

Thank you for the music: Music as a social surrogate that protects against social threats

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Abstract

Social need fulfillment is imperative to well-being, leading to a strong motivation to ensure that social needs are met. The social surrogacy hypothesis proposes that individuals may use non-human social targets, including television characters, books, or comfort foods, to address social needs. The current work sought to examine the social surrogacy hypothesis in the domain of music. Utilizing both correlational (Study 1) and experimental (Study 2) methodology, the current research suggests that music can provide social benefits in response to social threats. In addition, it suggests that music may operate via multiple social surrogate pathways (Study 1) and that the benefits of music are social in nature (Study 2).

Keywords

social surrogacy, music, belonging, parasocial relationship

When faced with a bad day, many individuals blast the car radio, put in earbuds and envelop themselves in their favorite songs, or sing in the shower. Whether it be a rejection from a friend, lover, family member, or even an awkward social interaction with a stranger, individuals often turn to music when they are feeling lonely (e.g., Derrick et al., 2009; Ter Bogt et al., 2010; Van den Tol & Edwards, 2013). However, the psychological processes related to this phenomenon remain understudied and therefore largely unknown. Although much work has emphasized the importance of social needs for psychological well-being (e.g., Baumeister & Leary, 1995; Cacioppo et al., 2006; Gabriel et al., 2017; Myers, 2000; Williams, 2007), and other work has investigated how music can be used to bond individuals to one another (Coyne et al., 2013; Lonsdale & North, 2011; Tarrant et al., 2000), less experimental work has examined how music listened to in isolation might fill social needs and thus the cause and effect of these relationships is yet unknown (Schäfer et al., 2020).

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We propose the social surrogacy hypothesis as a theoretical basis for understanding and examining how music can be used to provide social resources in response to social threats. According to the social surrogacy hypothesis, music may fill social needs due to the perceived relationships with artists, immersion into the social world of the music, or as a reminder of important others. We hypothesize that music serves as a social surrogate and protects against the negative effects of social isolation.

Music as a social surrogate

Belongingness is a fundamental human need and a major motivator of behavior (Baumeister & Leary, 1995). Social need fulfillment, or sense of belonging, is imperative to optimal functioning, and failure to connect with others can lead to an abundance of negative outcomes, including decreased cognitive performance (Baumeister et al., 2002); long-term health problems (Cacioppo et al., 2006) depression and anxiety (Beck et al., 1974; Brown & Harris, 2001; Slavich et al., 2009); lowered state self-esteem and negative mood (Leary et al., 1998, 1995; Williams, 2007; Williams et al., 2000; Zadro et al., 2004); greater anger and aggression (Leary et al., 2006); and greater loneliness (Qualter et al., 2015). Given these negative outcomes, individuals are strongly motivated to seek out and maintain social connections and feel a sense of belonging with others (Baumeister & Leary, 1995; Gabriel et al., 2016; Hartmann, 2016; Lieberman, 2013; Williams, 2007).

The strength of the need to belong has led to a flexibility in the way it is addressed. For example, people can fill their need for connection through more “traditional” means, such as spending time with friends, family members, and significant others; they also can fill their belongingness needs through more “nontraditional” social strategies – in other words, activities that people don’t typically think of as social (Paravati et al., 2021). These nontraditional social strategies are known as social surrogates (symbolic or non-human social targets; Derrick, 2012; Gabriel et al., 2017; Hartmann, 2016). Social surrogates can buffer against loneliness, isolation, and rejection (Gabriel et al., 2017; Greenwood & Long, 2009; Paravati et al., 2021). We propose that music may fill social needs by serving as a social surrogate.

There are three types of social surrogates: parasocial relationships, immersion into a social world, and reminders of others. We propose that music can operate via all three of these pathways and that this makes it a potent social surrogate. Parasocial relationships are one-sided bonds, such as celebrities and their fans (Gabriel et al., 2016; Hartmann, 2016; Horton & Wohl, 1956). Music may function as a parasocial bond by providing a psychological link to a singer or musical group. In support, survey studies have found that individuals reported that they feel less alone when listening to music because they felt understood by the singer (Saarikallio & Erkkilä, 2007) and that participants “looked for acceptance, comfort and support when they imagined that ‘the music’ could be their friend” (Van den Tol & Edwards, 2013, p. 453). Similarly, researchers have posited that individuals may feel that they share an emotional experience with a musical artist after listening to specific songs (Clarke et al., 2009). This past work suggests that music may provide positive social benefits due to a perceived relationship with the music or the musical artist. Thus, perhaps social needs may be fulfilled when listening to music due to the parasocial relationship one has with their favorite musician.

Immersion into a social world may also play a role in music filling social needs (Frith, 1996). Narratives, such as those found in books or television, frequently lead to psychological immersion into the world of the narrative (Cohen, 2006; Derrick et al., 2009; Gabriel & Young, 2011; Green, 2005; Green & Brock, 2000; Green et al., 2004; Mar & Oatley, 2008). For example, people reading the Harry Potter novels actually begin to feel like young wizards attending Hogwarts

(Gabriel & Young, 2011). That transportation into the social world leads to a sense of belongingness and well-being (Green, 2005; Green et al., 2004). Frith (1996) posited that, when engaging with music, the listener is placed into the world of the music. Similarly, after conducting a daily diary study on individuals' use of music and their affect, Van Goethem and Sloboda (2011) explained music's ability to improve mood as possibly being due to the ability of music to immerse listeners into another world. Thus, it seems possible that immersion into a social world may also contribute to how music can function as a social surrogate to fulfill social needs. Listeners may feel immersed in the world of the music and therefore reap social benefits from engaging with the music.

