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The Role of Home Experience in Children's Executive Function Skills

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THE ROLE OF HOME EXPERIENCE IN CHILDREN'S EXECUTIVE FUNCTION SKILLS

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Metaferia, B. K., Futo, J., Drew, R., & Takacs, Z. K. (2020). Parents' Beliefs About Play and the Purpose of Preschool Education, Preschoolers' Home Activity and Executive Functions. *Front. Psychol*, *11*(1104), 1–11. https://doi.org/10.3389/fpsyg.2020.01104

Metaferia, B. K., Futo, J., & Takacs, Z. K. (2021). Parents' Views on Play and the Goal of Early Childhood Education in Relation to Children's Home Activity and Executive Functions: A Cross-Cultural Investigation. *Front. Psychol.*, *12*(646074). https://doi.org/10.3389/fpsyg.2021.646074

[1] The co-authors of the listed publications have contributed to the use of the publications in my dissertation.

Foreword

Early childhood is known for the important developmental improvement of executive function (EF) (Carlson, 2005; Fay-Stammbach et al., 2014). A growing body of literature underlines that well-developed EF during this period of life is associated with better school readiness skills, including math, science, language, social, and emotional competence (Bull, Espy, & Wiebe, 2008; Nayfeld, Fuccillo, & Greenfield, 2013; Ponitz, McClelland, Matthews, & Morrison, 2009), and early school achievement (Blair & Razza, 2007; McClelland et al., 2007). On the other hand, poor mastery of EF skills in the early period of life has been allied with problems like developmental psychopathology (Pennington & Ozonoff, 1996), physical aggression (Séguin & Zelazo, 2005) and school readiness problems and academic difficulty (Blair, 2002; Diamond, 2007).

On top of biological maturation, a number of factors contribute to the development of EF (Blair, 2006; Cicchetti, 2002; Vernon-feagans, Willoughby, & Garrett-peters, 2016). A culture in which a child grows is among the important factors associated with variation in the development of EF. A cross-cultural comparison of children from Eastern and Western cultures, for instance, demonstrated that children from Eastern culture typically outperform their Western counterparts on EF tasks (Grabell et al., 2015; Lan et al., 2011; Charlie Lewis et al., 2009; Oh & Lewis, 2008; Sabbagh, Xu, Carlson, Moses, & Lee, 2006). However, the cross-cultural comparisons of EF skills so far have predominantly been limited to children from the East and West. This dissertation, thus, is believed to be one of the first efforts to enrich the literature in these areas by comparing samples highly underrepresented in the literature: Ethiopia and Hungary.

Moreover, children's home experience factors such as socioeconomic status (Noble et al., 2005; Sarsour et al. 2011), parent-child relationships and interaction (Bernier et al., 2012; Bernier et al., 2010; Blair et al., 2014; Rhoades et al., 2011; Valcan, Davis, & Pino-Pasternak, 2017), and parental scaffolding (Bernier et al., 2010; Hammond et al., 2012; Hughes & Ensor, 2009) are also among the important environmental variables connected to developmental differences in EF in early childhood. There are also findings (e.g., Berk & Meyers, 2013; Pierucci et al., 2014; Thibodeau et al., 2016) demonstrating the positive contribution of participation in pretend play to EF skills during early childhood. In the current literature, however, it seems that forms of play other than pretend play (e.g., peer play, solitary play, motor play) as well as various experiences of children at home (such

as engagement in academic-related activities, arts and crafts activities, motor activities, and sports and physical activities, and spending mealtime with family) get little attention with respect to their contribution to the development of EF. To the best of our knowledge, no study has so far investigated the relationship between children's everyday home activities (which include both play and other experiences) and the development of their EF skills. In this regard, this dissertation is the first of its kind to investigate the contribution of these variables to the development of EFs. The incorporation of all of these home-related factors together into the current study allowed us to develop a more comprehensive picture of the role of children's home experiences in the development of their EF skills, including an examination of the relative importance of the experiences in EF development.

With respect to the role of play in child development, parents hold different views that range from perceiving play as predominantly amusement all the way to play as a vehicle for a range of developmental benefits to children (Farver & Howes, 1993; Fisher et al., 2008). A rising body of literature highlights the importance of parents' play beliefs in connection to their support and engagement in their children's play (see Ihmeideh, 2019) as well as creating play opportunities and arrange learning environments at their home (Farver & Wimbarti, 1995; Haight, Parke, & Black, 1997). Parents who place high value on the developmental importance of play are more likely to facilitate children's play by actively engaging in and encouraging play and supporting peer play (Farver & Howes, 1993; Farver, Kim, & Lee, 1995; Haight et al., 1997; Parmar, Harkness, & Super, 2004a). There is also literature supporting that parental engagement in their children's play, in turn, is associated with children's developmental benefits such as the attainment of prosocial behaviors (Putallaz, 1987), advancement in cognitive skills (Lin & Yawkey, 2013), and better skills at regulating emotions (O'brien & Md-Yunus, 2007).

Thus, the purposes of this dissertation were to examine the contribution of preschool children's home experiences (parents' play beliefs and preschoolers' home activities) in the development of their EFs in the context of Ethiopia and Hungary, and cross-culturally scrutinize the universality and specificity of the variables contributing to children's EF development in the two socio-cultural contexts. Moreover, the dissertation aimed at investigating parents' views about play and the goal of preschool education. The other purpose of the dissertation was to examine the cross-cultural variations in the frequency of preschoolers' home routines and EF skills.

This dissertation is prepared based on three studies jointly conducted with my supervisors. The dissertation is organized into five chapters. The first chapter is the general introduction that introduces the reader with important background information about the study. This part of the dissertation entertained contents such as meaning, components, and significance of EF; the influence of culture and other home experiences (both play and other home routines) in the development of children's EF. The introduction also shows the research/knowledge gap in the current literature that necessitates our investigations. The last part of the introduction addresses the purposes of the dissertation and the research questions answered by it.

Study 1 aimed at exploring the link between preschoolers' experiences at home (preschoolers' activities at home and their parents' play beliefs) and the development of their EFs with participants from Ethiopia. The result showed that parental play support and preschoolers' frequency of breakfast at home were found to be important predictors of children's inhibitory control skills, after controlling for their age and family SES. Besides, preschoolers' frequency of engagement in arts and crafts activities was found to be a small but significant predictor of their VSWM skills, after accounting for age and SES.

Study 2 was conducted to replicate and extend Study 1 findings with Hungarian participants. The result showed that, after controlling for children's age and SES, parental play support and preschoolers' frequency of participation in pretend play were found to be important home related variables associated with their inhibitory control skills. Moreover, preschoolers' frequency of participation in fine motor play was found to be an important predictor of their performance in the VSWM task, after accounting for age and SES. Study 2 also extended Study 1 by examining Hungarian parents' beliefs about the purpose of preschool education and the link it could have with their play beliefs. The result showed that Hungarian parents held the belief that social-emotional development and entertainment of preschoolers were the primary purposes of preschool education. However, no link was found between parental play and educational beliefs.

Study 3 was a cross cultural comparison between samples from Ethiopia and Hungary. The purposes of the study were to cross-culturally examine Ethiopian and Hungarian parents' beliefs about play and the purpose of preschool education, and preschoolers' home activities and EF skills, including inhibitory control, shifting, and visual-spatial

working memory. The study was also aimed at investigating cross-cultural variations in the links between preschoolers' home experiences and EF skills.

The result indicated that while Ethiopian parents viewed academic and cognitive development as the major goals of preschool education, Hungarians put social-emotional development and entertainment foremost instead. Also, preschoolers in Ethiopia engage in academic and arts and crafts activities after preschool significantly more often than their Hungarian counterparts. On the other hand, preschoolers in Hungary were found to participate in fine motor activities, solitary play, and sports and other physical activities significantly more often than their Ethiopian counterparts. We found no significant cross-cultural differences in EF skills between the two samples. The result also showed that preschoolers' frequency of participation in pretend play and parents' play support beliefs were found to be important predictors of children's inhibitory control skills in both samples, after accounting for their age and SES. However, preschoolers' frequency of breakfast at home was found to be an additional significant predictor of inhibitory control skills in the Ethiopian sample only. Preschoolers' frequency of engagement in arts and crafts and other fine motor activities were found to be significant predictors of their VSWM skills in the Ethiopian and the Hungarian samples respectively. The result also depicted that after controlling for SES, parental play support was an important factor predicting preschoolers' shifting skills only in the Hungarian sample.

All in all, this dissertation makes important contributions to the current literature on the cross-cultural investigation in the development of preschoolers EF, the role of children's home experience in the development of EF, and the beliefs parents hold about the importance of play in child development and the primary purposes of preschool programs. It focused on samples from two countries that are rarely researched in this field. Our results demonstrated that different experiences at home seem to have different effects on the components of EF. Moreover, there are common home experience related factors that influence the development of EF in different cross-cultural contexts, while the influence of some factors varies depending on a given socio-cultural context. This implies that the study of home experience related factors should always be conducted with the particular socio-cultural context in mind.

Chapter One

Introduction

1.1. Executive Function

Executive function (EF) refers to a top-down neurocognitive operations related to the deliberate, goal directed control and monitor of thought, action, and emotion (Zelazo & Carlson, 2012). This higher-order cognitive function is supported by developments in prefrontal cortical regions and associated networks (Bunge & Wright, 2007; Houdé, Rossi, Lubin, & Joliot, 2010; Rueda, Rothbart, McCandliss, Saccomanno, & Posner, 2005) and gives direction and guidance to lower-order brain functions (Stuss & Levine, 2002). In this regard, instead of being tied to specific cognition domains, EF is regarded as a meta-cognitive, supervisory, or regulatory system (Ward, 2020). Although the views regarding components of EF is diverse (Ackerman & Friedman-Krauss, 2017), it seems there is a broad consensus that it consisted of three main distinct yet interrelated elements: working memory, inhibitory control, and cognitive flexibility (Miyake et al., 2000; St Clair-Thompson & Gathercole, 2006).

Working memory (also called updating) is the ability to maintain a limited amount of information in mind for a brief time while making operation on it (Cantin, Gnaedinger, Gallaway, Hesson-mcinnis, & Hund, 2016; Diamond, 2012; Follmer & Follmer, 2017; Monette, Bigras, & Lafrenière, 2015). This important cognitive skill, which serves as a form of mental workspace for most cognitive processes (Fukuda et al., 2010), is vital for reasoning and problem-solving as these mental processes require holding information in mind and analyzing and synthesizing them for a given purpose (Diamond & Ling, 2016). Based on its content, working memory can be categorized as verbal/semantic and non-verbal/visuospatial working memory (Diamond, 2013; Miyake et al., 2000).

Inhibitory control refers to the ability to suppress an automatic prepotent response in favor of a subdominant response (Diamond, 2013; Follmer & Follmer, 2017; Wright, Waterman, Prescott, & Murdoch-Eaton, 2003). The role of this skill in a playground, for instance, could be that children need inhibitory control in order to be able to wait for their turn and stick to the rules of games. In the classroom context, children with stronger inhibitory control have a better control over their behavior even in the presence of

distractors. For instance, children with well-developed inhibitory control skills could inhibit their impulsive behavior, obey classroom rules and regulations, keep their attention focused and do a class activity by resisting distraction (McClelland et al., 2007).

Inhibitory demands appear to differ depending on the extent to which working memory is involved in a given activity (Garon, Bryson, & Smith, 2008; Lan et al., 2011; Roberts & Pennington, 1996). For instance, inhibition tests such as “Simon Says” have a strong working memory element and demand children to learn and hold rules in memory. On the other hand, there are inhibitory control measures (e.g., delay of gratification tasks) with lower working memory demands and may involve motivation and emotion (Carlson, 2005; Lan et al., 2011). When the demands on working memory are high for a given task and developmental level, inhibiting an impulsive response is less likely to succeed (Roberts & Pennington, 1996).

Cognitive flexibility (also called shifting) refers to the competence to flexibly shift between different domains (mental sets, tasks, rules, or goals) (Diamond, 2013; Follmer & Follmer, 2017). For instance, if a given problem is not solved using one technique, then one needs cognitive flexibility to think of another technique to approach it with. Such flexibility skills are very important, especially in a novel situation (Diamond & Ling, 2016). The result of extended investigation on the operation of cognitive flexibility in childhood indicated that it involves the use of a combination of other cognitive skills together so that the new response set is activated; the response set which was activated before is inhibited, and the response rules are retained and processed in working memory (Chevalier & Blaye, 2008; Davidson, Amso, Anderson, & Diamond, 2006). There are two types of shifting: attention shifting and response shifting, which differ in whether the changing involves picking components of a stimuli or requiring motor responses (Rushworth, Passingham, & Nobre, 2002).

Executive functions have also been classified as "cool/cold" or "hot" components, depending on whether they are related to emotional or solely cognitive features (Chan, Shum, Toulopoulou, & Chen, 2008; Poon, 2018; Tsermentseli & Poland, 2016; Ward, 2020; Zimmerman, Ownsworth, O’Donovan, Roberts, & Gullo, 2016). Despite the fact that hot and cool EF are thought to interact as part of a single coordinated system, they

may be behaviorally and neuroanatomically dissociable (see Hongwanishkul, Happaney, Lee, & Zelazo, 2005). Cold executive functioning skills (e.g., inhibition, working memory, cognitive flexibility, planning) that demand logic and critical analysis (Rubia, 2011) are aroused under relatively abstract, decontextualized, and non-emotional circumstances (Peterson & Welsh, 2014; Poland, Monks, & Tsermentseli, 2016; Zelazo & Müller, 2002). The dorsolateral prefrontal cortex is responsible for cold EF (Castellanos, Sonuga-Barke, Milham, & Tannock, 2006; Chan et al., 2008). Hot EF processes, on the other hand, refer to the more affective elements of EF, elicited by emotionally and motivationally significant problems, like the ability to delay gratification or make affective choices (Poland et al., 2016; Salehinejad, Ghanavati, Rashid, & Nitsche, 2021). Areas of the brain that control emotions and the brain's reward systems, such as the orbito–frontal cortex, ventral striatum, and limbic system, service the hot EF processes (Skogli, Andersen, Hovik, & Øie, 2017).

Recently, literature classified EF as externally-driven and self-directed based on where the source of instruction and goal come from. EF is externally-driven, as in the case where a child executes activities towards realizing a goal when instruction or cues are given by other agents, such as parents (e.g., a parent reminding a child to wear a jacket before going out) (Barker & Munakata, 2015; Barker et al., 2014; Snyder & Munakata, 2010). The traditional behavioral intervention experiences (such as computerized training and mindfulness practices) designed to foster children's EF skills have been benefiting for externally-driven EF (Barker et al., 2014). EF is self-directed when a child must independently choose a goal and create, enact, and sustain activities toward this goal without external cues being provided (e.g., doing homework independently as per the homework time scheduled) (Barker & Munakata, 2015; Barker et al., 2014). Despite the importance of self-driven EF in the actual world, relatively limited information is available about how it develops and what factors promote its development in children (Barker & Munakata, 2015; Snyder & Munakata, 2010). Recently, emerging evidence demonstrates that parental autonomy support and children's engagement in less-structured activities seem to benefit their self-directed EF skills. In their investigation work with 6–7 year-old children, Barker et al. (2014) found that children's opportunity to engage in less-structured leisure time (such as free play, parties and family gatherings,

and museum visits) is associated with better self-directed EF skills than engagement in structured activities. The finding also demonstrated that the amount of time children spent in structured activities predicted poorer self-directed EF.

Available evidence demonstrates that self-driven EF lags behind that of externally-driven EF in terms of their development (see Snyder & Munakata, 2010). Moreover, cognitive control demands are higher for self-driven than for externally-driven EF, even in adults (Bryck & Mayr, 2005; Forstmann, Brass, Koch, & Cramona, 2005; Lie, Specht, Marshall, & Fink, 2006).

Measurement Issues in Executive Function

One of the important issues in studying executive function skills is their measurements. The measurement of EF skills is fraught with problems. One of the major stumbling blocks to achieving precise, valid, and reliable measurements of EF is task impurity (Miyake et al., 2000). Although most performance-based EF tests are used to measure a single EF skill, performance in them is influenced by other executive and non-executive cognitive processes too (Anderson, Anderson, Northam, Jacobs, & Mikiewicz, 2002; Miyake et al., 2000). The absence of ecological validity in the performance-based EF measurements is the next concern with EF measures (Goldstein, 1996; Sbordone, 1996). This is owing to the unique nature of the tasks and the testing situations (Eslinger & Damasio, 1985; Hughes, 2011; Levine et al., 1998). Traditionally, performance-based tests have been administered in an ideal situation in which a child is assessed in a quiet room and engaged in a one-on-one interaction with an adult/test administrator in order to obtain the child's "optimal performance." As a consequence, the resulting performance may not be representative of the child's performance under less ideal conditions (Young, Gurm, & O'Donnell, 2017).

The weak relationship between performance-based measures and rating scale measurements is the other measurement issue in EF (Bodnar, Prahme, Cutting, Denckla, & Mahone, 2007; Mahone et al., 2002; Mcauley, Chen, Goos, Schachar, & Crosbie, 2010; Toplak, West, & Stanovich, 2013). This could be because rating scales assess EF-related behaviors in everyday activities in a real world context, whereas performance-based tests

measure performance during planned activities that involve less self-direction on the part of the examinee (Ledochowski, Andrade, & Toplak, 2019). Another measurement issue is the variability of the task demands of various EF measurements with development. In different stages of development, children may utilize various types of information from a given stimulus (Anderson & Reidy, 2012). In the Stroop Color and Word test, for example, the interference effect occurs only if reading is relatively automatic on the part of the child. If this is not the case, the interference effect will not be noticed, but this does not mean that the youngster who is less advanced in word recognition has a better (Young et al., 2017).

Executive functions are increasingly recognized as a critical component of children's cognitive and social functioning (de Wilde, Koot, & van Lier, 2016; Riggs, Jahromi, Razza, Dillworth-Bart, & Mueller, 2006) and school readiness and early school success (see Blair & Raver, 2015). Literature highlights the apparent overlap between the requirements of early elementary schooling and the EF skills. Children with well-developed EFs are able to control their impulses to initiate more adaptive behaviors, pay attention to lessons, remember directions and keep information in mind, and see things from multiple perspectives and shift flexibly among them, have better success in school (Blair, 2002; McClelland, Acock, & Morrison, 2006; Morrison, Ponitz, & McClelland, 2010).

There is ample evidence that the development of EF is a multistage process in which different components of EF grow at different times, beginning in infancy and lasting at least until adolescence (Diamond, 2015; Goldman-rakic, 1987; Welsh & Pennington, 1988). The difference includes variations in the time of fast change and developmental trajectories in general. For instance, while the development of working memory reaches adult-like levels by 12 years of age, cognitive flexibility continues to develop until 15 years of age (Best & Miller, 2010; Klenberg et al., 2006). In fact, like other developmental skills, EFs do not only follow an age-related developmental trajectory but is modified by the interaction between several contextual and child-related factors such as social interactions, attachment relationships, parental scaffolding, socio-economic status, exposure to specific activities, and individual characteristics of a child (Ackerman

& Friedman-Krauss, 2017; Bernier, Beauchamp, Carlson, & Lalonde, 2015; Bernier et al., 2012; Bialystok, Craik, Green, & Gollan, 2009; Center on the Developing Child at Havard University, 2011; Hartanto, Toh, & Yang, 2019). Extreme disturbances related to poverty, abuse and neglect, violence, family chaos, use of negative control, and maltreatment, and other environmental insults as well as less access to cognitively stimulating materials have negative impact on the development of children's EF skills (Brown, Ackerman, & Moore, 2013; Hughes & Devine, 2017; Noble, McCandliss, & Farah, 2007; Noble, Norman, & Farah, 2005; Pechtel & Pizzagalli, 2011; Raver, 2004; Raver, Blair, & Willoughby, 2013; Rhoades, Greenberg, Lanza, & Blair, 2011; Sarsour et al., 2011; Wanless, McClelland, Tominey, & Acock, 2011). Inadequate attainment of EF skills in early period of life has been associated with a number of problems such as developmental psychopathology (Pennington & Ozonoff, 1996), physical aggression (Séguin & Zelazo, 2005) and problems related to school readiness and academic success (Blair, 2002; Diamond, 2007).

Individual differences in EF have been linked with a lot of developmental outcomes, including social and communication skills (Clark, Prior, & Kinsella, 2002), deployment and regulation of attention (Willcutt, Doyle, Nigg, Faraone, & Pennington, 2005), regulation of emotion skills (Blair & Ursache, 2011; Hofmann, Schmeichel, & Baddeley, 2012; Zelazo & Cunningham, 2007), academics (including word reading, vocabulary, and comprehension of both oral and written language) (Christopher et al., 2012; Chrysochoou, Bablekou, & Tsigilis, 2011; Fuhs, Farran, & Nesbitt, 2015), mathematical and arithmetic competencies (Blair & Razza, 2007; Bull & Scerif, 2001; Espy et al., 2004; van der Sluis, de Jong, & van der Leij, 2007), verbal and nonverbal reasoning (Carlson, Moses, & Breton, 2002; van der Sluis et al., 2007) as well as social and moral competencies (Kochanska, Murray, & Harlan, 2000).

Culture and Executive Function

The culture in which children growing up could influence their EF development. Several findings from cross-cultural investigations demonstrated developmental advantages in EF for Eastern children over their Western counterparts. For instance, a comparison of Chinese and US preschoolers depicted that Chinese preschoolers outperformed their US

counterparts on different EF tasks that include Day/Night Stroop, Grass/Snow Stroop, Bear/Dragon, Dimensional-Change Card Sort, Tower-Building, Kansas Reflection-Impulsivity Scale for Preschoolers, and Whisper (Sabbagh et al., 2006). Another cross-cultural investigation by Imada, Carlson, and Itakura (2013) showed that 4- to 9-year-old Japanese children perform better (on both accuracy and response time) than their counterparts in the United States on tests of Dimensional Change Card Sort. Moreover, based on two separate studies involving children attending local or international schools from Hong Kong and the United Kingdom, Wang, Devine, Wong, and Hughes (2016) reported an advantage in EF for children from Hong Kong compared to their peers in the United Kingdom. Furthermore, the findings from a longitudinal cross-cultural investigation of the development of EF across the preschool period for the United States and Chinese children showed that Chinese children experienced greater gains in EF compared to their US counterparts. Contrary to the aforementioned findings, there are also results of studies, reporting no cross-cultural difference in children's EF. For instance, the comparison of Japanese and Canadian children's performance on the Dimensional Change Card Sorting was found comparable (Moriguchi, Evans, Hiraki, Itakura, & Lee, 2012).

