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A Comparison of Music Characteristics of Funeral Music from Croatia, the Netherlands, and the United Kingdom

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Abstract

Music forms an integral and essential part of funeral rituals worldwide, but has to date received little systematic research attention. Recent investigations into funeral music used in the Netherlands showed that it is lower in tempo and valence, less energetic, and more acoustic than popular music. Funeral music is also often in a major mode. The present study sought to replicate these findings for a Dutch (NL) funeral music sample and to expand upon previous knowledge by investigating the audio features provided by Spotify, namely: valence, energy, tempo, acousticness, instrumentality, mode, and danceability for funeral music samples from Croatia (HR) and the United Kingdom (UK). First, values of music characteristics for funeral music used in HR, $N = 388$ pieces, NL, $N = 500$ pieces, and UK, $N = 439$ pieces, were compared to values of popular control music from each country separately. Previous findings were replicated: for HR, NL, and UK, funeral music displayed a similar pattern as described above. Second, the values of Spotify audio features for funeral music were compared between countries. Analyses revealed significant differences between NL/UK and HR, namely lower valence and energy and higher acousticness (only HR-UK) and instrumentality for NL/UK compared to HR. Effect sizes were, however, small and are likely due to differences in music selections. These results suggest that, even though there is much diversity in music pieces and songs, funeral music within and across these European countries is more alike than different in terms of its audio characteristics.

Keywords: emotion, funeral music, international comparison, music characteristics, Spotify

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Introduction

Music forms an essential and integral part of many funeral rituals around the world (e.g., Bruin-Mollenhorst & Hoondert, 2018; Caswell, 2012; Emke, 2002; Gammon, 1988; Garrido & Garrido, 2016; Kölbl, 2021; Mills, 2012; Parsons, 2012; Prelovšek, 2021). Despite its importance before, during, and after these farewell rituals (e.g., Bruin-Mollenhorst, 2020; Caswell, 2012; Merrill et al., 2022; Viper et al., 2022), funeral music itself has received little systematic research attention. This is surprising, given music's key role during the ceremony (Bruin-Mollenhorst, 2020), in the experience of consolation (Hanser et al., 2016; Viper et al., 2022), and during the grieving process (Merrill et al., 2022). The present study aimed to replicate recent findings on funeral music used in the Netherlands, which is characterized as lower in valence, energy, danceability, tempo, higher in acousticalness, and more often in a major mode, compared to popular songs in general (Hanser et al., 2022; Mollenhorst et al., 2016). In addition, we investigate whether a similar pattern can be found for funeral music applied in Croatia and the United Kingdom and whether there are differences between these countries for the aforementioned values.

The Changing Nature of Funerals and Funeral Music

Over time, funeral rituals are subject to change. In addition, the functions, types, and repertoires of funeral music, which heavily depend on the region and culture one belongs to, evolve alongside it (Davidson & Garrido, 2016; Emke, 2002; Garrido & Davidson, 2016a; Garrido & Garrido, 2016). Historically, funeral rites and funeral music in (Western) European countries were strongly influenced by Christian traditions (e.g., Bruin-Mollenhorst & Hoondert, 2018; Caswell, 2012; Davidson & Garrido, 2016; Gammon, 1988; Parsons, 2012). Funeral music mainly consisted of songs, for example, specific hymns and regional variations of the lament¹ (Gammon, 1988; Kölbl, 2021; Prelovšek, 2021), sometimes accompanied by instruments, but at other times a cappella. This and the number of songs sung at a funeral depended on what religion one belonged to (Caswell, 2012; Garrido & Davidson, 2016a).

The introduction of cremations at the end of the 19th and early 20th centuries in the United Kingdom and the Netherlands, respectively, substantially affected the choice and use of funeral music (Bruin-Mollenhorst & Hoondert, 2018; Parsons, 2012). Nowadays, cremations are the most common type of funeral in these countries (Bruin-Mollenhorst & Hoondert, 2018; Parsons, 2012; Van der Smissen et al., 2019). Within the British and Dutch crematorium setting, recorded music became the standard due to its low costs, and the increased secularization gave way to a more

¹ It is beyond the scope of this article to provide a full overview of funeral music traditions and specific outings, such as the Croatian lament. For more information see, among others, Gammon (1988), Katić (2013), Kölbl (2021), Prelovšek (2021) and additional ethnomusicological literature referenced in these sources.

