The Do Re Mi's of Everyday Life: The Structure and Personality Correlates of Music Preferences

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The present research examined individual differences in music preferences. A series of 6 studies investigated lay beliefs about music, the structure underlying music preferences, and the links between music preferences and personality. The data indicated that people consider music an important aspect of their lives and listening to music an activity they engaged in frequently. Using multiple samples, methods, and geographic regions, analyses of the music preferences of over 3,500 individuals converged to reveal 4 music-preference dimensions: Reflective and Complex, Intense and Rebellious, Upbeat and Conventional, and Energetic and Rhythmic. Preferences for these music dimensions were related to a wide array of personality dimensions (e.g., Openness), self-views (e.g., political orientation), and cognitive abilities (e.g., verbal IQ).

At this very moment, in homes, offices, cars, restaurants, and clubs around the world, people are listening to music. Despite its prevalence in everyday life, however, the sound of music has remained mute within social and personality psychology. Indeed, of the nearly 11,000 articles published between 1965 and 2002 in the leading social and personality journals, *music* was listed as an index term (or subject heading) in only seven articles. The eminent personality psychologist Raymond Cattell even remarked on the bewildering absence of research on music, "So powerful is the effect of music . . . that one is surprised to find in the history of psychology and psychotherapy so little experimental, or even speculative, reference to the use of music" (Cattell & Saunders, 1954, p. 3).

Although a growing body of research has identified links between music and social behavior (Hargreaves & North, 1997; North, Hargreaves, & McKendrick, 1997, 2000), the bulk of studies have been performed by a relatively small cadre of music educators and music psychologists. We believe that an activity that consumes so much time and resources and that is a key component of so many social situations warrants the attention of mainstream social and personality psychologists. In the present article we begin to redress the historical neglect of music by exploring the landscape of music preferences. The fundamental question guiding our research program is, Why do people listen to music? Although the answer to this question is undoubtedly complex and beyond the scope of a single article, we attempt to shed some light on the issue by examining music preferences. In this research we take the first crucial steps to developing a theory of music preferences—a theory that will ultimately explain when, where, how, and why people listen to music.

Why Study Music Preferences?

Recently, a number of criticisms have been raised about the lack of attention to real-world behavior within social and personality psychology (e.g., Funder, 2001; Hogan, 1998; Mehl & Pennebaker, 2003; Rozin, 2001). For example, Funder (2001) noted that although there is a wealth of information regarding the structure of personality, "the catalog of basic facts concerning the relationships between personality and behavior remains thin" (p. 212). According to Funder, one way researchers can address this issue is to extend their research on the structural components of personality to include behavior that occurs in everyday life. Still others have criticized the field for focusing on a narrow subset of social phenomena and ignoring many basic, pervasive social activities. Rozin (2001) opined, "Psychologists should learn . . . to keep their eyes on the big social phenomena, and to situate what they study in the flow of social life" (p. 12). In short, there is a growing concern that the breadth of topics studied by many research psychologists is too narrow and excludes many important facets of everyday life that are worthy of scientific attention. Music is one such facet.

Music is a ubiquitous social phenomenon. It is at the center of many social activities, such as concerts, where people congregate

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Preparation of this article was supported by National Institute of Mental Health Grant MH64527-01A1. We are grateful to Matthias Mehl, Sanjay Srivastava, and Simine Vazire for their helpful comments on this research; Patrick Randall and Sanjay Srivastava for their statistical advice; Sarah Glenney for her assistance with Study 1; and Paradise Kaikhany, Mathew Knapek, Jennifer Malaspina, Yvette Martinez, Scott Meyerott, Ying Jun Puk, Stacie Scruggs, and Jennifer Weathers for their assistance with the data collection in Studies 4 and 5.

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Journal of Personality and Social Psychology, 2003, Vol. 84, No. 6, 1236–1256

0022-3514/03/$12.00 DOI: 10.1037/0022-3514.84.6.1236

to listen to music and talk about it. Even in social gatherings where music is not the primary focus, it is an essential component—imagine, for instance, a party or wedding without music.

Music can also satisfy a number of needs beyond the social context. Just as individuals shape their social and physical environments to reinforce their dispositions and self-views (Buss, 1987; Gosling, Ko, Mannarelli, & Morris, 2002; Snyder & Ickes, 1985; Swann, 1987; Swann, Rentfrow, & Guinn, 2002), the music they select can serve a similar function. For instance, an individual high in Openness to New Experiences may prefer styles of music that reinforce his or her view of being artistic and sophisticated. Furthermore, individuals may seek out particular styles of music to regulate their emotional states; for example, depressed individuals may choose styles of music that sustain their melancholic mood. Although the myriad psychological and social processes influencing people's music preferences are undoubtedly complex, it is reasonable to suppose that examining the ties between basic personality traits and music preferences could shed some light on why people listen to music.

The present research is designed to extend theory and research into people's everyday lives by examining individual differences in music preferences. By exploring the structure of music preferences and its links to personality, self-views, and cognitive ability, we begin to lay the foundations on which a broad theory of music preferences can be built.

What Do We Already Know About Music Preferences?

Although music has enjoyed considerable attention in cognitive psychology (e.g., Bharucha & Mencl, 1996; Chaffin & Imreh, 2002; Deutsch, 1999; Drayna, Manichaikul, de Lange, Sneider, & Spector, 2001; Krumhansl, 1990, 2000, 2002; Radocy & Boyle, 1979; Sloboda, 1985), biological psychology (e.g., Oyama et al., 1983; Rider, Floyd, & Kirkpatrick, 1985; Standley, 1992; Todd 1999), clinical psychology (Chey & Holzman, 1997; Diamond, 2002; Dorow, 1975; Hilliard, 2001; Wigram, Saperston, & West, 1995), and neuroscience (e.g., Besson, Faita, Peretz, Bonnel, & Requin, 1998; Blood & Zatorre, 2001; Blood, Zatorre, Bermudez, & Evans, 1999; Clynes, 1982; Marin & Perry, 1999; Peretz, Gagnon, & Bouchard, 1998; Peretz & Hebert, 2000; Rauschecker, 2001), very little is known about why people like the music they do.

Clearly, individuals display stronger preferences for some types of music than for others. But what determines a person's music preferences? Are there certain individual differences linking people to certain styles of music? The few studies that have examined music preferences suggest some links to personality (Arnett, 1992; Cattell & Anderson, 1953b; Cattell & Saunders, 1954; Little & Zuckerman, 1986; McCown, Keiser, Mulhearn, & Williamson, 1997), physiological arousal (Gowensmith & Bloom, 1997; McNamara & Ballard, 1999; Oyama et al., 1983; Rider et al., 1985), and social identity (Crozier, 1998; North & Hargreaves, 1999; North, Hargreaves, & O'Neill, 2000; Tarrant, North, & Hargreaves, 2000).

Personality

Cattell was among the first to theorize about how music could contribute to understanding personality. He believed that preferences for certain types of music reveal important information about unconscious aspects of personality that is overlooked by most personality inventories (Cattell & Anderson, 1953a, 1953b; Cattell & Saunders, 1954; Kemp, 1996). Accordingly, Cattell and Anderson (1953a) created the I.P.A.T. Music Preference Test, a personality inventory comprising 120 classical and jazz music excerpts in which respondents indicate how much they like each musical item. Using factor analysis, Cattell and Saunders (1954) identified 12 music-preference factors and interpreted each one as an unconscious reflection of specific personality characteristics (e.g., surgency, warmth, conservatism). Whereas Cattell believed that music preferences provide a window into the unconscious, most researchers have regarded music preferences as a manifestation of more explicit personality traits. For example, sensation seeking appears to be positively related to preferences for rock, heavy metal, and punk music and negatively related to preferences for sound tracks and religious music (Little & Zuckerman, 1986). In addition, Extraversion and Psychoticism have been shown to predict preferences for music with exaggerated bass, such as rap and dance music (McCown et al., 1997).

Physiological Arousal

Another line of research revealing links between music preferences and personality has focused on the physiological correlates of music preferences. For example, heavy metal fans tend to experience higher resting arousal than country music fans. Furthermore, listening to heavy metal music has been shown to increase the arousal level of heavy metal fans beyond that of country music fans (Gowensmith & Bloom, 1997). Similarly, preference for highly arousing music (e.g., heavy metal, rock, alternative, rap, and dance) appears to be positively related to resting arousal, sensation seeking, and antisocial personality (McNamara & Ballard, 1999).

Social Identity

Additional evidence linking music preferences and personality comes from research on social identity. For example, North and Hargreaves (1999) found that people use music as a "badge" to communicate their values, attitudes, and self-views. More specifically, they examined the characteristics of the prototypical rap and pop music fan. Participants' music preferences were related, in part, to the degree to which their self-views correlated with the characteristics of the prototypical music fan. This relationship, however, was moderated by participants' self-esteem, such that individuals with higher self-esteem perceived more similarity between themselves and the prototype than did individuals with low self-esteem. Similar findings in different populations, age groups, and cultures provide additional support for the notion that people's self-views and self-esteem influence music preferences (North, Hargreaves, & O'Neill, 2000; Tarrant et al., 2000).

Although the results from these studies provide intriguing glimpses into relationships between music preferences and personality, taken together they offer an incomplete picture. For instance, most of the studies examined only a limited selection of music genres: Cattell and Saunders (1954) examined preferences for classical and jazz music, Gowensmith and Bloom (1997) examined preferences for heavy metal and country music, and North and

Hargreaves (1999) examined preferences for pop and rap music. Moreover, most of the studies examined only a few personality dimensions: Little and Zuckerman (1986) examined sensation seeking, McCown et al. (1997) examined Extraversion and Psychoticism, and McNamara and Ballard (1999) examined antisocial personality. A theory of music preferences needs to be based on a more comprehensive exploration of the music and personality domains. Thus, we build on the provocative findings provided by this important early work with a series of studies using a broad and systematic selection of music genres and personality dimensions.

Overview of Studies

Given the paucity of research on music preferences, we sought to explore the structure of music preferences and to examine its relationship to personality. The questions guiding this research were as follows: How much importance do people give to music? What are the basic dimensions of music preferences? How can they be characterized? How do they relate to existing dimensions of personality?

In Study 1 we examined lay beliefs about the relevance and importance of music in people's everyday lives. Adopting a factor-analytic approach, in Studies 2–4 we examined the basic structure of music preferences. In Study 5 we examined the psychological attributes of different styles of music. In Study 6, we examined the relationship between music preferences and personality, self-views, and cognitive ability.

Study 1: Lay Beliefs About the Importance of Music

It seemed self-evident to us that music is an important part of individuals' lives, but before embarking on this program of research, we wanted to determine whether our beliefs were empirically grounded. Thus, the purpose of this study was simply to develop a general understanding of lay beliefs about the role of music in everyday life. How important is music to people? Is music more or less important than other leisure activities? Do individuals believe that their music preferences reveal information about their personality? What are the contexts in which individuals typically listen to music? To examine these issues, we administered a questionnaire that would provide some preliminary answers.

Method

Participants. The sample was made up of 74 University of Texas at Austin undergraduates who volunteered in exchange for partial fulfillment of an introductory psychology course requirement during the spring semester of 2001. The sample included 30 (40.5%) women and 44 (59.5%) men, 2 (2.7%) African Americans, 7 (9.5%) Asians, 5 (6.8%) Hispanics, 49 (66.2%) Whites, and 11 (14.8%) individuals of other ethnicities. The average age of participants was 18.9 years ($SD = 2.3$).

Procedure. On arrival, participants were introduced to a study of lifestyle and leisure preferences. They were then asked to complete a packet of questionnaires that were designed to assess their attitudes and beliefs about various lifestyle and leisure activities. Our first question dealt with the importance individuals give to various lifestyle and leisure activities. Participants were presented with a list of eight different activities and were asked to indicate how personally important each domain was to them using a scale ranging from 0 (*Strongly disagree*) to 100 (*Strongly agree*; e.g., "Music is very important to me"). The next question was about participants' beliefs about how much their lifestyle and leisure activities say about their self-views, using a scale ranging from 0 (*Strongly disagree*) to 100 (*Strongly agree*; e.g., "My movie preferences say a lot about who I am"); their personalities, using a scale ranging from 1 (*Strongly disagree*) to 7 (*Strongly agree*; e.g., "My television preferences reveal a great deal about my personality"); and other people's personalities, using a scale ranging from 1 (*Strongly disagree*) to 7 (*Strongly agree*; e.g., "People's television preferences reveal a great deal about their personality"). Finally, using a scale ranging from 1 (*Never*) to 7 (*All the time*), participants were asked to indicate the frequency with which they engaged in various activities while in nine different contexts (alone at home, going to sleep, hanging out with friends, driving, getting up in the morning, studying, working, exercising, and getting ready to "go out"; e.g., "How often do you read books or magazines while at home?").[1]

Results and Discussion

How much importance do individuals place on music? As shown in Figure 1, along with hobbies ($M = 82.0$, $SD = 19.3$), music ($M = 78.1$, $SD = 23.6$) was considered the most important of the domains we examined; the difference between music and hobbies was not significant, $t(69) = 1.12$, *ns*. Furthermore, music was considered significantly more important than the next item, food preferences, $t(69) = 3.56$, $p < .001$. Overall, participants' music preferences were at least as important as or more important than the other seven domains, supporting our belief that music is an important part of people's lives.

