CHILDREN'S RELIANCE ON SHARED PSYCHOLOGICAL ATTRIBUTES TO INFER GROUP MEMBERSHIP

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BOĞAZİÇİ UNIVERSITY

2019

CHILDREN'S RELIANCE ON SHARED PSYCHOLOGICAL ATTRIBUTES TO INFER GROUP MEMBERSHIP

Thesis submitted to

the Institute for Graduate Studies in Social Sciences

in partial fulfillment of the requirements for the degree of

Master of Arts

in

Psychology

by

Begüm Köseler

Boğaziçi University

2019

DECLARATION OF ORIGINALITY

I, Begüm Köseler, certify that

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ABSTRACT

Young Children's Reliance on Shared Psychological Attributes

to Infer Group Membership

Our social world is based on complex relationships and organizations, and sensitivity to cues that enable us to represent these relationships is crucial for navigating this complex social environment. The current research aims to shed further light on the development of social group representations and asks whether children perceive shared knowledge and shared preferences as diagnostic cues to social group membership. Although, both attributions indicate similarity between individuals, recent studies suggest that young children privilege knowledge in their group-based inferences and their social preferences. The first study was conducted with 5-year-olds. Children were introduced to two novel social groups and learned about the song preference or song knowledge of one member from each group. Children were then introduced to a novel agent's song knowledge or preference and they were asked to guess its group membership. Results showed that children did not use shared knowledge of or preference for songs between individuals to infer shared group membership. A follow up study with a similar methodology showed that 6- to 8-years old children used both cues (shared knowledge and shared preference) to infer shared group membership among individuals. These findings highlight potential differences in making predictive and diagnostic inferences and suggest that they might show different developmental trends and possibly rely on different mechanisms.

ÖZET

Çocukların Ortak Psikolojik Özelliklere Dayalı Grup Üyeliği Çıkarımları

İçinde yaşadığımız sosyal dünya karmaşık sosyal ilişkiler barındırır. Bu karmaşık sosyal ilişkileri temsil etmemizi sağlayan ipuçlarına olan duyarlılığımız ise sosyal çevremizi anlamlandırmak adına gereklidir. Bu araştırma, sosyal grup temsillerinin nasıl oluştuğuna ışık tutmayı hedeflemektedir. Bu bağlamda amaç, çocukların ortak bilgi ve ortak tercihleri sosyal grup üyeliğini tanımlayıcı birer ipucu olarak algılayıp algılamadığı araştırmaktır. Her iki ipucu da bireyler arası benzerliği gösterse de bu alanda yapılan son araştırmalar çocukların sosyal tercihlerinde ve sosyal grup üyeliğine dayalı çıkarımlarında ortak bilgiye daha duyarlı olduğunu göstermektedir. İlk çalışma 5 yaşındaki çocuklarla yapılmıştır. Çocuklara iki yeni sosyal grup tanıtıldıktan sonra her iki gruptan birer karakterin şarkı tercihi ya da şarkı bilgisi hakkında bilgi verilmiştir. Daha sonra grubu belli olmayan yeni bir karakterin şarkı bilgisi ya da şarkı tercihi hakkında bilgi verilmiş ve çocuklardan bu karakterin hangi gruba ait olduğunu tahmin etmeleri istenmiştir. Sonuçlar bu yaştaki çocukların ortak şarkı bilgisi ya da ortak şarkı tercihlerini kullanarak grup üyeliğine dair bir çıkarım yapmadıklarını göstermiştir. Benzer bir yöntem kullanılarak 6-8 yaşındaki çocuklarla yapılan takip çalışması, bu yaş aralığındaki çocukların grup üyeliği çıkarımlarında her iki ipucunu da (ortak bilgi ve ortak tercih) kullandıklarını göstermiştir. Bu bulgular, öngörücü ve tanısal çıkarımların doğasındaki potansiyel farklılıkları ve farklı gelişimsel süreçler izlediklerinin altını çizmektedir.

ACKNOWLEDGMENTS

This thesis is the result of the support and help of many individuals which I would like to express my deepest gratitude to all of them. First of all, I would like to thank to my supervisor, Asst. Prof. Gaye Soley, for her continuous guidance and support. This thesis would not have been possible without her invaluable feedbacks and constant supervision, I appreciate all the time and effort she spent on me. I would also like to thank my committee members, to Asst. Prof. Çağla Aydın for her valuable contributions and comments to this thesis and also to Asst. Prof. Deniz Tahiroğlu, for her constant support since the first day we met in undergraduate years in Özyeğin University. Her encouragement always carried me further.

I thank all the members of Baby and Child Development Lab, especially to Didar Karadağ for her generous friendship, to Ceren Bozkurt for her constant kindness and to Pınar Aldan for being there all the time for my endless questions. I appreciate all the lab assistants for their willingness to help during data gathering processes in many different circumstances.

I would also like to thank all my peers in Psychological Sciences graduate program, I have been always fascinated by the richness of different perspectives during our discussions in and out of the class. I am especially thankful to Öykü Ekinci for being a great listener of all the time.

I am also thankful to my sisters Hazal Gürsu and Nilsu Yavuzer for always providing me unconditional love and comfort. Also, I thank my best friends Çağla Yenen and Cem Dandul for making this journey enjoyable and finally, Anıl Demirer for always giving me confidence.

I am also grateful for my best friend and partner Ahmet Şahin Özen for his endless patience and support, for believing me in every situation that I couldn't believe in myself. Without his unconditional emotional support this journey would be much different.

I am also grateful to all my family members, especially to my role-models Hatice Köseler and Nizamettin Köseler. Without their guidance and effort, I would not reach this point.

I would also like to thank to all families, teachers and principals who helped me to conduct this research. And lastly, I would like to thank all the children for participating in this research and for allowing me to continue simply by their existence when my motivation falls.

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CHAPTER 1

INTRODUCTION

Human societies are organized into social groups. Based on various social cues such as language, gender, race, or team membership, even very young children divide their social world into groups and categories (Brewer, 1988; Fiske, 1998) and make group-based inferences about various characteristics of individual group members (e.g., Diesendruck & HaLevi, 2006; Plötner, Over, Carpenter, & Tomasello, 2016). A social group can be defined as a collection of individuals who interact with each other and share fundamental similarities (Brewer, 1979; Hirschfeld, 1996; Tajfel, Billig, Bundy & Flament; 1971). Although members of the same social group share various physical, behavioral and psychological attributes, these attributes are not necessarily equally informative about social group membership. Recent evidence suggests a strong link between social group membership and shared knowledge, sensitivity to which emerges early in life. Specifically, children prefer others who have the same knowledge state as themselves (Soley & Spelke, 2016), and they make selective inferences about others' knowledge states based on their group membership (Soley, 2019; Soley & Aldan, 2018). Adults also privilege shared knowledge, over other shared attributes such as shared preference when making affiliative inferences about others (Vélez, Bridgers & Gweon, 2019). Building upon these findings, the current research explores the developmental roots of similar inferences and asks whether children perceive shared knowledge as a diagnostic cue to shared group membership.

1.1 Children's sensitivity to social affiliations and groups

From early in life, children are engaged in a wide range of experiences with human behaviors. To make sense of these behaviors, children tend to group people into social categories (e.g., girls, boys) based on their consistent similarities and differences (e.g., Kinzler, Shutts, & Correl, 2010). Researchers have argued that children have to hold abstract naïve theories of human behavior in order to represent these social categories and make category-based inferences (Hirschfeld, 1996; Rhodes, 2013; Rhodes & Chalik, 2014). While young children and even infants have fundamental abstract theories of human behavior, these theories go into change throughout development (Rhodes, 2013; Wellman, Cross, & Watson, 2001).

Hirschfeld (1996), argued that social categories can be seen as "natural kinds" that reflect interpersonal similarities among members of a given category and differences among members of different categories. This suggestion implies that children perceive social categories as existing from birth and remaining stable during development, and they use these categories to predict others' physical, psychological and behavioral characteristics. This perspective is also known as "essentialism" (Taylor, Rhodes, & Gelman, 2009; for a review see Gelman, 2003). The essentialist beliefs about social categories share similarities with the categories in other biological domains. For instance, when children encounter a new animal category (e.g., dogs), they conclude that it is a specific natural kind based on biological differences (e.g., fur color, size), they also infer that members of this new animal category will be similar to each other (Brandone & Gelman, 2009; Rhodes & Gelman, 2009). Researchers have argued that representing social categories as natural kinds can ease cognitive processing since it offers an advantage for individuals to make fast inferences about group members and organize their social

world accordingly (Cimpian & Erickson, 2012; Gelman, 2003; Gil-White, 2001; Rhodes & Gelman, 2009). However, it might also potentially lead to erroneous social biases and problematic inferences specifically in the case of social categories such as gender (Coleman & Hong, 2008; Keller, 2005), race (Bastian & Haslam, 2006; Levy, Stroessner & Dweck, 1998) and ethnicity (Gil-White, 2001; Haslam, Rothschild & Ernst, 2002).

The essentialist beliefs about different social categories might vary depending on the children's age and the cultural context. At around 3- to 5 years of age, children consider a biologically based social category -gender- as a natural kind (Rhodes, Gelman, & Karuza, 2014). For instance, 4-year-old children readily infer that it is not accurate to identify same kind of person a boy and a girl, even if they share common properties (Rhodes & Gelman, 2009). Furthermore, gender is essentialized highly and similarly across different cultures, since it is a culturally meaningful social category in most of the societies in the world (Davoodi et al., 2019). On the other hand, studies showed that race, ethnicity and other social categories with no apparent biological markers might be essentialized later in development (at around 7 to 10 years of age) (Kinzler & Dautel, 2012; Rhodes & Gelman, 2009). For instance, Rhodes and Gelman (2009) showed that 5 years old children perceive race as a categorization of skin color but are also aware that it is a subjective and flexible way of categorizing individuals, as compared to categorization based on gender and animal species. Studies also showed that the developmental trajectory for essentialist beliefs are culture-dependent for social categories like ethnicity and religion (Diesendruck et al., 2013; Smyth, Feeney, Eidson & Coley, 2017). For instance, the degree of essentialist beliefs about ethnicity (i.e., Arab and Jewish) increase with age for children born and raised in the United

States, but in Israel, it is evident from 5 years of age, which might be related to the continuing struggle between these ethnic groups in that area (Diesendruck et al., 2013).

