

Emotional Cues in American Popular Music: Five Decades of the Top 40

E. Glenn Schellenberg

University of Toronto Mississauga and Freie Universität Berlin

Christian von Scheve

Freie Universität Berlin

Some musical characteristics are cues to happiness (fast tempo, major mode); others are cues to sadness (slow tempo, minor mode). Listening to music with inconsistent emotional cues leads to mixed feelings and perceptions, or simultaneous happy and sad responding. We examined whether emotional cues in American popular music have changed over time, predicting that music has become progressively more sad-sounding and emotionally ambiguous. Our sample comprised over 1,000 Top 40 recordings from 25 years spanning five decades. Over the years, popular recordings became longer in duration and the proportion of female artists increased. In line with our principal hypotheses, there was also an increase in the use of minor mode and a decrease in average tempo, confirming that popular music became more sad-sounding over time. Decreases in tempo were also more pronounced for songs in major than in minor mode, highlighting a progressive increase of mixed emotional cues in popular music.

Keywords: popular music, music and emotion, mixed emotions, social change, music history

Music is an inextricable part of human culture. The majority of music listening in industrialized countries involves popular music, with the biggest hits reaching millions of listeners. Popular music can be defined as music that is (1) made commercially, (2) made using ever changing technologies, (3) experienced as mediated, (4) made primarily for pleasure, and (5) formally hybrid (Frith, 2004). As such, popular music can be differentiated from classical and folk music as the other two major musical categories (Campbell, 2009).

The place of popular music in culture is multifaceted, ranging from a recreational activity to a signal of identity, a traded commodity, a means of establishing social relationships, and a way to convey political influence (e.g., DeNora, 2000; Frith, 1987). In fact, popular music is a “mirror of society,” reflecting shifts in peoples’ needs and preferences in the context of social and cultural change (Attali, 1985; Bennett, 2008). From a psychological perspective, listening to music systematically alters various forms of behavior, leading to marked changes in cognition, emotion, and motivation (e.g., Hargreaves & North, 1999; Thompson, 2009). In the present investigation, we asked whether the structure of popular music has changed since the 1960s, focusing primarily on two cues that are related to the emotions music conveys and induces, specifically *tempo* (slow to fast) and *mode* (major or minor).

Our basic premise was that the evolution of music preferences is linked to music’s capacity to convey and elicit emotions. It is well established that people listen to music because of the way it makes them feel (DeNora, 2003; Juslin & Västfjäll, 2008; Sloboda, 1992). Moreover, music preferences are closely tied to emotional needs and mood-management practices (Knobloch & Zillmann, 2002; Lonsdale & North, 2011), whereas needs and preferences for eliciting or altering feelings are associated with individual, social, and cultural circumstances (Vandekerckhove, von Scheve, Ismer, Jung, & Kronast, 2008). As in recent research (DeWall, Pond, Campbell, & Twenge, 2011), we were interested in changes in musical cues to emotion over a long period of time (five decades). Such changes would highlight correspondingly large-scale and gradual shifts in the aggregate preferences for music and its emotional status.

Although there are many cues to emotion in music, such as melodic structure, pitch height, dynamics, and rhythm (e.g., Gabrielsson & Lindström, 2001), tempo and mode are among the most reliable and well documented. It is well established that (1) happy-sounding music tends to be composed with a fast tempo and major mode, (2) sad-sounding music tends to be slow and minor, and (3) listeners tend to feel the emotions that music conveys (for a review see Hunter & Schellenberg, 2010). More provocative findings indicate that music composed with conflicting cues to happiness and sadness (fast and minor or slow and major) leads to mixed emotions or simultaneous happy and sad emotional responding, both in terms of listeners’ perceptions as well as their feelings (Hunter, Schellenberg, & Schimmack, 2008, 2010; Ladinig & Schellenberg, 2012). In the real world, the situation would be more complex in many respects. For example, songs that sound happy in terms of tempo and mode can have negative lyrics or feature instruments associated with sadness. In the empirical research cited above, however, the music had no vocals and extraneous features such as instrumentation were counterbalanced for music with consistent or conflicting cues.

Emotional responding to music can also be mixed on two different levels: one referring to the actual emotions associated

This article was published Online First May 21, 2012.

E. Glenn Schellenberg, Department of Psychology, University of Toronto Mississauga, Mississauga, ON, Canada and Cluster of Excellence “Languages of Emotion,” Freie Universität Berlin, Berlin, Germany; Christian von Scheve, Department of Sociology and Cluster of Excellence “Languages of Emotion,” Freie Universität Berlin.

Supported by grants from the Cluster of Excellence “Languages of Emotion,” Freie Universität Berlin, and from the Social Sciences and Humanities Research Council of Canada. We thank Julia Giering, Sara Koohestanian, and Stephanie Stalinski for analyzing the recordings.

Correspondence concerning this article should be addressed to E. Glenn Schellenberg, Department of Psychology, University of Toronto Mississauga, Mississauga, ON, Canada L5L 1C6. E-mail: g.schellenberg@utoronto.ca

with the piece and the other involving listeners' aesthetic evaluations (Hunter & Schellenberg, 2010). In the latter case, listeners often like angry- or sad-sounding music, much the way viewers appreciate Andy Warhol's *Death and Disaster* series of paintings or Edvard Munch's *The Scream*. These combinations of simultaneous negative and positive affect in response to music—either on the same level or on different levels—are likely to be one reason why so-called aesthetic emotions differ qualitatively from utilitarian or everyday emotions (Scherer, 2004; Zentner, Grandjean, & Scherer, 2008).