How much do people believe music preferences say about themselves? As shown in Figure 2, along with hobbies ($M = 76.5$, $SD = 23.4$) and bedrooms ($M = 63.4$, $SD = 31.8$), music preferences ($M = 69.4$, $SD = 25.7$) were believed to reveal a considerable amount of information about participants' personal qualities; the differences between music and hobbies and music and bedrooms were not significant (ts < 1.91, ps $> .06$). Overall, participants believed that their music preferences revealed as much if not more information about themselves than the other domains.

How much do people believe music preferences reveal about their own and others' personalities? As shown in Figure 3, participants considered hobbies to reveal as much about their own personalities as music (Ms $= 5.51, 5.26$; SDs $= 1.54, 1.78$), $t(71) = .91$, *ns*, yet music was believed to reveal significantly more than the next highest activity, movie preferences ($M = 4.54$, $SD = 1.78$), $t(71) = 2.66$, $p < .01$.

Furthermore, music preferences ($M = 5.89$, $SD = 1.61$) were second only to hobbies ($M = 5.89$, $SD = 1.15$) in terms of what participants believed they revealed about others' personalities, $t(71) = 2.58$, $p < .025$. In addition, music was believed to provide significantly more information about others than book and magazine preferences ($M = 4.74$, $SD = 1.75$), $t(71) = 2.54$, $p < .025$. Thus, participants believed that music preferences reveal at least as

[1] Participants were not asked how often they engaged in all of the activities in all the situations because it did not always make sense to do so. For example, it did not seem appropriate to ask participants how often they read books while driving because reading is probably an uncommon activity in this situation.

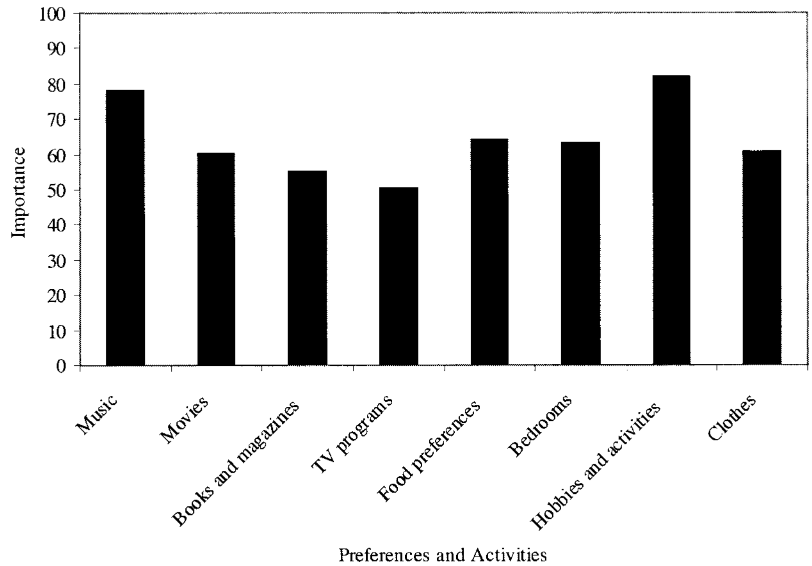

Figure 1. Lay beliefs about the importance of various preferences and activities.

much about their personalities and the personalities of others as the other lifestyle and leisure domains (with the exception of hobbies).

In which contexts do individuals listen to music? The results shown in Figure 4 indicate that participants reported listening to music frequently in every situation listed ($M = 5.19$, $SD = .93$). In general, music is listened to most often while driving, alone at home, exercising, and hanging out with friends. In addition, the results indicated that participants listened to music more often than any of the other activities (i.e., watching television, reading books, and watching movies) across all the situations (ts > 3.3, ps $< .001$) except while going to sleep, in which case watching television was as common as listening to music, $t(72) = 1.5$, *ns*. These findings provide further support for the pervasiveness of music in people's everyday lives.

Summary

We sought information concerning lay beliefs about music. The results strongly support the notion that music is important to people and that individuals believe that the music people listen to provides information about who they are. Moreover, the fact that our participants reported listening to music more often than any other activity across a wide variety of contexts confirms that music plays an integral role in people's everyday lives. In general, these

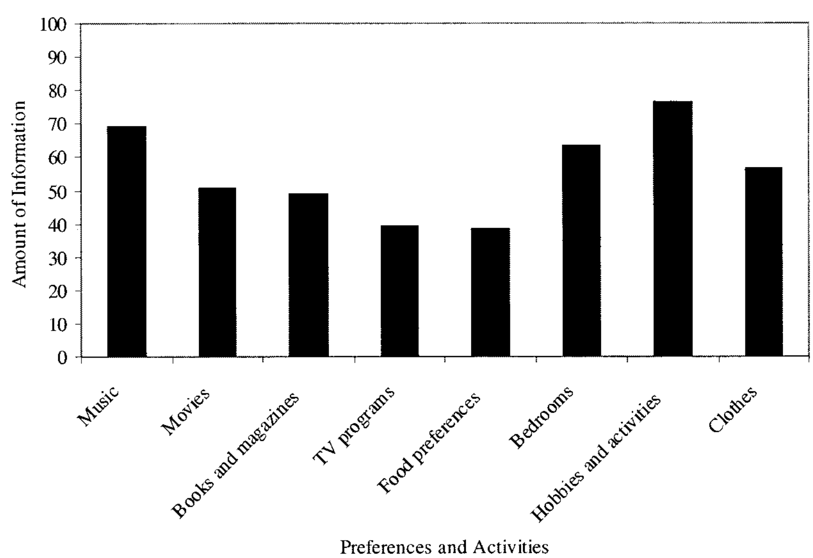

Figure 2. Lay beliefs about the amount of information various preferences and activities reveal about personal qualities.

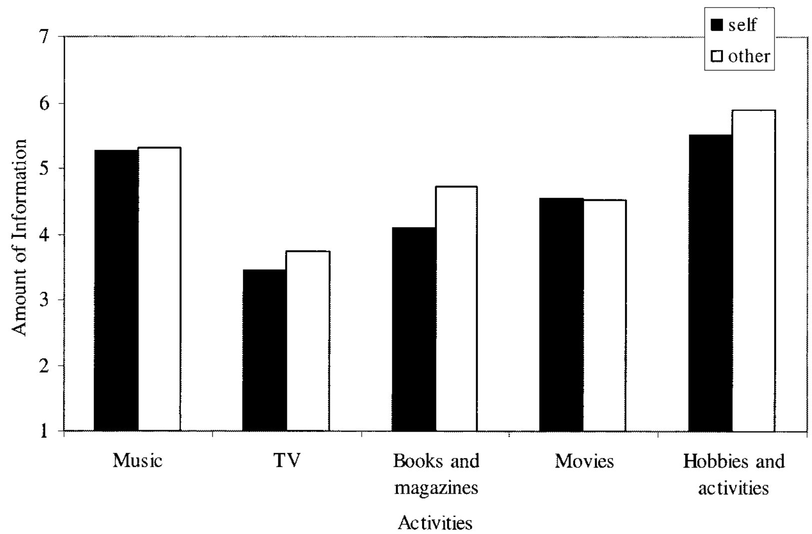

Figure 3. Lay beliefs about the amount of information various preferences and activities reveal about the personality of oneself and others.

findings reinforce the importance of music as an everyday social phenomenon and offer further justification for including music on the research agenda for mainstream social and personality psychology.

Mapping the Terrain of Music Preferences: A Factor-Analytic Approach

The results of Study 1 indicate that people consider music to be as important as other lifestyle and leisure activities. Having confirmed the importance of music in everyday life, the next step was to identify the structure of music preferences. Three independent studies were designed to identify the dimensions of music preferences and examine their generalizability across samples and methods. Study 2 was an exploratory analysis of music preferences. Studies 3 and 4 served as confirmatory studies to test the generalizability of the music-preference dimensions across time, samples, and methods.

Measuring Music Preferences

What is the most sensible unit of analysis for studying music preferences? There are a variety of ways in which music preferences can be assessed. For example, individuals could report their

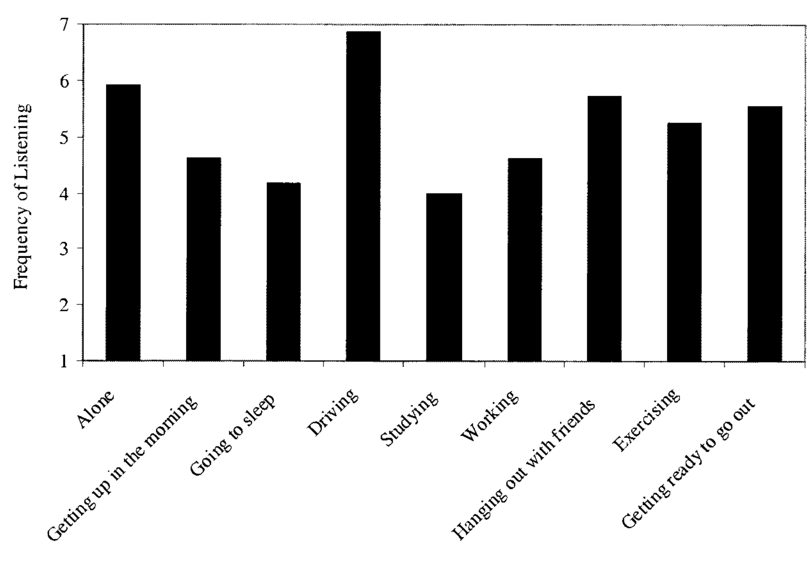

Figure 4. Self-reported frequency of listening to music in different situations.

degree of liking for specific songs (e.g., "Born Blind"), bands or artists (e.g., Sonny Boy Williamson), subgenres (e.g., harmonica blues), genres (e.g., blues), or general music attributes (e.g., relaxed). Thus, music preferences could be measured at different levels of abstraction, ranging from a highly descriptive subordinate level to a very broad superordinate level (John, Hampson, & Goldberg, 1991; Murphy, 1982).

What is the optimal level of abstraction with which to categorize music? The focus of this research is on ordinary, everyday music preferences, so our goal was to assess music preferences at the level that naturally arises when people think about and express their music preferences. When people discuss their music preferences they tend to do so first at the level of genres and to a lesser extent subgenres and only later step up to broader terms (e.g., loud) or down to specific artists (e.g., Van Halen) or songs (e.g., "Running with the Devil"; Jellison & Flowers, 1991). Thus, the genre and subgenre categories were the optimal levels at which to start our investigations of music preferences.

We used a multistep process to determine which genres and subgenres to include in our measure of preferences. First, we created a preliminary pool of music-preferences categories comprising music genres and subgenres. Specifically, we used a free-association type task in which a panel of five judges was asked to list all the music genres and subgenres that came to mind. Second, to ensure that a variety of different styles of music were included, we consulted with online music stores (e.g., towerrecords.com, barnesandnoble.com) to identify additional genres and subgenres to supplement the initial pool. This procedure generated a total of 80 music genres and subgenres that varied in specificity. Next, we presented these 14 genres and 66 subgenres to a group of 30 participants and asked them to indicate their preference for the music categories using a 1 (*Not at all*) to 7 (*A great deal*) rating scale. Participants were instructed to skip any category with which they were not familiar. Our analyses of items left blank showed that very few participants (7%) were familiar with all of the specific subgenres (e.g., Baroque, industrial, Western swing), but nearly all of them (97%) were familiar with the broader music genres (e.g., classical, heavy metal, country). These findings suggested that the genre level was the appropriate level at which to begin examining music preferences.

Thus, the final version, called the Short Test Of Music Preferences (STOMP), is made up of 14 music genres: alternative, blues, classical, country, electronica/dance, folk, heavy metal, rap/hip-hop, jazz, pop, religious, rock, soul/funk, and sound tracks. Preference for each genre is rated on a 7-point Likert-type scale with endpoints at 1 (*Not at all*) and 7 (*A great deal*).

Study 2: An Exploratory Factor Analysis of Music Preferences

The primary objective of Study 2 was to identify the basic dimensions of music preferences. The study was exploratory and, given the patchy literature on this topic, we had no a priori theories or expectations about the number of dimensions or the nature of the underlying structure. Instead, the analyses served as a springboard for generating theories and hypotheses regarding the nature of music preferences. We used exploratory factor analysis to examine the factor structure of music preferences; then, in a subsample of participants, we examined whether the music dimensions would generalize across time.

Method

Participants. The sample was made up of 1,704 University of Texas at Austin undergraduates who volunteered in exchange for partial fulfillment of an introductory psychology course requirement during the fall semester of 2001. Of those who indicated, 1,058 (62.6%) were women and 633 (37.4%) were men, 62 (4.1%) were African American, 205 (13.5%) were Asian, 205 (13.5%) were Hispanic, 988 (65%) were White, and 60 (3.9%) were of other ethnicities.

Three weeks after the first sample was tested, a subsample of 118 of the participants was tested again in exchange for partial fulfillment of an introductory psychology course requirement. Of those who indicated, 94 (82%) were women and 21 (18%) were men, 6 (5.3%) were African American, 25 (21.9%) were Asian, 11 (9.7%) were Hispanic, 64 (56.1%) were White, and 8 (7%) were of other ethnicities.

Procedure. Participants completed the STOMP and a battery of personality measures during a massive testing session (Time 1). Participants completed the STOMP again 3 weeks later (Time 2).