Literature has been hypothesized different explanations for the developmental advantages in EF of Eastern children over their Western counterparts. For instance, Chen and colleagues (1998) mention early parental expectation of children' mastery of impulse control. While children from Eastern cultures (e.g. Chinese) are expected to have mastery of impulse control around 2 years of age, children from Western cultures are not expected the same until the preschool years (Chen et al., 1998). This could create opportunities for Chinese children to be taught the importance of self-control (Ellefson, Ng, Wang, & Hughes, 2017) and start practicing EF skills at an earlier age than their US counterparts (Sabbagh et al., 2006). There is also another explanation which is linked to the difference in parenting practices in the context of individualist versus collectivist cultures (Schmitt et al., 2018). In a collectivist culture like China, children, for instance, are supposed to practice and learn how to behave in the society through adults modelling of the "acceptable" behaviors (Jian, 2009). On the other hand, individual choices and

negotiation are valued elements in child rearing practices in individualistic cultures (Greenfield et al., 2006).

The other explanation comes from the difference in educational styles and schooling environments in the two cultural groups, in general. According to Lan and colleages (2011), the difference in educational styles between countries (e.g., Chines and US) is the major reason for the the cross-cultural variations in EF skills. While being able to control one's behavior, attention and concentration are a central element of Chinese education, self-expression and decision-making freedom are more in focus in US education (Song & Jinyu, 2016). On top of that, compared to the preschool settings in US, impulse control is exceedingly valued in Chinese preschools (Tobin, Wu, & Davidson, 1989). This might mean that the schooling environment in China is more supportive of the development of EF skills than the schooling environment in the US.

1.2. Children's Home Activities and Executive Functions

Play is a natural and enjoyable activity that takes majority of children's time at their home. Various theories of play have emerged to describe and explain the universal significance of play for centuries. Mellou (1994) divided play theories into classical theories of play (developed in the nineteenth century and focused on explaining the existence and purpose of play) and modern theories of play (originated after 1920 and tried to explain the contribution of play in child development). One of the important conclusions that can be drawn from the theories is that the concept of play and its implications have varied widely over the past two centuries (see Mellou, 1994; Stagnitti, 2004), that could range from perceiving play, in itself, adds no value to a child's development (e.g., the surplus energy theory of play) (see Stagnitti, 2004) to conceptualizing children's play as central to their cognitive development, problem solving, creative thought, and adaptation (Lifter, Foster-Sanda, Arzamarski, Briesch, & McClure, 2011). Of the modern theories, Piaget's and Vygotsky's theories of play lead the discussion on child development today (Lillard, 2015). Play, according to (Piaget, 1962), is a major way for children to engage with materials in their environment and build knowledge about the world. Vygotsky (1967) underlined the importance of children's play with others for their development.

1.2.1. Types of Play and Their Developmental Course

There are many different ways in which play scholars have categorized play that naturally vary according to one's theoretical perspective (see Bergen, 2019; Burghardt, 2011; Smilansk, 1968). According to Lillard (2015), five types of play (sensorimotor and object play, physical or locomotor play, exploratory play, construction play, and symbolic play), with the proviso that the category boundaries are not sharp, have earned special attention in the research literature.

Sensorimotor and object play is one of the types of play during childhood. The early manifestations of infant play commonly involve the visual, sensory, and motor areas of the brain as these areas are actively developing during the first year of life and building connections to the emotional brain centres (Bergen, 2019). Piaget was the first to describe sensorimotor play in depth (Lillard, 2015). Piaget's theory underlines that children's sensorimotor interactions with objects lay a foundation for their cognitive development (Piaget, 1962). In the sensorimotor period a child plays by practicing sensory and motor capacities on the environment (Lillard, 2015). Object play refers to playful use of any objects, such as grasping and mouthing anything within reach, building blocks, jigsaw puzzles, cars, dolls, etc. (Smith & Pellegrini, 2008). Children's play with objects shows qualitative variations during different stages of development (Lifter et al., 2011). For instance, with babies, object play is picking up and dropping, banging, or mouthing objects (Lifter et al., 2011). With toddlers, this is sometimes just manipulating the objects and constructing relationships that exploit the unique physical properties of objects (e.g., stacking cups and blocks), but sometimes it involves pretend play (e.g., feeding a doll) (Lifter et al., 2011; Smith & Pellegrini, 2008). As preschoolers, children typically attribute animacy to doll figures, and they engage in sociodramatic and fantasy play (Lifter et al., 2011).

Physical or locomotor play is the other type of play characterized by gross motor action and a higher metabolic rate than when the person is at rest (Lillard, 2015; Pellegrini & Smith, 1998; Pellegrini, 2011). Locomotor play involves large body movements and is supposed to help with muscle strength, endurance, and skill development (Smith & Pellegrini, 2008). Physical activity play can be divided into three main types that overlap

in time but follow one another: rhythmic stereotypies (e.g., rapid and repeated movements of the limbs, head, and boot) in infancy, locomotor games (running, climbing, and other large-body or muscular activities) in childhood; and rough-and-tumble play in the juvenile period (Pellegrini & Smith, 1998; Smith, 2005). Even though rough-and-tumble play is common for both genders (Power, 2000), boys engage in more physical rough-and-tumble play than girls (Blurton Jones, 1967).

Exploratory play refers to investigative play with objects using all the senses, marked by inquisitiveness about what is novel and not well-understood (Lillard, 2015). Exploration is the behaviour that occurs when children come into contact with unfamiliar objects; they manipulate, or investigate their special features and attributes (West, 1977) to find out, for instance, their shapes (e.g., flat or rounded), size (e.g., long or short), and usage (used for drinking or for covering one's head), (Pellegrini, 2013). In their initial appearance, there seems to be an overlap between exploratory play and sensorimotor play (Bornstein, 2006). Pellegrini & Smith (1998) argue that exploring their environment rather than playing with it consumes much of children's time, especially during infancy. Both ontogenetically and microgenetically, exploration comes before play. Ontogenetically, for the first 9 months of life, newborns' behavior is dominated by exploration (Pellegrini & Smith, 1998). Play and exploration coexist around the age of 12 months (Pellegrini & Smith, 1998). By the age of 18 months, the child's interactions with the environment are dominated by play rather than exploration (Belsky & Most, 1981). Exploration also precedes play microgenetically, in the sense that children of all ages must first examine an object or learn its properties before they can play with it ((Hutt, 1966, cited in Pellegrini & Smith, 1998). All in all, children explore an object when they first encounter it and they play with it once it becomes familiar to them (Lillard, 2015).

Construction play involves constructing something with materials that include any elements that can be put together or shaped into structures, such as LEGOs or clay, or wooden blocks (Katz & Buchholz, 1999; Lillard, 2015; Smilansk, 1968). This kind of play is an extension of early exploratory play, but now it demands the capacity to combine early 'pure' imitation with purposeful anticipation (Sheridan, 2011). It begins with very simple block-building at around18–20 months of age (Sheridan, 2011), and it

is always aimed at practically constructing the object that the player has in mind (Bergen, 2019). Advancements in construction play may include the creation of psychologically meaningful sights and sounds, such as visual arts and musical play (Gray, 2017). Pellegrini & Gustafson (2005) reported that construction play covered around 15% of preschool free-play activity. Gredlein & Bjorklund's (2005) investigation revealed that children's engagement in construction play positively contributes to their problem-solving skills that involve construction.

Symbolic play involves symbolizing an object/action as if it is something else than it actually is, in the essence of fun and enjoyment (Lillard, 2015; Smith & Pellegrini, 2008). Pretend play starts when infants reach the pre-symbolic level between 8 and 11 months of age and are able to recognize the real relationship between familiar objects and their related actions (e.g., drinking from a cup; Fein, 1981; McCune, 1995). About the age of three and forwards, pretend play involves highly complex social role-playing skills with peers (Howes, 1994) and it peaks around the age of four (Haight & Miller, 1993). In discussing the important transformations that can happen in symbolic play, Leslie (1987) noted three important changes: object substitution that happens when a child replaces one object for another; substitution of properties occurs when a child pretends as if something has different properties than in fact it has; and imaginary object play that happens when a child pretends something is there in fact it is not. Even though both Piaget and Vygotsky described that symbolic play ceases around the age of 6, a recent investigation depicted that it continues into middle childhood and beyond (Smith & Lillard, 2012).

1.2.2. Play and Child Development

Play, which has been declared as the right of every child by the United Nations High Commissioner for Human Rights (2006), is a fundamental component of development in childhood (Fisher, Hirsh-Pasek, Golinkoff, Singer, & Berk, 2011; Fisher, Hirsh-pasek, Michnick, & Glick, 2008; Hanline, Milton, & Phelps, 2010). There is literature (for a reivew see Tarman & Tarman, 2011) suggesting that in play, children demonstrate developmental competencies that they do not, and perhaps even cannot, accomplish in other contexts such as through formal classroom instructions. In this regard, the importance and benefits of play are well documented. Play, for instance, enhances

children's social competence and creativity (Coyl-Shepherd & Hanlon, 2013; Creasey, Jarvis, & Berk, 1998), improves peer relationships (Coplan & Arbeau, 2009), boosts concept and language development (Bergen, Hutchinson, Nolan, & Weber, 2010), supports vocabulary acquisition of at-risk preschoolers (Han, Moore, Vukelich, & Buell, 2010), facilitates socio-emotional development (McWayne, Fantuzzo, & McDermott, 2004) and benefit physical health and reduce childhood obesity (Johnson, Christie, & Wardle, 2005). Moreover, when children play with others they develop their skills of working in groups, sharing, negotiating, and resolving conflicts with others (Mcelwain & Volling, 2005; Pellegrini & Smith, 1998) and acquire skills to express and regulate powerful emotions (Fantuzzo, Coolahan, Mendez, McDermott, & Sutton-Smith, 1998; Pellegrini, 1992).

Furthermore, play also helps children develop new skills that enable them to improve their self-confidence and resilience, which will benefit them in solving problems in their future lives (Erickson, 1985; Hurwitz, 2002). Play is also one of the activities that help children adjust to school, improve school and learning readiness, learning behaviors, and problem-solving skills (Carlsson-Paige, 2011; Coolahan, Fantuzzo, Mendez, & McDermott, 2000; Fisher, 1992; Zigler & Bishop-Josef, 2009). The important contribution of play in children's school readiness, literacy development, and self-regulation is supported by investigation (Diamond, Barnett, Thomas, & Munro, 2007; Roskos & Christie, 2001; Zigler, Singer, & Bishop-Josef, 2004). Self-driven play allows youngsters to exercise decision-making skills, proceed at their own pace, explore their own areas of interest, and eventually fully participate in the hobbies they desire to pursue (Erickson, 1985; Hurwitz, 2002; Pellegrini & Smith, 1998).

1.2.2.1. Parental Play Support and Child Development

Familial support of children's play and the accessibility of opportunities to play with other children are extremely important in child development (see Ginsburg, 2007; Lin & Li, 2018). There are findings indicating that parental support of children's play improves children's science, mathematical and numeracy skill (Hao & Fleer, 2017; Sikder & Fleer, 2018; Vandermaas-peeler, Boomgarden, Finn, & Pittard, 2012), helps social skill and adaptable temperament (Fogle & Mendez, 2006), betters emotion regulation, and child-

parent relationship (Singh & Gupta, 2012). Parental engagement in their children's play as a playmate is among the different forms of parental play support. An increasing body of literature shows a positive contribution of parents' engagement in their children's developmental outcomes (Tamis-LeMonda, Shannon, Cabrera, & Lamb, 2004). For example, parents engagement in their children's play encourage healthy brain development (Tamis-LeMonda, Shannon, Cabrera, & Lamb, 2004), boosts language and cognitive development (Lin & Yawkey, 2013; Tamis-LeMonda et al., 2004a, 2004b), increase the complexity and frequency of children's play (Dempsey, Kelly-Vance, & Ryalls, 2013), benefits child-parent relationship (Hughes & Fleming, 2015; Singh & Gupta, 2012), improves regulation of emotion and the acquisition of prosocial behaviours (Md-Yunus, 2007; Putallaz, 1987).

The view parents hold about the developmental benefits of play is an important factor that impact the level to which they support their children's play activities, the nature and occurrence of play activities and the degree of their involvement in their children's play at home (Avornyo & Baker, 2018; Fisher et al., 2008; LaForett & Mendez, 2017; Lin & Li, 2018; Manz, Gernhart, Bracaliello, Pressimone, & Eisenberg, 2014). In this regard, a comparison of parents' involvement in their children's play indicated that mothers, who valued play for its educational and cognitive benefits, were more likely to join their children's play, while mothers who hold a belief that the value of play is merely for entertainment did not exert meaningful efforts to facilitate their children's play (Farver & Lee-Shin, 2000; Farver & Howes, 1993; Farver & Wimbarti, 1995; Haight, Parke, & Black, 1997; Haight, Wang, Fung, Williams, & Mintz, 1999; Manz et al., 2014; Parminder Parmar, Harkness, & Super, 2004). Parental play beliefs could range from perceiving play as primarily entertainment all the way to play as a vehicle for a range of developmental benefits to children (Farver & Howes, 1993; Fisher et al., 2008). In this regard, Fogle and Mendez (2006) developed a scale to measure parents play beliefs using low-income Africa-American mothers in the US and came up with two views of play (Play Support and Academic focused). The Play Support belief represented a view that play is a means for important developmental outcomes beyond being entertaining activities for children. The Academic Focused belief, on the other hand, represented a

view that play is a less worthwhile activity for children's development in contrast with explicit academic activities, such as reading to a child.

There are also important findings indicating that parents' play belief is a vehicle for children to acquire a variety of social and school readiness competencies (LaForett & Mendez, 2017b). Findings from investigations (e.g., Parker, Boak, Griffin, Ripple, & Peay, 1999), for instance, showed that children with parents acknowledging the value of play in development have better developed cognitive competencies and independence comparted to children with parents who do not appreciate the developmental role of play. Lin and Yawkey's (2014) investigation also showed that parental play support beliefs depicted a moderate positive association with both parent- and teacher-rated children's social competence even after controlled for the parental background variables linked to children's social competence. Maternal play support beliefs were positively associated with children's interactive peer play (Fogle & Mendez, 2006).

1.2.2.2. Cross-Cultural Variation in Play and Play Beliefs

Beside understanding the important contribution of play in child development, acknowledging its cultural aspects and looking for ways to support play from cultural viewpoints remain a significant task (Izumi-Taylor, Samuelsson, & Rogers, 2010). Cultural systems, norms, beliefs, and values inform institutional (e.g. preschoolers) and parental beliefs and practices, and eventually play an important role in child development (Hedegaard, 2009; Roopnarine, Meera, Kwanghee, & Ziarat, 2003; Vygotsky, 1978). In this respect, activities believed to be valuable for child development in one community may differ from the others. Thus, play opportunities may vary along the communities based on the beliefs, values and practices held in the community (Göncü, Mistry, & Mosier, 2000).

There are findings indicating that while adults with European cultural origin hold a strong play support belief that acknowledges the important role of play in child development (Haight, Parke, & Black, 1997; Parmar, Harkness, & Super, 2004; Yahya & Wood, 2016), parents in some non-Western cultures or in low-income communities hold weak play support beliefs and appreciate the valuable contribution of other activities such as

academic training and work-related activities for children instead of play (Holmes, 2011; Yahya & Wood, 2016). For instance, in Mexican culture, in contrast to play activities, children's participation in work-related activities is thought to be far more important (C. Tamis-LeMonda, Uzgiris, & Bornstein, 2002). Similarly, the Caribbean teachers and parents emphasize the importance of academic activities for preschoolers instead of play activities (Leo-Rhynie et al., 2009; Logie, 2013). Likewise, Mayan mothers do not value the importance of play for their children's development (Rogoff, Mistry, Göncü, & Mosier, 1993). In their investigation, Farver, Kim and Lee (1995) reported that Korean-American parents, compared to their Anglo-American counterparts, hold beliefs that academics is more valuable than play for their children, and they participate less in their children's pretend play. Children with parents holding less favorable attitudes towards play may be given less opportunities to play (Göncü et al., 2000).

Moreover, the type and form, initiation, orientation, frequency, thematic focus of play and play partner show cultural disparities. For example, while Marquesan children engage more in object-oriented play (Roopnarine, Lasker, & M.Sacks, 1998), Latino-American children spend more in language-based plays (Thomas, 1998). US children engage in more symbolic play, whereas French children engage in more exploratory play (Suizzo & Bornstein, 2006). Furthermore, while Italian children have significantly more types of affect expression in their play, their US counterparts have more imagination in their play (Chessa et al., 2013; Farver & Shin, 1997). Moreover, a cross-cultural comparison of pretend play at home between Irish American families and Chinese families in Taiwan depicted that child-initiated pretend play was significantly more frequent in Irish American children than their Chinese counterparts (Haight et al., 1999). Regarding the choice of play partner, for instance, while Irish American children favored their peers in play, caregivers were favored by their Chinese counterparts (Fung, 1994). Furthermore, while Chinese caregivers put more emphasize on social harmony and respect for rules in their play with children, European-American mothers focus on independence and self-expression in parent-child play (Haight et al., 1999).

1.2.2.3. Pretend Play and Executive Functions

One of the common and delightful home moments in early childhood is pretend play. The link between pretend play and EF has empirical support. For instance, Cemore and Herwig (2005) found that the time preschoolers spent in pretend play at home was positively correlated with their ability to delay gratification, a task that demands children to control an impulse to achieve a goal. Similarly, Kelly and Hammond (2011) reported a positive relation between structured pretend play and the ability to inhibit prepotent responses among preschoolers, even after accounting for mental age. Recent experimental evidence also demonstrated that engaging in pretend play can improve children's EF. From their investigation of the effect of a pretend play intervention on preschoolers' EF skill using a randomized controlled design, Thibodeau and colleagues (2016) reported that children who participated in the fantasy-based pretend play intervention (e.g. pretending that they were birds flying around a forest) showed greater gains in working memory and cognitive shifting but not in inhibitory control. Besides, very recently, White and Carlson (2021) conducted an experiment to examine the effect of story content (fantasy or reality) and mode of engagement with the story (pretense or a non-pretense control) on the inhibitory control skills of 3-year-old children. The result showed that, after controlling for baseline inhibitory control, receptive vocabulary, age, gender, affect, and propensity toward pretense, children who engaged in story-related pretend play (regardless of story content) outperform their counterparts who engaged in a non-pretense activity on the "Less Is More" EF task that measures inhibitory control. On the other hand, there are also studies that did not replicate the positive contribution of pretend play to EF skills. For instance, Cemore and Herwig (2005) revealed no relationship between classroom observations of preschoolers' pretense and their performance on the delay of gratification task. In this regard, in their review on the impact of pretend play on children's development, Lillard and colleagues (2013) ascribe the inconsistencies in the findings to the measure of multiple aspects of pretend play and EF in addition to methodological limitations.

1.2.3. Motor Activities and Executive Functions

Early childhood is also known for the rapid development of both gross and fine motor skills (Clark & Metcalfe, 2002). Children's well-built fine motor skills are associated with better performance in mathematics at kindergarten entry and greater gains in mathematics over the year (Luo, Jose, Huntsinger, & Pigott, 2007; Son & Meisels, 2006). Several observational investigations with preschool-aged children have also demonstrated positive associations between children's fine motor skills and EF (Becker, Miao, Duncan, & Mcclelland, 2014; MacDonald et al., 2016; Oberer, Gashaj, & Roebers, 2018). In this regard, especially, aspects of fine motor skills that demand visual and motor systems integration (e.g., copying shapes, building with small blocks), are important factors associated with early learning and cognition, and development of self-regulation and EF (Becker et al., 2014; Carlson, Rowe, & Curby, 2013). Even though the specific means for the association between fine motor and EF skills have not yet been clearly understood, MacDonald and colleagues (2016) forwarded a possible ascription that engagement in visual-motor activities commonly create opportunities for children to practice important EF skills. For instance, copying a shape or building a small block structure requires children, for example, to stay within the lines (focus their attention), remember what the shape or structure looked like (sharpen their working memory), and overcome the temptation to get up and play with a friend (use inhibitory control).

In a similar vein, beyond its contribution in physical development, gross motor skills play a meaningful role in the development of EF in early childhood. Children's engagement in physical activities that demand goral-directed behavior could also support the development of their EF (Bomstein, Hahn, & Suwalsky, 2013). Numerous investigations that examine the link between gross motor skills and EF in children have documented positive associations (Aadland et al., 2017; Bomstein et al., 2013; Cook et al., 2019; Stein, Auerswald, & Ebersbach, 2017; Wassenberg et al., 2005).

Motor coordination, which is the aspects of motor skills, is strongly associated with EF, in both typically developing children (Fels et al., 2014) and children with developmental coordination disorder (Leonard, 2016; Wilson, Ruddock, Polatajko, & Blank, 2012). Especially, studies investigating the association of motor coordination with EF in children

and adolescents (Livesey, Keen, Rouse, & White, 2006; Luz, Rodrigues, & Cordovil, 2014; Rigoli, Piek, Kane, & Oosterlaan, 2012b) depicted that children and adolescents with higher levels of motor coordination outperform their counterparts in cognitive performance activities.

1.2.4. Physical Activities and Executive Functions

The overall finding from a systematic review of observational and experimental studies investigating the relationships between physical activity and cognitive development in early childhood depicted that higher levels of physical activity are related to small but significant advancement in EF (Carson et al., 2016). Preschool-aged children's involvement in physical activity during the day also is related to better performance on inhibitory control and self-regulation tests (Becker, Mcclelland, Loprinzi, & Trost, 2014; Campbell, Eaton, & Mckeen, 2002). While there are physical activity intervention demonstrating positive effect on EF (Booth et al., 2013), habitual physical activity have been shown negative association with EF (Cook et al., 2019; Willoughby, Wylie, & Catellier, 2018). In this regard, evidence from experimental studies with children indicating that cognitively-engaging physical activity and exercises (rule-based ball games, for example) have a stronger effect on the brain than cognitively non-engaging exercises (like running) (see Sibley & Etnier, 2003; Tomporowski, Davis, Miller, & Naglieri, 2016). However, this was not replicated in a meta-analysis by Takacs and Kassai, (2019). The results of an investigation by Campbell, Eaton, & Mckeen (2002) examining the role of motor activity in preschoolers' behavioral control indicated that higher levels of physical activity predicted higher inhibition performance. Other studies focusing on the effects of physical activity on different aspects of cognitive functions show that physical activity can improve attention (Chaddock et al., 2010; Davis et al., 2011) and working memory (Mcmorris, Sproule, Turner, & Hale, 2011; Niederer et al., 2011).

Regarding the mechanism how physical activities are related to children's EF skills, there are literature suggesting that physical activity on its own may not directly improve EF skills (Bierman & Torres, 2016; Diamond & Ling, 2016). Best (2010), for instance, argued that much of the physical activity and exercise comes through children's

involvement in group activities that demand complex cognition to cooperate with teammates, forecast teammates' and opponents' behaviors, plan and employ strategies, and flexibly adapt oneself to dynamic task demands (Best, 2010), almost all of which are similar to what EF tasks demand in children's executive processes (Banich, 2009). Alternatively, physical activity can lead to improvement in sleep and the amount of oxygen and blood flow to the brain while reducing depression and stress, that together, in turn, contribute to better development of EF skills (see Ackerman & Friedman-Krauss, 2017).

