$) received significantly higher ratings than Mate Retention ($M = 41$, $SD = 18$), $t(3530) = 9.32$, $p < .001$. Mate Retention received significantly higher ratings than Status ($M = 35$, $SD = 20$), $t(3530) = 5.88$, $p < .001$, and Breakup Concern ($M = 33$, , $SD = 17$). Status and Breakup Concern did not differ in mean rating, $t(3530) = 1.75$, $p = .08$. Songs were rated as *least* relevant for Disease Avoidance, followed by Kin Care (Children). Disease Avoidance ($M = 10$, $SD = 4$) received significantly lower ratings than Kin Care (Children; $M = 12$, $SD = 8$), $t(3530) = 3.62$, $p < .001$.

Were songs about one fundamental social motive or multiple motives? I examined the bivariate correlations between the motives on their ratings to examine whether a song rated to be high on one motive tended to be rated higher or lower on other motives. Of 55 total pairwise comparisons, 37 (36 after Holm's method of adjustment for multiple comparisons) were statistically significant (see Appendix B for full correlation table). Thus, songs tended to be about multiple motives rather than just one motive. Notably, the mating-related motives—Mate Seeking, Mate Retention, and Breakup Concern—showed strong positive correlations, with *r*s between .52 and .88 (*p*s < .001). These motives were negatively associated with other motives, such as Self-Protection (*r*s < -.40, *p*s < .001), Group Affiliation (*r*s < -.26, *p*s < .01), and Status (*r*s < -.45, *p*s < .001), indicating that songs rated to be about mating-related motives tended to be rated as relatively irrelevant for other motives. Similarly, the affiliation motives—Group Affiliation and Exclusion Concern—showed a strong positive association ($r = .60$, $p < .001$), as did the two kin care motives—Family and Children ($r = .84$, $p < .001$).

Figure 3

Correlations Between the Ratings on Fundamental Social Motives

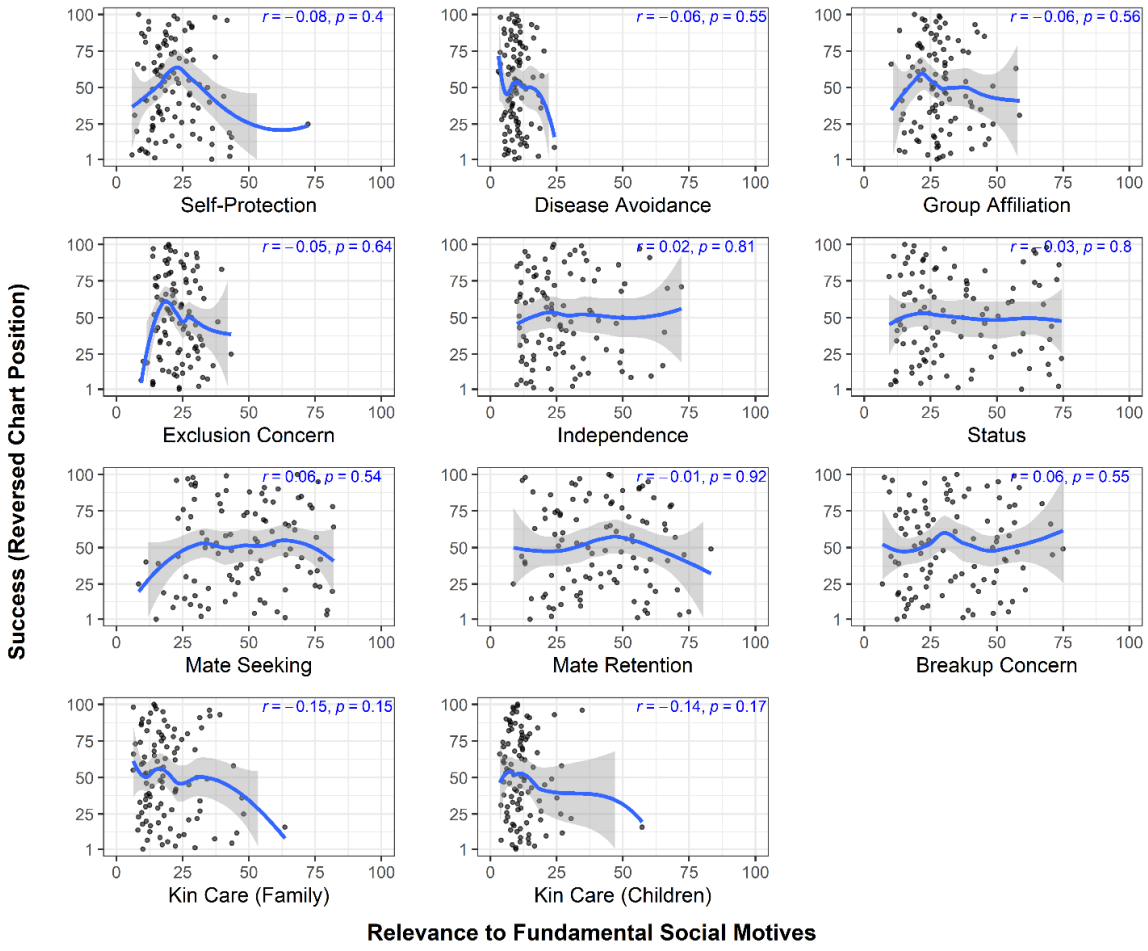


Note. Dots represent each song. Blue lines are loess curves with span = .75. Grey areas around the curves indicate confidence intervals. Diagonal panels show density plots.