diverse and popular repertoire, while classical and religious music remained the norm until well into the 1970s (Bruin-Mollenhorst & Hoondert, 2018; Parsons, 2012). Initially, the choice of music was also limited due to technological restrictions. Crematoriums in the Netherlands, for example, offered standard sets of typically three songs on tape that might be played during short, formal services (Bruin-Mollenhorst & Hoondert, 2018; Van der Smissen et al., 2019). With the development of smaller and more user-friendly sound systems and, more recently, easier (digital) access, the choice of music during a funeral has become almost limitless (see Bruin-Mollenhorst & Hoondert, 2018, also for some additional changes that affected limitations in selection). This fits in with a global shift towards more personalized funeral rituals that, instead of abiding by religious traditions, better fit the wishes of both the deceased and/or bereaved (e.g., Bruin-Mollenhorst & Hoondert, 2018; Caswell, 2011; Emke, 2002; Parsons, 2012).

In contrast, the first Croatian crematorium (Zagreb) was opened in the 1980s, and a second one was opened in 2021 (Osijek). Because of this, it can be asserted that cremations in Croatia are gaining in frequency, but are still less common than in NL and UK which may also be reflected in the choice of music. The focus on personalization, and thus also the selection of music, however, also occurs in communities where cremations are less frequent (Emke, 2002). This increase in personalization can be viewed in light of a re-ritualisation of mourning in which 'the life of the deceased is celebrated' after a period of secularization and less focus on religious traditions (e.g., Caswell, 2011, 2012; Emke, 2002; Garrido & Garrido, 2016; Parsons, 2012; Venbrux et al., 2009; also see Davidson & Garrido, 2016). Additionally, professionals who run funeral homes have become more attentive to both the personal needs and the psychological well-being of the bereaved than to conforming to tradition (Emke, 2002).

Functions of Funeral Music

Music can fulfill various functions during a funeral. These purposes are related to the ceremony, such as (1) background music playing while entering or leaving the ceremony room and (2) music in between speeches that empowers their contents or serves as an illustration of what is said, or music that is more focused on the deceased and bereaved, such as (3) the most liked music of the deceased as an expression of his or her identity, and (4) evoking and the control of emotions (Bruin-Mollenhorst, 2020). A piece of music can simultaneously serve various functions during the ceremony. These funeral-specific purposes align with the primary psychological functions of music listening as identified by Schäfer and colleagues (2013), namely music (1) as self-awareness and as an expression of one's identity, (2) to regulate emotion and mood, and (3) to bolster or express social relatedness. Since most music heard at Dutch funerals reflects some aspect of the individual who passed away, Bruin-Mollenhorst (2020) introduced the concept of the musical eulogy. By listening to music that is the departed's favorite or reflects aspects of their personality,

memory, or a specific relationship with the bereaved, those present at a funeral pay their respects to the deceased. These authors further argued that since most songs are not written explicitly with the departed in mind, for the musical eulogy, the lyrics and their content matter less than the complete piece of music. It may be just some specific sentences, words, the title, or nothing of the lyrics at all, but the music as a whole that relates to the deceased's identity.

The function of funeral music and its selection process extends beyond the funeral ceremony. Music is, for instance, one of the primary sources of consolation after losing a loved one (Hanser et al., 2016). Recent qualitative research further suggests that the process of music selection by the dying and their next of kin can be experienced as consoling both before and, in the case of the bereaved, after the funeral (Viper et al., 2022). Music is a way for the bereaved to evoke personal memories of and experience a feeling of staying connected with the deceased (Merrill et al., 2022; Viper et al., 2022). This connection is considered a continuing bond and may aid the bereaved in their grieving process (Klass et al., 2014; Merrill et al., 2022).

Funeral Music Characteristics

The choice of music matters since it is essential to reflect the departed accurately (Bruin-Mollenhorst, 2020). However, there was, until recently, little systematic research on the possible distinctive features of funeral music. Traditionally, virtually all funeral hymns were in a minor mode, thus sounding sad (Gammon, 1988). Yet, as previously outlined, much of the current funeral music in both the United Kingdom and the Netherlands is popular music (Bruin-Mollenhorst, 2019; Caswell, 2012; Garrido & Davidson, 2016a; Parsons, 2012). However, classical and religious music are still popular funeral choices in the highly secularized Netherlands (Bruin-Mollenhorst, 2019). Australian survey data further suggests that people are inclined to choose positive-sounding music for their own funerals. This choice for happy over sad-sounding music is at least partially dependent on personality characteristics and age (Garrido & Davidson, 2016b). Despite more personal choices regarding music being made, some pieces of music remain popular as funeral music in general. This is probably the result of culture and tradition, the aforementioned personal factors, or aspects of the music and lyrics that make it particularly suitable for this purpose (Bruin-Mollenhorst, 2019).