1.2.5. Other Home Routines and Executive Functions

For most children, the home creates the environmental context in which they could learn socialization (Dreyer & Dreyer, 1973). In this regard, the time for the family to be together such as mealtime could create opportunities for a myriad of learning to take place on the part of children (Dreyer & Dreyer, 1973). In family mealtime, parents create the setting in which the meal is conducted and bring to the table expectations for behavior (Fiese & Schwartz, 2008). Beyond learning specific behaviors centered about dinner, children also learn the general roles, rules, and values of family living coalesce in this setting (Dreyer & Dreyer, 1973). Moreover, Snow & Beals (2006) and Weizman & Snow (2001) reported improved language development and academic achievement in children when mealtimes are characterized by responsiveness to children's questions, and when behavior is well regulated. Furthermore, there are also evidences indicating that frequency of family mealtimes, and family climate during shared mealtimes are related to the behavior and development of a child. For instance, children with families spending mealtime together have shown vocabulary growth (Snow & Beals, 2006) and fewer behavior problems (Hofferth & Sandberg, 2001).

Breakfast is another important element of children's everyday life at home that could affect their cognitive function. The importance of children's breakfast consumption is usually stressed by parents and educators assuming that it is important for children's successful learning (Pollitt & Mathews, 1998). In fact, the findings of studies investigating the associations between breakfast consumption and cognitive function depict several inconsistencies which could be attributed to differences in study designs

and study population (Micha, Rogers, & Nelson, 2010; Widenhorn-mu, Hille, Klenk, & Weiland, 2020). In their review study, Adolphus, Lawton, Champ, & Dye (2016) explicitly stated that very few studies investigating the breakfast-cognition link deal with the nutritional value, which seems to be a general limitation of the literature examining the issue. Most studies, instead, used other means of measures such as frequency of breakfast, comparing breakfast with no breakfast, and blood glucose monitoring (see Adolphus et al., 2016). However, the overall findings of the studies have indicated that breakfast can positively impact cognitive functioning (Cooper, Bandelow, & Nevill, 2011). There might be several possible explanations for this finding. The first would be that having breakfast regularly could enhance the nutritional value the child receives which might have a direct positive impact on brain development (Datar & Nicosia, 2012). The second explanation would be that having or not having breakfast on the morning of the cognitive function tests could have a temporary effect on children's performance on the tasks (see Datar & Nicosia, 2012). As children tend to sleep for a longer time during the night and their energy reserve is smaller, by the morning it is more likely that their stored glycogen is depleted (Datar & Nicosia, 2012). This results in their brain experiencing a shortage of energy in the morning that could affect children's cognitive functions (Datar & Nicosia, 2012; Wesnes et al., 2003).

1.3. Socio-cultural Contexts in Ethiopia and Hungary

Ethiopia is a multi-ethnic and ecologically diverse East African country with a population of about 109 million (World Bank, 2019b) of which around eighty percent live in rural areas (Wold Bank, 2019a). The World Bank's 2018 report showed that Ethiopia's gross domestic product (GDP) was about 84.36 billion USD (World Bank, 2019b). In Ethiopia, while 71% of children (age 0-17) live with both biological parents, 17% of children live with either their biological mother or father only (Better Care Network, 2015). Most of the preschoolers are monolingual.

Kindergarten, which is mainly an urban phenomenon and left for the private sector, is generally a three-year program for 4 to 6-year olds (Woldehanna, 2011). Accordingly, the government has very limited involvement in early childhood education such as providing some technical support and quality monitoring (Woldehanna, 2011). In order

to improve the enrollment of young children in early childhood education in the country, 'O' class and child-to-child programs, as part of early childhood education, have been launched very recently beyond the kindergarten program (MoE, 2016). Even though the Education and Training Policy (MoE, 1994) of the country underlines the importance of children's overall development during the preschool years, the preschools in the country run a very structured programs that focus more on academic activities and far less on play (see Admas, 2016; Tigistu, 2013). Interestingly, parents of preschoolers also hold academic focused beliefs that could drive preschools to focus on academic development instead of other aspects of development such as social-emotional development (Admas, 2016; Tigistu, 2013).

On the other hand, Hungary is a country in East-Central Europe with a population of about 9.8 million of which 28.36 % is reported as rural (World Bank, 2019). According to World Bank's 2019 report, the country's GDP was 160.97 billion USD. Regarding ethnicity, the country is relatively homogenous (Józsa, Török, & Stevenson, 2018) and Hungarian is the official language. The majority of the Hungarian children are monolingual. It is estimated that about half a million children in Hungary grow up in single parent families (Coface Families Europe, 2018).

According to the Hungarian National Public Education law, children shall attend preschool education from the age of 3 until they reach compulsory school age (Act CXC of 2011 on National Public Education). As indicated in the Govn decree 363/2012 (XII. 17.) on the Core Program for Kindergartens, the goal of preschool education in Hungary is "... promoting a harmonious physical and social development of the child's personality." (363/2012. (XII. 17.). The national core curriculum for kindergarten education regulates the pedagogical work in the kindergartens. The core program indicates the types of activities in the program as:

> Play (as the fundament of preschool education); Rhyming and Storytelling; Drawing, Painting, Making Patterns, Handwork; Singing, Music, Singing Games, Children's Dances; Becoming Actively Acquainted with the Outer World (content in environmental and content in mathematics); Movement (physical activity); activities of a work nature (e.g. taking care of animals, plants); activity based learning (as cited in Böddi & Serfőző, 2019, 189).

1.4. Aim of the Dissertation

Recently, investigating experiences that aid early gains in EF has become a high priority for research in the area (see Diamond, 2012; Takacs & Kassai, 2019). However, most of the investigation entertaining children's experience variables, especially home related, have been revolving around socioeconomic status, parenting style, attachment security, scaffolding, and parent-child interaction (see Bernier et al., 2012; Bernier, Carlson, & Whipple, 2010; Fay-Stammbach, Hawes, & Meredith, 2014; Hammond, Müller, Carpendale, Bibok, & Liebermann-Finestone, 2012), and specific forms of play, primarily pretend play (Carlson, White, & Davis-unger, 2014; Cemore & Herwig, 2005; Kelly & Hammond, 2011). The developmental significance of other home activities (e.g., academic, arts and crafts, and sport and physical activities) and other forms and types of play (e.g., peer play, solitary play, motor play) have received little attention in the literature. In addition, to the maximum of our knowledge, there is no study that investigate the role of parental play beliefs in their children's EF skills. Thus, taking such research gaps into account our investigations were aimed to investigate the contribution of preschool children's home experience (parental play beliefs and both children's play and other activities at home) in the development of their EF. The inclusion of all these components of home experiences into our studies also helped to form a more comprehensive understanding of the contribution of children's home environment to the development of EF skills including the investigation of the comparative importance of the experiences in relation to EF skills. Therefore, our investigation would contribute to fill a gap in the current literature.

Furthermore, like other aspects of development, the development of EF shows cross-cultural variations. For instance, the cross-cultural comparison of children's performance on EF tasks show that children from East outperform their West counterparts (e.g. Imada, Carlson, & Itakura, 2013; Lewis et al., 2009; Sabbagh, Xu, Carlson, Moses, & Lee, 2006). Unfortunately, such comparisons have been bounded to children from Eastern and Western cultures which give little attention to the other parts of the world. The present study, therefore, is believed to be one of the first efforts to enrich the literature on the areas by comparing samples from Ethiopia and Hungary. We selected Ethiopia and

Hungary for comparison taking their very different socio-cultural backgrounds into account, including the far-reaching differences between the aims of and the parental expectations from early childhood education. While children's physical and socio-emotional development are the focus of early childhood education in Hungary (Govn decree 363/2012 XII. 17.), academic development was found to be the very important outcome for Ethiopian parents, even during the preschool years (Admas, 2016; Tigistu, 2013).

Thus, the purpose of this dissertation was to explore the beliefs parents hold about the primary purposes of preschool education and the role of play in child development and to examine the relationship between the two. Moreover, the present investigations aimed at cross-culturally examining parents' beliefs about play and the purpose of preschool education, preschoolers' different home activities, and EF skills including inhibitory control, cognitive flexibility, and working memory with participants from Ethiopia and Hungary. Furthermore, examining the contribution of preschoolers' home experiences (preschoolers' activity at home and parents' play beliefs) in the development of their EFs (inhibitory control, shifting and visual-spatial working memory) in various socio-cultural contexts (Ethiopia and Hungary) and exploring the contributions of these experiences to EF skills cross-culturally were the other purposes of the dissertation.

To achieve these purposes of the dissertation, the following research questions were formulated:

1. What beliefs do parents with preschoolers hold about the purpose of preschool education and the role of play in child development and how are their educational and play beliefs relate each other?
2. Do Ethiopian and Hungarian parents hold different views about the role of play in child development and the purpose of preschool education?
3. Are there cross-cultural variations in the frequency of preschoolers' activities at home and EF skills including inhibition, switching, and visual-spatial working memory?

4. What is the relationship between preschoolers' home experiences (parental play beliefs and preschoolers' activities at home) and their EF skills under the contexts of the two nations?
5. Is there a cross-cultural difference in the relationships between the frequency of preschoolers' activities at home and their performance on the battery of EF tasks?

Chapter Two

The Relationship between Parental Play Beliefs, Preschoolers' Home Experience and Executive Functions: An Exploratory Study in Ethiopia (STUDY 1)[2]

2.1. Objective of the Study

Taking the important role of children's home experience for development into consideration, the purpose of the current study was to investigate the link between preschoolers' activity at home and parental play beliefs and development of their EFs. To achieve this purpose of the study, the following research questions were formulated:

1) Is the frequency with which preschoolers engage in different forms of play at home associated with their EF skills?
2) Do parental play beliefs significantly relate to children's EF skills?
3) What is the relationship between preschoolers' home activities (such as spending mealtime with family, breakfast experience at home, academics-related activities, and sports and physical activities) and their EF skills?

Hypothesis

Regarding the first research question, we hypothesized that the more children spend playing (especially pretend play and peer play) at home the better their performance in EF tasks would be (Kelly & Hammond, 2011; Bierman and Torres, 2016). On a related note, we hypothesized that children with parents who believe that play has an important role in children's development would have better performance in EF tasks. On the other hand, we did not have specific hypotheses regarding the relationship between different home activities (such as academics-related activities, spending mealtime with family, breakfast experience at home, and sports and physical activities) and EF, this part of the study was exploratory. It should be noted that we originally intended to test our research questions on all three EF components (working memory, inhibitory control, and cognitive flexibility), however, we could not use the data of the switching task intended to measure

[2]Metaferia, B. K., Takacs, Z. K., & Futo, J. (2020). The Relationship Between Parental Play Beliefs, Preschoolers' Home Experience, and Executive Functions: An Exploratory Study in Ethiopia. *Front. Psychol, 11*(624), 1–13. https://doi.org/10.3389/fpsyg.2020.00624

cognitive flexibility for statistical analyses due to its low level of variance (see more details under the section Measures).

2.2. Methods

Participants

Families were recruited from a variety of preschools in Ethiopia, which ranged from small to large city area preschools representing lower to middle-class areas. One hundred two preschoolers (57 boys and 45 girls; mean age = 62.08 months; *SD* = 7.66 months; age range: 50 - 74 months) with their parents (34 males and 68 females; mean age = 35.21 years; SD = 6.96 years; and age range: 25 - 70 years) participated in the present study. The person who filled in the questionnaire was the mother in 55% of the cases, the father in 32%, the grandmother or the grandfather of the child in 2% or some other relatives living with the child in 11%. The participating children in the study were preschoolers who (at the time of the data collection) have been attending preschool for less than a year (24.5%), between a year and two (51.0%), and three years (24.5%). The demographic characteristics of the participants are presented in Table 1.

Procedures

Participant preschool centers were selected from three cities in Ethiopia (Addis Ababa, Ambo, and Hawassa) using convenience sampling. The directors of the centers gave written consent to participate in the study, after which parents were sent a consent form (about their own and their children's participation). To the parents who gave consent, a questionnaire was sent. Children of these parents were taken out of the classroom in the preschool for an individual testing session (about 20 - 25 minutes) including neuropsychological tests of executive functions. The order of the tasks was the same for all participant: children started with a go/no-go task followed by a switching task, and they all finished with a test of visual-spatial working memory task. One-on-one testing was conducted in a separate, quite room. The procedure implemented in the current study was approved by the Eötvös Loránd University's Research Ethics Committee (issue number: 2017/209). The data collection period ranges from July to September of 2017.

Measures

Children's executive function skills were assessed by neuropsychological tests applied in a one-on-one testing session in the preschool. A questionnaire was sent to the parents in order to collect data about preschoolers' home activities and their parents' play beliefs. The questionnaire used consisted of three parts: a scale including demographic questions, a scale regarding the frequency of different home activities (developed by the investigators of the present study) and a scale concerning the parents' beliefs about play (PPBS).

Demographic information

Demographic data included the respondent's gender and relationship with the child, the child's gender, age, the education levels of the father and the mother, the family gross annual income and the child's years of enrolment in a preschool program. The education level of the parents was rated on a five-point scale ranging from 1 (Elementary school complete) to 5 (having Graduate Degree/ masters or above). Gross household annual income was rated on seven-point scale ranging from 1 (0 – 24,999 Birr) to 7 (200,000 Birr or more). A SES variable was constructed by averaging the average of parents' education and their annual gross income.

Parent Play Beliefs Scale

The final version of Fogle and Mendez's (2006) Parent Play Beliefs Scale (PPBS) was used to measure parents' perspectives on the role of play in their children's development. The scale was developed using African-American mothers with their preschool-age children in Head Start. The scale consists of 25 items rated on a 5-point Likert-type scale rated from 1 (disagree) to 5 (very much agree). In Fogle and Mendez's (2006) investigation, the principal component analysis yielded two subscales: Play Support and Academic Focus. The play support subscale consisted of 17 items (e.g., 'through play my child develops new skills and abilities,' and 'I can help my child learn to control his or her emotions during play') reflecting a view that play has the potential to offer a range of developmental benefits to children on top of being an entertaining activity. Academic focus, on the other hand, consisted of eight items (e.g., 'I do not think my child learns

important skills by playing,' and 'I would rather read to my child than play together') reflecting views that academically oriented activity rather than play is important for their children's development.

In their validation study, Fogle and Mendez (2006) reported that the internal consistency of the two subscales was high (α = .90 and .73, respectively). In the current study, the same subscales were used, and they again showed good internal consistency (α = .88 and .75 respectively) after deleting an item from the academic focused subscale. The bivariate correlation of the two subscales depicted a significant negative correlation ($r = -0.21$, $p = .043$).

Home activities scale

The home activities scale was developed by the investigators of the present study to assess children's frequency of different activities in their home. It consisted of 10 items corresponding to ten activities we aimed to assess: academics-related activities, spending mealtime with family, breakfast at home, frequency of pretend play, motor play, fine motor activities, arts and crafts, solitary play, peer play, and sports and physical activity (see Appendix for the measure). In the scale, parents were presented with a list of preschoolers' daily routines after preschool and asked how often their children engage in the activities (e.g., how often do their children engage in arts and craft, academic activities, pretend play, peer play or solitary play). The participants used a five-point response Likert scale, ranging from 'very rarely /less than once a week' (1) to 'very frequently /most of the time during the day' (5), to indicate the extent to which their children were involved in the activities included in the scale. The validity of the home activities scale was assured in two ways. First, the principal investigator is familiar with the family routines and childcare practices in Ethiopia. Second, feedback was collected from experts familiar with the situation on the validity of the scale during its development.

Translation of the survey

The questionnaire was translated to the target language (Amharic). The process involved three independent translators: two educational psychologists with a master's degree and one applied developmental psychologist with a PhD level of education. The translators

were native speakers of Amharic but were fluent English speakers. The first author collected the three translations, checked the discrepancies and made a first version. Finally, the Amharic questionnaire was back-translated to English by an English language expert with Amharic mother tongue to compare the equivalence of the original scales in English and the target scale in Amharic. Based on the back-translation, important revisions were made.

Inhibition task

The fish–shark go/no-go task (Wiebe et al., 2012), where children were instructed to respond to the picture of a fish (go stimulus) by a button press, but not for the picture of a shark (no-go stimulus), was used on a laptop computer using PsychoPy 1.85.1 version (Psychological Software Tools; Peirce, 2008) in order to assess children's inhibitory control skills. On each trial the stimulus was presented for 1,500 ms if the participant did not respond earlier (see Wiebe et al., 2012). There were six practice trials (four go and two no-go trials). When the participant demonstrated that they understood the instructions, the test was started. The test consisted of 60 trials, two-third of which were go trials and one-third were no-go trials. Sensitivity (*d'*) was computed using signal detection theory that indicates the extent to which one responds differentially to two groups of stimuli (Macmillan & Creelman, 2005). Hits (correct go trials) and false alarms (incorrect no-go trials) were used in computing sensitivity. A higher value of sensitivity indicates better performance in the task (Macmillan & Creelman, 2005).

Switching task

Another version of the go/no-go task was applied in order to assess children's cognitive flexibility: using different stimuli (a picture of a cat and a tiger) and four blocks in which the rule was switched. Accordingly, in the first and third blocks, participants were instructed to make a button response whenever the picture of a cat (go stimulus) appeared on the center of a laptop computer screen and refrain from responding in case of the picture of a tiger (no-go stimulus). In the second and fourth blocks the participants completed tasks with the reversed stimulus–response rules as in the first and third blocks. Under each block, 16 go and 8 no-go trials were used. For each trial, just like in the fish-

shark go/no-go task, the stimulus (cat or tiger) appeared on the screen for 1,500 ms if the participant did not press the button earlier. Before starting the first block, there were six practice trials including four go trials and two no-go trials. In addition, participants were informed about the corresponding rule of every block before the beginning of each block of the task. Sensitivity was calculated for each block the same way as in the go/no-go task. Following this, average sensitivity scores of switching blocks were calculated by taking the average of the sensitivity difference of switching blocks (i.e., difference in sensitivity of the third and the first blocks and the difference in sensitivity of the fourth and the second blocks), with higher scores indicating better cognitive flexibility skill. However, following this calculation, the very small range of average sensitivity scores [-1.56, .88], where the possible range varies between -6.081 and 6.081 became apparent. Because of the observed lack of discriminative power, the scores of the switching task were excluded from the analysis.

Visual-spatial working memory task

A visual-spatial working memory (VSWM) test, the “Mr. Peanut” task (Kemps et al., 2000) was chosen to be used in the current study. We used a computerized version that was based on the work of Morra (1994). In the task, preschoolers are presented with a clown figure called “Mr. Peanut" on a laptop computer screen where he decorates himself by putting stickers at any of the 14 different locations on his body. After that he disappears from the screen and reappears without the stickers. Children are requested to locate the part of Mr. Peanut’s body that he decorated with stickers before they were removed (for more details see Morra, 1994). The test is carried out after a practice session where the child completed three practice trials. The test starts only when the participant correctly responds for all the three practice trials. The program offers the opportunity for the participant to change their response by deleting the sticker they already located.

In the test phase of the task, participants were presented 3 trials one after the other on each level (starting with one sticker). When they successfully passed a given level by correctly responding to at least one of the three trials, they were moved up to the next level (At each consecutive level, the number of stickers increases by one). The test automatically stops if a participant makes three consecutive mistakes on any of the given

levels. When calculating the scores, the rule outlined by Morra (1994) was applied: in case the participant correctly responded to at least two of the three trials on a level, he/she is scored one point, and for correctly responding for only one trial on a level recorded 1/3 point. The total score is the sum of the scores participants obtained on each of the levels they successfully passed through.

Data analysis

SPSS v25.0 for Windows (IBM Corporation, Armonk, NY, USA) was used for performing the analyses. Out of the 131 questionnaires that were sent out, 116 (89%) were returned and six of these were excluded from analysis as they had a lot of missing values. We could not test eight children with the EF tasks due to their absence from preschool during data collection. In addition, as seventeen participants experienced a technical problem in the fourth block of the switching task, they were excluded from the analysis of switching variable. Also, seven children with missing values on the working memory test and six with negative sensitivity (*d*') score on the go/no-go task were excluded from analysis of working memory and inhibitory control variables, respectively. Negative *d'* score happens when hit rate is lower than false alarm rate that can occur as a result of response confusion (Stanislaw & Todorov, 1999). However, one child with negative *d'* score in the fourth block of switching task was not excluded from the analysis as it could be an indicator of perseverance. Moreover, the assumption of normality and homogeneity of variance in addition to outlying scores were inspected in all the analyses. Two outliers found in parental play support scores and one from switching scores were excluded from the analyses.

Bivariate correlation was computed to evaluate the relationship between preschoolers' performance in EF tasks on the one hand and their home activities and parents' play beliefs on the other. Analysis of the home activities was run using individual items. Furthermore, we conducted hierarchical regression analyses predicting children's performance on the EF tests from significant correlates from the home activities and the parental play beliefs variables controlling for children's age and SES. The control variables of age and SES were entered first in the regression models, followed by entering predictors that showed significant associations with the dependent variable based on the

results of correlation analyses. In analyzing inhibitory control skills, we used *d'* which is calculated using hit (correct go trial) and false alarm (incorrect no-go trials) rates.

2.3. Results

Descriptive statistics

Table 2 presents descriptive statistics for preschoolers' executive functions, home activities and parental play belief scores. It is presented in the way that data was used in the analysis, i.e., the excluded outliers from the analysis were also excluded from the descriptive statistics.

Correlational analyses

In bivariate correlation analyses, we examined whether the sociodemographic variables (children's age and SES), child's home activities and parents' play beliefs variables were correlated with children's performance in EF tasks, as shown in Table 3. Both age and SES demonstrated a significant, positive correlations with performance on the go/no-go task and on the VSWM test. Spending mealtime together with the family, having breakfast at home, frequency of pretend play, and peer play showed significant positive relations with children's performance on the go/no-go task. Moreover, parental play support demonstrated a significant positive correlation with performance on the go/no-go task. Frequency of having breakfast at home and the frequency of participation in arts and crafts activities also showed significant positive correlations with preschoolers' performance on the Mr. Peanut VSWM task.

Hierarchical regression analyses

Hierarchical regression analyses were conducted to determine the contribution of children's home activities and parental play belief variables for predicting children's inhibitory skills, after controlling for age and SES. Accordingly, age and SES were entered first in the regression model. As shown in Table 4, this model accounted for a significant proportion of the variance (32%) on the go/no-go task performance [F (2, 77) = 18.49, $p < .001$)]. Next, based on the correlation analyses, the frequency of mealtime

together with family, the frequency of having breakfast at home, the frequency of pretend play, the frequency of peer play, and parental play support were entered into the regression. The result showed that breakfast and parental play support were significant predictors in the model, while pretend play, peer play and spending mealtime together were not. After removing pretend play, peer play and mealtime together variables from the equation, the model was significant [F (4, 75) = 16.67, $p < .001$] and explained 47% of the variance in go/no-go task performance. Thus, breakfast at home and parental play support beliefs explained an additional 15% variance in inhibitory control. Both variables were medium-sized predictors (parental play support: $\beta = .36$, $p < .001$, frequency of breakfast: $\beta = .31$, $p = .001$).