Recent studies revealed that children also divide their social environment into groups based on abstract labels or t-shirt colors. (Tajfel et al.,1971). Besides, they categorize individuals based on how members cooperate or compete with each other, yet, they do not necessarily perceive these social groups as natural kinds (Kalish & Lawson, 2008; Rhodes & Brickman, 2011). Based on this evidence, Rhodes (2013) suggested a second intuitive theory that social categories illustrate social obligations and might guide children in predicting social interactions. Specifically, this intuitive theory suggests that members of the same category or group would protect and choose not to harm each other, these social obligations are applicable to every group member, but they do not extend beyond group boundaries (Rhodes, 2013; Rhodes & Chalik, 2016). For instance, in her work, Rhodes (2012) presented two novel social categories (labeled as "Flurps" and "Zazes" and marked by different t-shirt colors) to 3- to 10-year-old children. She found that children of all ages used category information to anticipate social interactions between members. Specifically, children expected that an agent would direct harmful actions (e.g., hitting or teasing) towards outgroup members as well as avoid harmful actions towards ingroup members. Since harmful actions violate social obligations, children expected that individuals would avoid harmful actions towards members of the same category.

Recent studies also showed that sensitivity to social affiliation cues is evident even in infancy. Spelke (2013) argued that, at birth, infants are ready to conceptualize the social relations determined by social categories. Even prior to acquiring language, infants hold expectations about others' behaviors depending on

social affiliative cues, such as sharing actions or attributes (Powell & Spelke, 2013), as well as support or help (Jin & Baillargeon, 2017) between group members. Later in development, social preferences become evident in children's explicit behaviors and attitudes (Gelman et al., 1986; Taylor & Gelman, 1993; Taylor et al., 2009; Kinzler & Spelke, 2011). An impressive number of studies focused on children's social preferences based on various social cues such as gender, race, and age. These studies demonstrated that 2-to 5-year-old children choose to be friends with individuals from their own social group both in their everyday environment and in experimental contexts (Aboud, 1988; Alexander & Hines, 1994; Kinzler et al., 2007; Kircher & Furby, 1971; Kowalski & Lo, 2001; Macoby & Jacklin, 1987; Martin & Fabes, 2001; Martin et al., 1999).

1.2 Children's group-based inferences

Mental representations of social groups offer an inductive potential for predicting individuals' various attributes. Consistent with this idea, there is a growing literature showing children's inferences about others' biological, psychological (e.g., preferences, knowledge, interests and beliefs) and behavioral attributes based on their category membership. Evidence comes from the studies which marked group membership status by various social category cues such as gender, race, ethnicity and social status (e.g., Bauer & Coyne, 1997; Birnbaum, Deeb, Segall, Ben-Eliyahu, & Diesendruck, 2010; Diesendruck & HaLevi, 2006; Martin, 1989).

Gender is widely studied for investigating children's use of category knowledge for inferring others' attributes. Studies show that young children treat gender as a natural category and they perceive gender of a person as established at birth, stable during development, and they infer that members of the same gender

category will have common physical and biological characteristics (Diesendruck & Halevi, 2006; Gelman, Collman, & Maccoby, 1986; Waxman, 2010). For instance, 5-years-old children infer that a "girl" would share fundamental similarities with regard to biological properties (i.e., have estrogen in their blood) with other "girls" even though they might have distinct personalities or have perceptual differences. Moreover, these biologically based inferences seem to be similar across different cultures (Davoodi, et al. 2019).

Diesendruck and Eldror (2011) suggest that children can easily infer others' psychological properties based on their social category membership, as well. In line with this argument, studies showed that gender is inductively powerful for inferring others' psychological attributes such as their interests (Martin, Wood, & Little, 1990), behaviors (Berndt & Heller, 1986; Diesendruck & Halevi, 2006; Taylor, 1996) and preferences (Bauer & Coyne, 1997; Martin, Eisenbud & Rose, 1995; Reis & Wright, 1982). For instance, Bauer and Coyne (1997) investigated whether 3-year-old children infer others' preferences for objects (e.g., toys) based on their gender. In their study, Bauer and Coyne (1997) showed that when children learn that a boy likes sofas and a girl likes tables, then they infer that another girl would also like tables. In a similar manner, by the age of 4 years, children use gender for inferring others' preferences for toys (e.g., dolls vs. trucks) even when these preferences are inconsistent with their gender stereotypes (e.g., girls who like trucks) (Gelman et al., 1986; Martin & Little.,1990).

Children use other social categories for inductive inferences as well. For instance, Diesendruck and HaLevi (2006), showed how children infer others' psychological (i.e., preferences, desires) and behavioral attributes based on ethnicity and social status. In a set of experiments, 5-year-old children were introduced to

characters labeled by their category membership (e.g., Arab/Jewish, rich/poor) and learned about these characters' preferences, desires and behaviors for arbitrary properties (e.g., likes to play "zaber", wants to be a "narim", listens a lot to "randit" music). Specifically, when Jewish Israeli children were presented with two characters defined as Arab or Jewish and learned that the Arab child likes to play an arbitrary game called "zigo" and the Jewish child likes to play "zaber", children concluded that other Arab children would also like to play "zigo" rather than "zaber". Likewise, children use individuals' social status for inferring their preferences (e.g., likes to run) (Del Rio & Strasser, 2011). Children also use social category information to make inductive inferences about others' knowledge. Shared conventions, such as norms, special rituals, or dances are examples of culturally inherited, behavioral markers of social groups (Legare & Watson-Jones, 2015). Research suggests that from early on, children consider certain kind of patterns (mainly conventions) as shared behavioral knowledge within a cultural group (Kalish & Sabbagh, 2007). For instance, young children have an expectation that rules of a certain game or common object functions are known and shared by people in a given cultural group and they also expect other members of that group to conform to these (German & Defeyter, 2000; Killen & Rutland, 2011; Rakoczy, Warneken, & Tomasello, 2008). Even 2-years-olds expect that members of their social group (e.g., linguistic ingroups) to be more likely to adhere to social conventional norms (Liberman, Howard, Vasquez & Woodward, 2018). By the age of 4, children attribute knowledge of conventional linguistic forms (i.e., the conventionality of novel words) selectively to their linguistic-ingroup members (Diesendruck, 2005). Moreover, children link social categories with shared knowledge; even the social

categories are marked with minimal group cues such as their clothing (Plötner et al., 2016; Soley, 2019).

Overall, these studies suggest that children expect members of the same social category to exhibit similar behaviors and psychological attributes (e.g., Diesendruck & haLevi, 2006; Plötner et al., 2016). On the other hand, some studies suggest that social categories might be more informative about the social relationships between individuals as compared to shared attributes within them. For instance, Shutts, Pemberton and Spelke (2013) showed that children at age 4, use social category-based knowledge to predict friendship among individuals but not shared activity preferences (i.e., likes to play blicket). Together, these findings discussed above indicate that young children have abstract expectations about how members of the same category will relate to one another, and how social categories are inductively powerful for inferring individuals' abstract properties.

Children's attribution-based group inferences

Developmental work reviewed above suggests that children draw inferences about others' biological and psychological attributes easily based on their social group membership. But from a reverse perspective, the literature on how children infer others' social group membership based on various attributes remains rather limited. Gelman, Collman, and Maccoby (1986) suggest that although preschool children easily infer others' properties based on group membership, they might have difficulties in inferring others' group membership based on diverse biological properties. For instance, after being presented with two children labeled as boy and girl, and having learned that girls have a substance name "estro" in their bodies, child participants readily infer that another girl would also have "estro" in her body,

whereas they do not have an expectation about children who have "estro" in their bodies to be necessarily classified as girls (Gelman et al., 1986).

With a similar purpose, a recent work by Vélez, Wu, and Gweon (2018) investigated whether children infer an agent's group membership based on their preferences. For instance, if a child learned that an agent from the red team liked "robots" rather than "cars", he or she might expect that another agent who like "robots" belongs to the red team. However, results showed that 3- to 5-year old children did not infer group membership based on agent's preferences; in other words, they did not expect that an agent who likes "robots" would belong to the red team. Together, these findings suggest that there might be an asymmetry regarding children's group-based inferences and attribution-based group inferences, thus examining this possible asymmetry might give us a better understanding of children's reasoning about shared attributes within social groups.

As mentioned above, until the age of 5 years, children do not treat shared preferences and biological properties among individuals as diagnostic markers of group membership (Gelman, et., al., 1986; Vélez, et., al, 2018). A crucial question arising from these findings is whether children at age 5, are not able to make attribution-based group membership inferences, or whether these particular shared attributes are not reliable cues for inferring social group membership. One possibility is that, although young children hold essentialist beliefs about gender, non-observable biological properties may not serve as powerful cues to one’s gender. Gelman and her colleagues (1986) suggest that children's group membership inference from non-observable biological properties might be a later developing skill. Since children are not exposed to such knowledge (e.g., estro in girls' or andro in boys' bodies) before the school age, they might not prioritize it over perceptual

information when inferring an individual's category membership (Gelman, et al., 1986). In a similar manner, shared preferences between individuals might also be less informative when determining an individual's group membership. For instance, Vélez and colleagues (2018) suggest that, until adolescence, children's preferences are not solely shaped by their own choices, therefore, shared preferences might not be treated as informative about one's social history or group membership, particularly for young children. Therefore, young children might not perceive shared preferences among individuals as a powerful cue to infer group membership.

Additionally, it has been argued that predictive (inferring individuals' attributes based on their category membership) and diagnostic (inferring individuals' category membership based on various attributes) inferences might be driven by different mechanisms and diagnostic inferences can be seen relatively difficult compared to predictive inferences (Fernbach et al., 2010; Fernbach, Darlow, & Sloman, 2011). Since the strength of alternative causes are higher in diagnostic inference (inference from effect to cause), it might weaken people's judgments. For instance, the probability to infer one's social group membership based on what s/he shares with others, might be lower due to other alternative explanations for group membership (Fernbach et al., 2011). On the other hand, researchers have argued that since representing alternative causes is costly in time and resources, difficulty to consider alternatives in diagnostic inference might seem reasonable (De Neys, Schaeken & D'ydewalle, 2002; Evans, Over & Handley, 2003). In line with this argument, studies showed that the number of possible alternative causes increased adult participants' response time (De Neys, Schaeken & D'ydewalle, 2002; Fernbach et al., 2010). From a developmental perspective, researchers have argued that

representing accessible and explicit alternative causes might facilitate children's cognitive processes for diagnostic inferences (Fernbach, Macris & Sobel, 2012).