The motivation for the present study arose during the process of selecting the stimuli used by Hunter et al. (2008). Instrumental music excerpts with conflicting cues were easier to find than excerpts with consistent cues, and clearly happy-sounding excerpts from recent popular recordings were particularly difficult to locate. These observations—coupled with memories of unambiguously happy-sounding music from the 1960s (e.g., *She Loves You* or *Help!* by The Beatles)—led in part to the hypothesis that popular music has become more sad-sounding and emotionally ambiguous over time. Further consideration of this possibility revealed that it is consistent with theoretical conceptions of cultural and social change posited by scholars in sociology (Bauman, 1991; Giddens, 1991) and the humanities (Butler, 1990; Derrida, 1967; Empson, 1930; Hesmondhalgh, 2008; Mestrovic, 1997; Williams, 1998).

Related research has attempted to explain *who* listens to sad-sounding music and *why* they do so. One approach focuses on listeners' temporary states, revealing that the typical bias favoring happy- over sad-sounding music in terms of liking and preference (Hunter et al., 2008, 2010; Husain, Thompson, & Schellenberg, 2002; Thompson, Schellenberg, & Husain, 2001) can be eliminated when listeners are fatigued (Szpunar, Schellenberg, & Pliner, 2004) or in a sad mood (Schellenberg, Peretz, & Vieillard, 2008). Another approach focuses on more stable individual differences. Liking music that evokes sadness is associated with personality characteristics (i.e., positively with openness-to-experience and empathy, negatively with extraversion; Ladinig & Schellenberg, 2012; Vuoskoski, Thompson, McIlwain, & Eerola, 2012), whereas listeners with music training show elevated levels of liking music that evokes mixed emotions (Ladinig & Schellenberg, 2012).

To date, little is known about large-scale preferences for sad or ambiguous-sounding music. Moreover, shifts in the popularity of music have rarely been examined in terms of music's measurable characteristics. Researchers have focused instead on the structure of the creative industries and organizational processes that constrain or promote aesthetic choice (Harrington & Bielby, 2000; Peterson & Anand, 2004), or on patterns of consumption that differ across social strata (Chan & Goldthorpe, 2006; Peterson & Kern, 1996). From the former perspective, the advent and popularity of rock'n'roll can be explained by specific configurations of legal, technological, and industrial structures in the 1950s, which were accompanied by a social protest movement in the 1960s and 1970s. From the latter perspective, music's popularity is primarily a function of large-scale patterns of conspicuous consumption and its symbolic properties, particularly its capacity to indicate social class and status. More recent research highlights music's aesthetic and structural properties as predictors of music preferences and consumer choice. Nevertheless, the focus has been on subjective, discursive, and interpretative processes (Bennett, 2008; DeWall et al., 2011; Martin, 1995; Pettijohn & Sacco, 2009a, 2009b; Sal-

ganik, Dodds, & Watts, 2006; Zullow, 1991), rather than on popular music's musical properties.

For example, Pettijohn and Sacco (2009a, 2009b) documented changes between 1955 and 2003 in the lyrics of popular music and the appearance of the recording artists. Their goal was to examine how these variables changed with prevailing social and economic conditions, which were calculated as a single continuous variable derived from unemployment rates, cost of living, and disposable income, as well as birth, death, marriage, divorce, suicide, and homicide rates. Text-analysis software and correlational analyses revealed that lyrical sentences were longer (i.e., with more words) during more difficult economic times, and that there were more references to the future and to sports; a greater use of second-person pronouns; increased mention of social processes and people in general; but fewer exclamation marks and a reduction in the use of terms relating to physical state (Pettijohn & Sacco, 2009a).

Analyses of photographs of the recording artists revealed that during hard times, performers' faces tended to have "more mature facial features, including smaller eyes, thinner faces, and larger chins" (Pettijohn & Sacco, 2009b, p. 155). When contemporary listeners were asked to provide subjective evaluations of the recordings many years after most of them were on the charts, songs that were popular during hard times were deemed to be more meaningful, comforting, and romantic (Pettijohn & Sacco, 2009b). These associations disappeared, however, when participants examined the printed lyrics rather than listening to the recordings (Pettijohn & Sacco, 2009a), which raises doubts about the actual importance of the lyrics while highlighting the contribution of musical factors. Unfortunately, only two musical characteristics were analyzed: tempo and duration. Popular recordings tended to become longer in duration and slower in tempo as social and economic conditions became more difficult (Pettijohn & Sacco, 2009b). Because decreasing the tempo of a song will automatically increase its duration, it is impossible to determine from the authors' analyses whether these changes were completely redundant, or whether they point to increases in the complexity of popular recordings during hard times (i.e., increases in duration that are independent of tempo decreases).

In a separate examination of popular recordings from 1955 to 1989, pessimistic language was a predictor of reductions in Gross National Product 2 years later, a link that was mediated by worries about the economy and reductions in consumer spending (Zullow, 1991). Another study reported systematic changes in the use of linguistic markers of psychological traits and emotions in popular music between 1980 and 2007, again using text-analysis software (DeWall et al., 2011). The results revealed an increase in the use of first-person singular pronouns over time but a decrease in first-person plural pronouns, which points to a general increase in self-focus and narcissism. Terms relating to social interactions or positive emotions also became less frequent over time, but the use of angry and antisocial words increased.

To the best of our knowledge, the only study that focused previously on configurations of tempo and mode examined classical rather than popular music. Post and Huron (2009) documented typical configurations for music from different historical periods. They found that in the Baroque (1600–1750) and Classical (1750–1820) eras, slow music tended to be written in minor mode, although the reverse was true in the Romantic (1820–1900)

era. Performers also tended to play classical pieces at a slower tempo if they were written in minor rather than major mode.

Systematic changes over time in the characteristics of cultural artifacts extend to other art forms such as novels, TV shows, and computerized media. In the field of comparative literature, Moretti (2005) examined changes in the number of novels written over time, shifts in narrative structure, and the emergence of niche genres (e.g., nautical tales, mysteries, science fiction), relating each change to concurrent social and cultural events (e.g., wars, politics, censorship). Similarly, Johnson (2005) analyzed structural changes over time in visual and computerized media (e.g., TV shows, video games), suggesting that increasingly complex cultural artifacts help to explain the so-called Flynn Effect (i.e., consistently rising IQ). These observations of increasing complexity over time in nonmusical cultural artifacts provided additional motivation to test our hypotheses about music.

