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Shared cultural knowledge: Effects of music on young children's social preferences

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Abstract

Adults use cultural markers to discern the structure of the social landscape. Such markers may also influence the social preferences of young children, who tend to conform to their own group and prefer others who do so. However, the forces that propel these preferences are unknown. Here, we use social preferences based on music to investigate these forces in four- and five-year-old children. First, we establish that children prefer other children whose favorite songs are familiar to them. Then we show that this effect depends on shared knowledge: children both prefer others who know songs they themselves know, and avoid others who know songs they do not know, irrespective of the target children's liking of the songs. These results suggest that young children have a remarkably selective sensitivity to shared cultural knowledge. Shared knowledge may be a powerful determinant of children's social preferences, both because it underpins effective communication and because it is conveyed by others through social interactions and therefore can serve as a marker of social group identity.

Keywords

shared knowledge; shared preference; music; song familiarity; culture; social-cognitive development

1. Introduction

The human social world is remarkably complex and varied: diverse factors, including race, gender, political affiliation, and preferences for sports teams, modulate people's social choices and social interactions. Even human infants show social preferences and make social choices based on some of these attributes, but the sources of their preferences and choices are obscure and subject to debate. Do young children's social preferences reflect their sensitivity to specific markers of other people's appropriateness as social partners, or are

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they mediated by more general psychological factors, such as preferences for those who are familiar or globally similar to the self? In the experiments presented below, we begin to address this question by investigating young children's social preferences based on music.

Some of the social preferences that are prominent in adulthood are already present in early childhood. For example, children aged 2 to 5 years tend to prefer individuals of their own gender, race, and age (Aboud, 1988; Alexander & Hines, 1994; French, 1987; Kircher & Furby, 1971; Kowalski & Lo, 2001; Martin, Fabes, Evans, & Wyman, 1999), as well as individuals who speak in their native language and accent (Kinzler, Dupoux, Spelke, 2007). When pitted against each other, accent overrides race, suggesting that, from very early on, some cues are privileged over others in guiding social preferences (Kinzler, Shutts, DeJesus, & Spelke, 2009). Finally, children prefer others who act prosocially and fairly over those who do not (Heyman & Gelman, 1998; Ng, Heyman, & Barner, 2011).

Sensitivity to some of these factors emerges in infancy. Infants preferentially attend to people who speak their native language with a native accent as opposed to those who speak in a foreign language or accent (Kinzler, Dupoux & Spelke, 2007), to people who speak in an infant-directed style as opposed to adult-directed style (Schachner & Hannon, 2011), to faces of a familiar race and the gender of their most frequent caregivers as opposed to faces of less familiar races or genders (Bar-Haim, Ziv, Lamy, & Hodes, 2006; Kelly, et al., 2005; Quinn, Yahr, Kuhn, Slater, & Pascalis, 2002), and to characters who act prosocially over those who act antisocially (Hamlin, Wynn, & Bloom, 2010). Thus, infants and young children are sensitive to attributes that will be socially important later in life.

1.1 Potential determinants of early social choices

Some of the tendencies that have been proposed to underlie children's early social preferences serve to guide preferences in nonsocial as well as social contexts. Children, like adults, may prefer objects or events that are familiar over those that are unfamiliar (e.g., Zajonc, 1968). For example, children may prefer native-language speakers because of their greater exposure to these speech sounds (but see Kinzler et al., 2009). Moreover, children, like adults, might be favorably disposed toward any person, object or event that is associated with positive events over those that are associated with negative events (Olson, Banaji, Dweck, & Spelke, 2006; Olson, Dunham, Dweck, Spelke, & Banaji, 2008). For example, children may favor other people of a higher status race because such people have been associated more often with positive events in the child's past experience (Olson, Shutts, Kinzler & Weisman, 2012). In these two cases, general biases may lead children to prefer specific individuals over others.

In contrast, children’s early social preferences may depend on their sensitivity to attributes that mark specifically the qualities of potential social partners. For example, when children meet a new person, they may attend to attributes that indicate whether or not that person is a member of their own social group. Consistent with that possibility, adults automatically encode coalitional affiliations (i.e., collaborative vs. competitive relationships) among individuals, a likely adaptation that has functioned throughout the evolution of our species (Kurzban, Tooby, & Cosmides, 2001). Recent evidence suggests that even preverbal infants are sensitive to behaviors indicative of group affiliations and expect individuals to act

similarly to their group members (Powell & Spelke, 2013; He & Baillargeon, 2011). As a second example, children may attend to attributes that make an individual a good communicative partner, including signs that the person is attentive to the child and is both competent and motivated to engage with him or her. Even very young infants are sensitive to signs of social attention and engagement such as direct gaze (Farroni, Csibra, Simion, & Johnson, 2002) and infant-directed speech (Schachner & Hannon, 2011), and young children respond appropriately to evidence bearing on the competence and motives of their communicative partners (e.g., Koenig, Clément, & Harris, 2004; Bonawitz, et al., 2011). Below, we consider the latter possibilities in more detail.

1.2. Shared cultural knowledge as a cue to group membership

A particularly potent cue to group membership is shared knowledge of cultural traditions. Members of a given social group often share knowledge about traditions, folk tales and, most relevant to the current experiments, music. Much research from sociology, anthropology and ethnomusicology suggests that cultural knowledge serves to define and delimit social groups (e.g., Bourdieu & Passeron, 1977; Stokes, 1994): diverse ethnic groups create their own songs to display their boundaries within larger societies, and use music-based ritualistic activities to strengthen both affiliation among group members and social boundaries (e.g., Allen, 1988; Baily, 1994; Stokes, 1994). In the aboriginal cultures of Northern Australia, for example, lineage songs that belong to particular clans can only be sung by members of that or related clans; the control of knowledge of these ancestral songs may play an important role in the formation of social group identity and group affiliation (Ellis, 1985; Magowan, 1994).

However, cultural traditions are associated not only with shared knowledge but also with shared preferences or "taste" (e.g., Bourdieu, 1984). Several strands of research suggest that taste is stratified in societies (e.g., Gans, 1974; Meyer, 1977; Shepherd, 1977; Bourdieu, 1984; DiMaggio, 1987). For instance, music taste varies with social class (Gans, 1974), gender identity (Larson, 1995) and age (Tolhurst, Hollien, & Leeper, 1984). Further, shared taste clearly affects adults' as well as children's social choices (Billig & Tajfel, 1973; Brewer & Silver, 1978; Fawcett & Markson, 2010; Johnstone & Katz, 1957; Zillmann & Bhatia, 1989).

Shared knowledge and shared preferences tend to occur together: if we know a song particularly well, we often acquired this knowledge because we had an interest in that kind of music in the first place; conversely, as we gain familiarity with a song as with other entities, our liking for that song is apt to increase. Accordingly, shared knowledge and shared preferences have typically been confounded in research on taste. Nevertheless, people do not like every object or event that they are able to recognize, and people exhibit immediate evaluative responses to novel objects and events (Duckworth, Bargh, Garcia, & Chaiken, 2002). Thus, shared knowledge and shared preferences do not fully covary.

There are reasons to think that shared cultural knowledge is more informative about an individual's past social history than are shared preferences. First, knowledge of cultural products such as songs arises only from exposure to those products, but preferences emerge from multiple sources including (in the case of music) auditory sensitivity (e.g., Masataka,

2006), exposure (e.g., Soley & Hannon, 2010), and even personality. For example, extroversion has been shown to be positively correlated with preference for cheerful vocal music (Rentfrow & Gosling, 2003). Because these factors vary both within and between groups, music preferences will cross-cut social group boundaries to a considerable degree.

Although cultural knowledge depends on exposure to the culture, this exposure can come about in multiple ways in contemporary societies. In particular, knowledge of music can come from listening to the radio, watching television, or browsing the internet as well as from direct interaction with others. As a consequence, shared cultural knowledge also cross-cuts the boundaries of most contemporary social groups. Nevertheless, young children are especially apt to gain new knowledge by interacting directly with others. Infants, for example, learn to focus on the speech sound contrasts of a natural language when they interact directly with a native speaker, but not when they are exposed to the same language in non-interactive video sessions (Kuhl, Tsao, & Liu, 2003). For children, therefore, an individual's cultural knowledge may be more diagnostic of her past social history than are her personal preferences.

Shared cultural knowledge may be more diagnostic of social group membership for a second reason. Although some preferences endure over long time periods, other preferences are subject to change (e.g., LeBlanc, Sims, Siivola, & Obert, 1996), but knowledge tends to endure. Over the course of childhood, in particular, music preferences tend to change significantly, whereas knowledge tends to accumulate and can be strikingly enduring. Knowledge of specific songs, in particular, may endure throughout the life of an individual. Even infants show remarkably long-lasting memory for melodies (Hepper, 1991; Saffran, Loman, & Robertson, 2000). In one recent study, infants who were exposed to one of two highly similar lullabies at 5 months of age recognized the lullaby, and discriminated it from the other lullaby, more than 8 months later (Mehr, Song, & Spelke, 2015). Knowledge of songs therefore is likely to be a more stable source of information about a person's social history.

