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## Family context of low-income young children and their self-regulation in the United States and Turkey

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### ABSTRACT

The current study examines the contributions of family context (e.g. life events, home environments) to low-income preschool children's self-regulation (behaviour regulation and executive function) in the United States and Turkey. Participants were 1139 low-income children (486 from the U.S. and 653 from Turkey) and their parents. Children's self-regulation was assessed via structured tasks and family related variables such as life events, home environments, and demographic information were assessed via parent-report. Results from regression analyses showed that child's age-predicted behaviour regulation and executive function in children both from the U.S. and Turkey. Child gender, favouring girls predicted behaviour regulation and executive function and parent-child verbal interaction was associated with behaviour regulation only in the U.S. Family structure (favouring living in a two-parent household) predicted executive function and economic change predicted behaviour regulation in Turkey. Contributions and future directions were also discussed.

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Self-regulation; American children; Turkish children; family context; early childhood

## Introduction

Self-regulation in early childhood is an important foundational skill that consists of behaviour regulation, cognitive skills, and emotion regulation. Self-regulation develops through interactions with the environment during early years (Kochanska, Coy, & Murray, 2001; McClelland, Cameron, Wanless, & Murray, 2007). Family context as an environment where children grow has been shown to be associated with development of children's self-regulation (Li-Grining, 2012; Størksen, Ellingsen, Wanless, & McClelland, 2015). For example, the context of the family environment (e.g. parents' child-raising styles, activities between parent and the child, and life changes that occur in the family) as a first social and physical setting for children, have been linked to self-regulation (Bernier, Carlson, & Whipple, 2010). We know that each family context differs depending on their cultural and familial norms, which in turn influences children development including self-regulation (Acar, Uçuş, & Yıldız, 2017; Leyva & Nolivós, 2015). Furthermore, heterogeneities in self-regulation of children found in previous studies have been attributed to differences in expectations of parents for children in different cultures, cultural background, heredity, the status of secure attachment to mother, relations with adults and life experiences within the family context (Boyer, 2013; Kochanska, Philibert,

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& Barry, 2009; Wanless, Wanless et al., 2011). However, to our knowledge, comparative studies that investigate the contributions of the family contexts in different cultures are limited. To address this paucity, we aimed to examine the associations between family context (i.e. the activities held at home, utilized materials, interactions in the family, and the life events within family) and low-income preschool children's self-regulation in Turkey and the United States (U.S.).

### **Self-regulation in early childhood**

Self-regulation is a building block of the early childhood period, affecting social, emotional, language and motor development. Experiences gained in this period support development of complex organizational skills in the prefrontal cortex of the brain, such as reasoning, suppression of impulses, and decision making (Tarullo, Obradovic, & Gunnar, 2009). Self-regulation is defined as the emotional management, focus and attention skills of a child, used to control her/his physical, emotional, and cognitive functions (Shonkoff & Phillips, 2000). These skills help children to control emotions and thoughts, internalize social rules, and realize target-driven actions by delaying immediate satisfaction (Blair, Ursache, Greenberg, & Vernon-Feagans, 2015). Children who have better self-regulation in early childhood adapt to school easily and are academically successful (McClelland & Tominey, 2011; Posner & Rothbart, 2009). Thus, early childhood period is critical for supporting and improving self-regulation of children.

Children's reactions to their environment begin from the birth and become further developed throughout early childhood. For instance, a crying baby learns to be calmed or to have a need fulfilled by a caregiver. These reactions show that behaviours related to self-regulation appear starting from infancy (Bonnett & Maich, 2014). Children later begin to evaluate their own responses and compare them with an adult's responses (Bronson, 2000). Self-regulating of children between 3 and 5-years-old improve quickly (Karreman, van Tuijl, van Aken, & Deković, 2006; McClelland et al., 2007). In this age range, children learn to follow classroom rules and control their impulses to comply with the stimuli in the environment (Garner & Waajid, 2012). Preschool children who were able to control their impulses had better literacy and mathematics skills, school adaptation skills, and emotional control as compared to their peers who had difficulty in controlling their impulses (Blair & Razza, 2007; Valiente, Lemery-Chalfant, & Swanson, 2010; von Suchodoletz, Trommsdorff, Heikampa, Wieber, & Gollwitzer, 2009).

