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Children's expectations about the stability of others' knowledge and preference states

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A B S T R A C T

It is a crucial ability to predict others' psychological states across time and contexts. Focusing on cultural inventions such as songs and stories, we contrasted children's attributions of stability with others' knowledge and preference states across time and space and whether these attributions change as a function of children's familiarity with the known/liked items. Children (91 4-year-olds and 97 6-year-olds) were introduced to characters who *knew* or *liked* a song, a story, a game and a dance that were either novel or familiar. Children were asked whether the characters would still know/like these when they move to another city or when they grow up to be an adult. Both age groups expected these attributes to be more durable in the moving scenario compared with the growing-up scenario, but this trend became more robust with age. Whereas overall children did not judge knowledge as more durable than preferences, children found knowledge to be more enduring with age. The 6-year-olds' stability attributions also increased when known/liked items were familiar. These results suggest that, across the preschool years, children become more nuanced in their predictions about the future forms of knowledge and preference states.

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Introduction

Being able to anticipate own and others' psychological states across time and contexts is a crucial ability that allows us to make adaptive decisions. From an early age, children understand various psychological states, such as preferences, beliefs, and knowledge, and form expectations regarding how these states might vary across people, contexts, and time. Here, by focusing on two psychological attributes, namely preference and knowledge states, we systematically examined children's expectations regarding the endurance of these states across time and space, how these expectations change with age, and how they change as a function of children's familiarity with these states.

Even though mental states are not directly observable, starting early in life young children track various cues in their environment to infer these states and use them to make sense of and predict others' behaviors. When inferring others' epistemic states, children use distinct cues varying from situational cues such as the physical conditions (e.g., Pratt & Bryant, 1990), to person-specific cues such as a person's past accuracy or confidence (e.g., Birch et al., 2008; Jaswal & Malone, 2007; Koenig et al., 2004), to social cues such as group membership (e.g., Aldan & Soley, 2019; Kinzler et al., 2011). Similarly, children readily infer others' preferences based on situational cues as well as agents' emotional expressions and their verbal reactions and actions (e.g., Jara-Ettinger et al., 2015; Kushnir et al., 2010; Pesowski et al., 2016; Repacholi & Gopnik, 1997). For instance, when someone picks one item rather than the other, 5-year-olds infer that that person prefers it over the other if both items are similarly accessible (Pesowski et al., 2016). However, children do not make a similar inference when one of the items is not physically accessible (Pesowski et al., 2016).

Importantly, psychological states tend to vary across contexts and time, and over the preschool years children gradually get better at predicting how their and others' psychological states would change across different contexts (e.g., Atance & Caza, 2018; Bélanger et al., 2014; Lyon & Flavell, 1993; Martin-Ordas, 2017). Around age 4, children begin to understand both knowledge gain and loss over time (e.g., Atance & Caza, 2018; Lyon & Flavell, 1993; Taylor et al., 1991). Four-year-olds expect general knowledge to increase with age and expect that adults, in general, would know more things than children (e.g., Atance & Caza, 2018; Taylor et al., 1991). On the other hand, they are also aware that children and adults might be experts in different knowledge domains (VanderBorght & Jaswal, 2009). Specifically, children are expected to know more about toys, and adults are expected to know more about foods (VanderBorght & Jaswal, 2009), but the understanding about the relationship between age and knowledge becomes more nuanced by 6 years of age (Fitneva, 2010). Around 4 years of age, children also understand that the longer people wait, the more likely they are to forget what they know (Lyon & Flavell, 1993). Children are able to make predictions about future states of preferences as well. For instance, 3- to 5-year-olds are able to accurately predict that an adult's drink preference would be different than their own (Bélanger et al., 2014). Nevertheless, when it comes to predicting own future preferences, only 5-year-olds accurately predict that they would prefer a drink generally preferred by adults over a drink generally preferred by children when they are grown up (Bélanger et al., 2014).

From an early age, children also *essentialize* some psychological attributes (Erdley & Dweck, 1993; Gelman et al., 2007; Heiphetz et al., 2017; Heyman & Dweck, 1998). For instance, they judge traits such as intelligence or shyness as innate and stable (Erdley & Dweck, 1993; Heyman & Dweck, 1998). Children essentialize different beliefs to varying degrees; for instance, they perceive opinions as more biologically determined than factual beliefs and religious beliefs (Heiphetz et al., 2017). These studies suggest that children distinguish different psychological states when reasoning about how they vary across contexts.

Building on these findings, the current study examined children's stability attributions to individuals' knowledge and preference states across space and time. Because children's future-oriented reasoning tends to be more adaptive when reasoning about a third party rather than themselves (Atance et al., 2021; Bélanger et al., 2014; Lee & Atance, 2016), we asked children for their opinions about novel targets' knowledge and preference states rather than their own. In addition, we focused on knowledge of and preference for cultural products such as songs and stories for both theoretical and methodological reasons, which we detail below.

