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Associations Between Shared Musical Engagement and Parent–Child Relational Quality: The Mediating Roles of Interpersonal Coordination and Empathy

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ABSTRACT

Parent–child musical engagement in childhood and adolescence was assessed as a predictor of relational quality in emerging adulthood. From a perspective grounded in the communicative dynamics of musical engagement, this effect was hypothesized to be mediated by perceptions of interpersonal coordination and empathy between parent and child. Support was found for such mediated effects, particularly with coordination as a mediator. Results persisted when controlling for other forms of positive parent–child activity, thus illustrating the specific relational power of musical engagement, and more generally the importance of attending to *what* parents and children are doing when they interact.

We do not need science to tell us that music is powerful. It can communicate feelings without a word; combinations of rhythms, pitches, and timbres elicit intense emotional and physiological responses. Music causes physical movements, such as dances that are synchronized to beats (Patel, 2014). When two people move together in time, they become coordinated with one another in ways that promote interpersonal liking and affiliation (Hove & Risen, 2009). In children, rhythmic synchrony enhances feelings of closeness and similarity (Rabinowitch & Knafo-Noam, 2015) and engagement in musical activities elicits cooperative and prosocial behaviors (Kirschner & Tomasello, 2010). Thanks to a growing body of scientific research, we are gaining insight into *how* music moves us emotionally, *why* it affects our communication with others, and in what ways interpersonal relationships benefit from shared musical engagement.

Connections between communication and music have not been extensively examined in the field of communication. Nonetheless, music is inherently communicative. Evidence and theory suggest that musical behaviors were communicatively important from the beginning of human civilization (Huron, 2001; Mithen, 2005). Playing music often involves talk that can touch on deep emotional issues (e.g., when musicians discuss musical expression in rehearsal: Murnighan & Conlon, 1991), and requires nonverbal communication during play to achieve a coordinated and effective performance (Kawase, 2014). Dance is inherently communicative (Pines & Giles, 2018). Many forms of *non*-musical communication also involve musical features—intonation, rhythm, timing, and call-and-response, for instance (Malloch & Trevarthen, 2009). Music is communicative in diverse ways.

Our first shared musical experiences, like our first encounters with verbal and nonverbal communication, are typically with parents. The type and frequency of parent–child musical interactions change with the relationship’s evolution, but shared engagement with music is not

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uncommon across the parent–child relational lifespan. Can these shared musical experiences positively influence relational quality?

The purpose of this study is to examine two forms of parent–child musical engagement (structured and casual) in childhood and adolescence as specific contexts of parent–child communication. We explore whether these musical activities are associated with relationship quality by assessing the child’s perceptions of support and depth, conflict, closeness, and shared identity with the parent during emerging adulthood. We focus particularly on two potential mediators of these effects—interpersonal coordination and empathy (see [Figure 1](#)). In this introduction, we discuss the concepts and associations outlined in [Figure 1](#), moving from musical engagement, through coordination and empathy, to discussion of relationship quality. To close the introduction, we note developmental trends in the frequency of parent–child musical engagement that might influence the strength of the mediated effects in the figure.

Shared musical engagement

From composition to concert-going, musical engagement takes many forms. Individually, musical engagement can be a deeply personal and moving experience, but *shared* musical engagement involves collaborative, communicative, and coordinated interaction that has benefits for the self and interpersonal relationships (Woody & McPherson, 2010). All shared musical activity, however, is not alike; our paper distinguishes the following two forms.

Structured musical engagement

Some shared musical activities require conscious organization and structured coordination. These include the choreographed multimodal movement fundamental to a dance performance, the perfect interplay of melodies and harmonies necessary for a choral ensemble’s success, and the precise interpersonal communication between musicians developing a shared artistic vision.

Joint structured musical engagement involves participatory activity that parallels music’s organization (e.g., dipping a dance partner at the end of a song). Music is at the center of attention in structured engagement (Bayley, 2011; Murnighan & Conlon, 1991), although other components will also influence the creative process (e.g., interpersonal dynamics). Structured engagement likely involves musical activity that is central to the participants’ personal identities (MacDonald, Hargreaves, & Miell, 2002). Such engagement elicits intense emotional responses among participants, responses that may require verbal negotiation if competing aesthetic perspectives arise (Murnighan & Conlon, 1991; Woody & McPherson, 2010). Verbal and nonverbal communication in rehearsal influences the coordination and synchronization of performance. Hence, shared structured musical engagement involves intense engagement with music, and high levels of emotional and temporal attunement among collaborators.