To investigate the properties of currently used funeral music, Mollenhorst and colleagues (2016) compared the playlist of a Dutch crematorium (including religious and classical music) to lists of popular music (Top 2000, Top 40) in the Netherlands on valence, energy, tempo, and mode². These investigators found that funeral music was lower in valence, energy, and tempo and more often in a major mode than music

² Mollenhorst et al. (2016) used Echo Nest to extract these audio features. This is owned by Spotify.

from popular charts and characterized it as sounding solemn, serene, and tender. These findings were partially replicated and expanded upon by Hanser et al. (2022), who reported that English and Dutch popular funeral songs are lower on Spotify values of valence, energy, and danceability but higher in acousticness than non-funeral music. Funeral music was also more often in a major mode. No significant differences in tempo were found.

Listeners who are in a sad mood tend to prefer music that matches their disposition (Hunter et al., 2011), and (self-selected) sad music may, for example, help the person to cope and acknowledge their feelings of sadness and loss, and to experience consolation (e.g., Eerola et al., 2018; Hanser et al., 2016; Taruffi & Koelsch, 2014; Van den Tol & Edwards, 2013; Van den Tol, 2016). A major mode and fast tempo are often associated with happiness, while a minor mode and slow tempo are commonly related to sadness (e.g., Juslin & Laukka, 2004; Schellenberg & Von Scheve, 2012). Most popular music is in a major mode; however, as this broad genre evolved during the second half of the 20th century, its tempo decreased, and more songs were written in a minor mode. This decrease in tempo was largest for songs in a major mode. Overall, popular music became more sad sounding (Schellenberg & Von Scheve, 2012), with musical cues such as tempo and mode giving mixed messages, resulting in a more complex, mixed affect (e.g., Swaminathan & Schellenberg, 2015). A slow tempo in combination with a major mode is often associated with music sounding tender (Juslin & Laukka, 2004). Music characteristics of funeral music thus suggest it sounds sad and tender, and is of mixed affect (Hanser et al., 2022; Mollenhorst et al., 2016).

The question remains whether these findings on the characteristics of funeral music are specific to the Netherlands or apply in other countries. As said, the selection process of funeral music is highly personal but also depends, at least to some extent, on culture and tradition. Funeral music may include local songs and theme music from popular television shows (Caswell, 2012) and may thus vary considerably between countries. Studies that explore potential cultural differences in the audio characteristics of music used for a specific purpose are still scarce, even though there is reason to assume such differences exist. Recent investigations on music streaming data reveal cultural differences in arousal levels of streamed music (Park et al., 2019), but a relationship with specific listening behavior or function, such as for a funeral, was not considered. Differences, however, also appear in listening to music for mood regulation. For example, the down-regulation of anger in East Asian cultures seems to be associated with energetic music (Liew et al., 2022). To the best of our knowledge, a cross-cultural comparison (here limited to several European countries) of funeral music characteristics is currently missing. The present study considers funeral music used in Croatia, the Netherlands, and the United Kingdom. These countries were selected because of the dates of crematorium appearances and the availability of lists of music used at funerals. Previous

investigations into funeral music used in the Netherlands served as a starting point (Hanser et al., 2022; Mollenhorst et al., 2016).

The Current Study

The present study consists of two parts. First, the Spotify audio features of valence, energy, danceability, instrumentality, acousticness, tempo, and mode of funeral music from Croatia (HR), the Netherlands (NL), and the United Kingdom (UK) are individually compared to values of general popular chart music from the same nation. We expect findings for all countries to reflect those reported earlier in NL: funeral music is lower in valence, energy, danceability, and tempo, higher in acousticness and instrumentality, and more often in a major mode than popular music in general.

Second, the aforementioned Spotify values for funeral music from HR, NL, and UK are compared between countries. Differences may be present due to, for example, variations in funeral traditions or country-specific choices, but since this analysis is exploratory, we did not formulate specific hypotheses for this research goal. Yet, due to its geographical proximity, it is plausible that potential differences between NL and UK are more minor than those between the NL/UK and HR.