Past research suggests that, compared with preferences for culture-specific products, knowledge of culture-specific products is prioritized by children when making social inferences as well as social choices (e.g., Kalish & Lawson, 2008; Karadağ & Soley, 2023; Soley & Spelke, 2016). Thus, children expect an exclusive link between social group membership and culture-specific knowledge and not other psychological attributes such as preferences. Children tend to perceive membership in cultural groups, such as nationality and ethnicity, as being relatively stable across time (e.g., Davoodi et al., 2020; Diesendruck et al., 2013; Hussak & Cimpian; 2019). Accordingly, we asked whether children would hold similar beliefs about psychological attributes that are closely linked to cultural group membership. If children consider culture-specific knowledge to be a more fundamental attribute of being a member of a group, they might subsequently judge this attribute as more enduring across time and space.

It is also possible that culture-specific knowledge is more closely linked to group membership and is privileged as a source of social preferences and inferences by children because of its enduring nature. Cultural knowledge, such as knowledge of specific songs, tends to endure throughout one's life. Preferences for such artifacts, on the other hand, tend to change significantly across the lifespan (e.g., LeBlanc et al., 1996). In line with these, children expect knowledge to accumulate (e.g., Atance & Caza, 2018) and expect preferences to change across the lifespan (e.g., Bélanger et al., 2014). Nevertheless, past research has not directly compared children's expectations regarding the stability of knowledge and preference states.

Methodologically, using cultural products allows closely matching and directly comparing children's stability attributions for knowledge and preference states. Specifically, contrasting these two attributes permits using identical items (e.g., liking Song A vs. knowing Song A) and matching the two conditions as closely as possible.

In addition to comparing children's stability expectations in knowledge and preference domains, we also examined how children's stability attributions would change as a function of age. Children start reasoning more adaptively about their own and others' psychological states, such as their knowledge and preferences, at 5 years of age (Atance & Caza, 2018; Bélanger et al., 2014; Caza et al., 2016; Fitneva, 2010). For instance, whereas preschool children are good at reasoning about current knowledge states, only children who are older than 5 years reliably predict future or past knowledge states (Caza et al., 2016). Therefore, in the current study we tested both 4- and 6-year-olds to capture potential developmental trends. Furthermore, whereas children already prioritize shared cultural knowledge over shared preferences in their social choices at 4 years of age (Soley & Spelke, 2016), explicit inferences regarding the exclusive relationship between group membership and shared knowledge are evident among children aged 5 years and older (Soley, 2019; Soley & Aldan, 2020; Soley & Köseler, 2021). Thus, it is also possible that older children will attribute more stability to knowledge states compared with younger children.

We also examined the role of familiarity of the knowledge/preference items in guiding children's stability attributions. Children make different social attributions about individuals who are knowledgeable about familiar versus unfamiliar cultural information (Soley & Spelke, 2016). Furthermore, children's estimates about future psychological states of individuals tend to be more accurate if those individuals are psychologically more distant from themselves such as being more dissimilar to them (Lee & Atance, 2016). Thus, it is possible that children's predictions might change depending on whether they know the items that the target children like or know. Although we did not have a strong prediction, one of the possibilities was that children might expect cultural knowledge to be more stable than preferences, particularly when items are unfamiliar compared with when they are familiar.

Finally, we asked whether children's stability attributions would change in different contexts such as growing up or moving to a new place. Previous research suggests that children relate variations in culture-specific cues such as language to variations in geographic location (e.g., Kinzler & DeJesus, 2013; Weatherhead et al., 2016) and assume that individuals who share their knowledge of culture-specific practices and symbols are more likely to live close by (Soley & Köseler, 2021). Based on these findings, one possibility might be that children would expect culture-specific knowledge to be more stable across time compared with across space. Nevertheless, this factor was also exploratory.

Children were presented with target characters who knew or liked certain culture-specific artifacts, namely a song, a dance, a game, and a story. We then asked children whether the characters would still know or like these when they grew up or when they moved to a new place. Half of the children were introduced to cultural artifacts that they were familiar with, and half of them were introduced to novel, made-up culture-specific artifacts.

Method

Participants

A total of 188 children participated in the study. Of these children, 91 were 4 years old (45 girls; M_{age} = 4.49 years, range = 4.01–4.99) and 97 were 6 years old (46 girls; M_{age} = 6.39 years, range = 6.08–6.96). An additional 15 children were tested but eliminated from the final sample due to distraction (n = 6), experimenter error (n = 5), failure to complete the experiment (n = 3), or parental interference (n = 1). Based on previous studies on a similar topic (e.g., Caza et al., 2016; Fitneva, 2010, 2020), we targeted 20 children per age group for each of the possible combinations of familiarity (familiar vs. unfamiliar items) and attribute (preference vs. knowledge).