Finally, music may fill social needs by serving as a reminder of others. Non-human targets can fill belonging needs by reminding people of close others who are associated with the object. This is how comfort foods (Troisi & Gabriel, 2011), household objects (such as a child's blanket or spouse's favorite chair; Niemyjska, 2015), prayer objects (Gabriel et al., 2016), and photographs and letters (Gardner et al., 2005) make people feel connected and secure. There is reason to believe that music may serve as a reminder of others. When asked to report their motivations for listening to music, a common response is that the music reminds the listener of friends, family, or lovers (Clarke et al., 2009; DeNora, 1999; Lonsdale & North, 2011; Schäfer & Eerola, 2020; Van den Tol & Edwards, 2013; Van Goethem & Sloboda, 2011).

Current research and hypotheses

The current work examines whether music is a social surrogate that fulfills social needs. Specifically, we propose the following:

Hypothesis 1 (H1). Individuals turn to favorite music when their belongingness needs are activated and expect to be less lonely when listening to that music.

Hypothesis 2 (H2). Individuals will be likely to endorse using favorite music as a social surrogate in multiple ways (i.e., parasocial relationships, immersion into a social world, and reminders of others) compared with non-favorite music.

Hypothesis 3 (H3). Because music can function as a social surrogate, it can provide social benefits in response to social threats.

Although no other work has looked at these exact hypotheses, they are consistent with previous research on music. For example, Schäfer and colleagues (2020) found that participants were less sad and less lonely after listening to music (both comforting and distracting music) as compared with before listening to music. Although, as the authors acknowledge, the lack of a no music control makes it difficult to know if it was the passage of time or the music itself, their findings are highly consistent with our hypotheses. Similarly, in a correlational and exploratory study, Schäfer and Eerola (2020) found evidence that music may provide a sense of belonging by evoking memories of relationship partners and allowing people to identify with the music. These possible mechanisms are similar (although not exactly the same) as the main mechanisms of social surrogates established in other research (see Gabriel et al., 2016, for a review) and examined in this research. In summary, if our hypotheses are confirmed, the current work – by utilizing a combination of correlational and experimental design and focusing on

established mechanisms of social surrogacy – will build on previous research to increase understanding of music as a social surrogate.

Study 1 examined whether music serves as a social surrogate and via which mechanism(s). We expected that participants would report being likely to turn to music when feeling lonely and would expect to feel less lonely after listening to their favorite music (Hypothesis 1). Furthermore, we expected that the parasocial bonds with their favorite musicians, immersion in the social world of the music, and reminders of close others would all be more related to listening to favorite songs than to unfamiliar songs (Hypotheses 2). Study 2 used an experimental design to test if actually listening to one's favorite music can serve as a strategy to provide feelings of belonging in response to the negative social effects of rejection (Hypothesis 3).

Study 1

Study 1 examined favorite songs as social surrogates by comparing favorite songs to non-favorite songs, non-favorite TV shows, and favorite TV shows (a well-established social surrogate; Derrick et al., 2009). We investigated to what degree participants would be drawn to these activities when lonely, how lonely they would feel when doing them, and how associated each activity was with parasocial bonds, reminders of others, and immersion into social worlds. We predicted that participants would have higher scores on favorite songs in terms of being drawn to them when lonely, feeling less lonely when listening to them, and would associate them more with parasocial bonds, reminders of others, and social worlds compared with non-favorite songs and non-favorite TV shows. Furthermore, we predicted that favorite songs would function similarly to favorite TV shows, which have already been shown to be powerful social surrogates. Specifically, we expected that participants would be similarly drawn to favorite TV shows and favorite music, and would feel similarly less lonely when watching favorite TV shows and listening to favorite music. In addition, because we expect both favorite TV shows and favorite music to be acting as social surrogates, we did not expect any differences between them on scores of parasocial relationships, reminders of others, or immersion into social worlds. In other words, we did not expect to see statistical differences in the type of social surrogate that would imply that one functions more or less effectively than the other; whether it be through favorite music or favorite TV shows, we expected these methods to be associated with parasocial bonds, reminders of others, and immersion into social worlds, and would help people feel less lonely.

Participants and procedure

This study was completed online using Qualtrics software from a setting of the participants' choice. Participants completed an online consent form and then were directed to complete the survey measures before being debriefed. This study utilized a within-subjects design in which all participants responded to items about every activity. All materials and procedures used in the study were approved by the Institutional Review Board of the university of the research team.