Can the relative success of a song be predicted by which fundamental social motive it most reflects? I examined the bivariate correlations between each fundamental social motive and song success as operationalized by the (reversed) position of a song on the Billboard Hot 100 chart. There were no significant correlations between each motive and success, $|r|$s < .15, ps > .15 (see Figure 3 for all correlations).

Figure 4

Correlations Between Each Motive and Song Success



Note. Dots represent each song. Blue lines are loess curves with span = .75, and grey areas around the curves indicate confidence intervals.

The original analytic plan was to examine whether song success could be predicted by the eleven ratings, averaged across participants, given to each of the fundamental social motives. However, high correlations between the predictors suggested that multicollinearity was present, which was confirmed by variance inflation factor (VIF) values. VIF was greater than 5 for two predictors (11.8 for Mate Retention and 6.9 for Breakup Concern), which is problematic, with six predictors with VIFs greater than 2.5, which is a more conservative threshold (Johnston et al., 2018; see Appendix C for all VIF values). After removing the predictor with an extremely high VIF (> 10; Mate

Retention), which lowered all VIFs to 4.22 or less, a multiple regression conducted with the remaining ten predictors revealed that relevance ratings on each motive did not predict song success, $F(10, 89) = 0.33$, $p = .97$, $R^2 = .04$ (see Appendix D for detailed regression results).

In addition, given the strong correlations between the ratings for the three mating-related motives, the two affiliation motives, and the two kin care motives, I conducted a principal components analysis (PCA) to determine whether the eleven motive variables could be efficiently summarized by fewer components, which would also address the multicollinearity problem. Based on the scree plot shown in Figure 4, I extracted three components with eigenvalues greater than 1 (component loadings shown in Table 2), which accounted for 74 percent of the variance in the ratings. The first component reflects the consistent rating between the mating-related motives, which were associated with lower ratings on all other motives, the second component reflects consistent rating on the kin care motives, and the third component reflects consistent rating on the group-related motives.

Figure 5

Scree Plot of Eigenvalues

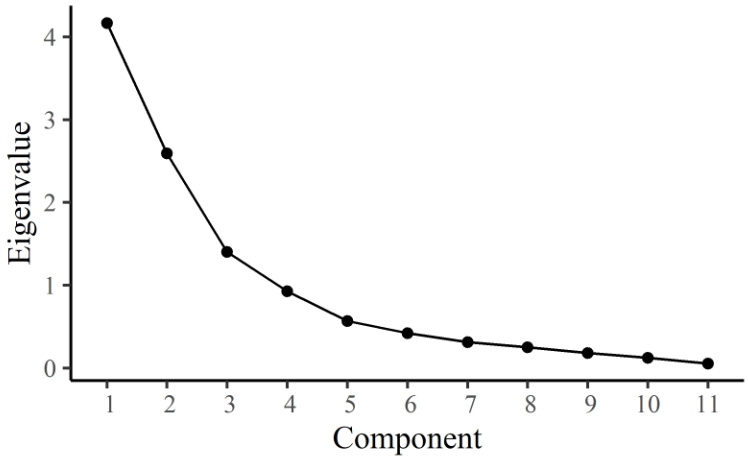


Table 2

Principal Component Loadings for Each Motive

Variables	PC 1	PC 2	PC 3
Self-protection	0.75	0.24	-0.31
Disease Avoidance	0.38	0.67	
Group Affiliation	0.55		**0.70**
Exclusion Concern	0.60	0.16	**0.43**
Independence	0.45	0.26	**-0.65**
Status	0.69	-0.48	0.17
Mate Seeking	**-0.84**		0.33
Mate Retention	**-0.87**	0.38	
Breakup Concern	**-0.72**	0.52	
Kin Care (Family)	0.20	**0.85**	0.19
Kin Care (Children)	0.31	**0.79**	0.16