In early childhood, children begin to gain advanced skills required for self-regulation by focusing their attention on one stimulus and shifting attention to another direction as needed. In addition, children learn to control their impulsive behaviours in their relationships with people at home, at school, and in their neighbourhood (McClelland et al., 2007). As children develop self-regulation through interactions with their environment, the factors in their environment, as well as their own characteristics such as gender and age, influence their self-regulation. From this point of view, aligned with the purpose of the current study, next sections will provide information pertaining to child demographics and family context, and how these constructs are related to children's self-regulation.

### **Family context and child self-regulation**

In the current study, family context in early childhood refers to physical and social context where children and parents interact. The home environment as part of the family context appears to consist of intertwined components such as caregiver behaviours, materials, and events that constitute the environment the child experiences. Variations in components of the home environment, such as the parent-child interactions (Tamis-LeMonda, Bornstein, & Baumwell, 2001) and the presence of cognitively stimulating materials and activities (Bradley, Corwyn, McAdoo, & Coll, 2001) have been shown to be repeatedly associated with children's development in the previous research (Beauchaine, Webster-Stratton, & Reid, 2005; Velderman et al., 2006). Although there have been studies examined the variations of home context across racial and ethnic groups in the United States (Bradley et al., 2001), examinations of cross-cultural differences of home context and how it

contributed to child self-regulation are far from being completely unravelled. This study adds to the literature by examining these construct in two cultural contexts; the U.S. and Turkey.

Activities, materials, and interactions in the home that pertain to children's language, vocabulary, and literacy development (e.g. book reading, books available in the home, and talking to children) have been found to predict children's language development in low-income samples in the U.S. (Pan, Rowe, Singer, & Snow, 2005; Raikes et al., 2006; Rodriguez et al., 2009). In addition, in the U.S., researchers have shown the link between children's early language skills and their abilities to self-regulate (Müller, Zelazo, Lurye, & Liebermann, 2008; Vallotton & Ayoub, 2011). Specifically, mothers' verbal interaction with their children in the form of scaffolding at the age of three has been shown to indirectly influence the executive function at the age of six through directly influencing children's language and nonverbal problem-solving skills at the age of four (Landry, Miller-Loncar, Smith, & Swank, 2002). Despite the fact that the associations between home context and the self-regulation are clear in the American children, the paucity of research examining these constructs still present in Turkey. For this reason, the current study aimed to address this gap and contribute to the existing cross-cultural literature.

As a second component of the family context in the current study, family structure has been operationalized from different perspectives (e.g. Lerman, 2002). We operationalized the meaning of family structure in the current study as whether two parents were together or single-parent households based on the previous conceptualizations (Gibson-Davis & Gassman-Pines, 2010). Previous research has shown that family structure matters for child outcomes such that when there are both parents at home context, parents would have more chance to interact with children as they share tasks within the family as compared to single-parent household, albeit this depends on parents' cultural, financial, and health status (Beck, Cooper, McLanahan, & Brooks-Gunn, 2009; Gibson-Davis, 2008). From this perspective, we aimed to examine whether family structure as part of the family context matters for children's self-regulation in two different cultural contexts.

### ***Family context within culture and children's self-regulation***

Children's self-regulation develops through interactions with their environment. Cultural norms and values shape parenting behaviours, in turn, parenting behaviours shape children's development including their self-regulation (Trommsdorff, 2009).

The cultural context of parents informs how they approach child rearing practices (Votruba-Drzal, 2003). Overall, previous studies demonstrated that home environment and family dynamics shaped through cultural context matter for children's developmental trajectories and outcomes (Biedinger, 2011; Bradley & Corwyn, 2005; Edwards, Sheridan, & Knoche, 2010; Votruba-Drzal, 2003).