Results and Discussion

Factor structure. To identify the major dimensions of music preferences, we performed principal-components analyses on participants' ratings. Determining the number of factors to retain is critical in such analyses, because underextraction or overextraction may distort subsequent findings (Zwick & Velicer, 1986). We therefore used multiple converging criteria to decide on the appropriate number of factors to retain: scree test (Cattell, 1966), the Kaiser rule (i.e., eigenvalues of 1 or greater), parallel analyses of Monte Carlo simulations (Horn, 1965), and the interpretability of the solutions (see Zwick & Velicer, 1986). Following these criteria, a four-factor solution was retained, which accounted for 59% of the total variance.

In accord with Pedhauzer and Schmelkin (1991), both orthogonal (varimax) and oblique (oblimin) rotations were initially performed. However, the two solutions were virtually identical, and the mean correlation among the oblique factors was low ($r = .01$), suggesting that the orthogonal solution offered a good fit for these data.

As can be seen in the varimax-rotated factor loadings shown in Table 1, the factor structure was very clear and interpretable, with few cross-loading genres. Pop music was the only genre with factor loadings greater than .40 on multiple factors. To determine the best labels for the dimensions, seven psychologists (including the two authors) examined the factor structure and consensually generated labels to capture the main themes underlying the factors. As in most factor-analytic research, broad labels inevitably capture some factors better than others and should thus be used only as guides to the content of each dimension.

The genres loading most strongly on Factor 1 were blues, jazz, classical, and folk music—genres that seem to facilitate introspection and are structurally complex—and this factor was named *Reflective and Complex*. Factor 2 was defined by rock, alternative, and heavy metal music—genres that are full of energy and emphasize themes of rebellion—and was named Intense and Rebellious. Factor 3 was defined by country, sound track, religious, and pop music—genres that emphasize positive emotions and are structurally simple—and was named *Upbeat and Conventional*.

Table 1
Factor Loadings of the 14 Music Genres on Four Varimax-Rotated Principal Components in Study 2

	Music-preference dimension			
Genre	Reflective and Complex	Intense and Rebellious	Upbeat and Conventional	Energetic and Rhythmic
Blues	***.85***	.01	−.09	.12
Jazz	***.83***	.04	.07	.15
Classical	***.66***	.14	.02	−.13
Folk	***.64***	.09	.15	−.16
Rock	.17	***.85***	−.04	−.07
Alternative	.02	***.80***	.13	.04
Heavy metal	.07	***.75***	−.11	.04
Country	−.06	.05	***.72***	−.03
Sound tracks	.01	.04	***.70***	.17
Religious	.23	−.21	***.64***	−.01
Pop	−.20	.06	***.59***	*.45*
Rap/hip-hop	−.19	−.12	.17	***.79***
Soul/funk	.39	−.11	.11	***.69***
Electronica/dance	−.02	.15	−.01	***.60***

Note. $N = 1{,}704$. All factor loadings $|.40|$ or larger are in italics; the highest factor loadings for each dimension are listed in boldface type.

Factor 4 was defined by rap/hip-hop, soul/funk, and electronica/dance music—genres that are lively and often emphasize the rhythm—and was named *Energetic and Rhythmic*.

Generalizability across time. The factor structure is clear, but is it temporally stable? It is possible that the music individuals enjoy listening to changes on a day-to-day basis, perhaps depending on the mood an individual is in. If so, the temporal stability of music preferences should be quite low. Alternatively, music preferences may be relatively stable, such that preferences for certain genres do not vary on a day-to-day basis.

To address this issue, we determined the test–retest reliability of the factors using the subsample of participants who completed the STOMP again (at Time 2, approximately 3 weeks after the initial testing session). For Times 1 and 2, we created unit-weighted scales to measure each of the four varimax factors. Next, we computed the correlation between Times 1 and 2 for each of the four music dimensions. The results showed that preference for each of the dimensions remained stable across time, with retest rs = .77, .80, .89, and .82 for the Reflective and Complex, Intense and Rebellious, Upbeat and Conventional, and Energetic and Rhythmic dimensions respectively.

The results from this exploratory investigation suggest that there is a clear underlying structure to music preferences. Four interpretable factors were identified that capture a broad range of music preferences. The results from the subsample of participants tested 3 weeks after the first sample indicate that the music-preference dimensions are reasonably stable. However, the analyses were exploratory in nature, and a more stringent confirmatory analysis was needed to test the generalizability of the structure across samples. This was addressed in Study 3.

Study 3: Generalizability Across Samples

The purpose of this study was to test the cross-sample generalizability of the dimensional structure of the music preferences identified in Study 2. To address this issue, we used the same procedure as in Study 2 and administered the STOMP to another sample of college students.

Method

Participants. This sample was made up of 1,383 University of Texas at Austin undergraduates who volunteered in exchange for partial fulfillment of an introductory psychology course requirement during the spring of 2002. Of those who indicated, 726 (59.7%) were women and 490 (40.3%) were men, 30 (2.5%) were African American, 225 (18.5%) were Asian, 160 (13.2%) were Hispanic, 760 (62.6%) were White, and 39 (3.2%) were of other ethnicities. There was no overlap of participants between Studies 2 and 3.

Procedure. The procedure used in Study 3 was identical to the one used in Study 2. To assess music preferences, participants completed the same version of the STOMP as participants in Study 2.

Results and Discussion

Confirmatory factor analysis (CFA). To examine the generalizability of the four music-preference dimensions, we performed a CFA on the music-preference data using LISREL (Jöreskog & Sörbom, 1989). CFA is a special type of factor analysis in which hypotheses regarding the number of factors, their interrelations, and the variables that load onto each factor can be specified and tested. On the basis of the four orthogonal factors identified in Study 2, we tested two models to permit a strong test of the music-preference dimensions: one model in which the factors were independent and one model in which the factors were allowed to correlate. In both models, we specified four latent factors representing the four music dimensions: All the genres that loaded onto each of the respective factors identified in Study 2 were freely estimated. In Model 1, the intercorrelations of the latent factors were set to zero, whereas in Model 2, this constraint was freed. Evaluation of the fit of each model was based on multiple

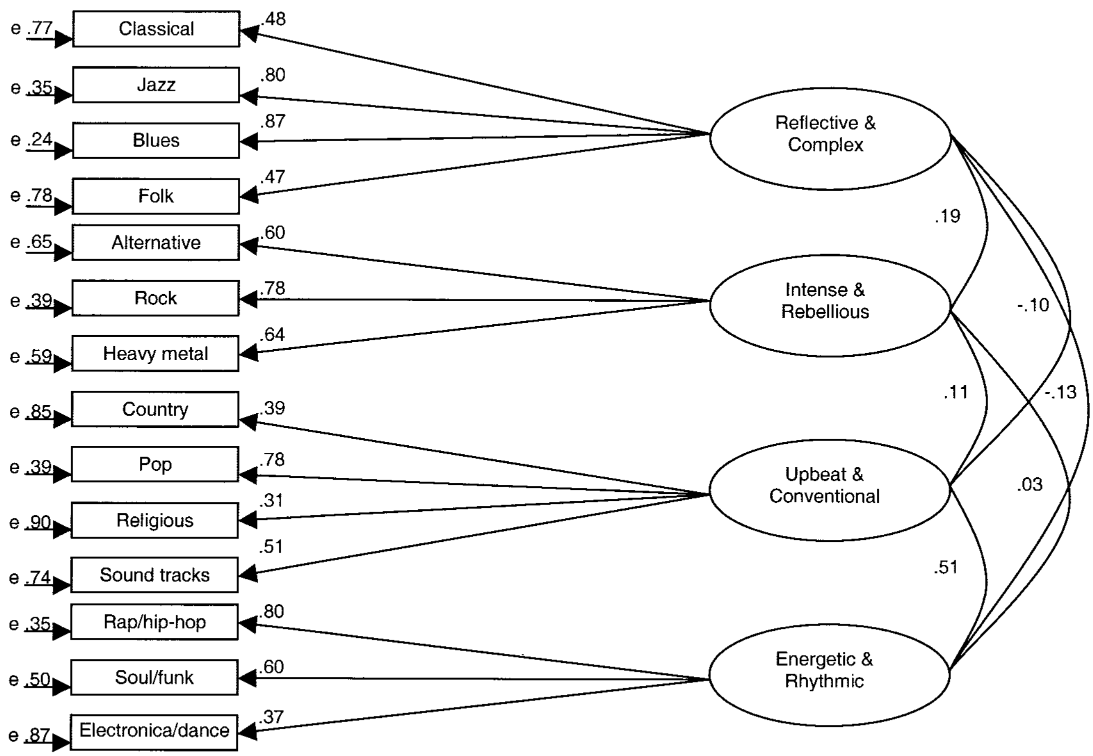

Figure 5. Standardized parameter estimates for Model 2 of the music-preference data in Study 3. $\chi^2(71, N = 1{,}383) = 626.69$; goodness-of-fit index = .94; adjusted goodness-of-fit index = .91; root-mean-square error of approximation = .07; standardized root-mean-square residual = .06. e = error variance.

criteria (Benet-Martínez & John, 1998; Bentler, 1990; Loehlin, 1998).[2]

The results indicated that although Model 1, the orthogonal model, did provide a reasonable fit, $\chi^2(77, N = 1{,}383) = 812.3$ (GFI = .92, AGFI = .89, RMSEA = .09, SRMR = .09), Model 2, which allowed for correlated factors, fit significantly better, $\Delta\chi^2(6) = 185.6$, $p < .001$; $\chi^2(71, N = 1{,}383) = 626.69$ (GFI = .94, AGFI = .91, RMSEA = .07, SRMR = .06). As shown in Figure 5, the intercorrelations among the music-preference dimensions were relatively small, with only one (Upbeat and Conventional with Energetic and Rhythmic) exceeding .20. Furthermore, the factor loadings for all of the music genres were in the expected direction. In short, the cross-sample congruence of the music-preference dimensions identified in Study 2 and the CFA fit from this study provide compelling evidence for the existence of four music-preference dimensions.

Limitations. Although the results from the CFA provide support for the cross-sample generalizability of the music-preference dimensions, two potential limitations undermine the generalizability of the model. First, participants' music preferences were derived from self-reports. In theory, people know what they like and what they do not like. However, relying exclusively on self-reports of music preferences assumes that people are able to accurately report on their preferences and fails to control for the potential biases produced by impression-management motivations. An individual may enjoy listening to country music but might report no preference for it if listening to country is considered "uncool."

Second, our participants were attending a public university in central Texas, a hotbed of country music, which raises concerns about the generalizability of the results to other geographic regions. It is not clear how Southern culture might influence participants' preferences. Would a similar music factor structure be obtained among native New Yorkers, or even college students living in New York City? Thus, it could be premature to conclude that the music-preference dimensions identified in Studies 2 and 3 generalize across samples. To address these two limitations it is necessary to examine music preferences using a methodology that is not dependent on self-reports and does not oversample from a particular geographic region. Study 4 was designed to address these limitations.

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[2] A widely used fit index is the chi-square statistic. For small sample sizes, a satisfactory fit is obtained when chi-square is approximately equal to its degrees of freedom. However, the chi-square statistic is very sensitive to sample size such that, when the sample size is large, slight discrepancies in fit can lead one to reject an otherwise good-fitting model. Thus, for large sample sizes researchers are encouraged to use additional indices to evaluate the fit of a model (Bentler, 1990; Loehlin, 1998). Widely used alternatives include the goodness-of-fit index (GFI), the adjusted goodness-of-fit index (AGFI), the root-mean-square error of approximation (RMSEA), and the standardized root-mean-square residual (SRMR). A RMSEA less than .10 reflects a good-fitting model and a value less than .05 an excellent-fitting model (Steiger, 1989). According to Hu and Bentler (1999), an SRMR less than .08 reflects a good-fitting model (for a detailed review of the various fit indices, see Loehlin, 1998).

Study 4: Generalizability Across Samples, Methods, and Geographic Regions

Recently, a number of online Web sites (e.g., audiogalaxy.com, kazaa.com, morpheus.com, napster.com) have sprung up to allow individuals to share and download music from the Internet. One feature offered by some of these Web sites is the ability to view the music libraries of individuals using the Web site. At the time this research was conducted, one such music provider (audiogalaxy.com) had a list of all of the users currently online around the globe. For the United States, users were organized by state. Each user was then linked to a separate page that contained a list of all the songs that the user had downloaded since joining the site. The lists represent behaviorally revealed preferences of individuals across the country and are ideally suited to address the limitations of Studies 2 and 3.

Method and Procedure

We used the features offered by audiogalaxy.com to survey the music collections of people from around the United States. We downloaded the music libraries of individuals from each of the 50 states and then categorized the songs in each person's music library into music genres. To ensure full geographic representation of music preferences within the United States, 10 users from each state were randomly selected. Thus, the total sample was composed of 500 individuals. Many of the users had only a few songs in their music libraries, making it hard to obtain reliable estimates of their music preferences. Therefore, we implemented a minimum criterion of at least 20 songs. The number of songs in the remaining music libraries ranged from 20 to over 500 songs. To ensure equal impact, we randomly selected 20 songs from each eligible user's music library, regardless of how many songs were in their music library.

The 500 music libraries were divided among a group of seven judges so that six judges had 70 libraries each and one had 80. Judges were then trained to code the songs in each user's music library into one of the 14 music genres covered in the STOMP: alternative, blues, classical, country, electronica/dance, folk, heavy metal, rap/hip-hop, jazz, pop, religious, rock, soul/funk, and sound tracks. If judges were unfamiliar with a song in a participants' music library, they consulted with towerrecords.com or with another judge to determine the appropriate genre. In instances in which the appropriate genre of a song could not be determined by these means, the song was not included in the analyses.