This thesis investigates whether a more reliable cue to group membership would be shared cultural knowledge among individuals, since knowledge is an attribute that is more exclusively transferred by social interactions.

1.3 Shared cultural knowledge as a diagnostic cue to group membership

Humans living together are surrounded by knowledge of norms, rituals, traditions, songs, practices and conventions. In order to successfully adapt to the social environment and live in harmony with others, from the first years of life, humans need to acquire and transmit knowledge of these cultural traditions. Indeed, children, even infants have an understanding of conventionality of culture and expect others to act in a way to confirm this (Diesendruck & Markson, 2011). Accordingly, shared cultural knowledge is an informative cue about individuals' social and cultural history (Clark, Schreuder, & Buttrick, 1983; Soley & Spelke, 2016).

Other psychological attributes such as preferences, on the other hand, might not be as closely linked to cultural history as knowledge, given that an individual's preferences might be affected by many other factors, apart from his/her social history and cultural group. As an example, studies showed that musical preferences are influenced by personality characteristics (e.g., Rentfrow & Gosling, 2003) and they are also going into change throughout development (LeBlanc, Sims, Siivola, & Obert, 1996). Even though preferences are linked to an individuals' culture, since preferences might be derived from a variety of sources, they might not be shared by all members of a certain cultural group.

Recent evidence suggests a privileged position of shared knowledge over shared preferences in both adults' and children's reasoning about the relationship between shared attributes and social groups. For instance, Kalish (2012) showed that both adults and young children expect that norms but not preferences to be shared among members of the same social group. In a similar manner, even infants infer that conventions but not preferences are generalizable across individuals (Henderson & Woodward, 2012). A recent study also showed that 5 years old children infer that individuals who speak with the same accent would live in the same geographical area and share certain cultural norms that are linked with that specific area; but they do not hold an expectation for them to share similar personal preferences (Weatherhead, White, & Friedman, 2016).

Moreover, a recent study revealed that, for adults, sharing rare preferences (e.g., liking The Roverandom by J.R.R Tolkien) demonstrates stronger cue for people's social affiliation judgments than sharing common preferences (e.g., liking Harry Potter Series by J.K. Rowling) (Vélez et al., 2019). Researchers suggest that sharing rare preferences might be more informative of shared social history among individuals, as it reflects a tight social connection for the proper conveyance of that knowledge. For instance, an individual might acquire knowledge and/or preference for Harry Potter from various channels and social experiences whereas one can derive preference and/or knowledge for The Roverandom from relatively more specific social experiences. These specific social experiences might serve as a more reliable marker of an individual's group membership. Moreover, same work also revealed that shared knowledge (without mentioning preference) influences adult participants' social choices more than shared preferences (without prior knowledge, - also named as affinity) (Vélez et al., 2019). Researchers argued that shared

knowledge can be seen as a good signal of shared cultural background or common experiences between individuals, therefore, overcome the shared preference effect in guiding individuals' social choices (Vélez et al., 2019).

Developmental works suggest that children guide their social preferences and inferences selectively based on shared cultural knowledge, as compared to shared preferences (Soley, 2019; Soley & Aldan, 2018; Soley & Spelke, 2016) For instance, Soley and Spelke (2016) showed how children shape their social choices (i.e., their friendship choices) based on shared musical knowledge rather than shared musical preference. In a set of experiments, they showed that 4- and 5-year-olds tend to choose to befriend with children whose favorite songs are familiar to them. Besides, regardless of the target children's preference for the songs, children choose to be friends with those who know a familiar song as well as they avoid children who know an unfamiliar song (Soley & Spelke, 2016).

Soley and Aldan (2018) investigated both children's and adults' generalizations of song knowledge and song preference based on individuals' gender and language. Both adults and children attributed shared song knowledge to individuals who speak the same language rather than individuals from same gender. In addition, children and adults attributed song preference similarly across the two categories, suggesting that both groups selectively generalize cultural knowledge but not preference across members of the same cultural group. A recent study using novel social groups, also showed that 5 to 6-year-old children generalize cultural knowledge, but not preferences and generic knowledge, across members of the same social groups (Soley, 2019), Together, these results point to an early emerging link between shared cultural knowledge and social groups and raise the possibility that

children might also selectively use cultural knowledge as a diagnostic cue to social group membership.

1.4 The present research

Studies reviewed above show how young children guide their inferences about others' attributes based on group membership. Using music, an important form of cultural knowledge, the present research examines children's group membership inferences based on two psychological attributes: shared preferences and shared knowledge.

In order to understand the importance of shared attributes on children's group membership inferences, two studies were conducted. The first study was based on a recent study examining whether children treat shared preferences as a diagnostic feature of social group membership (Vélez et al., 2018). Using the same methodology as Vélez et al. (2018), we examined 5-year-old children's group membership inferences based on agents' preference and knowledge. Given that Vélez and colleagues (2018) found that children do not use shared preference between two agents to make the inference that they belong to the same group, we expected to find a similar effect. However, given that children prioritize shared knowledge over preferences in their social choices, as well as in their social inferences (Soley & Aldan, 2018; Soley & Spelke, 2016; Soley, 2019), we predicted that children might treat shared cultural knowledge as a diagnostic cue to group membership.

On the other hand, it has been argued that predictive and diagnostic inferences might be driven by different mechanisms (Fernbach, Darlow, & Sloman, 2011). Thus, even though children privilege cultural knowledge as an attribute shared among group members, they might still not use it to make group membership

inferences. Previous literature on children's category-based and attribute-based inductive inferences about social (Gelman, 2003) and non-social (Waxman, 2010) categories suggest that these two types of inferences might show different developmental trajectories as well, and the latter might indeed emerge later in development (Gelman et al., 1986; Gelman & Markman, 1986). For exploring this possibility, we conducted a second study that adopted a slightly different methodology and tested 6-to 8-year-old children.

In sum, with these two studies, we aimed to investigate whether children use different shared psychological attributes such as shared knowledge and shared preference to make inferences about others' social group membership, and how these inferences change across development.

CHAPTER 2

STUDY 1

2.1 Method

2.1.1 Participants

Ethics approval of the studies was obtained from The Ethics Committee for Master and PhD Theses in Social Sciences and Humanities, in Boğaziçi University. The permission for conducting the studies in schools was also obtained from the The Ministry of Education as well as the relevant schools' administrations. Participating children were recruited from two preschools in Istanbul via convenience sampling method. Once the study was approved by the school administration, parents of children were sent an envelope with the informed consent form. Children, whose parents gave permission were tested in their schools upon getting their oral consent. Some children were also tested at Boğaziçi University Baby and Child Development Laboratory. Children received stickers as thank you gifts.

Final sample included 33 Turkish speaking 5-year-old children (18 female: mean age: 5 y 4 m; range 5 y 1 m – 5 y 9 m), who were recruited from a private preschool in Ataşehir and a public preschool in Sarıyer, Istanbul. Children were randomly assigned to one of the two between-subjects conditions; Shared Knowledge (N=16) and Shared Preference (N=17). An additional 21 children were tested but they were eliminated from the final analyses since they were outside of the predetermined age range.

2.1.2 Stimuli

The stimuli consisted of Keynote presentations that were adapted from those previously used in Vélez and colleagues (2018). The visual stimuli were composed of animations depicting stories where aliens named “Gazorps” (See Figure 1 and Appendix A) listened to songs and indicated which one they knew (Shared Knowledge Condition) or liked (Shared Preference Condition). Each alien had a unique facial characteristic and wore a red or blue t-shirt determined by its team membership. Gazorps spoke in between simple animations, and the content of these speech segments were similar to the ones used by Vélez et al. (2018). To create the Turkish recordings, a female adult read the translated scripts in a quiet room and her voice was recorded using Audacity audio recording program. In order to create an alien-like voice, the recordings were modified by increasing the pitch level %35 Hz. The voice recordings were presented in AIFF format.

Two of the 18th century American folk songs previously used by Soley & Spelke (2016) were selected. These songs were computer-generated instrumental piano melodies and they were matched for their duration (11 sec.) by using GarageBand (Apple Ins., Cupertino, CA). All auditory stimuli were embedded into keynote presentations and presented on a MacBook Air (Apple, Inc., Cupertino, CA) 13,3-inch screen with 1440 X 900 screen resolution.

2.1.3 Design and procedure

Participants were tested in their own schools, during school time, or in the laboratory. The whole session lasted for 8-10 minutes.

At the very beginning of the session, there was a brief introductory phase. Participating children were informed that they would see new characters and be

asked questions about these characters. After that, the experimenter introduced the Gazorps as follows; “Today, we are going to learn about a faraway planet called Gazum! On the planet Gazum, there are friendly aliens called Gazorps. Gazorps play in different teams. Some Gazorps are on the red team, and some Gazorps are on the blue team.” (adopted and translated from Vélez et al., 2018). To make sure that the participants distinguished the two teams, they were asked to identify each group by pointing to the red and the blue team. All children accurately distinguished the teams on the first trial.

After that, children saw two baskets on the screen, on each basket there was a loudspeaker image representing the songs. Children saw one Gazorp from the red or the blue team. The Gazorp said “Let’s listen to songs!” and approached each basket to hear the song in it. Once the Gazorp approached the first basket, the experimenter provides one of the two songs and the Gazorp produced a neutral vocalization like “Hmm.”. Then the Gazorp approached the second basket and after listening to the second song, it said: “Yes, this song! I know (or liked) this song!” and bounced. Following this, the child was asked which one the Gazorp knew or liked. The Gazorp left the screen and a new Gazorp that belongs to the other team (red or blue) performed similar actions but indicating liking or knowledge of the other song. The child was asked to show each basket that had the song each Gazorp knew/liked.