Another hierarchical regression model was developed to examine the contribution of frequency of having breakfast at home and frequency of participation in arts and crafts for children's visual-spatial working memory. Breakfast experience at home and participation in art and craft were added to the model next to age and SES variables as a block. The result showed that age and SES explained 18% of the variance in Mr. Peanut VSWM [F (2, 79) = 8.79, $p < .001$]. Breakfast variable was removed from the model as its contribution was not significant. The inclusion of art and craft variable in the model improved the model's explained variance by 5%. It was a small-sized but significant predictor ($\beta = .22$, $p = .03$). Thus, the final model explained 23% [F (3, 78) = 7.87, $p < .001$] of the total variance in Mr. Peanut VSWM task performance. The summary of the final model is presented in Table 4.

2.4. Discussion

This study aimed to explore the relationship between preschoolers' home activities and their EF skills, including inhibitory control, cognitive shifting, and visual-spatial working memory. We also examined, for the first time as far as we know, the relationship between parental play beliefs and preschoolers' EF skills. The findings of the study are in line with the hypothesis suggesting a significant positive relation between parental play beliefs and their children's EF skills, at least as far as inhibitory control is concerned.

Our results showed that the frequency with which children have breakfast at home and, interestingly, parental play support beliefs were significant predictors of preschoolers' inhibitory control skills, after controlling for age and SES. In contrast, play frequency or parental play beliefs were not related to children's visual-spatial working memory capacity, the only significant predictor of which was the frequency of arts and crafts activities at home, after controlling for age and SES. In sum, our results support that early home experiences provide young children with opportunities that can promote their EF development (Rhoades et al., 2011). However, different activities and parental beliefs seem to have different effects on the components of EF (inhibitory control and visual-spatial working memory).

Our findings that indicate a significant positive relationship among age, SES and EF confirm the results of previous studies (Noble et al., 2005; & Sarsour et al., 2011). Concerning breakfast experience, the result also supports previous findings indicating that breakfast affects cognitive functions (Wesnes et al., 2003). One of the potential explanations for this finding could be that regular breakfast affects the nutritional value the child receives which could influence brain development (Datar & Nicosia, 2012). Another justification could be that having or omission of breakfast that morning could temporarily affect children's performance of EF tasks (see Datar & Nicosia, 2012). Alternatively, this relationship might be mediated by other factors such as the effects of household chaos, which is thought to be associated with irregular and altered family meals as well as food-insecurity (Fiese, Gundersen, Koester, & Jones, 2016; Rosemond et al., 2019). There is also substantial evidence demonstrating that children's chaotic home environments are linked with less optimal cognitive function (Deater-Deckard et al., 2009; Hanscombe, Haworth, Davis, Jaffee, & Plomin, 2011).

One of the most important findings in the current study is the significant positive relationship between parental play support and preschoolers' inhibitory control skills. This demonstrates that children with parents holding beliefs that play is an important means of development beyond amusement and valuing of play relative to more explicit academic activities at home, such as reading to a child, tend to have better inhibitory control skills. In this regard, after interpreting the results of three parental belief studies,

LaForett & Mendez (2016) pointed out that parents' play beliefs could affect the degree to which they encourage their children's play at home, the nature of their children's play activities, and the level of involvement in their children's play. Consistent with this, parents with strong play support beliefs could foster opportunities for their children's play by supplying various play resources and by actively joining them in play stimulation activities (Johnson et al., 2005). This would improve the home environment and thereby create better opportunities for children to engage in cognitively challenging activities that could contribute to their EF development. Moreover, there is also empirical evidence confirming that parental play support beliefs and academic focused beliefs were, respectively, positively and negatively related to their children's integrative play skills (LaForett & Mendez, 2016).

A deeper level of parental involvement in their children's play could promote better parent-child relationship, opportunities for scaffolding, attachment security, and language skill among others. There are studies that evidence a positive association of scaffolding (Hammond et al., 2012; Hughes & Ensor, 2009), attachment security (Bernier et al., 2012), and verbal ability (Landry et al., 2002) with EF skills. Bernier et al. (2010) also highlight the importance of parent-child relationship in the development of children's self-regulatory capacities.

We speculate three reasons for the finding indicating the effects of parental play beliefs only for inhibitory control and not for VSWM. First, the result could be related to the nature of the play support belief subscale used itself. Around one-third of the items in the subscale explicitly address the importance of play in the development of social–emotional competence which is significantly, positively linked with the development of inhibitory control (Rhoades, Greenberg, & Domitrovich, 2009). On the other hand, there is no explicitly stated item in the subscale that is related to working memory (VSWM). As a result, the subscale is expected to have more power to address inhibitory control skills than VSWM.

Second, as the ability to control behaviors and emotions in accordance with social expectations is an important part of early social-competence (Rhoades et al., 2009), the parents who hold a strong play support belief would give priority to the development of

these important skills. Parents' efforts to develop such skills could directly or indirectly contribute to the development of inhibitory control. There has been also a theory and some data demonstrating that inhibitory control may facilitate the process of developing these skills (Hughes, Dunn, & White, 1998; Kochanska, Coy, & Murray, 2001). As a result, parents would work on improving their children's inhibitory control skills as a means to improve their children's social-emotional competence. In this regard, in their study, Rhoades, Greenberg, & Domitrovich (2009) found that inhibitory control significantly predicted social–emotional competence above and beyond other variables associated with it.

Third, many of the games that children play in their everyday lives involve the use of inhibitory control skills (e.g., Simon Says, Wesley says, traffic light,…), however only very few of them ("memory" or arts and crafts activities) directly target VSWM. As a consequence of this, common children's games are more likely to have a measurable facilitatory effect on inhibitory control skills than VSWM.

Another interesting result found in the current investigation is the finding depicting a significant positive association between the frequency of participation in arts and crafts activities and VSWM. It is plausible that participation in arts and crafts could contribute to a child's ability to organize visual stimuli to create an understanding of meaningful patterns. This skill could help children to improve their VSWM. Accordingly, in the Mr. Peanut test, children with more experience in arts and crafts might be better at holding the location of the stickers in their mind than their counterparts who engage in the same activities infrequently. This situation could promote their performance in VSWM task.

The result indicating no significant relationship between parents' academic focus beliefs and their children's EFs might suggest that making children focus on explicit academic-related activities at home, instead of play activity, during the preschool years, could be less important for their EF development. This is also confirmed by the finding from the present study that indicates no significant relationship between the frequency of academic activity or parental academic focus beliefs at home and EF. At the same time, practical experience of preschools in Ethiopia suggests that preschoolers are engaged in far less play activity at their preschools as most of their time is allotted for academic purpose

instead (Tigistu, 2013). Therefore, parents should be aware of the importance of play for the overall development of children and promote their children's play after preschool instead of spending much of their home time with explicit academic-related activities.

The study has some limitations. First of all, we did not manage to test our research questions on cognitive flexibility due to the small variance found on the task we used. The sample in the current study was chosen based on convenience and was not representative (for instance, we missed participants from rural areas). Children's weight and perinatal risk factors would provide very valuable information about EFs, unfortunately we have no data on them in this study. Moreover, as home activities were measured using individual items, the reliability of the scale was not proven. Finally, as the interpretation of the findings regarding parental beliefs and children's activities at home (Fogle & Mendez, 2006; LaForett & Mendez, 2016; Parmar et al., 2004) needs the demographic and socio-cultural contexts to be taken into account, it is questionable how the results can be generalizable to other socio-cultural contexts. Therefore, subsequent work is needed to (1) test the predictors on cognitive flexibility; (2) replicate the study in different socio-cultural contexts; (3) improve the validity of children's home activities scale and (4) determine the path by which parents' play beliefs and preschoolers' home activities relate to EF development. For instance, in addition to parental play belief it would be interesting to assess the role of parent-child interactions and the nature of scaffolding during play in order to create a better understanding of the overall picture of the issue under investigation.

Conclusions

Based on the results, we can conclude that preschoolers' home activity and parental play support are related to children's EF development. In general, children with parents valuing the importance of play for the overall development of children tend to have better inhibitory control skills. This is of especially high practical relevance in Ethiopia where preschoolers are being enrolled in very structured programs focusing more on literacy and far less on play (Tigistu, 2013). Besides, children who are frequently having breakfast and participate in arts and crafts activities at home tend to show better inhibitory control skills and visual-spatial working memory capacities, respectively.

Table 1

Sample demographics

Variables	Frequency	Percent
Mother's education level		
Elementary school complete	16	15.7
High school complete	42	40.8
College diploma	30	29.1
University degree	11	10.7
Graduate degree (master's or above)	3	2.9
Not reported	1	1
Father's education level		
Elementary school complete	10	9.8
High school complete	24	23.5
College diploma	27	26.5
University degree	21	20.4
Graduate degree (master's or above)	15	14.6
Not reported	5	4.9
Gross household annual income in Birr		
0 – 24,999	8	7.8
25,000 – 49,999	16	15.7
50,000 – 79,999	25	24.5
80,000 – 99,999	17	16.7
100,000 – 149,999	20	19.6
150,000 – 199,999	12	11.8
200,000 or more	2	2.0
Not reported	2	2.0

Table 2

Mean, standard deviation, minimum and maximum scores for children's EF performance, home activities and parental play beliefs

Variables	N	Mean	SD	Min – Max
SES	95	3.27	1.09	1.50 – 6.25
Child's EF				
VSWM	95	2.50	0.80	0.67 – 4.00
Inhibitory control	95	2.57	1.00	0.25 – 4.20
Cognitive flexibility	84	-.33	.59	-1.56 – .88
Child's home activity				
Academic skills practice after preschool	102	3.12	1.15	1 – 5
Mealtime together with family	99	3.60	1.02	2 – 5
Breakfast at home	99	2.88	1.09	1 – 5
Engage in pretend play	99	3.10	1.27	1 – 5
Engage in motor play	102	3.27	1.11	1 – 5
Engage in fine-motor activities	100	3.25	1.18	1 – 5
Participate in arts and crafts	95	2.43	1.40	1 – 5
Engage in solitary play	97	2.30	1.45	1 – 5
Play with peers	101	3.29	1.30	1 – 5
Do sports & physical activities	101	2.78	1.18	1 – 5
Parents' play beliefs				
Parental belief: Academic focused	95	18.80	4.67	10.00 – 29.00
Parental belief: Play support	92	72.19	6.80	55.00 – 85.00

Table 3

Bivariate correlations between study variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Child's Age	1															
2. SES	.06 N = 95	1														
3. Visual-spatial working memory	.41** N = 94	.21* N = 88	1													
4. Inhibitory control	.38** N = 94	.46** N = 88	.41** N = 89	1												
5. Academics-related activities	.19 N =101	-.05 N = 95	.06 N = 95	.01 N = 95	1											
6. Mealtime with family	.07 N = 98	.32** N = 92	.01 N = 93	.25* N = 92	-.03 N =99	1										
7. Breakfast at home	.21* N = 98	.23* N = 93	.21* N = 92	.34** N = 92	.25* N =99	.04 N =96	1									
8. Pretend play	.33* N = 98	.27* N = 93	.14 N = 92	.39** N = 92	.05 N =99	.28** N = 97	.34** N = 97	1								
9. Motor play	.15 N = 101	.11 N = 95	.02 N = 95	.19 N = 95	.04 N=102	.00 N = 99	.16 N = 99	.18 N = 99	1							
10. Fine motor activities	.15 N = 99	.10 N = 93	.20 N = 93	.20 N = 93	-.05 N =100	.17 N = 98	.05 N = 98	.18 N = 98	-.02 N = 100	1						
11. Arts and crafts	-.04 N = 94	.03 N = 89	.22* N = 88	.08 N = 88	.02 N =95	.07 N = 93	.22* N = 95	.05 N = 95	.10 N =95	.25* N =95	1					
12. Solitary play	.00 N = 96	-.01 N = 91	.04 N = 90	.09 N = 90	-.15 N =97	.18 N = 95	.06 N = 95	.10 N = 96	-.07 N = 97	.08 N =96	.23* N =92	1				
13. Peer play	.04 N = 100	.27* N = 94	.08 N = 95	.22* N = 95	.18 N =101	.22* N = 98	.22* N = 98	.27** N = 98	.24* N = 101	.04 N =99	-.17 N =94	-.07 N =96	1			
14. Sports and physical activities	.27* N = 101	.06 N = 95	.17 N = 95	.12 N = 95	.11 N =102	.22* N = 99	.11 N = 99	22* N = 99	.44** N =102	.12 N =100	.20 N =95	.13 N =97	.14 N =101	1		
15. Parental belief: Academic focused	-.01 N = 94	.01 N = 88	.03 N = 88	.04 N = 88	.32** N =95	-.06 N = 92	.08 N = 94	-.03 N = 93	.10 N =95	.01 N =94	-.08 N =91	-.08 N=91	.14 N =94	.08 N =95	1	
16. Parental belief: Play support	.22* N = 91	.37** N = 86	.08 N = 87	.42** N = 87	-.29** N =92	.44** N = 89	-.07 N = 92	.30** N = 91	.10 N =92	.03 N =91	-.04 N =89	.22* N =90	.04 N =92	.20 N =92	-.21* N =91	1

*$p < .05$; **$p < .001$

Table 4

A hierarchical regression of inhibitory control and visual-spatial working memory using preschoolers' home activity and parental play support variables.

	Inhibitory control				Visual-spatial WM			
	Step 1		Step 2		Step 1		Step 2	
	β	*95% CI*	*β*	*95% CI*	*β*	*95% CI*	*β*	*95% CI*
Age	.32	(.02, .07)**	.21	(.00, .05)*	.35	(.02, .06)**	.36	(.02, .06)***
SES	.44	(.23, .58)***	.23	(.04, .39)*	.22	(.01, .31)*	.22	(.02, .31)**
Breakfast			.31	(.12, .45)**				
Play support			.36	(.02, .08)***				
Arts and crafts							.22	(.02, .24)*
F	18.49***		16.67***		8.79***		7.87***	
R^2	.32		.47		.18		.23	
adj R^2	.31		.44		.16		.20	
R^2-change			.15				.05	

**p <.05; **p <.01; ***p <.001; 95% CI*

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Chapter Three

Parents' Beliefs about Play and the Purpose of Preschool Education, Preschoolers' Home Activity and Executive Functions (STUDY 2)[3]

3.1. Objective of the Study

The purpose of the current study was to replicate and extend previous findings shown in Chapter Two (Metaferia, Takacs, & Futo, 2020) which indicate a link between preschoolers' home experiences (parental play beliefs and preschoolers' home activities) and their EF skills, and was conducted in Ethiopia. The current study examined Hungarian parents' beliefs about the purpose of preschool education and its relationship with their play beliefs. The following research questions were investigated in the study:

- Are there associations between parents' play beliefs and their children's EF skills?
- Do preschoolers' frequency of engagement in activities at home (including play and other activities) significantly relate to their EF skills?
- What beliefs do Hungarian parents hold about the purpose of preschool education and how are their educational beliefs related to their play beliefs?

Hypothesis

Based on the accumulating literature, we hypothesized that the frequency and duration of play activities and parents' play support would be related to children's EF skills. More specifically, based on the findings from our previous study (Metaferia, Takacs, & Futo, 2020), we hypothesized that parental play support beliefs would be related to children's inhibitory control skills, with strong positive play support beliefs associated with better inhibitory control skills. We also speculated based on this previous study that children's frequency of participation in arts and crafts activities would be positively linked to their VSWM skills. On the other hand, we did not make specific hypotheses concerning the

[3]Metaferia, B. K., Futo, J., Drew, R., & Takacs, Z. K. (2020). Parents' Beliefs About Play and the Purpose of Preschool Education, Preschoolers' Home Activity and Executive Functions. *Front. Psychol*, *11*(1104), 1–11. https://doi.org/10.3389/fpsyg.2020.01104

parents' beliefs of the primary purpose of preschool education, this was an exploratory question of the present study.

3.2. Methods

Participants

The sample comprised eighty-seven preschoolers (44 boys, 42 girls, and one not reported; mean age = 62.37 months; SD = 8.33 months; age range = 47 – 80 months) and their parents (eight male and 79 females; mean age = 37.73 years; SD = 5.64 years; age range = 22 – 63 years) from four preschools in Budapest (the capital of Hungary) and one preschool in Sopronhorpács (a Hungarian village). Eleven of the 87 participants were from Sopronhorpács. Independent-samples *t*-tests depicted that there were no significant differences between the two subsamples on either children's age ($M_{Budapest}$ = 61.90, $SD_{Budapest}$ = 8.26; $M_{Sopronhorpács}$ = 65.45, $SD_{Sopronhorpács}$ = 8.54); t (82) = -1.32, p = .189; or SES ($M_{Budapest}$ = 0.028, $SD_{Budapest}$ = 0.797; $M_{Sopronhorpács}$ = -0.070, $SD_{Sopronhorpács}$ = 0.847); t (82) = 0.376, p = .708; and other important variables such as EF scores and play beliefs. The caregivers who filled out the questionnaire were the children's mothers (93.1%), fathers (5.7%) and grandmothers (1.1%). The child participants had been attending preschool for less than a year (50.6%), between a year and two (47.1%), and for three years (2.3%) at the time of data collection. The education level of parents is summarized in Table 1.

Procedure

Following approval of the study by the Research Ethical Committee of the Faculty of Psychology and Education at ELTE Eötvös Loránd University (issue number: 2017/209), the directors of a number of preschools were contacted. After receiving confirmation of interest from the directors of a preschool, and obtaining consent from parents, questionnaires were sent home with children. Parents were requested to return completed questionnaires to the preschool, where the researchers collected them. In addition, trained research assistants administered EF tests to the participating children during individual testing sessions in a quiet room at their preschool. The order of these neuropsychological

tests was the same for all participants: starting with the go/no-go task, followed by the switching task, and finishing with the visual-spatial working memory task. The session took about 20 – 25 minutes.

Measures

The questionnaire consisted of four parts: demographic information, parental beliefs regarding the purpose of preschool education, play beliefs, and the child's home activities. It was prepared in English and translated into Hungarian. The translation process involved two independent translators who were native speakers of Hungarian and fluent in English. The second and third authors collected the two translations, checked the discrepancies and made the final version accordingly.

Demographic information

Information concerning the respondent's relationship with the child, the child's gender and age, the highest educational level of the parents, the family gross annual income, family size, and preschoolers' year of enrolment in preschool was collected. Parental educational level was measured on a five-point scale ranging from elementary school completed (1) to graduate degree/Master's or above (5). The family's annual gross income was measured on a nine-point categorical scale. An aggregate SES variable was created by averaging the standardized score of the average education of the parents and the standardized score of the annual gross income per family member.

Parental Play Beliefs Scale

The Parental Play Beliefs Scale (PPBS), developed by Fogle and Mendez (2006), was used to measure parents' play beliefs. Originally, PPBS was used with African-American mothers of preschoolers in the Head Start program. The scale consists of 25 Likert-scale items with five responses ranging from 1 (disagree) to 5 (very much agree). A principal component analysis in the validation study (Fogle & Mendez, 2006) revealed two subscales: Play Support and Academic Focused beliefs, the first consisting of 17 items (e.g., 'through play my child develops new skills and abilities,' and 'I can help my child learn to control his or her emotions during play') and the second including 8 items (e.g.,

'I do not think my child learns important skills by playing,' and 'I would rather read to my child than play together'). The subscales showed a good level of internal consistency (α = .90 and .73, respectively) in the scale validation study (Fogle & Mendez, 2006), as well as in the present study (α = .80 and 70. respectively) after removing one item from the play support subscale and two items from the academic focused subscale. The bivariate correlation of the two subscales showed a strong negative correlation ($r = -0.52$, $p < .001$).

Parents' Beliefs about the Purpose of Preschool Education Scale

To measure parents' beliefs about the purpose of preschool education, a rank-order scale consisting of 7 items indicating different possible purposes of preschool education was developed by the present investigators. The items were: general knowledge, cognitive skills, language development, social skills, enjoying themselves, emotional well-being and academic skills. Parents were requested to rank the items based on their personal beliefs on the importance starting from 1 (most important) to 7 (least important).

Child's Home Activities Scale

The Child's Home Activities Scale (CHAS) consisted of two parts: 1) the frequency of the activity (a Likert-scale) and 2) estimation of duration of time spent on the activities. The Likert scale was developed by Metaferia, Takacs, and Futo (2020) to assess the frequency of the preschoolers' participation in selected activities at home. It consisted of ten items designed to measure the frequency [ranging from 'very rarely /less than once a week' (1) to 'very frequently /most of the time during the day' (5)] with which preschoolers engage in the following activities: breakfast at home, spending mealtime with family, academic-related activities, pretend play, motor play, fine motor activities, arts and crafts, solitary play, peer play, and sports and physical activity. The second part of the CHAS was designed to measure the average duration children are engaged in the activities at home. Parents were provided with five activities and requested to provide an estimation of time (in minutes) their children spent participating in each activity during the day. The time estimations were made separately for each activity for the weekdays and for weekends. The activities examined were: screen time, night sleeping, peer play,

playing with adults, and playing alone. Average play duration per a day variable was created for each activity by averaging the weekdays and weekends play time. Average total play duration variable was created by taking the average play duration per a day for peer play, play with adult, and solitary play.

Executive functions measures

EF skills including inhibitory control, switching, and visual-spatial working memory (VSWM) were measured using a computerized go/no-go task, switching task (using PsychoPy 1.85.1 version Psychological Software Tools; Peirce, 2008) and the Mr. Peanut task, respectively.

Inhibitory control

A computerized go/no-go task using pictures of a fish and a shark (see Wiebe, Sheffield, & Espy, 2012) consisting of 40 go (fish) and 20 no-go (shark) test trials was used to measure the inhibitory control skills of children. Before starting, children were instructed to press the space bar on a laptop as quickly as possible at the appearance of the target stimulus and withhold pressing the key whenever the non-target stimulus appeared on the screen. Children completed a practice session consisting of 4 go and 2 no-go trials prior to the testing session. During the test, each stimulus appeared on the screen for 1,500 ms unless the child pressed the response key sooner. Based on signal detection theory, sensitivity (*d'*) was calculated for each child using their frequency of responding to go trials /hit/ and no-go trials /false alarm/ (see Macmillan & Creelman, 2004). The maximum score a child could obtain is 4.20.