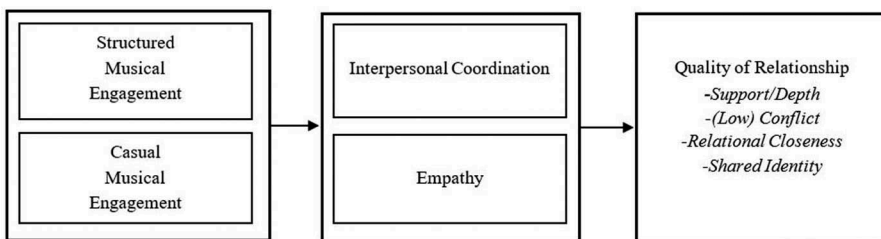


Figure 1. Illustration of theoretical model. Casual and structured musical engagement in parent–child relationships positively influence interpersonal coordination and empathy, which subsequently influence four indicators of parent–child relationship quality. This process is hypothesized to occur for parent–child musical engagement that occurs in both childhood and adolescence. However, as described in the manuscript, we predict stronger effects for musical engagement occurring between parents and older (as opposed to younger) children.

Casual musical engagement

Casual engagement with music, more common for most of us, often happens incidentally. It includes the spontaneous synchronization of dancing around the house, turn-taking in singing karaoke duets, a conversation about a favorite band, and the coordinated chaos of mosh pits. Casual musical activity typically requires less time commitment than structured engagement—exchanging opinions about a song takes less time than writing the song. Joint casual musical activity does not require formal musical knowledge (e.g., attending a concert), and although these activities can be central to one's identity, they need not be. Casual engagement with music can trigger intense affective responses (Lamont, 2011). However, in contrast to structured engagement, these are responses to *others'* musical production. Casual verbal and nonverbal communication about music is likely to be extemporaneous (e.g., “This song describes exactly how I feel about my ex”; swaying together during a concert). Although sometimes less intense than shared structured engagement, casual musical engagement also promotes conversational coordination, physical synchrony, and joint emotional responses.

We hypothesize that these forms of musical engagement have consequences for interpersonal relationships, in part due to the mediating process variables described next.

Mediating process variables: interpersonal coordination and empathy

Interpersonal coordination

When people behave in ways that are mutually arranged, synchronized, or are cooperatively patterned, they are engaged in interpersonal coordination. This coordination can occur in dyads or larger groups. Quarterbacks coordinate with receivers to successfully transfer a football. Surgeons and nurses coordinately action to effectively perform an operation. Coordination can arise from in-time physical synchrony, and need not be a conscious endeavor. Structured, goal-oriented tasks (e.g., winning a game, healing a patient) require conscious cooperation. Spontaneously falling into step with another person does not (Nessler, Kephart, Cowell, & De Leone, 2011). Behavioral coordination (e.g., gaze or posture matching) with a conversational partner is communicative, with a range of socially beneficial outcomes (Giles, 2016). For example, in the context of the parent–child relationship, longitudinal research reveals that parent–infant synchrony positively influences the child's self-regulation, behavior, moral codes, and empathic abilities in social situations into adolescence (Feldman, 2007).

Interpersonal coordination benefits groups and interpersonal relationships. Militaries use measured marching and chanting cadences to signal group strength (McNeill, 1995), and walking *in step* with someone generates stronger feelings of connectedness than merely walking *together* (Wiltermuth & Heath, 2009). A self-other identity overlap happens in response to joint synchronization; when brains and bodies function simultaneously with mutual coordination and awareness, the cognitive-behavioral processes that take place activate a “mirror neuron” system response among partners (Hove & Risen, 2009). This self-other overlap may help explain why synchronous action leads to feelings of similarity that result in compassion and altruism (Valdesolo & DeSteno, 2011) and why cooperation emerges in children who engage in temporally coordinated interaction (Rabinowitch & Meltzoff, 2017).

Due to the temporal structure of music's beats and pulses, social musical interaction provides a rich environment for synchronous and coordinated behavior. Music's auditory cues inspire the body to move in time with it rhythmically—a phenomenon called entrainment (Patel, 2014). From foot tapping to playing music, we entrain. When this occurs in a social context, not only do we synchronize with the music, but we also entrain and synchronize with others (Cross & Morley, 2009). Collaborative musical engagement (e.g., dancing, playing instruments) involves cooperation among participants: beyond synchronization, musicians must adjust their volume relative to others, and dancers must adjust the dynamism and direction of their movements with one another. Mutual time keeping and coordination is facilitated by music's auditory signals. Music provides a rhythmic

framework that enhances interpersonal coordination. Of course, music does not just coordinate our actions. It also connects us emotionally, and hence we next discuss connections between joint musical engagement and empathy.

Empathy

Empathy is the “capacity to (a) be affected by and share the emotional state of another, (b) assess the reasons for the other’s state, and (c) identify with the other, adopting his or her perspective” (De Waal, 2008, p. 281). This definition captures the complexities of studying empathy, which comprises multiple interrelated cognitive and affective dimensions (De Waal, 2008; Reniers, Corcoran, Drake, Shryane, & Völlm, 2011). Cognitive empathy (perspective-taking) is recognizing and understanding others’ feelings, and being able to place oneself into their situation (Gasiorek & Ebesu Hubbard, 2017; Shen, 2010). Affective empathy is characterized by feeling another’s emotions, while maintaining a sense of self as distinct from the other (Decety & Jackson, 2006). Associative empathy blurs the distinction between the self and other, resulting in feeling the other’s experience as if it were one’s own (Decety & Jackson, 2006; Shen, 2010).