Method

Materials

Song Selection: Funeral Music

The selection process was like that of previous research on funeral music in which online sources were consulted (Hanser et al., 2022; Mollenhorst et al., 2016). For a sufficiently large sample of music, information was gathered from multiple websites belonging to funeral homes, crematoria, funeral insurers, musicians, or other funeral-related services that offer help, lists of (often) used music, or examples of what music to use at a funeral. This resulted in selections of $N = 388$ Croatian (HR), $N = 500$ Dutch (NL), and $N = 439$ United Kingdom (UK) pieces of, in the specific country, popular funeral music. These websites were accessed, and Spotify values were downloaded in October and November 2022, and February 2023. NL and UK websites provide lists of recorded music. Table 1 provides an overview of the consulted sources and Spotify playlists.

Live music is the norm in Croatia, although the use of recorded music is increasing, for instance, because of restrictions on live performances during the Covid-19 pandemic (Perinić Lewis et al., 2022). HR websites thus typically offer a repertoire of live music to be played at the funeral instead of the playback of pre-recorded music. The general idea behind these lists, whether pre-recorded or live, is the same: they serve as inspiration for the bereaved when they have to select the most appropriate music for a specific funeral.

Table 1

Overview of Consulted Websites and Playlists for Music Selection

	Website or Playlist
Croatia: Funeral Websites	https://pogrebne-usluge-miraj.hr/pjevanje-i-glazba/ https://glazbasprovod.webs.com/ https://www.brezavocalart.com/sprovodi
Croatia: Funeral Playlist	6mWbXvkCTAxIWkOV3IcdZy?si=08662937cc4646f4
Croatia: Spotify Control Playlists by <i>Hrvatska diskografska udruga</i>	73 priče o albumima: 6M4z6Usrp9r6G2SmQbPqiX?si=1e67710577d14b64 Antologija: 4O4qQJVvChYFrC9MscWSZ?si=19a262fde1a34a79 Uvijek dobre: 5DWhQaFS1JiqUyCOHBQwS7?si=061c7807a4574a33 Top 40: 6Ltgoiot6GR1xE4JCw4fZX?si=598e5f4296d84dae HR Control: 2VvJBUnaG3pGuD4IanzYc9?si=8d4e926bf8604001
Croatia: Control Websites	https://hdu.hr/ https://www.top-lista.hr/www/
NL: Funeral Website	https://tilburg2.plechtigheidonline.nl/musicbook
NL: Funeral Playlist	2a5D6lfo7MI6DyNSftmsu?si=e6de0a61c20e490a
NL: Control Playlist	4FEI2SImiRz81TVB8fPgVe?si=cf2c408311c1429a
NL: Control Website	https://www.top40.nl/bijzondere-lijsten/alle-nummer-1-hits-per-jaar?
UK: Funeral Websites	https://www.funeralpartners.co.uk/help-advice/arranging-a-funeral/music-for-funerals/ https://www.coop.co.uk/funeralcare/music/charts https://www.over50choices.co.uk/funeral-planning/personalising-a-funeral/funeral-music
UK: Funeral Playlist	5Rz79SbbdHbJ3KAj6vGNHj?si=780a49203e404248
UK: Control Playlist	5GEf0fJs9xBPr5R4jEQjtw?si=a2f508714cde4aa2
Every Official UK Number 1 Ever	
UK: Control Website	https://www.officialcharts.com/
Official Charts	

Within the selection of each country, duplicate music was avoided. For example, we only included one version of Gounod's Ave Maria, even though several versions were listed. Unless a specific version of classical or religious music was mentioned, we used the first suggested entry by the Spotify search. Each country had some songs listed that we could not find on Spotify (HR $N = 19$ (5%), NL $N = 22$ (4%), UK $N = 10$ (2%)) and which we thus could not account for in further analyses.