In short, culture may have an impact on child-rearing practices and consequently on child outcomes. As such, parents in the U.S. rear their children in a way that based on the promotion of the child's independence, confidence, assertiveness, and sense of self-identity (Rubin & Chung, 2006). Alternatively, Kâğıtçıbaşı (1984) emphasized that children are encouraged to be dependent on the family, obedient and compliant to parents' authority in Turkish culture. Although Turkish culture has undergone tremendous change in the last three decades (Kagitcibasi & Ataca, 2005), interdependence values are still valued and utilized in child development, particularly in low socio-economic status families (Kagitcibasi, 2007). Nevertheless, Turkish culture reserves both individualistic (e.g. autonomy, self-reliance) and collectivistic cultural values (e.g. obedience, gratefulness) within itself and reflect these values in their approaches to child development, including self-regulation (Sen, Yavuz-Müren, & Yagmurlu, 2014).

### ***Demographic characteristics and self-regulation in early childhood***

Children's demographic factors such as child's age, mother's educational level and child's gender are related to their self-regulation (McClelland & Tominey, 2011; Miech, Essex, & Goldsmith, 2001;

Wanless et al., 2011). For instance, the development of self-regulation has been found to be related to age of the child such that older children demonstrate better self-regulation than younger children (von Suchodoletz et al., 2013). In addition, child's gender is also related to self-regulation, but this relation varies depending upon where the study is conducted. Studies conducted in the Western countries show that girls get higher scores compare to boys (Matthews, Ponitz, & Morrison, 2009; Weis, Heikamp, & Trommsdorff, 2013). But in the cross-cultural research conducted in different countries while girls receive significantly higher scores in behaviour regulation in the Western sample, there were no significant differences between girls and boys in the samples of other countries (von Suchodoletz et al., 2013). Another group of studies demonstrates no significant differences between girls and boys in the direct measurement of self-regulation skills, but girls receive higher scores in adult-reported measurements (von Suchodoletz et al., 2013; von Suchodoletz, Trommsdorff, & Heikamp, 2011). In the light of the results of these studies, we aimed to control for these demographic information and see whether they are in line with the findings from the previous studies.

### **The present study**

The main purpose of the current study was to examine the contributions of family context (e.g. life events, home environments) to low income preschool children's self-regulation (behaviour regulation and executive function) in the U.S. and Turkey. This comparative study has an importance in terms of extension of the results from previous studies and examining whether family context is related to children's self-regulation depending on cultural context. To fulfil our research purpose, we addressed the following research questions: 1 – Are there self-regulation (behaviour regulation and executive function) differences between American and Turkish Children? 2 – Are experiences of economic changes, parents' verbal interaction with children, and family structure associated with children's self-regulation (behaviour regulation and executive function)?

## **Methods**

### **Participants**

We followed similar ways of recruiting participants in both counties. In the U.S. children and their parents from Educare programmes in two Midwestern cities were recruited. Educare programmes serve children from economically disadvantaged households. In Turkey, we recruited participants from state-funded schools serving mostly disadvantaged children. We had 486 (55.5% male) from the U.S. and 653 (50.3% male) children and their parents from Turkey. Average age for the U.S. children was 49.58 months ( $SD = 7.0$ ) and 65.91 months ( $SD = 7.16$ ) for Turkish children. See Table 1 for detailed demographic information about participants.

### **Measures**

#### **Self-regulation (behaviour regulation and executive function)**

We used five tasks from the Preschool Self-Regulation Assessment (PSRA; Smith-Donald, Raver, Hayes, & Richardson, 2007) and Carlson (2005). Tasks tapping executive function/control were balance beam, pencil tap, and tower task; and tasks tapping behaviour regulation or impulse control was snack delay and gift wrap. This twofold conceptualization was operationalized by following previous research (e.g. Denham, Warren-Khot, Bassett, Wyatt, & Perna, 2012; Kochanska, Murray, & Harlan, 2000; Smith-Donald et al., 2007). Turkish validation of the PSRA was conducted by Findik Tanribuyurdu and Güler Yildiz (2014). This battery of tasks has been used with Turkish and American children in previous research (see Acar et al., 2018). See descriptive statistics of executive function and behaviour regulation in Table 2 for each county. Each task was