A power analysis via G*Power software for a one-way repeated-measures analysis of variance (ANOVA) with four measurements with the aim of yielding a small effect size ($f^2 = 0.10$) generated a recommended sample size of 141 to achieve .80 power and an alpha of .05. As we were expecting small to null effects, we conservatively oversampled. Participants were recruited from the Research Match database that matches volunteers to studies. We had a final sample of

354 individuals (266 female, 73 male, 9 other, 6 did not respond; $M_{\text{age}} = 49.51$, $SD = 16.56$). Of them, 89.5% identified as White, 3.5% as Asian/Pacific Islander, 6.2% as Black, 0.4% and 0.8% as Other; also, 3.8% of participants identified as Hispanic. Given that our final sample was 354 participants, we had adequate sample size to detect a small effect in this study.

Materials

For all scales, participants were asked questions as they relate to the following four activities: "Listen to music- my favorite album/song;" "Listen to music- anything that's on the radio;" "Watch television- a favorite TV program;" and "Watch television- anything that's on."

Social surrogates and loneliness scale. The Social Surrogates and Loneliness activities scale was adapted from past research examining social surrogates (Derrick et al., 2009). For each activity, participants indicated how likely they would be to engage in that activity when they felt lonely and how lonely they would feel when doing the activity. Participants used a scale of 1 (*definitely would not do*) to 7 (*definitely would do*) and 1 (*definitely would feel lonely*) to 7 (*definitely would not feel lonely*). Participants also had the option of indicating "0" (would not do activity). If a participant indicated "0" for an activity, they were excluded from any analysis that included that item.

Parasocial bond. Participants' parasocial bond with their favorite musical artist (as well as their favorite TV show character and musicians and TV show characters more generally) were measured using an adaption of the Parasocial Interaction (PSI) Scale (Schramm & Hartmann, 2008). Participants were asked to what degree (1 = *not at all*; 5 = *very much*) they agreed with 10 statements, including "My favorite musical artist/TV character makes me feel as if I am with someone I know well." These scales all had high reliability (favorite music parasocial relationship (PSR): $\alpha = .90$; control music PSR: $\alpha = .89$; favorite TV show PSR: $\alpha = .89$; control TV show PSR: $\alpha = .90$).

Reminders of others. Although no existing scales assess reminders of others, previous work did code for references to reminders of others in statements made about music (e.g., DeNora, 1999; Van den Tol & Edwards, 2013). Therefore, we turned the type of item coded for into three questions: "When I (listen to my favorite music/watch a favorite TV show), it reminds me of other people with whom I have (listened to the song/watched the show) before," "When I (listen to my favorite music/watch a favorite TV show), it makes me think of someone who is similar to what the (song/TV show) is about," and "I am reminded of other people when I (listen to my favorite music/watch a favorite TV show)." Participants used a scale of 1 (*not at all*) to 7 (*very much*) to rate their responses. These scales all had high reliability (favorite music: $\alpha = .88$; control music: $\alpha = .91$; favorite TV show: $\alpha = .86$; control TV show: $\alpha = .92$).

Immersion into a social world. This subtype of social surrogacy was measured by asking participants eight items adapted from the Transportation Scale (Green & Brock, 2000). For example, "When I listen to my favorite music, I feel immersed in the world of the music." Participants used a scale of 1 (*not at all*) to 7 (*very much*) to rate their responses. This scale had high reliability (favorite music: $\alpha = .86$; control music: $\alpha = .80$; favorite TV show: $\alpha = .83$; control TV show: $\alpha = .79$).

Table 1. Descriptive Statistics for Study 1.

Variable	<i>M</i>	<i>SD</i>
<i>Likelihood of seeking activity when feeling lonely (1–7 scale)</i>		
Favorite Music	5.17	1.75
Any Music	3.48	1.69
Favorite TV show	5.60	1.64
Any TV show	3.65	1.93
<i>Likelihood of feeling less lonely when engaging in activity (1–7 scale)</i>		
Favorite Music	5.53	1.56
Any Music	4.65	1.62
Favorite TV show	5.63	1.48
Any TV show	4.08	1.87

Results

Plan of analysis

To examine our hypotheses, a series of repeated-measures ANOVA were conducted. Because all participants completed the same measures about all four different activities (Favorite Music, Any Music, Favorite TV, Any TV), four levels of the repeated measure (the four activities) were included to examine the effect of type of activity on each outcome. If the assumption of sphericity was not met for each test, the Greenhouse–Geisser correction was applied and reported.

To examine our first hypothesis, that individuals are likely to turn to their favorite music when their belongingness needs are activated and expect to feel less lonely when listening to the music, we ran two repeated-measure ANOVAs. The first ANOVA examined the effect of activity type on seeking out that activity when lonely and the second on feeling lonely when engaged with that activity. To examine our second hypothesis, that individuals will be likely to endorse using favorite music as a social surrogate in multiple ways (i.e., parasocial relationships, immersion into a social world, and reminders of others), we ran three more repeated-measures ANOVAs. These ANOVAs examined the effect of activity on parasocial relationship, immersion into a social world, and reminders of others.

Music and loneliness

To examine our first hypothesis, that individuals turn to favorite music when their belongingness needs are activated, two repeated-measures ANOVAs were conducted. If people use favorite music as social surrogates, then they should be more likely to use them when lonely (ANOVA 1) and feel less lonely when listening to them (ANOVA 2) compared with non-favorite songs and non-favorite TV shows.¹ Mean values and standard deviations for these analyses are reported in Table 1.

