

Sequence of theory-of-mind acquisition in Turkish children from diverse social backgrounds

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Abstract

We examined the sequence of theory of mind (ToM) acquisition in 260 Turkish children ($M_{\text{age}} = 53.36$ months, $SD = 10.37$) and the demographic factors associated with it. Children came from five different cities in Turkey. Their ToM skills were measured using Wellman and Liu's (2004) ToM Scale, which probes various mental state understandings from diverse desires to hidden emotions. These Turkish children demonstrated the traditional, collectivist ToM acquisition pattern evident in Iran and China with earlier understanding of knowledge access (KA) than diverse beliefs (DB), not the western, individualist pattern evident in U.S., Australian and German children. Gender, SES and number of adults living in the home influenced the pace of children's ToM acquisitions. A post hoc analysis examined a minority of children that exhibited individualist ToM acquisition with earlier achievement of DB than KA. The results contribute to a fuller socio-cultural understanding of ToM development including examination of variations within a single heterogeneous developing country. They also further suggest the importance of exposure to different ideas and beliefs in large households for earlier understanding of varying belief states.

Sequence of Theory-of-mind Acquisition in Turkish Children from Diverse Social Backgrounds

Theory of mind (ToM) --understanding persons in terms of their internal mental states such as beliefs and desires--reveals both apparent universals and differences in development across cultures and communities. Universally, children acquire explicit false belief (FB) understanding in the years from 3 to 6 (Callaghan et al., 2005; Wellman, Cross, & Watson, 2001). However, across cultures, there are differences in adult theories of mind (Lillard, 1998; Lurhmann, 2001) and differences in the childhood timing and achievement of differing theory-of-mind concepts (Mayer & Träuble, 2013; Vinden, 1996). A key aim for current research is to better understand the nature of, and influences on, these similarities and differences in order to detail more clearly how ToM exemplifies “universalism without uniformity” (Shweder & Sullivan, 1993, p. 507).

Turkey recommends itself as a locale for investigating these questions. Prior research reveals intriguing differences in children's specific ToM trajectories in western, individualist countries (such as, U.S., Australia, Germany) compared to non-western "Asian", collectivist countries (such as, China, Iran) such that children in individualist western cultures appear to learn diversity in subjective beliefs earlier compared to their peers in collectivist eastern cultures (Shahaeian et al., 2011; Wellman et al., 2006). Turkey straddles this divide both geographically and as a society that blends individualist western and collectivist middle eastern traditions (Göregenli, 1995). Further, social class differences often relate to differences in more or less individualist versus collectivist-traditional values, as much as simple differences in nationality (Durgel, van de Vijver, Yagmurlu, 2013; Mayer, et al., 2012;

Okur & Corapci, 2016). This is also true in Turkey. In the present research, we assess ToM acquisition in a large number of Turkish children whose families span a large range of social class circumstances.

Theory of Mind

ToM has a multifaceted nature (Samson & Apperly, 2010); it includes an interconnected network of basic mental states such as desires, beliefs, knowledge, and feelings, whose acquisitions are fundamental to help children to understand and interact within the social world. Although the ability to understand mental states of others continues to advance into late childhood, adolescence and beyond (e.g., Bianco, Lecce, & Banerjee, 2016; Devine & Hughes, 2013), there is remarkable growth in its development between 3 and 6 years of age worldwide (e.g., Wellman, et al., 2001).

Universalism without uniformity. Early cultural studies of ToM development focused on universality as revealed by false-belief tasks (see, e.g. Callaghan et al., 2005, Vinden, 1996, and meta-analyses by Wellman et al., 2001). Still, more recent studies have pointed to much greater and more nuanced variability by including other mental state concepts in their measurements in addition to false-belief (e.g., Kristen et al., 2006; Peterson, Wellman, Liu, 2005). In particular, research using Wellman and Liu's (2004) ToM scale to track ToM has revealed two alternative sequences of ToM developments. As outlined in Table 1, the scale measures various ToM understandings including diverse desires (DD), diverse beliefs (DB), knowledge access (KA), false belief (FB), and hidden emotion (HE). These mental state concepts in the scale proceed in stepwise fashion. Consistently, children in western, "individualist" societies such as U.S., Australia, and Germany evidence a