A user's preference for a particular genre of music was determined by the number of songs that appeared in each music genre. Thus, scores for each of the genres could range from 0 (*No preference*) to 20 (*Strong preference*). Because there were almost as many music categories as there were songs for each user, a large number of the music categories contained zeros. Consequently, the distribution of the music-preference data was negatively skewed and corrected using Poisson transformations.

The only available information for each user was their username and the songs in their music library, so we could not determine their gender or age. However, according to the marketing department for a similar online music Web site, approximately 60% of online music users are men and 40% are women, and the average age of users is 25 years (sales department of kazaa.com, personal communication, July 5, 2002).[3]

Results and Discussion

To examine the generalizability of the music-preference dimensions across methods and populations, we performed a CFA on the audiogalaxy.com data using LISREL (Jöreskog & Sörbom, 1989). As in Study 3, we tested two models, one in which the factors were specified as orthogonal and one in which the factors were allowed to correlate. In both models, we specified four latent factors representing the four music dimensions: All the genres that loaded onto each of the respective factors identified in Study 2 were freely estimated.

The results indicated that although Model 1, the orthogonal model, provided a reasonable fit, $\chi^2(77, N = 500) = 176.31$ (GFI = .95, AGFI = .93, RMSEA = .05, SRMR = .06), Model 2, which allowed for correlated factors, fit significantly better, $\Delta\chi^2(6) = 39.27$, $p < .001$; $\chi^2(71, N = 500) = 137.05$ (GFI = .96, AGFI = .94, RMSEA = .04, SRMR = .05). As shown in Figure 6, the intercorrelations among the music-preference dimensions were generally small, with only one (Reflective and Complex with Energetic and Rhythmic) exceeding .20. Furthermore, the factor loadings for the music genres were generally strong, and all were in the expected direction.

In sum, three separate studies of over 3,500 participants converged on the finding that music preferences can be organized into four independent dimensions: Reflective and Complex, Intense and Rebellious, Upbeat and Conventional, and Energetic and Rhythmic. Although the age range of the audiogalaxy.com sample was probably not as broad as we had hoped, the convergent findings provided strong evidence for the generalizability of the music-preference dimensions. These dimensions generalized across time, populations, method, and geographic region.

Study 5: Understanding the Music Dimensions

After we had identified some robust music-preference dimensions, the next task was to identify the qualities that define them: What are the common threads that hold these factors together? Why do preferences for certain genres of music cluster together? The attributes of music vary across a wide range of moods, energy levels, complexities, and lyrical contents. For example, some genres emphasize negative emotions (e.g., heavy metal), whereas others emphasize positive emotions (e.g., religious); some genres are technically complex (e.g., classical), whereas others tend to be basic (e.g., country); some genres have relatively few songs with vocals (e.g., jazz), whereas others only have songs with vocals (e.g., pop). Thus, the objective of Study 5 was to systematically examine the attributes of the four music-preference dimensions.

Method

Examining the properties of the music dimensions involved three steps. First, we selected songs that exemplified the music genres defining each of the music-preference dimensions. Second, we generated a set of specific music attributes on which the exemplar songs could be judged. Third, a group of judges independently rated the exemplar songs on each of the music attributes.

Exemplar song selection. To determine the defining attributes of each of the music-preference dimensions, we selected a sample of songs that could serve as stimuli for judges to rate. Specifically, we selected songs to serve as exemplars for the 14 music genres used in the previous studies: alternative, blues, classical, country, electronica/dance, folk, heavy metal,

[3] Audiogalaxy.com did not respond to our requests for the demographic information of their subscribers. Therefore, we report here information furnished by a similar online music provider (kazaa.com), which was willing to provide us with general demographic information about online music users.

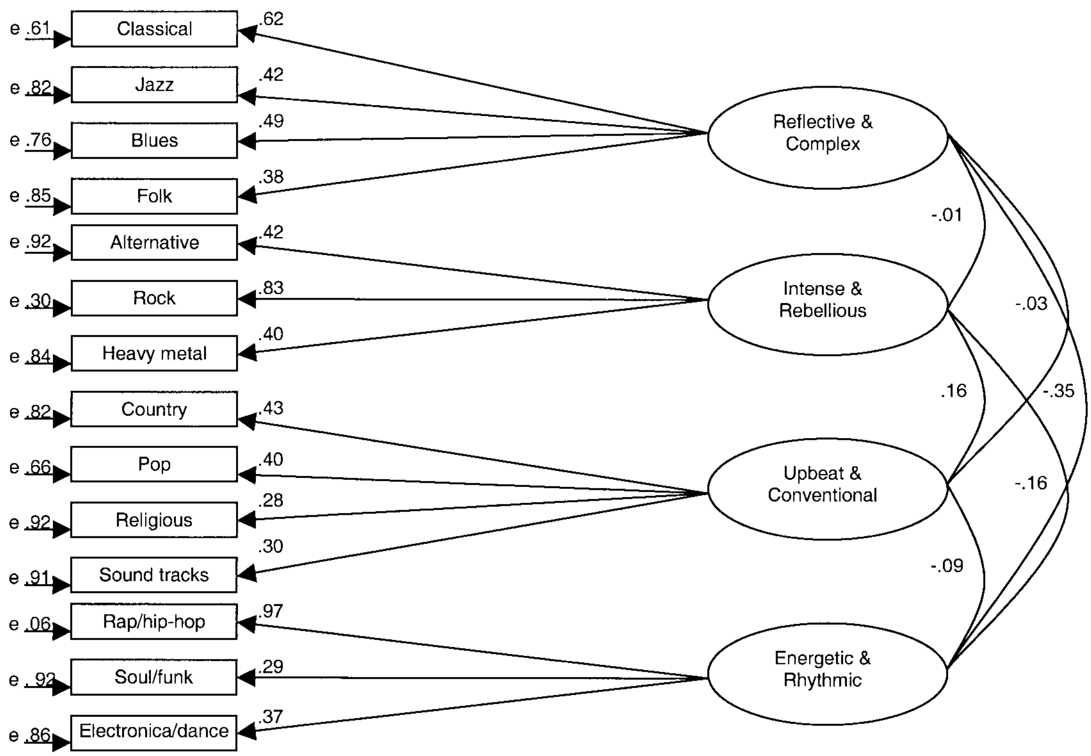

Figure 6. Standardized parameter estimates for Model 2 of the music-preference data in Study 4. $\chi^2(71, N = 500) = 137.05$; goodness-of-fit index = .96; adjusted goodness-of-fit index = .94; root-mean-square error of approximation = .04; standardized root-mean-square residual = .05. e = error variance.

hip-hop/rap, jazz, pop, religious, rock, soul, and funk. Sound track music was excluded because sound tracks can contain the musical styles of practically every other music genre; in other words, there were extremely few specific songs that were more prototypical of sound tracks than of other genres.

Some songs blend styles from different genres, so it was necessary that each song exemplify only one genre. To ensure this, we consulted with various online music providers (e.g., towerrecords.com, audiogalaxy.com) to identify the exemplar songs of each of the respective genres. Many online music providers display "essential" compilation albums for a variety of music genres. The essentialness of each recording is based on either the number of units sold, customer recommendations, or reviews by music critics. Using these resources, we created a pool of approximately 25 possible songs for each of the 14 music genres. Selecting only one exemplary song as an index of a whole genre would not provide a very reliable estimate of the characteristics of the genre or sufficient content validity. To improve the content validity of the sets of songs representing each genre, we selected 10 exemplary songs that represented a broad array of styles, artists, and time periods within each genre. This process resulted in a total of 140 songs (see Appendix for a list of the songs).

Music attribute selection. To select the music attributes, we used a multistep procedure similar to the one described by Aaker, Benet-Martínez, and Garolera (2001) to select commercial brands. Songs are often described using terms that are also used to describe people (e.g., *complex*, *emotional*, *cheerful*, *reflective*). Therefore, we began our item-selection procedure with the pool of 300 person descriptors in the Adjective Check List (ACL; Gough & Heilbrun, 1983). Using a 1 (*relevant*) to 3 (*irrelevant*) rating scale, three expert judges independently rated each of the 300 ACL adjectives for their relevance in describing various aspects of music. All attributes that were considered at least somewhat relevant (i.e., a 2 on the scale) by at least two of the three judges were retained, resulting in an initial pool of 130 attributes.

To increase the range of music attributes and to test the effectiveness of the initial ACL-based procedures, a second step used a structured free-description task in which four independent judges were asked to list all the music attributes that came to mind while thinking about any and all types of music. Using this procedure, only seven new attributes were identified that had not been identified in the previous step; this finding was reassuring because it underscored the effectiveness of the ACL-based item-generation procedures.

In the third step, a separate group of seven judges independently evaluated the extent to which each attribute could be used to characterize various aspects of music. Specifically, judges were instructed to first indicate the extent to which each of the music attributes could be used to describe various aspects of the music and/or the lyrics using a 5-point scale (1 = *Not at all*; 5 = *Definitely*), then to indicate which aspect of the music the attribute best described using a three-valued categorization system (i.e., L = only the lyrics, B = both the lyrics and music, M = only the music). For example, if *reflective* was considered useful in describing a particular aspect of music it might be given a 4, and if it was thought to be characteristic of the lyrics only it would get an *L*.

The number of potential music attributes was very large, so we used a high-relevance threshold (4.5 or higher) to ensure inclusion of only the most relevant attributes. This strategy resulted in a list of 20 attributes: clever, dreamy, relaxed, enthusiastic, simple, pleasant, energetic, loud, cheerful/happy, uplifting, angry, depressing/sad, emotional, romantic, rhythmic, frank/direct, boastful, optimistic, reflective, and bitter. Because the expert judges used person descriptors as a starting point for generating music attributes, a few important general musical attributes, such as tempo (e.g., fast, slow) and mode (e.g., acoustic, electric), did not appear on the list. Thus, we supplemented the 20 attributes with an additional 5 attributes (fast, slow, acoustic, electric, and voice) for a final list of 25 music attributes.

Procedure. A group of seven judges, representing a variety of musical tastes, independently rated the songs on the attributes. The 140 songs were compiled onto CDs. The songs on the CDs were grouped by genre. To reduce the impact of order effects, two sets of CDs that differed in song order were created. Judges were unaware of the purpose of the study and were simply instructed to listen to each song in its entirety, then to rate each song on each of the music and lyric attributes using a 7-point scale with endpoints at 1 (*Extremely uncharacteristic*) and 7 (*Extremely characteristic*). For songs with no lyrics, judges were instructed to leave the lyric attributes blank; there were 25 songs with no lyrics. Our analyses of structure in Studies 2–4 were based on music preferences of ordinary persons, so for this study, too, we were interested in ordinary persons' impressions of music (rather than the impressions of trained musicians). Thus, judges were given no specific instructions about what information they should use to make their judgments.

Results and Discussion

Reliability. To evaluate the reliability of judges' attribute ratings of the songs, Cronbach's alphas were computed across songs for each attribute. In general, reliability was high. As can be seen in Table 2, inter-rater reliability was highest for the general attributes ($M\ \alpha = .90$), followed by the music and lyric attributes (Ms = .79, .79). Overall, the coefficients ranged from .43 for ratings of the rhythm of the lyrics to .93 for the amount of singing.

Table 2
Interrater Reliability (Coefficient Alpha) of Judges' Ratings of the Music Attributes

	Music attribute category		
Attribute	General (M = 0.90)	Lyrics (M = 0.79)	Music (M = 0.79)
Fast	0.90		
Slow	0.89		
Acoustic	0.87		
Electric	0.89		
Voice	0.93		
Frank/direct		0.62	
Boastful		0.80	
Optimistic		0.83	
Reflective		0.62	
Bitter		0.87	
Clever		0.64	0.66
Dreamy		0.82	0.85
Relaxed		0.85	0.88
Enthusiastic		0.73	0.77
Simple		0.66	0.70
Pleasant		0.70	0.70
Energetic		0.84	0.86
Loud		0.84	0.85
Cheerful/happy		0.86	0.83
Uplifting		0.82	0.70
Angry		0.91	0.90
Depressing/sad		0.87	0.82
Emotional		0.85	0.78
Romantic		0.88	0.86
Rhythmic		0.43	0.45

Note. Means were calculated using Fisher's r-to-z transformation. Blank cell indicates that no data were collected for this attribute in this category.

Interestingly, reliability for some of the more metaphorical attributes such as sad, angry, depressing, bitter, happy, relaxed, and romantic was at least as high as more observable, literal attributes such as whether the song was acoustic, electric, fast, or slow.

Distinguishing the music-preference dimensions. What are the attributes that distinguish the music-preference dimensions? To examine how the music dimensions differed in terms of musical attributes, we performed analyses of variance (ANOVAs) on each of the attributes within the three music-attribute categories (general, lyrical, and musical), using music dimension as the independent variable.

How did the music dimensions differ in terms of general attributes? As shown in Figure 7, the music dimensions were significantly different across the five general attributes; Fs(3, 136) ranged from 6.68 to 67.13, all ps $< .001$. In general, the Reflective and Complex music dimension was slower in tempo than the other dimensions, used mostly acoustical instruments, and had very little singing. The Intense and Rebellious dimension was faster in tempo, used mostly electric instruments, and had a moderate amount of singing. The Upbeat and Conventional dimension was moderate in tempo, used both acoustic and electric instruments, and had a moderate amount of singing. The Energetic and Rhythmic dimension was also moderate in tempo, used electric instruments, and had a moderate amount of singing.