To summarize, we hypothesized that popular music has, in general, become sadder-sounding over time, with an increasing use of minor mode and slower tempo. At a cultural level, this shift would point to increases in liking (i.e., positive evaluations) on the part of consumers for music that expresses negative (e.g., sad, ominous, dour, serious) affect. We also hypothesized that there would be, in general, an increase in the use of mixed emotional cues in popular music over time. Both hypotheses posited an increase in emotional ambiguity or complexity over time, either in terms of positive affective responding to music that portrays negative emotions, or in the appreciation of music with mixed emotional cues. As noted although many factors other than tempo and mode contribute to a piece of music's emotional status, on average fast-tempo and major-mode recordings sound happy, slow and minor recordings sound sad, and fast and minor or slow and major recordings sound simultaneously happy and sad (Hunter et al., 2008, 2010; Ladinig & Schellenberg, 2012). Our focus was on large-scale configurations of these structural properties of popular music and how they changed over five decades.

Method

Sample

We operationally defined the popularity of music as its market success, which can be represented by a song's position in sales and airplay charts. To analyze musical characteristics over five decades using a single source, we chose Billboard magazine's year-end "Hot 100" charts as our indicator of popularity, as in previous research (DeWall et al., 2011; Pettijohn & Sacco, 2009a, 2009b; Zullo, 1991). The year-end charts reflect both the number of weeks a song was on the charts and its position in the weekly charts. Since 2005, Billboard charts have incorporated consideration of downloaded music and streaming in addition to airplay and hard-copy purchases. Our sample comprised the top 40 recordings for each year in 5-year blocks beginning with 1965 to 1969, with additional blocks from each of the four succeeding decades (i.e., 1975–1979, 1985–1989, 1995–1999, 2005–2009). Because some hit songs were "double-sided" but occupied a single place in the charts (e.g., *You Learn* and *You Oughta Know* by Alanis Morissette), our sample had 1,010 recordings rather than 1,000 (40 songs \times 5 years \times 5 decades). Each recording was purchased and downloaded from iTunes.

Measures

We analyzed the year each recording appeared in the charts, its duration (in seconds), the gender of the performing artist, and the recordings' tempo and mode. Duration and gender were included primarily as covariates. Some recordings had more than one version (or edit) with different durations. For example, *Light My Fire* by The Doors is approximately 7 min on the album but the single edit is less than 3 min. We opted to use the duration of the shortest edit in our analyses, which is invariably the version that is heard on the radio and released as a single. In the few instances where the duration of the United States single edit was *not* the shortest version released (e.g., the European edit was slightly shorter), we used its duration instead. The gender of the performing artist was coded as "male" in cases of a male solo performer (e.g., Elvis Presley) or an all-male band (e.g., The Rolling Stones). Because a vast majority of the artists were male, we included mixed artists (i.e., those with both men and women) in the female (i.e., nonmale) category. For example, recordings by Aretha Franklin (female solo artist), The Pretenders (female lead singer, other band members male), and The Fifth Dimension or The B-52s (mixed gender bands) were in the female category.

For each recording, tempo in beats per minute (BPM) and mode (major or minor) were documented by two musically trained assistants who were blind to the study's hypotheses and worked independently. In cases of conflicting judgments, the raters met and attempted to resolve the conflict. If they could not reach agreement, a third musically trained assistant was consulted. Because measuring tempo and mode was more complicated than determining values for the other variables, we now describe the procedures in greater detail.

Measuring tempo. Tempo refers to the underlying speed of the beat or pulse in music, which is related to the concept of *meter* (i.e., alternating strong and weak beats) but independent of *rhythm*. (Rhythm refers to the timing of events that occur in the musical surface, which distinguish, say, reggae from samba.) The assistants measured a song's tempo using two methods: once with the software *MixMeister BPM Analyzer*¹, which objectively determined BPM, and again with software that calculated BPM after the assistant tapped along for 24 beats (e.g., ItjBPM, available from the Mac App Store). The two approaches were necessary because "objective" software is designed for DJs, such that it chooses the beat-unit (quarter-note, eighth-note, etc.) that returns a value closest to 120 BPM (standard dance tempo). For example, for an obviously slow song with 60 BPM (beat = quarter note), the software would return a value of 120 BPM (beat = eighth note). To identify the beat, the assistants were instructed to pay particular attention to the snare drum (or handclaps), which typically occurs on the second and fourth beats of a bar in the most common meter (i.e., 4/4 time signature).

For songs in triple meter (3/4 or 6/8), determining the tempo was slightly more complicated. For example, Tom Jones' *What's New Pussycat?* could be classified either as a very fast song written in a 3/4 (waltz) time signature (188 BPM; more than 50% faster than a disco classic such as Thelma Houston's *Don't Leave Me This*

¹ Freely available at www.mixmeister.com/bpmanalyzer/bpmanalyzer.asp.

Way—121 BPM), or a slow-tempo song in 6/8 (62 BPM). In these cases, we opted for the *perceived* tempo based on the *tactus*, the beat that one would tap or dance to (62 BPM in the case of *Pussycat*). Of the 1,010 songs, 41 received conflicting tempo ratings (usually rated either very fast or very slow). The final tempo used in the analyses was determined by the third rater. In cases in which a recording had two different tempi, typically one for the verses and another for the choruses (e.g., Elton John's version of *Lucy in the Sky with Diamonds*), the assistants divided the total number of beats by the duration of the song.

Measuring mode. The assistants also determined a song's mode, which was defined as the mode of the tonic triad (the chord based on *do*), or the key signature if the song were notated. Although determining mode was based on the tonic (reference) key, a song in, say, C major, could actually have the majority of its harmonies in minor mode (e.g., A, D, and E minor), typically chords that belong to the underlying key. This same point could also be made, however, about the classical pieces analyzed by Post and Huron (2009), and it has no bearing on the psychological importance of the tonic chord, which is evident even among musically untrained children (Schellenberg, Bigand, Poulin-Charronnat, Garnier, & Stevens, 2005) and adults (for a review see Bigand & Poulin-Charronnat, 2006).