Cognitive flexibility

The switching task used in the present study was similar to the task used by Metaferia, Takacs, and Futo (2020). A modified Go/No-Go task was used including 4 blocks, in each of which the rule was switched. The task consisted of 16 go and 8 no-go trials in each block. Each stimulus was visible on the screen for 1,200 ms unless the child pressed the response key earlier. The Go and No-Go stimuli were counterbalanced across blocks. Accordingly, a picture of a cat was the go stimuli and a picture of the tiger the no-go

stimuli in the first and third blocks; and the stimuli were reversed for the second and fourth blocks. Before the beginning of each block children were informed of the Go and No-Go stimuli by the research assistant. Children completed a practice session before the first block consisting of 4 Go and 2 No-Go trials prior to they start testing. In order to calculate a switching score for each child, sensitivity was first calculated for each child during each block and then a sensitivity difference score between switching blocks (sensitivity of block 3 minus block 1 and sensitivity of block 4 minus block 2) was calculated. Next, the switching score for each child was calculated by taking the average of the difference between switching blocks (i.e., the average of block 3 minus block 1 and block 4 minus block 2). A child could obtain a maximum of 6.08 score.

Visual-spatial working memory

The Mr. Peanut test, developed based on the work of Morra (1994), was used in the present study to measure children's visual-spatial working memory (VSWM). Mr. Peanut is a clown-like figure who appears on the screen decorated with stickers at any of the14 different body locations after which he disappears. When he reappears the stickers are missing and the children's task is to indicate the parts of Mr. Peanut that were marked with stickers prior to his disappearance. The test consists of levels ranging from 1 to 7 body parts with 3 different trials at each level. For the child to move to the next level he/she had to respond to at least one of the three trials correctly. Responding only to one of the three trials correctly resulted in a score of .33 and responding at least two of the three trials correctly lead to a score of 1. The total score was the sum of the scores the child received at the different level. The possible maximum score that a child could achieve is 7.00. Children participated in a practice session consisting of 3 trials prior to the testing session. A child needed to respond to all 3 practice trials correctly before moving on to the test.

Data Analyses

A bivariate Pearson's correlation analyses were used to examine whether there was a significant relationship between parental play beliefs and preschoolers' home activities on the one hand and preschoolers' EFs scores on the other. We also used hierarchical

regression analyses to determine the extent to which parental play beliefs and preschoolers' home activities predicted preschoolers' EF skills. All hierarchical regressions applied in the study used a two-step process. Accordingly, in the first step, sociodemographic variables (children's age and SES) were entered as controls. In the second step, based on the results of the bivariate correlation analyses, significant correlates of the dependent variable from parents' play beliefs and preschoolers' home activity variables were entered together as predictors. Finally, parents' beliefs regarding the purpose of preschool education were analyzed using a Friedman-test. Post hoc analysis with Wilcoxon signed-rank tests were also conducted to examine the significance of the differences in beliefs. The relationship between parental beliefs about the purpose of preschool education and play beliefs was examined using a Kendall's tau-b correlational analysis.

All statistical analyses were conducted using SPSS v25.0 for Windows (IBM Corporation, Armonk, NY, USA). To manage the normality of the frequency of participation in motor play activity, the scores were managed by reverse score transformation. Accordingly, each score was first subtracted from the highest possible score plus one and then log transformed. Finally, the reversed log transformed scores were reversed back for easier interpretation (see Field, 2009). Furthermore, 8 outliers from mealtime scores and one from play with adult were excluded from the analysis as the transformation didn't work out.

3.3. Results

Table 2 presents descriptive statistics for the variables used in the analyses.

Correlational analyses

The first two research questions were designed to examine the association between children's activity at home and parental play beliefs on one hand and their EFs on the other. Table 4 indicates the results of these association. We also aimed to investigate how parental beliefs about the purpose of preschool education are related to their play beliefs. Surprisingly, as can be seen from Table 5 neither parents' academic focused beliefs, nor

their play support beliefs were significantly correlated with any of the preschool purpose variables.

Hierarchical regression analyses

Four hierarchical regression analyses were run to investigate the extent to which preschoolers' home activity and their parents' play beliefs were predictive of preschoolers' EF skills (inhibitory control, visual-spatial working memory, and switching). In each regression analysis, in the first step sociodemographic variables (i.e., child's age, SES) that had a significant relationship with the corresponding components of EF were controlled, while in the second step the significant correlates of the dependent variables from the parental beliefs and the home activity variables were entered as predictors. The results of the hierarchical regression analyses are summarized in Table 6.

In the first regression model preschoolers' inhibitory control skills were predicted. Age and SES were entered in the first block. As shown in Table 6, age and SES together accounted for a significant level of the variance (19%) [F (2, 73) = 8.039, p = .001)]. Then, based on the result of the bivariate correlational analyses, frequency of breakfast at home, pretend play, fine motor activities, peer play, and sports and physical activities in addition to total play time and parental play support beliefs were entered into the regression model in the second block. Only the frequency of pretend play and parental play support belief were significant predictors in the model. After removing the non-significant predictors (breakfast at home, fine motor activities, peer play, sports and physical activities, and total play time), the model explained a significant amount of variance of 35% in inhibitory control [F (4, 73) = 9.123, p < .001)]. As shown in Table 6, parental play support and preschoolers' frequency of participation in pretend play were found to be medium (β = .30)- and small-sized (β = .27) positive predictors, respectively.

The second hierarchical regression analysis examined the contribution of home activities and parental play beliefs to VSWM. Sociodemographic variables (age and SES) were entered in the model in the initial block, explaining 17% of the variance in VSWM [F (2, 79) = 8.10, p =.001)]. Next, based on the results of the correlational analyses, frequency of pretend play, fine motor activities and arts and crafts were entered in the model in the

second block. However, only frequency of participation in fine motor activities was a significant predictor of VSWM, while pretend play and arts and crafts were not. After removing the non-significant predictors, the total variance explained by the model reached 24% [F (3, 79) = 8.16, p < 001)]. The inclusion of the fine motor activity variable improved the model by 7% and this variable was a significant, small-sized (β = .27) positive predictor in the final model, as shown in Table 6.

The third hierarchical regression analysis was built to predict children's switching skills. In step 1, SES was included as a control variable and explained a significant level of variance (7%) in switching score [F (1, 80) = 5.76, p = .019)]. In step 2, frequency of participation in pretend play was entered into the model. However, the inclusion of this variable did not result in any significant improvement to the model and it was not a significant predictor either.

Friedman ANOVA

In the third research question, we targeted to investigate the beliefs parents hold about the purpose of preschool education. Friedman ANOVA and Wilcoxon signed-rank tests were used to examine differences between parents' beliefs about the purpose of preschool education. Overall, there was a statistically significant difference among parents' beliefs about the purpose of preschool education $\chi2(6) = 157.57$, $p < .001$. Post hoc analysis with Wilcoxon signed-rank tests using Bonferroni correction, resulting in a significance level set at $p < 0.0024$, was carried out. The median and interquartile range of parental beliefs about the purpose of preschool education is summarized in Table 3. There were statistically significant differences between the following parental beliefs: general knowledge was considered less important as compared to social skills (Z = -6.48, p < .001), enjoying themselves (Z = -5.57, p < .001), and emotional well-being (Z = -5.21, p < .001); cognitive skills was considered less important as compared to social skills (Z = -6.35, p < .001), enjoying themselves (Z = -4.54, p < .001), and emotional well-being (Z = -4.82, p < .001); language development was considered less important as compared to social skills (Z = -6.80, p < .001), enjoying themselves (Z = -4.92, p < .001), and emotional well-being (Z = -5.06, p < .001); academic skills was considered less important as compared to social skills (Z = -7.25, p < .001), enjoying themselves (Z = -5.78, p <

.001), and emotional well-being (Z = -5.65, $p < .001$). However, there were no statistically significant differences between the rest [general knowledge vs cognitive skills (Z = -2.25, $p = .025$), general knowledge vs language (Z = -1.15, $p = .252$), general knowledge vs academic skills (Z = -1.36, $p = .173$), cognitive skills vs language development (Z = -1.06, $p = .288$), cognitive skills vs academic skills (Z = -3.01, $p = .003$), language development vs academic skills (Z = -2.13, $p = .033$), social skills vs enjoying themselves (Z = -2.04, $p = .042$), social skills vs emotional well-being (Z = -2.28, $p = .023$), and enjoying themselves vs emotional well-being (Z = -0.13, $p = .901$)].

3.4. Discussion

The main goal of the present study was to examine the role of play and other home activities in children's developing EF skills in a Hungarian sample. This was achieved with parental reports of the frequency and duration with which their children engage in different sorts of play at home and also by investigating parental play beliefs. Additionally, we aimed to assess parents' beliefs about the purpose of preschool education and examine how these educational beliefs are related to their beliefs about play.

Small-to-moderate positive correlations were found between the three components of EF skills, which is in line with the literature (see Lan, Legare, Ponitz, Li, & Morrison, 2011) suggesting that these components are related but separable components. Our results demonstrated that parental play support and children's frequency of pretend play are significant predictors of inhibitory control, after controlling for age and SES. This means that children who frequently engage in pretend play at home and have parents who hold strong play support beliefs are likely to have better inhibitory control skills than their peers. The result that parental play support is a medium-sized predictor of children's inhibitory control skills after accounting for age and SES is consistent with the finding reported by Metaferia, Takacs, and Futo (2020) in an Ethiopian sample. Additionally, frequency of pretend play was also an important predictor for inhibitory control. This replicated previous finding (Kelly & Hammond, 2011) indicating that pretend play is positively linked to the development of inhibitory control in young children.

Interestingly, unlike in the present study, Metaferia, Takacs, and Futo (2020) found that the frequency of having breakfast at home was also a significant predictor of children's inhibitory control skill. This difference could be attributed to a variation in the socio-cultural context under which the two studies were conducted. Breakfast service is common in Hungarian preschools such that preschoolers are given an opportunity to eat at their preschool center when they arrive in the morning. However, such service is not provided by Ethiopian preschools.

Another important finding in the present study is that the frequency with which children engage in fine motor activities at home was a small but significant predictor of their performance in a VSWM task, after controlling for age and SES. According to our finding, children with better participation in fine motor activities at home demonstrate better visual-spatial working memory performance which is not in support of our hypothesis speculated that frequency of participation is arts and crafts (instead of fine motor skills) would have been a significant predictor of VSWM. The results of the current study extend a previous finding indicating that fine motor skills are significantly positively associated with VSWM among typically developing adolescents (Rigoli, Piek, Kane, & Oosterlaan, 2012a). In the same line, another study indicates that motor coordination is linked to visuo-spatial working memory among children with developmental coordination disorder (Alloway & Temple, 2007). On the other hand, even though some home activities were significantly correlated with children's cognitive flexibility in the present study, none of these variables were significant predictors after controlling for SES.

The result in the present study indicates that Hungarian parents hold the belief that development of social-emotional competence is the primary purpose of preschool education. The reason for this result could be that the purpose of preschool education in Hungary (Kormányrendelet az óvodai nevelés országos alapprogramjáról, Act of 363/2012) is very well articulated and the expectation for a preschool to be academically focused is neither culturally widespread nor accepted. However, no significant association was found between the parents' beliefs about the purpose of preschool education and their play beliefs. This means, surprisingly, that parents holding academic

focused or play support beliefs do not have a corresponding belief about the purpose of preschool education.

The current investigation makes valuable contributions to our understanding of the role of play and other home activities in children's developing EF skills. However, it has several limitations. First, our findings should be interpreted with caution given that parental play beliefs and preschoolers' activities at home could vary as a function of different socio-economic contexts. A follow-up study using a cross-cultural design is highly recommended. Second, reliance on self-report data in assessing children's activities at home and parental play beliefs might make the data susceptible to social desirability bias. Moreover, the frequency with which children engage in different home activities was assessed with single items, thus we have no information regarding the reliability of these measures. Third, the content of home activities was not explored in the present study and may be of greater importance than the frequency of participation in them. Future studies should take the content of home activities into account to gain a more comprehensive understanding of what activities children engage in. Further, IQ was not assessed and may account for some of the variability in the EF scores. Additionally, we used a convenience sample which was not representative of the population from which the participants were recruited. To establish further generalizability of our results, it will be important to recruit a representative sample in follow-up studies. Finally, probably the biggest limitation of the present study is that we applied a correlational strategy thus the associations found might not reflect casual relations and might be affected by confound variables. While we used socioeconomic status as a control variable in all the models, it is still questionable whether other variables might explain the results. It is possible, for instance, that parental play support, children's play activities and inhibitory control skills are related to other parenting factors or home activities and that such a third variable (e.g. parent-child relationship, attachment security, scaffolding) could explain the relationship (see Bernier et al., 2012; Bernier, Carlson, & Whipple, 2010b; Fay-Stammbach, Hawes, & Meredith, 2014; Hammond, Müller, Carpendale, Bibok, & Liebermann-Finestone, 2012). In a similar vein, the link between frequency of children's engagement in fine motor activity and visual working memory could be explained by a third variable such as level of motor coordination (see Rigoli et al., 2012).

In sum, the present study has important conclusions regarding the role of play and other activities at home in the development of EF skills. We found that the frequency of pretend play and parental play support beliefs are important predictors of preschoolers' inhibitory control skills, while the frequency of fine motor activities is a significant factor in visual-spatial working memory. Additionally, we found that Hungarian parents hold the belief that building socio-emotional competence is the primary purpose of preschool education as opposed to developing academic skills. However, these educational beliefs were not related to parents' views concerning the value of play. Further studies are needed to replicate the present findings.

Table 1

Sample demographics

Education level	Mother's		Father's	
	Frequency	Percent	Frequency	Percent
Elementary school complete	3	3.4	4	4.6
High school complete	23	26.4	36	41.4
College diploma	26	29.9	15	17.2
University degree	30	34.5	25	28.7
Graduate degree (master's or above)	5	5.7	6	6.9
Not reported	-	-	1	1.1

Table 2

Mean, standard deviation, minimum and maximum scores on children's EF performance, home activities and parental play beliefs

Variables	N	Mean	SD	Min - Max
Child's EF				
Inhibitory control	85	2.87	.86	.77 – 4.20
Cognitive flexibility	84	-.18	.65	-2.16 – 1.53
VSWM	86	2.56	.84	.67 – 4.33
Child's home activity				
Academic skills practice after preschool	85	2.69	1.42	1 – 5
Mealtime together with family	87	3.97	1.07	1 – 5
Breakfast at home	87	3.76	.79	2 – 5
Engage in pretend play	86	3.38	1.43	1 – 5
Engage in motor play	84	4.15	1.17	1 – 5
Engage in fine-motor activities	86	3.57	1.15	1 – 5
Participate in arts and crafts	87	2.43	1.15	1 – 5
Engage in solitary play	83	3.54	1.21	1 – 5
Play with peers	86	4.01	1.33	1 – 5
Do sports & physical activities	86	3.07	1.29	1 – 5
Screen time	70	1.08 hrs	0.72 hr	0.05 – 3.07 hrs
Night sleep total time	81	9.54 hrs	.89 hr	7.65 – 12 hrs
Time spent on playing with adult	80	1.83hrs	1.23 hrs	.28 – 5.15 hrs
Total play time	52	4.96 hrs	2.21 hrs	1.1 – 9.87 hrs
Parents' play beliefs				
Parental belief: Academic focused	80	10.36	2.77	6 - 19
Parental belief: Play support	82	69.78	5.11	55 - 79

Table 3

The median and interquartile range of parental beliefs about the purpose of preschool education

Purpose of preschool education	Median	Interquartile range
General knowledge	5.00	4.00 - 6.00
Cognitive skills	4.00	3.75 - 6.00
Language development	5.00	4.00 - 6.00
Social skills	2.00	1.00 - 3.00
Enjoy themselves	2.00	2.00 - 4.00
Emotional well-being	2.50	1.00 - 4.00
Academic skills	6.00	4.00 - 7.00

Table 4

Bivariate correlations among demographics, home activities, parental play beliefs, and executive functions

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1. Child's Age	1																				
2. SES	.03 N=81	1																			
3. Visual-spatial working memory	.33** N=83	.27* N=83	1																		
4. Inhibitory control	.31** N=82	.32** N=82	.40** N=84	1																	
5. Cognitive flexibility	.20 N=81	.26* N=81	.32** N=83	.32** N=83	1																
6. Academic-related activities	.25* N=82	-.04 N=82	.08 N=85	.09 N=83	-.09 N=82	1															
7. Mealtime with family	.15 N=76	-.02 N=76	.11 N=79	.15 N=78	.10 N=76	-.11 N=78	1														
8. Breakfast at home	.19 N=84	.35** N=84	.21 N=86	.27* N=85	.15 N=84	-.09 N=85	.26* N=78	1													
9. Pretend play	.06 N=83	.22* N=84	.26* N=85	.35** N=84	.24* N=83	.06 N=84	.18 N=78	.15 N=86	1												
10. Motor play	.22 N=81	.09 N=81	.16 N=83	.17 N=82	.17 N=81	-.05 N=82	.20 N=76	.18 N=84	.14 N=83	1											
11. Fine motor activities	.10 N=83	.18 N=84	.35** N=85	.30** N=84	.09 N=83	.06 N=84	.17 N=78	.25* N=86	.37** N=85	.07 N=83	1										
12. Arts and crafts	.10 N=84	.17 N=84	.23* N=86	.08 N=85	.08 N=84	.11 N=85	.03 N=87	.09 N=87	.16 N=86	.08 N=84	.54** N=86	1									
13. Solitary play	.04 N=80	-.04 N=81	.16 N=82	.11 N=81	-.09 N=80	.03 N=81	.24* N=75	.23* N=83	.35** N=82	.25* N=80	.25* N=83	.06 N=83	1								
14. Peer play	.06 N=83	.18 N=83	.02 N=85	.33** N=84	.13 N=83	.05 N=84	.27* N=79	.07 N=86	.28** N=85	.16 N=83	.23* N=85	.11 N=86	-.02 N=82	1							
15. Sports and physical activities	.10 N=83	.17 N=83	.12 N=85	.22* N=84	.15 N=83	-.01 N=84	.17 N=78	.33** N=86	.36** N=85	.27* N=83	.21 N=85	.15 N=86	.18 N=82	.40** N=85	1						
16. Screen time	-.02 N=67	-.34** N=68	.00 N=69	-.04 N=68	.08 N=67	.05 N=68	.14 N=64	.02 N=70	-.22 N=69	.03 N=67	.12 N=70	.02 N=70	-.07 N=67	-.08 N=70	-.06 N=69	1					
17. Sleep during night	.18 N=78	.20 N=78	.21 N=80	.20 N=79	.19 N=78	-.23* N=79	.14 N=73	.20 N=81	.11 N=80	.06 N=78	.24* N=80	.14 N=81	.18 N=77	.09 N=80	.06 N=80	.02 N=70	1				
18. Play with adult	.06 N=77	.12 N=79	.08 N=80	.16 N=78	.22 N=77	.06 N=79	.26* N=74	.15 N=80	.13 N=79	.15 N=77	.26* N=80	.32** N=80	-.02 N=77	.09 N=79	.27* N=79	.24 N=67	.27* N=75	1			
19. Total play time	.18 N=51	.15 N=50	.04 N=52	.33* N=50	.20 N=50	-.04 N=52	.21 N=52	.23 N=52	.13 N=51	.09 N=49	.26 N=52	.32* N=52	-.08 N=49	.28* N=52	.29* N=52	.41** N=50	.22 N=51	.80** N=51	1		
20. Parental play beliefs: Academic focused	-.02 N=77	-.32** N=78	-.05 N=80	-.10 N=78	-.05 N=77	.30** N=80	-.03 N=73	-.17 N=80	-.19 N=79	.01 N=77	-.12 N=79	-.01 N=80	.03 N=76	-.18 N=79	-.09 N=79	.24 N=65	-.30* N=74	-.18 N=76	-.11 N=50	1	
21. Parental play beliefs: Play support	.13 N=79	.26* N=79	.08 N=81	.40** N=80	.22 N=79	-.19 N=80	.15 N=74	.11 N=82	.20 N=81	.02 N=79	.11 N=81	.10 N=82	.06 N=79	.14 N=81	.07 N=82	-.09 N=66	.03 N=77	.30* N=75	.38** N=50	-.52** N=76	1

*$p < .05$; **$p < .001$

Table 5

Kendall's tau-b correlations among parental play beliefs and views about the purpose of preschool education variables.

	1	2	3	4	5	6	7	8	9
1. Academic skills development	1								
2. Emotional well-being	-.22* N=82	1							
3. Enjoy themselves	-.11 N=82	.15 N=82	1						
4. Social skills development	.18* N=82	-.43** N=82	-.43** N=82	1					
5. Language development	-.11 N=82	-.12 N=82	-.17 N=82	.11 N=82	1				
6. Cognitive skills development	-.20* N=82	.02 N=82	-.11 N=82	-.11 N=82	.03 N=82	1			
7. General knowledge	-.04 N=82	-.17 N=82	-.07 N=82	-.03 N=82	-.14 N=82	.04 N=82	1		
8. Parental belief: Academic focused	.01 N=75	.09 N=75	.03 N=75	.02 N=75	-.02 N=75	.04 N=75	-.11 N=75	1	
9. Parental belief: Play support	.09 N=78	-.02 N=78	-.04 N=78	-.02 N=78	.08 N=78	.10 N=78	.04 N=78	–	1

**p < .05; **p < .001*

Table 6

Hierarchical multiple regression models summary predicting inhibitory control, visual-spatial working memory and switching

	Inhibitory control				Visual-spatial WM				Switching			
	Step 1		Step 2		Step 1		Step 2		Step 1		Step 2	
	β	*95% CI*	*β*	*95% CI*	*β*	*95% CI*	*β*	*95% CI*	*β*	*95% CI*	*β*	*95% CI*
Age	.29	(.008, .052)*	.24	(.004, .045)*	.31	(.011, .053)**	.29	(.009, .049)**				
SES	.30	(.095, .574)**	.15	(-.061, .402)	.27	(.064, .502)*	.21	(.007, .439)*	.26	(.038, .403)*	.21	(-.009, .366)
Pretend play			.25	(.026, .278)*							.19	(-.014, .187)
Play support			.30	(.016, .086)**								
Fine motor							.27	(.050, .353)*				
F	8.04**		9.12***		8.10**		8.16***		5.76*		4.41*	
R^2	.19		.35		.17		.24		.07		.10	
adj R^2	.16		.31		.15		.21		.06		.08	
R^2-change	.19		.16		.17		.07		.07		.03	

**p <.05; **p <.01; ***p <.001; 95% CI*

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Chapter Four

Parents' Views on Play and the Goal of Early Childhood Education in Relation to Children's Home Activity and Executive Functions: A Cross-Cultural Investigation (STUDY 3)[4]

4.1. Objective of the Study

The present investigation aimed at examining parents' beliefs about play and the purpose of preschool education, and preschoolers' home activities cross-culturally with preschoolers from Ethiopia and Hungary. The other purpose of the current investigation was to explore cross-cultural variations in the development of EF skills including inhibitory control, shifting and visual-spatial working memory. Finally, exploring cross-cultural variations in the links between preschoolers' home experiences and EF skills was another purpose of the study. To realize these purposes of the study, we formulated the research questions below:

- Do Ethiopian and Hungarian parents hold different views about the role of play in child development and the purpose of preschool education?
- Is there cross-cultural variation in the frequency of preschoolers' activities at home?
- Are there cross-cultural differences in preschoolers' EF skills including inhibition, switching, and visual-spatial working memory?
- Is there a cross-cultural difference in the relationships between the frequency of preschoolers' activities at home and their performance on the battery of EF tasks?