Song Selection: Popular Music (used for the comparison with the funeral music)

Number 1 hit singles from popular music charts served as comparison music,

ascertaining that this music is widely known within HR, NL, and the UK (Table 1). Larger samples more accurately represent the popular music in the three countries, motivating us to include all hit songs, even though this led to unequal sample sizes. For the UK, according to Officialcharts.com, we used number 1 hit singles from 1952 until late 2022 for a total of 1374 songs. Similarly, for NL, we used the number 1 hit singles of the Dutch Top 40 (1965 – late 2022) for a total of 806 songs. For the Croatian selection, we combined several lists (Top 40 of week 46, 2022; *73 priče o albumima*; *Zabavno, Antologija*; and *Uvijek dobre*; these playlists were compiled by Hrvatska diskografska udruga, which keeps track of the Croatian Top 40 since 2012 and curates playlists of older popular music; and compilation albums and a playlist (1950s) by Croatia Records that are listed as HR Control in Table 1) for a total of 857 songs to have a representative sample of older and some newer popular music, since we were unable to find a single source of number 1 hit songs, like the top chart music from the UK and NL.

Spotify Audio Features

Data on audio features were collected from the Spotify website (Spotify for Developers, 2022) through the Application Program Interface (API). The API was accessed through the R-package *spotifyR* (R Core Team, 2022; Thompson et al., 2021). Information was gathered for all individual pieces of music on a track's acousticness (how acoustic a track sounds); danceability (a composite score that takes into account rhythm, beat, and regularity to provide an estimate on how danceable a track is); energy (a perceptual measure on a track's arousal and intensity); instrumentalness (predicts whether a track is instrumental or contains vocals); mode (whether a track is in a major (1) or minor (0) mode), tempo (an estimate of the beats per minute; BPM), and lastly; valence (a perceptual measure on how positive a track sounds. Lower values point towards more negatively sounding music). Apart from mode, higher values indicate an increase in a specific feature. These audio features, or music characteristics, have been used before with funeral music (Hanser et al., 2022). Additionally, these measures have been used to characterize dance music (Duman et al., 2022), music that promotes sleep (Scarratt et al., 2023), music that is used in pain management (Howlin & Rooney, 2021); and to investigate mood-regulation through music (Liew et al., 2022; Vidas et al., 2021).

Statistical Analyses

Analyses were conducted with IBM SPSS 28.0 and R 4.1.1. Analyses consisted of non-parametric tests, due to violations of normality (Shapiro-Wilk test, all $ps < .05$ for all variables), and unequal selection sizes. Potential differences between the funeral and popular music within each country were investigated through a series of independent sample Welch's t -tests on each of Spotify's audio characteristics. We report the effect size of the t -tests as Cohen's d (small 0.2, medium 0.5, and large

0.8; Cohen, 1988). Findings are considered significant at $p = .008$ (.05/6) due to multiple comparisons. The categorical value of mode was investigated through a Chi square test, and its effect size ϕ (small .1, medium .3, and large .5; Cohen, 1988) is reported.

Subsequently, Kruskal-Wallis tests were conducted to compare Spotify audio features between countries. Statistical differences were further explored with pairwise comparisons. The effect size is reported as ϵ^2 (small .01, medium .06, and large .14; Tomczak & Tomczak, 2014). Because of multiple-comparison post-hoc testing, conservative Bonferroni corrections were applied.

Results

Music Characteristics

First, differences between the audio characteristics of funeral and popular music were explored separately for each country (see Table 2). In Croatia, funeral music was significantly lower in danceability, energy, and valence but higher in acousticness than popular music. After correcting for multiple testing, there was no significant difference in instrumentalness or tempo. Effect sizes were medium (danceability and acousticness) to large (energy and valence). Both funeral and popular control songs were more often in a major mode, but funeral music was significantly more often in a major mode than control music $\chi^2 = 6.16, p = .013$ with a small effect-size of $\phi = .07$.

Table 2

Overview of the Mean Values of Music Characteristics of Funeral and Control Songs for Each Country