**Table 1.** Child and parent demographic information.

Demographic variable	U.S. ( $n = 486$ ) $M$ (SD)	Turkey ( $n = 653$ ) $M$ (SD)	Whole sample ( $N = 1139$ ) $M$ (SD)
Child's age* (months)	49.58 (7.0)	65.91 (7.16)	59.23 (10.71)
Child's gender (male)	55.5%	50.3%	52.1%
Caregiver's age* (years)	30.05 (5.98)	33.50 (7.64)	32.39 (7.33)
Caregiver's education*			
Finished elementary	18.9%	49.7%	34.3%
Finished high school	56%	33.9%	44.9%
Finished college	25.1%	16.5%	20.8%
Family structure			
Two parent	28.8%	83.5%	
Single parent	24.5%	4.3%	
Other	46.7%	12.3%	

Note: \*Indicates a significant difference between the U.S and the Turkey group,  $p < .05$ .

implemented by a trained research assistant in both counties individually with each target child. Interrater reliability among raters was assessed via using intraclass correlation (ICC) (Shrout & Fleiss, 1979). ICC across tasks was found as .75 for Turkish raters and .92 for the U.S raters, indicating acceptable reliability among raters.

### *Life events (economic change)*

Using responses from the Educare Parent Interview Form, we conducted principal components analysis to identify and create a composite score for the factor we were interested in which was the experience of economic change. Initial eigen values showed that the first three factors account for 14%, 8%, and 8% of the variance, respectively. Only the third factor was selected as the first two factors did not concern economic changes. Two items with the highest loadings were selected, having a primary factor loading of .6 or above. These items are: Has there been a substantial change in your income?; Has there been a change in your partner's work (new job, lost jobs, new location)? The sum of the two items was used as the composite economic change score, with higher score indicating more economic changes.

### *Home environments (home talk)*

Items tapping children's verbal interaction at home from the Home Observation for Measurement of the Environment (HOME; Caldwell & Bradley, 1984) were chosen. Parents reported on items in this scale as part of their parent interview in both countries. The HOME has been validated and used in Turkey with preschool-age children (Baydar, Küntay, Göksen, Yagmurlu, & Cemalçilar, 2010). Three items (e.g. described what child is experiencing, talked during errands, talked about school) in total were chosen. Internal consistency of this scale for Turkey was .51 and for the U.S. was .59.

### *Demographic information*

Parents from both countries reported on their education level, family structure, their child's age and gender.

**Table 2.** Descriptive statistics of the variables in the study.

Variable	U.S.	Turkey	Whole Sample	Min	Max	Scale range
	( $n = 486$ ) $M$ (SD)	( $n = 653$ ) $M$ (SD)	( $N = 1139$ ) $M$ (SD)			
Executive function	-.0015 (.68)	.0011 (.69)	.0000 (.69)	-2.09	3.22	
Behaviour regulation	-.0027 (.77)	-.0037 (.69)	-.0033 (.72)	-3.99	.78	
HOME talk*	6.64 (1.97)	4.60 (2.19)	5.47 (2.33)	0	9	0-9
Economic changes*	.56 (.69)	.46 (.63)	.50 (.66)	0	2	0-2

\*Indicates a significant difference between the U.S. and the Turkey group,  $p < .05$ .

## Data collection procedures

After obtaining the University Institutional Review Board approval for ethical considerations for the study in both countries, parallel data collection procedures were followed in both countries. Parents were given parent interview questionnaires in fall in the U.S. and spring in Turkey. Training for the self-regulation tasks was standardized across the Turkish and U.S. data collections. Two assessors tested each child. As one implemented the task, another one timed and scored.

## Data analysis

We first conducted univariate analyses for the whole sample and for each country (see Table 1). We also ran correlations of the variables for the whole sample and for each country to see possible similarities and differences in terms of relations among the variables. We also conducted one-way multivariate analyses of variance (MANOVA) to examine whether there are significant differences between the two groups. Finally, using the Statistical Package for the Social Sciences (SPSS; IBM Corp. Released, 2013), we ran a series of regression analysis for each group to examine how the variables of interest related to children's executive functioning and behaviour regulation.