Finally, there is an evolutionary reason why shared knowledge might be more diagnostic of group membership than shared preferences, at all ages. Until recent times, with the introduction of modern means of disseminating knowledge (e.g., books, recordings, television and the Internet), shared cultural knowledge could only be transmitted by means of direct social interactions. Thus, if an unfamiliar person demonstrated knowledge of the same stories and songs known to the self, there must have been a chain of social transmission linking that person to the people in one's own social group. Examples abound where shared knowledge indicates shared group membership, from private jokes to references to shared stories and gossip. Of course, some of this knowledge was acquired because the members of a group shared interests and preferences. Given that knowledge was exclusively transmitted from one individual to another for most of our species' existence, however, shared cultural knowledge may have been an important cue to group membership in ancestral human environments. In contrast, as noted, shared preferences might arise through a variety of means other than social transmission, at every point in human history.

1.3. Shared cultural knowledge as a cue to communicative competence

Shared cultural knowledge also may be a powerful indicator of a different social attribute of an otherwise unfamiliar individual: that individual's potential to engage with the self in social interaction and communication. Suppose, for example, that we encounter an individual and engage in a conversation about music: one of the most frequent topics of conversation (Rentfrow & Gosling, 2006). We might both like the song currently playing, but if we discover that one of us knows nothing about the singer or her songs, a two-sided conversation on this topic will be difficult. Communication proceeds by establishing and building on *common ground*: a body of shared beliefs that the parties to the communication mutually exhibit to one another and acknowledge (Clark, 1996). In contrast, successful communication does not require that its parties hold the same opinions or express the same preferences. Shared knowledge, rather than shared preferences, determines whether, and to what degree, conversational partners can engage with one another.

1.4 Children's sensitivity to shared beliefs and preferences

Even though shared knowledge and shared preferences are abstract qualities that must be inferred, there are reasons to think that young children might be sensitive to such attributes. Indeed, the traits that lead to social preferences in children are not limited to others' overt behavior and appearance, but also include attitudes, preferences, and beliefs (Byrne & Griffitt, 1966; Reaves & Roberts, 1983; Fawcett & Markson, 2010; Heiphetz, Spelke, & Banaji, 2013). Moreover, children are remarkably selective in the kinds of inferences that make based on mental states. For example, young children infer that statements of opinion provide more information about the individuals who hold the beliefs than they provide about the world, and that the reverse is true for statements of fact (Heiphetz, Spelke, Harris & Banaji, 2013). Moreover, children express liking for other children who share their beliefs, both factual beliefs and beliefs in the domain of religion and myth (Heiphetz, Spelke, & Banaji, 2013, 2014).

Young children are also sensitive to others' preferences and make inferences about other individuals' preferences based on various social categories that predict social and evaluative preferences in children (e.g., Kuhn, Nash, & Brucken, 1978; Diesendruck & haLevi, 2006). For example, preschool-age children use gender information to predict individuals' preferences for familiar objects (Kuhn, Nash, & Brucken, 1978; Martin & Little, 1990). Children also use social category membership to make inferences about category members' preferences for novel activities and objects (e.g., Diesendruck & haLevi, 2006). Moreover, both children and infants show social choices for those who share their preferences (Reaves & Roberts, 1983; Fawcett & Markson, 2010; Mahajan & Wynn. 2012). These findings raise the possibility that children are sensitive to abstract traits such as shared music knowledge and shared music preferences. Moreover, as children are selective in the kind of inferences they make based on abstract attributes, they might use evidence of music knowledge and music preferences to support different kinds of social inferences and choices.

1.5. Using music to study social preferences

Music is particularly conducive to testing such issues for three reasons. First, like language, music is a human universal with culture-specific properties, making it a potentially useful

marker of group membership in all cultures. Through everyday exposure to music, individuals become sensitive to the melodic and rhythmical structure of the music of their culture (for a review, see Bigand & Poulin-Charronnat, 2006). Sensitivity to the music of one's culture emerges in childhood (Koelsch et al., 2003; Schellenberg, 2005; Trainor & Trehub, 1994), or, in the case of rhythm, already during the first year of life (Hannon & Trehub, 2005a; 2005b; Soley & Hannon, 2010). Moreover, although some emotional responses to music are universal (Egermann, Fernando, Chuen, McAdams, 2015), this implicit knowledge of culture-specific musical regularities often leads to an advantage in understanding emotions that are conveyed by an unfamiliar tune of one's own culture (Gregory & Varney, 1996; Morey, 1940) and in remembering novel music from that culture (Demorest, Morrison, Beken & Jungbluth, 2008).

Second, several studies suggest that music serves as a cue to social group membership and influences social preferences in adolescence and adulthood. For example, adults make various inferences about others based on their music taste: they use others' preferences for certain music genres as cues to their individual, social and ethnic characteristics (Litle & Zuckerman, 1986; Rentfrow & Gosling, 2003, 2007; Rentfrow, McDonald & Oldmeadow; 2009). Furthermore, individuals evaluate fans of music genres they themselves like more positively than fans of other music genres (Bakagiannis & Tarrant; 2006; Lonsdale & North, 2009; North & Hargreaves, 1999; Tekman & Hortacsu, 2002), and music taste plays a crucial role in friendship formation, especially among adolescents (Epstein, 1994; Johnstone & Katz, 1957; Selfhout, Branje, ter Bogt, & Meeus, 2009). Given that preferences for the musical structure of one's own culture are present already around the age of six months (Soley & Hannon, 2010), it is possible that music might drive social preferences early in life as well.

Third, music allows us to test different levels of familiarity, that is, familiarity with a music style vs. familiarity with specific songs. Further, it allows us to test the effects of emotional responses evoked by music. As a result, music provides us with a complex (and understudied) web of interactions between perceptual, emotional, and cultural sources of children's social preferences. In six experiments, therefore, we explore the conditions under which young children prefer others who share their music.

1.6. The current experiments

In these experiments, we first aim to establish that music can influence children's social preferences. Then we ask whether children's music-based social preferences are driven by a general preference for the familiar, by emotional reactions to individuals who are associated with events that evoke positive emotions, or by the more specific marker of group membership provided by shared knowledge.

In the first experiment, we adapt a method that has been used previously to reveal children's language-based social preferences (Kinzler et al., 2007) and use it to test for preferences for individuals whose "music" is familiar. We introduced four- and five-year-old American children to pictures of two children and presented them with two brief, computer-generated melodies that differed in terms of both familiarity of songs and familiarity of music style[1] (i.e., popular Western children's songs vs. unfamiliar Balkan folk songs). After each melody

was described as "the favorite song" of one of the target children (i.e., those on the pictures), participants were asked which of the two children they would rather have as a friend. To foreshadow our results, participants chose the target child whose favorite song was a familiar Western song rather than an unfamiliar Balkan song, validating this method.

Accordingly, we used the method in Experiments 2 and 3 to explore which aspects of music are critical in guiding children's social preferences. In Experiments 2 and 3, the target children on the pictures were associated with two songs that differed on one of two dimensions of familiarity: familiarity of specific songs (Western children's songs vs. unfamiliar 18th century Western folk songs that shared the melodic and rhythmic structure of familiar songs) or familiarity of music style (unfamiliar Western vs. Balkan folk songs). These experiments provided evidence that children prefer other children whose favorite song is a song that they themselves know. In contrast, children showed no preference between other children whose favorite song displayed the style of music that they know.

After establishing this basis for children's social preferences, we begin to explore the nature of these preferences in Experiments 4–6. The songs in Experiments 1 to 3 were always introduced as the favorite songs of the pictured children. This statement gives two kinds of information: that the child *knows* the song, and that she *likes* the song. In Experiments 4 to 6, we disentangled these two kinds of information by introducing participants to pictures of two children who differed in either their knowledge of or their preferences for a familiar or an unfamiliar song (respectively, well-known Western children's songs and unfamiliar, 18th century Western folk songs). Then we asked participants whom they would rather have as their friend.

2. Experiment 1

In Experiment 1, we investigated whether music modulates children's friendship choices when the favorite songs of the potential social partners differed both in familiarity and in style. We reasoned that if music has any effects on children's social preferences, then this effect should appear when children are presented with this strong musical contrast.

2.1. Method

2.1.1. Participants—Twenty-four children (14 girls: mean age: 4 y 10 m; range 4 y - 5 y 7 m) participated in Experiment 1. Two additional children were excluded from the final sample due to failure to finish the experiment. In Experiments 1 to 3, we selectively recruited children from families with both parents born and raised in the United States. We excluded any children from foreign families or who did not know the familiar melodies according to parental report. Children were recruited from the greater Boston area and tested in the Laboratory for Developmental Studies at Harvard University.

[1]In most Western music, time is equally divided into smaller units, creating isochronous meters, where subdivisions of a "rhythm" have simple duration ratios (e.g., 1:1 or 2:1). For example, a Waltz has an isochronous meter, as every measure has three beats of equal duration. In contrast, in the music of the Balkans, non-isochronous meters, in which subdivisions have more complex duration ratios (e.g., 3:2; London, 1995), are commonly used in addition to the isochronous meters of western music. That is, in Balkan meters, time is not always evenly divided, but can consist of alternations of groups of 2s and 3s (London, 1995). In our stimuli, all Western songs used isochronous meters (e.g., 3/4 and 4/4), while all Balkan songs had non-isochronus meters (i.e., 7/8 and 9/8).