Music characteristics	Funeral	Control	<i>t</i> -value	<i>p</i> -value	Cohen's <i>d</i>
Croatia (HR)	<i>N</i> = 388	<i>N</i> = 857			
Danceability	.44 (.16)	.53 (.16)	-9.54	< .001	0.58
Energy	.43 (.18)	.60 (.18)	-16.15	< .001	0.99
Acousticness	.57 (.29)	.37 (.28)	11.11	< .001	0.69
Instrumentalness	.04 (.15)	.02 (.08)	2.60	.010	0.17
Valence	.39 (.21)	.58 (.23)	-14.74	< .001	0.87
Tempo (BPM)	115 (31.36)	119 (29.10)	-2.02	.044	0.13
Mode % Major	78.9%	72.2%			
The Netherlands (NL)	<i>N</i> = 500	<i>N</i> = 806			
Danceability	.42 (.17)	.62 (.16)	-21.17	< .001	1.22
Energy	.36 (.20)	.66 (.20)	-26.66	< .001	1.53
Acousticness	.61 (.30)	.24 (.24)	23.43	< .001	1.40
Instrumentalness	.16 (.32)	.04 (.16)	7.95	< .001	0.52
Valence	.34 (.23)	.61 (.25)	-20.38	< .001	1.14
Tempo (BPM)	113 (31.65)	120 (26.17)	-3.74	< .001	0.22
Mode % Major	81.2%	68.9%			

Music characteristics	Funeral	Control	<i>t</i> -value	<i>p</i> -value	Cohen's <i>d</i>
United Kingdom (UK)	<i>N</i> = 439	<i>N</i> = 1374			
Danceability	.41 (.19)	.60 (.16)	-18.54	< .001	1.12
Energy	.36 (.23)	.66 (.21)	-24.14	< .001	1.37
Acousticness	.63 (.33)	.27 (.28)	20.62	< .001	1.22
Instrumentalness	.20 (.34)	.04 (.15)	9.27	< .001	0.73
Valence	.35 (.26)	.60 (.24)	-17.96	< .001	1.02
Tempo (BPM)	111 (31.78)	120 (26.31)	-5.45	< .001	0.33
Mode % Major	85.4%	71.3%			

Note. 1) Mean values are provided for all music characteristics (SD given in parentheses) except for mode, 2) All music characteristics except for tempo and mode have a range from 0-1, 3) BPM = beats per minute, 4) Cohen's *d*: small 0.2, medium 0.5, and large 0.8.

A similar pattern was found for funeral music used in the UK and NL. Funeral music was significantly lower in danceability, energy, instrumentalness, valence, and tempo, than popular music, while values of acousticness were higher for the funeral music selection. Effect sizes were again substantial except for tempo (small). For NL, significantly more funeral than popular music was in a major mode $\chi^2 = 24.18$, $p < .001$, with a small effect of $\phi = .14$. Similarly, the UK funeral sample was significantly more often in a major mode than the popular music selection $\chi^2 = 35.02$, $p < .001$. This effect was also small ($\phi = .14$). Except for tempo, differences found for the HR music were smaller than those found for NL and UK music.

Secondly, funeral music selections were compared to one another to identify possible cross-cultural differences. Kruskal-Wallis tests revealed significant differences between countries for energy, acousticness, instrumentalness, and valence (see Table 3). Effects were small, except for instrumentalness, which was a medium effect. Subsequent pairwise comparisons revealed no significant differences between NL and UK. The Croatian sample, however, was higher in values of energy and valence and lower in acousticness (only for HR-UK) and instrumentalness than those belonging to NL and UK.

Table 3

Kruskal-Wallis Tests of Between-Country Differences for Funeral Music

Music characteristic	χ^2	<i>df</i>	<i>p</i>	ϵ^2
Danceability	5.91	2	.052	.00
Energy*	34.93	2	< .001	.03
HR - UK			< .001	
HR - NL			< .001	
Acousticness*	15.04	2	< .001	.01
HR - UK			< .001	
HR - NL			.018	
Instrumentalness*	79.45	2	< .001	.06
HR - UK			< .001	
HR - NL			< .001	

Table 3 – Continued

Music characteristic	χ^2	<i>df</i>	<i>p</i>	ϵ^2
Valence*	20.17	2	< .001	.01
HR - UK			.001	
HR - NL			< .001	
Tempo	3.67	2	.160	.00

Note: 1) *denotes a significant difference, 2) *p*-values for pairwise comparisons have been Bonferroni-adjusted, 3) ϵ^2 : small 0.01, medium 0.06, and large 0.14.

Discussion

Recent investigations into funeral music used in the Netherlands (Hanser et al., 2022; Mollenhorst et al., 2016) showed that it is lower in valence, energy, and tempo but higher in acousticness compared to popular music in general. Funeral music is also more often in a major mode. The present study analyzed funeral music used in Croatia, the Netherlands, and the United Kingdom based on the following music characteristics: valence, energy, danceability, acousticness, instrumentality, tempo, and mode as obtained from the music streaming platform Spotify.