Because empathy requires redirecting one’s focus from the self to other, all forms of empathy have benefits for interpersonal relationships. Individuals who exhibit empathic concern are likely to engage in prosocial behaviors like helping and cooperation (Smith, 2006), which increase depth and quality in social interactions. Partners who effectively pair cognitive and affective aspects of empathy produce an emotionally rich communication environment, resulting in increased relationship quality (Meeks, Hendrick, & Hendrick, 1998). Empathy is also associated with a self-other overlap—experiencing empathy can lead to confusion of other and self, and thus to feelings of greater closeness to the other (Aron, Aron, & Smollan, 1992).

Music influences empathy. As a form of emotional communication that lacks semantic meaning (Cross, Laurence, & Rabinowitch, 2012), shared musical experiences are shared emotional experiences—often among the more intense emotional experiences humans have (Lamont, 2011). Simply listening to music activates areas of the brain associated with empathy, positive affect, and pleasure (Lamont, 2011; Rabinowitch, Cross, & Burnard, 2013), which contribute to satisfying relationships (Guerrero, Farinelli, & McEwan, 2009; Robins, Caspi, & Moffitt, 2000). These emotions may be triggered by the release of oxytocin, a hormone strongly linked to social bonding and that facilitates empathy (Clarke, DeNora, & Vuoskoski, 2015; Lamont, 2011). Rabinowitch et al. (2013), as well as Kirschner and Tomasello (2010) demonstrate that shared musical activities increase empathy among children.

Quality of relationship

Due to the processes outlined thus far, we believe that joint musical engagement can benefit a variety of parent–child relational outcomes. The outcomes we examine are widely used in interpersonal research (Baym, Zhang, Kunkel, Ledbetter, & Lin, 2007; Canevello & Crocker, 2010). The concepts are related, but each also captures a unique aspect of relationships (Crespo, Davide, Costa, & Fletcher, 2008). We examine the outcomes independently to expand our understanding of how music’s capabilities relate to each of them in the parent–child relationship. Below, we discuss the importance of each as an indicator of relational quality.

Support refers to the extent that a person believes he/she can turn to a relational partner for help and guidance in times of need. *Depth* refers to the respondent’s perception that the relationship is significant and secure, and that there are few repercussions or costs (e.g., guilt) associated with turning to their partner for support. In a low depth relationship, a partner may be perceived as available for support, but high emotional costs (low depth) might discourage requests for assistance (Pierce, Sarason, & Sarason, 1991). In high support/depth relationships, partners manage stress better, are healthier, and report more life satisfaction (Sarason, Sarason, Shearin, & Pierce, 1987). Parental support predicts the quality of adolescents’ peer and partner relationships (Tuggle,

Kerpelman, & Pittman, 2014). In intergenerational familial relationships, supportive communication relates positively to perceptions of shared family identity, which is associated with positive attitudes toward elder partners (Soliz & Harwood, 2006).

Conflict is defined by Pierce et al. (1991) as “the extent to which the individual experiences angry or ambivalent feelings regarding the other person” (p. 1031). While conflict is an inescapable component of close relationships and can be beneficial when managed effectively (Yarnell & Neff, 2013), harmful conflict (our focus) has lasting, negative effects on the partners’ communication and relationship (Canary, Cupach, & Messman, 1995).

Relational Closeness is the degree to which respondents perceive interconnectedness or overlap with a relational partner (Aron et al., 1992). Close partners believe that their relationship is stable, which supports open, honest communication, and reduces conflict (Rispen, Greer, Jehn, & Thatcher, 2011). Close partners do not worry that airing grievances or disagreements will end the relationship (Eckstein, Leventhal, Bentley, & Kelley, 1999).

Shared Family Identity is the feeling of belonging to a common group. It is associated with reduced conflict, a sense of similarity and shared fate, and positive emotions toward others in the group (Gaertner & Dovidio, 2000). The parent–child relationship is part of a larger family unit, but being in a family does not necessarily translate to perceptions of common identity. For adolescents, feelings of shared belonging with parents help them navigate daily stresses (Soliz & Harwood, 2006). Relational closeness and shared family identity are distinct—it is possible to feel close to someone without perceptions of a common group identity and vice versa.