2.1.2. Stimuli—Visual displays consisted of 6 pairs of photographs of 5 year-old children (6 girls and 6 boys) that were matched based on adult ratings on attractiveness, positiveness and friendliness. Auditory stimuli consisted of 12 songs that were synthesized and presented without lyrics. Six of the songs were Western popular children's songs (e.g., "Mary Had a Little Lamb", "Row Row Row Your Boat"), and six were Balkan folk songs with unfamiliar melodies presenting melodic and rhythmic structures that are foreign to Western music. The main motivations for using synthesized instrumental versions of the songs were, (1) to be able to have greater control over different aspects of music stimuli, and (2) to explore the effects of melodic familiarity, independently of the familiarity with lyrics. As sung melodies without lyrics (e.g., lalala) might sound rather unnatural, especially if the lyrics are highly familiar, we opted for instrumental renderings of the songs. Accordingly, all songs in all experiments were arranged in MIDI and recorded to aiff format using the same instruments (Piano and Dance Kit) on GarageBand (Apple Inc., Cupertino, CA) and the song pairs on each trial were matched for duration and tempo. All melodies and their transcriptions are available as supplementary online material.

2.1.3. Design and Procedure—Participants were shown photographs of two 5-year-old children on a computer screen one by one. As each photograph was shown, the experimenter played a song that was described as "the child's favorite song". After the songs were played, the two photographs were shown on the screen side by side, and the participant was asked, "Which one of these children would you like to be friends with?" Each participant received 6 trials with different pairs of photographs and songs. The order of the familiar and unfamiliar music as well as the lateral positions of the photographs was counterbalanced both across trials and across participants. Pairings of photographs to songs were counterbalanced across participants. Participants listened to the songs through the speakers of a laptop computer.

2.1.4. Data analysis—Percentages of choices of children associated with familiar Western songs were calculated for each participant, and the average of these scores across children was compared to the chance level of 50%, using a one-sample, two-tailed t-test. Counts of participants mostly preferring target children associated with familiar songs, mostly preferring target children associated with unfamiliar songs and with no preference were compared to the chisquare distribution of a binomial random process with a success probability of .5 and 6 Bernoulli trials (i.e., the distribution of heads after tossing a fair coin 6 times).

2.2. Results

Participants tended to choose as a friend the target children whose favorite songs were familiar songs in the style of Western music ($M = 63\%$, $SD = 22.1\%$), $t(23) = 3.1$, $p < .01$, $d = .63$ (see Figure 1a). Fifteen participants mostly chose the pictures associated with the familiar songs, whereas 4 participants mostly chose the pictures associated with the unfamiliar Balkan songs and 5 had no preference, χ^2 (2, $N = 24$) = 8.54, $p = .018$. Thus, the favorite songs of potential partners modulated participants' social preferences when the songs differed in familiarity and music style.

2.3. Discussion

The results of Experiment 1 suggest that music can drive young children's social preferences and that the present method can reveal such effects. Accordingly, the next two experiments asked what aspects of music influenced children's social preferences.

3. Experiment 2

In Experiment 1, the children's preferences could be driven either by familiarity with specific songs, or by familiarity with the style of music that is characteristic of the children's own culture. In Experiment 2, we asked whether familiarity with specific songs was sufficient to guide social preferences.

3.1. Method

The method was the same as in Experiment 1 except for the songs associated with the target children on the pictures. Auditory stimuli consisted of 12 synthesized excerpts. Half of the songs were 18th century folk songs with the melodic structure of Western music, whose specific melodies are rarely heard today (see supplementary online material). These songs were paired with the popular Western children's songs used in Experiment 1.

Participants were 24 children (13 girls: mean age: 4 y 7 m; range 4 y – 5 y 10 m); 5 additional participants were excluded from the final sample because their parents were foreign or indicated that their children were not familiar with the children's songs.

3.2. Results and Discussion

As shown in Figure 1c, participants tended to choose as friends the target children whose favorite songs were familiar songs in the style of Western music, relative to children whose favorite songs were unfamiliar songs in the same style of Western music (M = 61%, SD = 21%), $t(23) = 2.6$, $p < .05$, $d = .53$. Fourteen participants mostly chose the pictures associated with the familiar songs, whereas 5 participants mostly chose the pictures associated with the unfamiliar Western songs; 5 participants had no preference. This distribution differed from that expected from a binomial random process, χ^2 (2, N = 24) = 6.12, $p = .046$.

A two (Experiment: 1 vs. 2) by 2 (Music type: familiar vs. unfamiliar music associated with the target child) mixed factor ANOVA, performed on the number of trials on which participants chose the child associated with each type of music, revealed a significant main effect of music type, $F(1,46) = 16.0$, $p < .001$, $\eta^2 = .25$, no significant main effect of experiment, $F(1,46) < 1$, ns, and no significant interaction, $F(1,46) < 1$, ns.

In contrast to Experiment 1, the songs in Experiment 2 differed only in how familiar they were to the participants, but not in terms of their culture-specific musical properties. As participants reliably chose the target child associated with the familiar songs in both experiments, these results confirmed that song familiarity is sufficient to drive social preferences in children.

The combined results of Experiments 1 and 2 suggest that participants are equally likely to choose friends based on their favorite songs when the songs differ both in their familiarity to the children and in their culture-specific conventions, and when they differ only in their familiarity. This finding raises the possibility that culture-specific properties of the songs used in Experiment 1 do not influence the participants' social preferences, which may be driven exclusively by the familiarity with the songs, irrespective of whether or not the unfamiliar song conformed to the rules of Western music. We aimed to test this possibility in Experiment 3.

4. Experiment 3

In Experiment 3, the potential social partners' favorite songs were all unfamiliar to participants, but half conformed to the conventions of Western musical culture whereas the others came from a different culture. If familiarity with culture-specific music styles plays a role in the establishment of social preferences, we would expect participants to prefer children associated with songs from their own culture over songs from a different culture, even if both songs are unfamiliar.

4.1. Method

The method was the same as in Experiment 1 and 2 except for the songs associated with the target children on the pictures. Auditory stimuli consisted of 12 synthesized excerpts. Six of the songs were the unfamiliar Western folk songs from the 18th century used in Experiment 2; the other six songs were the unfamiliar Balkan folk songs used in Experiment 1.

Participants were 24 children (8 girls: mean age: 4 y 7 m; range 4 y – 5 y 7 m). Two additional children were excluded from the final sample due to failure to finish the experiment.

4.2. Results

Figure 1c shows the results of Experiment 3. Participants showed no tendency to choose as friends other children whose favorite songs conformed to the melodic and rhythmic conventions of Western music; when both songs were unfamiliar, their preference for children associated with Western music (M = 52%, SD = 23%) did not differ significantly from chance, $t(23) = .57$, $p > .5$, ns. Nine participants mostly chose the pictures associated with the unfamiliar Western songs, whereas six children mostly chose the pictures associated with the unfamiliar Balkan songs. The remaining nine participants had no preference, χ^2 (2, N = 24) = .98, p = .61.

Further analyses compared the preferences of children in Experiment 3 to those in Experiment 1, who also were presented with Western and with Balkan melodies but for whom the Western songs were familiar. This 2 (Experiment: 1 vs. 3) by 2 (Music type: Western vs. non-Western music associated with the target child) mixed factor ANOVA, performed on the number of trials on which participants chose the child associated with each type of music, revealed a significant main effect of music type $F(1,46) = 6.1$, $p = .017$, $\eta^2 = .11$, but no significant main effect of experiment, $F(1,46) < 1$, ns, and no significant interaction, $F(1,46) = 2.6$, $p = .11$. Thus, children's preference for music in the Western style

was no greater than chance in Experiment 3 but failed to differ significantly from their preference for familiar songs in Experiment 1.

4.3. Discussion

Experiments 1 and 2 provide evidence that the favorite songs of potential social partners affect children's evaluation of these partners when the songs differ in terms of familiarity. In contrast, Experiment 3 provides no evidence that the favorite songs of potential social partners affects children's evaluation of these partners when the songs all are unfamiliar but differ in their conformity to a culture-specific style of music.

Might the negative findings of Experiment 3 be explained by children's failure to discriminate between the music styles of the two different cultures? To address this possibility, we conducted a further experiment with a separate group of children, drawn from the same population. We presented 20 children (9 girls: mean age: 4 y 11 m; range 4 y - 5 y 11 m) with the same song pairs, and we asked them which of the two songs sounded more like the songs they know. These participants chose the unfamiliar Western folk songs significantly more often than the unfamiliar Balkan songs ($M = 65\%$, $SD = 15\%$), $t(19) = 4.4$, $p < .001$, $d = .89$. Thirteen participants mostly chose Western songs, whereas only one child mostly chose Balkan songs; the remaining six participants had no preference, χ^2 (2, $N = 20$) = 10.48 $p = .005$. Hence, young children readily discriminated the unfamiliar Western songs from the unfamiliar Balkan songs used in this experiment, and reported that the songs in the Western music style were more similar to the songs they know than those in the Balkan music style. This similarity did not, however, influence the social choices of the children in the main experiment.