All children were native Turkish speakers, and they came mainly from middle- to high-socioeconomic backgrounds. Participants were recruited via social media accounts and the existing database of the laboratory. Prior to data collection, the study was approved by the institutional ethics review board.

Materials

We compiled four familiar and four unfamiliar knowledge/preference items. Unfamiliar items were composed of a novel game, story, dance, and song. All these were made up and labeled with either made-up words (e.g., "Zimzop game") or real words (e.g., "fantastical dance"). For compiling a list of familiar items, parents were sent a list of eight items (two per each type of game, song, story, and dance) before the experimental session, and were asked to choose the ones that their children would be familiar with. These items included songs, dances, stories, and games that are popular among children in Turkey. Parents were also asked to provide additional items if their children were not familiar with any items within a given category. If parents indicated multiple items as familiar, one was randomly selected and used in the experiment.

To present along with each item, eight drawings of White children (four boys and four girls) were created. The drawings were black and white and had different facial features and hairstyles. To present along with the "growing-up" scenarios, eight drawings of adults were created (four women and four men). These were adult versions of the target child characters (i.e., having similar facial features and hair). These characters were referred to by the letters of the alphabet (i.e., L, B, S, and T) to avoid potential bias toward certain names that the children might be familiar with. To present along with the "moving" scenarios, eight color drawings of cityscapes were used. In addition, two black circles differing in size were created to help children visualize different levels of confidence in their choices (i.e., the small circle means *a little sure* and the big circle means *very sure*). The visual stimuli were arranged into Microsoft PowerPoint slides and were presented on a laptop computer.

Design and procedure

Children were tested individually over Zoom. After informing the parents and children about the study and helping them to adjust the Zoom settings (e.g., activating the full screen mode, moving the experimenter video), we obtained parents' verbal consent and children's assent to participate. Following this, children were asked to name some colors and animals that were presented on the screen to make sure that they could see the stimuli and hear the instructions of the experimenter without any problems.

Then the experimenter gave a brief introduction to the study by saying the following: "Let me now tell you how we are going to play this game. I will introduce you to some people and ask you some questions about them. However, there are no right or wrong answers to these questions. So, you can answer as you wish." Then a child drawing (male or female depending on the gender of the participant) appeared on the left side of the screen and the experimenter said, "I will introduce you to children like this one. This is B. B is the same age as you." Then, the adult version appeared on the right side of the screen next to the child drawing and the experimenter said, "And this is the grown up adult B." Then the adult version disappeared from the screen and the experimenter said: "I will also show you where these children live." A cityscape drawing appeared on the right side of the screen next to the child drawing, and the experimenter said: "For example, B lives in this city. Do you know which city you live in? Do you know what 'moving' means? Have you ever moved and lived in a different city or a new house?" The last three questions were asked because the pilot data revealed that some of the 4-year-olds were not clear about what "moving" entailed. Based on the answers of the children (e.g., if they indicated that they did not know what "moving" means), the experimenter gave further explanations to familiarize children with the concept.

Children received four test trials. On each trial, a child drawing appeared in the middle the screen and the experimenter introduced the child as knowing (or liking, depending on the condition) one of the four items (song, story, game, or dance) as follows: "This is L. L knows/likes the 'Zimzop game.' Following this, children were asked whether they would expect the character to know/like the same item in case of growing up and moving to another city. For the growing-up question, the same child drawing appeared in the middle of the screen and the experimenter stated: "L is at the same age as you." As the child drawing disappeared and the adult version appeared on the screen, the experimenter asked, "Do you think L would know/like the Zimzop game when she grows up to be an adult?" For the moving question, the same child drawing appeared in the middle of the screen along with a cityscape drawing on the right side of the screen and the experimenter stated, "L lives in this city." Following this, the cityscape drawing disappeared and a new one appeared on the screen and the experimenter asked, "Do you think L would know/like the Zimzop game when she moves to this city?" After participants indicated their answer to each question as yes or no, two black circles appeared on the screen and the experimenter asked, "How sure are you? Are you a little sure or very sure?" As the experimenter asked these questions, a red square appeared around the small or large circle, indicating which of the two circles the experimenter referred to. The order of the questions about moving and growing up and the order in which the items (song, story, game, and dance) were presented were counterbalanced across children.

The Zoom session took approximately 10 min. After completing the four test trials, children were thanked for their participation and a digital diploma was e-mailed to the parents.