Parent–child relationship development and musical engagement

In early childhood, parents are caregivers, teachers, playmates, and protectors. Parents usually create rules for acceptable behaviors, and young children strive to adhere and conform to the family group’s norms (Berndt, 1979). The child’s identity development is largely in the family context (Jenkins, 2014), and in middle childhood (about 9 years old), children report their parents as their primary source of support (Furman & Buhrmester, 1992). During this phase, as parents help children navigate first experiences, attachment is generally strong (Brumariu & Kerns, 2011). Parents and children spend more time together in early and middle childhood than in later years (Laursen & Collins, 2004), hence autonomy is rare. Levels of conflict between parent and child are high in toddlerhood when the child is learning how to navigate social situations. These conflicts touch on emotions and behavioral consequences (Laible, Panfile, & Makariev, 2008), but the negative effect associated with the conflict typically levels out through early and middle childhood, until adolescence (Laursen & Collins, 2004).

Children’s early introduction to music and musical participation is generally with a parent. Lullabies calm infants to sleep, children absorb their parents’ musical preferences on car rides, and joint engagement occurs in physically interactive musical games like *Pat-a-Cake* (which stimulates mimicry), or in call-and-response songs like *Who Ate the Cookies from the Cookie Jar?* Such songs promote multimodal parent–child interaction in early childhood, enhancing the pair’s synchrony, coordination, and emotional communication (Creighton, 2011). Early parent–child musical interactions enhance bonding and emotional communication (Creighton, 2011). Music-like phenomena are apparent in *non-musical* interaction between parents and prelinguistic children (Malloch & Trevarthen, 2009).

In adolescence, a decline in parental supervision affords children more autonomy, with more opportunities to meet people from different groups and to explore identities outside the family (Coleman, 2011). Adolescents rely more on peers than parents for social support (Coleman, 2011), and as identification with peer groups increases, perceptions of the parental relationship change. Compared to pre-adolescence, adolescents view their relationship with their parent as involving more difficult communication (Barnes & Olson, 1985), as well as reduced closeness and cohesion (Collins & Russell, 1991). Adolescence features more, and increasingly unpleasant, parent–child

conflict (Laursen, Coy, & Collins, 1998). In the pursuit of an independent social identity, many adolescents spend more time with peers away from home, adopt tastes different from those of the family, and increase peer conformity (Hopkins, 1983). Thus, adolescents become enmeshed in a struggle between competing parent versus peer group identifications (Brenick & Romano, 2016). Often, the reduction in closeness reverses course post-adolescence, when children begin to perceive parents as an important support system once again (Furman & Buhrmester, 1992). This is not, however, necessarily a reflection of increased depth, but perhaps is instead due to physical autonomy and distance, reduced accountability to the parent, and the ability to share fewer details about their lives (Arnett, 2004).

Adolescents consume more music than any other age group (Bonneville-Roussy, Rentfrow, Xu, & Potter, 2013). Music is functional for adolescents in management of mood and social group identities (Rentfrow, Goldberg, & Levitin, 2011). To find commonalities with their peers, adolescents may listen to their friends' musical preferences, and in the pursuit of an autonomous identity they may seek out music that contrasts with their parents' tastes (Campbell, Connell, & Beegle, 2007). Thus, their music-making is more likely to be with peers in organized school groups or garage bands than it is with their parents—while their musical engagement is increasing overall, their shared engagement with their parents is likely to be decreasing.

Predictions

To summarize, we predict that parent–child relationships benefit from musical engagement because that engagement involves communication that enhances interpersonal coordination and empathy, each of which has positive relational outcomes. We predict these effects to be stronger with structured musical activities that require verbal and nonverbal communication to work through the creative process, more intentional coordination, cooperation and synchrony, and more other-focused attention. We also expect stronger effects when parent–child musical engagement occurs during adolescence rather than earlier in childhood, because parent–child musical engagement is prevalent in early childhood but rarer, and hence perhaps more influential, in adolescence. Adolescence is also a time when music is becoming more important in general to the child. These predictions are collected in the following hypotheses.

H₁: Shared parent-child musical engagement will be positively correlated with the child's perception of parent-child relational quality.

H₂: The effect in H1 will be mediated by a) interpersonal coordination and b) empathy.

H₃: The effect in H1 will be stronger from structured musical engagement than from casual musical engagement.

H₄: The effect in H1 will be stronger for shared musical engagement that occurs after age 13 than that which occurs between ages 6 and 13.

Method

Participants

Undergraduate students ($N = 173$) from a large southwestern U.S. university completed an online questionnaire in exchange for course credit. Of the 173, two were eliminated because they did not wish to have their data used and 14 were removed due to incomplete or missing

data, or because they failed attention check questions (e.g., “please move this slider to 100”). The final sample ($N = 157$) was mostly female (70.1%) with a mean age of 21.4 years ($SD = 4.02$).