Mode was determined primarily by listening to the recordings, a task that is usually easy for trained musicians for the vast majority of pop songs. For example, when a trained musician listens to a recording such as The Troggs's *Wild Thing* from 1966, it is obvious within a few seconds that the first chord is the tonic, and that the tonic chord is major. Other examples in our sample that are similarly easy include Blondie's *Heart of Glass* from 1979 (major), Bobby Brown's *My Perogative* from 1989 (minor), Backstreet Boys' *Everybody (Backstreet's Back)* from 1998 (minor), and Lady Gaga's *Love Game* from 2009 (minor). In less certain cases, the raters examined musical scores when available and consulted with other judgments of mode for each song that were obtainable from the Internet. In some cases, they used a keyboard to play chords along to the music to help determine the mode. When deemed necessary, Mixshare's *Rapid Evolution 2* software was used as an additional means of analyzing a song's mode.² When parts of a song (e.g., verses) were in minor mode and other parts (e.g., choruses) were in major mode (e.g., The Turtles' *Happy Together*), or vice versa, the assistants calculated total durations for both modes and entered the value corresponding to the longer duration (i.e., minor for *Happy Together*). In rare instances in which mode could not be determined unambiguously or agreement between assistants was impossible (only nine recordings, mostly hip-hop), recordings were considered to have "indeterminate" mode and excluded from analyses that involved mode.

Results

The analyses examined associations among five variables: tempo, mode, duration, artist gender, and recording year. Each variable was either continuous (tempo, duration, and recording year) or dichotomous (mode and gender). Preliminary analyses examined pairwise associations among the two main predictor variables (tempo and mode) and the two covariates (duration and gender), with analyses involving year reported subsequently. Table 1 provides a measure of association between each pair of variables:

Table 1
Pairwise Associations Among Tempo, Mode, Duration, and Gender (Ns ≥ 997)

	Tempo	Mode	Duration
Mode	.05		
Duration	-.28***	.08**	
Gender	.00	.05	.07*

* $p < .05$. ** $p < .01$. *** $p < .0001$.

Pearson's r (tempo and duration), a point-biserial correlation (r_{pb} ; tempo and mode, tempo and gender, duration and mode, duration and gender), or ϕ (mode and gender). For each measure, values can range from 0 (*no association*) to 1 (*perfect association*). The sign (positive or negative) was meaningful only for tempo and duration, which proved to have the strongest (negative) association. Longer recordings tended to have slower tempi. To illustrate, an increase in duration of 10 s was on average accompanied by a decrease in tempo of 1.7 BPM. Weaker but significant associations were evident between mode and duration and between gender and duration. On average, recordings in minor mode were longer than recordings in major mode by 8.2 s, whereas recordings by female artists were longer than recordings by male artists by 6.5 s.

The next set of analyses examined simple associations between recording year and each of the predictor variables. Descriptive statistics are provided in Table 2, grouped by decade for ease of interpretation. To make the statistical analyses comparable across measures and similar to those reported above, we again calculated measures of effect size. Although some of the associations were small in magnitude, each was significant because of our large sample. In line with our principal hypotheses, recordings of popular music tended to become slower over time, $r = -.24$, $N = 1,010$, $p < .0001$, and more likely to be in minor mode, $r_{pb} = .30$, $N = 1,001$, $p < .0001$. As shown in Table 2, in the 1960s the average tempo was 116.4 BPM ($SD = 26.2$) and 85.0% of hit recordings were in major mode, whereas in the first decade of the 21st century, the average tempo was 99.9 BPM ($SD = 24.6$) and fewer than half of the recordings (42.5%) were in major mode. Although the negative linear association between tempo and recording year was significant, the mean tempo was actually slowest in the 1990s.

There was also a positive association between year of recording and duration, $r = .40$, $N = 1,010$, $p < .0001$, which confirmed that pop songs became longer over time, increasing in duration by 1.3 s per year on average. In fact, average duration increased from less than 3 min (176.9 s; $SD = 39.1$) in 1965–1969 to almost 4 min (230.7 s; $SD = 25.5$) in 2005–2009. Nevertheless, as shown in Table 2, duration actually peaked in the 1980s and the linear effect was driven by short-duration recordings from the 1960s. Finally, the likelihood of the recording artist being female increased over time, $r_{pb} = .14$, $N = 1006$, $p < .0001$. In the 1960s, 79.0% of artists were male, whereas in 2005–2009, the proportion of male artists decreased to 60.5%. In absolute terms, however, the lowest percentage of male recording artists was in the 1990s.

² Freely available at www.mixshare.com/software.html.

Table 2
Descriptive Statistics for Mode, Tempo, Duration, and Gender Listed Separately for Each Decade

Years	% Major	Mean tempo	Mean duration	% Male
1965–1969	85.0	116.4	176.9	79.0
1975–1979	75.1	103.0	225.3	66.2
1985–1989	78.0	104.2	256.8	63.0
1995–1999	62.7	89.4	248.2	55.5
2005–2009	42.5	99.9	230.7	61.7

Note. Tempo was measured in BPM. Duration was measured in seconds.

We used multiple regression to examine whether tempo, mode, duration, and gender each made unique contributions in predicting the year the pop songs were recorded (i.e., with the other predictor variables held constant). The regression model was significant, $R = .51$, $F(4, 992) = 88.66$, $p < .0001$, accounting for 26.3% of the variance in recording year. Moreover, each predictor variable made a significant unique contribution to the model. In descending order of predictive power, duration accounted uniquely for 9.5% of the variance in recording year, whereas mode, tempo, and gender accounted for 7.0, 2.5, and 1.1%, respectively, $ps \leq .0001$.