Hypothesis

We hypothesized that there would be clear cross-cultural variations in parental attitudes about the purpose of preschool education between the two sample groups. More

[4]Metaferia, B. K., Futo, J., & Takacs, Z. K. (2021). Parents' Views on Play and the Goal of Early Childhood Education in Relation to Children's Home Activity and Executive Functions: A Cross-Cultural Investigation. *Front. Psychol.*, *12*(646074). https://doi.org/10.3389/fpsyg.2021.646074

specifically, we speculated that Ethiopian parents' educational beliefs tend towards academic skills while Hungarian parents would tend to hold the belief that social-emotional development is the main purpose of preschool education. We also hypothesized that Hungarian parents would hold significantly stronger play support beliefs than their Ethiopian counterparts.

Based on previous studies (e.g. Metaferia et al., 2020; Metaferia, Takacs, & Futo, 2020), we hypothesized that there might be cross-cultural variations in the relationship the frequency of children's home activities and their parents' play support would have with children's performance on the battery of EF task. To be more specific, it was found in a previous study that parental play support beliefs and preschoolers' frequency of breakfast at home were positively linked to children's inhibitory control skills in an Ethiopian sample (Metaferia, Takacs, et al., 2020). On the other hand, in addition to parental play support beliefs, preschoolers' frequency of participation in pretend play was an important predictor of inhibitory control skills in a Hungarian sample (Metaferia, Futo, et al., 2020). We also speculated that children's frequency of participation in arts and crafts and in fine motor activities were important predictor of children's performance in VSWM task for Ethiopian and Hungarian samples respectively. Regarding the second and third research questions, we made no hypothesis, thus, these parts of the study were exploratory.

4.2. MATERIALS AND METHODS

Participants

The participants of the study were children attending preschools during the time of data collection and their parents. Preschoolers with special needs (recognized by the preschools), and multilinguals were excluded from the study. Preschools from which the participant children were selected represent lower to middle-class areas in their respective countries.

Ethiopia

Hundred and thirty-nine preschoolers (62 boys, and 77 girls; M_{age} = 63.83 months; *SD* = 7.68 months; age range = 44 – 84 months) and their parents (63 male and 76 females;

M_{age} = 36.66 years; *SD* = 7.14 years; age range = 20 – 60 years) recruited from nine preschools in the capital, Addis Ababa, participated in the study. All participating preschoolers were Amharic monolinguals. Family members of the participant preschoolers who supplied the requested information for the study were preschoolers' father (43.2%), mother (53.2%), grandfather (0.7%) and grandmother (1.4%).

Hungary

Hundred and twenty-seven preschoolers (61 boys, 66 girls; M_{age} = 62.06 months; *SD* = 9.37 months; age range = 45 – 84 months) and their parents (17 male and 110 females; M_{age} =37.71 years; *SD* = 5.97 years; age range = 22 – 63 years) from seven preschools in the capital, Budapest, took part in the study. Seventy-six of the total Hungarian participants in the current study also participated in a previous study (Metaferia, Futo, et al., 2020) of ours. All participating preschoolers were Hungarian monolinguals. Preschoolers' caregivers who provided the required information about the participant child were their father (7.9%), mother (90.6%), grandfather (0.8%) and grandmother (0.8%).

Independent sample t-tests depicted that there were no significant differences between the two samples on children's age [($M_{Ethiopia}$= 63.83, $SD_{Ethiopia}$ = 7.68; $M_{Hungary}$= 62.06, $SD_{Hungary}$ = 9.37); *t* (241.98) = 1.67, *p* = .097] or average parental education level [($M_{Ethiopia}$= .3.13, $SD_{Ethiopia}$ = 1.05; $M_{Hungary}$= 2.98, $SD_{Hungary}$ = .95); *t* (260) = 1.17, *p* = .245].

Table 1

Sample's demographics

	Ethiopian sample		*Hungarian sample*	
Variables	Frequency (Mother/father)	Percent (Mother/father)	Frequency (Mother/father)	Percent (Mother/father)
Parents' education level				
Elementary school complete	13/9	9/7	6/8	5/6
High school complete	39/34	28/25	37/50	29/39
College diploma	43/27	31/19	37/26	29/20
University degree	33/38	24/27	38/31	30/24
Graduate degree (master's or above)	9/30	7/22	8/12	6/9
Not reported	2/1	1/1	1/-	1/-
Gross household annual income (in Birr)				
0 – 24,999	21	15		
25,000 – 49,999	20	14		
50,000 – 79,999	26	19		
80,000 – 99,999	17	12		
100,000 – 149,999	22	16		
150,000 – 199,999	11	8		
200,000 or more	19	14		
Not reported	3	2		
Gross household annual income (in Forint)				
0 – 49.999			-	-
50.000 – 99.999			4	3
100.000 – 199.999			7	6
200.000 – 299.999			15	12
300.000 – 399.999			20	16
400.000 – 499.999			23	18
500.000 – 599.999			19	15
600.000 – 699.999			13	10
700.000 or above			19	15
Not reported			7	6

Procedure

Preschools from Addis Ababa and Budapest were contacted to recruit participants for the present study. After obtaining written consent of preschool directors, information sheet and consent paper were sent to parents of preschoolers to request for their participation including their preschoolers in the present study. When parents agreed to participate by signing the consent form, the questionnaires were sent to them. When parents returned the filled in questionnaire to preschools, neuropsychological tests measuring EF skills were administered to their children by trained research assistants. The tests were administered individually at a separate quiet room in their respective preschools. The sequence of the tasks was kept the same for all participants: the go/no-go task, the switching task, and the visual-spatial working memory task. The test session lasted about 20 – 25 minutes for each child. The procedure applied in the present investigation was permitted by the Research Ethics Committee of the Faculty of Education and Psychology at ELTE Eötvös Loránd University's (issue number: 2017/209).

Measures

A questionnaire with four parts (demographic information, parental views on the goal of preschool education, parental play beliefs, and the child's home activities) was used in order to collect data from parents. Originally, the questionnaire was prepared in English and translated into the target languages (Amharic and Hungarian). As an average, the questionnaire took 30 minutes to be filled in.

Demographic information

The demographic information consisted of the child's gender, age, year of enrolment in preschool, and relationship with the respondent, parents' highest level of education, and the family size and gross annual income was collected. A five-point scale ranging from elementary school completed (1) to graduate degree/Master's or above (5) was applied to measure the educational level of both parents. A seven- and a nine-point categorical scales were applied in measuring the family's gross annual income for Ethiopian and Hungarian samples, respectively. The z-score of the average education of parents and the z-score of annual income per family size were averaged to create SES variable.

Parental Play Beliefs Scale

Parental play beliefs were measured using the Parental Play Beliefs Scale (PPBS) developed by Fogle and Mendez with sample of low-income mothers with children enrolled in Head Start program (Fogle & Mendez, 2006). The PPBS consists of twenty-five items with a five-point Likert-scale ranging from 1 (disagree) to 5 (very much agree). In the scale validation study, a principal component analysis yielded two subscales, namely Play Support and Academic Focused beliefs (Fogle & Mendez, 2006). The Play Support scale includes 17 items (e.g., 'I can help my child learn to control his or her emotions during play,' and 'through play my child develops new skills and abilities') and the Academic Focused scale consists of 8 items (e.g., 'I would rather read to my child than play together,' and 'I do not think my child learns important skills by playing').

In the present investigation, item differential function (DIF) analysis was carried out on the scale using ordinal logistic regression technique (see Zumbo, 1999) in order to examine whether the items function similarly in the two sample groups. Accordingly, an item (item 2) from Academic Focused and four items (item 21, 22, 23, & 24) from Play Support scales were excluded from the scale as they functioned differently in the two sample groups. In the scale validation study, the subscales depicted internal consistency of $\alpha = .90$ and .73 for Play Support and Academic Focused scales, respectively (Fogle & Mendez, 2006). The subscales also showed a good level of internal consistency in the current study (Ethiopian sample: Play Support= .89, Academic Focused= .70; Hungarian sample: Play Support= .80, and Academic Focused = .63) after removing the items functioning differently. The bivariate correlation between the two subscales depicted similar sized, significant negative correlations in both samples ($r_{\text{Ethiopia}} = -0.41$, $p < .001$, and $r_{\text{Hungary}} = -0.39$, $p < .001$).

Parents' Beliefs about the Purpose of Preschool Education Scale

A ranking-order scale with 7 items, developed by Metaferia, Futo, et al. (2020), was used to measure parents' views on the purpose of preschool education. The scale consists of a list of potential purposes of preschool education (general knowledge, cognitive skills, language development, social skills, enjoy themselves, emotional well-being and

academic skills). Parents are asked to rank the purposes of preschool education listed based on their importance (1 as the most important to 7 as the least important) based on their personal beliefs. Average rankings for each item were calculated in the two samples.

Child's Home Activities Scale

The Child's Home Activities Scale (CHAS), developed by Metaferia, Takacs, et al. (2020), was used to measure preschoolers' frequency of participation in the selected home activities. The activities included in the scale were planned as individual indicators of preschoolers' activities at their home. The scale was designed to gather information about different aspects of children's everyday lives such as frequency of engagement in different type/form of play (e.g., pretend play, motor play, solitary play, and peer play), academic-related activities, art and craft activities and sports and physical activities. Furthermore, frequency of having breakfast at home, and spending mealtime together with family were addressed in the scale intending to gather information about whether or not children get nutrition before preschool as opposed to "mealtime together" which was designed to examine its social implications. The scale consists of ten Likert-scaled items ranging from 'very rarely /less than once a week' (1) to 'very frequently /most of the time during the day' (5). In the scale, parents were requested to rate the frequency at which their children participate in the home activities included in the scale: breakfast at home, spending meal time with family, academic-related activities, pretend play, motor play, fine motor activities, arts and crafts, solitary play, peer play, and sports and physical activity.

Translation of the survey

The English version of the questionnaire was carefully translated to Amharic and Hungarian. Three independent translators of which two were educational psychologists with a master's degree and one applied developmental psychologist with a PhD level of education were involved in the translation of the Amharic version of the questionnaire (see Metaferia, Takacs, et al., 2020). The translators were native speakers of Amharic and fluent in English. Upon completion, the three translations were collected and checked for the discrepancies by the first author and made important amendments. The translation of

the Hungarian version of the questionnaire involved two independent native speakers of Hungarian and fluent in English. The collected translations from the translators were cross checked for their discrepancies and made important revisions by the second and third authors (see Metaferia, Futo, et al., 2020).

Executive functions measures

Three computerized neuropsychological tests, a go/no-go task, a switching task and a Mr. Peanut task, were administered to children to measure their inhibitory control, switching, and visual-spatial working memory, respectively. The first two tests were run using 1.85.1 version of PsychoPy (Psychological Software Tools; Peirce, 2008).

Go/no-go task

A fish and shark go/no-go task was applied to measure the inhibitory control skills of the participant preschoolers (see Wiebe, Sheffield, & Espy, 2012). The task consisted of a practice and a test session. The practice session consisted of 4-go and 2-no-go trials demanding children to respond to the target and withhold for the non-target stimuli. The testing session consisted of 40-go and 20-no-go trials where a stimulus appears on a laptop screen for 1,500 ms unless a child responded earlier. Children were expected to respond to the target (i.e., when the target/fish stimulus appears on the screen) as quickly as possible by pressing the space bar in a laptop keyboard and withhold for the non-target (i.e., when the non-target/shark stimulus appears on the screen). Using frequency of correctly responding to go trials and no-go trials, sensitivity (*d'*) was calculated for each child following the signal detection theory (see Macmillan & Creelman, 2004).

Switching task

A cat and tiger go/no-go task with four blocks was used to measure shifting skill of the participant children (Metaferia, Futo, et al., 2020; Metaferia, Takacs, et al., 2020). The go and no-go stimuli were counterbalanced by switching the target and non-target stimuli as the task moves from one block to the next block. Correspondingly, participants were informed the target and non-target stimuli before the beginning of every block. Each block consisted of 16 go and 8 no-go trials where each stimulus appeared on the screen

for 1,200 ms if the child did not respond to it earlier. Before the beginning of the actual test, a practice session involving 4-go and 2-no-go trials, was carried out. In order to estimate the switching task score of each child, sensitivity (*d'*) was calculated for each block based on signal detection theory. Based on the sensitivity scores of each child for every block, the sensitivity score differences between switching blocks was calculated (i.e., sensitivity of block 3 minus block 1 and sensitivity of block 4 minus block 2). Next, the average of the two differences was calculated as switching score of every child (see Metaferia, Takacs, et al., 2020).

Mr. Peanut visual spatial working memory task

The children's visual spatial working memory (VSWM) was measured using Mr. Peanut visual special working memory task designed based on work of Morra (1994). Mr. Peanut is a 'crown-like' picture that appears on a computer screen with stickers on his body and disappears for a while and reappears on the screen again without stickers. The stickers can appear 14 different possible locations on Mr. Peanut body part. The task for the children is to put sticker on Mr. Peanut's body using their memory after he removed them. The task begins with a practice session consists of 3 trials where children learn how to put stickers on Mr. Peanut's body by memorizing their locations before they are removed. The task progresses step-by-step starting from one sticker to seven stickers at a time where in every stage three attempts were given. In order to move to the next level of the task the child should at least correctly respond to one of the three trials at the present stage of the task. At each level of the task, correctly responding to one or at least two of the three trials results scores of .33 and 1 respectively. The total score was calculated by adding an individual score the child earned at each of the stages he/she gone through.

Data Analyses

SPSS v20.0 for Windows (IBM Corporation, Armonk, NY, USA) was used in conducting the statistical analyses. All variables used in the analyses were found to be normally distributed. Independent samples t-tests were applied to compare preschoolers' activities at home and their performance in EF tasks, and parental play beliefs between the two samples. Bivariate correlation analyses were used to examine the relationship

preschoolers' EFs could have with parental play beliefs and preschoolers' home activities. We also built two-step hierarchical regression models explaining preschoolers' EF skills using parental play beliefs and preschoolers' home activities as predictors for each sample separately. Accordingly, children's age and SES were entered in the first step as control variables. Next, the significant correlates of the corresponding EF component from home activity and parental play belief variables were entered together into the regression equations. Moreover, Fisher z-transformation was carried out to make comparison of the correlation between preschoolers' home experiences (preschoolers' home activity and their parents' play beliefs) and their performance on the battery of EF tasks between the two sample groups. Furthermore, Friedman-tests were used to analyze parents' priorities regarding the purpose of preschool education in the two groups separately. Post-hoc test using a Wilcoxon signed-rank tests were also carried out to examine the significance of the differences in their beliefs in the two samples independently.

4.3. RESULTS

Research Question 1: Do Ethiopian and Hungarian parents hold different views about the role of play in child development and the purpose of preschool education?

As can be seen in Table 3, the independent-samples *t*-test showed that there was no significant difference between the play support beliefs that the Ethiopian and the Hungarian parents held. However, Ethiopian parents held significantly stronger academic focused beliefs than their Hungarian counterparts.

A Friedman ANOVA and Wilcoxon signed-rank tests were carried out to assess priorities in parental educational beliefs in both samples, separately. Table 7 presents the summary of the median and interquartile range for parental educational beliefs in the two samples. The result showed that parents hold different prioirities for the different educational goals in both samples (Ethiopia: $\chi2(6) = 83.93$, $p < .001$; and Hungary: $\chi2(6) = 253.43$, $p < .001$). Post-hoc test using a Wilcoxon signed-rank tests with Bonferroni-adjusted significance level of $p < 0.0024$, was carried out. The summary of the Wilcoxon signed-rank test using the z-statistics and significance values are presented in Table 8. As Table 7 shows that while Ethiopian parents held an educational belief that prioritizes academic and cognitive development, Hungarian parents held the educational beliefs that prioritize social-

emotional development and enjoyment for their children.

Research Question 2: Is there cross-cultural variation in the frequency of preschoolers' activities at home?

As shown in Table 3, the result of independent samples t-tests showed that Ethiopian preschoolers practiced academic skills and participated in arts and crafts activities after preschool significantly more often than their Hungarian peers. On the other hand, Hungarian preschoolers engage in fine-motor activities, solitary play, and sports and other physical activities significantly more often than their Ethiopian counterparts. However, there were no significant differences regarding frequency of mealtime together with family, breakfast at home, pretend play, motor play or peer play.

Research Question 3: Are there cross-cultural differences in preschoolers' EF skills including inhibition, switching, and visual-spatial working memory?

Independent-samples t-tests were carried out in order to examine if there were cross-cultural variations in children's performance on the battery of EF tasks between the two samples. The results indicated that there were no statistically significant difference in inhibitory control [($M_{Ethiopia}$= 2.73, $SD_{Ethiopia}$ = .85; $M_{Hungary}$= 2.92, $SD_{Hungary}$ = .90); t (251.61) = -1.70, p = .091], switching [($M_{Ethiopia}$= -.10, $SD_{Ethiopia}$ = .64; $M_{Hungary}$= -.18, $SD_{Hungary}$ = .67); t (241.86) = .94, p = .348] or VSWM [($M_{Ethiopia}$=2.62, $SD_{Ethiopia}$ = .77; $M_{Hungary}$= 2.54, $SD_{Hungary}$ = .92); t (228.00) = .78, p = .435] between the two samples.

Research Question 4: Is there cross-cultural variation in the relationships between the frequency of preschoolers' activities at home and their performance on the battery of EF tasks?

As shown in Table 4, the bivariate correlation analyses indicated that the sociodemographic variables (age of preschoolers and SES) showed significant, positive correlations with preschoolers' performance in all the three EF tasks in both countries. Frequency of participation in pretend play, fine motor activities and arts and crafts activities showed significant positive correlation with preschoolers' performance on Mr. Peanut VSWM task in both countries. On the other hand, frequency of breakfast at home

and peer play were also significant correlates of children's score on VSWM task in the Ethiopian sample. Frequency of breakfast at home, pretend play, peer play and parental play support were significant correlates of inhibitory control in both samples. On the other hand, while preschoolers' frequency of participation in motor play showed significant, positive association with inhibitory control in the Hungarian sample, frequency of mealtime together with family, participation in fine motor activities, and in sports and physical activities showed significant, positive correlations with inhibitory control in Ethiopia. We also found that parental play support and preschoolers' frequency of pretend play and peer play displayed significant, positive correlations with preschoolers' performance in the switching task in both countries. Additionally, frequency of breakfast at home and participation in sport and physical activities showed significant, positive correlations with shifting skills in Ethiopia and Hungary, respectively.

Comparisons of significant correlations of preschoolers' home experiences and their performance on the battery of EF tasks between the two sample groups were carried out using Fisher z-transformation (single sided test). The correlations between frequency of pretend play and inhibitory control, peer play and inhibitory control, and parental play support and inhibitory control were comparable in the two countries (zs<.1.40, ns). However, correlation between breakfast and inhibitory control were significantly higher in case of the Ethiopian sample than their Hungarian counterparts ($z = 1.93$, $p = .027$). The correlation between frequency of pretend play and VSWM, frequency of fine motor and VSWM, and frequency of arts and crafts and VSWM were also comparable in the two samples (zs< .50, ns). Moreover, the correlations between pretend play and switching, peer play and switching, and parental play support and switching were also equivalent (zs< .32, ns). See the Appendix).

Next, the contribution of parental play beliefs and preschoolers' home activities to the EFs were examined in separate regression models for each country. Based on the results of the correlational analyses, all the variables that had significant correlations with the corresponding component of EF were entered simultaneously into a regression model, after controlling for preschoolers' age and SES.

In Ethiopia, preschoolers' age and SES together accounted for a significant proportion of

the variance (24%) in the inhibitory control [F (2, 108) = 16.56, p < .001)]. Next, frequency of mealtime together with family, breakfast at home, pretend play, fine motor activities, peer play, sport and physical activities, and parental play support were entered into the model predicting inhibitory control. Only frequency of breakfast at home, pretend play, and parental play support were found significant predictors in the model that accounted for an additional 20% variance in inhibitory control. After removing non-significant predictors that included mealtime, fine motor activities, peer play, and sport and physical activities from the equation, the model was significant [F (5, 105) = 15.97, p < .001)] and explained 43% of the variance in preschoolers' performance in inhibitory control task. In the model, while the parental play support variable was a medium-sized predictor (β = .32, p < .001), frequency of breakfast (β = .17, p = .035) and pretend play (β = .17, p = .041) variables were small-sized predictors.

Another regression equation was built for the Ethiopian sample to examine the contribution of preschoolers' home activities to their VSWM task performance, after putting age and SES in control. Preschoolers' age and the SES variables together accounted 21% of the variance in VSWM [F (2, 118) = 15.98, p < .001]. Based on the results of correlational analyses, frequency of breakfast at home, pretend play, fine motor activities, arts and crafts activities, and peer play were simultaneously entered into the equation predicting VSWM. The result showed that only the frequency of participation in arts and crafts activities was a significant predictor next to sociodemographic variables that improved the model by 3%. After removing the variables not significantly contributing (breakfast at home, pretend play, fine motor activities, and peer play) to the model, the final model explained 24% [F (3, 117) = 12.42, p < .001] of the variance in VSWM. Finally, in order to examine the contribution of preschoolers' home experience in their performance on switching task, another regression model was built. Preschoolers' age and SES were included to the equation as the first step. However, the model was not significant [F (2, 97) = 2.61, p = .079]. Table 5 depicts the summary of the final model.

In Hungary, we also performed hierarchical regression analyses to determine the extent to which parental play beliefs and preschoolers home experiences predict children's EF skills. Since sociodemographic variables (preschoolers' age and SES) were significantly related to EF skills that includes inhibitory control, shifting, and VSWM in the present

study, these variables were entered as a control into the regression equation. Based on the results from bivariate correlation, the additional contribution of parental play belief and preschoolers' home activity variables was then examined by simultaneously entering them into the regression equation.

When age and SES were entered simultaneously as predictors of preschoolers' inhibitory control skill, they accounted 18% of the variance [F (2, 103) = 11.55, $p < 0.001$]. Then, preschoolers' frequency of breakfast at home, pretend play, peer play, motor play, and parental play support were simultaneously entered into the model. However, frequency of pretend play and parental play support were significant predictors in the model that explained an additional 16% of the variance in preschoolers' inhibitory control score. The final model was significant [F (4, 101) = 13.12, $p < 0.001$]. As can be seen in Table 6, the positive beta values of pretend play (β = .23, p = .007) and parental play support (β = .31, p = .001) suggest that preschoolers with frequent engagement in pretend play and parents holding better play support belief predicted better inhibitory control skills of children.