Our first hypothesis was that comparing funeral music from Croatia and the United Kingdom to popular music from these countries would reveal a similar pattern. The present results confirm this expectation. Additionally, previous findings on the difference between funeral and popular music in the Netherlands were replicated (Hanser et al., 2022; Mollenhorst et al., 2016). Moreover, effect sizes of these differences were substantial. The only exceptions to this pattern are instrumentality and tempo (although trends are visible), which showed no significant difference between funeral and control music in Croatia. This is likely due to the live repertoire in this country, as opposed to the selection of recorded music in the Netherlands and the United Kingdom which also included large orchestral works.

The second analysis addressed possible between-country differences. Given the exploratory nature of this research question, we did not formulate a specific hypothesis, but we nevertheless anticipated minimal differences between the Netherlands and the United Kingdom. This was indeed the case. Moreover, although we found significant differences for the characteristics of energy, acousticness, instrumentality, and valence between Croatian funeral music and that of the Netherlands and the United Kingdom, these differences were minimal at best. These discrepancies are likely due to the lack of (predominantly) instrumental³ pieces of music in the Croatian selection.

³ For all funeral music (1327 pieces), there are negative correlations between instrumentality (all *ps* < .001) and the characteristics of danceability (-.34), energy (-.35), valence (-.28), and tempo (-.14), and a positive correlation with acousticness (.30), which adds to our explanation that fewer instrumental music has led to these differences in values.

Moreover, we analyzed fewer pieces of funeral music used in Croatia, which may also have contributed to these minor differences. The analysis of fewer songs, for example, also underlies the lack of difference in tempo between funeral and control music reported by Hanser et al. (2022) since the tempo of popular music averages out to 120 BPM (see Duman et al., 2022 for a discussion). Yet, the present variations should also not be overstated. The pattern of differences in values between Croatian funeral and popular music is quite similar to that of the two other countries in the present work, and values for both the funeral and popular selection correspond to what one might expect from previous studies (see Hanser et al., 2022; Mollenhorst et al., 2016).

The present findings suggest that the characterization of funeral music in NL as sounding solemn, serene, and tender (Mollenhorst et al., 2016) extends to music used for this purpose in Croatia and the United Kingdom. Despite the sometimes very different tunes that range from theme songs from television or sports, music sung in Dutch or Croatian, and other culturally specific choices, funeral music within and between these countries appears to be more alike than dissimilar, at least when it comes to the investigated music characteristics. Additionally, all three countries are relatively close to one another and have been influenced by Christian traditions. This strong resemblance results in, for example, the presence of local versions of the hymn *Amazing Grace* (NL *Waarheen, Waarvoor*, HR *Milost*) in all three samples. Likewise, multiple compositions of *Ave Maria* were used. Research into the perception of (discrete and dimensional) emotions in film music between Finnish and Spanish also showed few and slight differences between these countries (Fuentes-Sánchez et al., 2021). Differences in the role of, for example, energy and arousal were found between cultures, but these were reported between East Asian, Latin American, and Western cultures (e.g., Liew et al., 2022; Park et al., 2019). In the present study, these variations may be absent or small at best between the geographically and culturally neighboring European regions.

An alternative explanation is that music characteristics other than the ones provided by Spotify reveal cross-cultural differences. Analyses of what can be described as music show that a singular definition of what constitutes music is hard to find and that it depends on more factors than valence, tempo, and mode but also on, for example, pitch (Savage et al., 2015) or the use of specific instruments (Kölbl, 2021).

The present work did not consider lyrics, even though song texts are particularly relevant to sad-sounding and soothing music (e.g., Ali & Peynircioğlu, 2006; Brattico et al., 2011; Fiveash & Luck, 2016; Hanser et al., 2016; Van den Tol & Edwards, 2013). Hanser and colleagues (2022) found more use of second-person pronouns (you, yours) and future-focused words (will, shall) when comparing the lyrics of funeral and popular control songs. These authors reported more positive (e.g., love, sun, stars) than negative words in funeral music, but also more words expressing sadness. Funeral music lyrics are thus somewhat emotionally mixed

(Swaminathan & Schellenberg, 2015). Second-person pronouns are associated with increased popularity and may express a social connection in which listeners think of someone important to them (Packard & Berger, 2020). This makes second-person pronouns particularly relevant to funeral music. Together with the future focus, these words may help the bereaved express or form continuing bonds with the deceased. These combinations (i.e., ‘I will always love you’) may be particularly prevalent in the song title or chorus, which by repetition receives much emphasis (Hanser et al., 2022). These parts of the text may be especially relevant to the song selection for the musical eulogy (Bruin-Mollenhorst, 2020). Replication of these lyrical characteristics in English and other languages is needed because it is evident from previous work that music characteristics alone do not fully explain why some songs are popular as funeral music and others are not. Moreover, a textual analysis may reveal potential differences in thinking about death and mourning, for example, between cultures, but also between listeners with different music genre preferences.