Procedure and materials

After consent, but prior to answering other questions, participants selected the parental figure with whom they spent the most time while growing up. Biological mothers were most commonly selected (79.6%; biological fathers 19.1%; non-biological mothers 1.3%). Subjects were asked to respond to the questionnaire with that parental figure in mind. Respondents were asked to *recall* the frequency with which they engaged in musical and non-musical activities with the parent during their childhood (ages 6–13) and adolescence (ages 14+). They then answered questions concerning their *current* degree of interpersonal coordination, empathy, and relational quality with the parent.

Predictor variable: shared musical engagement

Due to a lack of existing measurements, a 10-item shared musical engagement questionnaire (SMEQ) was developed for this study to measure the frequency with which parents and children engaged in musical activities together (see Table 1 for the final nine items; as described below, one item was deleted). Six questions asked about activities involving musical coordination and synchronization (e.g., playing instruments together), two questions asked about shared listening experiences either through media or in live venues, and two questions concerned talking about music. The SMEQ was presented twice for respondents to report how frequently they engaged in the activities with their parent between ages 6 and 13, and from age 14 to the present. Responses were on a 5-point scale (*never to very frequently*).

We anticipated two factors would emerge, distinguishing structured and casual musical engagement. This was examined with exploratory factor analysis using principal components extraction and varimax rotation. Examination of eigenvalues and the scree plot clearly indicated a two-factor solution, with one item (pertaining to singing in organized religious or community groups) loading on both factors. That item was discarded, and the remaining nine items demonstrated a clean and consistent two-factor solution in reports for both age ranges (see Table 1). A six-item measure of *casual musical engagement* included talking about music, casual dancing, and shared music listening (at ages 6–13 $\alpha = .84$; age 14+ $\alpha = .89$). A three-item measure of *structured musical engagement* involved playing musical instruments together and dancing in organized groups (at ages 6–13 $\alpha = .73$; age 14+ $\alpha = .81$).

Table 1. Shared parent–child musical engagement factor analysis results.

	Age 6–13		Age 14±	
	Casual	Structured	Casual	Structured
Sang the same songs while doing chores around the house, riding in the car, or just hanging out.	.777		.825	
Actively listened to music with the sole purpose of sharing the music.	.768		.834	
Talked about music for which the two of you had a shared liking.	.757		.872	
Danced to music around the house or at family functions.	.743		.765	
Talked about music that was liked by one of you, but not the other.	.665		.771	
Attended live concerts or music festivals.	.653		.635	
Played musical instruments in organized bands, symphonies, or orchestras.		.877		.888
Played musical instruments around the house or at family functions.		.814		.821
Danced to music in organized dance groups.		.673		.819

Note. Factor loadings $<.4$ are deleted for visual clarity.

Mediator variables: empathy and interpersonal coordination

Empathy

We adapted the State Empathy Scale (Shen, 2010) to solicit information on the child's view of their parent. Participants recalled the last time they saw their parent experience a strong emotional reaction that did not directly involve them, and then rated their level of agreement with 12 statements measuring three dimensions: Cognitive empathy (e.g., "I could see my parent's point of view" $\alpha = .83$); Affective (e.g., "I could feel my parent's emotions" $\alpha = .79$); Associative (e.g., "I could identify with the situation my parent was in" $\alpha = .84$) All items were rated on 5-point scale from *not at all to completely*.

Coordination

We added items capturing the full range of synchronization, cooperation, and coordination to Harwood, Qadar, and Chen's (2016) measure. This yielded an eight-item measure assessing the child's perception of coordination during *non-musical* activity. Thinking about times when they and their parent need to complete tasks or engage in joint activity, subjects rated how much they: felt in "synch" with one another; felt like they "clicked" with one another; worked seamlessly to complete the task; felt like they were coordinated; felt like they cooperated with each other while completing the task at hand; felt like they were a "unit"; moved or spoke in the same way almost at the same time; and felt that there was a mutual desire to help the other person. Ratings were on a 0–100 scale (*not at all – totally*; $\alpha = .95$).

Dependent variables: relational quality

Support/depth

Support and depth of the relationship was measured with eight items from the Quality of Relationships Inventory-Parent Perception (QRI-PP; Matos, Pinheiro, Costa, & Mota, 2016), which was derived from the original Quality of Relationship Inventory (Pierce et al., 1991). This was adapted for the child's perspective, replacing the word "child" with "parent." Items assessed the support the child believed they would be willing to provide to the parent, from advice to physical availability (e.g., "To what extent could this parent count on you to help him/her when he/she has a problem?"), as well as the child's perceptions of individual and reciprocal commitment to the relationship (e.g., "How close will your relationship with this parent be in 10 years?") on a 4-point Likert scale (*not at all – very much*; $\alpha = .84$).

Conflict

The eight *conflict* items were also derived from the QRI-PP and assessed on the same 4-point Likert scale. The items assessed existing conflict levels in the relationship (e.g., "How much do you argue with your parent?"), as well as negative feelings associated with unhealthy conflict (e.g., "How much does your parent make you feel guilty?"; $\alpha = .86$).