As expected, differences were found between which activities people reported as being more likely to turn to when lonely, $F(2.48, 861.73) = 174.23$, $p < .001$, $\eta_p^2 = .33$. A post hoc pairwise comparison using the Bonferroni correction found that people were most likely to turn to favorite TV shows when feeling lonely (all $ps < .001$). People were more likely to turn to favorite music than any music ($p < .001$) or any TV show ($p < .001$). Any music and any TV show did not differ from one another ($p = 1.00$). In summary, favorite music was more appealing to lonely people than other music and general TV shows.

Table 2. Descriptive Statistics for Study 1.

Variable	<i>M</i>	<i>SD</i>
<i>Parasocial relationship (1–5 scale)</i>		
Favorite musical artist	3.12	.76
Musical artist that happens to be on radio	2.22	.65
Favorite TV character	3.15	.71
TV character that happens to be on TV	2.31	.68
<i>Reminders of others (1–7 scale)</i>		
Favorite Music	4.88	1.56
Any Music	3.73	1.62
Favorite TV show	4.16	1.69
Any TV show	3.03	1.59
<i>Immersion into a social world (1–7 scale)</i>		
Favorite Music	4.96	1.31
Any Music	3.17	1.30
Favorite TV show	5.25	1.27
Any TV show	2.90	1.27

Expected loneliness was also found to differ between the activities, $F(2.48, 862.05) = 119.35$, $p < .001$, $\eta_p^2 = .26$. A post hoc pairwise comparison using the Bonferroni correction found that favorite music and favorite TV show did not differ from each other ($p = 1.00$), but people reported feeling less lonely when listening to favorite music than when listening to any music ($p < .001$) and when watching any TV show ($p < .001$). People also reported feeling less lonely when listening to any music than when watching any TV show ($p < .001$). In summary, people felt less lonely when listening to favorite music than other music and general TV shows. This supports our hypothesis (H1) that people turn to favorite songs when lonely, compared with any music or any TV show, and feel less lonely when listening to their favorite songs compared with any music or any TV show.

Music and social surrogates

To examine our second hypothesis, that individuals will be likely to endorse using favorite music as a social surrogate in multiple ways (i.e., parasocial relationships, immersion into a social world, and reminders of others), we ran three more repeated-measures ANOVAs. If people use favorite songs as social surrogates, then they should be more likely to have parasocial relationships with them (ANOVA 1), be immersed into the social world of the music (ANOVA 2), and be reminded of close others when listening to it (ANOVA 3) compared with non-favorite songs and non-favorite TV shows. Mean values and standard deviations are reported in Table 2.

There were differences in the strength of parasocial relationship with each type of target, $F(2.48, 792.56) = 309.30$, $p < .001$, $\eta_p^2 = .47$. Participants reported having stronger parasocial relationships with their favorite musician than any non-favorite musician ($p < .001$), as well as compared with any TV character ($p < .001$). However, participants had similarly strong parasocial relationships with favorite musicians and favorite TV characters ($p = 1.00$).

Next, there were differences in how much each activity reminded participants of important others, $F(2.86, 993.56) = 159.05$, $p < .001$, $\eta_p^2 = .31$. Participants reported that their favorite music was more strongly linked to reminders of others than a non-favorite song, ($p < .001$), a non-favorite TV show ($p < .001$), or a favorite TV show ($p < .001$).

Finally, there were differences in how much participants were immersed into the social world of each type of activity, $F(2.48, 862.05) = 119.35$, $p < .001$, $\eta_p^2 = .26$. Participants reported they were more immersed into the social world of their favorite music compared with non-favorite music ($p < .001$), or non-favorite TV shows ($p < .001$). However, participants were more immersed in their favorite TV show compared with their favorite music ($p < .001$).

In summary, we found evidence that all three kinds of social surrogates were associated more strongly with favorite music than with non-favorite music or non-favorite TV.

Discussion

Study 1 found that people are more likely to turn to favorite music than engage in other non-favorite media activities when feeling lonely, and that individuals expect to feel less lonely when engaging with favorite music than when listening to anything on the radio or watching anything that is on TV. Favorite songs were very similar to favorite TV shows (an established social surrogate). Thus, we found support for our first hypothesis (H1) that individuals turn to their favorite songs when their belongingness needs are activated, suggesting that individuals use music for social purposes.

Study 1 also provided some clarity on the theoretical mechanisms that can explain how music may satisfy social needs. In support of our second hypothesis (H2), all three kinds of social surrogates were associated with favorite songs. People viewed favorite songs (as compared with non-favorite songs and non-favorite TV shows) as related to parasocial bonds, reminders of others, and social worlds. In summary, Study 1 strongly suggests that people turn to favorite songs when feeling lonely, feel less lonely when listening to those songs, and that music can serve as a social surrogate in multiple ways.