Lastly, a new target Gazorp without a t-shirt was presented on the screen. The experimenter explained this as follows: “This is a whole new Gazorp. We have never seen this Gazorp before. This Gazorp lost its shirt. Let’s see which song this Gazorp knows (or likes)” Following this, the new Gazorp performed identical actions, and vocalizations, indicating its knowledge or preference status. The experimenter then introduced the test question as follows: “You get to guess which team this Gazorp is

in! Is this Gazorp in the blue or red team?" A blue and a red t-shirt appeared on the screen, afterwards children were requested to point to one of the t-shirts. At last, the experimenter asked the child why s/he made that choice.

Sixteen experimental conditions were created for counterbalancing purposes. The presentation order of the teams (Blue first vs. Red first), the matching of the songs to the teams, the target Gazorp's preference/knowledge of songs, and the side on which t-shirts appeared (left vs. right) during the test question were counterbalanced across participants.

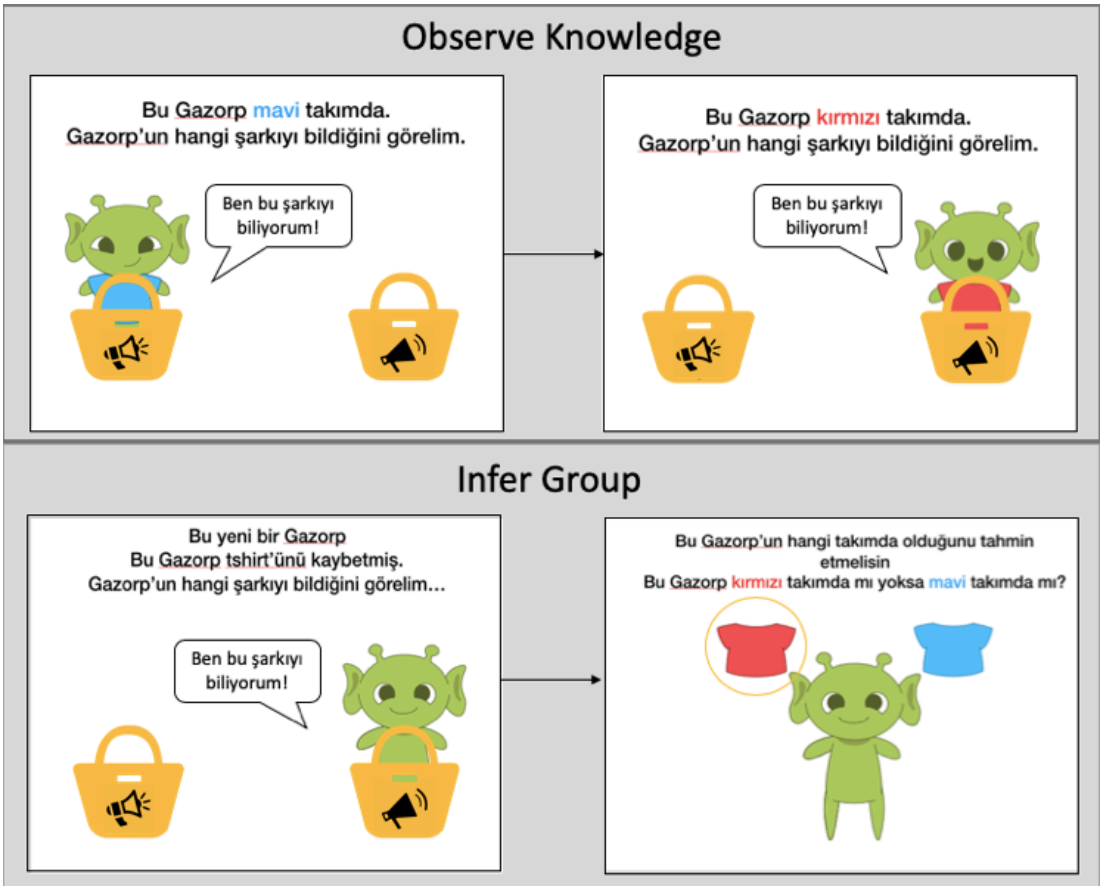


Figure.1 Sample displays from Study 1

Note: An example of Observe Knowledge and Infer Group Phase for Shared Knowledge Condition. Children's team membership inference is indicated with a circle.

Participants' answers were recorded online manually by the experimenter and the testing session was recorded by a portable video camera. Later, an independent coder

checked the experimental procedure and data coding from the recorded videos. For all trials, the independent coder declared that all cases were coded accurately.

2.2 Results of Study 1

2.2.1 Data analysis

Study 1 investigated whether children evaluate shared preferences and shared knowledge as a diagnostic feature of a social group. If children infer group membership from target Gazorps' preference or knowledge, then children would match the target Gazorp with the team that shared its preference or knowledge. For instance, if a Gazorp on the red team knows Song A and if the target Gazorp also knows Song A, then children might expect that the target Gazorp also belongs to the red team. In order to test this, participants' responses were coded as "1" if the child matched the target Gazorp with the team that shared its song preference or song knowledge, and "0" if they did not. The percentages of matching scores were calculated individually and these percentages were compared to the chance level (%50) by using two-sample binomial tests. Across conditions (shared preference vs. shared knowledge), children's choice rates were also analyzed by Fisher's exact test.

Additionally, children's clarifications about their choices categorized based on the content of the answer. For instance, children who refer to the target Gazorp's team membership or the song preference / song knowledge categorized into differing groups. Two independent raters coded these clarifications and discussed to resolve disagreements.

2.2.2 Results and discussion

Statistical analyses were conducted with SPSS software (IBM SPSS Statistics, IBM Corp, 2013).

Overall, children did not reliably match the target Gazorp with the team that shared its preference or knowledge. Specifically, in the Shared Knowledge condition, 9 children out of 16 chose the matching team (56.25%; binomial test; p =.8), and in the Shared Preference condition, 9 children out of 17 chose the matching team (52.94%; binomial test; $p > .99$) (See Figure 2).

In order to test the effect of the type of shared attributes (knowledge vs. preference) on children's group membership inferences, children's matching scores were compared across two experimental conditions. Results indicated no statistically significant difference between the two conditions (Fisher's exact test; $p > .99$), providing information that 5-years-old children's matching scores did not differ by the type of shared psychological attributes.

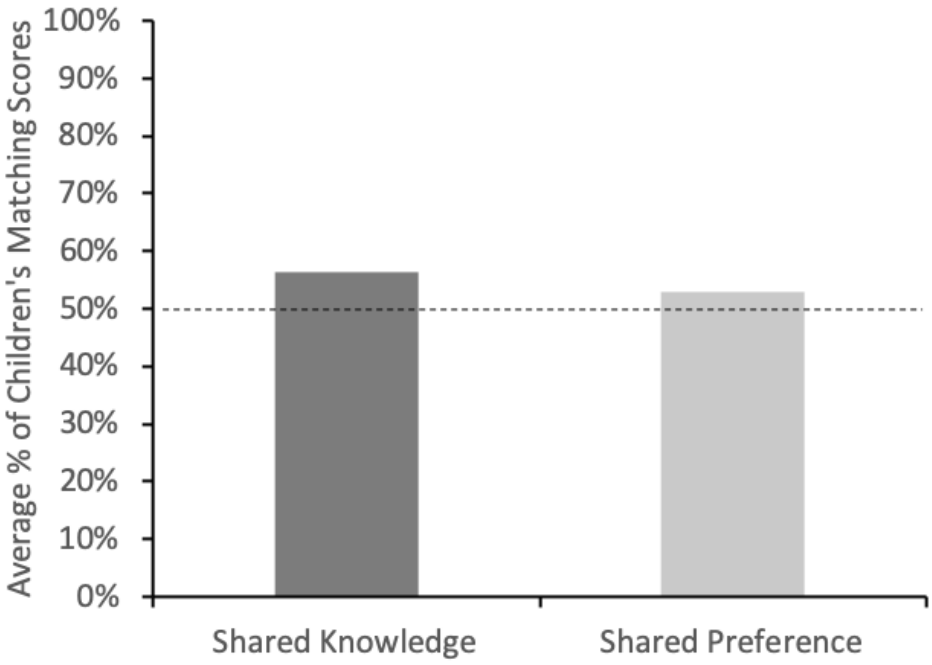


Figure. 2 Results of Study 1

Note: The proportion of participants who chose the matching team in shared knowledge and shared preference conditions.

Overall, 11 of 18 children provided an explanation for their matching choices. Five of 11 children referred to the Gazorp's team or teammates' song knowledge or song preference (e.g., "Because he likes the blue team's song."), one child referred to target Gazorp's song preference (e.g., "Because he likes this song"), three children described target Gazorp's physical characteristics (e.g., "Because he is green"). Additionally, two children gave an irrelevant explanation (e.g., "Because he is playing a ball."). Two independent raters coded these clarifications ($\kappa = .74$, $p < .001$).

Further analyses were conducted in order to test whether children's choices were driven by counterbalanced features of the stimuli. Overall, participants (N = 33) did not systematically choose a team based on t-shirt color (22 out of 33 chose blue; binomial test; $p = .08$). Also, children did not choose the team that they saw most recently in memory check question (19 out of 33 choose the most recent team; binomial test, $p = .49$). Finally, children did not choose the t-shirt, where the target Gazorp moved to (18 out of 33 choose the shirt on the same side; binomial test; $p = .728$).

Overall, the results of Study 1 suggest that 5-year-old children did not use shared knowledge of or shared preference for songs to guide inferences about shared group membership. These findings parallel pervious research (Gelman et al., 1986; Vélez et al., 2018), showing that children, at this age, do not consider shared preferences as diagnostic for shared group membership. However, given that children prioritize knowledge over preference in their social choices, and also as an attribute shared among same group members (Soley, 2019; Soley & Aldan, 2018; Soley & Spelke, 2016), we predicted that children might use it as a diagnostic cue to

group membership. Contrary to our predictions, 5-year-old children did not make such inductive inference based on shared knowledge of songs.

Taken together, results from Study 1 point to a possible asymmetry regarding children's group-based inferences and attribution-based group inferences. This asymmetry implies that, although children infer others' attributes, such as shared preferences and knowledge based on their group membership, they do not necessarily treat them as diagnostic features of social groups. The asymmetry in children's judgements raises the question whether children do not treat shared preferences and shared knowledge as diagnostic of a social group, or whether these attributes are not reliable markers for inferring social group membership. To further answer this question, in the light of previous studies showing a link between shared cultural knowledge and social groups (Soley, 2019; Soley & Aldan, 2018; Soley & Spelke, 2016), we adopted a different methodology and examined whether children older than 5 years of age would use shared knowledge as a diagnostic cue to group membership.