DD>DB>KA>FB>HE sequence of development (e.g., Kristen et al., 2006; Peterson et al., 2005; Wellman & Lui 2004; Wellman, Fang & Peterson, 2011). However, children in eastern, “collectivist” societies such as China and Iran evidence an alternative DD>KA>DB>FB> HE sequence (e.g., Wellman et al., 2006; Wellman et al. 2011; Shahaeian, et al, 2011) where children understand that people who see something know about it (knowledge access) before they understand diversity in beliefs. Slaughter and Perez-Zapata (2014) provide a brief review of this research by summarizing similarities and differences across cultures in children’s acquisition of various mental state concepts. How can we better explain these similarities and differences? One crucial step to elucidate children’s understanding of people’s minds in different cultures (suggested by Gauvain, 1998; Vinden & Astington, 2000) is to understand the characteristics of that culture in depth.

Cultural Contexts

When children develop an earlier understanding about diversity in beliefs in some sociocultural contexts but develop an earlier understanding about having access to knowledge in others, this might be due to the functionality of these specific mind-reading skills in those contexts. Children actively learn ideas and values in the context of socialization practices by parents, family, and communities. From the point of view of contextualism, it is no surprise then that timing in the acquisition of different understandings might be different (Coll, Akerman, & Cicchetti, 2000; Greenfield & Suzuki, 1998). Turkish society provides substantial cultural variation at the level of the country, family, and social class with which to view ToM acquisition.

Turkish Culture.

National context: Turkey is a country where both European individualist and Asian collectivist elements coexist (Göregenli, 1995). In recent broad surveys, Turkey is ranked halfway between individualist and collectivist cultures: 37th out of 93 countries, on the dimension of individualism (Hofstede, Hofstede & Minkov, 2010). An older, 49-country comparison found that Turkey scored high on conservatism, hierarchy, and harmony (collectivist ideals) and relatively lower on the autonomy, egalitarianism, and mastery (individualist ideals) (Schwartz, 1999). However, Turkey has been transitioning from a predominantly collectivist society to one that simultaneously observes both collectivist and individualist values.

Relatedly, Turkey has transformed from a rural and agricultural society to an urban and non-agricultural, industrial society (Norris & Inglehart, 2009; Rasuly-Paleczek, 1996). According to the Turkish Statistical Institute (TUIK, 2014), fueled by higher education and employment opportunities in big cities, as of 2012, 72% of the Turkish population now resides in urban centers. Although the first generation of migrants in cities largely kept their traditional collectivist values, their children started embracing urban culture with its westernized ideals engendering coexistence of multiple views within households and extended family contexts (Sunar, 2002). Coexistence of individualist and collectivist values also mixes with social class and this is true in Turkey. Families from higher SES tend to embrace individualist socialization values, whereas those from lower SES usually conform to traditional collectivist values in socialization practices (Göregenli, 1995; Sen, Yavuz-Müren, & Yagmurlu, 2014). This demonstrated presence of both individualist and collectivist ideals

within a single society presents a critical environment to view cultural variability with respect to ToM development.

Familial contexts: Not only do national contexts impact social experiences but so do variations in family interactions and experiences. Variations in familial contexts and experiences such as number of siblings and number of adults in the home often co-vary with traditional versus western culture and with SES (Cutting & Dunn, 1999; Ruffman, Perner, Naito, Parkin & Clements, 1998, Yagmurlu, Berument, & Celimli, 2005). Because children's understanding of the mind is formed through their social interactions, understanding might also be linked with these variations in social and familial contexts. In fact many studies, beginning with Perner, Ruffman and Leekam (1994) have shown that a greater number of siblings is related to better understanding of beliefs (Jenkins & Astington, 1996; Peterson, 2000). Lewis, Freeman, Kyriakidou, Maridaki-Kassotaki, and Berridge (1996), however, noted the importance of the child's overall social network, such as daily interactions with adults and peers. Their study with Greeks in Crete and Cyprus, where many people lived in extended families, indicated that the most powerful predictor of ToM development was the number of adults the children interacted with on a daily basis. Lewis and colleagues argued that research must move beyond sibling or nuclear family influence to consider extended family and social contexts, especially for collectivist societies. Again, Turkey provides a good venue for addressing this need.

The Current Research

In sum, a variety of factors that could influence ToM developments should be considered in tandem: cultural context at the level of the country, social class, and the family.