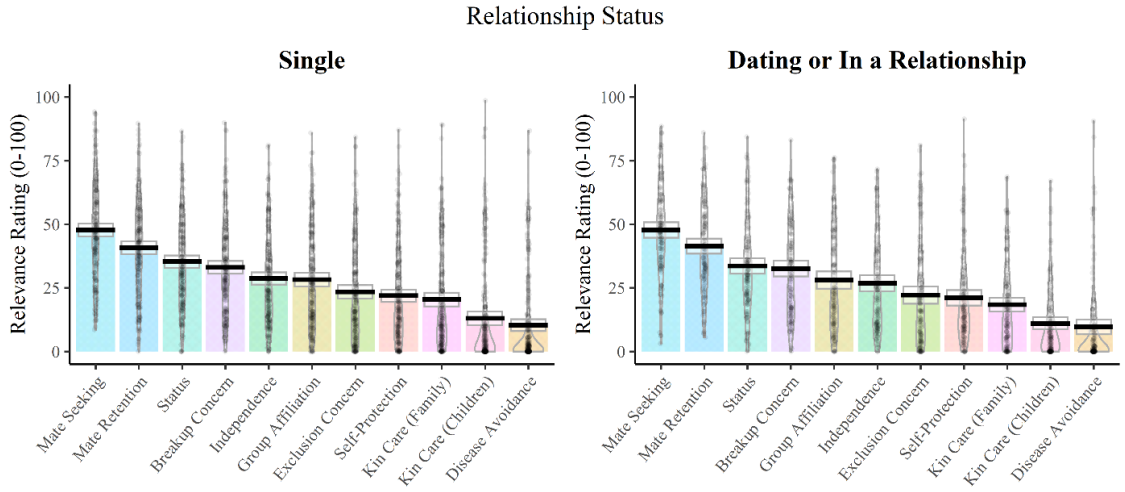
Exploratory Analysis

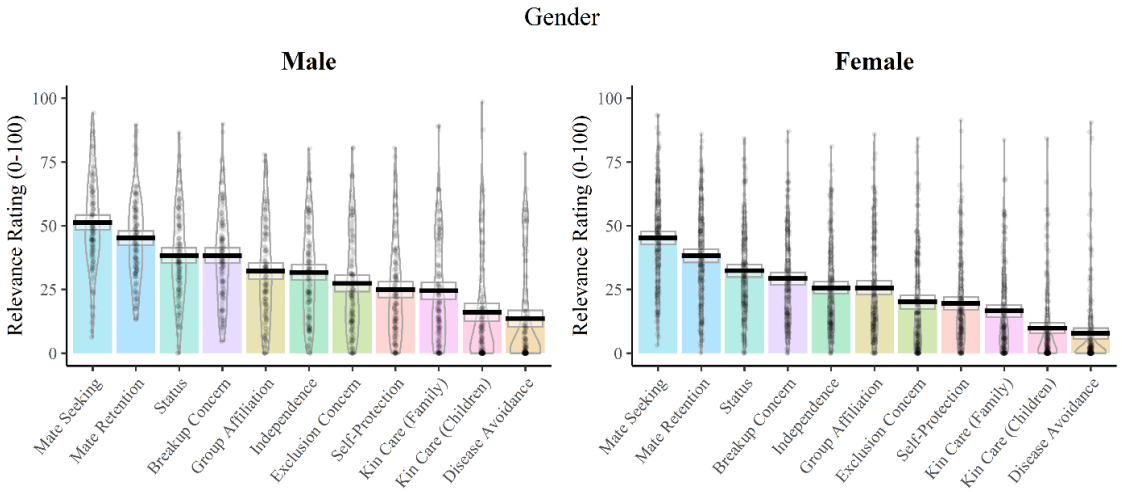
How robust is the pattern found here to demographic differences? Demographic factors, such as gender, relationship status, age and parenthood, likely influence which developmental and social tasks are most salient to individuals, which in turn may affect which aspects of the song lyrics they pay more attention to. For example, people in committed relationships might perceive a song about having a night out to be more

relevant to mate retention, rather than mate seeking. Figure 4 shows that the rank ordering of motives by average ratings do not differ when comparing males vs. females and single participants vs. participants who are dating or in a committed relationship. Indeed, the interaction between motive and gender had no effect on the ratings, $F(10, 3380) = 0.82$, $p = .62$, and the interaction between motive and relationship status had no effect on the ratings, $F(10, 3420) = 0.46$, $p = .92$. Because the sample consisted of young college students, there was an insufficient number of participants with children to compare whether parenthood affects the rank ordering, and the age range was too restricted to allow any comparisons across age groups.

Figure 6

Mean Ratings of Songs Separated by Relationship Status and Gender.