Relational closeness

Closeness was measured using the single-item inclusion-of-other in self scale (IOS; Aron et al., 1992). Measured on a 7-point scale, participants selected one of seven diagrams with overlapping circles that best represents how close they feel they and their parent are (more overlap indicates higher perceptions of relational closeness and a higher score).

Shared family identity

Two items adapted from Nier et al. (2001) assessed perceptions of shared family identity ("To what extent do you feel that you and your parent belong to the same group?" and "To what extent do you feel like you and your parent are on the same team?"). Responses were on a 7-point Likert scale (0 = *not at all*, 6 = *very much*; $\alpha = .85$).

Covariate: non-musical activities

A 14-item scale asked participants how often they and their parent participated in shared activities unrelated to music (e.g., having dinners together, playing board games, shopping). As with the shared musical activities scale, 5-point scales (*never to very frequently*) were used for the two age ranges studied (ages 6–13 $\alpha = .78$; ages 14+ $\alpha = .85$).

Results

Hypothesis 1 predicted that shared parent–child musical engagement in childhood would be associated with positive parent–child relationships among young adults. We tested H1 using partial correlations between the four measures of shared musical engagement and the four relational outcome measures (a total of 16 tests); we controlled for shared *non*-musical engagement at the relevant age. The hypothesis was largely supported for casual musical engagement that occurs after the child turns 14 (see [Table 2](#)); the partial correlations are significant and positive for relational closeness and shared family identity, and marginally significant for support/depth. Conflict is not significant. The hypothesis was not supported for the other types and ages of musical engagement with only two marginally significant effects across the 12 remaining analyses. We thus find partial support for positive relational effects from parent–child joint musical activities, even when non-musical activities are controlled.

Hypothesis 2 predicted that the effect of shared parent–child musical engagement on relational quality would be mediated by (a) coordination and (b) empathy (see [Figure 1](#)). We initially tested H2 using model 4 from the PROCESS macro (Hayes, 2013), with coordination, cognitive empathy, associative empathy and affective empathy as parallel mediators; each analysis involved 10,000 bootstrapped samples. Examining indirect effects even when the overall effect is nonsignificant (as is the case with some of our associations) is widely accepted (Hayes, 2013; Shrout & Bolger, 2002). Separate models were run for parent–child musical engagement at ages 6–13 versus age 14+, for casual versus structured musical engagement, and for each of the four dependent variables. No significant results emerged from analyses with structured musical engagement as a predictor, or for associative or affective empathy as mediators. We return to these null effects in the discussion section. Therefore, we re-ran the models with two rather than four parallel mediators (cognitive empathy and coordination), and focusing only on the effects of casual shared musical engagement. The remaining results reflect these effects on the four relational outcomes at the two ages—hence we report eight mediated models in [Table 3](#). Coordination and cognitive empathy were parallel mediators. *Non*-musical parent–child activities at the same age as the predictor were controlled in all analyses.

For reported musical engagement during ages 6–13, the combined indirect effect of coordination and cognitive empathy was significant or approached significance for all dependent variables (see top half of [Table 3](#)). The indirect effect for interpersonal coordination was significant for all the dependent variables (although marginally so for conflict). Casual musical engagement marginally and positively predicted coordination, and coordination significantly predicted all dependent variables in the predicted direction (negative for conflict, positive for the others). Indirect effects for cognitive empathy were nonsignificant. H2 was supported for coordination as mediating between casual music engagement at ages 6 to 13 and positive parent–child relational outcomes. H2 was not supported for empathy as a mediator at these ages.

For casual music engagement from age 14 (see bottom half of [Table 3](#)), the combined indirect effect was significant for all dependent variables, as were all indirect effects for coordination. Casual music engagement significantly predicted coordination, and coordination significantly predicted all the dependent variables in the predicted direction. The indirect effect for cognitive empathy was significant or approaching significance for all outcome variables except for conflict. Casual musical engagement significantly predicted cognitive empathy, and cognitive empathy significantly and positively predicted support/depth, shared family identity, and relational closeness (marginally so

Table 2. Partial correlations, controlling for parent–child shared non-musical activities (H1).

Type of parent–child musical engagement	Age	Relational outcomes			
		Support/Depth	Conflict	Relational closeness	Shared family identity
Casual	6–13	.100	.009	.152 [†]	.144 [†]
	14+	.143 [†]	–.116	.202*	.178*
Structured	6–13	–.023	.075	.025	.017
	14+	–.104	.040	.000	–.057

[†] $p < .10$. * $p < .05$.

Table 3. Indirect effects of casual music engagement reported for two age ranges on quality of parent–child relationship, through interpersonal coordination and cognitive empathy (H2).