Data from Turkey could do so, given a large and varied enough sample, because of its substantial within-country variation at each of these levels. That was our aim in the present research: we used ToM Scale data revealing sequences as well as levels of development to report findings from a large number of Turkish children whose families spanned a large range of social class circumstances. Only one prior study (Etel & Yagmurlu, 2015) studied Turkish children using a ToM Scale and it found the individualist acquisition pattern. However, this was a small-sample study of institutionalized children and, as argued by its authors, frequent and long-term interaction of these children with their peers in the institutional context might have led them to encounter various ideas and beliefs, which in turn triggered acquisition of DB earlier than KA. Instead, we examined a large sample of typically developing children recruited from five different and dispersed urban locations within Turkey spanning its European and Asian parts.

Method

Participants

Two-hundred and sixty children (125 girls) aged 34 to 80 months ($M_{\text{age}} = 53.36$ months, $SD = 10.37$) participated. They were chosen from preschools in five different Turkish cities: Istanbul, Bursa, Balıkesir, Tekirdağ and Muğla. These cities span geographical locales, are industrialized cities with higher Socio-economic Development Index scores and higher employment and education opportunities compared to other cities in Turkey (Albayrak, Karamustafa, Savaş, & Baki, 2015) and so are magnets for urban migration. They provide a rich basis to recruit children from families of varying SES levels and household compositions (e.g., family size) that might potentially influence ToM acquisition. The preschools that

children were chosen from were similar in quality (majority being public preschools) and with enrollments from families of a wide range of socio-economic backgrounds. In that sense children in our sample can be considered as representing the full range of preschoolers in Turkey as much as possible.

The families were diverse demographically. For mothers, 9% were illiterate with no school experience, 11% had primary school education, 17% were high school graduates and 31% had a university degree. Father education was somewhat higher: 1% of fathers were illiterate, 12% had primary school education, 24% were high school graduates and 35% had university degrees. Comparable numbers of families were from low, middle and high income groups: household income of 32% of families was less than 2000 Turkish Lira, (TL; ~695 US\$), 38% of families were earning between 2000 TL and 7000 TL (~2430 US\$), and 29% of them had monthly income of more than 7000 TL.

One hundred and thirteen children in our sample (50%) had siblings, ranging from 0 to 3, with the modal number (42%) one. Older individuals at home (parents, relatives and siblings older than the focal child) who live permanently with the family varied more widely, from 1 to 9: 52% of children lived with 2 older individuals, 26% with 3, and 22% lived with 4 or more. Only 2% of children lived with a single individual (parent) at home.

Measures

Demographic. Demographic information was obtained from mothers about parent education, monthly household income, siblings and other adults permanently living with the family (see Table 1). Education level of mothers and fathers was measured on 10-point Likert type scale, with '0' indicating illiteracy and '10' indicating graduate degree. Monthly

household income was rated on 7-point scale ranging from 'below 630 TL' (~218 US\$) to 'above 12000 TL' (~4166 US\$). A composite SES measure averaged standardized scores for education of mothers and fathers and monthly household income.

Theory of Mind. We measured ToM via Wellman and Liu's scale (2004), translated into Turkish, consisting of five items testing mental state understanding: diverse desires (DD), diverse belief (DB), knowledge access (KA), false belief (FB) and hidden emotion (HE). Each item requires inference about subjective internal states, however, of varying nature and complexity. Table 2 outlines the scale's items.

All items had target questions and control questions that probe children's understanding of the task-skits. Children passed an item (0 = incorrect, 1 = correct) if they correctly answered the target and control question. Scoring adhered to the detailed procedures described in Peterson, Wellman, and Liu (2005) yielding scores of 0-5.

Procedure

Data collection was approved by a university Institutional Review Board. Written consent of the parents and the directors of childcare centers/kindergartens, and verbal assent of the children were obtained. Demographic information was provided by mothers. Individual ToM testing for each child occurred in a separate and quiet room.

Results

ToM Scores

Table 3 shows both zero order correlations between demographic variables and total ToM scale score, and partial correlations controlling for age. As in prior research (e.g.,

Wellman, Fang, & Peterson, 2011; Wellman & Liu 2004), children's ToM scale scores increased with age, which supports the measurement validity of our translated scale.