Again, in the Hungarian sample, age and SES together explained 17% of the variance in VSWM [F (2, 100) = 9.93, $p < 0.001$]. Next, preschoolers' frequency of participation in pretend play, fine motor activities, and arts and crafts were simultaneously entered to the equation predicting preschoolers' performance in VSWM task. However, frequency of participation in fine motor activities was the only significant predictor improving the model by 6% and thus, after removing the insignificant predictors from the model the final model explained the total of 23% of the variance in VSWM score [F (3, 99) = 9.66, $p < 0.001$]. Lastly, age and SES together entered to the model predicting preschoolers' performance in switching task. However, only SES variable was contributed significantly in model. After removing age, SES explained 5% of the variance in switching score [F (1, 103) = 5.27, p = 0.024]. Next, based on the bivariate correlation result, pretend play, peer play, sport and physical activities, and parental play support were simultaneously entered into the model. However, only parental play support was found to be significant predictor of switching score that improved the model by 4% [F (2, 102) = 5.21, p = 0.007].

Table 2
Descriptive statistics for EF and home experience measures in two samples.

	Ethiopian sample				*Hungarian sample*			
Variables	N	Mean	SD	Min - Max	N	Mean	SD	Min - Max
SES	132	.00	.91	-1.68 – 2.17	113	.01	.82	-2.13 – 1.65
Child's EF								
Inhibitory control	134	2.73	.85	.00 – 4.20	124	2.92	.90	.00 – 4.20
Cognitive flexibility	124	-.10	.64	-1.51 – 1.36	121	-.18	.67	-2.16 – 1.53
VSWM	138	2.62	.77	.67 – 4.33	118	2.54	.92	.33 – 4.33
Child's home activity								
Academic skills practice after preschool	135	3.35	1.20	1 - 5	120	2.72	1.40	1 - 5
Mealtime together with family	137	3.77	1.02	1 - 5	127	4.02	1.10	1 - 5
Breakfast at home	137	3.56	1.01	1 - 5	125	3.72	.93	2 - 5
Engage in pretend play	138	3.37	1.05	2 - 5	127	3.48	1.31	1 - 5
Engage in motor play	137	3.93	1.22	1 - 5	125	4.12	1.10	1 - 5
Engage in fine-motor activities	139	3.35	1.24	1 - 5	127	3.68	1.09	1 - 5
Participate in arts and crafts	135	3.08	1.22	1 - 5	127	2.52	1.13	1 - 5
Engage in solitary play	136	2.85	1.51	1 - 5	126	3.75	1.14	1 - 5
Play with peers	136	3.80	1.08	1 - 5	126	3.74	1.29	1 - 5
Do sports & physical activities	136	2.75	1.43	1 - 5	127	3.41	1.03	1 - 5
Parents' play beliefs								
Parental belief: Academic focused	123	16.35	5.27	6.00 – 30.00	119	10.52	2.70	6.00 – 18.00
Parental belief: Play support	131	55.38	8.75	31.00 – 65.00	123	56.43	4.95	45.00– 65.00

Table 3

T-test statistics for home experience measures between the two samples.

	Ethiopian sample		*Hungarian sample*		
Home experience Variables	Mean	SD	Mean	SD	*t(df)*
Child's home activity					
Academic skills practice after preschool	3.36	1.20	2.72	1.40	*3.94 (236.14)***
Mealtime together with family	3.77	1.02	4.02	1.10	*-1.92 (262)*
Breakfast at home	3.56	1.01	3.72	.93	*-1.32 (260)*
Engage in pretend play	3.37	1.05	3.48	1.31	*-.75 (241.45)*
Engage in motor play	3.93	1.22	4.12	1.10	*-1.34 (260)*
Engage in fine-motor activities	3.35	1.24	3.68	1.09	*-2.27 (263.64)**
Participate in arts and crafts	3.08	1.22	2.52	1.13	*3.87 (260)***
Engage in solitary play	2.85	1.51	3.75	1.14	*-5.42 (249.66)***
Play with peers	3.80	1.08	3.74	1.29	*.430 (245.07)*
Do sports & physical activities	2.75	1.43	3.41	1.03	*-4.32 (245.21)***
Parents' play beliefs					
Parental belief: Academic focused	16.35	5.27	10.52	2.70	*10.89 (183.42)***
Parental belief: Play support	55.38	8.75	56.43	4.95	*-1.19 (207.96)*

Table 4

Bivariate correlations among demographics, home activities, parental play beliefs, and executive functions variables for Ethiopian and Hungarian samples

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Child's Age	1	.18 N=112	.36** N=117	.35** N=123	21* N=120	.23* N=119	.02 N=126	.11 N=124	.09 N=126	.25* N=124	.00 N=126	.08 N=126	.01 N=125	.06 N=125	.07 N=126	.00 N=118	.13 N=122
2. SES	.07 N=126	1	.24* N=104	.37** N=110	25** N=107	-.09 N=107	.09 N=113	.16 N=111	.20* N=113	.00 N=112	.00 N=113	-.02 N=113	.09 N=112	.17 N=112	.07 N=113	-.20* N=108	.31** N=110
3. VSWM	.36** N=132	.35** N=131	1	.31** N=117	.40** N=112	.13 N=112	-.02 N=118	.01 N=116	.19* N=118	.09 N=116	.23* N=118	.19* N=118	.03 N=117	.13 N=115	.11 N=118	.08 N=111	.09 N=114
4. Inhibitory control	.23** N=128	.45** N=127	.44** N=133	1	.35** N=118	.03 N=117	.05 N=124	.20* N=122	.33** N=124	.18* N=122	.11 N=126	.07 N=124	.06 N=123	.21* N=123	.16 N=124	.02 N=116	.40** N=120
5. Cognitive flexibility	22* N=118	22* N=118	32** N=118	20* N=119	1	-.11 N=115	.17 N=121	.10 N=119	.19* N=121	.06 N=119	.14 N=121	-.02 N=121	.00 N=120	.22* N=120	.19* N=121	-.11 N=113	.23* N=118
6. Academic-related activities	.21* N=130	-.04 N=128	.06 N=134	-.10 N=130	-.04 N=120	1	.15 N=120	-.02 N=119	-.03 N=120	.01 N=119	-.01 N=120	.11 N=120	-.10 N=119	-.06 N=118	-.07 N=120	.44** N=116	-.11 N=117
7. Mealtime with family	.04 N=131	.15 N=130	.12 N=136	.29** N=132	.04 N=122	.12 N=133	1	.26** N=125	.05 N=127	.24** N=125	-.10 N=127	-.09 N=127	.12 N=126	.22* N=126	.14 N=127	.15 N=119	-.11 N=123
8. Breakfast at home	.23** N=131	.30** N=130	.24** N=136	.42** N=132	.27** N=122	.05 N=133	.03 N=136	1	.07 N=125	.04 N=123	-.01 N=125	-.02 N=125	-.08 N=124	.22 N=124	.14 N=125	-.03 N=118	.03 N=121
9. Pretend play	.16 N=133	.25** N=131	.25** N=137	.41** N=133	.20* N=123	.07 N=134	.31** N=136	.26** N=136	1	.19* N=125	.20* N=127	.09 N=127	.29** N=126	.11 N=126	.10 N=127	-.23* N=119	.19* N=123
10. Motor play	.22* N=131	.02 N=130	.02 N=136	.16 N=132	.12 N=122	-.02 N=133	.25** N=136	.10 N=137	.33** N=136	1	.04 N=125	.04 N=125	.18 N=124	.10 N=122	.12 N=125	-.06 N=118	.13 N=122
11. Fine motor activities	.07 N=133	.05 N=132	.19* N=138	.17* N=134	.16 N=124	-.08 N=135	.37** N=137	.09 N=137	.30** N=138	.36** N=137	1	.45** N=127	.04 N=126	.09 N=126	-.04 N=127	-.10 N=119	.22* N=123
12. Arts and crafts	.00 N=129	.12 N=128	.19* N=134	.04 N=130	.02 N=120	.10 N=131	.01 N=135	.01 N=134	-.03 N=134	.15 N=134	.24** N=135	1	.05 N=126	-.07 N=126	-.10 N=127	.04 N=119	.02 N=123
13. Solitary play	.07 N=132	-.03 N=129	.06 N=135	.16 N=131	-.01 N=121	-.14 N=132	.18* N=134	.03 N=134	.21* N=135	.17* N=133	.13 N=136	.02 N=132	1	-.01 N=125	-.02 N=126	-.15 N=118	.03 N=122
14. Peer play	.06 N=130	.03 N=129	.19* N=135	.30** N=132	.18* N=121	-.04 N=132	.15 N=134	.14 N=134	.23** N=135	.33** N=134	.10 N=136	.10 N=132	.05 N=133	1	.37** N=126	-.09 N=119	.02 N=123
15. Sports and physical activities	.19* N=130	.08 N=129	.01 N=135	.25** N=131	.09 N=121	-.11 N=132	19* N=134	-.02 N=135	.16 N=135	.41** N=135	.06 N=136	.11 N=132	.16 N=133	.19* N=133	1	-.09 N=119	.00 N=123
16. Parental belief: Academic focused	-.10 N=118	-.27** N=116	-.18 N=123	-.27** N=119	-.19 N=108	.33** N=119	-.11 N=122	-.07 N=123	-.04 N=122	-.10 N=123	.00 N=123	.13 N=121	-.18* N=121	00 N=120	-.13 N=121	1	-.39** N=116
17. Parental belief: Play support	.10 N=125	.20* N=124	.10 N=130	.54** N=126	.23* N=117	-.09 N=127	.31** N=129	.27* N=129	.44** N=130	.43** N=129	.32** N=131	.02 N=128	.34** N=128	.33** N=128	.33** N=128	-.41** N=118	1

Note: Correlations for the Ethiopian sample in the bottom diagonal; correlations for the Hungarian sample in the top diagonal;
**p < .05; **p < .001*

Table 5

Summary of hierarchical multiple regression models predicting executive function skills in Ethiopian sample

	Inhibitory control				Visual-spatial working memory				Switching			
	Step 1		Step 2		Step 1		Step 2		Step 1		Step 2	
	β	*95% CI*	*β*	*95% CI*	*β*	*95% CI*	*β*	*95% CI*	*β*	*95% CI*	*β*	*95% CI*
Age	.22	(.006, .042)**	.15	(.000, .033)*	.32	(.015, .047)***	.32	(.016, .048)***	.09	(-.009, .025)	.03	(-.015, .020)
SES	.41	(.230, .545)***	.24	(.081, .378)**	.31	(.127, .398)***	.29	(.111, .380)***	.20	(.004, .284)*	.12	(-.068, .231)
Breakfast			.17	(.010, .282)*							.18	(-.029, .249)
Pretend play			.17	(.005, .258)*							.04	(-.112, .160)
Play support			.32	(.016, .049)***							.12	(-.007, .025)
Arts and crafts							.17	(.006, .204)*				
Peer play											.01	(-.115, .130)
F	16.56***		15.97***		15.98***		12.42***		2.61		1.86	
R^2	.24		.43		.21		.24		.05		.11	
adj R^2	.22		.41		.20		.22		.03		.05	
R^2-change			.20				.03				.06	

**p <.05; **p <.01; ***p <.001; 95% CI*

Table 6

Summary of hierarchical multiple regression models predicting executive function skills in Hungarian sample

	Inhibitory control				Visual-spatial working memory				Switching			
	Step 1		Step 2		Step 1		Step 2		Step 1		Step 2	
	β	*95% CI*	*β*	*95% CI*	*β*	*95% CI*	*β*	*95% CI*	*β*	*95% CI*	*β*	*95% CI*
Age	.27	(.008, .042)**	.22	(.005, .036)**	.33	(.015, .052)**	.33	(.015, .051)***				
SES	.30	(.135, .539)**	.16	(-.017, .371)	.19	(.006, .423)*	.18	(-.002, .402)	.22	(.026, .360)*	.16	(-.035, .308)
Pretend play			.23	(.043, .269)**								
Play support			.31	(.025, .086)**							.22	(.003, .056)*
Fine motor							.25	(.062, .370)**				
F	11.55***		13.12***		9.93***		9.66***		5.27*		5.21**	
R^2	.18		.34		.17		.23		.05		.09	
adj R^2	.17		.32		.15		.20		.04		.08	
R^2-change			.16				.06				.04	

**p <.05; **p <.01; ***p <.001; 95% CI*

Table 7

The median and interquartile range of parental beliefs about the purpose of preschool education for Ethiopian and Hungarian samples

	Ethiopian sample		*Hungarian sample*	
Purpose of preschool education	Median	Interquartile range	Median	Interquartile range
General knowledge	4.00	2.00 - 7.00	5.00	4.00 - 6.00
Cognitive skills	2.00	1.00 - 4.00	4.00	3.00 - 5.00
Language development	4.00	2.00 - 5.00	5.00	4.00 - 6.00
Social skills	3.00	2.00 - 5.00	2.00	1.00 - 3.00
Enjoy themselves	4.00	2.00 - 6.00	2.00	2.00 - 4.00
Emotional well-being	5.00	3.00 - 6.20	2.00	1.00 – 3.75
Academic skills	3.00	1.00 - 5.00	7.00	5.00 - 7.00

Table 8

Summary of Wilcoxon signed-ranks test using the *Z* statistic and significance value

Purpose of preschool education	*Ethiopian sample*		*Hungarian sample*	
	Z	*p*	Z	*p*
General knowledge vs cognitive development	-6.42	.000*	-2.84	.005
General knowledge vs language skill development	-3.73	.000*	-.41	.68
General knowledge vs social skill development	-2.95	.003	-7.41	.000*
General knowledge vs enjoyment	-1.04	.297	-6.29	.000*
General knowledge vs emotional wellbeing	-1.15	.25	-6.83	.000*
General knowledge vs academic skill development	-4.16	.000*	-4.16	.000*
Cognitive development vs language skill development	-3.82	.000*	-2.28	.023
Cognitive development vs social skills development	-3.82	.000*	-6.72	.000*
Cognitive development vs enjoyment	-4.60	.000*	-4.78	.000*
Cognitive development vs emotional wellbeing	-6.85	.000*	-6.42	.000*
Cognitive development vs academic skills development	-2.47	.013	-6.00	.000*
Language skills development vs social skills development	-.37	.715	-7.94	.000*
Language skills development vs enjoyment	-2.14	.032	-5.86	.000*
Language skills development vs emotional wellbeing	-4.72	.000*	-6.97	.000*
Language skills development vs academic skills development	-.78	.436	-4.21	.000*
Social skills development vs enjoyment	-1.99	.047	-1.71	.087
Social skills development vs emotional wellbeing	-4.66	.000*	-.90	.370
Social sills development vs academic skills development	-.95	.340	-8.68	.000*
Enjoyment vs emotional wellbeing	-3.14	.002*	-1.10	.271
Enjoyment vs academics skills development	-2.86	.004	-7.78	.000*
Emotional wellbeing vs academics skills development	-4.68	.000*	-8.09	.000*

*$p < 0.0024$ (*Bonferroni correction*)

4.4. DISCUSSION

The study aimed at exploring the cross-cultural variation in the frequency of preschoolers' engagement in home activities and parental beliefs about the role of play in child development and the purpose of preschool education in Ethiopia and Hungary. Further aims of the present investigation were to examine the cross-cultural variation in the development of preschoolers' EF skills including inhibitory control, shifting, and visual-

spatial working memory; and to examine the correlations between preschoolers' home experiences (preschoolers' home activities and their parents' play beliefs) and EF cross-culturally. It is important to note that we intended to recruit two samples that did not differ in terms of SES so that any differences between the samples truly reflect cultural variations. In fact, this was confirmed by the non-significant difference between parental educational levels.

We found that Ethiopian parents hold significantly stronger academic focused beliefs than their Hungarian counterparts. This coincided with our finding indicating that Ethiopian preschoolers practiced academic skills after preschool significantly more often than their Hungarian counterparts. However, no significant cross-cultural variation was found on the play support beliefs that parents hold. Ethiopian parents holding stronger academic focused beliefs while holding comparable play support beliefs with their Hungarian counterparts may indicate that Ethiopian parents recognize that play may have some benefits to child development but prefer academic activities over play for their children.

We also found support for our hypothesis regarding the cross-cultural variation of parental beliefs of the primary purpose of preschool education between the two samples. While academic and cognitive development were reported as the primary purposes of preschool education for Ethiopian parents, social-emotional development and enjoyment for children are the principal purposes of preschool education for Hungarian parents. This is in line with the finding reported by Tigistu (2013) indicating that academic practice is the focus of preschool education in Ethiopia to meet the parents' expectations and demands. Also, Metaferia and colleagues (2020) reported that Hungarian parents hold the belief that social-emotional development is the primary purposes of preschool education (Chapter 3).

Our finding also demonstrated that Ethiopian preschoolers practiced academic skills and arts and crafts activities at their home more frequently than their Hungarian counterparts. In contrast, our finding depicted that Hungarian preschoolers more frequently engage in fine-motor activities, solitary play, and sports and physical activities at their home compared to their Ethiopian counterparts. We found comparable frequency of spending mealtime together with family, having breakfast at home, and engage in pretend play,

motor play, and peer play between preschoolers in Ethiopia and Hungary.

Our finding indicated that there was no significant cross-cultural variation in preschoolers' performance on any of the EF tasks including the Go/no-go task, the switching task and the Mr. Peanut visual spatial working memory task. Our finding also depicts that, after controlling for age and SES, preschoolers' frequency of participation in pretend play and their parents' play support are important variables predicting their inhibitory control skills in both the Ethiopian and the Hungarian samples. These results indicate that preschoolers with parents acknowledging the importance of play for the overall development of children and frequently engage in pretend play have better inhibitory control skills than their counterparts. This finding is consistent with the findings reporting that parental play support in Chapter 2 and 3 (Metaferia, Futo, et al., 2020; Metaferia, Takacs, et al., 2020) and children's engagement in pretend play (Kelly & Hammond, 2011; Metaferia, Futo, et al., 2020) are important factors associated with the development of inhibitory control.

The importance of parental play support for the development of inhibitory control in preschoolers could be explained by different possible means. For instance, parents with strong play support beliefs could better facilitate children's play by different means ranging from supplying play resources to their children to actively engaging in their children's play activities (Johnson et al., 2005) that could in turn improve the parent-child interaction, parental scaffolding, and intimacy. Several studies (see Bernier et al., 2012; Bernier, Carlson, & Whipple, 2010b; Fay-Stammbach, Hawes, & Meredith, 2014; Hammond, Müller, Carpendale, Bibok, & Liebermann-Finestone, 2012) underline the positive contributions of these variables in children's inhibitory control skills.

Our result also demonstrated a cross-cultural variation in the role of breakfast in preschoolers' inhibitory control; on top of parental play support and frequency of pretend play, frequency of breakfast at home proved to be an important factor predicting the development of inhibitory control skills in the Ethiopian sample only. This result replicated the finding reported by Metaferia et al. (2020) indicating that frequency of breakfast at home is an important factor associated with preschoolers' performance in inhibitory control task. On top of that, the correlation between preschoolers' experience

of breakfast at home and their inhibitory control skill is significantly higher in the Ethiopian sample than in the Hungarian.

As expected, we found a cross-cultural variation in preschoolers' home experiences associated with the development of VSWM and shifting skills. While frequency of participation in arts and crafts activities was the important factor predicting VSWM in Ethiopian preschoolers after accounting for preschoolers' age and family SES, frequency of participation in fine motor activities was important predictor of preschoolers' performance in Mr. Peanut's visual-spatial working memory task for Hungarian preschoolers. We also found an interesting result that parental play support is important predictor of the shifting skills in the Hungarian but not in the Ethiopian sample. One of the possible explanations for this cross-cultural variation could be linked to the nature and structure of the play opportunities and activities parents recurrently facilitate for their children at home. Concerning this point, based on their interpretation of the findings from parental belief studies, LaForett and Mendez (2016) underlined that parents' play beliefs could affect the nature of play activities their children frequently engage in. For instance, many of the play activities that Hungarian parents facilitate for their children in their everyday lives could involve the use of shifting skills on top of inhibitory control skills compared to their Ethiopian counterparts.

We believe that the present study makes important contributions to the current literature on the cross-cultural investigation in the development of preschoolers EFs, the role of children's home experience in the development of EF, and the beliefs parents hold about the importance of play in child development and the primary purposes of preschool programs. We focused on samples from two countries that are rarely researched in this field. Yet, it has some limitations. First, while aiming to recruit two samples that are comparable in terms of demographics, both samples were recruited using convenience sampling technique which is not a representative sampling method. Thus, generalization of the findings could be difficult. Besides, it would have been better to use substantially larger samples for a more precise estimation of the results in our cross-cultural investigation. Second, as self-report technique was employed in collecting data from parents about their beliefs of play for child development and the purpose of preschool education and preschoolers' activities at home, the technique might be

susceptible to social desirability bias. Third, we have no information regarding the reliability of the measures used to collect preschoolers' home activities as we assessed these variables using individual items. Finally, IQ and language skills of preschoolers, and the effect of other variables within the family and community (such as parenting style, scaffolding, availability of play opportunities including playgrounds) that may be important for the outcome measures were not assessed.

Conclusion

All in all, from the finding of the present study, we made the following conclusions. While building socio-emotional competence seems to be the primary purpose of preschool education for Hungarian parents of preschoolers, academic and cognitive skills development are the priority for their Ethiopian counterparts. In addition, Ethiopian parents were shown to hold significantly stronger academic focused beliefs than their Hungarian counterparts. However, no significant cross-cultural variation was found between Ethiopian and Hungarian parents on play support beliefs. Ethiopian preschoolers seem to practice academic skills and arts and crafts activities at their home more frequently compared to their Hungarian counterparts. On the other hand, Hungarian preschoolers were reported to engage in fine-motor activities, solitary play, and sports and physical activities more frequently at their home compared to their Ethiopian counterparts. We found no cross-cultural variation in the development of the children's EF skills. Parental play support and preschoolers' participation in pretend play were found to be important variables associated with the development of inhibitory control regardless of the socio-cultural variations between the two nations. However, there were cross-cultural variations in terms of predictive factors associated with the development of both VSWM and shifting skills in preschoolers; while frequent participation in arts and crafts was shown an important home experience for the development of VSWM skills in Ethiopian preschoolers, frequent participation in fine motor activities was found an important factor associated with the development of the same skill in the Hungarian sample. Finally, parental play support seems to be an important element of preschoolers' home experience associated with the development of their shifting skills in Hungarian, but not in Ethiopian preschoolers.