## Results

Table 1 shows the demographic information for the sample and Table 2 shows the descriptive statistics of the variables in the study. Results from MANOVA analyses showed that children from the U.S. were significantly younger than their Turkish counterpart,  $F(1, 759) = 961.79, p < .001$ . Caregivers from the U.S. were also significantly younger,  $F(1, 799) = 40.59, p < .001$ , and had higher education levels,  $F(1, 869) = 68.29, p < .001$ , compared to their Turkish counterparts.

In addition, caregivers from the U.S. also reported a more frequent conversation with their children,  $F(1, 1012) = 236.23, p < .001$ , and also experience more economic changes,  $F(1, 1008) = 5.897, p < .05$  compared to the Turkish sample. The two groups did not differ in terms of executive function and behaviour regulation scores.

The correlations among the variables for the whole sample are presented in Table 3. Child's age and gender were positively correlated with both executive function and behaviour regulation. In addition, the experience of economic changes was positively correlated with executive function. Table 4 shows that the patterns of correlations differed for the two groups on several variables. For example, for the U.S. group, child's age, gender, the experience of economic change, and talking with the child were positively correlated with executive function. For the Turkey group,

**Table 3.** Correlations among study variables for the whole sample.

Variable	1	2	3	4	5	6	7	8	9
1. Executive function	–								
2. Behaviour regulation	.345**	–							
3. Child's age	.235**	.154**	–						
4. Child gender	.092*	.104*	.027	–					
5. Caregiver's age	–.068	–.047	.172**	.012	–				
6. Caregiver's education	.088	–.082	–.291**	.007	–.080*	–			
7. Family structure	–.023	.039	–.417**	.024	–.063	.135**	–		
8. HOME talk	.075	.036	–.367**	.032	–.158**	.251**	.219**	–	
9. Economic changes	.132**	.072	–.048	–.033	–.106**	.029	.143**	.081*	–

Note: Child gender and family structure were dummy-coded (1 = male, 2 = female; 1 = two-parent household, 2 = single-parent household).

\* $p < .05$ .

\*\* $p < .01$ .

**Table 4.** Correlations among study variables for the U.S. and Turkey samples.

Variable	1	2	3	4	5	6	7	8	9
1. Executive function	–	.253**	.315**	.053	–.157**	.073	–.234**	.053	.129*
2. Behaviour regulation	.459**	–	.194**	.046	–.074	–.048	–.046	–.010	.140**
3. Child's age	.413**	.306**	–	–.021	–.069	–.244**	–.105*	–.118*	.036
4. Child gender	.154*	.187**	.003	–	.022	.037	–.029	.070	–.016
5. Caregiver's age	.081	–.007	.116	–.059	–	.051	.173**	–.047	–.073
6. Caregiver's education	.115	–.130	–.031	–.016	.021	–	–.022	.222**	–.036
7. Family structure	.113	.114	–.067	.156*	–.057	.052	–	–.049	.047
8. HOME talk	.168*	.129	.014	.034	–.171**	.064	.076	–	.059
9. Economic changes	.141*	–.005	.041	–.049	–.128*	.047	.168**	.049	–

Notes: Child gender and family structure were dummy-coded (1 = male, 2 = female; 1 = two-parent household, 2 = single-parent household). Below the diagonal shows correlations for the U.S.; above the diagonal shows correlations for Turkey.

\* $p < .05$ .

\*\* $p < .01$ .

\*\*\* $p < .001$ .

child's age was positively correlated with executive function, and caregiver's age family structure was negatively related to executive function. In addition, for the U.S. group, only child's age and gender were significantly related to behaviour regulation whereas, for the Turkey group, child's age and experience of economic changes were positively related to behaviour regulation.