A wide range of ages aids in assessing the validity of a ToM Scale, but then age needs to be taken into account. That was especially important in these data because age also correlated with other variables including number of siblings and SES. Before controlling for age, only number of younger siblings was significantly correlated with ToM score. With age controlled, ToM score did not significantly correlate with number of younger ($r = .12, ns$) or older siblings ($r = -.08, ns$) or SES ($r = .08, ns$), but was negatively associated with number of adults at home ($r = -.18, p = .008$), as shown in Table 3.

There was no overall age difference between girls ($M = 53.81, SD = 10.13$) and boys ($M = 52.94, SD = 10.61$), $t(258) = .67, p = .50$. However, there were gender differences in ToM scores, $t(258) = 2.48, p = .014$, with girls ($M = 2.86, SD = 1.15$) outperforming boys ($M = 2.50, SD = 1.15$).

Predictors of ToM Score. To better examine the contribution of these variables to ToM in this cultural context, we carried out hierarchical regression analyses that allow estimation of the unique contribution of each variable to the progression of ToM scores. Because age, gender and number of adults at home were associated with ToM scale scores, they were entered into a three-step regression analysis to investigate their independent contributions to the ToM outcome as outlined in Table 4.

When age was introduced, as expected, the regression significantly predicted ToM scale performance ($R^2 = .23, F(1, 222) = 66.37, p < .001$). Gender, introduced second, did not predict ToM score when age was controlled ($R^2 = .24, F_{change}(1, 221) = 3.36, p = .07$). In the

third step, number of adults at home further predicted ToM scores of children (total variance accounted for, $R^2 = .27$, $F_{change}(1, 220) = 7.06$, $p = .008$). As in the partial correlations, this relation was negative: fewer adults at home predicted higher ToM scale scores, see Table 4. At the same time, as shown in Table 3, fewer adults at home also consistently correlated with higher SES.

Acquisition Order

As shown in Table 5, we found that the Turkish data closely resemble the pattern found in prior work with Chinese and Iranian children: DD>KA>DB>FB>HE, rather than that found in children from western, individualist countries: DD>DB>KA>FB>HE. A Guttman scalogram analysis of these data (according to the procedures specified in Green, 1956) yielded a Coefficient of Reproducibility of .915. 1.00 would be perfect scalability, but values above .90 are considered significant.

Guttman scaling is deterministic (only patterns fitting the exact step functions for increasing difficulty are scale-appropriate) and its coefficients are inflated in several circumstances. Item-response theory (Bock, 1997) approaches allow more quantitative analyses including of less strict scale progressions. The most straightforward item-response-theory model, the Rasch measurement model, is a one-parameter logistic model for dichotomous data (Rasch, 1960; Wright & Masters, 1982), which is often regarded as a probabilistic model for Guttman scaling (Andrich, 1985; Wilson, 1989). Table 5 outlines our Rasch analysis of these data.

Order of item difficulty was identical in the Rasch model as in the Guttman scalogram, the Rasch model additionally provides a metric of relative distances between items. For

simplicity, the item difficulties in Table 5 were re-scaled with False Belief 's (arbitrarily considered the anchor task of the five tasks) difficulty measure receiving a 5.0 on the linear scale. The five items are appropriately spread (all successive items differ by more than .50 units) and the largest spreads (in score units) are for KA>DB and DB>FB.

Table 5 also shows Rasch model fit statistics that evaluate the extent to which a person with a given ability level will likely respond positively to less difficult items and negatively to more difficult items. Infit is more sensitive to unexpected responses near an item's measurement level; outfit is more sensitive to unexpected responses far from that item's level. Standardized infit and outfit statistics for individual items have an expected value of 0. Positive values greater than 2.0 indicate greater unpredictable variation than expected for a consistent one-parameter scale. Negative values suggest the scale is more deterministic than expected because Rasch models are probabilistic, thus negative values indicate the data approximate a more deterministic Guttman scale (Bond & Fox, 2001). None of the values for these data approach 2.0; three of the 10 are negative.

Variability in acquisition order. As clear in Table 5, children in our sample found KA questions easier than DB questions (KA>DB), and indeed significantly more children passed the KA item compared to the DB item, $\chi^2(1, N = 260) = 13.25, p = .0003$. This overall "collectivist" pattern of ToM acquisition was confirmed in the Rasch analysis which additionally indicated that the spread from KA to DB was sizable.