Nevertheless, the findings of Experiment 3 support no strong conclusions concerning the effects of culture-specific music styles on young children's social preferences. First, the lack of a significant interaction between Experiments 1 and 3 prevents us from concluding that familiarity of music styles is less important than familiarity of specific melodies. Second, it is possible that the style contrast tested in Experiments 1–3 was not optimal for eliciting this effect. In particular, the Balkan songs not only conformed to the rules of an unfamiliar music style, but also were more complex in terms of their melodic and rhythmic structures, compared to the Western songs; children might prefer other children whose favorite songs are more complex, and this preference may compete, in these experiments, with a countervailing preference for children whose favorite songs exhibit a familiar musical style. Thus, our results leave open the possibility that culture-specific differences in musical styles might also contribute to the formation of social choices in children. In the rest of this paper, we focus on the clear findings from Experiments 1–3: children prefer other children whose favorite songs they know.

5. Overview of Experiments 4–6: disentangling knowledge from preference

The findings of Experiments 1–3 are consistent with at least three hypotheses. First, children's social preferences might be driven by a preference for any objects, events or patterns that are familiar (e.g., Zajonc, 1968), coupled with a process of affective tagging that leads individuals also to prefer other individuals who are associated in any way with the

preferred objects, events or patterns (e.g., De Houwer, Thomas, & Baeyens, 2001; Manis, Cornell, & Moore, 1974; Olson et al., 2006; 2008). Together, familiarity preferences and affective tagging could lead children to like individuals associated with familiar songs more than individuals associated with unfamiliar ones.

Second, children might prefer social partners whom they perceive as more similar to themselves (Duck, 1973; Lydon, Jamieson & Zanna, 1988; Meltzoff, 2007). Because young children can readily report whether they themselves know or like a song, children may like others who are similar to themselves on either of these dimensions. On both these hypotheses, children should like other children who share either their music preferences or their music knowledge. By the third hypothesis, in contrast, children should prefer other children who share their cultural knowledge over those who share their preferences, consistent with the evolutionary and communicative significance of shared knowledge. Experiments 4–6 test this last hypothesis against the other two hypotheses.

Because knowledge and preference tend to co-occur (e.g., Demorest & Schulz, 2004), past research in psychology as well in sociology on the role of music in social preferences has almost exclusively relied on these correlated experiences, without attending to the distinctive role of shared knowledge in mediating the relation between shared music preferences and social affiliation. Does shared taste elicit social bonding, because those with similar tastes have similar preferences and other phenomenal states? Or does shared taste matter because those with similar tastes are likely to have similar knowledge? These two possibilities can be distinguished by disentangling knowledge and preference and by assessing the role of each factor separately. This is the aim of Experiments 4–6.

In these experiments, we evaluate the effects of shared song knowledge and shared song preferences on children's social choices. In order to distinguish knowledge from preferences, we changed our experimental method in several respects. After introducing children to the pairs of photographs used in Experiments 1 to 3, we played one song that was either familiar or unfamiliar to the participants (rather than two songs as in the previous experiments). We then indicated either that one target child knew the song whereas the other child did not (Experiment 4), that one child liked the song whereas the other child did not (Experiment 5), or that one child knew the song but disliked it, whereas the other child liked the song but did not know it (Experiment 6). Participants were then asked which of those two children they would rather have as a friend.

If children's social choices are based on emotional responses to familiar songs that become associated with particular people, children should treat shared preferences and shared knowledge equally. Similarly, if children's social preferences are driven by inferences about the similarity between themselves and others, again we would expect children to prefer others who share either their knowledge or their preference for songs. If, on the other hand, children specifically attend to cues that make for effective social partners, including cues to social group membership or cues to good communicators, they might selectively attend to shared knowledge rather than to shared preferences, and prefer others who share their knowledge of songs.

7. Experiment 4

In Experiment 4, we tested the effects of others' knowledge of songs in guiding children's evaluation of social partners.

7.1. Method

Participants—Participants were 24 children (14 girls: mean age: 4 y 11 m; range 4 y – 6 y) who were recruited and tested at the Discovery Center of the Museum of Science in Boston, MA. An additional ten children were excluded from the final sample due to failure to recognize the familiar songs at the end of the session (see below; n = 2), failure to finish the experiment (n = 4), parental interference (n = 1), distraction (n = 1) or experimenter error (n = 2).

7.1.1. Stimuli—Visual displays were identical to those used in the previous experiments. The music sequences consisted of six of the songs used in Experiment 2: three popular Western children's songs and three 18th century Western folk songs. Participants listened to the songs through headphones.

7.1.2. Design and Procedure—On each of 6 trials, the experimenter introduced participants to photographs of two 5-year-old children on a computer screen and said: "This is (e.g.) Ashley, and this is (e.g.) Laura and here is a song I played for them". Then the experimenter played one of the six songs. After the song was played, the experimenter said: "Ashley knows this song, and Laura doesn't know this song, but she knows other songs". Then the participant was asked: "Which one of these children would you like to be friends with?" Each participant received 6 trials with different pairs of photographs and with familiar and unfamiliar songs presented in ABBAAB order. The order of the familiar and unfamiliar songs was counterbalanced across participants. The lateral positions of the photographs associated with the knowledge of the songs were counterbalanced across trials, and the pairings of photographs to song knowledge was counterbalanced across participants.

7.1.3. Recognition test—Because Experiments 4 to 6 took place at a museum, we did not have any control over the family background of the participants. We therefore gave participants a recognition test at the end of the session to assess whether they were familiar with the popular Western children's songs. Specifically, each participant was presented with three additional pairs of songs from Experiment 3 (Western children's songs and 18th century Western folk songs). After listening to each pair, the experimenter asked which of the two songs sounded familiar. Participants who failed to choose the familiar song on at least two out of three trials were excluded from our sample.

7.1.4. Data Analysis—Percentage of choices of participants associated with the target child who knew the song (hereafter the "knowledgeable" target) were calculated for each participant, separately for trials with familiar and unfamiliar songs, and the average of these scores across participants was compared using a paired-sample, two-tailed t-test. Choices of knowledgeable targets associated with familiar and unfamiliar songs were also compared to chance by planned, one-sample, two-tailed t-tests. The number of participants preferring the

knowledgeable target for familiar and unfamiliar songs, respectively, was compared using Fisher's exact test.

7.2. Results

As shown in Figure 2a, participants' preference for knowledgeable target children was significantly higher when the targets were described as knowing the familiar songs than when they were described as knowing the unfamiliar songs (familiar songs: $M = 63\%$, $SD = 32\%$; unfamiliar songs: $M = 36\%$, $SD = 29\%$), $t(23) = 3.2$, $p < .01$, $d = .65$. Planned follow-up tests showed that participants marginally preferred the targets who knew the familiar songs, $t(23) = 1.9$, $p = .07$, $d = .38$, and reliably preferred the targets who did *not* know the unfamiliar songs, $t(23) = 2.3$, $p < .05$, $d = .47$. The proportion of participants who preferred the knowledgeable target differed significantly depending on whether the target knew familiar or unfamiliar songs, $p = .042$ (Fisher's exact test). Taken together, these results suggest that children prefer others who share their knowledge of songs, and avoid others who know songs that they themselves do not know.

7.3. Discussion

The results of Experiment 4 provide evidence that children's choices of a knowledgeable target child depends on the nature of the song that the target knows, revealing a robust preference for other children who share children's own state of knowledge regarding a song, be it knowledge or ignorance.

This finding suggests that children use knowledge of familiar vs. unfamiliar songs to modulate their social preferences, but they are open to an alternative interpretation. Children themselves may prefer familiar songs to unfamiliar songs, and they might simply avoid individuals who are positively associated with music material that they themselves do not prefer. This possibility is addressed in Experiment 6. Specifically, we tested whether the effects we observed in Experiment 5 are specific to the described state of knowledge of each target child, or whether the effects would also obtain when we do not describe target children's song knowledge but their song preferences.

8. Experiment 5

In Experiment 5, we tested children's social preferences for other children who expressed preferences for familiar and unfamiliar songs, using the method of Experiment 4.

8.1. Method

The method was the same as in Experiment 4 except that after the experimenter introduced the two target children and played a song, she stated: "(e.g.) Ashley likes this song, and (e.g.) Laura doesn't like this song, but she likes other songs."

Participants were 24 children (11 girls: mean age: 5 y 1 m; range 4 y 1 m – 5 y 11 m). An additional 10 children were excluded from the final sample due to failure to recognize the familiar songs at the end of the session (n = 4), failure to finish the experiment (n = 3), distraction (n = 1) or experimenter error (n = 2).