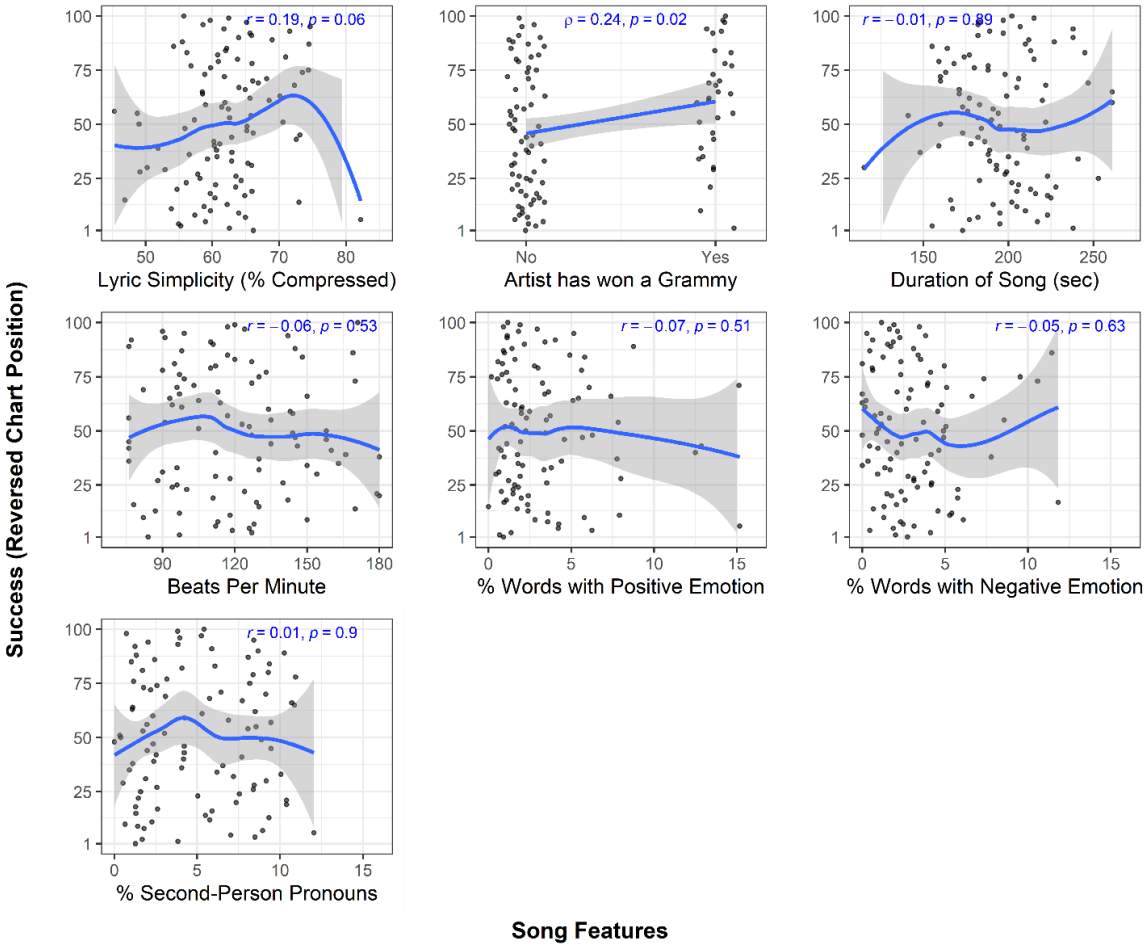


Note. Dots indicate each participant's mean rating for a given motive, averaged across all songs presented to them. Horizontal black bars indicate grand-mean ratings for each motive, averaged across all participants. Grey boxes indicate 95% confidence intervals.

What other features of songs predict success? I conducted bivariate correlations to examine whether lyric simplicity, prior Grammy Awards, song duration, BPM, positive and negative emotion conveyed in the lyrics, and use of second-person pronouns would be correlated with success. There was a significant positive correlation for lyric simplicity, $r = .19$, $p = .06$, and prior Grammy Awards, $r = .24$, $p = .02$, such that songs with simpler lyrics tended to be more successful and songs performed by a Grammy-winning artist tended to be more successful.

Figure 7

Correlations Between Song Features and Song Success.


Success (Reversed Chart Position)
r = 0.19, p = 0.06
Lyric Simplicity (% Compressed)
ρ = 0.24, p = 0.02
No
Yes
Artist has won a Grammy
r = −0.01, p = 0.89
Duration of Song (sec)
r = −0.06, p = 0.53
Beats Per Minute
r = −0.07, p = 0.51
% Words with Positive Emotion
r = −0.05, p = 0.63
% Words with Negative Emotion
r = 0.01, p = 0.9
% Second-Person Pronouns
Song Features

CHAPTER 4

DISCUSSION

Which evolutionarily important social motives are cultural products about? And can the success of cultural products be predicted by which of these motives they primarily reflect? I explored this question using a list of songs that were the most popular in the U.S. in the year 2020, for which relative success could be easily quantified. Songs in the Billboard Hot 100 chart were thought to be mostly about seeking a romantic partner, followed by holding on to romantic partners, breakups, and status. Not surprisingly, songs were least about avoiding infectious diseases, and had little to do with caring for children. Further, the PCA analysis showed that the ratings could largely be explained by just three components, suggesting that a song was rarely rated as relevant to just one of the related motives. Finally, song success was found to be largely unassociated with which motive it reflects.

That the mating-related motives were seen as most reflected in popular songs is divergent from the hierarchical ordering of fundamental social motives found in other studies. For example, in studies using the same rating method as the current study to examine how people perceive various social norms as facilitating their social motives, social norms were seen as most relevant for group-related motives, such as affiliation, exclusion concern, and status (Kwon et al., 2022).

Further, in these studies people's own motivations were found to be largely unrelated or only weakly correlated to their perceptions of social norms. Similarly, the ordering of motives found in the present study also held when ratings were separated by gender and relationship status, suggesting that any variations in people's own motivations

that might result from these participant characteristics did not affect how songs were construed in terms of motives. In a related vein, people across the world consider familial motives, including caring for family and children, and retaining a mate, as the most important to them, and consider mate seeking and breakup concern to be of relatively little importance (Ko et al., 2020). Taken together, these findings suggest that people are not merely projecting their own motivations when rating which motives a song is about.