CHAPTER 3

STUDY 2

3.1 Method

3.1.1 Participants

Ninety-seven, 6-, 7- and 8-years old children (52 female: mean age = 7 y 5 m; range 6 y – 8 y 9 m) were recruited from primary schools in Sarıyer and Çekmeköy, Istanbul. Children were randomly assigned to one of the two conditions: Shared Knowledge Condition (N=48) or Shared Preference Condition (N=49). Two additional children were eliminated from the final sample due to the failure to complete the experiment (N=1) or being outside of the age range (N=1). The sample size for each age group (i.e., 6, 7, and 8) was a minimum of 16 children.

3.1.2 Stimuli

For the visual displays, 40 unique child drawings (20 girls and 20 boys) were created using an online tool. These characters wore blue, yellow or grey t-shirts. Two separate stimuli sets were created for each gender. Twenty-four of the child characters were chosen randomly (12 girls and 12 boys, half wearing blue and half wearing yellow t-shirts) and these were used to introduce the groups to the participating children (See Figure 3 and Appendix B). The remaining characters as well as random characters from each group were clustered into four female and four male triads. In these triads, one character wore either a blue or a yellow t-shirt and the remaining two wore grey t-shirts (See Figure 4). These were used as test stimuli. All visual stimuli were arranged into Microsoft Office Power-Point (2017) slides and

presented on a MacBook Air (Apple, Inc., Cupertino, CA) 13,3-inch screen with 1440 X 900 screen resolution.

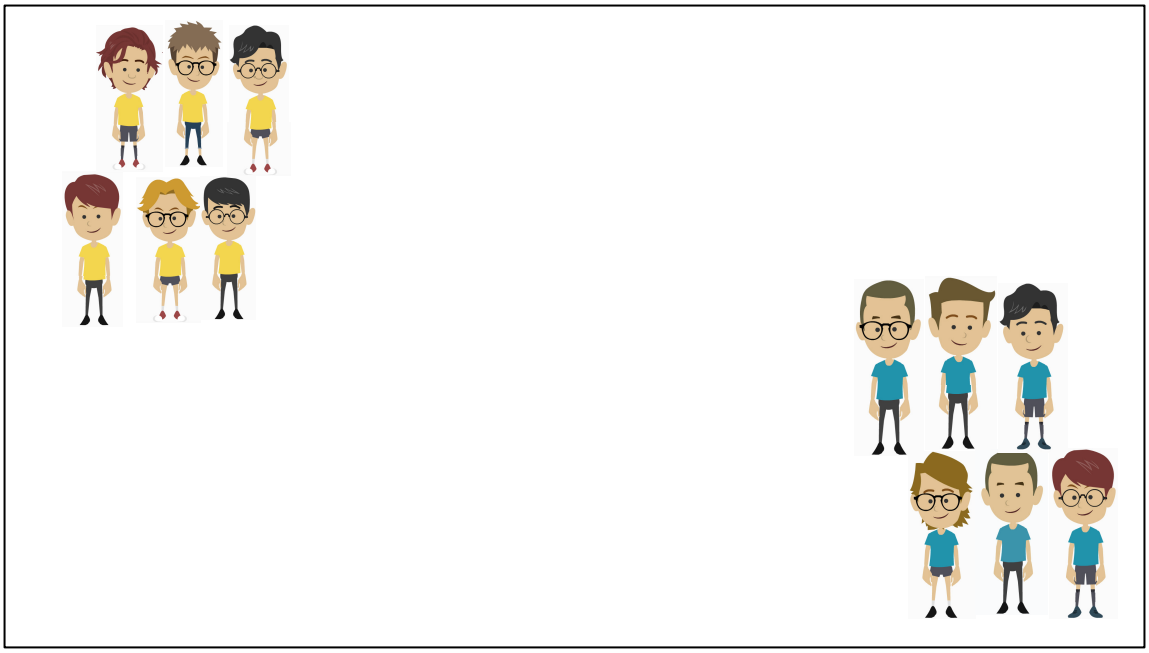


Figure. 3 Sample familiarization display from Experiment 2

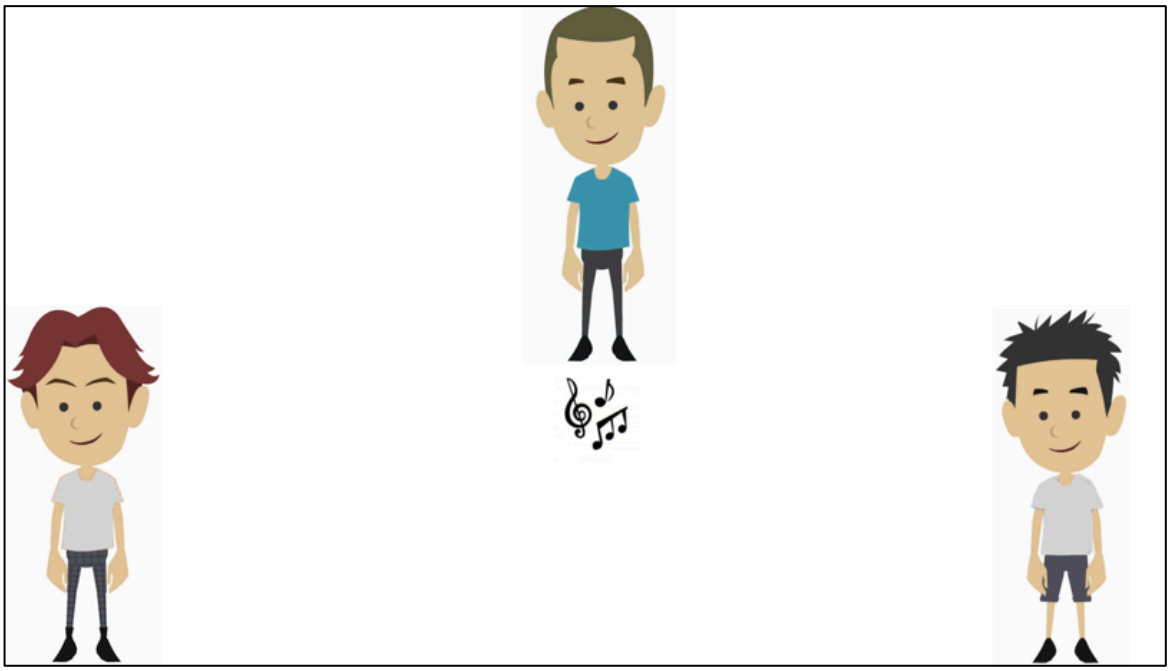


Figure. 4 An example for the experimental trials

3.1.3 Design and procedure

Participants were tested in a quiet room in their own schools, during schooltime, or in the laboratory. The whole session lasted for 5-8 minutes for each participant.

At the very beginning of the session, there was a brief introductory phase. Participating children were told that they would see new characters and be asked questions about these characters. Then the experimenter introduced the two novel groups to the participating child, by showing him/her a slide depicting six members of each group. The experimenter pointed to one of the groups, said "These are Tikas", and pointed to the other group and said, "These are Mitus". To make sure that the participant was following the information presented, s/he had to point to each group when the experimenter asked, "Can you show me which ones are Tikas/Mitus?" The groups were reintroduced until the child correctly identified each group. Eighty-six children could accurately distinguish the groups on the first trial and 11 children on the second trial.

Following this, the test trials started. On each trial, a child drawing appeared at the upper middle side of a blank slide. With the experimenter's click, an image of notes appeared below the child drawing, symbolizing the song and the experimenter explained "There is a song that this Tika/Mitu knows (or likes). With another click, other child drawings came into view at the bottom-left and bottom-right parts of the slide. The experimenter said: I played this song to both of these children (pointing to the child drawings below). This child (pointing to child drawing at bottom left) said s/he knew (or liked) this song and this child (pointing to child drawing at bottom right) said s/he did not. Which of the below children do you think is also a Mitu/Tika? This one (pointing to the on the right)? This one (pointing to the one on the left)? Or both of them?". Children were asked to point to one or to both of the

characters below. Children's answers were coded as "Same", if they pointed to the character who also knew/liked the same song as the target; they were coded as "Different" if the child pointed to the other character; and "Both" if they pointed to both characters. Each participant received four trials, with different child drawing triads.

For counterbalancing purposes, four experimental conditions were created. The group membership of the target child drawings as well as the positions of the child drawings with matching knowledge/preference were counterbalanced across trials. The presentation order of the target child drawing's group membership and associated group color were counterbalanced across participants.

Participants' answers were written manually by the experimenter and the testing session was recorded by a portable video camera. Later, an independent coder checked the experimental procedure and data coding from the recorded videos. The second coder noticed mistakes on 5 trials, and these were corrected accordingly.

3.2 Results of Study 2

3.2.1 Data analysis

Study 2 investigated whether children use shared preferences and shared knowledge as a cue to group membership. Accordingly, each child's same group choices were counted across four trials. The percentages of these scores were calculated individually and these percentages were compared to the chance level by using one sample t-tests. The chance level for choosing the character who shares the target character's knowledge or preference was 0.33 for each trial, since children possibly choose from the options "Same", "Different" and "Both".

In addition, children's choices on each trial were coded as "1" for same choices and "0" for different and both choices. In order to analyze whether children's same choices vary depending on the type of shared attributes, participants' scores were compared between the two experimental conditions (shared knowledge vs. shared preference) through Generalized Estimating Equations (GEE) in SPSS. Age group (6, 7 and 8 years) was also added to the model as a second predictor, in order to see the effect of age across conditions.

3.2.2 Results and discussion

Results revealed that, 6-8 years old children use both shared preferences and shared knowledge as cues to group membership. Overall, children inferred that the character who knew or liked the same song as the target would be in the same group as the target. Specifically, when children asked to infer group membership, children chose the character who shared target individual's song knowledge (M = 52.6, SD = 29.73, $t(47) = 12.2$, $p < .001$) (chance level = .33) and song preference (M = 56.1, SD = 29.55, $t(48) = 13.2$, $p < .001$) more than expected by chance (See Figure 5).