Age of reported musical engagement	Dependent variable	Combined indirect effect	Mediator 1: Interpersonal coordination			Mediator 2: Cognitive empathy			
			Indirect effect	X-M	M-Y	Indirect effect	X-M	M-Y	
6–13	Support/Depth	.001, .120*	.002	.091*	3.17 [†]	.01**	n.s.	n.s.	.18**
	Conflict	–.096, .002 [†]	–.096	.001 [†]	3.17 [†]	–.01**	n.s.	n.s.	n.s.
	Relational closeness	.006, .292*	.005	.241*	3.17 [†]	.03**	n.s.	n.s.	.32*
	Shared family identity	.004, .304*	.001	.256*	3.17 [†]	.04**	n.s.	n.s.	.31**
14+	Support/Depth	.022, .148**	.009	.106*	3.92*	.01**	.002, .067*	.16*	.18**
	Conflict	–.115, –.013*	–.117	–.015**	3.92*	–.01**	n.s.	.16*	n.s.
	Relational closeness	.049, .337**	.029	.264**	3.92*	.03**	–.000, .165 [†]	.16*	.31 [†]
	Shared family identity	.054, .365**	.034	.297**	3.92*	.04**	.004, .154*	.16*	.32**

Note. Confidence intervals in the table are reported at the 95% level. At ages 6–13, the combined indirect effect through both mediators to conflict is marginally significant, 90% CI [–.087, –.005]. The indirect effect through coordination to conflict is marginally significant, 90% CI [–.087, –.006]. At ages 14+, the indirect effect through cognitive empathy to relational closeness is marginally significant, 90% CI [.005, .151]. Confidence intervals at the 99% level are available from the authors.

[†] $p < .10$ * $p < .05$ ** $p < .01$.

for the latter). Hypothesis 2 received strong support for casual musical engagement occurring after age 13, for both the tested mediators. Effects for conflict were less consistent than for the positively framed relational outcomes.

Hypothesis 3 predicted that the effects in H1 would be stronger for structured musical engagement than casual musical engagement. We tested H3 using Steiger’s (1980) test of the difference between two dependent correlations with one variable in common (Lee & Preacher, 2013). To control for non-musical activities in these comparisons, we separately regressed the music and relational variables onto the relevant non-musical activities variable, and saved the residuals. Correlations between the musical engagement and relational quality residuals thus become zero-order correlations identical to the partial correlation values in Table 3. Comparisons of these correlations for structured and casual musical engagement variables did not support H3; all significant effects were the opposite of our predictions. In shared engagement that occurs after 13 years old, the effect of casual engagement was significantly stronger ($z > 1.96, p < .05$) than the effect of formal musical engagement in predicting support/depth, relational closeness, and shared family identity. The remaining five differences were not significant.

Hypothesis 4 predicted that the effects in H1 would be stronger for musical engagement that occurred after the child turned 14 years old than at ages 6–13. We tested H4 using the same procedures as H3; H4 was largely unsupported. The negative association of casual musical engagement with parent–child conflict was significantly stronger from age 14 onward than it was for ages 6 to 13, but the remaining seven comparisons were nonsignificant.

Discussion

Our study advances knowledge of music and social-communicative behavior by showing that joint musical engagement is associated with stronger interpersonal relationships in the family. Joint casual musical engagement in adolescent parent–child relationships is positively associated with the child’s relational perceptions in emerging adulthood. Moreover, both casual and structured music-making in childhood and adolescence indirectly influence parent–child relational quality in emerging adulthood through interpersonal coordination and empathy. Coordination mediated the effects at both target ages, while cognitive empathy only mediated the effects of musical engagement from age 14 onward. Formal tests of age differences in effects were nonsignificant, thus failing to support our prediction that parent–child musical activity in adolescence would be more influential. However, significance levels for indirect effects were weaker for joint musical engagement in childhood (versus adolescence), thus suggesting that age effects might merit further research. We statistically controlled for reports of *non-musical* activities at the same ages as the musical activities. Hence, we do not believe our effects are not merely the result of current relationship quality biasing recall of earlier musical activities.

In two areas, results ran counter to our predictions. First, structured musical engagement was a nonsignificant predictor throughout. Our respondents engaged in substantially *more* casual than structured musical engagement in both childhood and adolescence (paired *t*-test comparisons of the amount of structured versus casual engagement yield effect size r^2 s > .60: see [Table 4](#) for means). Some forms of structured musical engagement were extremely rare in our data (e.g., 76% of our sample *never* played instruments in organized groups with their parents after the age of 13). Hence, a floor effect gave us little ability to detect effects of structured parent–child musical engagement. Different results might emerge if we could recruit a sample with more diversity on this measure (e.g., families of music students might yield more in the way of structured musical engagement in the family). It is also possible that structured music making requires a sufficiently intense focus on the music itself that it detracts from the interpersonal relationships in the context, whereas casual music making allows a stronger interpersonal focus (Ilari, Fesjian, & Habibi, 2018).