Results

Children's answers to yes/no and sureness questions were merged using a scoring that was adapted from past research (Lei & Cimpian, 2019; Soley & Köseler, 2021). For this, children's answers to the stability expectation questions were scored as 1 for answering yes and −1 for answering no. Their answers to these questions were multiplied by 1.5 when they indicated that they were *very sure* of their answer and were multiplied by 0.5 when they were *a little sure*. Accordingly, scores for each trial ranged from −1.5 to 1.5. This allowed children to give a graded response rather than simply choosing between two answers.[2] The data and analysis code are publicly available at https://osf.io/p5fcr/?view_only=9b5603036af0446ea913078ebcab396f.

First, we compared children's scores across four trials with chance (0) for each cell with one-sample, two-tailed t tests. The results of these are summarized in Fig. 1. As can be observed from the graph, children in both age groups expected attributes (cultural knowledge and preference) to

[2] Analyses including only children's yes/no answers yielded mainly parallel results. The chance comparisons yielded the same results with or without the sureness ratings. In the LMM analyses, the significant main effects and two-way interactions remained the same, with the exceptions that the interaction between attribute and age (p = .06) and the interaction between attribute and scenario (p = .08) became marginally significant. The results of these analyses are reported as online supplementary material.

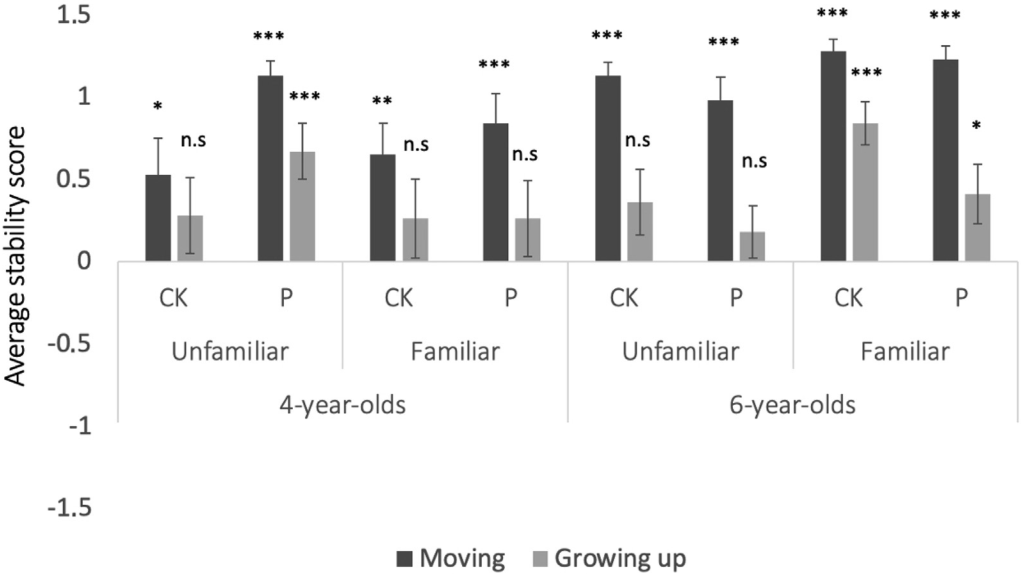

Fig. 1. Average stability scores attributed to cultural knowledge (CK) and preference (P) in moving and growing-up scenarios. *p < .05; **p < .01; ***p < .001. Error bars represent standard errors.

be stable in case of moving, but they did not have this expectation in case of growing up except for 6-year-olds in the familiar condition and 4-year-olds in the unfamiliar preference condition.

To examine the stability attributions across groups, we conducted linear mixed-effects modeling (LMM) by the "lme4" package (Bates et al., 2015) in R (R Development Core Team, 2013). The stability score was the output variable in the model. Attribute (knowledge vs. preference), age (4 vs. 6 years), familiarity (familiar vs. unfamiliar), scenario (moving vs. growing up), and all interactions between these variables were included as fixed effects. We also added a random intercept of participants.

First, we created the full model, including all predictors and their interactions, and compared it with the null model, lacking all these fixed effects and only including the random intercept of participants. The full model showed a better fit than the null model, $\chi^2(14) = 181.57$, $p < .001$. We then formed a reduced model that was identical to the full model except for the interaction term to be evaluated in the analysis, and we compared the reduced and full models. If the interaction investigated in the comparison did not contribute to the model, we dropped it and did not include it in further comparisons. The final model included the fixed effects of age, attribute, familiarity, scenario, and interactions between age and scenario, between age and familiarity, between age and attribute, and between attribute and scenario. We then also reduced each fixed effect from the model and compared it with the final model to decide whether it improved the model fit.

For every significant predictor in the final model, we estimated an effect size by following the procedure suggested by Muradoglu et al. (2023). To estimate the effect size for each predictor, first we calculated the sum of variances of the random effect of participants and residuals from the random effect table in the final model. We then divided the coefficient of the predictor by the sum of variance calculated above (see Jenifer et al., 2023, for the same procedure).