The final analysis tested the hypothesis that the trend for popular music to slow down over time would be stronger for major-mode than for minor-mode recordings. Figure 1 illustrates mean tempo separately for major-mode and minor-mode recordings for each of the 25 years in our sample. We used a General Linear Model with tempo as the outcome variable, and mode, recording year, and the interaction between mode and year as predictor variables. The interaction, which provided the test of our hypothesis, was significant, $F(1, 997) = 4.00$, $p = .0457$. Follow-up analyses examined the association between tempo and recording year separately for major-mode and minor-mode recordings. Although the association was significant in both cases (reflecting the general decrease in tempo over time), it was stronger for major-mode recordings, $r = -.30$, $N = 693$, $p < .0001$, than for minor-mode recordings, $r = -.21$, $N = 308$, $p = .0002$ (see Figure 1). Songs in major-mode decreased in tempo by 6.3 BPM on average per decade, whereas songs in minor mode decreased by 3.7 BPM.

Discussion

Our findings confirm that popular recordings became sadder-sounding and more emotionally ambiguous since the 1960s. The increasing use of minor-mode is particularly compelling because the proportion of minor songs doubled over five decades. Although the linear decrease in tempo over time was also reliable statistically, in absolute terms the slowest-tempo recordings were from the 1990s, which suggests that the trend may have leveled out or started to reverse direction. We also found that the decrease in tempo through the years was stronger for major-mode than for minor-mode recordings, which reveals both a general reduction in unambiguously happy-sounding recordings, as well as an increase in recordings with ambiguous emotional status. Thus, we now know that as the lyrics of popular music became more self-focused and negative over time (DeWall et al., 2011), the music itself became sadder-sounding and more emotionally ambiguous.

Ladinig and Schellenberg (2012) documented—at a single point in time—an association between musical sophistication and liking music that evokes mixed emotions, with musically trained listeners demonstrating higher levels of liking than their untrained counterparts. The results from the present study can be interpreted similarly but longitudinally, if we assume that consumers of popular music became “more sophisticated” since the 1960s. By more sophisticated, we mean simply that listeners became more appreciative of complexity in popular music. It seems unlikely, however, that an increase in appreciation of musical complexity would be independent of a simultaneous increase in the appreciation of complexity in TV shows or computer games (Johnson, 2005). This hypothesis could be tested in future research.

The present findings have striking parallels to the evolution of classical music from 1600 to 1900. Throughout the 17th and 18th centuries, cues to emotion based on mode and tempo tended to be consistent, with fast-tempo pieces in major mode and slow-tempo pieces in minor mode (Post & Huron, 2009), such that pieces tended to sound unambiguously happy or sad. By the 1800s and the middle of the Romantic era, tempo and mode cues were more likely to conflict, such that the emotional status of the pieces became more ambiguous. Popular music from 1965 to 2009 shows the same developmental trend over a much shorter time-scale.

It is important to acknowledge that popular music with mixed emotional cues has always existed, albeit somewhat marginalized, confined typically to specific subcultures seeking out noncommercial music that is considered more authentic and artistic than music with broader appeal (e.g., *Hong Kong Garden* by Siouxsie and the Banshees from 1978, which is fast and minor). As popular music extended to new markets (e.g., in commercials, video games, TV-shows, movies, etc.) and became more widely available, the distinction between commercial and noncommercial popular music diminished. Artistic integrity and commercial success are no longer contradictory, and art-rock bands such as Radiohead have legions of fans. In our sample, the two earliest recordings with mixed emotional cues were both 1966 hits from African American artists, one an up-tempo (120 BPM) but primarily minor Motown hit—*Reach Out (I'll be There)* by The Four Tops—and the other a classic rhythm and blues ballad in a slow tempo (65 BPM) and

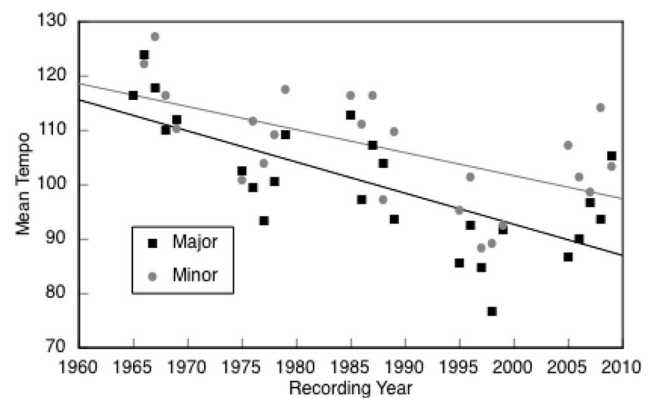


Figure 1. Changes in tempo as a function of recording year. Major-mode recordings are in black squares. Minor-mode recordings are in gray circles. Best-fitting regression lines (black/major, gray/minor) illustrate a steeper negative slope for major- than for minor-mode recordings.

major mode—*When a Man Loves a Woman* by Percy Sledge. It would be particularly interesting to determine in the future whether some subgenres of popular music led the way in the shift to emotional ambiguity, and how these shifts may be associated with other aspects of social and cultural change such as the civil rights movement.

Increased use of minor mode and slower tempo in popular music may be a rhetorical device, such that minor mode and/or slow tempo are used as a means of persuading the listener of the performers' seriousness, intelligence, and maturity, and, consequently, that the listener exhibits a similar level of sophistication. Marketing of art-rock or alternative bands (e.g., Sigur Rós, which has many slow songs in major mode) as authentic or elite may have generated additional demand for music with a more complex affective structure, which, in turn, serves as an indicator of the listener's sophistication. In line with this view, popular music from the past that is unambiguously happy-sounding (fast and major; e.g., Abba's *Waterloo*) often sounds naïve and slightly juvenile to contemporary ears. Indeed, children's music in the Western world (e.g., *Twinkle Twinkle Little Star*, *Itsy Bitsy Spider*, *The Wheels on the Bus*, *London Bridge is Falling Down*) is uniformly in major mode, whereas many well-known bands, particularly those that were popular in the 1990s (e.g., Depeche Mode, Marilyn Manson, Nine Inch Nails), rely on minor mode for the vast bulk of their repertoires.