Nonetheless, as outlined in the introduction, children in Turkey as a group could potentially include those representing both collectivist and individualist influences and understandings. We explored this possibility in several further analyses that were necessarily

exploratory because we did not administer to parents an instrument to directly assess their collectivist or individualist values and practices.

First, we tallied the number of children who fit the majority, “collectivist” pattern perfectly, according to a Guttman scalogram; 161 of 260 (62%) fit this pattern. This contrasts with other studies where 75-85% of US, Australian and German children often fit the “individualist” pattern perfectly (Kristen et al. 2006; Peterson et al. 2005; Wellman & Liu 2004). It contrasts as well with several studies where about 75% of Iranian (Shahaeian et al., 2011) and Chinese (Wellman et al., 2011; although see e.g., Wellman et al., 2006 where 62% of Beijing preschoolers fit the collectivist scale perfectly). After removing those 161 children, then 21 children (8% of the total sample) fit the “individualist” profile perfectly. This was the second most frequent pattern because of the still remaining children at most 15 (6%) fit any other of the remaining 25 possible patterns perfectly.

To follow-up further, we focused on children and items (KA and DB) that distinguish the “collectivist” and “individualist” patterns directly. Whereas 74 children evidenced a KA>DB pattern, 35 evidenced DB>KA (with the remaining children either failing both or passing both tasks). Using this two-item criteria alone --passing KA and not DB or vice versa-- 74 (68%) showed the “collectivist” pattern (KA but not DB) but a substantial minority 35 (32%) showed the individualist pattern. Thus, these data further suggest heterogeneity whereby Turkish children as a group may represent a mix of collectivist and individualist reasoning about people.

These two sub-groups were also sizable enough for some additional analyses. When compared in terms of demographic characteristics, the two groups did not differ in gender, χ^2

(1, $N = 109$) = 0.102, $p = .75$, but did differ in age. Children showing the KA>DB ToM acquisition pattern were on average older ($M = 53.43$, $SD = 9.30$) than those showing DB>KA ($M = 46.40$, $SD = 10.43$), $F(1, 107) = 12.56$, $p = .00006$, $\eta^2 = .11$. When controlling for age, the KA>DB group had fewer ($M = 2.45$) adults at home, $F(1, 88) = 4.28$, $p = .04$, $\eta^2 = .05$, than DB>KA group ($M = 2.77$). However, there was no difference in number of older siblings, $F(1, 82) = 1.83$, $p = .18$ or number of younger siblings, $F(1, 82) = 0.21$, $p = .64$ between the groups. Lastly, SES of families did not differ in these two groups, $F(1, 88) = 0.85$, $p = .36$, when controlling for age.

The age differences complicate these comparisons; moreover, as shown in Table 3, when age is controlled, SES and number of adults at home are negatively correlated. To estimate the independent contributions of age and number of adults at home to ToM acquisition order, we used logistic regression (the DV reflecting either KA>DB or DB>KA response). Since gender, number of older and younger siblings and SES were not significantly different in the two groups, they were not further analyzed in this regression. The logistic regression model was significant, meaning that the set of predictors entered reliably distinguished a KA>DB acquisition pattern from a DB>KA pattern, $\chi^2(2, N = 91) = 15.62$, $p = .0004$ and explained 23% of the variance in ToM acquisition order as indicated by Nagelkerke R^2 . The Wald criterion demonstrated that age was negatively related with DB>KA acquisition order, $p = .046$. But more focally, with age controlled in this analysis, the number of adults at home was significantly, positively related with DB>KA acquisition order as its fit with the Wald criterion was, $p < .05$. The number of adults at home increased the

odds of being in DB > KA group 1.59 times, for each additional adult at home, Exp (B) = 1.59, 95% CI = [1.00, 2.54].

Discussion

Acquisition of ToM, including various abilities from understanding desires, belief and hidden emotions, should be assessed within the broad cultural framework in which it develops (Lillard, 1998). That framework can prioritize or facilitate some ToM aspects before others depending on the functional value of those aspects in that cultural context (Callaghan et al., 2005; Oh & Lewis, 2008). Indeed, when assessment of ToM moved from the use of false-belief tests to include progressions of various mental state understandings (such as diverse beliefs, knowledge access and hidden emotions), the role of culture emerged more clearly because sequential progressions of ToM acquisition differed in different cultural contexts (Shahaeian et al., 2011; Wellman et al., 2006), even when the timing of ToM progress was essentially similar.