It is interesting to consider that individuals were more likely to turn to a favorite TV show than anything else when feeling lonely, and that they felt more immersed in these shows compared with the other stimuli. We did not ask participants if their favorite shows also include their favorite music, and it is worth noting that many TV shows include soundtracks that likely increase the level of immersion the viewer (and simultaneous listener) experiences while engaging with that form of media. However, it is notable that there was no difference between favorite TV shows and favorite songs for the variables of decreasing loneliness and parasocial relationship strength, and favorite music was more strongly related to reminders of others compared with favorite TV shows. This is surprising, considering that TV shows tend to have stronger narratives compared with songs. It may be that songs are more strongly tied to specific memories involving other people that are evoked when listening to the song. Considering these social surrogates were equally effective in reducing loneliness in participants, even with the impressive immersive ability of favorite TV shows, favorite music is clearly a strong social surrogate and is worthy of its own study.

One limitation of Study 1 was that participants were asked to report how they *expected* to feel when listening to music to reduce loneliness. Some research suggests that people are not consciously aware of the positive social impact of using social surrogates such as parasocial relationships (Paravati et al., 2019). Therefore, Study 2 sought to demonstrate via an experimental study that favorite music could provide social benefits when faced with social threats (in this

case, the social threat of exclusion via participation in the game Cyberball), regardless of participants' expectations. Furthermore, Study 2 examined the hypothesis that favorite music provides social benefits, rather than general mood elevation.

Study 2

Study 2 experimentally examined the hypothesis that music can serve as social surrogate and help individuals feel less of the negative effects of social threat (H3). To test this hypothesis, an established social surrogacy paradigm introduced by Derrick et al. (2009) and Troisi and Gabriel (2011) was adapted to the current hypotheses: participants experience a social threat and then engage with the social surrogate (or do not). We expected that after experiencing a social threat (in this case, playing an online game designed to socially exclude participants: Cyberball), participants would feel lower belonging if they were asked to listen to unknown music as compared with if they were able to listen to their favorite song. Specifically, we expected that there would be no differences between participants in the Favorite Music and Control Music condition in their feelings of belonging directly after the Cyberball game (but before listening to music). This would suggest that participants in both conditions were similarly affected by the Cyberball game. However, we did expect to find differences between participants in the two conditions in their feelings of belonging after listening to music, such that those who listened to their favorite music would feel more belonging than those who listened to unfamiliar music. We also expected that this difference would exist even when controlling for positive and negative mood and feelings of belonging before listening to the music. This would suggest that listening to favorite music after an ostracizing event is more beneficial to belonging needs than listening to control music. Finally, we expected that the positive effects of listening to favorite music will be specific to social outcomes (and not other well-established outcomes of rejection), suggesting a social protective effect of favorite music.

Method

Participants and procedure. In this study, all participants first completed consent forms and then filled out information about their favorite things (e.g., favorite color, song, and show). This allowed us to assess their favorite song without drawing attention to music as a variable of interest. Next, they were relocated to a computer where they played Cyberball (and therefore experienced a social needs threat). Following this, participants were randomly assigned to either engage with their favorite music (social surrogate condition) or listen to music selected by the research team (control condition). Then, all participants completed measures of well-being typically used to assess the negative effects of rejection: fulfillment of basic needs during that moment (while filling out the questionnaire), fulfillment of basic needs during the game, state belongingness, and mood. Finally, participants completed demographic items, were debriefed, and were dismissed. All procedures used in the study were approved by the Institutional Review Board of the university of the research team. The basic procedure of the study is outlined in Figure 1.

A power analysis via G*Power software to conduct a between subjects *t*-test with the aim of yielding a medium effect size ($d = 0.50$) yielded a recommended sample size of 128 to achieve .80 power and an alpha of .05. To account for the potential for participants to only partially complete the survey, we recruited 317 undergraduate student participants for this study using a private online platform run by the university's psychology department. However, 32 of these

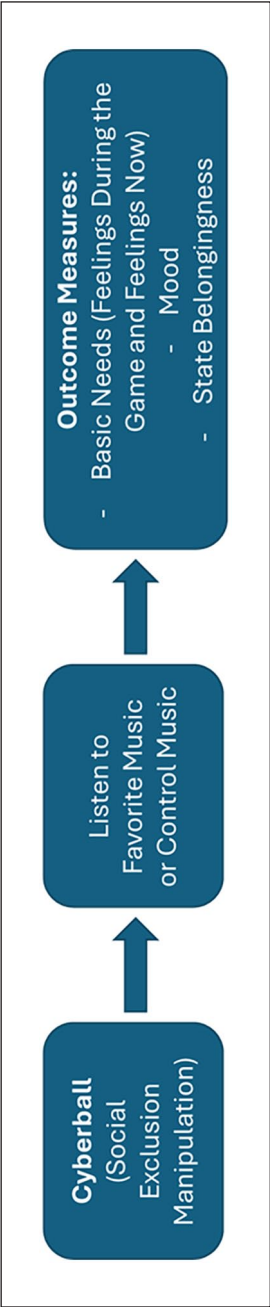


Figure 1. Basic Procedure of Study 2. Participants Engaged in the Social Exclusion Manipulation, Then Listened to Music (Either Favorite Music or Control Music) and Then Answered Questions About Their Feelings Both During the Cyberball Game (Before Listening to Music) and at That Moment (After Listening to Music).

participants did not pass the manipulation check (i.e., said they did not listen to their favorite song even when they did, said that the random song was their favorite song, or were not sure if the song they listened to was their favorite song or not). These participants were excluded from analyses; therefore, the final sample included 285 participants (143 female, 136 male, 6 other). Of them, 54.4% identified as White, 23.9% as Asian, 11.6% as Black, 0.4% as American Indian or Alaska Native and 9.8% as Other; also, 8.1% of participants identified as Hispanic. Their ages ranged from 18 to 45 years ($M_{\text{age}} = 18.99$, $SD = 2.16$).