It is unlikely that composers' use of minor mode and/or slower tempo as rhetoric is typically explicit or conscious, or that listeners' appreciation of music with mixed cues is a deliberate strategy. Nevertheless, musically untrained listeners may recognize quickly and explicitly that a contemporary fast-tempo, major-mode song (e.g., Aqua's *Barbie Girl*) has something amiss about it besides the lyrics. Although *Barbie Girl* sold millions of copies and topped the 1997 charts in North America, Europe, and Australia, it was almost universally reviled by the critics (e.g., ranked 5th in a list of Worst Songs Ever by AOL Radio in 2010) or considered to be a "guilty pleasure" (by MuchMoreMusic in 2007). In other words, a listener might like the song yet still be aware that liking it is slightly transgressive. Lady Gaga has somehow managed to transcend this association, such that her fast-tempo, major-mode recordings (e.g., *Born This Way*, *Edge of Glory*) sound fresh while recalling or quoting popular music from an earlier time.

Because popular music is an inextricable part of human culture, it is interesting to speculate about social and cultural changes that accompanied the increasing appreciation of emotionally complex music and ambivalent feelings. One possibility can be found in what social scientists have described as processes of individualization. Increasing individualization in the modern age has allowed for substantial autonomy in creating subjective identities independent of social status and class (Bauman, 2002; Giddens, 1991), such that consumer behavior has become an integral part of identity formation (Featherstone, 1997; Storey, 1999; Warde, 1994). Globalized market economies inevitably breed artistic and aesthetic diversity (Cowen, 2002), which leads consumers to seek alternatives from which they can pick and choose. Consequently, listeners increasingly demand a range of alternatives, including music that is emotionally ambivalent.

This perspective is corroborated by social and cultural theory emphasizing the ambivalence of modern societies. For example, Elias (1997) argued that increasing social differentiation has

brought about constantly changing interdependencies between people, leading to uncertainty and fragility of social relationships and, ultimately, to the "reflexive selves" that mark the ambivalence of modernity (Bauman, 1991; Giddens, 1991). In the humanities, Empson (1930) introduced "ambiguity" as a key concept at the height of modernism, whereas deconstructivists highlighted the general polysemy of written texts (Derrida, 1967). Gender studies critiqued traditional roles, subverted the binary nature of male and female identities, and evoked multiple forms of sexual self-fashioning that assumed a larger role in popular culture (Butler, 1990). More recently, scholars have related these changes to the emotional consequences of modernity (Mestrovic, 1997; Williams, 1998) and diagnosed increasing emotional self-reflexivity and self-management (Illouz, 2007; Neckel, 2009), which is consistent with the ambivalent character of popular music.

Other changes over time in popular music that we observed included songs of longer duration and with a higher proportion of female artists. Although artist gender and duration were not independent, there was still a significant partial association with recording year for both variables (i.e., with the other variable held constant, as well as mode and tempo). Because the positive association between recording year and duration remained evident when tempo (as well as mode and gender) was held constant, the increase in duration can be interpreted as another sign of increased complexity in popular music, at least as indexed by the total number of beats per song. Future research could verify that the increase in duration and total number beats is not due simply to increased repetition.

Although Pettijohn and Sacco (2009b) reported that popular recordings tended to become longer and slower during difficult social and economic times, we documented gradual long-term associations with duration and tempo that are unlikely to be the consequence of consistently increasing economic and social hardship since the 1960s. The two phenomena are nevertheless unlikely to be completely independent. Whereas the association with economic and social hardship probably reflects contributions from exogenous "shocks," our discovery of large-scale changes over time is more likely to parallel gradual changes in consciousness and attitudes toward increasing inequalities and insecurity (Conley, 2009). Increases in the duration of recordings would also be related to the increased storage capacity of compact discs and other digital formats compared to vinyl. In our sample, duration peaked in the late 1980s, shortly after the advent of the compact disc in 1982. As songs and albums of longer duration became more typical of popular music, DJs may also have become more willing to play longer songs.

Finally, the higher proportion of female artists over time is undoubtedly a consequence of advances in gender equality more broadly. One might argue that the sexual objectification of female artists remains rampant, belying the importance of a greater proportion of female artists. Nevertheless, it is clear that (1) the sexual objectification of male artists is almost equally rampant, and (2) female musicians who portray themselves as objects of desire (e.g., Lady Gaga, Madonna, Rihanna) are nonetheless powerful women who are making their own choices and fully in control of their careers.

In summary, the present findings documented the evolution of cues to emotion in music that has been popular in the United States since the 1960s. At the present time, we can only speculate about

the causes and mechanisms driving this change, and it is unlikely that a single causal explanation would suffice. Indeed, there is almost certain to be a complex interplay among the effects of social and cultural change, the emotions expressed by artists and composers through popular music, the emotional needs of purchasers and listeners, marketing strategies of the music industry, and the emergence of online social networks (e.g., *Twitter*) and streaming services that increase direct artist-to-consumer contact. Regardless, our study sheds light on links between long-term cultural change on a macrosocial scale and emotional expression, perception, and responding, at least in relation to popular music. As such, the findings improve our understanding of the individual in relation to society, and how culture is shaped by the emotional needs and preferences of individuals.