Our study provides further support for cultural diversity in sequential acquisition of ToM. Moreover, our findings are more nuanced than others in this area, because we consider “culture” not only as indexed by a rough overall national categorization, but also in terms of family constellations and SES. And we sampled children from five widely spread and different Turkish cities. We showed that, overall, Turkish children learn ToM in ways similar to children in other collectivist cultures such as China (Wellman et al., 2011) and Iran (Shahaeian, et al., 2014) by achieving KA earlier than DB. Equally possibly, these Turkish data probably also reflect SES as a potent “cultural” factor.

As characteristic of a collectivist orientation, Turkish children's sequence of ToM acquisition reflected the possible higher importance placed on shared knowledge and mutual understanding of facts as documented in prior research on Turkish parental beliefs (Sen et al., 2014). As stated in our introduction, research also reveals that parental emphasis on obedience over self-direction in socializing children is related to economic conditions where adults are required to conform to authority figures. In either case, what someone knows and does not know becomes important since access to knowledge about shared norms or lack thereof would determine the level of conformity to the group. In contrast, expression of diverse beliefs is not encouraged and even deemed detrimental to harmonious group relations (Markus & Kitayama, 1991). Thus, sequential development of ToM arguably mirrors the relative importance and function of knowledge access over diverse beliefs in collectivist societies and in families with lower social class (although for an exception see Kuntoro et al., 2013). This may partly explain the pattern of ToM performance in our Turkish children with their early achievement of KA before DB.

Clearly, then, one possible explanation for our data characterizing the progression of ToM insights in Turkish children concerns probable patterns of family practices, values and discourse. In particular, these family practices, values and discourse emphasize consensual knowledge acquisition in collectivist and lower social class contexts, as the basis of learning social rules and achieving conformity. The collectivist-individualist distinction is the same general argument advanced for related results from China and Iran (Shaheian et al., 2014; Wellman et al., 2011; Slaughter & Perez-Zapata, 2014). No studies, including our own,

however, have yet studied parent-child discourse in the home or parental socialization values directly.

Accepting this general picture of Turkish ToM acquisition, we also conducted exploratory analyses of the children's ToM scale response differences which could possibly manifest varying parenting values and practices as well as the position of Turkey as a blend of individualist or collectivist values (Göregenli, 1995). These data suggest that, although collectivist cultural beliefs about people and knowledge arguably dominate, both individualist and collectivist response patterns may coexist in urban Turkish children. That children's beliefs can represent a heterogeneous mix of various reasoning styles, within national groups (or even within individual children), has become more prevalent in the literature (see e.g., Legare, Evans, Rosesengren & Harris, 2012). Our findings provide initial evidence for such a claim for ToM reasoning, albeit via admittedly exploratory analyses.

The only other study that we know of that also explored the heterogeneity of response patterns in a single sample is that of Kuntoro et al. (2013). Similar to our approach, Kuntoro et al. identified 27 urban Indonesian children (out of a total sample of 101) that evidenced either KA but not DB or DB but not KA responses. For these Indonesian children 26 of 27 children showed the individualist pattern, providing no evidence for heterogeneity of differing cultural patterns in their sample. Of course, that study yielded a considerably smaller sample (only 27 contributing to their heterogeneity analysis) and a much more homogeneous within-country sample (taken from one single city in a large multi-island society).

Relatedly, our exploratory results mean that, in contrast to other studies (where one single pattern or another, was apparent for more than 75% of the children), we could examine