The increasing personalization of funerals and, thus, funeral music may lead to an increasingly diverse and idiosyncratic repertoire. Yet, some music is still chosen more often than others (Bruin-Mollenhorst, 2019). The current findings on how audio characteristics correspond to specific emotions and uses may explain part of this attraction. Personal choices involve different artists but may also have similar audio features. Over time, often-used funeral music may be replaced by newer, then popular songs, but with potentially comparable music characteristics as the present repertoire.

Limitations

The present study is marked by several limitations in addition to the ones already mentioned. First, although Spotify provides basic descriptions of what its music audio features mean (Spotify for Developers, 2022), how these scores are compiled is unclear. Several studies have, however, linked these values to characterize music used for a specific behavior, functions, and certain situations, such as pain management, funeral rituals, leisure, and mood regulation (Duman et al., 2022; Hanser et al., 2022; Howlin & Rooney, 2021; Liew et al., 2022; Mollenhorst et al., 2016; Scarratt et al., 2023; Vidas et al., 2021). Still, carefully considering Spotify values concerning existing databases of, for example, values for music valence, or different methods of extracting audio features from a piece of music is necessary to investigate their validity.

Secondly, since these types of music are still commonly used during funeral rituals, selections of funeral music included classical, religious, and folk music, as listed on the websites we consulted, to form a more valid representation of the funeral music repertoire. These types of music are less likely to appear in the top charts of popular music (even though they may be widely known, see Bruin-Mollenhorst, 2019), which may account for some differences in, for example, instrumentality.

However, differences in the other audio features, as reported in this study, correspond to the pattern found by Hanser and colleagues (2022), who only compared popular funeral music songs to controls. The inclusion of these genres thus seems to be no problem. Moreover, the distinction between popular, classical, and religious music is sometimes neglectable, consider, for example, Beyoncé's *Ave Maria*. Including several different compilation records and playlists for Croatian popular control music may have introduced some bias, such as the underrepresentation of popular music from the 2010s. Relying on a single or more comparable lists is recommended for future study.

Thirdly, the current study is archival. This means that, other than that the music selections are used at funerals or qualify as pop music, we cannot make inferences on specific circumstances or situations under which these songs were selected or any person's specific traits or specific objectives (e.g., to comfort the bereaved or to honor of characterize the deceased) that may underly the choice for particular funeral music. Further qualitative and quantitative investigations should focus on personal preference, personality traits, song appropriateness, cultural norms, and further use of funeral music by the bereaved, as well as the involvement of the bereaved in the selection process and performance of this music. This may provide us with valuable information, given the substantial role of music in mourning and grief processing (Merrill et al., 2022).

Conclusion

The current study reproduced previous findings on the characteristics of Dutch funeral music. It showed that it tends to be lower in valence, energy, and tempo, higher in acousticness and instrumentalness, and more often in a major mode than popular music in general. It further demonstrated that most of this pattern also applies to funeral music from the United Kingdom and Croatia when compared to popular music. Moreover, differences between countries were absent or small, and are likely due to the applied selection method. Personal and local preferences may be responsible for the considerable variation in songs and artists, whereas the underlying music characteristics may, to a great extent, be similar. Future work should consider this personal choice and relevance in more detail. In addition, comparing these values between geographically more distant cultures seems warranted, because of potential differences in, for example, the use of music that is higher in energy for emotion regulation (see Liew et al., 2022). Further investigations should also address song lyrics. The present work and other recent studies that link audio features to specific behavior may help us understand why some music is supporting or helpful in particular situations, which may lead to potential interventions aimed at well-being. Research on funeral music, in particular, is needed given music's importance in the grieving process, the formation of continuing bonds, and how to better understand and aid people in mourning (Merill et al., 2022; Viper et al., 2022).

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