The final model summary is presented in Table 1.

The main effect of attribute, $\chi^2(1) = 0.37$, $p = .54$, was not significant, but the results yielded significant main effect of age, $\chi^2(1) = 5.18$, $p = .02$, $d = 0.10$, and an interaction between attribute and age, $\chi^2(1) = 7.08$, $p < .001$, $d = 0.12$. Following up on the interaction, pairwise comparison adjusted by Tukey showed that older children ($M = 0.89$, $SD = 0.53$) attributed more stability to targets' knowledge compared with younger children ($M = 0.43$, $SD = 0.83$), *estimate* = .48, $SE = .14$, $p < .01$, but there was no age difference in stability attributions for targets' preferences (older: $M = 0.69$, $SD = 0.60$; younger: $M = 0.74$, $SD = 0.71$), *estimate* = −.04, $SE = .14$, $p = .99$ (see Fig. 2).

Table 1
Summary of the final model

Fixed effect	*Estimate*	*SE*	*t*	*p*
(Intercept)	.69	.05	14.09	<.001
Attribute	−.03	.05	−0.59	.55
Age	.11	.05	2.26	.03
Scenario	−.28	.02	−12.23	<.001
Familiarity	.03	.05	0.62	.53
Attribute × Age	.13	.05	2.64	<.01
Attribute × Scenario	.05	.02	2.18	.03
Age × Scenario	−.08	.02	−3.31	<.001
Age × Familiarity	.11	.05	2.24	.03

Note. The final model in R: Stability Decision ~ Attribute + Age + Scenario + Familiarity + Attribute × Age + Attribute × Scenario + Age × Scenario + Age × Familiarity + (1|Participant).

Thus, whereas overall children did not expect knowledge states to be more stable than preference states, with age there was a trend in this direction.

The effect of familiarity, $\chi^2(1) = 0.40$, $p = .53$, was not significant; however, there was a significant interaction between age and familiarity, $\chi^2(1) = 5.13$, $p = .02$, $d = 0.10$; older children ($M = 0.94$, $SD = 0.46$) expected more stability than younger children ($M = 0.50$, $SD = 0.77$) when items were familiar, *estimate* = .44, *SE* = .15, $p = .02$, but not when items were unfamiliar (older: $M = 0.66$, $SD = 0.63$; younger: $M = 0.66$, $SD = 0.79$), *estimate* = .001, *SE* = .13, $p = 1.00$ (see Fig. 3).

So, whereas there was no overall effect of familiarity, older children, but not younger children, expected familiar states to be more stable.

There was also a main effect of scenario, $\chi^2(1) = 142.06$, $p < .001$, $d = 0.26$, and a significant interaction between age and scenario, $\chi^2(1) = 10.91$, $p < .001$, $d = 0.07$; older children ($M = 1.14$, $SD = 0.51$) expected more stability than younger children ($M = 0.79$, $SD = 0.86$) in case of moving, *estimate* = .37, *SE* = .11, $p < .01$, but not in case of growing up (older: $M = 0.43$, $SD = 0.88$; younger: $M = 0.38$, $SD = 1.03$), *estimate* = .07, *SE* = .11, $p = .90$ (see Fig. 4).

Thus, children expected more stability in knowledge and preference states over space than over time, and this tendency became more pronounced with age.

Finally, there was a significant interaction between attribute and scenario, $\chi^2(1) = 4.76$, $p = .03$, $d = 0.05$: Children expected more stability in the moving scenario compared with the growing-up scenario, $\chi^2(1) = 142.06$, $p < .001$), and this difference was greater when reasoning about targets' preferences (moving: $M = 1.05$, $SD = 0.63$; growing up: $M = 0.38$, $SD = 0.91$), *estimate* = .66, *SE* = .06, $p < .0001$, than when reasoning about their knowledge (moving: $M = 0.90$, $SD = 0.79$; growing up: $M = 0.43$, $SD = 0.10$), *estimate* = .46, *SE* = .07, $p < .0001$ (see Fig. 5).

Thus, children expected greater stability of psychological states across locations than across time, and this effect was more pronounced when reasoning about preference states.

Discussion

This study investigated children's stability attributions to others' knowledge and preference states across time and space and whether these attributions change as a function of children's age and their familiarity with the items that the targets like or know.