In order to assess participants' own preferences for familiar and unfamiliar songs, and to validate our stimuli, we presented an additional twenty participants (9 girls: mean age: 4 y 10 m; age range: 4 y - 5 y 10 m) with the song pairs used in Experiment 2, from which the 6 songs used in the present experiment were drawn (i.e., Western children's songs and 18th century Western folk songs). After listening to each pair, the experimenter asked which of the two songs the participant liked more. Participants chose familiar (Western) songs significantly more often than predicted by chance (M = 66%, SD = 33%), $t(19) = 2.2$, $p < .05$, $d = .49$. Eleven participants mostly chose familiar Western songs, four participants mostly chose unfamiliar Western songs, and the other five participants had no preference ($\chi^2(2, N = 20) = 3.93$, $p = .14$).

8.2. Results and Discussion

As shown in Figure 2b, participants' choices for agents who liked familiar songs and unfamiliar songs did not differ significantly (familiar songs: M = 68%, SD = 32%; unfamiliar songs, M =69%, SD = 35%), $t(23) = 0.2$, $p > .8$, ns. Participants preferred both the target children who liked the familiar songs $t(23) = 2.8$, $p < .02$, $d = .57$, and the target children who liked the unfamiliar songs, $t(23) = 2.7$, $p < .02$, $d = .55$. The proportion of participants who preferred target children who liked songs did not differ significantly depending on whether the target children liked familiar or unfamiliar songs, $p = .8$ (Fisher's exact test).

To compare the results of Experiments 4 and 5, we analyzed participants' choices for the target child who was positively associated with a song (i.e., the target who knew or liked the song) using a repeated-measures ANOVA with song familiarity as the within-subject factor and association type (knowing or liking, i.e., Experiment 4 or 5) as the between-subjects factor. We observed a significant main effect of familiarity, $F(1,46) = 4.78$, $p = .034$, $\eta^2 = .09$, suggesting that children associated with familiar songs were chosen more often than children associated with unfamiliar songs, as well as a significant main effect of Experiment, $F(1,46) = 7.12$, $p = .011$, $\eta^2 = .13$, suggesting that participants in Experiment 5 were more likely to choose the positively associated agents. Crucially, we observed a significant interaction between familiarity and Experiment, $F(1,46) = 5.91$, $p = .019$, $\eta^2 = .11$. The children in Experiment 5 were equally likely to choose children liking familiar and unfamiliar songs, even though children at this age prefer familiar songs over unfamiliar songs. In a marked contrast, children in Experiment 4 rejected children who knew unfamiliar songs, and tended to choose children who knew familiar songs, suggesting that shared song knowledge, not shared song preferences, drives children's social choices.

To probe this finding further, we conducted a final experiment in which we pitted song preferences against song knowledge. Given the findings of Experiments 4 and 5, we expected children to weight song knowledge over song preferences in selecting other children as friends.

9. Experiment 6

In this experiment, we tested the relative impact of shared knowledge and liking on children's evaluation of social partners. After being introduced to two potential social

partners and listening to a song, participants were told that one of the children knew the song, but did not like it, whereas the other child did not know the song, but after listening to it, liked it. Participants were then asked whom they would rather have as a friend. If children pay more attention to emotional responses to music, then they should prefer others who like songs, regardless of their familiarity with the songs. As a result, we should not see a difference in participants' choices of agents associated with familiar and unfamiliar songs. If, on the other hand, children selectively pay attention to knowledge of songs, then, based on the results of Experiment 4, children should prefer the target child who knows the familiar but not the unfamiliar songs.

9.1. Method

The method was the same as Experiment 4 and 5 except that on each trial, after the experimenter introduced two target children, and played the song, she stated: "(e.g.) Ashley knows this song, but doesn't like it. Laura doesn't know this song, but after hearing it, she likes it." Participants were 24 children (12 girls: mean age: 5 y; range 4 y-5 y 11 m). An additional eight children were excluded from the final sample due to failure to recognize the familiar songs at the end of the session (n = 4), failure to finish the experiment (n = 1), distraction (n = 2) or experimenter error (n = 1).

9.2. Results and Discussion

As shown in Figure 2c, participants' choices for the knowledgeable agents associated with familiar songs and unfamiliar songs significantly differed (familiar songs: $M = 57\%$, $SD = 33\%$; unfamiliar songs: $M = 26\%$, $SD = 29\%$), $t(23) = 5.1$, $p < .001$, $d = 1.04$. The proportion of choices for children who knew but did not like the familiar target songs did not differ significantly from that expected by chance, $t(23) = 1.0$, $p > .3$, ns. In contrast, participants chose children who knew but did not like unfamiliar target songs at frequencies significantly *below* chance, $t(23) = 3.9$, $p < .00, 5$, $d = .79$. The proportion of participants who preferred knowledgeable children differed significantly depending on whether the children were reported to know songs that were familiar vs. unfamiliar to the participants, $p = .017$ (Fisher's exact test). Thus, even though participants in Experiment 5 preferred target children who liked familiar and unfamiliar songs equally well, when knowledge was pitted against preference, participants chose to affiliate with target children who shared their knowledge of the songs.

The combined results of Experiments 4–6 suggest that, in general, children prefer agents who 'like' songs, regardless of whether the songs are familiar or not, perhaps because individuals who like things are perceived as more positive than individuals who do not like things. However, children's social preferences are markedly different when they receive information about their potential partner's knowledge of songs that are familiar or unfamiliar to the children themselves. Children tended to choose targets who know familiar songs, even if this required that they reject the target who liked these songs. In contrast, when liking of a song and *ignorance* of an unfamiliar song coincided, children significantly chose the corresponding target. Together, these results suggest that children's social preferences based on song familiarity are driven by children's inferences about shared knowledge.

10. General Discussion

The present research investigates the role of music in guiding children's evaluation of potential social partners. The findings of Experiments 1 to 3 provide evidence that the favorite songs of potential social partners affect children's evaluation of these partners, but that some aspects of music guide children's social preferences more than others. Social effects of music are only observed when specific songs differ in familiarity: children like others whose favorite songs they know. In contrast, we observed no clear effects of familiarity with the general musical conventions of our participants' own culture. Even though children judge that unfamiliar songs that follow the conventions of their own culture are more like the music they know, they show no preference for target children associated with these songs in the present experiments.

In Experiments 4 to 6, we investigated how expressed preferences for, and knowledge of, songs affected children's social choices. Results revealed two separate effects on children's choices. First, children generally like others who like songs, regardless of whether the songs are familiar. Second, children like others who know songs that they know, and reject others who know unfamiliar songs, despite their contrasting music preferences. Here we consider three possible explanations for this effect.

10.1. Can familiarity preferences, together with affective tagging, explain our results?

At first sight, the effects of song familiarity revealed by these experiments accord with the general principle that familiarity breeds liking (Zajonc, 1968). From this principle, a plausible account of the social effects of music might rely on a mechanism of affective tagging: in line with previous data (e.g., Olson et al., 2006; 2008), children might prefer persons who are associated with stimuli that are judged as positive. However, affective tagging cannot explain our findings. In Experiments 4 and 5, the same familiar and unfamiliar songs were paired with the same pairs of pictures in exactly the same way. Hence, one would expect affective tagging to occur in both experiments in similar ways. That is, children should simply prefer other children who are positively associated with familiar songs over those who are negatively associated with those songs, irrespective of *how* they are associated (either by knowledge or esthetic preference). In contrast to this prediction, children behaved differently when given information about others' knowledge vs. preferences. The stimulus features that can drive social preferences thus appear to be remarkably specific, and difficult to reconcile with an affective tagging mechanism coupled with a tendency to prefer the familiar.

10.2. Do culture-specific music styles provide a basis of music-based social preferences?

Culture-specific music styles might be good cues to group membership, because implicit knowledge about culture-specific aspects of music is acquired early in life, it leads to preference for music of one's own culture even in early infancy (Soley & Hannon, 2010), and it leads to various impairments when processing the music of a different culture or the associated emotions (e.g., Hannon & Trehub, 2005a; Demorest et al., 2008; Morey, 1940). Hence, in some situations, implicit culture-specific knowledge about musical conventions would provide a reliable cue for identifying out-group members.

However, culture-specific musical traditions may be less informative both about social group membership and about good communicative partners, compared to knowledge of specific songs, because music styles typically vary to a considerable degree only over large geographical distances. In particular, some ethnomusicologists divide the world into just seven to ten musical areas, based on the variation in rhythmic and melodic structure (Nettl, 1983). As a result, each of the musical areas covers a large geographic range comprising many different human groups. For example, the traditional music of many countries in southeastern Europe (e.g., Bulgaria, Macedonia, Turkey) features similar complex rhythms (Rice, 1994; London, 1995; Bates, 2010). Likewise, familiarity with Western music principles of harmony, melody and rhythm is certainly shared among Western audiences. Within these areas, however, are multiple social groups that vary in their language, accent, and cultural traditions. These smaller social groups constantly formulate their own culture-specific knowledge in order to define themselves and establish and preserve their boundaries within larger cultural groups (e.g., Bourdieu, 1984; DiMaggio, 1987; Stokes, 1994). This tendency can lead to a corpus of specific songs of which knowledge is shared in the community. Such knowledge may be a better sign of membership to the group where the knowledge has been created.