Materials

Music stimuli. To gather data on their favorite song, participants first completed a questionnaire which asked them about their favorite and least favorite things, such as their favorite TV show, favorite color, and favorite song. Following this, participants engaged in Cyberball (see below). After completing that task, participants were asked to sit quietly for a moment while the research assistant prepared the next step of the study. During this time, following a random assignment algorithm, research assistants queued up a specific song selection for the participant to listen to on their computer. The participants were instructed to listen to the song for 3 minutes. In the Favorite Music Condition, participants listened to a song that they had indicated was their favorite song at the start of the study. In the Control Music Condition, participants listened to an instrumental upbeat song that they likely had never heard before (“Vibes & Sweet” by LiQWYD; <https://www.youtube.com/watch?v=7zaZfCKv370>).

Cyberball. Participants engaged in Cyberball (Cyberball 5.0; Williams & Jarvis, 2006). In this task, participants are led to believe that they are playing an online ball passing game with two unfamiliar peers. However, the other players are actually computerized confederates. Participants are instructed to play the game by tossing the ball to other players by clicking on the player they would like to pass to. This game was specifically coded to ostracize participants and lead their belongingness needs to become activated. For the first five passes in the game, the ball is passed equally between the players, however, for the rest of the 25 passes, the ball is only passed between the confederates and not passed to the participant. This manipulation has been used hundreds of times on tens of thousands of participants and has been found to be effective in engendering social threat (for a review, see Hartgerink et al., 2015; Hay et al., 2023; Mwilambwe-Tshilobo & Spreng, 2020).

Reflexive and reflective needs questionnaire. To measure satisfaction of basic needs, participants completed 20 items assessing how much participants felt belonging, self-esteem, meaningful existence, control and certainty during the task (Hales & Williams, 2018; Williams, 2009). Participants first completed these 20 items in reference to how they felt while they were playing the Cyberball game (Reflexive). Then participants completed the same 20 items in reference to how they feel at that moment (Reflective). An example item from the belonging subscale is “I felt I belonged to the group.” Each subscale of the reflexive questionnaire had good reliability (belonging: $\alpha = .87$; self-esteem: $\alpha = .86$; meaning in life: $\alpha = .86$; control: $\alpha = .74$; certainty: $\alpha = .79$). Each subscale of the reflective questionnaire also had good reliability (belonging: $\alpha = .78$; self-esteem: $\alpha = .82$; meaning in life: $\alpha = .85$; control: $\alpha = .65$; certainty: $\alpha = .82$).

State belongingness. As an additional measure of satisfied state belonging, participants responded to a 10-item scale (adapted from Derrick et al., 2009). An example item from this scale includes “Right now, I feel like I fit in,” $\alpha = .94$.

Table 3. Mean Values (Standard Deviations) for Dependent Variables by Condition in Study 2.

	Favorite music	Control music	
	<i>M (SD)</i>	<i>M (SD)</i>	<i>t-test, p-value</i>
Reflexive Needs (Reflecting on Feelings During Game)			
Belongingness	3.47 (0.94)	3.33 (0.95)	$t(283) = 1.25, p = .21$
Self-Esteem	3.25 (0.86)	3.08 (0.89)	$t(283) = 1.40, p = .16$
Meaningful Life	3.79 (0.97)	3.60 (0.95)	$t(283) = 1.71, p = .09$
Control	2.78 (0.82)	2.80 (0.75)	$t(283) = -0.23, p = .82$
Certainty	4.33 (0.86)	4.24 (0.92)	$t(283) = 0.87, p = .39$
Reflective Needs (Feelings After Music)			
Belongingness	4.64 (0.76)	4.37 (0.80)	$t(283) = 2.99, p < .01$
Self-Esteem	3.96 (0.75)	3.83 (0.81)	$t(283) = 1.46, p = .15$
Meaningful Life	5.09 (0.79)	4.93 (0.85)	$t(283) = 1.67, p = .10$
Control	3.78 (0.80)	3.76 (0.73)	$t(283) = 0.21, p = .84$
Certainty	4.69 (0.89)	4.61 (0.83)	$t(283) = 0.72, p = .47$
Other Measures (Feelings After Music)			
Positive Mood	3.58 (1.20)	3.39 (1.22)	$t(283) = 1.31, p = .19$
Negative Mood	1.97 (0.91)	1.97 (0.90)	$t(283) = 0.03, p = .98$
Belongingness State	4.82 (1.20)	4.52 (1.30)	$t(283) = 2.30, p < .05$

Mood. Mood was measured using the International Positive and Negative Affect Schedule – Short Form (Watson et al., 1988). Participants were given a list of emotions and for each emotion asked to indicate how much they were feeling the emotion in that moment on a scale of 1 (*not at all*) to 7 (*extremely*). Participants responded to 10 emotions (e.g., interested, excited, and enthusiastic) assessing positive affect, $\alpha = .90$. The other 10 emotions (e.g., distressed, upset, and scared) assessed negative affect, $\alpha = .84$.