How did the music dimensions differ in terms of lyrical attributes? As shown in Figure 8, the music dimensions were significantly different across all of the lyric attributes except rhythmic; all statistically significant Fs(3, 128) ranged from 4.10 to 33.02, ps $< .01$. For presentational clarity, the lyric attributes were divided into four general categories: complexity (e.g., simple, clever), positive affect (e.g., cheerful/happy, romantic), negative affect (e.g., depressing/sad, angry), and energy level (e.g., relaxed, energetic). In general, the lyrics in the Reflective and Complex dimension were perceived to be complex, to express both positive and negative emotions, and to have a low level of energy. The Intense and Rebellious dimension was perceived to be moderately complex, low in positive affect, but high in negative affect and energy level. The lyrics in the Upbeat and Conventional dimension were perceived as simple and direct, low in negative affect, but high in positive affect and energy level. The lyrics in the Energetic and Rhythmic dimensions were perceived as being somewhat complex, unemotional, and moderate in energy level.

How do the music dimensions differ in terms of musical attributes? As shown in Figure 9, the music dimensions were significantly different across the 15 music attributes; Fs(3, 136) ranged from 3.06 to 46.08; ps $< .05$. For presentational clarity, we again divided the attributes into four general categories: complexity, positive affect, negative affect, and energy level. The musical attributes of the Reflective and Complex dimension were perceived as complex, high in both positive and negative affect, yet low in energy level. As with the lyric attributes of the Intense and Rebellious dimension, the music attributes were perceived as moderately complex, low in positive affect, and high in both negative affect and energy level. The music attributes of the Upbeat and Conventional dimension were perceived as simple and direct, moderately high in positive affect, and low in both negative affect and energy level. The music attributes of the Energetic and Rhythmic dimension were perceived as moderately complex, unemotional, and moderate in energy level.

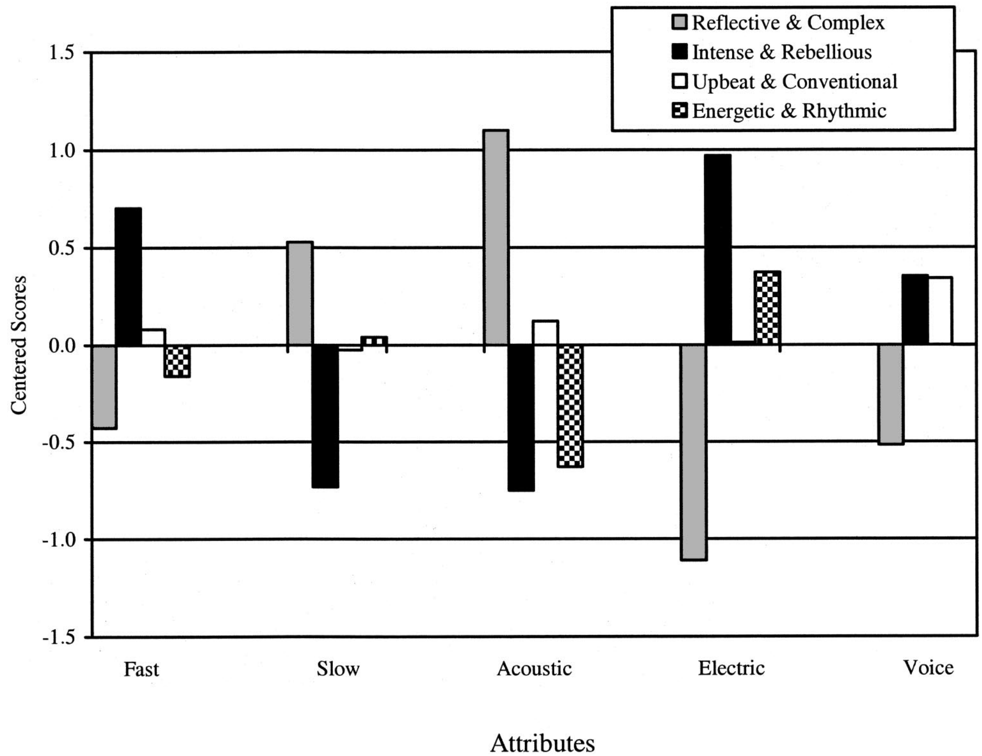

Figure 7. General attributes of each of the music-preference dimensions.

Summary

Overall, the judges' ratings of the 140 songs shed light on the underlying attributes that bind music genres together. In addition, they suggest that the dimension labels we chose in Study 2 characterize each dimension quite well. Analyses of the music attributes paint rather interesting and unique pictures of each dimension. Whereas the Reflective and Complex dimension projects a broad spectrum of both positive and negative emotions that is quite complex in structure, the Intense and Rebellious dimension displays moderately complex structure and intense negative emotions. The Upbeat and Conventional dimension expresses predominantly positive emotions, is simple in structure, and is moderately energetic, whereas the Energetic and Rhythmic dimension exhibits comparatively less positive and negative emotion, is moderately energetic, and tends to place greater emphasis on rhythm.

Study 6: Examining the Relationship Between Music Preferences and Personality

In Studies 2–4, we identified four dimensions of music preferences that generalized across time, populations, methods, and geographic region. In Study 5, we characterized each dimension in terms of a variety of different music attributes. Having identified and characterized the music-preference dimensions, we could address a central question underlying this research: How are music preferences related to existing personality characteristics?

Method

Participants. To examine the external correlates of the four music-preference dimensions, we administered a number of tests of personality, self-views, and cognitive ability to a sample of college students. Participants were from Studies 2 and 3 and the retest subsample from Study 2 (*N*s = 1,704, 1,383, and 118, respectively). In both Studies 2 and 3 (S2 and S3), participants completed measures of personality and self-views, and participants in the retest subsample (SS2) completed a test of cognitive ability.

Measures of personality. Personality was assessed with a variety of measures. To assess personality at a broad level, we included the Big Five Inventory (BFI; John & Srivastava, 1999). The BFI consists of 44 items that tap five broad personality domains. Items were rated on a 5-point scale with endpoints at 1 (*Disagree strongly*) and 5 (*Agree strongly*).

The Personality Research Form—Dominance (Jackson, 1974) was administered as a measure of interpersonal dominance strivings. Using a true–false response format, participants indicated their agreement with 16 statements.

We included the Social Dominance Orientation Scale (Pratto, Sidanius, Stallworth, & Malle, 1994). This questionnaire consists of 14 items, which tap individual differences in orientation to socially conservative ideals and attitudes. Participants were asked to indicate their feeling toward each statement using a 7-point Likert-type scale with endpoints at 1 (*Very negative*) and 7 (*Very positive*).

The Brief Loquaciousness and Interpersonal Responsiveness Test (Swann & Rentfrow, 2001) was administered to assess individual differences in interpersonal communication styles. Specifically, this test discriminates between individuals who tend to express their thoughts and feelings as soon as they come to mind (*blirtatious* [from the acronym for the test, BLIRT] individuals) and individuals who tend to keep their thoughts to themselves (*nonblirtatious* individuals). Participants indicated the extent to which they agreed with eight items using a 5-point scale with endpoints at 1 (*Strongly disagree*) and 5 (*Strongly agree*).

Self-esteem was assessed with the Rosenberg Self-Esteem Scale (Rosenberg, 1965). This is a widely used measure of self-esteem and consists of 10 statements. Participants were asked to indicate, using a 5-point

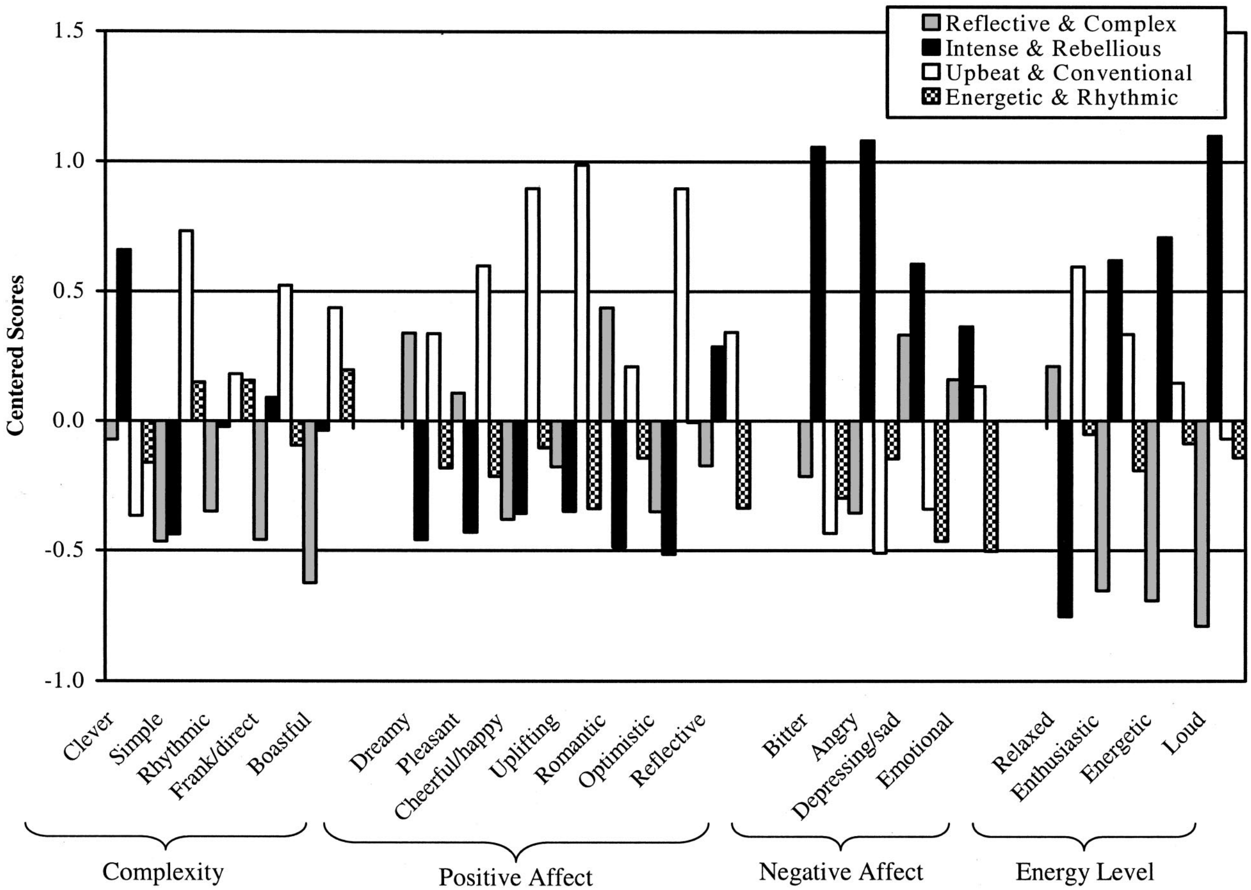

Figure 8. Lyric attributes of each of the music-preference dimensions.

Likert-type scale with endpoints at 1 (*Not at all*) and 5 (*Extremely*) the extent to which each statement was characteristic of themselves.

The Beck Depression Inventory (Beck, 1972) was included as a measure of depression. This test assesses individual differences in depression and captures the degree to which individuals have experienced depressive thoughts and feelings during the preceding week. Participants responded to 13 items, each with four statements, and indicated which statement best described their feelings over the past week.

Self-views. We were also interested in how individuals' self-views relate to their music preferences. Using a 5-point Likert-type scale with endpoints at 1 (*Disagree strongly*) and 5 (*Agree strongly*), participants were asked to indicate the extent to which they saw themselves as politically liberal, politically conservative, physically attractive, wealthy, athletic, and intelligent.

Cognitive ability. The Wonderlic IQ Test (Wonderlic, 1977) was administered as a measure of verbal and analytic reasoning ability. The test includes 50 items, and participants were given 12 min to complete as many items as possible. Research among college samples has found that the test is predictive of college grades (McKelvie, 1989) and ratings of self-perceived intelligence (Paulhus, Lysy, & Yik, 1998).

Results and Discussion

To examine the relationship between music preferences and personality, scale scores on each of the four dimensions were computed. We then computed correlations between the music-preference dimensions and scores on the measures of personality, self-views, and cognitive ability. The patterns of correlations between the music-preference dimensions and the external correlates are shown in Table 3.[4]

The correlations presented in Table 3 reveal a fascinating pattern of links between music preferences and personality, self-views, and cognitive ability. For example, the Reflective and Complex dimension was positively related to Openness to New Experiences, self-perceived intelligence, verbal (but not analytic) ability, and political liberalism and negatively related to social dominance orientation and athleticism. These correlations, along with item-level analyses of the BFI, suggest that individuals who enjoy listening to reflective and complex music tend to be inventive, have active imaginations, value aesthetic experiences, consider themselves to be intelligent, tolerant of others, and reject conservative ideals.

[4] Research with musicians has suggested that men and women prefer to play different musical instruments (Dibben, 2002; O'Neill, 1997; O'Neill & Boulton, 1996), so it is reasonable to suppose that the relationships between music preferences and personality could be moderated by sex. However, when correlations between music preferences and personality were computed separately for men and women, the magnitude and pattern of the correlations were virtually identical for both sexes. Thus, the correlations presented in Table 3 include both men and women.