Our primary goal was to compare children's stability attributions across cultural knowledge and preference domains. Unlike our prediction, children did not expect knowledge of culture-specific artifacts to be more enduring than preferences. On the other hand, our prediction regarding the developmental trend was partly confirmed. We observed an increase in children's stability attributions with age, and this trend was mainly driven by an increase in children's stability attributions to cultural knowledge. The 6-year-olds attributed significantly more stability to cultural knowledge than the 4-year-olds. We also observed nonsignificant opposite trends for 4-year-olds and 6-year-olds: The 4-year-olds tended to attribute more stability to preference compared with knowledge, and the opposite trend was observed among the 6-year-olds. These trends are also in line with past studies suggest-

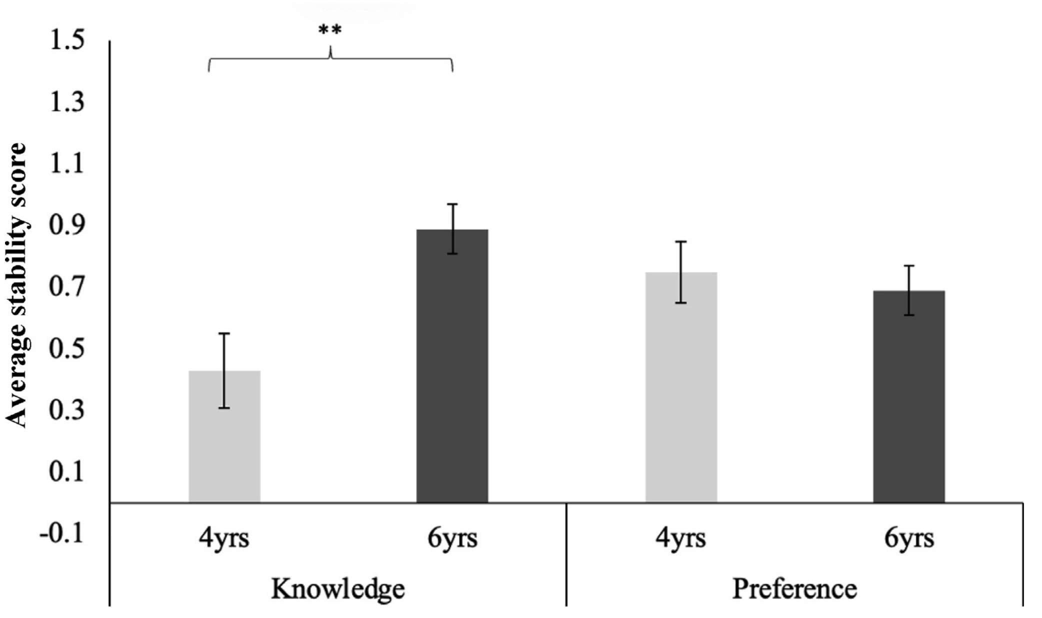

Fig. 2. Average stability scores attributed to knowledge and preference by 4-year-olds (4yrs) and 6-year-olds (6yrs). **p < .01. Error bars represent standard errors

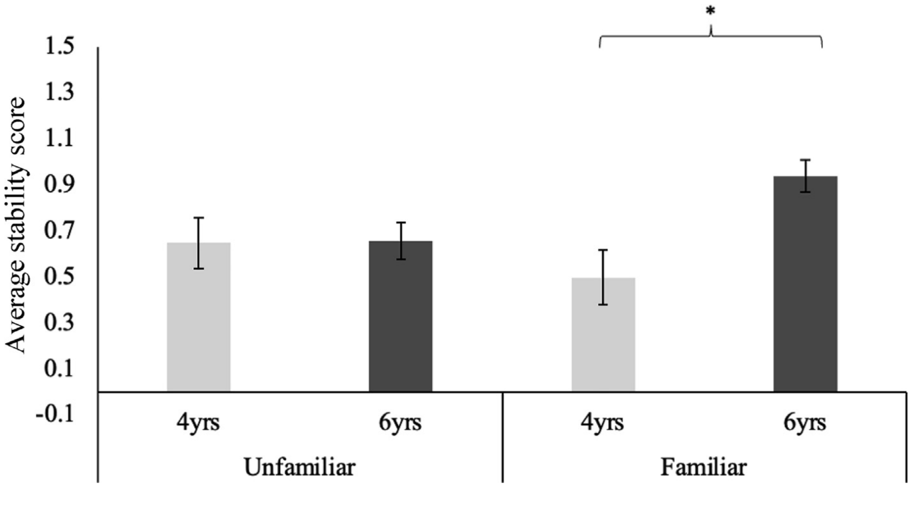

Fig. 3. Average stability scores attributed to unfamiliar and familiar items by 4-year-olds (4yrs) and 6-year-olds (6yrs). *p < .05. Error bars represent standard errors.

ing that children start reasoning more adaptively about their own and others' knowledge and preferences around 5 years of age (Atance & Caza, 2018; Bélanger et al., 2014; Caza et al., 2016; Fitneva, 2010). Children around 5 years of age distinguish knowledge of and preferences for culture-specific items in how they associate them with groups (Soley, 2019; Soley & Aldan, 2020).