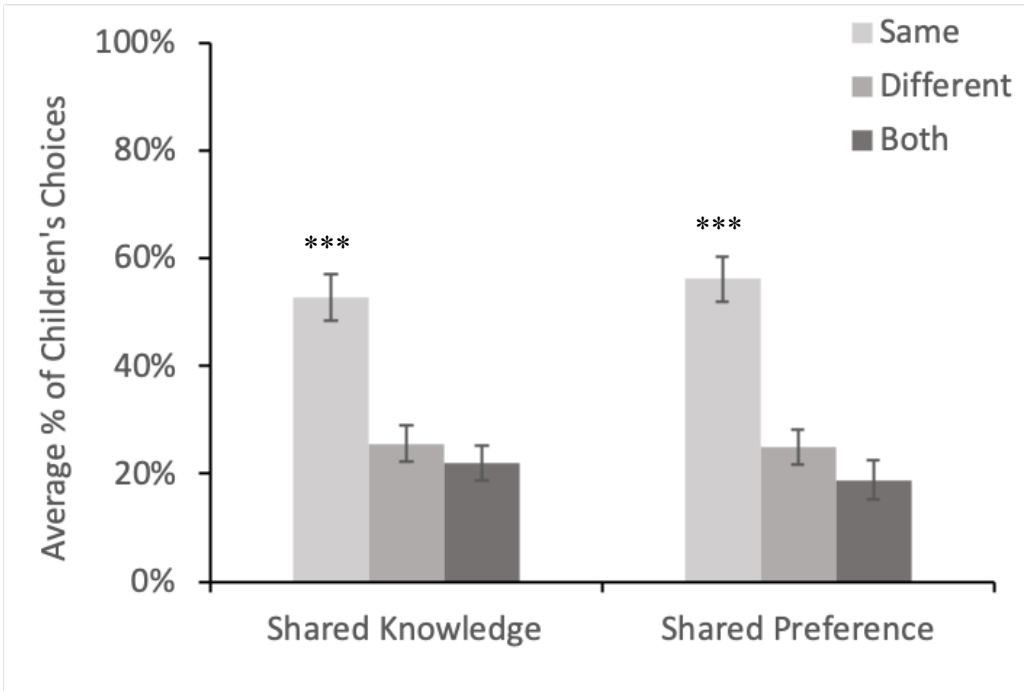


Figure 5. Results of Study 2

Note: Children's average percentage choices of same, different and both in shared knowledge and shared preference conditions. ***$p < .001$ (error bars represent standard errors).

Generalized Estimating Equations (GEE) was performed by using repeated measures binary logistic regression analysis with choosing same vs. not same group as the dependent variable, being predicted by the type of shared attributes (fixed: knowledge vs. preference) and subject (random: for controlling repeated measures). Results revealed that, the type of shared attributes (song knowledge vs. song preference) did not significantly predict children's same group choices (Wald χ^2 = .462, df = 1, p = .497). When age group was added to the model as a second predictor, results revealed no age-related effects on children's same choices (Wald χ^2 = 4.730, df = 2, p = .094).

Overall, the results from Study 2 revealed that 6 to 8 years old children readily infer others' group membership based on shared attributes, namely shared

song preference and shared song knowledge. Specifically, children infer that if two individuals know or like the same song, then they might be in the same social group.

CHAPTER 4

GENERAL DISCUSSION

The present research examines the developmental roots of attribution-based group membership inferences by investigating the diagnostic property of shared cultural knowledge and shared preferences between individuals. The results of Study 1 suggest that 5-year-old children did not treat shared attributes, namely shared knowledge of and preference for songs, as diagnostic cues to social group membership. Specifically, children did not infer an agent's group membership based on his/her song preference and song knowledge. As discussed in the introduction, these findings can be seen as in the same way as previous research showing that shared toy preferences and shared biological characteristics are not treated as reliable cues to group membership (Gelman et al., 1986; Vélez et al., 2018). However, a growing body of evidence suggests that there is a strong link between shared cultural knowledge and social group membership. Since the knowledge of cultural traditions, rituals, or songs transfer through social interactions throughout history, we predicted that it might also serve as a more reliable cue for determining social group membership. Contrary to our predictions, Study 1 findings showed that 5-year-old children did not make such inductive inferences based on shared knowledge of songs.

At first sight, it might seem surprising that children did not treat shared knowledge of songs as a reliable cue for inferring one's social group membership. As discussed in introduction, young children readily infer an individual's various attributes based on his or her social group membership. However, previous literature on children's group-based and attribute-based inferences suggests that these two

kinds of inferences (diagnostic vs. predictive) might be driven by different cognitive mechanisms (Gelman et al., 1986; Gelman & Markman, 1986; Fernbach et al., 2011). Namely, in attribute-based diagnostic inference (inference from effect to cause) the strength of alternative causes has a higher impact on an individual's final judgments. In our case, the probability of inferring target Gazorp's team membership based on his shared song knowledge or song preference with other team members might be lower due to other alternative explanations. For instance, the target Gazorp might also share biological or physical characteristics with other team members. We tried to eliminate this possibility by using different facial features when designing each character. Still, when asked about a clarification for their answers, 3 out of 11 children referred to target character has shared physical characteristics by saying "Because he is green" or "Because he looks like him". Thus, the presence of alternative causes might lead children to not only attend to shared knowledge of songs between characters when inferring their group membership. As a result, shared attributes like song knowledge and preferences, might not be sufficient to infer an agent's group membership, due to other potential cues to grouping.

On the other hand, it is also worth to mention that, in Study 1, we asked children to infer the target character's social group membership (team membership) based on minimal information. Participating children observed the choice of a single member of each team and decided the team that target belongs to. In contrast, in real world, children might adjust the reliability of a shared preference or knowledge for social group membership through repeated observations. In order to infer one's social group membership, it might be necessary to observe from multiple people from each group across multiple situations. As an example, children might readily expect that an individual who likes or knows a particular toy, song, or an activity to be

categorized as a girl or a boy. Since they have prior experience with what children from each gender category likes and knows, they might use it to navigate their social group membership inferences accordingly. In line with this, studies showed that from early on children are knowledgeable about typical activities and toys for their gender category (i.e., dolls for girls and trucks for boys) (Bauer & Coyne, 1997; Berenbaum, Martin, Hanish, Briggs & Fabes, 2008). In our case, a single observation about shared preference and knowledge might not elicit a diagnostic inference about social group membership.

Moreover, team membership may also not provide a strong cue to social group membership, since members of a team tend to gather in order to complete a task (which was in our case, for playing with each other). Indeed, Plötner and her colleagues (2016) operationally define a task group as people who work together and collaborate. Thus, team membership might be considered as a task group in our context and might not suffice for children to consider shared psychological attributes as diagnostic of it, particularly given that the characters belonging to both teams were identified as" Gazorps".

In conclusion, Study 1 results leave an open the question of whether children at age 5, make attribution-based group membership inferences based on shared psychological attributes, or as previous studies suggest (Gelman et al., 1986; Gelman & Markman, 1986) whether these inferences emerge later in development given that shared attributes, especially shared knowledge, might be considered as a reliable cue to cultural groups. Thus, in study 2, with a different methodology, we attempted to test the diagnostic features of shared attributes for group membership with children older than 5-years of age.

Aside from using children instead of alien-like characters as target agents in Study 2, one other major difference was in the phase of introducing groups. In study 1, we introduced alien-like agents as “Gazorp” and provided the information that each Gazorp belong either to red or blue team. In study 2, we introduced two different groups of children and labelled them differently as “Tikas” and “Mitus”, in an attempt to make the group differences more salient. We did not give an extra information about the type of groups (i.e., whether they were teams or task groups). In study 2, results showed that children aged between 6- to 8 years treat both shared knowledge of and shared preference for songs as diagnostic cues to group membership. In other words, they expected an individual liking or knowing the same song as another person would belong to the same group as that person. Thus, children’s ages as well as these methodological modifications might have led to the difference in the findings of Study 1 and 2.

Together these findings contrast previous research showing the privileged status of shared cultural knowledge, as compared to shared preferences, in children's group-based inferences and social choices (Kalish, 2012; Soley & Spelke, 2016; Vélez et al., 2018). Children in the current studies did not distinguish shared preference and knowledge in their attribute-based group membership inferences. We suggest reasons why children might not prioritize shared knowledge of songs over shared preferences when guiding their group membership inferences.

Firstly, a certain domain of preferences might be specifically more diagnostic, in different time points in development. For instance, developmental works showed that shared food preferences lead infants to infer affiliation between individuals (Liberman, Woodward & Kinzler, 2017; Liberman, Woodward, Sullivan & Kinzler, 2016). Given the importance of food selection in infancy, they might have developed

early emerging reasoning about the social importance of food preferences (Liberman et al., 2016). Similarly, shared musical preferences might become more critical for social group affiliation, as children become independent. For instance, children under age six might have relatively less control over what kind of music they listen, as compared to older age groups. The boundaries of musical experiences for younger children might be defined by adults, including parents, siblings, and teachers. As children grow up, they might become more autonomous and selective about the music that they are exposed to. Especially in adolescence, listening to music becomes an entirely personal experience with a more considerable time spent in listening to (Larson et al., 1989). Thus, with greater autonomy and experience, musical preferences might become linked to one's identity (North & Hargreaves, 1999; Rentfrow & Gosling, 2006) and thus, a reliable source of information for affiliative inferences.

As mentioned earlier, music can be seen as an essential part of a culture that defines the cultural groups and separates it from other groups (Brown, 1991; Cross, 2001). It has been documented that cultural groups create their unique music (Cross, 2001). By creating and transferring music-based conventions, cultural groups enhance affiliative behaviors within group members and underline social boundaries (Baily, 1994; Shepherd, 1977). Thus, shared knowledge of songs between individuals might also have an important status for identifying one's social group membership. In study 2, we found that starting in 6 years of age, children treat shared cultural knowledge of songs between individuals as a reliable cue to group membership. This finding contributes to a growing evidence indicating an early link between shared knowledge and cultural groups (Soley, 2019; Soley & Aldan, 2018; Soley & Spelke, 2016; Vélez et al., 2018; Vélez et al., 2019). Children older than 6

years of age, might develop a reasoning that songs can be learned through social interaction, thus sharing a knowledge of song might be particularly diagnostic to shared group membership. As a result, children might readily infer that if two individuals know the same song than they are more likely to be members of the same social group.