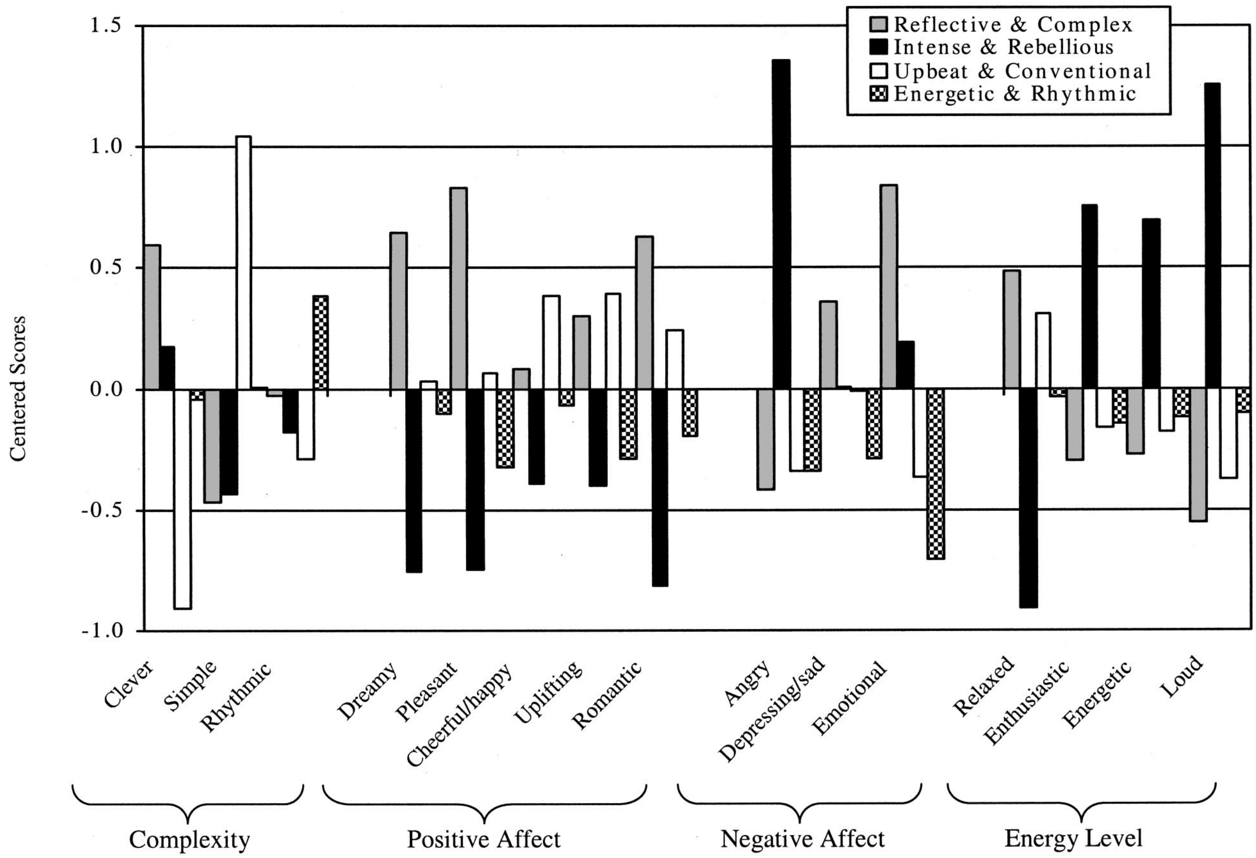

Figure 9. Music attributes of each of the music-preference dimensions.

The Intense and Rebellious dimension was positively related to Openness to New Experiences, athleticism, self-perceived intelligence, and verbal ability. Interestingly, despite previous findings that this dimension contains music that emphasizes negative emotions, individuals who prefer music in this dimension do not appear to display signs of neuroticism or disagreeableness. Overall, individuals who prefer intense and rebellious music tend to be curious about different things, enjoy taking risks, are physically active, and consider themselves intelligent.

The external correlates of the Upbeat and Conventional dimension reveal positive correlations with Extraversion, Agreeableness, Conscientiousness, conservatism, self-perceived physical attractiveness, and athleticism and negative correlations with Openness to New Experiences, social dominance orientation, liberalism, and verbal ability. Our analyses suggest that individuals who enjoy listening to upbeat and conventional music are cheerful, socially outgoing, reliable, enjoy helping others, see themselves as physically attractive, and tend to be relatively conventional.

The Energetic and Rhythmic dimension was positively related to Extraversion, Agreeableness, blirtatiousness, liberalism, self-perceived attractiveness, and athleticism and negatively related to social dominance orientation and conservatism. Thus, individuals who enjoy Energetic and Rhythmic music tend to be talkative, full of energy, are forgiving, see themselves as physically attractive, and tend to eschew conservative ideals.

As one would expect for such a broad array of constructs, the magnitude of correlations varied greatly. To test the generalizability of the correlations across samples, we computed column–vector correlations for each of the four dimensions. Specifically, we transformed the correlations using Fisher's *r*-to-*z* formula and then computed the correlation between the two columns of transformed correlations. As shown in the bottom row of Table 3, the pattern of correlations for each of the music dimensions was virtually identical across samples; column–vector correlations ranged from .851 for the Energetic and Rhythmic dimension to .977 for the Reflective and Complex dimension.[5]

One noteworthy finding was the absence of substantial correlations between the music-preference dimensions and Emotional Stability, depression, and self-esteem, suggesting that chronic emotional states do not have a strong effect on music preferences. Within each music dimension, however, there are undoubtedly songs that capture different emotional states. Therefore, the fact that no relationship was found between music preferences and chronic emotions does not indicate that emotions are not related to

[5] It should be noted that strong column–vector correlations could be generated merely from the inclusion of a mixture of constructs, some of which correlate strongly and some of which correlate weakly with the music-preference dimensions.

Table 3
External Correlates of the Music-Preference Dimensions

Criterion measure	*M* (*SD*)	Reflective and Complex		Intense and Rebellious		Upbeat and Conventional		Energetic and Rhythmic	
		S2	S3	S2	S3	S2	S3	S2	S3
Personality									
Big Five									
Extraversion	3.42 (0.85)	.01	−.02	.00	.08*	.24*	.15*	.22*	.19*
Agreeableness	3.80 (0.62)	.01	.03	−.04	.01	.23*	.24*	.08*	.09*
Conscientiousness	3.57 (0.64)	−.02	−.06	−.04	−.03	.15*	.18*	.00	−.03
Emotional Stability	3.11 (0.81)	.08*	.04	−.01	−.01	−.07	−.04	.01	−.01
Openness	3.75 (0.61)	.44*	.41*	.18*	.15*	−.14*	−.08*	.03	.04
Interpersonal dominance	1.52 (0.25)	.07*	.06*	.04	.06*	.05	.08*	.04	.05
Social dominance	2.70 (1.00)	−.16*	−.12*	.06*	.04	−.06*	−.14*	−.09*	−.10*
Blirtatiousness[a]	2.95 (0.70)	.00	.00	.01	.07*	−.04	.01	.08*	.11*
Self-esteem	3.05 (0.69)	.02	.00	−.02	−.01	.07*	−.05	.06*	−.04
Depression	0.87 (0.34)	.01	−.03	.03	.03	−.08*	−.07*	−.02	.04
Self-views									
Politically liberal	3.17 (1.22)	.15*	.09*	.03	.08*	−.20*	−.17*	.07*	.14*
Politically conservative	2.83 (1.21)	−.09*	−.03	−.04	−.03	.24*	.23*	−.06*	−.09*
Physically attractive	3.69 (0.91)	.00	−.03	−.04	−.05	.07*	.09*	.15*	.08*
Wealthy	2.86 (1.11)	−.04	−.06	−.03	.00	.08*	.05	.02	−.01
Athletic	3.33 (1.26)	−.07*	−.08*	.06*	.07*	.13*	.12*	.11*	.07*
Intelligent	4.22 (0.71)	.10*	.06*	.07*	.08*	−.05*	−.02	−.02	.01
Cognitive ability (Wonderlic)[b]									
Verbal	19.09 (3.72)	.19*	—	.19*	—	−.18*	—	−.01	—
Analytical	6.11 (2.16)	.08	—	.05	—	.02	—	−.08	—
Column vector correlations		.977		.863		.923		.851	

Note. *N*s = 1,704, 1,383, and 118 for S2, S3, and SS2, respectively. Means and standard deviations are averaged across samples. Dashes in cells indicate data were not collected. S2 = sample from Study 2; S3 = sample from Study 3; SS2 = sub-sample from Study 2.
[a] Blirtatiousness = tendency to express thoughts and feelings as soon as they come to mind (from the acronym for the Brief Loquaciousness and Interpersonal Responsiveness Test [BLIRT]; see Swann & Rentfrow, 2001). [b] SS2.
* $p < .05$.

music preferences. One possibility is that existing personality dimensions influence the music-preference dimensions that individuals generally prefer and that emotional states influence the "mood" of the music that individuals choose to listen to on any given day. To gain a firm grasp of the link between music preferences and emotions, future research should examine the emotional valence of the music people choose to listen to while in different emotional states.

General Discussion

The primary purpose of this research was to examine the landscape of music preferences, thereby laying the groundwork for a theory of music preferences. In a series of studies, we examined lay beliefs about music, the structure underlying music preferences, and the links between music preferences and personality. One goal of this research was to determine how much importance individuals give to music relative to other leisure activities. Overall, the results from Study 1 indicate that music is at least as important as most other leisure activities. Participants believed that their music preferences revealed a substantial amount of information about their own personalities and self-views and the personalities of other people. Furthermore, participants reported listening to music very frequently in a variety of different contexts. These latter findings converge nicely with recent work by Mehl and Pennebaker (2003), who sampled people's everyday activities and found that individuals listened to music during approximately 14% of their waking lives, roughly the same amount of time as they spent watching television and half the amount of time they spent engaged in conversations. Thus, our data support empirically what might seem self-evident to many: Music is important to people, and they listen to it frequently.

Using multiple samples, methods, and geographic regions, three independent studies converged to reveal four dimensions of music preferences. The findings presented in Studies 2–4 are important because they are the first to suggest that there is a clear, robust, and meaningful structure underlying music preferences. In addition, the results from Study 5 provide valuable information about the music attributes that differentiate the music-preference dimensions: The dimensions can be distinguished by their levels of complexity, emotional valence, and energy level.

Although early research on music preferences suggested links between certain music genres and certain personality characteristics, the picture they provided was not complete. Using a broad and systematic selection of music genres and personality dimensions, the results from Study 6 cast more light on the variables that link individuals to their music of choice. Across two samples of college students, relationships between music preferences and existing personality dimensions, self-views, and cognitive abilities were identified.

Developing a Theory of Music Preferences

The research reported here fits into a broader agenda of developing a theory of music preferences. What should be asked of such a theory? One important question pertains to the formation of music preferences. How do music preferences develop? What factors influence their development? A second question relates to the trajectory of music preferences. How, when, and why do music preferences change? A theory of music preferences should also address the impact of music on behavior. How do music preferences influence behavior and how do individuals make use of music in their everyday lives?

The research presented here indicates that personality, self-views, and cognitive abilities could all have roles to play in the formation and maintenance of music preferences. The results from Study 6 are consistent with the idea that personality has an impact on music preferences. Just as the social and physical environments that people select and shape reflect their personalities (Buss, 1987; Gosling et al., 2002; Snyder & Ickes, 1985), so too do their musical environments. Our findings show that, for example, preference for cheerful music with vocals (the Upbeat and Conventional dimension) was positively related to Extraversion whereas preference for artistic and intricate music (e.g., the Reflective and Complex dimension) was positively related to Openness to New Experiences. Future research that includes narrower facets of personality is needed to provide a finer grained picture of the effects of personality on music preferences.

Music preferences also appear to be shaped by self-views. Theorists concerned with social identity and the self have pointed out that the social environments that individuals select serve to reinforce their self-views (e.g., Gosling et al., 2002; Swann, 1987, 1996; Swann et al., 2002; Tajfel & Turner, 1986), and our findings suggest that people may select music for similar reasons. This can happen in two ways. First, music preferences could be used to make self-directed identity claims (Gosling et al., 2002). That is, individuals might select styles of music that reinforce their self-views; for example, individuals may listen to esoteric music to reinforce a self-view of being sophisticated. Our findings provide evidence consistent with this idea: Individuals with a conservative self-view preferred conventional styles of music (the Upbeat and Conventional dimension), whereas individuals with an athletic self-view preferred vigorous music (the Intense and Rebellious dimension).

Music can also be used to make other-directed identity claims (Gosling et al., 2002). That is, individuals might select styles of music that allow them to send a message to others about who they are or how they like to be seen; for instance, individuals who listen to heavy metal music at a loud volume with their car windows rolled down may be trying to convey a “tough” image to others. Evidence for other-directed identity claims has been provided by research suggesting that people use music as a badge for others to see (North & Hargreaves, 1999). Thus, music preferences may operate at different levels, both reinforcing how one sees oneself and sending messages to others.