From this perspective, knowledge of specific songs might be more useful as a cue to group membership than culture-specific musical styles. Nevertheless, our results leave open the possibility that culture-specific differences in musical styles might also contribute to the formation of social choices in children. Musical styles may be especially likely to carry social power when they are specific (for example, the aspects of musical style that distinguish disco music from hip-hop), and their social power may be greatest at older ages (for example, adolescence).

10.3. Do shared music preferences influence people's social choices?

In the present experiments, young children did not choose to affiliate with novel individuals based on those individuals liking for songs that were familiar to the children. This finding does not imply, however, that shared preferences have no effect on children's social choices: in many situations, they do. For instance, children prefer those individuals who share their preferences for food, toys, or activities (Reaves & Roberts, 1983; Fawcet & Markson, 2010; Mahajan & Wynn, 2012). Thus, young children may prefer to affiliate with other children who like the music that they like, even though they fail to prefer others who like the music that they know. Research using variations on the present methods, but presenting songs that are equally well known to the participants but unequally favored by them, could address this question.

Moreover, although young children do not favor other children who like the songs they know, older children and adults may do so. Young children have limited control over the music they encounter (songs sung at school or in the home, songs sung as games in the play-yard), but teenagers are able to make more conscious and active decisions about the contents of their music players, and these choices will be guided by their music preferences. With the advent of such active decisions may come tendencies to weight preferences more highly in making friendship choices. Alternatively, shared knowledge might trump shared preferences

at all ages, because of the critical role that it plays in fostering communication and building common ground. Research teasing apart music knowledge and preferences, like Experiments 4–6, could serve to test these possibilities.

10.4 Conclusion: Cultural knowledge

Regardless of the social roles played by music styles and music preferences, the present findings provide evidence that young children's social choices are influenced by a form of cultural knowledge: knowledge of specific songs. Because shared cultural knowledge can reliably ground communicative interactions, children might have developed sensitivity to this cue over the course of their social history, through their experiences communicating with others. Because shared cultural knowledge has been a reliable cue to social group membership throughout human evolution, it is also possible that our species has evolved a tendency to seek evidence for shared knowledge in evaluating new potential social partners.

These findings raise further questions. First, how explicit is children's reasoning about the basis of their social choices among people who differ in their knowledge of songs? Do young children explicitly reason about knowledge of music as a cue to effective communicative partners or social group members, or do their social choices follow from implicit processes, like the unconscious processes that lead adults to favor those who speak with the accent of their community (see Giles & Billings, 2004, for a review) or adopt their incidental gestures (e.g., Kendon, 2004)?

Second, what is the role of shared music knowledge, distinct from music preferences, at older ages? Will older children and adults weight music knowledge over music preferences in choosing new social partners? More deeply, does shared music knowledge influence social choices in the same ways at different times in development, or does its influence change with the growth of knowledge, experience, and autonomy?

Finally, is sensitivity to shared cultural knowledge limited to specific domains such as religion (Heiphetz et al., 2013, 2014) and music, or is it more general? These are not the only domains in which people learn from others, and in which culturally variable systems of knowledge emerge: other examples include traditions of visual decoration (on clothing or on the body), of stories and poems, and of dances, games and sports. In all these domains, shared preferences and shared knowledge are likely to be interrelated in human groups, but they may have differing effects on the minds of their members. By studying those effects, psychologists may gain insight into the power of culture as a unifying force in human societies and over human social cognitive development.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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References

Aboud, F. Children and prejudice. Cambridge, MA: Basil Blackwell; 1988.

Alexander GM, Hines M. Gender labels and play styles: Their relative contribution to children's selection of playmates. Child Development. 1994; 65:869–879. [PubMed: 8045173]

Allen R. African-American Sacred Quartet Singing in New York City. New York Folklore. 1988; 14(3–4):7–22.

Baily, J. The role of music in the creation of an afghan national idntity, 1923–73. In: Stokes, M., editor. Ethnicity, identity, and music. Oxford: England: Berg Publishers; 1994. p. 45-60.1994

Bakagiannis S, Tarrant M. Can music bring people together? Effects of shared musical preference on intergroup bias in adolescence. Scandinavian Journal of Psychology. 2006; 47:129–136. [PubMed: 16542355]

Bar-Haim Y, Ziv T, Lamy D, Hodes RM. Nature and nurture in own-race face processing. Psychological Science. 2006; 17(2):159–163. [PubMed: 16466424]

Bates, E. Music in Turkey: Experiencing music, expressing culture. New York: Oxford University Press; 2010.

Bigand E, Poulin-Charronnat B. Are we "experienced listeners"? A review of the musical capacities that do not depend on formal music training. Cognition. 2006; 100:100–130. [PubMed: 16412412]

Billig M, Tajfel H. Social categorization and similarity in intergroup behavior. European Journal of Social Psychology. 1973; 3:27–52.

Bonawitz EB, Shafto P, Gweon H, Goodman N, Spelke E, Schulz LE. The double-edged sword of pedagogy: Teaching limits children's spontaneous exploratoration and discovery. Cognition. 2011; 120(3):322–330. [PubMed: 21216395]

Bourdieu, P. Distinction: A social critique of the judgement of taste. Cambridge, Massachusetts: Harvard University Press; 1984.

Bourdieu, P., Passeron, JC. Reproduction in education, society and culture. London: Sage Publishing; 1977.

Brewer MB, Silver M. Ingroup bias as a function of task characteristics. European Journal of Social Psychology. 1978; 8:393–400.

Byrne D, Griffitt W. A developmental investigation of the law of attraction. Journal of Personality and Social Psychology. 1966; 4:699–702.

Clark, HH. Using Language. Cambridge: Cambridge University Press; 1996.

De Houwer J, Thomas S, Baeyens F. Associative learning of likes and dislikes: a review of 25 years of research on human evaluative conditioning. Psychological Bulletin. 2001; 127(6):853–869. [PubMed: 11726074]

Demorest SM, Schultz SJM. Children's Preference for Authentic versus Arranged Versions of World Music Recordings. Journal of Research in Music Education. 2004; 52(4):300–313.

Demorest SM, Morrison SJ, Beken MN, Jungbluth D. Lost in translation: an encultuation effect in music memory performance. Music Perception. 2008; 25(3):213–223.

Diesendruck G, haLevi H. The role of language, appearance, and culture in children's social category-based induction. Child Development. 2006; 77:539–553. [PubMed: 16686787]

DiMaggio P. Classification in art. American Sociological Review. 1987 Aug.52:440–55.

Duck SW. Similarity and perceived similarity of personal constructs as influences on friendship choice. British Journal of Social and Clinical Psychology. 1973; 12:1–6.

Duckworth KL, Bargh JA, Garcia M, Chaiken S. The automatic evaluation of novel stimuli. Psychological Science. 2002; 6:515–519.

Egermann H, Fernando N, Chuen L, McAdams S. Music Induces Universal Emotion-Related Psychophysiological Responses: Comparing Canadian Listeners To Congolese Pygmies. Frontiers in Psychology: Emotion Science. 2015; 5:1341.

Ellis, CJ. Aboriginal music: Education for living. St. Lucia: University of Queensland Press; 1985.

Epstein, JS. Misplaced childhood: An introduction to the sociology of youth and their music. In: Epstein, JS., editor. Adolescents and their music: If its too loud, you're too old. New York: Garland; 1994. p. 13-34.

Farroni T, Csibra G, Simion F, Johnson MH. Eye contact detection in humans from birth. Proceedings of the National Academy of Sciences of the United States of America. 2002; 99:9602–9605. [PubMed: 12082186]

Fawcett CA, Markson L. Similarity predicts liking in 3-year-old children. Journal of Experimental Child Psychology. 2010; 105:345–358. [PubMed: 20092828]

French DC. Children's social interaction with older, younger, and same-age peers. Journal of Social and Personal Relationships. 1987; 4:63–86.

Gans, HJ. Popular culture and high culture: An analysis and evaluation of taste. New York: Basic Books; 1974.

Giles, H., Billings, AC. Assessing language attitudes: speaker evaluation studies. In: Davies, A., Elder, C., editors. The handbook of applied linguistics. Oxford: Blackwell Publishing; 2004. p. 187-209.

Gregory AH, Varney N. Cross-cultural comparisons in the affective response to music. Psychology of Music. 1996; 24:47–52.

Hamlin JK, Wynn K, Bloom P. Three-month-olds show a negativity bias in their social evaluations. Developmental Science. 2010; 13(6):923–939. [PubMed: 20977563]

Hannon EE, Trehub SE. Metrical categories in infancy and adulthood. Psychological Science. 2005a; 16:48–55. [PubMed: 15660851]

Hannon EE, Trehub SE. Tuning in to rhythms: Infants learn more readily than adults. Proceedings of the National Academy of Sciences (USA). 2005b; 102:12639–12643.

He, Z., Baillargeon, R. Infants expect individuals to retaliate more severely against outgroup members; Montreal, Canada. Paper presented at the Biennial Meeting of the Society for Research in Child Development; 2011 Mar.