Finally, it is also worth to mention that, in the 21st-century, cultural knowledge can also be derived from many different sources (e.g., television, internet, social media), thus it may reach a variety of social groups and extend beyond cultural boundaries. Today, young children's access to digital media has been dramatically increased (Rideout, 2011). Nevertheless, the impact of electronic devices on children's information gathering is still controversial (see Culen & Gasparini, 2011). Many research findings underlie that adult interaction is necessary for young children to learn new information effectively from digital media (DeLoache et al., 2010; Richert, Robb, Fender & Wartella, 2010). For instance, 12 to 24-month-old infants can learn novel words from videos only if their parents are available for them to scaffold their word learning process (DeLoache et al., 2010). Thus, despite the differences in how children gather knowledge (through social interaction or other means), our study findings suggest that shared knowledge might still relate to shared group membership.

4.1 Limitations and future directions

The methodological differences between the two studies leave open questions regarding the interpretation of results. Firstly, the main difference between the two designs was the children's working memory load at the question phase. In Study 1, each team member's song choice had to be memorized when participants were asked

to infer the target character's team membership. Although we acknowledged that children did not choose the team that they saw most recently when the memory check question was asked, the difficulty in remembering and following the agents' song choices might potentially lead children not to match target character with the group that shared its song preference or knowledge. Nevertheless, in Study 2, child drawings were available at all times and children had only to remember each character's knowledge or preference state of a song. Thus, the latter procedure might ease children's reasoning when treating shared attributes as diagnostic cues to groups.

On the other hand, in Study 1, although shared knowledge and shared preference conditions were matched in order to eliminate confounding factors, participants' initial assumptions about the songs might influence their final judgments. Since the unfamiliar songs in both conditions were played to participants, their liking state for each song might elicit a response about matching targets with the song that themselves like. If this is a rational concern, participants in Study 2 might have overcome this possibility since shared knowledge and preference for songs were introduced to children by only saying "A song was played to these children", without playing the song itself.

It is also important to note that even though the two studies had methodological differences, they had an important aspect in common: Across two studies, we used novel social groups in an attempt to eliminate children's pre-existing knowledge and experience about familiar social categories. For instance, presenting familiar social categories such as gender, might add different parameters to children's group membership inferences. Additionally, using minimal groups, instead of familiar social categories, offered us an advantage to investigate children's

abstract representation of social groups to infer shared group membership. Recent research using similar minimal group paradigms also provides evidence for children's ability to infer attributions based on minimal group membership (Baron & Dunham, 2015; Dunham, Baron & Carey, 2011).

Previous studies suggest that young children hold different attitudes towards diverse examples of social categories such as race, language, gender, and minimal groups (Dunham, Baron & Carey, 2011; Kinzler et al., 2009). In our studies, we presented children with two types of social groups, a task group (team) and a social category based on minimal group cues. As discussed in the introduction, previous studies (Soley, 2019; Soley & Aldan, 2018), show how children make selective inferences about others' knowledge states based on their group membership by using gender, language and minimal group cues. Although using minimal groups offers us an advantage to investigate children's mental representations of social groups, a future study using different social categories, such as language, ethnicity, nationality or gender, for investigating the diagnostic feature of shared attributes for group membership might be useful for testing the generalizability of the current findings. For instance, since most of the social groups include both genders, shared knowledge and preference for songs might not be treated as a reliable cue to infer an individual's gender. In contrast, cues such as language, ethnicity or nationality are closely related to cultural groups. As such, inferring an individual's spoken language might be easier from what s/he shares with others, especially sharing knowledge of a particular song. Thus, it is important for future studies to investigate the diagnosticity of shared attributes to group membership with various social groups.

Another interesting future direction would be to examine whether different forms of cultural knowledge or practices lead to similar inferences for shared group

membership. The findings in our study were limited by shared musical knowledge and preference between individuals, but it was evident that certain folk tales, traditions, dances or even games are also considered as important parts of a culture. These cultural practices might also be linked to social groups. Thus, generalizing the current findings into those domains might give us a better understanding of the cues children and adults use to infer others' social identity.

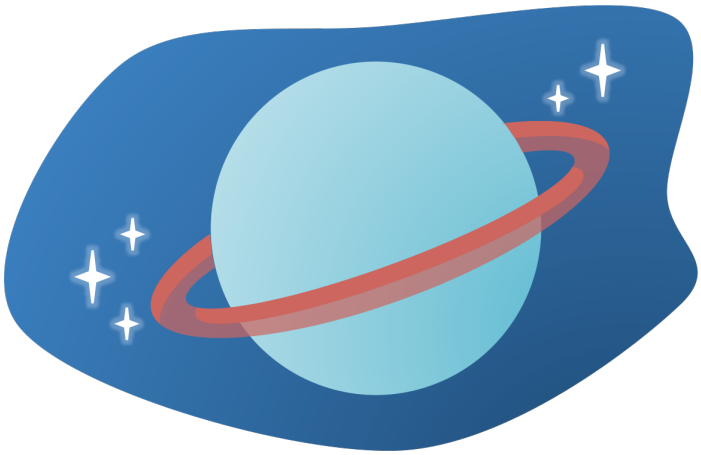
4.2 Conclusion

The sensitivity to cues that enable us to represent social relationships is crucial for navigating our complex social environment. Here, we explore whether shared attributes among individuals would be treated as reliable features of shared group membership for children. We show that children, from six years of age, infer others' group membership based on his/her preference and knowledge of songs. Our findings contribute to research on how children mentally represent social groups and which attributes licensed by social groups serve as reliable markers for inferring shared group membership. It is important to understand when children start to have complex reasoning about social groups, to investigate social structure that we live in.

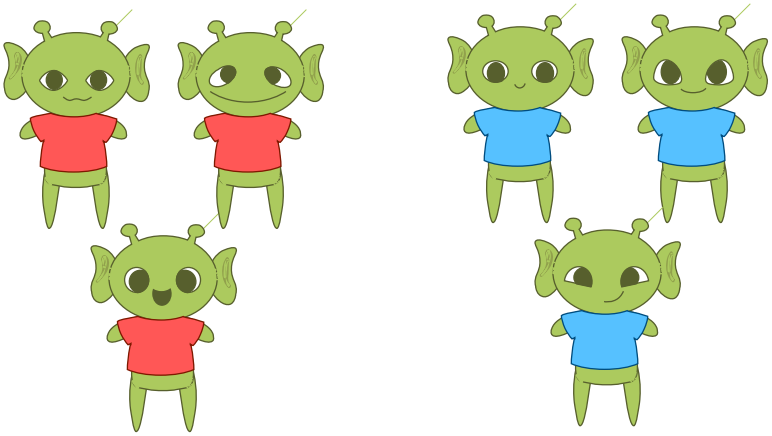
APPENDIX A

POWERPOINT SLIDES FOR STUDY 1

Bugün, Gazum adı verilen uzaklarıdaki bir gezegen hakkında bilgiler edineceğiz!



Gazum gezegeninde, Gazorp adında sevimli uzaylılar var. Gazorplar farklı takımlarda oynuyorlar.



Gazorpların hangi şarkıları bildiğini/sevdiğini öğreneceğiz.
Her sepette farklı bir şarkı çalıyor.
Hangi şarkıyı bildiğini/sevdiğini göreceğiz.

Bu Gazorp kırmızı takımda.
Gazorp'un hangi şarkıyı bildiğini/sevdiğini görelim.

Bu Gazorp mavi takımda.
Gazorp'un hangi şarkıyı bildiğini/sevdiğini görelim.

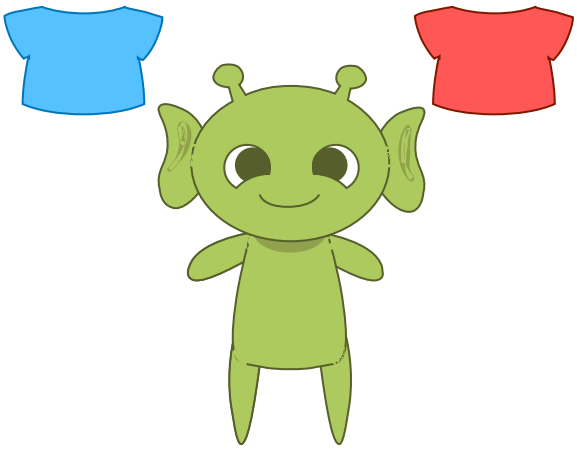
Bu Gazorp kırmızı takımda.
Gazorp'un hangi şarkıyı bildiğini/sevdiğini hatırlıyor musun?

Bu Gazorp mavi takımda.
Gazorp'un hangi şarkıyı bildiğini/sevdiğini hatırlıyor musun?

Bu yeni bir Gazorp
Bu Gazorp tshirt'ünü kaybetmiş.