Music preferences also appear to be influenced by cognitive ability. The relationship between cognitive ability and music preferences is consistent with the idea that people prefer music that provides optimal levels of stimulation. Berlyne (1971, 1974) hypothesized that individuals prefer aesthetic stimuli that produce moderate amounts of stimulation to objects that produce too much or too little stimulation. Previous research on aesthetic preferences in literature and visual arts has supported this notion, and this suggests that individual differences in cognitive complexity moderate preferences for particular aesthetic stimuli. Whereas cognitively complex individuals tend to prefer complex aesthetic stimuli, less cognitively complex individuals tend to prefer simple aesthetic stimuli (Barron, 1955; Francès, 1976; Kammann, 1966). The relationship between intelligence and preference for complex music supports this previous work and suggests that the optimal level of stimulation for highly intelligent individuals is produced by complex music whereas the optimal level of stimulation for less intelligent individuals is produced by comparatively simpler music. Future research that examines individual differences in cognitive complexity and music complexity could shed light on the possible mechanisms underlying the formation and maintenance of music preferences.

If music preferences are partially determined by personality, self-views, and cognitive abilities, then knowing what kind of music a person likes could serve as a clue to his or her personality, self-views, and cognitive abilities. The participants in Study 1 certainly believed that knowing a person’s music preferences could reveal valid information about what he or she is like. In addition, the findings from Study 6 suggest that knowing people’s music preferences can provide information about their Openness, Extraversion, political orientation, and intelligence. It is also possible that music preferences reveal information about other facets of personality, such as values and goals. Future research is needed to examine the role of music preferences in person–perception processes.

In addition to the influences of personality, self-views and cognitive abilities, a full theory of music preferences will need to examine many other possible determinants. It seems likely that cultural and environmental influences will influence the music an individual likes. For example, individuals growing up in small rural towns in Texas will probably be exposed to a very different set of music than individuals growing up in metropolitan New York. It also seems likely that the patterns of influences will vary across the life course such that individuals may first adopt the preferences of their parents; later become influenced by their peers; and then, as they develop more autonomy, their personalities may play a larger role. If so, we would expect stronger links between music preferences and personality in older rather than younger participants. Thus, one important direction for future research would be tracking the trajectory of music preferences across the life course.

A theory of music preferences should also be applicable across groups and contexts. Thus, one major goal is to examine the extent to which the specific structure identified in this research generalizes to other groups. Is there a similar structure underlying music preferences across different age groups? Would a similar structure emerge in Asia, Europe, Canada, and elsewhere? New styles of music are being created all the time and in different cultures, so it is reasonable to assume that the four music-preference dimensions found here would not be found among a group of elderly people living in a remote part of Indonesia. However, even though music genres come and go, there may be a finite number of music-preference dimensions that satisfy or reflect certain psychological needs. In other words, regardless of the time period or culture, there may be a limited number of styles of music that cluster together to form Reflective and Complex, Intense and Rebellious, Upbeat and Conventional, and Energetic and Rhythmic music dimensions. Thus, even if the specific structure identified in this research is not universal, a good theory of musical preferences will be able to explain how, when, and why the structures might differ.

A theory of music preferences should also explain how individuals make use of music. One possibility is that individuals use music as a means of regulating their emotions in everyday life. Do individuals seek out music that is consistent with their current mood or select music to change their mood? The findings from Study 6 suggest that chronic affect does not influence people's standing on any of the music-preference dimensions, but emotional states may influence the mood of the music chosen within their preferred dimension. For example, when a person high on the Reflective and Complex dimension is feeling cheerful, she may listen to jazz music that is lively, but when she is feeling sad she may choose the blues. This leads to another interesting question: Does emotional and physiological arousal influence music preferences? Previous research on music preferences has suggested that arousal does play a role (McNamara & Ballard, 1999). Moreover, research linking emotional states and physiological arousal has indicated that anger tends to be associated with a high heart rate, happiness with a moderate heart rate, and depression with a low heart rate (Averill, 1969; Cacioppo, Klein, Bernston, & Hatfield, 1993; Ekman, Levenson, & Frieson, 1983). Our findings dovetail nicely with this research. Judges in Study 5 perceived angry music as highly energetic, happy music as moderately energetic, and depressing music as least energetic. One possibility is that people choose a tempo of music that is consistent with the heart rate that characterizes their current or desired mood.

There is clearly a long way to go before a theory of music preferences can be articulated fully. However, the research presented here has provided a foundation on which future research can build, and we have suggested just a few of the many directions that such research can take. Ultimately, we hope that research will begin to inform our understanding of music, a phenomenon that pervades many aspects of everyday life but has hitherto been virtually ignored in mainstream social and personality psychology.

Conclusion

It is clear to us that music can contribute much to the understanding of many psychological phenomena. From personality and the self to social cognition and emotions, adding music to the research gamut can open a new window into people's everyday lives. To facilitate this goal, we have provided an initial map of the music-preferences terrain and identified some potential landmarks for future exploration.

More broadly, integrating facets of people's everyday lives into the research repertoire will undoubtedly cast light on important psychological processes that have remained in the shadow of mainstream topics in social and personality psychology. Music is only one of those facets. Thus, we urge social and personality psychologists to broaden their research foci to include aspects of people's daily lives and to develop an ecologically sensitive depiction of social behavior.

References

Aaker, J., Benet-Martínez, V., & Garolera, J. (2001). Consumption symbols as carriers of culture: A study of Japanese and Spanish brand personality constructs. *Journal of Personality and Social Psychology, 81*, 249–264.

Arnett, J. (1992). The soundtrack of recklessness: Musical preferences and reckless behavior among adolescents. *Journal of Adolescent Research, 7*, 313–331.

Averill, J. R. (1969). Autonomic response patterns during sadness and mirth. *Psychophysiology, 5,* 399–414.

Barron, F. X. (1955). The disposition toward originality. *Journal of Abnormal and Social Psychology, 51,* 478–485.

Beck, A. T. (1972). *Depression: Causes and treatments*. Philadelphia: University of Pennsylvania Press.

Benet-Martínez, V., & John, O. P. (1998). Los cinco grandes across cultures and ethnic groups: Multitrait–multimethod analyses of the Big Five in Spanish and English. *Journal of Personality and Social Psychology*, *75*, 729–750.

Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, *107*, 238–246.

Berlyne, D. E. (1971). *Aesthetics and psychobiology*. New York: Appleton-Century-Crofts.

Berlyne, D. E. (1974). The new experimental aesthetics. In D. E. Berlyne (Ed.), *Studies in the new experimental aesthetics: Steps toward an objective psychology of aesthetic appreciation.* New York: Halsted Press.

Besson, M., Faita, F., Peretz, I., Bonnel, A. M., & Requin, J. (1998). Singing in the brain: Independence of lyrics and tunes. *Psychological Science, 9,* 494–498.

Bharucha, J. J., & Mencl, W. E. (1996). Two issues in auditory cognition: Self-organization of octave categories and pitch-invariant pattern recognition. *Psychological Science*, *7*, 142–149.

Blood, A. J., & Zatorre, R. J. (2001). Intensely pleasurable responses to music correlate with activity in brain regions implicated in reward and emotion. *Proceedings of the National Academy of Sciences*, *98*, 11818–11823.

Blood, A. J., Zatorre, R. J., Bermudez, P., & Evans, A. C. (1999). Emotional responses to pleasant and unpleasant music correlate with activity in paralimbic brain regions. *Nature Neuroscience*, *2*, 382–387.

Buss, D. M. (1987). Selection, evocation, and manipulation. *Journal of Personality and Social Psychology*, *53*, 1214–1221.

Cacioppo, J. T., Klein, D. J., Bernston, G. G., & Hatfield, E. (1993). The psychophysiology of emotion. In M. Lewis & J. M. Haviland (Eds.), *Handbook of emotions* (pp. 119–142). New York: Guilford Press.

Cattell, R. B. (1966). The scree test for the number of factors. *Sociological Methods and Research*, *1*, 245–276.

Cattell, R. B., & Anderson, J. C. (1953a). *The I.P.A.T. Music Preference Test of Personality.* Champaign, IL: Institute for Personality and Ability Testing.

Cattell, R. B., & Anderson, J. C. (1953b). The measurement of personality and behavior disorders by the I.P.A.T. music preference test. *Journal of Applied Psychology*, *37*, 446–454.

Cattell, R. B., & Saunders D. R. (1954). Musical preferences and personality diagnosis: A factorization of one hundred and twenty themes. *Journal of Social Psychology*, *39*, 3–24.

Chaffin, R., & Imreh, G. (2002). Practicing perfection: Piano performance as expert memory. *Psychological Science*, *13*, 342–349.

Chey, J., & Holzman, P. S. (1997). Perceptual organization in schizophrenia: Utilization of the Gestalt principles. *Journal of Abnormal Psychology*, *106*, 530–538.

Clynes, M. (1982). *Music, mind, and brain: The neuropsychology of music.* New York: Plenum Press.

Crozier, W. R. (1998). Music and social influence. In D. J. Hargreaves & A. C. North (Eds.), *The social psychology of music* (pp. 67–83). New York: Oxford University Press.

Deutsch, D. (Ed.). (1999). *The psychology of music* (2nd ed.). San Diego, CA: Academic Press.

Diamond, J. (2002). The therapeutic power of music. In S. Shannon (Ed.), *Handbook of complementary and alternative therapies in mental health* (pp. 517–537). San Diego, CA: Academic Press.

Dibben, N. (2002). Gender identity and music. In R. A. R. MacDonald, D. J. Hargreaves, & D. Miell (Eds.), *Musical identities* (pp. 117–133). New York: Oxford University Press.

Dorow, L. G. (1975). Conditioning music and approval as new reinforcers for imitative behavior with the severely retarded. *Music Therapy, 12,* 30–40.

Drayna, D., Manichaikul, A., de Lange, M., Sneider, H., & Spector, T. (2001, March 9). Genetic correlates of musical pitch recognition in humans. *Science*, *291*, 1969–1972.

Ekman, P., Levenson, R. W., & Frieson, W. V. (1983, September 16). Autonomic nervous system activity distinguishes among emotions. *Science*, *221*, 1208–1210.

Francès, R. (1976). Comparative effects of six collative variables on interest and preference in adults of different educational levels. *Journal of Personality and Social Psychology, 33,* 62–79.

Funder, D. C. (2001). Personality. *Annual Review of Psychology, 52,* 197–221.

Gosling, S. D., Ko, S. J., Mannarelli, T., & Morris, M. E. (2002). A room with a cue: Judgments of personality based on offices and bedrooms. *Journal of Personality and Social Psychology*, *82*, 379–398.

Gough, H., & Heilbrun, A. (1983). *The Adjective Check List manual.* Palo Alto, CA: Consulting Psychologists Press.

Gowensmith, N. W., & Bloom, L. J. (1997). The effects of heavy metal music on arousal and anger. *Journal of Music Therapy*, *1*, 33–45.

Hargreaves, D. J., & North, A. C. (Eds.) (1997). *The social psychology of music.* New York: Oxford University Press.

Hilliard, R. E. (2001). The use of cognitive–behavioral music therapy in the treatment of women with eating disorders. *Music Therapy Perspectives*, *19*, 109–113.

Hogan, R. (1998). Reinventing personality. *Journal of Social and Clinical Psychology*, *17*, 1–10.

Horn, J. L. (1965). A rationale and test for the number of factors in factor analysis. *Psychometrika, 30,* 179–185.

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6,* 1–55.

Jackson, D. N. (1974). *Manual for the Personality Research Form*. Goshen, NY: Research Psychology Press.

Jellison, J. A., & Flowers, P. J. (1991). Talking about music: Interviews with disabled and nondisabled children. *Journal of Research in Music Education*, *39*, 322–333.

John, O. P., Hampson, S. E., & Goldberg, L. R. (1991). The basic level in personality-trait hierarchies: Studies of trait use and accessibility in different contexts. *Journal of Personality and Social Psychology, 60,* 348–361.

John, O. P., & Srivastava, S. (1999). The Big Five trait taxonomy: History, measurement, and theoretical perspectives. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality theory and research* (pp. 102–138). New York: Guilford Press.

Jöreskog K. G., & Sörbom, D. (1989). *LISREL 7: A guide to the program and applications* (2nd ed.). Chicago: SPSS.

Kammann, R. (1966). Verbal complexity and preferences in poetry. *Journal of Verbal Learning and Verbal Behavior*, *5*, 536–540.

Kemp, A. E. (1996). *The musical temperament: Psychology and personality of musicians.* New York: Oxford University Press.

Krumhansl, C. L. (1990). *Cognitive foundations of musical pitch.* New York: Oxford University Press.

Krumhansl, C. L. (2000). Rhythm and pitch in music cognition. *Psychological Bulletin*, *126*, 159–179.

Krumhansl, C. L. (2002). Music: A link between cognition and emotion. *Current Directions in Psychological Science*, *11*, 45–50.

Little, P., & Zuckerman, M. (1986). Sensation seeking and music preferences. *Personality and Individual Differences*, *7*, 575–577.

Loehlin, J. C. (1998). *Latent variable models: An introduction to factor, path, and structural analysis* (3rd ed.). Mahwah, NJ: Erlbaum.

Marin, O. S. M., & Perry, D. W. (1999). Neurological aspects of music perception and performance. In D. Deutsch (Ed.), *The psychology of music* (pp. 653–724). San Diego, CA: Academic Press.

McCown, W., Keiser, R., Mulhearn, S., & Williamson, D. (1997). The role of personality and gender in preferences for exaggerated bass in music. *Personality and Individual Differences*, *23*, 543–547.