It is somewhat puzzling that popular songs tend to be mostly about the motive that people, in their everyday lives, consider to be of relatively little importance. When asked which goals related to each of the fundamental social motives were most important to them, individuals in the U.S. tend to list mate seeking as the least important goal (Ko et al., 2019). Why, then, would the most popular songs in the U.S. be about mate seeking? Although this is an open question, I provide one speculation that songs about mating-related motives serve particular functions, at least to a particular demographic in the U.S.

One such function may be that mating themes in songs are related to hedonic wellbeing, which refers to achieving positive emotional states and avoiding negative ones (Busseri & Sadava, 2011). When asked which motive-related activities they would engage in if they were pursuing hedonic wellbeing, compared to when they were asked about self-actualization or eudaimonic wellbeing (about finding meaning or purpose in life), people reported greater likelihood that they would engage in mate seeking (Krems et al., 2017). Thus, the consumption of songs with mating-related themes may be aligned with pursuing pleasure and minimizing negative internal states.

Other work regarding the function of music is consistent with this speculation. For example, when asked how they use music in everyday life, individuals across various

world regions saw music as facilitating self-regulation—to enhance mood, alleviate stress, increase focus, and reduce negative emotions like frustration (Boer & Fischer, 2012; Schäfer et al., 2013; Van den Tol & Edwards, 2015). In contrast to how individuals interact with music, among other plausible functions of music, such as providing ambient sound, creating diversion, and promoting social cohesion, collective use of music was found to be most in the service of social cohesion (Boer & Fischer, 2012). Considering that modern Billboard rankings reflect streaming data, which accounted for 83% of total revenue in the U.S. music industry in 2020 (Friedlander, 2021), and that streaming is likely the most common form of individual music consumption, chart position should reflect these self-regulatory functions of music. And given that mate seeking situations are often accompanied by fluctuating emotional experiences, it seems plausible that popular songs appeal to people by exploiting their self-regulatory needs in such contexts. In a related vein, in a study that examined the relationship between fundamental social motives and mental health outcomes, people who reported high levels of mate seeking motivation and breakup concern were less satisfied with their lives and reported higher levels of depression and anxiety (Varnum & Kenrick, 2019). Thus, to the extent that songs addressing these motives help them regulate negative internal states, people may actively seek out such songs. Supporting this idea, prior work suggests that after a negative emotional event, people tend to choose sad songs, which may be an effective emotional regulation strategy rather than merely intensifying the negative emotional state (Van den Tol & Edwards, 2013). Listening to sad music may actually elicit positive emotions (Kawakami et al., 2013). For example, people might choose to listen to songs about mating-related motives following a breakup, or to remind them of past experiences

of breaking up, which may help them remember that they are not the only ones who have experienced such events or cognitively reappraise the situation (Gross, 2002).

Would the present findings generalize to other societies or demographics? It is quite possible that these patterns are unique to songs that are popular in the U.S. Songs exist in every society and serve various functions, some of which broadly correspond to the fundamental social motives that U.S. pop songs were generally not about, such as healing (disease avoidance) and soothing a baby (caring for children; Mehr et al., 2019). Even when restricting the inquiry to societies in which commercial songs are the most common form of music, the present findings may be attributable to factors like the demographics of the primary music consumers.

There may also be cultural differences in the functions that people derive from music. For example, when thinking about their favorite songs, Germans tended to perceive them as less facilitative of self-regulation compared to Indians (Schäfer et al., 2013). On a related note, cultural differences in ideal affect may be reflected in song choice (Tsai, 2007). For example, when asked to choose between a music CD that seemed likely to elicit high-arousal positive affect and a CD that seemed likely to elicit low-arousal positive affect, European-American participants more often chose the high-arousal option, compared to participants from Asian backgrounds (Tsai, Miao, et al., 2007). Given these findings, and the notion that people may choose songs that match their affective state for self-regulatory purposes, it seems plausible that successful songs in other cultures may reflect different themes compared to the U.S.

Although we found that success of songs could not be predicted by the fundamental social motives they reflect, this could be because the range of cultural

success was restricted by selecting from a list of songs that are already extremely popular. Future work could address this issue by selecting from a broader universe of songs, provided that a reliable measure of cultural success can be obtained, which may require alternative operationalizations of success, such as streaming counts or direct sales metrics. In this vein, another challenge for future research is devising a more nuanced measure of cultural success. For example, streaming counts may be influenced by factors such as song length and recommendations curated by streaming platforms, and thus may limit the inferences researchers can draw from any links to the content of cultural products.

The method used in the present study has the potential to be applied to other types of cultural products, provided that the stimuli are of manageable size. One natural extension is to examine different genres of songs and which motives are reflected in successful songs in each genre. Considering that different genres are preferred by different demographics, such work may be able to better answer the question of why people prefer songs that reflect certain motives over others. Extending this method to cultural products varying both in form and content, such as films and books, may also provide insight into the functions cultural products serve. For example, because songs, films, and books vary in duration, they may be suited for conveying different types of information or eliciting different types of emotions.

In conclusion, the present study presents a promising method for analyzing cultural products to explore whether cultural success can be attributed to the content and functional features of cultural products. The findings here that successful pop songs in the U.S. are mostly about mating-related social motives invite further investigation of why

such convergence has occurred and what functions these songs may serve for the millions of listeners.