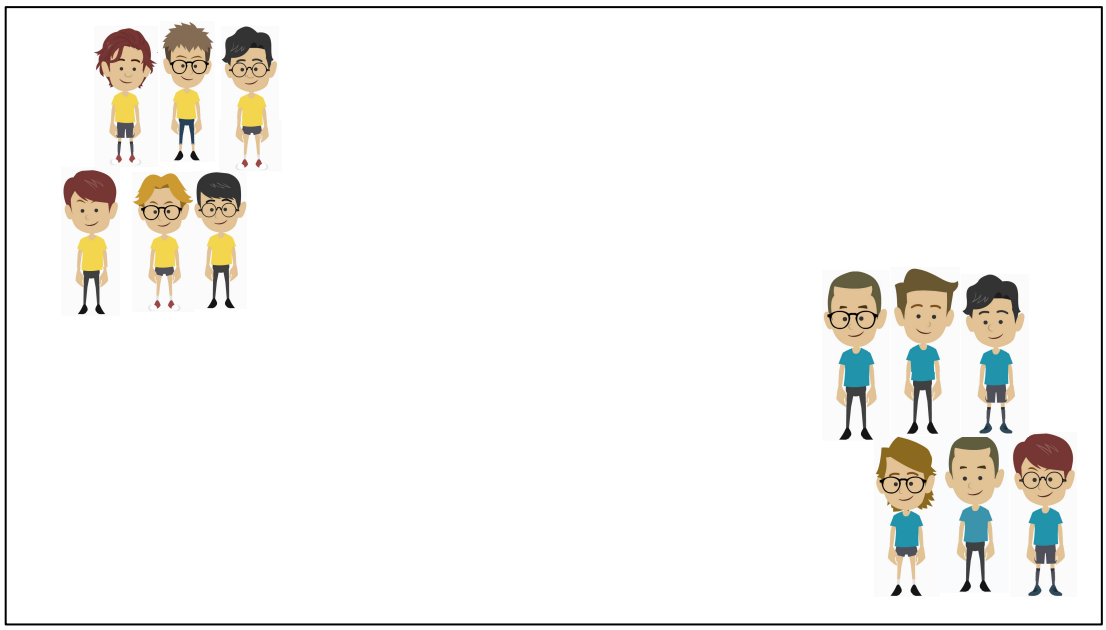
Gazorp'un hangi şarkıyı bildiğini/sevdiğini görelim…

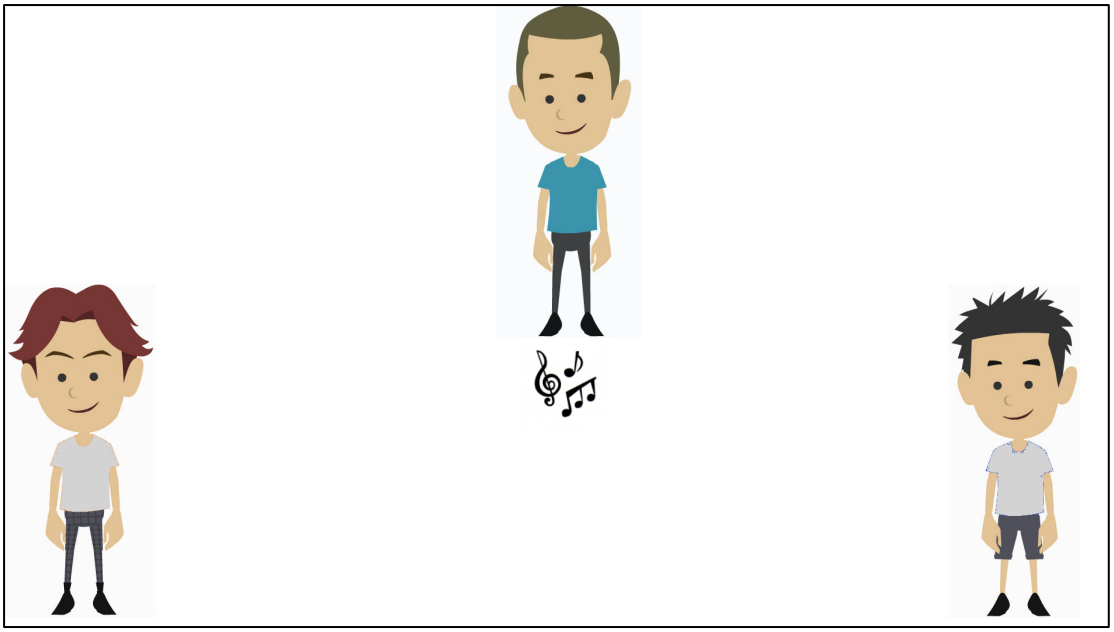
Bu Gazorp'un hangi takımda olduğunu tahmin etmelisin
Bu Gazorp mavi takımda mı yoksa kırmızı takımda mı?

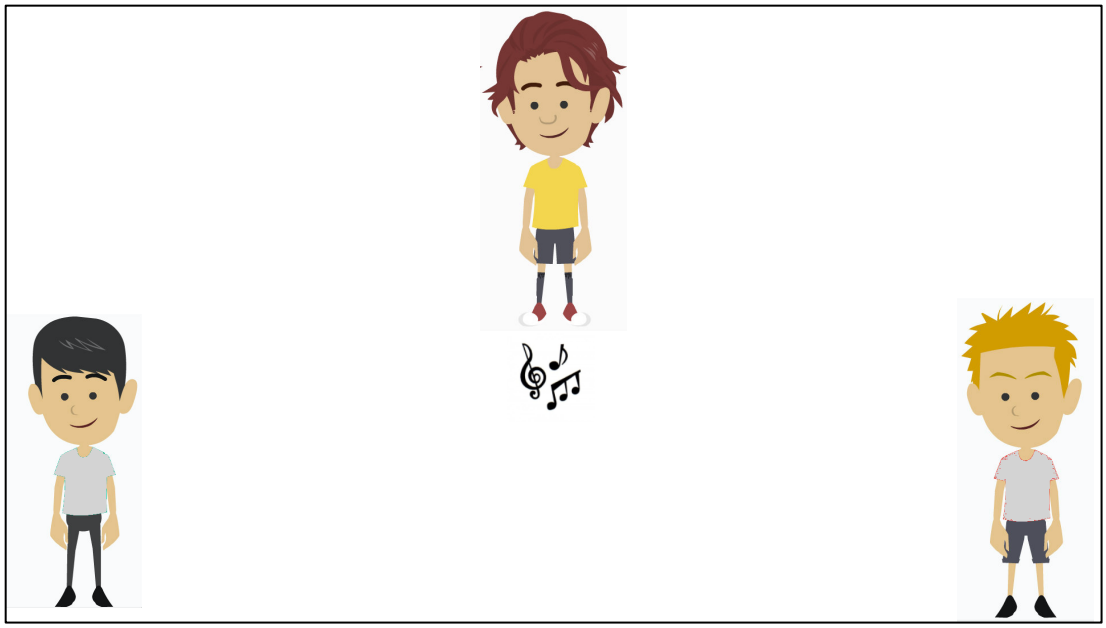


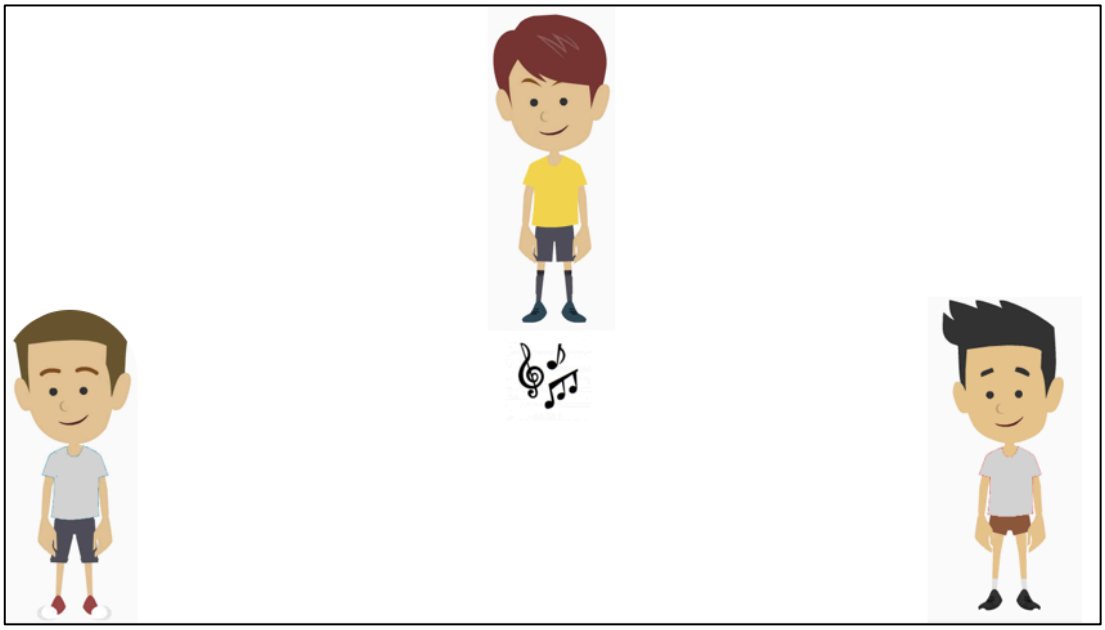
APPENDIX B

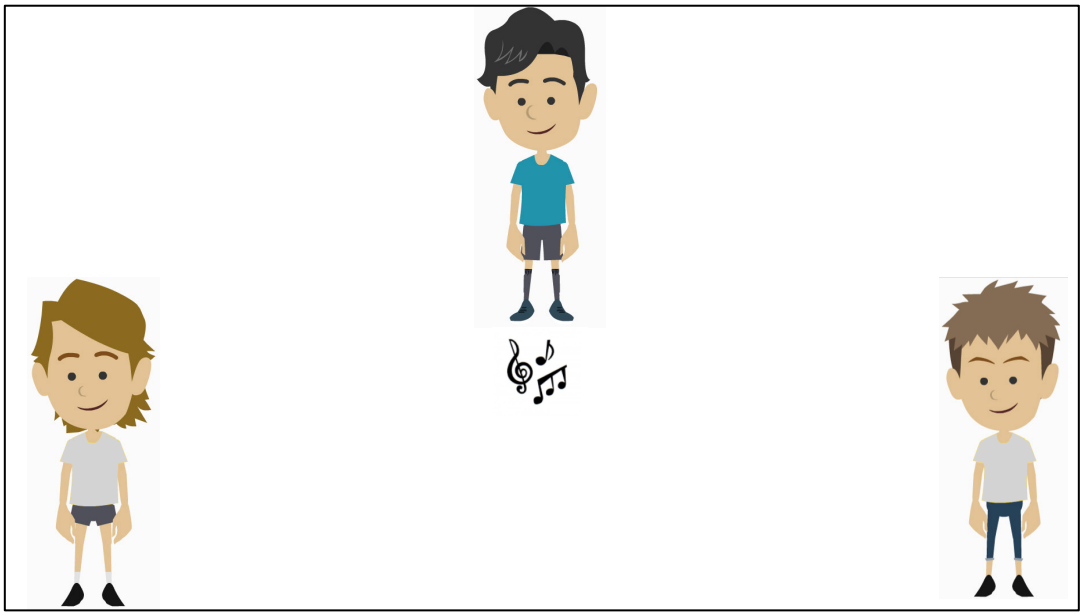
A SAMPLE OF POWERPOINT SLIDES FOR STUDY 2











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