A second unexpected result is that affective and associative empathy did not mediate any effects. While musical experiences can be highly emotional, effects in our emerging adult respondents involved only *cognitive* empathy. It is possible that the music involved in parent–child engagement involves more perspective-taking than intense emotional connections. Parent–child musical engagement might involve some degree of compromise or give-and-take

Table 4. Descriptive statistics for all variables ($N = 157$).

Predictors	<i>M</i>	<i>SD</i>	Range	Skew
Casual musical engagement, Age 6–13	1.97	0.89	0–4	–0.07
Casual musical engagement, Age 14+	1.98	0.97	0–4	–0.02
Structured musical engagement, Age 6–13	0.75	0.90	0–4	1.36
Structured musical engagement, Age 14+	0.53	0.78	0–4	1.63
<i>Mediators</i>				
Cognitive empathy	2.99	0.82	0–4	–0.83
Affective empathy	2.69	0.84	0–4	–0.67
Associative empathy	2.60	0.93	0–4	–0.49
Interpersonal coordination	72.52	20.27	0–100	–0.93
<i>Dependent variables</i>				
Support/depth	2.50	0.50	0–3	–1.68
Conflict	1.05	0.60	0–3	0.73
Relational closeness	3.78	1.66	0–6	–0.42
Shared family identity	4.72	1.32	0–6	–1.30
<i>Covariates</i>				
Non-musical activities, Age 6–13	2.45	0.55	0–4	–0.22
Non-musical activities, Age 14+	2.19	0.64	0–4	0.28

(e.g., in negotiating a road-trip mix that everyone enjoys, but perhaps is nobody's favorite: Clark & Giacomantonio, 2015). Also, our three empathy measures were highly intercorrelated (all r 's > .75), which would restrict the ability for them to have parallel mediating effects.

Implications

Our findings have applied implications for using music to build interpersonal relationships. Assuming our results extend beyond parent-child dyads, then these processes might be valuable in other family contexts, such as using music to bridge grandparent-grandchild communication difficulties, or as a feature in helping to enhance marital relationships. Beyond the family, music could be used to bridge other relational boundaries, enhancing cross-cultural relations or reducing interpersonal conflicts and bullying in schools.

Theoretically, our finding that coordination is a more important mediator of relational effects than empathy merits attention. Feeling coordinated and synchronized with a relational partner was consistently associated with the quality of relationships in our data. As such, activities *beyond* music that encourage coordinated behavior might be worth exploring. For example, joint sporting activities involve extensive physical coordination and synchronization, and hence offer a potential context to uncover similar effects to those we observed. This suggests broader potential in examining mimetic effects and mirror neurons in interpersonal relationships.

Limitations and future directions

We used cross-sectional survey data and relied on respondents' memory of past events, methods that are not without problems. It is plausible, for instance, that participants' memories are influenced by the current state of their relationships. However, we again note that we controlled for memories of non-musical activities. Hence, our results are not driven by a general bias in recall of childhood activities, but could only emerge if participants' biased recall was occurring solely for musical activities or events. That is, our results are only a result of bias if emerging adults who currently have positive relationships with their parent somehow generate more music-related (versus non-musical) memories concerning their childhood and adolescence. We also acknowledge that emerging adults' recall of the frequency with which particular events happened during their childhood may be less than perfect. However, adults' retrospective reports of the frequency of childhood activities do predict adult medical diagnoses, a fact that supports the validity of our retrospective measurement of childhood parent-child musical engagement (Kaskel et al., 2001). Future research should use an experimental approach that manipulates musical involvement, or a longitudinal design, to provide a clearer picture of the causal influence of joint musical engagement on dyadic relationships. Our sample lacked diversity—we should explore our effects with other ethnic groups, and more male participants. Our sample also lacked musicians. Gabor (2013) shows that classically-trained musician parents influence the lives, musical knowledge and practice, and careers of their classically trained musician children. Theoretically and practically it would be good to replicate our study on such parent-child dyads, especially regarding the relative influence of casual versus formal musical engagement. The current study captures only the child's perspective on the relationship. Research that analyzes the recollection and perspectives of child *and* parent would allow examination of actor-partner processes, and increase understanding of dyadic agreement concerning past musical engagement. Finally, we studied the parent-child dyad which is not typically a relationship of choice; extending our work to voluntary interpersonal relationships (e.g., friendships or romantic partners) is important. These limitations notwithstanding, we have provided strong indications that shared engagement with music is associated with quality interpersonal relationships. More broadly, our research demonstrates that music's communicative aspects of emotional dialogue, interactive structure, and coordinated nonverbal communication (Kawase, 2014; Malloch & Trevarthen,

2009), and perhaps communication's musical properties, such as intonation, rhythm, and timing (Malloch & Trevarthen, 2009), provide rich territory for exploring human relationship development.

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