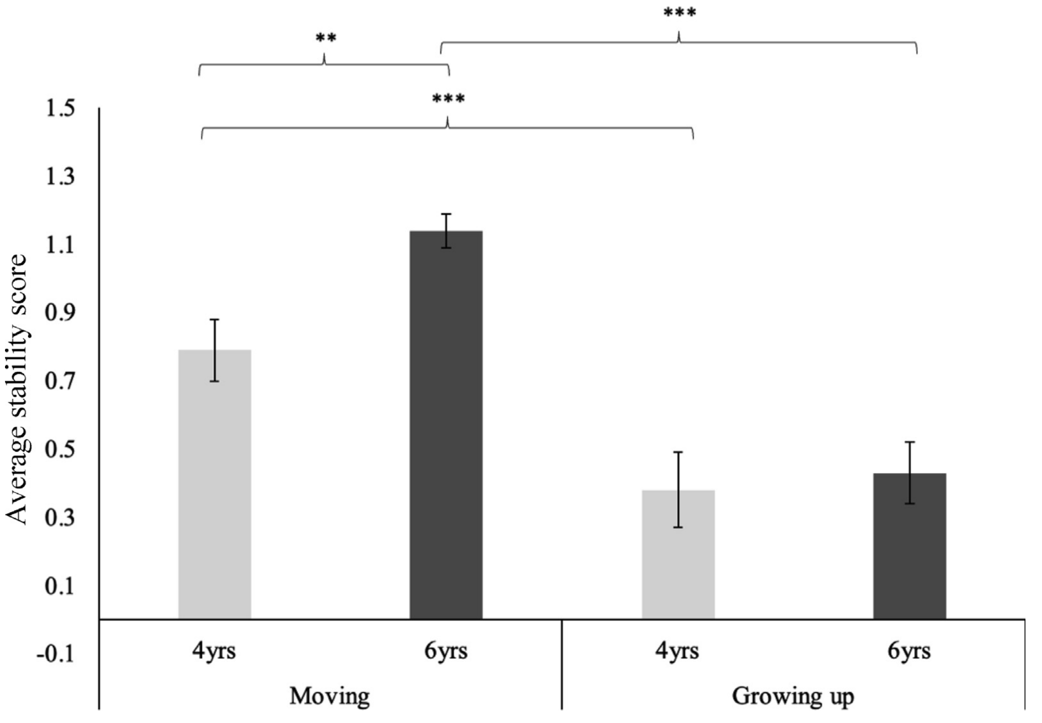

Fig. 4. Average stability scores attributed to moving and growing-up questions by 4-year-olds (4yrs) and 6-year-olds (6yrs). $^{**}p < .01$; $^{***}p < .001$. Error bars represent standard errors.

Nevertheless, when they need to make more complex inferences involving such attributes, children start reasoning more selectively about culture-specific knowledge around 7 years of age (Soley & Köseler, 2021). Thus, it is possible that the nonsignificant trends observed in the current study might become more robust with age, pointing to the importance of testing older children.

Past research suggests that whereas 8- to 10-year-old children and adults perceive opinions as more biologically determined than factual beliefs, they do not distinguish them when judging their stability (Heiphetz et al., 2017). A similar tendency might underlie the lack of difference in stability attributions in the current study. In other words, even though children might consider cultural knowledge as a more fundamental attribute of being a member of a group, they might not predict it to be more durable. Furthermore, children might expect these attributes to be stable for different reasons. For instance, preferences are strongly tied to individual characteristics (e.g., Rentfrow & Gosling, 2003). Accordingly, children might perceive preferences to be stable because of individual characteristics that are durable such as one's personality traits.

Familiarity with the knowledge and preference items had an influence on older children's stability attributions, where 6-year-olds expected people's knowledge and preference states to be more stable if they knew or liked items that target children were familiar with. The effects of familiarity of the items might be evident only among older children given their increased exposure to these items. Thus, as children become more familiar with specific items, they might attribute more stability to attributes involving them. Children around this age show a preference for familiar cultural artifacts over unfamiliar ones such as songs (e.g., Soley & Spelke, 2016). Accordingly, when the items were familiar, target children could have been perceived as more similar to themselves by the participating children because the targets shared participants' knowledge and preference states. Past research suggests that children's estimates about future psychological states of individuals tend to be less accurate if those individuals are psychologically more similar to themselves (Lee & Atance, 2016). Thus, these findings