Heiphetz L, Spelke ES, Banaji MR. Patterns of implicit and explicit attitudes in children and adults: tests in the domain of religion. Journal of Experimental Psyhology: General. 2013; 142:864–879.

Heiphetz L, Spelke ES, Harris PL, Banaji MR. The development of reasoning about beliefs: Fact, preference, and ideology. Journal of Experimental Social Psychology. 2013; 49:559–565. [PubMed: 23729845]

Heiphetz L, Spelke ES, Banaji MR. The formation of belief-based social preferences. Social Cognition. 2014; 32(1):22–47.

Hepper PG. An examination of fetal learning before and after birth. Irish Journal of Psychology. 1991; 12:95–107.

Heyman GD, Gelman SA. Young children use motive information for make trait inferences. Developmental Psychology. 1998; 34:310–321. [PubMed: 9541783]

Johnstone J, Katz E. Youth and popular music: a study of the sociology taste. American Journal of Sociology. 1957; 62:563–568.

Kelly D, Quinn P, Slater A, Lee K, Gibson A, Smith M, Ge L, Pascalis O. Three-month-olds, but not newborns, prefer own-race faces. Developmental Science. 2005; 8:F31–F36. [PubMed: 16246233]

Kendon, A. Gesture: Visible Action as Utterance. Cambridge: Cambridge University Press; 2004.

Kinzler KD, Dupoux E, Spelke ES. The native language of social cognition. Proceedings of the National Academy of Sciences. 2007; 104:12577–12580.

Kinzler KD, Shutts K, DeJesus J, Spelke ES. Accent trumps race in guiding children's social preferences. Social Cognition. 2009; 27(4):623–634. [PubMed: 21603154]

Kircher M, Furby L. Racial preferences in young children. Child Development. 1971; 42:2076–2078.

Koelsch S, Grossmann T, Gunter TC, Hahne A, Schroger E, Friederici AD. Children processing music: electric brain responses reveal musical competence and gender differences. Journal of Cognitive Neuroscience. 2003; 15:683–693. [PubMed: 12965042]

Koenig M, Clément F, Harris PL. Trust in testimony: children's use of true and false statements. Psychological Science. 2004; 15:694–698. [PubMed: 15447641]

Kowalski K, Lo YF. The influence of perceptual features, ethnic labels, and sociocultural information on the development of ethnic/racial bias in young children. Journal of Cross-Cultural Psychology. 2001; 32:444–455.

Kuhl PK, Tsao FM, Liu HM. Foreign-language experience in infancy: Effects of short-term exposure and social interaction on phonetic learning. Proceedings of the National Academy of Sciences. 2003; 100:9096–9101.

Kuhn D, Nash SC, Brucken L. Sex role concepts of two- and three-year olds. Child Development. 1978; 49:445–451. [PubMed: 679779]

Kurzban R, Tooby J, Cosmides L. Can race be erased? Coalitional computation and social categorization. The proceedings of the National Academy of Sciences of the United States of America. 2001; 98:15387–15392. [PubMed: 11742078]

Larson RW. Secrets in the bedroom: adolescents' private use of media. Journal of Youth and Adolescence. 1995; 24:535–550.

LeBlanc A, Sims WL, Siivola C, Obert M. Music style preferences of different age listeners. Journal of Research in Music Education. 1996; 44(1):49–59.

Litle P, Zuckerman M. Sensation seeking and music preferences. Personality and Individual Differences. 1986; 7:575–577.

London J. Some examples of complex meters and their implications for models of metric perception. Music Perception. 1995; 13:59–77.

Lonsdale AJ, North AC. Musical taste and ingroup favouritism. Group Processes and Intergroup Relations. 2009; 12:319–326.

Lydon JE, Jamieson DW, Zanna MP. Interpersonal Similarity and the Social and Intellectual Dimensions of First Impressions. Social Cognition. 1988; 6(4):269–286.

Magowan, F. The land us our essence, it stays forever: The yothuyindi relationship in Australian Aboriginal traditional and popular musics. In: Stokes, M., editor. Ethnicity, identity, and music: the musical construction of place. Oxford: Berg Publishers; 1994. p. 135-155.

Mahajan N, Wynn K. Origins of 'Us' versus 'Them': Prelinguistic infants prefer similar others. Cognition. 2012; 124:227–233. [PubMed: 22668879]

Manis M, Cornell SD, Moore JC. Transmission of attitude-relevant information through a communication chain. Journal of Personality and Social Psychology. 1974; 30:81–94.

Martin CL, Little JK. The relation of gender understanding to children's sex-typed preferences and gender stereotypes. Child Development. 1990; 61:1427–1439. [PubMed: 2245735]

Martin CL, Fabes RA, Evans SM, Wyman H. Social cognition on the playground: Children's beliefs about playing with girls versus boys and their relations to sex segregated play. Journal of Social and Personal Relationships. 1999; 16:751–771.

Masataka N. Preference for consonance over dissonance by hearing newborns of deaf parents and of hearing parents. Developmental Science. 2006; 9:46–50. [PubMed: 16445395]

Mehr, SA., Song, LA., Spelke, ES. For 5-month-old infants, melodies are social; Columbus OH. Poster to be presented at the biennial meeting of the Cognitive Development Society; 2015.

Meltzoff AN. 'Like me': a foundation for social cognition. Developmental Science. 2007; 10(1):126–134. [PubMed: 17181710]

Meyer JW. The effects of education as an institution. American Journal of Sociology. 1977 Jul.83:55–77.

Morey R. Upset in emotions. Journal of Social Psychology. 1940; 12:333–56.

Nettl, B. The Study of Ethnomusicology: Twenty-nine Issues and Concepts. Urbana: University of Illinois Press; 1983.

Ng R, Heyman GD, Barner D. Colaboration promotes proportional reasoning about resource distribution in young children. Developmental Psychology. 2011; 47:1230–1238. [PubMed: 21806299]

North AC, Hargreaves DJ. Music and adolescent identity. Music Education Research. 1999; 1:75–92.

Olson KR, Banaji MR, Dweck CS, Spelke ES. Children's bias against lucky vs. unlucky people and their social groups. Psychological Science. 2006; 17:845–846. [PubMed: 17100783]

Olson KR, Dunham Y, Dweck CS, Spelke ES, Banaji MR. Judgments of the Lucky Across Development and Culture. Journal of Personality and Social Psychology. 2008; 94:757–776. [PubMed: 18444737]

Olson K, Shutts K, Kinzler K, Weisman K. Children associate racial groups with wealth: Evidence from South Africa. Child Development. 2012; 83:1884–1899. [PubMed: 22860510]

Powell LJ, Spelke ES. Preverbal infants expect members of social groups to act alike. Proceedings of the National Academy of Sciences. 2013; 110:E3965–E3972.

Quinn PC, Yahr J, Kuhn A, Slater AM, Pascalis O. Representation of the gender of human faces by infants: a preference for female. Perception. 2002; 31:1109–1121. [PubMed: 12375875]

Reaves JY, Roberts A. The effect of type of information on children's attraction to peers. Child Development. 1983; 54:1024–1031.

Rentrow PJ, Gosling SD. Do re mi's of everyday life: the structure and personality correlates of music preferences. Journal of Personality and Social Psychology. 2003; 84(6):1236–1256. [PubMed: 12793587]

Rentfrow PJ, Gosling SD. Message in a ballad: the role of music preferences in interpersonal perception. Psychological Science. 2006; 17(3):236–242. [PubMed: 16507064]

Rentfrow PJ, Gosling SD. The content and validity of music-genre stereotypes among college students. Psychology of Music. 2007; 35:306–325.

Rentfrow PJ, McDonald JA, Oldmeadow JA. You are what you listen to: Young people's stereotypes about music fans. Group Processes and Intergroup Relations. 2009; 12:329–344.

Rice, T. May it fill your soul: Experiencing Bulgarian music. Chicago, IL: University of Chicago Press; 1994.

Saffran JR, Loman MM, Robertson RRW. Infant memory for musical experiences. Cognition. 2000; 77:B15–B23. [PubMed: 10980255]

Schachner A, Hannon EE. Infant-directed speech drives social preferences in 5-month-old infants. Developmental Psychology. 2011; 47:19–25. [PubMed: 20873920]

Schellenberg EG. Children's implicit knowledge of harmony in Western music. Developmental Science. 2005; 8:551–566. [PubMed: 16246247]

Selfhout MHW, Branje SJT, ter Bogt TFM, Meeus WHJ. The role of music preferences in early adolescents' friendship formation and stability. Journal of Adolescence. 2009; 32:95–107. [PubMed: 18164756]

Shepherd, J. Whose music? A Sociology of Musical Languages. London: Latimer, New Dimensions; 1977. The musical coding of ideologies; p. 69-124.

Soley G, Hannon EE. Infants prefer the musical meter of their own culture: A cross-cultural comparison. Developmental Psychology. 2010; 46(1):286–292. [PubMed: 20053025]

Stokes, M. Ethnicity, identity, and music. Oxford, England: Berg Publishers; 1994.

Tekman HG, Hortacsu N. Music and social identity: Stylistic identification as a response to musical style. International Journal of Psychology. 2002; 37(5):277–285.