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APPENDIX A

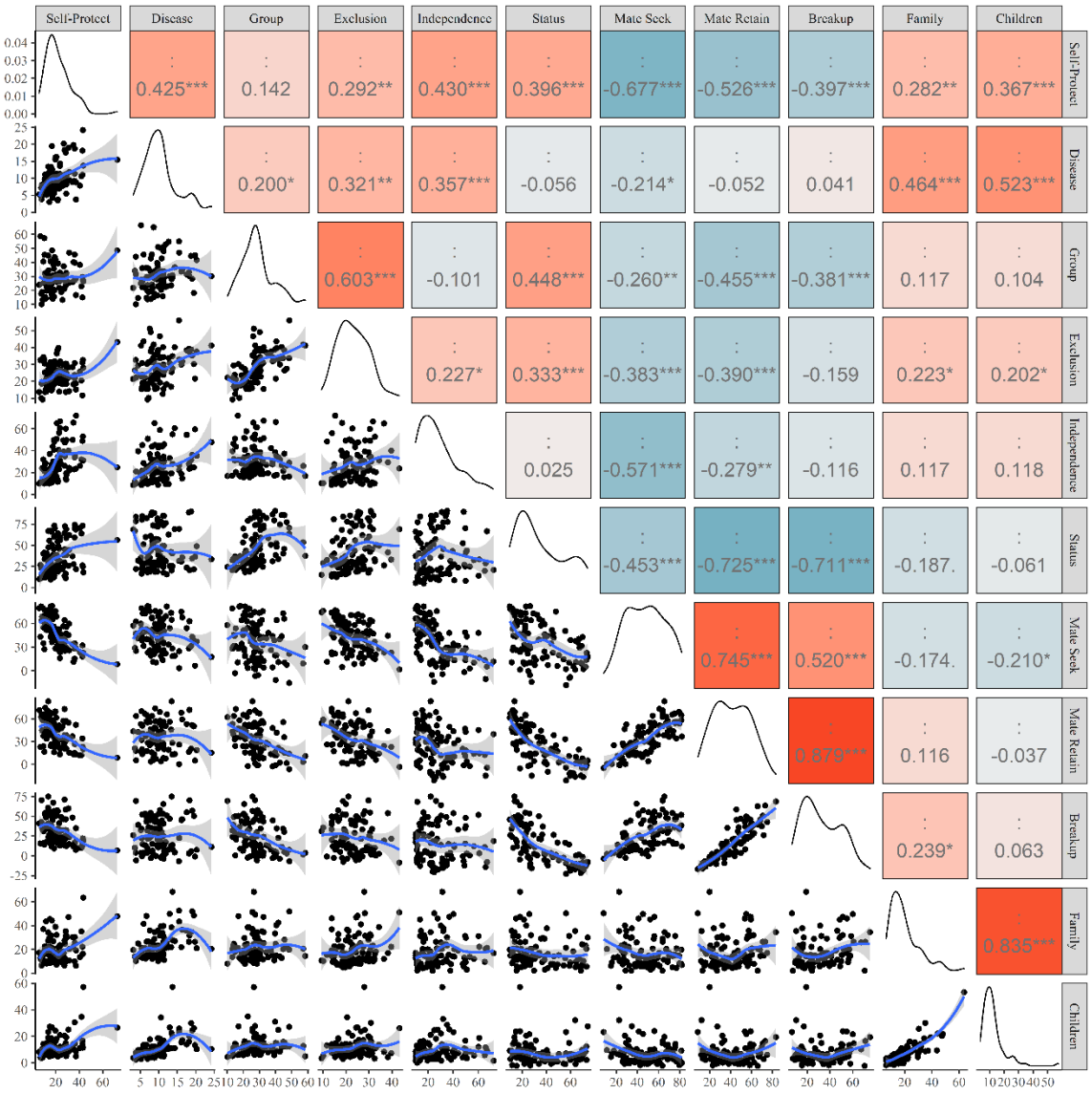
PAIRWISE COMPARISONS BETWEEN THE FUNDAMENTAL SOCIAL MOTIVES ON THEIR SONG RELEVANCE RATINGS