predictors of these differing sequences of ToM acquisition. Indeed, we found that number of others at home, and more specifically the number of adults, help predict shifts in ToM acquisition characteristic of either collectivist or individualist patterns. Specifically, children living in larger families composed of extended family members demonstrated understanding of DB earlier than KA. Arguably, this could be related to exposure to multiple ideas and viewpoints in larger households. The positive link between family size and ToM has been evidenced before (Jenkins & Astington, 1996; McAlister & Peterson, 2013; Ruffman et al., 1998), although the major focus of that prior research was the number of older and younger siblings in households rather than presence of relatives and grandparents (Hughes & Ensor, 2005). Our results were most similar, therefore, to those of Lewis et al. (1996) who argued that extended family influences increase children's opportunity to encounter various beliefs and ideas. But in contrast to those results, we focused more informatively on differing progressions of ToM understanding, rather than false belief timing alone. At the very least, our data argue that total number of adults in the home is an important factor to consider and especially in more traditional societies where multiple adults (parents, aunts, uncles, grandparents) often live together. The presence of these adults can change the developmental progression of sequential ToM acquisition especially if this acquisition takes place in a cultural atmosphere that hosts both collectivist and individualist values.

Furthermore, because Turkey is in the midst of societal transformations, large differences in beliefs and preferences can be seen among individuals of different ages living under the same roof, with young generations having more liberal and secular ideals and older generations having more conservative values. A generation gap can be a common feature of

every society regardless of individualist or collectivist orientation (Realo, Allik, & Vadi, 1997), but in Turkish households these differences in ideas are openly expressed and sometimes create conflictual relations (Yavuz & Özmete, 2012). In prior research (essentially using FB alone), conflict in family relations have been found to foster ToM understanding, arguably because they make the presence of multiple different views visible (Dunn, et al., 1991; Dunn & Slomkowski, 1992; Foote & Holmes-Lonergan, 2003). Therefore, children's observations of and interactions with family members, who differ from one another in their beliefs and behaviors, may lead to achievement of DB earlier than KA. This sort of reasoning may well explain our findings that living in a large household could accelerate mental-state understanding in the younger age of children showing an individualist acquisition pattern (DB>KA) compared to showing a collectivist acquisition pattern (KA>DB).

It is also important to highlight that while number of adults at home related to shifts in ToM acquisition order--probably by making the presence of multiple views more apparent and facilitating insights about diverse beliefs--it was linked with lower total ToM scores. This result might reflect the overall quality of relations and emotional climate within households. Although multiple viewpoints can become visible in multi-generational, crowded households, by hypothesis expressing them openly can create stress, tension and negative affect and so increase emotional tension and conflict. Conflictual emotional relations might negatively influence the general mental state understanding skills of children. In support of this hypothesis, studies consistently show that children exhibit lower social (Evans et al., 2005) and cognitive performance (Petrill, Pike, Price, & Plomin, 2004) in families where expression

of negative emotions and conflicts are commonly seen. Mental state understanding might similarly be subject to the negative impact of such a family atmosphere.

Despite the strengths of our study, such as its large diverse sample and its consideration of culture as based on SES and family constellation, our research is not without its limitations. As noted earlier, we did not directly measure families' endorsement of individualist versus collectivist values nor the associated parenting practices which could mediate different ToM acquisition patterns within the same cultural atmosphere. These are both important projects for future research in order to better grasp the relation between culture and progression of ToM.

Moreover, our study did not include a measure of children's verbal skills. Children's verbal abilities have often been found to be linked with their ToM performance (Dunn et al., 1991; Taumoepeau & Ruffman, 2006). Those with higher language skills tend to better understand the subjective mental states of others perhaps because words, especially mental state terms, highlight the connection between abstract mental states and observable behavior, thereby facilitating children's insight about others' minds. Indeed, multiple aspects of children's language skills impact their theory-of-mind performance (as reviewed in the meta-analysis of Milligan, Astington, & Dack 2007, with regard to false belief performance). Future studies investigating the relation between theory of mind sequences and cultural differences would do well to include measures of children's language skills. Differences in verbal skills might also help explain the girls' higher performance that we observed in their total ToM scores in the current study.

In sum, a handful of previous studies examining cultural influences on ToM understanding argued that cultural norms associated with individualism and collectivism (independence vs conformity) can determine parents' socialization, interaction and conversation styles with their children and thus give rise to specific mental state acquisition sequences. Our data extend these prior results by adding a different cultural context--Turkey--to this small prior dataset; by examining in one study a large sample (264 children) from five different cities rather than smaller samples collected in one locale, and by including examination of crucial socio-cultural factors such as SES and family configuration beyond country of residence alone. Moreover, our analyses suggested that in cultures within countries like Turkey, where elements of individualism and collectivism are blended, children can come to different orders of acquisition in accord with recent arguments that cultural development often represents a coexistence of different reasoning styles. Our findings thus extend current understandings and set the stage for more informative future research.