Demographics. Demographics were obtained by asking participants to report their age, gender, and other basic demographic information at the end of the questionnaires.

Results

Favorite music and belonging

First, we expected that there would be no differences between participants in the Favorite Music and Control Music condition in their responses to the reflexive needs questionnaire (RFQ). Although this scale was completed after both the Cyberball and the music manipulation were completed, participants completed this scale reflecting back on their feelings during the Cyberball game, which was before the music manipulation. As expected, there were no differences between these conditions in any of the subscales of the Reflexive Needs Questionnaire (Table 3). In other words, the two groups were similarly affected by the Cyberball game before listening to music.²

However, the reflective needs assessed well-being after the music manipulation. As expected, we found that participants in the Favorite Music condition reported greater feelings of belonging in the reflective needs questionnaire as compared with participants in the Control Music condition (see Table 3). Participants did not differ on any of the other subscales and there were

no differences in mood between the two conditions. Finally, participants also differed on the state belongingness scale. The specificity of the effects to the two belongingness measures is highly consistent with the hypothesis that favorite music functioned as a social surrogate following the social rejection.

Although the data were consistent with our hypotheses, it is also possible that participants enjoyed listening to their favorite music more than the control and so the effects were due to general positivity rather than social surrogates. To rule out the possibility, we repeated the initial ANOVA while controlling for positive and negative affect. This analysis found that the difference between the two conditions on the belongingness subscale of the reflective needs questionnaire still existed even when controlling for affect, $F(1, 316) = 4.84, p < .05$. Therefore, it is not likely that mere enjoyment of one song over the other accounted for these effects.

In addition, although non-significant, we did also see differences between the two conditions on belongingness scores before the music manipulation (i.e., the reflexive needs measurement). Therefore, to ensure that differences in belonging after the music manipulation were not due to pre-existing differences, we also ran the ANOVA with Time 1 scores (reflexive needs) added as a covariate. The covariate was significant, $F(2, 282) = 41.488, p < .001$. Time 1 belonging (reflexive) did predict Time 2 belonging (reflective). However, even when accounting for those Time 1 scores, the effects of favorite music on belonging at Time 2 were still significant, $F(2, 282) = 7.34, p = .007$. Thus, we can be confident that it was the introduction of favorite music that led to the increase in feelings of belonging and that this was not due to pre-existing differences in belonging. In summary, participants had higher belonging after listening to their favorite music on two different belonging measures, and the effects were not due to mood or to pre-existing differences in belonging.

Discussion

Study 2 provided experimental support for H3, that favorite music may offer social benefits following experiences of rejection. Individuals who were socially threatened and then listened to their favorite music reported greater levels of belonging, on two different measures, as compared with individuals who were socially threatened but listened to unknown music. Study 2 also suggested that the social benefits of music were not due to mood and were specific to belongingness. This suggests a uniquely social role for favorite music. Although music may provide other hedonic and distracting functions, these results suggest that, in times of social need, music has a social power and functions as a social surrogate with the power to provide social resources.

General discussion

Past work has demonstrated the vital importance of social need fulfillment (Baumeister & Leary, 1995; Gabriel et al., 2017), as well as the importance of music (Coyne et al., 2013; Rentfrow & Gosling, 2003) to individuals of all ages (DeNora, 1999; North & Hargreaves, 2000; Saarikallio & Erkkilä, 2007; Tarrant et al., 2000). The current work builds on research that suggests that individuals report turning to music to reduce loneliness (DeNora, 1999; Hargreaves & North, 1999; Hargreaves et al., 2002; Lonsdale & North, 2011; Tarrant et al., 2000), and work examining if this strategy is effective (Schäfer & Eerola, 2020; Schäfer et al., 2020). Our work builds on past work by once again demonstrating that individuals turn to music to reduce loneliness and that this strategy is effective; furthermore, our work suggests a psychological mechanism that makes this strategy effective: social surrogacy.

Study 1 demonstrated that people were more likely to seek out favorite music when feeling lonely over unfamiliar music or an unfamiliar TV show and favorite music is more strongly related to all three subtypes of social surrogacy (reminders of others and immersion into the social world of the music) than unfamiliar music or unfamiliar TV shows. Therefore, we found support for our first hypothesis (H1) that individuals turn to their favorite songs when their belongingness needs are activated as well as for our second hypothesis (H2) that favorite music would be associated with all three kinds of social surrogates (parasocial bonds, reminders of others, and social worlds). This work aimed to broaden the theoretical understanding of social surrogates by extending it to the domain of music, thus bridging the gap between the social psychology and music of psychology fields. Similar to books or television shows (e.g., Derrick et al., 2009), music seems to function to reduce loneliness by helping individuals feel a sense of connection to the social world of the music and lyrics. This is not the same for unknown music, much like it is not the same for watching just anything playing on TV; and it is not the case for listening to pleasant music in general (as evidenced by Study 2). Indeed, people utilize their specific social surrogates in the domain of music and television to reap the psychological benefits of these nontraditional social strategies (Paravati et al., 2021).