Motive	Motive	Mean Diff	SE	*df*	*t*	*p*
Mate Seeking	Mate Retention	6.7549	0.7249	3530	-9.32	<.0001
Mate Seeking	Status	13.0467	1.1445	3530	11.4	<.0001
Mate Seeking	Breakup Concern	14.8922	0.8711	3530	-17.1	<.0001
Mate Seeking	Group Affiliation	19.7377	1.1546	3530	-17.1	<.0001
Mate Seeking	Independence	19.9005	1.175	3530	-16.94	<.0001
Mate Seeking	Exclusion Concern	24.9759	1.088	3530	-22.96	<.0001
Mate Seeking	Self-Protection	26.3161	1.1972	3530	21.98	<.0001
Mate Seeking	Kin Care (Family)	28.4299	1.191	3530	-23.87	<.0001
Mate Seeking	Disease Avoidance	38.0152	1.1957	3530	-31.79	<.0001
Mate Seeking	Kin Care (Children)	35.8166	1.2288	3530	-29.15	<.0001
Mate Retention	Status	6.2918	1.0692	3530	5.88	<.0001
Mate Retention	Breakup Concern	8.1373	0.5726	3530	-14.21	<.0001
Mate Retention	Group Affiliation	12.9828	1.0349	3530	-12.55	<.0001
Mate Retention	Independence	13.1456	1.0888	3530	-12.07	<.0001
Mate Retention	Exclusion Concern	18.221	0.9625	3530	-18.93	<.0001
Mate Retention	Self-Protection	19.5612	1.0916	3530	17.92	<.0001
Mate Retention	Kin Care (Family)	21.675	1.0369	3530	-20.9	<.0001
Mate Retention	Disease Avoidance	31.2602	1.0583	3530	-29.54	<.0001
Mate Retention	Kin Care (Children)	29.0616	1.0917	3530	-26.62	<.0001
Status	**Breakup Concern**	**1.8455**	**1.0519**	**3530**	**-1.75**	**0.0794**
Status	Group Affiliation	6.691	0.8011	3530	-8.35	<.0001
Status	Independence	6.8538	0.9507	3530	-7.21	<.0001
Status	Exclusion Concern	11.9292	0.8309	3530	-14.36	<.0001
Status	Self-Protection	13.2694	0.8969	3530	-14.79	<.0001
Status	Kin Care (Family)	15.3832	1.0115	3530	-15.21	<.0001
Status	Disease Avoidance	24.9685	0.9757	3530	-25.59	<.0001
Status	Kin Care (Children)	22.7698	1.041	3530	-21.87	<.0001
Breakup Concern	Group Affiliation	4.8455	0.9746	3530	4.97	<.0001
Breakup Concern	Independence	5.0083	1.0011	3530	5	<.0001
Breakup Concern	Exclusion Concern	10.0837	0.8594	3530	11.73	<.0001
Breakup Concern	Self-Protection	11.4239	0.9996	3530	11.43	<.0001
Breakup Concern	Kin Care (Family)	13.5377	0.9322	3530	14.52	<.0001
Breakup Concern	Disease Avoidance	23.123	0.9311	3530	24.84	<.0001
Breakup Concern	Kin Care (Children)	20.9243	0.9632	3530	21.72	<.0001
Group Affiliation	**Independence**	**0.1628**	**0.8669**	**3530**	**0.19**	**0.851**
Group Affiliation	Exclusion Concern	5.2382	0.5626	3530	-9.31	<.0001
Group Affiliation	Self-Protection	6.5784	0.7717	3530	8.52	<.0001
Group Affiliation	Kin Care (Family)	8.6922	0.87	3530	9.99	<.0001
Group Affiliation	Disease Avoidance	18.2774	0.8376	3530	-21.82	<.0001
Group Affiliation	Kin Care (Children)	16.0788	0.9365	3530	17.17	<.0001
Independence	Exclusion Concern	5.0754	0.8719	3530	-5.82	<.0001
Independence	Self-Protection	6.4156	0.8267	3530	7.76	<.0001
Independence	Kin Care (Family)	8.5294	0.9196	3530	9.28	<.0001
Independence	Disease Avoidance	18.1146	0.8165	3530	-22.19	<.0001
Independence	Kin Care (Children)	15.916	0.8941	3530	17.8	<.0001
Exclusion Concern	**Self-Protection**	**1.3402**	**0.7983**	**3530**	**1.68**	**0.0933**
Exclusion Concern	Kin Care (Family)	3.454	0.8269	3530	4.18	<.0001
Exclusion Concern	Disease Avoidance	13.0393	0.7935	3530	-16.43	<.0001

Exclusion Concern	Kin Care (Children)	10.8406	0.8437	3530	12.85	<.0001
Self-Protection	**Kin Care (Family)**	**2.1138**	**0.806**	**3530**	**-2.62**	**0.0088**
Self-Protection	Disease Avoidance	11.6991	0.6031	3530	-19.4	<.0001
Self-Protection	Kin Care (Children)	9.5004	0.7737	3530	-12.28	<.0001
Kin Care (Family)	Disease Avoidance	9.5853	0.7366	3530	-13.01	<.0001
Kin Care (Family)	Kin Care (Children)	7.3866	0.5907	3530	-12.51	<.0001
Kin Care (Children)	Disease Avoidance	2.1986	0.607	3530	-3.62	0.0003

APPENDIX B

CORRELATIONS BETWEEN THE RATINGS ON ALL ELEVEN FUNDAMENTAL SOCIAL MOTIVES


Self-Protect
Disease
Group
Exclusion
Independence
Status
Mate Seek
Mate Retain
Breakup
Family
Children
0.425***
0.142
0.292**
0.430***
0.396***
-0.677***
-0.526***
-0.397***
0.282**
0.367***
0.200*
0.321**
0.357***
-0.056
-0.214*
-0.052
0.041
0.464***
0.523***
0.603***
-0.101
0.448***
-0.260**
-0.455***
-0.381***
0.117
0.104
0.227*
0.333***
-0.383***
-0.390***
-0.159
0.223*
0.202*
0.025
-0.571***
-0.279**
-0.116
0.117
0.118
-0.453***
-0.725***
-0.711***
-0.187.
-0.061
0.745***
0.520***
-0.174.
-0.210*
0.879***
0.116
-0.037
0.239*
0.063
0.835***