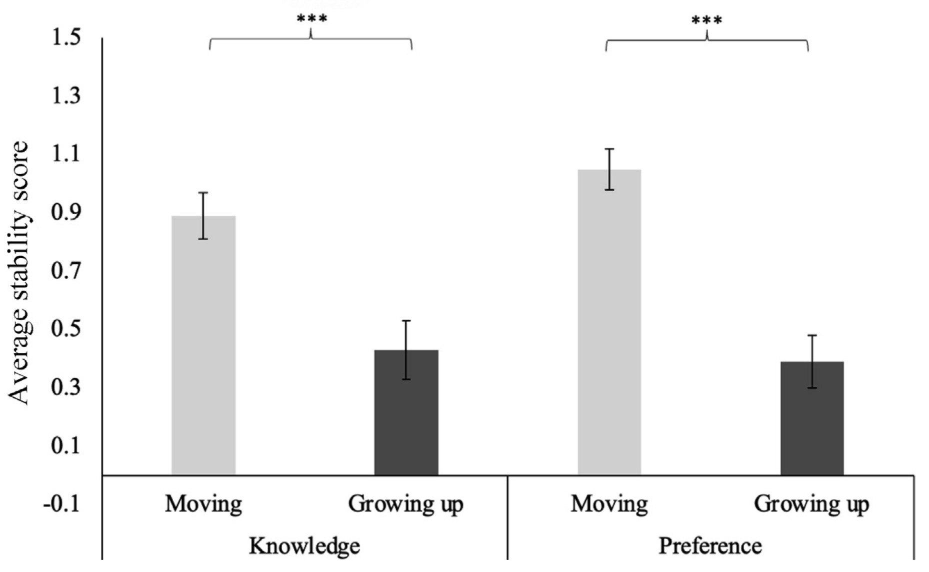

Fig. 5. Average stability scores attributed to knowledge and preference in moving and growing-up scenarios. ***p < .001. Error bars represent standard errors.

can also be interpreted as children making more objective estimates about others' future psychological states when targets' states are more dissimilar from their own.

It is possible that familiar items used in the current study could have been perceived as more child appropriate by participating children. In contrast, the items in the unfamiliar condition were labeled with either made-up words (Zimzop) or familiar words (e.g., fantastical dance), but because they were made up, there was no reason for them to be more child or adult appropriate. Thus, children could have attributed stability differently to knowledge and preference states involving familiar items compared with unfamiliar items, particularly for scenarios about growing up, considering the familiar items to be child appropriate. In such a scenario, however, one would expect child-appropriate items to be less likely to be known or liked by adults. In other words, one would expect less stability across time. We observed the opposite trend, where 6-year-olds expected more stability in the growing-up scenario for familiar items compared with unfamiliar items. Thus, this interpretation does not seem to be supported by the data.

Overall, children expected others' attributes to be more stable across space than across time. Furthermore, with age children expected knowledge and preference states to be more stable in case of moving, but no such age trend was observed for growing-up scenarios. Thus, already at 4 years of age, children expect others' attributes to be more stable in case of moving compared with growing up, and this tendency becomes more robust with age. Our results also showed that whereas the tendency to expect more stability in case of moving to a new city compared with growing up was evident for both knowledge and preference states, it was more robust in the preference condition. However, we did not observe any differences in terms of children's stability attributions to knowledge versus preference states separately for the moving and growing-up scenarios. Thus, this interaction seems to be driven by a combination of both. An interesting future direction would be to explore how children's stability attributions would change when moving scenarios involved changing cultures (e.g., moving to a new country). Given that children associate cultural variation and geographical background (e.g., Soley & Köseler, 2021; Weatherhead et al., 2016), they might expect less stability in such a scenario compared with when someone simply moves to a different city.

The current study examined how stable children expect cultural knowledge to be. Whereas we focused on knowledge of certain culture-specific artifacts like songs and games, cultural knowledge is not limited to these and can also include other types of knowledge such as factual and procedural knowledge. For instance, members of a community might share knowledge of facts about some animals simply because they live in a certain geography. Future research should further explore whether children distinguish such factual knowledge that is culture specific and that is general (or less likely to be constrained by cultural background) in terms of its endurance. Given that children distinguish various types of knowledge in terms of their social value, how they are learned and who would have access to them (Cimpian & Scott, 2012; Lockhart et al., 2016; Öner & Soley, 2023), it is possible that stability attributions to different types of knowledge also vary.

Overall, the current study contributes to the literature on children's reasoning about culture-specific knowledge and preference states as well as their future-oriented thinking. We examined children's estimates of others' future preference and knowledge states and explored how these estimates would change with age, across different scenarios such as moving to a new place versus growing up, and as children's familiarity with the liked/known items are varied. Our findings suggest that children are flexible when making inferences about the stability of others' psychological attributes and take different factors into account. Furthermore, with age children become more nuanced in their inferences about the stability of psychological attributes.

Data availability

Data and analysis code are shared on OSF https://osf.io/p5fcr/?view_only=9b5603036af0446ea913078ebcab396f.

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