### Regression analyses

Regression analyses revealed similar and different patterns of associations among the predictors (child age and gender, caregiver age and education level as covariates talking with children-home talk-, and family structure, economic change-life events-) and the two outcome variables between the two countries. We first analysed executive function scores as the dependent variable. For the U.S. group, the regression model was significant,  $F(6,199) = 10.630$ ,  $p < .001$ , with the independent variables accounting for 24.3% of the variance in executive function scores ( $R^2 = .243$ ). Results showed that gender ( $B = .207$ ,  $\beta = .149$ ,  $p < .05$ ) and child's age ( $B = .516$ ,  $\beta = .419$ ,  $p < .001$ ) were positively associated with executive function, meaning girls and older children had higher executive function scores. Talking with children was significant at trending level, ( $B = .045$ ,  $\beta = .118$ ,  $p = .058$ ), suggesting that talking with children more often was associated with children's higher executive function scores. For the Turkey group, the regression model was also significant,  $F(6,304) = 9.106$ ,  $p < .001$ , with the independent variables accounting for 15.2% of the variance in children's executive function ( $R^2 = .152$ ). We found that child's age was positively associated with executive function ( $B = .359$ ,  $\beta = .065$ ,  $p < .001$ ) and family structure was negatively associated with executive function ( $B = -.664$ ,  $\beta = -.180$ ,  $p < .05$ ), demonstrating living in a two-parent household was associated with higher executive function scores. Experience of economic changes was significant at trending level ( $B = .110$ ,  $\beta = .102$ ,  $p = .055$ ), suggesting that experience of more economic changes was associated with the higher executive function.

Next, we examined the predictor variables associated with behaviour regulation in two groups. For the U.S. group, the regression model was significant,  $F(6,199) = 8.946$ ,  $p < .001$ , with all the predictor variables accounting for 21.2% of the variance in behaviour regulation scores ( $R^2 = .212$ ). Child gender ( $B = .249$ ,  $\beta = .157$ ,  $p < .05$ ), age ( $B = .531$ ,  $\beta = .376$ ,  $p < .001$ ), and talking with the child ( $B = .059$ ,  $\beta = .028$ ,  $p < .05$ ) were all positively associated with behaviour regulation, such that females, older children, and talking to children more often were positively associated with higher behaviour regulation scores. For the Turkey group, the regression model was also significant,  $F(6,304) = 3.173$ ,  $p < .005$ , and the combination of the independent variables accounted for 5.9% of the variance in behaviour regulation scores. Child's age ( $B = .203$ ,  $\beta = .173$ ,  $p < .005$ ) and experience of economic changes ( $B = .136$ ,  $\beta = .131$ ,  $p < .05$ ) were positively associated with behaviour regulation.



## Discussion

The main aim of this research was to compare the associations between family context and young children's self-regulation in Turkey and the U.S. As we expected, regression analyses from the current study revealed that there are contributions of family context factors to children's self-regulation in both cultures. In Turkey, and economic change was associated with BR family structure was associated with EF. In the U.S. sample, the patterns were different such that child gender was associated with both EF and BR, and parent talking to children was associated with BR. In addition, we found that there were cultural differences in the ability of our independent variables to predict outcomes (EF and BR). That the independent variables accounted for more variance in both EF and BR for the U.S. sample compared to the Turkish sample suggesting that there may be more substantial predictors of EF and BR in the Turkish context that should be explored in future studies.

Another finding worth discussing is that family structure mattered for Turkish children's EF. Such that children with two-parent households scored higher on EF than children with single-parent households. This could be explained by the notion that reciprocal interactions with caregivers and child have impact on trajectories and development of executive function (Rochette & Bernier, 2014). Having two parents at home may provide better resources in terms of social and cognitive stimuli as these resources could easily be allocated as needed, which in turn provides a quality environment for the development of children's executive function. Single parents, on the other hand, may struggle providing higher quality and stimulating environment by which children immensely benefit. This finding aligns with previous research (Rhoades, Greenberg, Lanza, & Blair, 2011; Sarsour, Sheridan, Jutte, & Nuru-Jeter, 2011) showing that increment probabilities of being poor, having a single mother, having a teen parent, having a mother with mood problems, being exposed to high stress and low social support while scaffolding children's outcomes and functioning.