APPENDIX C

VARIANCE INFLATION FACTORS IN THE REGRESSION MODEL PREDICTING SONG SUCCESS FROM RELEVANCE TO EACH OF THE FUNDAMENTAL SOCIAL MOTIVES

All Eleven Predictors	
Predictor	**VIF**
Self-Protection	2.55
Disease Avoidance	2
Group Affiliation	2.38
Exclusion Concern	2.28
Independence	2.13
Status	2.65
Mate Seeking	4.94
Mate Retention	11.8
Breakup Concern	6.92
Kin Care (Family)	4.39
Kin Care (Children)	4.13

After Removing Mate Retention	
Predictor	**VIF**
Self-Protection	2.55
Disease Avoidance	1.98
Group Affiliation	2.37
Exclusion Concern	2.07
Independence	2.13
Status	2.6
Mate Seeking	3.31
Breakup Concern	2.86
Kin Care (Family)	4.22
Kin Care (Children)	4.03

APPENDIX D

REGRESSION RESULTS

Regression Results with All Eleven Fundamental Social Motives as Predictors

Predictor	***b***	***b*** [95% CI]	***beta***	***beta*** [95% CI]	***r***
(Intercept)	50.50**	[44.69, 56.31]			
Self-Protection	-0.81	[-10.15, 8.52]	-0.03	[-0.35, 0.29]	-.08
Disease Avoidance	1.03	[-7.23, 9.29]	0.04	[-0.25, 0.32]	-.06
Group Affiliation	-0.54	[-9.56, 8.48]	-0.02	[-0.33, 0.29]	-.06
Exclusion Concern	-3.98	[-12.80, 4.85]	-0.14	[-0.44, 0.17]	-.05
Independence	2.62	[-5.90, 11.15]	0.09	[-0.20, 0.38]	.02
Status	0.03	[-9.48, 9.54]	0.00	[-0.33, 0.33]	-.03
Mate Seeking	9.38	[-3.59, 22.36]	0.32	[-0.12, 0.77]	.06
Mate Retention	-24.59*	[-44.65, -4.52]	-0.85	[-1.54, -0.16]	-.01
Breakup Concern	18.19*	[2.83, 33.56]	0.63	[0.10, 1.16]	.06
Kin Care (Family)	-1.83	[-14.07, 10.41]	-0.06	[-0.48, 0.36]	-.15
Kin Care (Children)	-2.23	[-14.10, 9.63]	-0.08	[-0.49, 0.33]	-.14

Note. R^2 = .097, 95% CI[.00, .11]. *b* represents unstandardized regression weights. *beta* indicates the standardized regression weights. *r* represents the zero-order correlation. * indicates $p < .05$. ** indicates $p < .01$.

Regression Results After Removing Mate Retention (VIF > 10) From the Set of Predictors

Predictor	***b***	***b*** [95% CI]	***beta***	***beta*** [95% CI]	***r***
(Intercept)	50.50**	[44.53, 56.47]			
Self-Protection	-1.01	[-10.60, 8.58]	-0.03	[-0.37, 0.30]	-.08
Disease Avoidance	0.15	[-8.30, 8.61]	0.01	[-0.29, 0.30]	-.06
Group Affiliation	0.38	[-8.85, 9.61]	0.01	[-0.31, 0.33]	-.06
Exclusion Concern	-0.66	[-9.29, 7.97]	-0.02	[-0.32, 0.27]	-.05
Independence	2.37	[-6.38, 11.12]	0.08	[-0.22, 0.38]	.02
Status	1.58	[-8.10, 11.26]	0.05	[-0.28, 0.39]	-.03
Mate Seeking	0.26	[-10.66, 11.18]	0.01	[-0.37, 0.39]	.06
Breakup Concern	3.78	[-6.37, 13.94]	0.13	[-0.22, 0.48]	.06
Kin Care (Family)	-4.73	[-17.07, 7.60]	-0.16	[-0.59, 0.26]	-.15
Kin Care (Children)	-0.01	[-12.06, 12.03]	-0.00	[-0.42, 0.41]	-.14

Note. R^2 = .036, 95% CI[.00, .00]. *b* represents unstandardized regression weights. *beta* indicates the standardized regression weights. *r* represents the zero-order correlation. * indicates $p < .05$. ** indicates $p < .01$.

Regression Results with the Principal Component Scores as Predictors

Predictor	***b***	***b*** [95% CI]	***beta***	***beta*** [95% CI]	***r***
(Intercept)	50.50**	[44.71, 56.29]			
PC 1	-2.18	[-8.00, 3.64]	-0.08	[-0.28, 0.13]	-.08
PC 2	-2.80	[-8.62, 3.02]	-0.10	[-0.30, 0.10]	-.10
PC 3	-1.76	[-7.58, 4.06]	-0.06	[-0.26, 0.14]	-.06

Note. R^2 = .019, 95% CI[.00, .07]. *b* represents unstandardized regression weights. *beta* indicates the standardized regression weights. *r* represents the zero-order correlation. * indicates $p < .05$. ** indicates $p < .01$.