References

- Attali, J. (1985). *Noise: The political economy of music* (B. Massumi, Trans.). Minneapolis, MN: University of Minneapolis.
- Bauman, Z. (1991). *Modernity and ambivalence*. Ithaca, NY: Cornell University Press.
- Bauman, Z. (2002). *Society under siege*. Cambridge, UK: Polity Press.
- Bennett, A. (2008). Towards a cultural sociology of popular music. *Journal of Sociology*, 44, 419–432. doi:10.1177/1440783308097130
- Bigand, E., & Poulin-Charronat, B. (2006). Are we “experienced listeners”? A review of the musical capacities that do not depend on formal musical training. *Cognition*, 100, 100–130. doi:10.1016/j.cognition.2005.11.007
- Butler, J. (1990). *Gender trouble: Feminism and the subversion of identity*. New York, NY: Routledge.
- Campbell, M. (2009). *Popular music in America: The beat goes on* (3rd ed.). Boston, MA: Schirmer.
- Chan, T. W., & Goldthorpe, J. H. (2006). Social stratification and cultural consumption: Music in England. *European Sociological Review*, 23, 1–19. doi:10.1093/esr/jcl016
- Conley, D. (2009). *Elsewhere, USA: How we got from the company man, family dinners, and the affluent society to the home office, BlackBerry moms, and economic anxiety*. New York, NY: Pantheon.
- Cowen, T. (2002). *Creative destruction*. Princeton, NJ: Princeton University Press.
- DeNora, T. (2000). *Music in everyday life*. Cambridge, MA: Cambridge University Press. doi:10.1017/CBO9780511489433
- DeNora, T. (2003). *After Adorno: Rethinking music sociology*. Cambridge, MA: Cambridge University Press. doi:10.1017/CBO9780511489426
- Derrida, J. (1967). *L'écriture et la différence* [Writing and difference]. Paris: Seuil.
- DeWall, C. N., Pond, R. S. Jr., Campbell, W. K., & Twenge, J. M. (2011). Tuning in to psychological change: Linguistic markers of psychological traits and emotion over time in popular U.S. song lyrics. *Psychology of Aesthetics, Creativity, and the Arts*, 5, 200–207. doi:10.1037/a0023195
- Elias, N. (1997). *Über den Prozeß der Zivilisation, Bd. 2* [The civilizing process: Part 2]. Frankfurt/Main: Suhrkamp.
- Empson, W. (1930). *Seven types of ambiguity*. London: Chatto & Windus.
- Featherstone, M. (1987). Lifestyle and consumer culture. *Theory, Culture and Society*, 4, 55–70. doi:10.1177/026327687004001003
- Frith, S. (1987). Towards an aesthetic of popular music. In R. Leppert & S. McClary (Eds.), *Music and society: The politics of composition, performance and reception* (pp. 133–149). New York, NY: Cambridge University Press.
- Frith, S. (2004). *Popular music: Critical concepts in media and cultural studies*. London: Routledge.
- Gabrielsson, A., & Lindström, E. (2001). The influence of musical structure on emotional expression. In P. N. Juslin & J. A. Sloboda (Eds.), *Music and emotion: Theory and research* (pp. 223–248). Oxford, United Kingdom: Oxford University Press.
- Giddens, A. (1991). *Modernity and self-identity*. Cambridge, MA: Polity Press.
- Hargreaves, D. J., & North, A. C. (1999). The functions of music in everyday life: Redefining the social in music psychology. *Psychology of Music*, 27, 71–83. doi:10.1177/0305735699271007
- Harrington, C. L., & Bielby, D. D. (2000). Constructing the popular: Cultural production and consumption. In C. L. Harrington & D. D. Bielby (Eds.), *Popular culture: Production and consumption* (pp. 1–17). Malden, MA: Blackwell.
- Hesmondhalgh, D. (2008). Towards a critical understanding of music, emotion and self-identity. *Consumption, Markets and Culture*, 11, 329–343. doi:10.1080/10253860802391334
- Hunter, P. G., Schellenberg, E. G., & Schimmack, U. (2008). Mixed affective responses to music with conflicting cues. *Cognition and Emotion*, 22, 327–352. doi:10.1080/02699930701438145
- Hunter, P. G., Schellenberg, E. G., & Schimmack, U. (2010). Feelings and perceptions of happiness and sadness induced by music: Similarities, differences, and mixed emotions. *Psychology of Aesthetics, Creativity, and the Arts*, 4, 47–56. doi:10.1037/a0016873
- Hunter, P. G., & Schellenberg, E. G. (2010). Music and emotion. In M. R. Jones, R. R. Fay, & A. N. Popper (Eds.), *Music perception* (pp. 129–164). New York, NY: Springer. doi:10.1007/978-1-4419-6114-3_5
- Husain, G., Thompson, W. F., & Schellenberg, E. G. (2002). Effects of musical tempo and mode on arousal, mood, and spatial abilities. *Music Perception*, 20, 151–171. doi:10.1525/mp.2002.20.2.151
- Illouz, E. (2007). *Cold intimacies: The making of emotional capitalism*. London: Polity.
- Johnson, S. (2005). *Everything bad is good for you: How today's popular culture is actually making us smarter*. New York, NY: Riverhead.
- Juslin, P. N., & Västfjäll, D. (2008). Emotional responses to music: The need to consider underlying mechanisms. *Behavioral and Brain Sciences*, 31, 559–575.
- Knobloch, S., & Zillmann, D. (2002). Mood management via the digital jukebox. *Journal of Communication*, 52, 351–366. doi:10.1111/j.1460-2466.2002.tb02549.x
- Ladinig, O., & Schellenberg, E. G. (2012). Liking unfamiliar music: Effects of felt emotion and individual differences. *Psychology of Aesthetics, Creativity, and the Arts*. doi:10.1037/a0024671
- Lonsdale, A. J., & North, A. C. (2011). Why do we listen to music? A uses and gratifications analysis. *British Journal of Psychology*, 102, 108–134. doi:10.1348/000712610X506831
- Martin, P. J. (1995). *Sounds and society: Themes in the sociology of music*. Manchester, United Kingdom: Manchester University Press.
- Mestrovic, S. (1997). *Postemotional society*. London: Sage.
- Moretti, F. (2005). *Graphs, maps, trees: Abstract models for a literary history*. London: Verso.
- Neckel, S. (2009). Emotion by design: Self-management of feelings as a cultural program. In B. Röttger-Rössler & H. J. Markowitsch (Eds.), *Emotions as bio-cultural processes* (pp. 181–198). New York, NY: Springer. doi:10.1007/978-0-387-09546-2_9
- Peterson, R. A., & Anand, N. (2004). The production of culture perspective. *Annual Review of Sociology*, 30, 311–334. doi:10.1146/annurev.soc.30.012703.110557
- Peterson, R. A., & Kern, R. M. (1996). Changing highbrow taste: From snob to omnivore. *American Sociological Review*, 61, 900–907. doi:10.2307/2096460
- Pettijohn, T. F. II, & Sacco, D. F. Jr. (2009a). The language of lyrics: An analysis of popular Billboard songs across conditions of social and economic threat. *Journal of Language and Social Psychology*, 28, 297–311. doi:10.1177/0261927X09335259
- Pettijohn, T. F. II, & Sacco, D. F. Jr. (2009b). Tough times, meaningful music, mature performers: Popular Billboard songs and performed pref-