McKelvie, S. J. (1989). The Wonderlic Personnel Test: Reliability and validity in an academic setting. *Psychological Reports, 65,* 161–162.

McNamara, L., & Ballard, M. E. (1999). Resting arousal, sensation seeking, and music preference. *Genetic, Social, and General Psychology Monographs*, *125*, 229–250.

Mehl, M. R., & Pennebaker, J. W. (2003). The sounds of social life: A psychometric analysis of students' daily social environments and natural conversations. *Journal of Personality and Social Psychology*, *84*, 857–870.

Murphy, G. L. (1982). Cue validity and levels of categorization. *Psychological Bulletin*, *91*, 174–177.

North, A. C., & Hargreaves, D. J. (1999). Music and adolescent identity. *Music Education Research*, *1*, 75–92.

North, A. C., Hargreaves, D. J., & McKendrick, J. (1997, November 13). In-store music affects product choice. *Nature, 390,* 132.

North, A. C., Hargreaves, D. J., & McKendrick, J. (2000). The effects of music on atmosphere in a bank and a bar. *Journal of Applied Social Psychology, 30,* 1504–1522.

North, A. C., Hargreaves, D. J., & O'Neill, S. A. (2000). The importance of music to adolescents. *British Journal of Educational Psychology, 70,* 255–272.

O'Neill, S. A. (1997). Gender and music. In D. J. Hargreaves & A. C. North (Eds.), *The social psychology of music* (pp. 46–60). New York: Oxford University Press.

O'Neill, S. A., & Boulton, M. J. (1996). Boys' and girls' preferences for musical instruments: A function of gender? *Psychology of Music, 24,* 171–183.

Oyama, T., Hatano, K., Sato, Y., Kudo, M., Spintge, R., & Droh, R. (1983). Endocrine effect of anxiolytic music in dental patients. In R. Droh & R. Spintge (Eds.), *Angst, Schmerz, Musik in der Anasthesie* [Anxiety, pain, music in anesthesia] (pp. 143–146). Basel, Switzerland: Editiones Roche.

Paulhus, D. L., Lysy, D., & Yik, M. S. M. (1998). Self-report measures of intelligence: Are they useful as proxy measures of IQ? *Journal of Personality, 66,* 525–554.

Pedhauzer, E. J., & Schmelkin, L. P. (1991). *Measurement, design, and analysis: An integrated approach.* Hillsdale, NJ: Erlbaum.

Peretz, I., Gagnon, L., & Bouchard, B. (1998). Music and emotion: Perceptual determinants, immediacy and isolation after brain damage. *Cognition, 68,* 111–141.

Peretz, I., & Hebert, S. (2000). Toward a biological account of music experience. *Brain and Cognition, 42,* 131–134.

Pratto, F., Sidanius, J., Stallworth, L. M., & Malle, B. F. (1994). Social dominance orientation: A personality variable predicting social and political attitudes. *Journal of Personality and Social Psychology, 67,* 741–763.

Radocy, R. E., & Boyle, J. D. (1979). *Psychological foundations of musical behavior*. Springfield, IL: Charles C Thomas.

Rauschecker, J. P. (2001). Cortical plasticity and music. In R. J. Zatorre & I. Peretz (Eds.), *Annals of the New York Academy of Sciences: Vol. 930. The biological foundations of music* (pp. 330–336). New York: New York Academy of Sciences.

Rider, M. S., Floyd, J. W., & Kirkpatrick, J. (1985). The effect of music, imagery, and relaxation on adrenal corticoids and the re-entrainment of circadian rhythms. *Journal of Music Therapy*, *22*, 46–58.

Rosenberg, M. (1965). *Society and the adolescent self-image.* Princeton, NJ: Princeton University Press.

Rozin, P. (2001). Social psychology and science: Some lessons from Solomon Asch. *Personality and Social Psychology Review*, *5*, 2–14.

Sloboda, J. A. (1985). *The musical mind: The cognitive psychology of music.* New York: Oxford University Press.

Snyder, M., & Ickes, W. (1985). Personality and social behavior. In G. Lindzey & E. Aronson (Eds.), *Handbook of social psychology* (Vol. 2, pp. 883–947). New York: Random House.

Standley, J. (1992). Meta-analysis of research in music and medical treatment: Effect size as a basis for comparison across multiple dependent and independent variables. In R. Spintge & R. Droh (Eds.), *Musical medicine* (pp. 364–378). St. Louis, MO: MMB Music.

Steiger, J. H. (1989). *EzPATH: Causal modeling.* Evanston, IL: SYSTAT.

Swann, W. B., Jr. (1987). Identity negotiation: Where two roads meet. *Journal of Personality and Social Psychology*, *53*, 1038–1051.

Swann, W. B., Jr. (1996). *Self-traps: The elusive quest for higher self-esteem.* New York: Freeman.

Swann, W. B., Jr., & Rentfrow, P. J. (2001). Blirtatiousness: Cognitive, behavioral, and physiological consequences of rapid responding. *Journal of Personality and Social Psychology*, *81*, 1160–1175.

Swann, W. B., Jr., Rentfrow, P. J., & Guinn, J. S. (2002). Self-verification: The search for coherence. In M. Leary & J. Tagney (Eds.), *Handbook of self and identity* (pp. 367–383). New York: Guilford Press.

Tajfel, H., & Turner, J. C. (1986). The social identity theory of intergroup behavior. In S. Worchel & W. G. Austin (Eds.), *Psychology of intergroup relations* (pp. 1–24). Chicago: Nelson-Hall.

Tarrant, M., North, A. C., & Hargreaves, D. J. (2000). English and American adolescents' reasons for listening to music. *Psychology of Music*, *28*, 166–173.

Todd, N. P. M. (1999). Motion in music: A neurobiological perspective. *Music Perception*, *17,* 115–126.

Wigram, T., Saperston, B., & West, R. (1995). *The art and science of music therapy: A handbook.* Chur, Switzerland: Harwood Academic.

Wonderlic, E. F. (1977). *Wonderlic Personnel Test manual*. Northfield, IL: Wonderlic and Associates.

Zwick, W. R., & Velicer, W. F. (1986). Comparison of five rules for determining the number of components to retain. *Psychological Bulletin*, *99*, 432–442.

Appendix

Exemplar Songs for Each of the 14 Music Genres

Genre	Song	Artist/Composer
	Music Dimension 1: Reflective and Complex	
Blues	Nobody Loves Me But My Mother	B. B. King
	Spoonful	Howling Wolf
	Hideaway	John Mayall and Blues Breakers
	40 Days and 40 Nights	Muddy Waters
	Ray's Blues	Ray Charles
	Train My Baby	Robert Lockwood Jr.
	In Step	Stevie Ray Vaughan
	Mama He Treats Your Daughter Mean	Susan Tedeschi
	Already Gone	Robert Cray
	T-Bone Blues	T-Bone Walker
Folk	Precious Memories	Bill Monroe
	Blowing in the Wind	Bob Dylan
	For What It's Worth	Buffalo Springfield
	Become You	Indigo Girls
	Fire and Rain	James Taylor
	Riverboat Set: Denis Dillon's Square Dance Polka, Dancing on the Riverboat	John Whelan
	Packin Truck	Leadbelly
	Ride	Nick Drake
	Sounds of Silence	Simon and Garfunkel
	House of the Rising Sun	Joan Baez
Classical	Six Suites for Cello: Suite 1	Johann Sebastian Bach
	Symphony No. 9, Op. 125: 4th movement (Presto–Allegro assai; "Ode to Joy")	Ludwig van Beethoven
	Gianni Schicci: O mio babbino caro	Giacomo Puccini
	The Tale of Tsar Sultan: Flight of the Bumblebee	Nikolai Andreyevich Rimsky-Korsakov
	Clair de Lune	Debussy
	Marriage of Figaro, K. 492: Overture	Wolfgang Amadeus Mozart
	Madama Butterfly: Un bel di vedremo	Giacomo Puccini
	Ave Maria	Franz Schubert
	The Four Seasons: Spring	Antonio Vivaldi
	Die Walküre: Ride of the Valkyries	Richard Wagner
Jazz	What a Difference a Day Makes	Billie Holiday
	Time Out	Dave Brubek
	The Feeling of Jazz	Duke Ellington
	Stella by Starlight	Herbie Hancock
	Giant Steps	John Coltrane
	The Look of Love	Diana Krall
	All Blues	Miles Davis
	Afternoon	Pat Metheny
	Summer in the City	Quincy Jones
	The Girl from Ipanema	Stan Getz
	Music Dimension 2: Intense and Rebellious	
Alternative	Narcissus	Alanis Morrisette
	Song 2	Blur
	It's the End of the World	REM
	Coming Down the Mountain	Jane's Addiction
	Why Go	Pearl Jam
	Bullet With Butterfly Wings	Smashing Pumpkins
	Bleed American	Jimmy Eat World
	Verse Chorus Verse	Nirvana
	Linger	Cranberries
	Everlong	Foo Fighters
Heavy metal	Fight Song	Marilyn Manson
	Points of Authority	Linkin Park
	Angel of Death	Slayer
	Symphony of Destruction	Megadeath
	Welcome to the Jungle	Guns N' Roses
	Crazy Train	Black Sabbath
	Crawling in the Dark	Hoobastank
	Rollin	Limp Bizkit
	Too Bad	Nickleback
	War	System of a Down
Rock	Mary Jane's Last Dance	Tom Petty
	Jump	Van Halen
	Jealous Again	Black Crows
	Voodoo Child	Jimi Hendrix
	Brown Sugar	Rolling Stones
	YYZ	Rush
	Money	Pink Floyd
	Living on the Edge	Aerosmith
	San Berdino	Frank Zappa
	Living Loving Maid (She's Just a Woman)	Led Zeppelin
	Music Dimension 3: Upbeat and Conventional	
Country	A Better Man	Clint Black
	Please Come to Boston	David Allen Coe
	If the South Would Have Won	Hank Williams Jr.
	Rusty Cage	Johnny Cash
	Ready to Run	Dixie Chicks
	Girls With Guitars	The Judds
	Whiskey River	Willie Nelson
	I'm Out of Here	Shania Twain
	If the World Had a Front Porch	Alan Jackson
	When Love Finds You	Vince Gill

(*Appendix continues*)

Appendix (*continued*)

Genre	Song	Artist/Composer
	Music Dimension 3: Upbeat and Conventional (*continued*)	
Religious	Amen	Larnell Harris
	Rock of Ages	Praise Band
	Where There is Faith	4Him
	Awesome God	Rich Mullins
	Lord I Lift Your Name on High	DC Talk
	Smell the Color 9	Chris Rice
	If We Ever	Take 6
	Come, Now Is the Time to Worship	WOW Worship
	All Rise	Babbie Mason
	Your Love, Oh Lord	Third Day
Pop	I'm a Slave (4 U)	Britney Spears
	We Fit Together	O-Town
	Don't Make Me Love You	Christina Aguilera
	Material Girl	Madonna
	Shake Your Body (Down to the Ground)	The Jacksons
	Tell Me That I'm Dreaming	Backstreet Boys
	Independent Women Part 1	Destiny's Child
	I'm Real (Remix)	Jennifer Lopez featuring Ja Rule
	Bye Bye Bye	N'sync
	My Love Grows Deeper (Everyday)	Nelly Furtado
	Music Dimension 4: Energetic and Rhythmic	
Funk	Superbad Part 1	James Brown
	Celebration	Kool and the Gang
	That's the Way (I Like It)	KC and the Sunshine Band
	Tear the Roof off the Sucker (Give Up the Funk)	George Clinton and Parliament
	It's Not the Crime	Tower of Power
	Dynamite	Sly and the Family Stone
	Pick Up the Pieces	Average White Band
	Shaft	Isaac Hayes
	Ecstasy	The Ohio Players
	Sir Duke	Stevie Wonder
	Music Dimension 4: Energetic and Rhythmic (*continued*)	
Hip-Hop	All Good	De La Soul
	Public Enemy #1	Public Enemy
	Can I Kick It?	A Tribe Called Quest
	Don't See Us	The Roots
	Hypnotize	Notorious B.I.G.
	Funky for You	Common
	Easy Street	Eazy-E
	She's a Bitch	Missy "Misdemeanor" Elliot
	2 of Amerikaz Most Wanted	Tupac Shakur (featuring Snoop Doggy Dogg)
	The Next Episode	Dr. Dre (featuring Nate Dogg, Snoop Dogg)
Soul	Everything Is Everything	Lauryn Hill
	Can't Get Enough of Your Love Babe	Barry White
	If You Don't Know Me By Now	Marvin Gaye
	Cry For You	Jodeci
	L-O-V-E (Love)	Al Green
	Chain of Fools	Aretha Franklin
	Bag Lady	Eryka Badu
	Ain't No Sunshine When She's Gone	Bobby Blue Bland
	Untitled (How Does it Feel)	D'angelo
	I'd Rather Be With You	Bootsy Collins
Electronica	Kalifornia	Fatboy Slim
	Ibiza Mix	Paul Oakenfold
	Violently Happy	Bjork
	Radiation Ruling the Nation	Massive Attack
	Trans-Europe Express	Kraftwerk
	Roll It Up	The Crystal Method
	Never Let Me Down Again	Depeche Mode
	Why Can't It Stop	Moby
	Watercolors	LTJ Bukem
	What Does Your Soul Look Like	DJ Shadow

Received August 5, 2002
Accepted October 15, 2002 ■