In the Turkish sample of the current study, experiencing more economic changes was positively associated with higher executive functioning. Previously, studies found that economic levels of families have an effect on the holistic development of children and their socialization in Turkish context (Baydar et al., 2014). Families with a higher economic income level may prepare their children for life by providing good nutrition and health care as well as qualified educational and social environments (Conger & Dogan, 2007). Living in a low-income households may undermine family-child relationships and cognitive development of children (Kagitcibasi, 1999). One study involving from different regions of Turkey showed that economic level of a family directly affected the cognitive development of a child (Bekman & Aksu-Koç, 2009). This finding supports the idea that the economic level of parents has a positive relationship with executive function, which is considered a cognitive self-regulation process.

In the U.S., parents talking to their children showed a significant association with BR and statistically trending positive association with children's EF. This results in line with previous studies conducted in the U.S. using the HOME measurement tool (Bradley et al., 2001) such that parental verbal stimulation was associated with sustained growth in inhibitory control and cognitive flexibility (while controlling for baseline EF; Clark, Carlson, Zelazo, & Faja, 2013). Overall, children's language development facilitates self-reflection and intentional control of impulsive responses (Hammond, Müller, Carpendale, Bibok, & Liebermann-Finestone, 2012) particularly when the parents' verbal engagements encourage the child's opinions, choices, decisions, and problem solving (Matte-Gagne & Bernier, 2011).

Similarity in patterns between the two cultures was also found such that child age was associated with both EF and BR in the U.S. sample as this was also true for the Turkish sample. This finding is congruent with the previous studies showing that older children scored higher in self-regulation (Zhou et al., 2008). General trend in the findings is that children score higher on self-regulation skills as they get older due to cognitive and behavioural maturation (Zhou et al., 2008). It was also notable how child gender was significantly associated with both EF and BR for the U.S. sample, and this finding aligns with the existing studies showing that girls demonstrated higher scores in

tasks related to self-regulation (Matthews et al., 2009; Størksen et al., 2015; Weis et al., 2013). Interestingly, child gender was not significantly associated with EF and BR in the Turkish context. This was not, however, a surprising finding because previous research examining the differences of gender on Turkish children's EF showed mixed findings. For example, Etel and Yagmurlu (2015) found that there were no significant gender differences on executive function of children (when age was controlled) measured by day–night and peg-tapping tasks. In another study, authors found that girls scored higher on emotion regulation (assessed by parents and teachers) than boys did during preschool years (Yagmurlu & Altan, 2009). It appears that the mixed findings on this matter come from measurement-type and age differences. Considering the Turkish children were relatively older than the U.S. children, and we used performance-based EF tasks, our results align with the findings from the previous research done by Etel and Yagmurlu (2015) in Turkish context.

Considering results from the current study and the importance of self-regulation in the early childhood regarding children's school readiness (Hamre & Pianta, 2001; McClelland, Acock, & Morrison, 2006), and that environmental factors have impacts on the self-regulation (Blair, 2010; Blair & Raver, 2012), family oriented programmes should be applied to improve parents' ability to interact with their children effectively in both cultures especially for low-income families. In addition, researchers from these cultures should develop intervention programmes which aim to improve positive parent–child relationship that may have positive impacts and decrease possible negative impacts of life changes and economic situations of families on children's self-regulation skills in early childhood.

### **Limitations**

The present study has some limitations. For instance, ratings of home environment and life events were obtained by parent self-report; this method may create bias on HOME scores. To prevent this bias, future research should use multi-method techniques such as observations of home environment of children and their relationship with their parents to obtain more objective information. Although this study provides insights about how the family context of low-income children is related to their self-regulation in cross-cultural context, the interpretation of the findings remains limited, especially about the economic change in family. One suggestion for this incapability is to conduct mixed-methods research to interpret the findings better by obtaining parents' opinions and explanations within and between the cultures.

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### **Disclosure statement**

No potential conflict of interest was reported by the authors.

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