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Chapter Five

General Discussion

The aim of this dissertation was to investigate the role of home experiences in children's cognitive development and cross-cultural differences. More specifically, the dissertation aimed at investigating parents' beliefs about the role of play in child development and the purpose of preschool education and examining the association between the two. Also, the dissertation aimed at exploring cross-cultural variations in parents' beliefs about play and the purpose of preschool education, and frequency of preschoolers' activities at home and EF skills. The other purposes were to assess the connection between preschoolers' home experiences (preschoolers' home activities and their parents' play beliefs) and EF skills, including inhibitory control, cognitive shifting, and visual-spatial working memory, in the context of Ethiopia and Hungary, and to cross-culturally examine the links in the two nations.

Parental Educational and Play beliefs

The result from the investigations of parents' beliefs about the primary purpose of preschool education showed that Ethiopian parents with preschoolers hold the belief that academic and cognitive skills development are the primary purposes of preschool education (see Chapter 4). Ethiopian parents' holding academic skills development as the primary goal of preschool education is in line with the finding reported by Tigistu (2013) indicating that academic practice is the focus of preschool education in Ethiopia to meet the parents' expectations and demands. On the other hand, Study 2 and 3 confirmed that Hungarian parents hold the belief that development of children's social-emotional competence and enjoyment are the primary purpose of preschool education. The reason for Hungarian sample hold such belief could be that the purpose of preschool education in Hungary (Kormányrendelet az óvodai nevelés országos alapprogramjáról, Act of 363/2012) is very well articulated and the expectation for a preschool to be academically focused is neither culturally widespread nor accepted.

A cross-cultural comparison of parental views on the value of explicitly teaching academics (over play) to their children at home in the development of their children revealed that Ethiopian parents hold significantly stronger academic-focused beliefs than their Hungarian counterparts, as shown in Chapter 4. This coincided with our finding indicating that Ethiopian preschoolers practiced academic skills after preschool significantly more often than their Hungarian counterparts do (see Chapter 4). However, the cross-cultural comparison of Ethiopian and Hungarian parents' beliefs on the importance of play in child development (play support beliefs) revealed no significant variation. Ethiopian parents holding stronger academic-focused beliefs while holding comparable play support beliefs with their Hungarian counterparts may indicate that Ethiopian parents recognize that play may have some benefits to child development but prefer academic activities over play for their children. However, as Chapter 3 showed, no significant association was found between the parents' beliefs about the purpose of preschool education and their play beliefs. This means that parents holding academic focused or play support beliefs do not have a specific corresponding belief about the purpose of preschool education.

Preschoolers' Home Activities and Executive Functions

The cross-cultural comparison of the frequency of preschoolers' activities at home demonstrated that Ethiopian preschoolers practiced academic skills and arts and crafts activities at their home more frequently than their Hungarian counterparts do, as Chapter 4 shown. In contrast, our finding depicted that Hungarian preschoolers more frequently engage in fine-motor activities, solitary play, and sports and physical activities at their home compared to their Ethiopian counterparts (see Chapter 4). We found a comparable frequency of spending mealtime together with family, having breakfast at home, and engaging in pretend play, motor play, and peer play between preschoolers in Ethiopia and Hungary.

Interestingly, despite all the cross-cultural differences in play habits and beliefs, the cross-cultural comparison of EF skills (including inhibitory control, cognitive shifting, and VSWM) between preschoolers from Ethiopia and Hungary indicated no significant

variation. This part of our result is consistent with the previous finding depicting no significant differences in all the three EF components (inhibition, updating, and shifting) between primary school age children from Hong Kong and Germany (Schirmbeck et al., 2020). Our result could happen because children's play habits or parents' beliefs could be one of many factors in the development of EF. There are other important home experience factors such as parenting style, parent-child intimacy, and parental scaffolding that could better explain our results, demonstrating no cross-cultural difference in EFs regardless of the cross-cultural variation in children's play habits and parents' beliefs. Alternatively, as our studies were delimited to preschoolers' experiences at home, the contribution of other experiences outside of their home, primarily their experiences in preschools, would explain our result. Moreover, the result would be attributed to the low discriminatory power of the EF tests employed to discriminate between the EF skills of preschoolers from the two nations.

Predictors of Executive Function Skills in Different Cultures

Analysis of the link between preschoolers' home experiences (preschoolers' home activities and their parents' play beliefs) and inhibitory control skills showed that parental play support beliefs and the frequency with which children participate in pretend play were significant predictors of children's inhibitory control skills in both Hungarian (Study 2 and 3) and in Ethiopian (Study 3) samples, after controlling for preschoolers' age and family SES. On top of parental play support beliefs, the frequency with which children have breakfast at home was a significant predictor of inhibitory control skills in both Ethiopian samples (Study 1 and 3), after accounting for age and SES. Thus, parental play support and preschoolers' frequency of participation in pretend play were found to be reliable predictors of their inhibitory control skills regardless of the socio-cultural variations between the two samples (Ethiopia and Hungary). This means that children whose parents believe that play is an important means of development beyond amusement, and value play in comparison to more explicit academic activities at home (such as reading to a child), and who frequently engage in pretend play at home, are more likely to have better inhibitory control skills than their peers.

The important contribution of parental play support in the development of inhibitory control skills can be viewed from different directions. Parents who embrace play as important for children's cognitive and social development could better support and facilitate children's play through a variety of means, such as supplying more play resources, facilitating peer play, and actively engaging in their children's play as a play mate (see Johnson, Christie, & Wardle, 2005; LaForett & Mendez, 2017; Manz et al., 2014), and these could in turn improve parent-child interaction and intimacy, parental scaffolding, and attachment security. Several studies (see Bernier et al., 2012; Bernier, Carlson, & Whipple, 2010b; Fay-Stammbach, Hawes, & Meredith, 2014; Hammond, Müller, Carpendale, Bibok, & Liebermann-Finestone, 2012) highlight the positive contributions of these variables to children's inhibitory control skills. Besides, parents' play support at home can improve the children's home environment and thereby create better opportunities for children to engage in cognitively challenging activities that could contribute to their EF development. Moreover, when children play with their parents or other experienced person, they normally play at more sophisticated levels (Bornstein, Haynes, Reilly, & Painter, 1996; Fiese, 1990; Noll & Harding, 2003), that could create better opportunities for them to improve their EF skills.

Furthermore, there is also emerging evidence demonstrating that stronger parental play support is associated with children's better social skills, emotion regulation, integrative play skills, verbal ability, and language and cognitive development (Chen, 2015; Fogle & Mendez, 2006; LaForett & Mendez, 2017; Landry et al., 2002; Lin & Yawkey, 2013; Tamis-LeMonda, 2004), which have positive associations with inhibitory control (Carlson & Moses, 2001; S. M. Carlson & Wang, 2007; Gooch, Thompson, Nash, Snowling, & Hulme, 2016; Hughes, 1998; Rhoades et al., 2009). This part of our finding also extends the previous findings indicating that parents' play belief is a vehicle for children to acquire a variety of social and school readiness competencies (LaForett & Mendez, 2017; Lin & Yawkey, 2014). All in all, parents' beliefs may have an indirect but far-reaching influence on children's developmental outcomes through different means, such as improving parent–child interactions, the home environment, peer play, and play skills (see Harkness & Super, 1992).

The overall finding in our studies also confirmed that, on top of parental play support beliefs, preschoolers' frequency of pretend play at home is an important factor associated with inhibitory control skills, that showed no cross-cultural variation. This result is consistent with the findings from previous investigations. For example, Kelly and Hammond (2011) also reported a relationship between structured pretend play and inhibitory control skills among preschoolers. Similarly, Pierucci, O'Brien, McInnis, Gilpin, and Barber (2014) demonstrated that 4-to 6-year-olds' propensities toward imaginative play was associated with their inhibitory control competencies.

The association of pretend play with EF could be generated either uniquely by the symbolic demands inherent in solitary pretend play, or it might be instigated by the united effects of symbolism and social interaction ingrained in social pretend play (see White et al., 2021). In this regard, the symbolic thinking inherent in pretense could foster the development of representational schemes that enable children to resist situational constraints in pretense, such as when they pretend to be astronomers (White et al., 2021). This is in line with the claim that EF skills are fused with pretense, such as suppressing reality and flexibly controlling dual representations (see Carlson, White, & Davis-unger, 2014). In social play, children are required to share, negotiate, and resolve conflicts with others and stick to shared rules of play in a given scenario and practice to regulate their impulses and cooperate with the group to achieve common goals (Mcelwain & Volling, 2005; Pellegrini & Smith, 1998; White et al., 2021). Based on the observation of preschoolers' play activities (e.g., pretense, non-pretense) and interactions (e.g., social, solitary) during free-play classroom contexts over the course of a preschool year, White and colleagues (2021) reported that among observed play types in preschool contexts, social pretend play was the only predictor of inhibitory control skills gain.

In explaining the association between pretend play and EF, some researchers underline the potential mediating role of private speech (Berk & Spuhl, 1995; Fernyhough & Fradley, 2005). Children's engagement in pretend play is positively associated with their tendency to engage in private speech, such that by creating a rich context for private speech and self-regulating thought, pretend play may influence EF development (Berk & Meyers, 2013; Berk & Spuhl, 1995; Davis, Meins, & Fernyhough, 2014; Fernyhough &

Fradley, 2005). Carlson and Beck (2009) contend that pretense, private speech, and verbal thought are all symbolic activities that promote EF by providing children the opportunity to overcome immediate impulses and allow thinking about events and objects that do not immediately exist.

Moreover, beyond our results demonstrating a cross-cultural variation in the role of breakfast in preschoolers' inhibitory control, the correlation between preschoolers' experience of breakfast at home and inhibitory control skill is significantly higher in the Ethiopian sample than in the Hungarian. The inconsistency of the results showing the importance of breakfast across the two nations could be attributed to variations in the availability of breakfast services at preschool centers. As breakfast service is common in Hungarian preschool centers, preschoolers have an opportunity to have it at the center when they arrive in the morning. However, such a service is not available at preschool centers in Ethiopia. This means that, unlike preschoolers in Ethiopia, if Hungarian preschoolers skip breakfast at home, they still have a chance to have it at their preschool centers. There is data demonstrating the impact of breakfast experience on children's cognitive function and/or development (Wesneset al., 2003). Regular breakfast could affect brain development through influencing the nutritional value the child receives (Datar & Nicosia, 2012). Furthermore, numerous studies examining the temporary effects of breakfast on cognition found that skipping breakfast has a negative impact on cognitive function, demonstrating the brain's vulnerability to brief fasting (Mahoney, Taylor, Kanarek, & Samuel, 2005; Smith, Clark, & Gallagher, 1999; Wesnes et al., 2003).

Another fascinating finding with both Ethiopian samples (*Study 1 and 3*) depicted that preschoolers with frequent participation in arts and crafts activities demonstrated better VSWM skills than their counterparts, after controlling for age and SES. It is plausible that participation in arts and crafts could contribute to a child's ability to organize visual stimuli to create an understanding of meaningful patterns. On the other hand, the results with both Hungarian samples (*Study 2 and 3*) showed that, after controlling for age and SES, children with frequent involvement in fine motor activities at home exhibit better VSWM competence than their peers with infrequent participation in the activities. It is possible that those children who have better cognitive skills needed for fine motor

activities as well as arts and crafts (one of which is VSWM) may be more likely to engage in these kinds of activities as they like them more, they are more successful in them. The result demonstrating the link between children's frequency of participation in fine motor activities at home and their performance on the VSWM task is consistent with a previous finding with children from prekindergarten and kindergarten demonstrating a relationship between a measure of working memory (WJ-Working Memory) and fine motor skills (Becker, Miao, et al., 2014). Our result also extends a previous finding demonstrating that well developed fine motor skills are significantly linked with better visuospatial working memory among typically developing adolescents (Rigoli et al., 2012) and children with developmental coordination disorder (Alloway & Temple, 2007). Level of motor coordination could be a third variable that may explain the relation between frequency of participation in fine motor activity and visual working memory (see Rigoli et al., 2012).

The cross-cultural variations in the important home related factors associated with children's VSWM between participants from Ethiopia and Hungary would be attributed to the cross-cultural variations in the nature and content of arts and crafts activities children commonly engage in, such that children from Ethiopia could benefit from their frequent participation in the activities that could contribute to their VSWM skills. Besides, the link between VSWM and important home experience variables (fine motor activities vs. arts and crafts activities) would be moderated by other variables such as the characteristics of children, and the nature, type/form and content of the activity (see Berk & Meyers, 2013). In this regard, given the same type of play, there is some data demonstrating that the nature, focus, and/or content of the play and the skill it needs to apply and practice differ cross-culturally. For instance, the results of a comparison of pretend play between U.S. and Italian children depicted that U.S. children had more imagination in their play, whereas Italian children had significantly more types of affective expression in play (Chessa et al., 2013; Farver & Shin, 1997). Moreover, Latino-American children engage more in language-based plays (Thomas, 1998), Marquesan children spend more time on object-oriented play (Roopnarine et al., 1998). Such variations may create room for cross-cultural variations in the factors pertinent to the development of EF skills.

Alternatively, as arts and crafts activities involve more fine motor skills activities, the result would be ascribed to issues of differences in wording what fine motor and arts and crafts activities are and the translation of the items measuring these parts of the activities.

As illustrated in Chapter 4, we also found an interesting result from the cross-cultural investigation that, after controlling SES, parental play support is a significant predictor of the shifting skills in the Hungarian sample but not in the Ethiopian. In fact, this could happen because the nature of play (e.g., parent-child play) differs widely by culture, even among parents who believe that playing with their children is valuable. For instance, the play activities and the contents that Hungarian parents involve with their children and encourage them to play at home might better enforce their children to practice cognitive shifting skills than their Ethiopian counterparts do.

All in all, our results showed that the contribution of parental play support beliefs is mainly limited to inhibitory control. We speculate on three potential reasons for it. First, the result may be ascribed to the nature of the subscale used to measure parental play support beliefs: the items in the subscale dominantly and explicitly address factors related to inhibitory control skills rather than other components of EF (VSWM and cognitive shifting). About one-third of the items in the subscale explicitly focus on the value of play in the development of social–emotional competence, which is significantly and positively linked with the development of inhibitory control (Rhoades et al., 2009). Contrary to this, no item in the subscale explicitly addresses working memory and cognitive shifting skills.

Second, as the ability to control behaviors and emotions in accordance with social expectations is an important part of early social competence (Rhoades et al., 2009), parents who valued the importance of play to their children's development and learning would prioritize the development of these important skills. Parents' efforts to improve and develop such skills could directly or indirectly nurture the development of inhibitory control. There has also been a theory and some data demonstrating that inhibitory control may facilitate the process of developing these skills (Hughes, Dunn, & White, 1998; Kochanska, Coy, & Murray, 2001). As a result, parents would work on improving their children's inhibitory control skills as a means to improving their children's social-

emotional competence or vice versa. In this regard, in their study, Rhoades, Greenberg, & Domitrovich (2009) found that inhibitory control significantly predicted social–emotional competence above and beyond other variables associated with it.

In a similar vein, the finding that the frequency of pretend play at home was an important factor associated with just inhibitory control and not with other components of EF (VSWM and cognitive shifting), after controlling for age and SES, may be an indicator that only some aspects of EF are used in pretense (see Kelly & Hammond, 2011). As both the capacity to use mental representation and social interactions are thought to depend highly on the inhibition of impulsive responses, inhibitory control is a key nominee in the link between pretend play and EF (see White et al., 2021). In arguing for the involvement of inhibitory control components of EF in pretense, Carlson and colleagues pointed out that during pretend play, "children must inhibit the tendency to refer to an actual, veridical state of affairs so that non-reality representations can arise and be maintained" (Carlson, White, & Davis-Unger, 2014, p. 2).

In sum, the results of our investigation support the notion that early home experiences provide young children with opportunities that can promote their EF development (Rhoades et al., 2011). However, a consistent result across the studies in this dissertation demonstrated that, different experiences at home seem to have different effects on the components of EF. As parental play beliefs and preschoolers' activities at home could vary as a function of different socio-economic contexts, our findings should be interpreted with caution. In this regard, in order to fully comprehend the meaning of different play activities for children's development in different socio-cultural contexts, the cultural foundation of play should be taken into account (see Roopnarine, 2011). Our investigation demonstrating no significant link between parents' academic focus beliefs or children's frequency of academic activities at home and children's EFs might recommend that encouraging children to stress on explicit academic-related activities at home, instead of play activities, during the preschool years, could be less useful for their EF development.

Limitation

The studies included in this dissertation make valuable contributions to our understanding of the role of home experiences in children's EF skills in different socio-cultural contexts, the beliefs parents hold about the importance of play in child development and the primary purposes of preschool education, and the cross-cultural variations in the development of EFs through focusing on samples from diverse socio-cultural contexts and highly underrepresented in research. Yet, it has the following limitations. First, we used convenience samples that may not represent the population from which the participants were recruited. Still, in Study 3, we managed to recruit two samples with similar SES for the cross-cultural comparison. To establish further generalizability of our results, it will be important to recruit a larger representative sample in follow-up studies. Second, the self-report technique applied in collecting data about parental play and educational beliefs and preschoolers' activities at home might be susceptible to social desirability bias. For instance, parents would report their play beliefs and children's home activities to be in line with how play is generally regarded by preschools in a given country. Third, the frequency with which children engage in different home activities was assessed with single items, thus lacking information regarding the reliability of the measures. Fourth, the nature, content, and theme of home activities that may be of greater importance than the frequency of participation in them were not explored in our studies. Furthermore, the involvement nature of one activity in the other (for example, motor play in pretense, fine motor activities in arts and crafts) was not taken into account in the current studies. Fifth, the IQ and language skills of preschoolers, and the effect of other variables within the family and community (such as parenting style, scaffolding, availability of play opportunities including playgrounds, and perinatal risk factors) that may be important for the outcome measures were not assessed. Finally, probably the biggest limitation of the studies would be that we applied a correlational strategy, so the associations found might not reflect casual relations and might be affected by confounding variables. While we used socioeconomic status as a control variable in all the models, it is still questionable whether other variables might explain the results.

Conclusion

In conclusion, the academic and cognitive development of preschoolers are believed to be the primary purposes of preschool education for Ethiopian parents, while their Hungarian counterparts prioritize socio-emotional competence and enjoyment instead. Ethiopian and Hungarian parents with preschoolers hold comparable play support beliefs. However, they vary in terms of their academic focused beliefs in favor of parents from Ethiopia. Yet, no relationship was found between the beliefs parents hold about the primary purpose of preschool education and the importance of play for child development. Our studies also found that compared to Hungarian preschoolers, Ethiopian counterparts involve in academic and arts and crafts activities at their home more frequently. On the other hand, preschoolers in Hungary engage in fine-motor activities, solitary play, and sports and physical activities more frequently at their home compared to their Ethiopian counterparts. The dissertation also found that Ethiopian and Hungarian preschoolers were not different in terms of their EF skills, including inhibitory control, VSWM, and cognitive shifting. Our findings also depicted that preschoolers' home activities and parental play support are important factors associated with children's EF development. More specifically, parental play support beliefs and preschoolers' frequency of pretend play and breakfast at home are important predictors of preschoolers' inhibitory control skills. In particular, parental play support and preschoolers' frequency of pretend play at home were found to be valuable home-related factors connected to the development of inhibitory control regardless of the socio-cultural variations between Ethiopia and Hungary. On the other hand, there is a cross-cultural variation in terms of predictive factors associated with the development of VSWM between participants from Ethiopia and Hungary, such that while preschoolers' frequent participation in arts and crafts activities was shown to be an important home experience for the development of VSWM skills in Ethiopian preschoolers, frequent participation in fine motor activities was found to be an important factor associated with the development of the same skill in the Hungarian sample. Moreover, parental play support seems to be an important factor in preschoolers' home experiences associated with the development of their shifting skills in Hungarian, but not in Ethiopian preschoolers. All in all, our results demonstrated that different experiences at home seem to have different effects on the components of EF.

Moreover, there are common home experience related factors that influence the development of EF in different cross-cultural contexts, while the influence of some factors varies depending on a given socio-cultural context. This implies that the study of home experience related factors should always be conducted with the particular socio-cultural context in mind.

The findings of the studies in this dissertation raise attention to not only children's play habits but parental play beliefs when considering the role of play in children's cognitive development. Moreover, our results confirmed that beyond acknowledging the role of play in child development in general, the contributions of specific aspects of play in development should be examined taking the socio-cultural contexts into account. This is to mean that experience that holds true in a given cultural context may not work the same in another socio-cultural contexts. Future studies should take the socio-cultural contexts into account in examining play topics and be conscious in generalizing the findings of play studies to larger contexts as activities found to be valuable for child development in one community may not hold true in another.

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Appendixes

Comparison of correlations from the two samples

(done using online calculator at https://www.psychometrica.de/correlation.html#independent)

Variable	**Country/sample**		Correlation in Ethiopian sample	Correlation in Hungarian sample	**Test Statistic *z***	**Probability *p***
	Ethiopia Correlates	Hungary Correlates				
VSWM	Pretend	Pretend	.25** N=137	19* N=118	0.496	0.31
	Fine motor	Fine motor	.19* N=138	.23* N=118	-0.33	0.371
	Arts and crafts	Arts and crafts	.19* N=134	.19* N=118	0	0.5
Inhibition	Breakfast	Breakfast	.42** N=132	.20* N=122	1.927	0.027
	Pretend	Pretend	.41** N=133	.33** N=124	0.735	0.231
	Peer paly	Peer play	.29** N=130	.21* N=123	0.671	0.251
	Paly support	Play support	.54** N=126	.40** N=120	1.398	0.081
Switching	Pretend	Pretend	.20* N=123	.19* N=121	0.08	0.468
	Play support	Play support	.23* N=117	.23* N=118	0	0.5
	peer play	Peer play	18* N=121	.22* N=120	-0.319	0.375

Children's Home Activities Scale

Direction: Please read the list of activities in the table below and rate how often they happen with your child outside of the school time. The option in the answer varies from "very rarely" [less than once a week] (1) to "very frequently" [most of the time during the day] (5).

SN	How often does the child…	Frequency				
		Very rarely [less than once a week] **(1)**	**Rarely** [couple of times a week] **(2)**	**Occasionally** [at least 4 times a week] **(3)**	**Frequently** [at least once a day] **(4)**	**Very frequently** [Most of the time during the day] **(5)**
1.	practice academic skills (such as studying alphabets, numbers, words…)	1	2	3	4	5
2.	spend mealtime together with parents	1	2	3	4	5
3.	have breakfast	1	2	3	4	5
4.	engage in pretend play (e.g., during playing using a stick as a spoon, pretending to drive an invisible car, using banana as a phone…)	1	2	3	4	5
5.	engage in motor play (e.g., running, climbing, jumping, throwing, balancing…)	1	2	3	4	5
6.	engage in activities such as painting, drawing, writing, cutting with scissors, scooping sand with a small shovel, grabbing mulch, ...)	1	2	3	4	5
7.	participate in art and crafts activities that involve wet textures, such as glue	1	2	3	4	5
8.	engage in solitary play	1	2	3	4	5
9.	play with peers	1	2	3	4	5
10.	do sport and physical exercise	1	2	3	4	5