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Table 1

Demographic characteristics of children and their families (N = 260)

Variable	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
Age of the child (in months)	53.36	10.37	34	80
Number of older siblings	.41	.62	0	3
Number of younger siblings	.14	.36	0	2
Number of adults	2.45	0.99	1	7
Mother education	6.64	2.90	1	10
Father education	6.62	2.74	1	10
Monthly household income	4.46	1.67	1	7
SES (<i>z</i> score)	.00	.81	-2.07	1.46

Table 2: *The Theory-of-Mind Scale Items*

Task	Brief Description
1. Diverse Desires (DD)	Child judges that two persons (the child vs. the doll) have different desires about the same object: e.g., one likes carrot the other does not.
2. Diverse Beliefs (DB)	Child judges that two persons have different beliefs about the same object, <i>when the child does not know which belief is true or false</i> : e.g. one thinks a ball is in the bushes and the other thinks it is in the garage.
3. Knowledge-Access (KA)	Child judges another person's ignorance about the contents of a container when child knows what is in the container: e.g., child knows the box hides a toy dog, but child judges another person (who has never seen inside) does not know what's there.
4. False Belief (FB)*	Child judges another person's false belief about what is in a distinctive container when child knows what is in the container: e.g. child knows a crayon box, has pencils inside, but judge someone else who has never seen inside thinks it has crayons.
5. Hidden Emotion (HE)	Child judges that a person can feel one emotion but display a different emotion: e.g. character feels sad but can look happy on his face.

* Other false belief tasks can be used. For several reasons (see Wellman & Liu, 2004)
Contents False Belief is the task included in the standard 5-step scale.

Table 3

Zero order correlations and partial correlations after age is controlled (N = 260)

Variables	2	3	4	5	6
1. Age	.47***	.10	.21**	.12	-.33***
2. ToM score	-	-.01	.20**	-.10	-.09
3. Number of older siblings	-.06	-	-.19**	.12	-.12
4. Number of younger siblings	.12	-.22**	-	.18**	-.05
5. Number of adults	-.18**	.11	.16*	-	-.19**
6. SES	.08	-.10	.02	-.16*	-

Note: Zero-order correlations are presented above the diagonal, and partial correlations are presented below the diagonal.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 4

Hierarchical regression analysis predicting ToM score from age, gender and number of adults (N = 223)

	Step 1			Step 2			Step3		
	<i>B</i>	<i>SE</i>	β	<i>B</i>	<i>SE</i>	<i>B</i>	<i>B</i>	<i>SE</i>	β
DV: ToM scale score									
Age	.05	.01	.48***	.05	.01	.47***	.05	.01	.49***
Gender				-.25	.13	-.11	-.24	.13	-.11
Number of adults							-.18	.07	-.15**
R^2		.23			.24			.27	
<i>F</i> for change in R^2		66.37***			3.36			7.06**	

Note. *** $p < .001$. ** $p < .01$. * $p < .05$. Gender: girls were coded as 0; boys were coded as 1.

Table 5

Percentages of children passing each item in ToM scale (N = 260). Item Measurement

Summary and Fit Statistics for the Five-Item Rasch Model.

ToM scale items	N	(%)	Measurement	Error	Infit	Outfit
Diverse Desire (DD)	214	82.3	0.72	0.20	-1.0	1.3
Knowledge Access (KA)	204	78.5	1.10	0.19	0.1	0.3
Diverse Belief (DB)	165	63.5	2.28	0.16	0.4	0.9
False Belief (FB)	63	24.2	5	0.19	-0.6	-0.1
Hidden Emotion (HE)	49	18.8	5.53	0.21	0.1	0.7

Note: N and % show the count and percentages of children passing each item in the ToM scale (N = 260). The five items are ordered from least difficult (highest percent correct and lowest measurement score) to most difficult. Measurement scores are presented in arbitrary units derived from the Rasch analysis and indicate item difficulty. As explained in the text, these scores were rescaled so that False Belief (arbitrarily considered as the anchor task of the five tasks) had an item difficulty measure score of 5.0 on the linear scale. Error is the standard error for that difficulty measure. Infit and outfit are the standardized fit statistics for that item as explained in the text.