Study 2 experimentally demonstrated that music can serve as a social surrogate by providing social benefits following social threats. Therefore, we found support for our third hypothesis (H3) that music can function as a social surrogate and provide social benefits following social threats. Participants who listened to favorite music after being ostracized showed greater feelings of belonging across two different scales as compared with participants who listened to unknown music. Importantly, this effect was specific to social outcomes and not to other outcomes of rejection. In addition, the effect was not simply due to increases in mood that participants may have experienced from listening to a familiar and more enjoyable song. When controlling for positive and negative mood, participants in the favorite music condition still had higher belongingness scores than those in the control music condition. The effect was also still significant when controlling for initial levels of belonging. Therefore, listening to one's favorite music after a rejection experience provided a specifically social benefit by increasing feelings of belonging compared with control music.

The combination of the two studies suggests that the positive effects of music on belonging (Study 2) may be due to the music reminding people of close others, feeling as if the lyrics suggest an understanding of their life, or feeling a connection to the musical group/singer (Study 1). However, the relative strength of those different social surrogates in providing relief from rejection was not measured. Future research may want to examine which is most powerful and if there are individual differences in which people tend to be affected by different surrogates.

Future research should also continue to explore the contexts in which music can serve as a salve for social wounds. It may prove differentially effective at negating different kinds of social threats and future experimental studies could test threats beyond the Cyberball manipulation to better understand these possibilities. Future work could also collect data regarding the patterns individuals follow in their music listening. Our work utilized both retroactive self-report (in Study 1) as well as an in-person listening activity (Study 2) to study music listening in two distinct ways. However, in daily life, some avid music listeners may listen to music before, during, and after social threats, whereas other individuals may only turn to music after a social threat has occurred and they feel drawn to a social surrogate. By looking into these differing behavior patterns more thoroughly, researchers may better understand the differing patterns of utilizing music as a social surrogate in individuals' daily lives, as well as how these differing patterns may lead to more optimal social need fulfillment.

It is also possible there may be differences among age groups in how individuals use music as a social surrogate. Therefore, future work could extend the current work by looking more specifically at individuals in various age cohorts and determine if individuals utilize musical social surrogates in unique ways at different moments during their lifespan.

Notably, our current work utilized an older sample in Study 1 ($M_{\text{age}} = 49.51$, $SD = 16.56$) compared with Study 2 ($M_{\text{age}} = 18.99$, $SD = 2.16$) which allows us to more accurately generalize our findings about the effectiveness of music as a social surrogate to individuals in general, rather than to a specific age group. Based on previous research, we do not believe the use of music as a social surrogate would differ across the developmental lifespan. Many studies demonstrated that individuals of various ages report using music to help them (North & Hargreaves, 2000; Saarikallio & Erkkilä, 2007; Van den Tol & Edwards, 2013; Van Goethem & Sloboda, 2011). Importantly, individuals of all ages seem to share this motivation, as it has been not only reported in studies utilizing traditional middle-aged samples (DeNora, 1999), but also has been identified in studies examining adolescent samples (North & Hargreaves, 2000; Saarikallio & Erkkilä, 2007; Tarrant et al., 2000). Thus, it does not seem likely that one age group would use music as a social surrogate more than another, or that it would be a more effective strategy for one particular demographic, but future work could thoroughly examine this thought-provoking possibility.

Future work may also experimentally test how listening to music that serves as each type of social surrogate may relate to actual feelings following a rejection experience. For example, do people benefit more from music that reminds them of others when suffering a rejection at the hand of another? Does ostracism from a social group make music that pulls one into a social world more or less effective? Similarly, are there individual differences in which social surrogate pathways are more important? Future research can examine these issues by looking more specifically at how each pathway of social surrogacy (reminders of others, parasocial relationships, and immersion into a social world) mediates the positive social benefits of music.

Taken together, these studies extended the current knowledge of social surrogates to the domain of music, though they also leave much to be discovered. Importantly, these studies provide a starting point for future studies that, with improved designs and manipulations, may better inform the current field of social surrogacy. Much like many individuals turn to ABBA music when they are feeling lonely to feel happy again, future work may demonstrate that the sound of one's favorite music can elevate spirits, even if they are in a laboratory rather than at the disco.

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Supplemental material

Supplemental material for this article is available online.

Notes

1. This hypothesis could be tested using a series of fixed effects hierarchical regressions. Analyses were also conducted using this method, and the results were highly consistent with the findings reported here. Details on this additional analysis can be found in the Supplemental Materials.

2. Due to data collection constraints, we were not able to fully cross this design with a non-rejection control condition. Thus, although we can say that the two groups were similar in scores on the reflexive needs questionnaire, we cannot say, based on this data, that they were negatively affected by the rejection. However, our confidence in their lowered well-being is bolstered by two things. First, hundreds of other Cyberball studies that have found that this manipulation leads to lower reflexive needs. Second, we were able to collect additional data collected during a different semester in which we found that (a) rejection led to lower scores on all reflexive needs subscales and (b) rejected participants scored very similar to participants in this study whereas non-rejected participants did not. Details of this study and its results can be found in the Supplemental Materials.

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