- erences across social and economic condition in the USA. *Psychology of Music*, 37, 155–179. doi:10.1177/0305735608094512
- Post, O., & Huron, D. (2009). Western classical music in the minor mode is slower (except in the Romantic period). *Empirical Musicology Review*, 4, 2–10.
- Salganik, M. J., Dodds, P. S., & Watts, D. J. (2006). Experimental study of inequality and unpredictability in an artificial cultural market. *Science*, 311, 854–856. doi:10.1126/science.1121066
- Schellenberg, E. G., Bigand, E., Poulin-Charronnat, B., Garnier, C., & Stevens, C. (2005). Children's implicit knowledge of harmony in Western music. *Developmental Science*, 8, 551–566. doi:10.1111/j.1467-7687.2005.00447.x
- Schellenberg, E. G., Peretz, I., & Vicillard, S. (2008). Liking for happy and sad sounding music: Effects of exposure. *Cognition and Emotion*, 22, 218–237. doi:10.1080/02699930701350753
- Scherer, K. R. (2004). Which emotions can be induced by music? What are the underlying mechanisms? And how can we measure them? *Journal of New Music Research*, 33, 239–251. doi:10.1080/0929821042000317822
- Sloboda, J. A. (1992). Empirical studies of emotional response to music. In M. R. Jones & S. Holleran (Eds.), *Cognitive bases of musical communication* (pp. 33–46). Washington, DC: American Psychological Association. doi:10.1037/10104-003
- Storey, J. (1999). *Cultural consumption and everyday life*. London: Arnold.
- Szpunar, K. K., Schellenberg, E. G., & Pliner, P. (2004). Liking and memory for musical stimuli as a function of exposure. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 30, 370–381. doi:10.1037/0278-7393.30.2.370
- Thompson, W. F., Schellenberg, E. G., & Husain, G. (2001). Arousal, mood, and the Mozart effect. *Psychological Science*, 12, 248–251. doi:10.1111/1467-9280.00345
- Thompson, W. F. (2009). *Music, thought, and feeling: Understanding the psychology of music*. Oxford: Oxford University Press.
- Vandekerckhove, M., von Scheve, C., Ismer, S., Jung, S., & Kronast, S. (2008). Regulating emotions: Culture, social necessity and biological inheritance. In M. Vandekerckhove, C. von Scheve, S. Ismer, S. Jung, & Kronast, S. (Eds.), *Regulating emotions: Culture, social necessity and biological inheritance* (pp. 1–12). Malden, MA: Wiley-Blackwell.
- Vuoskoski, J. K., Thompson, W. F., McIlwain, D., & Eerola, T. (2012). Who enjoys listening to sad music and why? *Music Perception*, 29, 311–317. doi:10.1525/mp.2012.29.3.311
- Warde, A. (1994). Consumption, identity-formation and uncertainty. *Sociology*, 28, 877–898. doi:10.1177/0038038594028004005
- Williams, S. (1998). Modernity and the emotions: Corporeal reflections on the (ir)rational. *Sociology*, 32, 747–769. doi:10.1177/0038038598032004007
- Zentner, M., Grandjean, D., & Scherer, K. R. (2008). Emotions evoked by the sound of music: Characterization, classification, and measurement. *Emotion*, 8, 494–521. doi:10.1037/1528-3542.8.4.494
- Zullo, H. M. (1991). Pessimistic rumination in popular songs and news-magazines predict economic recession via decreased consumer optimism and spending. *Journal of Economic Psychology*, 12, 501–526. doi:10.1016/0167-4870(91)90029-S

Received January 12, 2012

Revision received March 2, 2012

Accepted March 5, 2012 ■

ORDER FORM

Start my 2012 subscription to *Psychology of Aesthetics, Creativity, and the Arts* ISSN:1931-3896

___ \$65.00	APA MEMBER/AFFILIATE	_____
___ \$105.00	INDIVIDUAL NONMEMBER	_____
___ \$448.00	INSTITUTION	_____
	<i>In DC and MD add 6% sales tax</i>	_____
	TOTAL AMOUNT DUE	\$ _____

Subscription orders must be prepaid. Subscriptions are on a calendar year basis only. Allow 4-6 weeks for delivery of the first issue. Call for international subscription rates.



AMERICAN
PSYCHOLOGICAL
ASSOCIATION

SEND THIS ORDER FORM TO

American Psychological Association
Subscriptions
750 First Street, NE
Washington, DC 20002-4242

Call **800-374-2721** or 202-336-5600
Fax **202-336-5568** :TDD/TTY **202-336-6123**
For subscription information,
e-mail: subscriptions@apa.org

Check enclosed (make payable to APA)

Charge my: Visa MasterCard American Express

Cardholder Name _____

Card No. _____ Exp. Date _____

Signature (Required for Charge)

Billing Address

Street _____

City _____ State _____ Zip _____

Daytime Phone _____

E-mail _____

Mail To

Name _____

Address _____

City _____ State _____ Zip _____

APA Member # _____

ACAA12