Tolhurst GC, Hollien H, Leeper L. Listening preferences for music as a function of age. Folia Phoniatricia. 1984; 36:93–100.

Trainor LJ, Trehub SE. Key membership and implied harmony in Western tonal music: Developmental perspectives. Perception & Psychophysics. 1994; 56:125–132. [PubMed: 7971113]

Zajonc RB. Attitudinal effects of mere exposure. Journal of Personality and Social Psychology Monographs. 1968; 9(2, part 2):1–27.

Zillman D, Bhatia A. Effects of associating with musical genres on heterosexual attraction. Communication Research. 1989; 16(2):263–288.

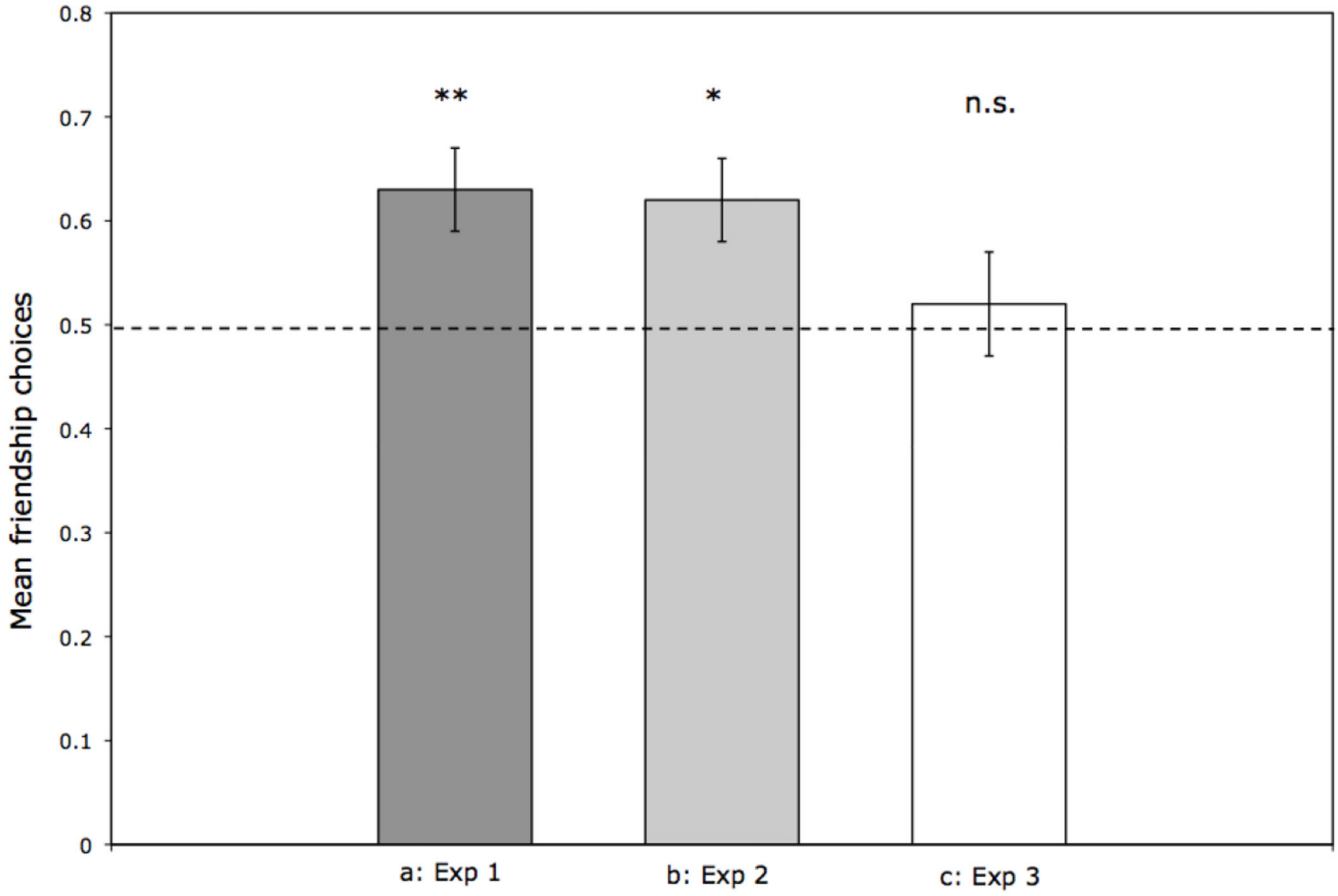

Figure 1.

Results of Experiments 1–3. Mean friendship choices associated with familiar Western songs compared to unfamiliar Balkan songs (Exp. 1), with familiar compared to unfamiliar Western songs (Exp. 2), and with unfamiliar Western compared to Balkan songs (Exp. 3). Error bars represent standard errors (* = $p < .05$, ** = $p < .01$).

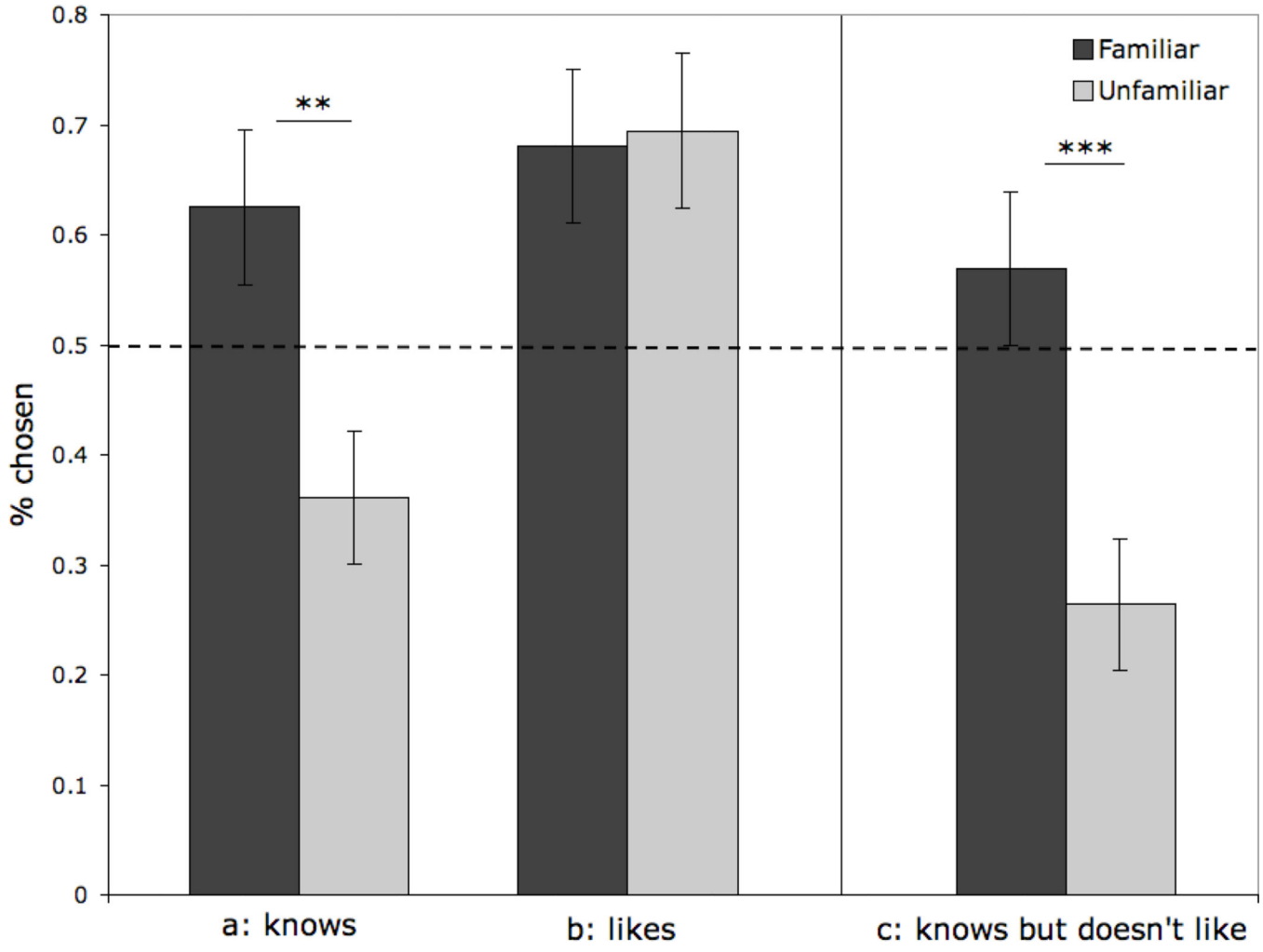

Figure 2.

Results of Experiments 4–6. Mean choices of the social partner (a) who knows familiar and unfamiliar songs, respectively, in Experiment 4, (b) who likes familiar and unfamiliar songs, respectively, in Experiment 5, and (c) who knows but does not like familiar and unfamiliar songs, respectively, in Experiment 6. Error bars represent standard errors (** = $p < .01$, *** = $p < .001$).