



EARLI SIG 5 2018

Abstract book

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Please note that the following presentations were canceled and therefore removed from the abstract book:

- The paper with the title **“Parental practices regarding motor development in Israel and the Netherlands”** by Ora Oudgenoeg-Paz, Utrecht University, Netherlands; Osnat Atun-Einy, Haifa University, Israel and Saskia van Schaik, Utrecht University, Netherlands was canceled and therefore removed from session C6
- The paper with the title **“Parental beliefs of preterm born infants about motor development in the Netherlands and Israel”** by Saskia van Schaik, Utrecht University, Netherlands; Ora Oudgenoeg-Paz, Utrecht University, Netherlands and Osnat Atun-Einy, University of Haifa, Israel was canceled and therefore removed from session C6
- The paper with the title **“Cognitive Activating Dialogues to co-construct Scientific Reasoning in Early Science Classrooms”** by Ines Freitag-Amtmann, Freie Universität Berlin, Germany was canceled and therefore removed from session C2
- The paper with the title **“Illuminating the environmental aspects of early learning in Kenya”** by Tabitha Wangeri, Kenyatta University, Kenya was canceled and therefore removed from session B1.
- The paper with the title **“Training parental scaffolding: How do parents of full- and preterm born toddlers benefit?”** by Kim Gärtner, Heidelberg University, Germany was canceled and therefore removed from session A3.
- The paper with the title **“Modal Markers and Shared Thinking in Early Education”** by Frauke Hildebrandt, Potsdam University of Applied Sciences, Germany was canceled and therefore removed from session B1.
- The paper with the title **“Time outside preschool: The influence of organized leisure on children’s academic competencies”** by Karoline Mikus, University of Tuebingen, Germany was canceled and therefore removed from session B4.
- The paper with the title **“Bridging actions? The role of the bilingual assistant in the teacher-parent conference”** by Janne Solberg, University College of Southeast Norway, Norway was canceled and therefore removed from session B5.
- The paper with the title **“Affirmation vs. criticism of power?! Future challenges for gender perspectives in early childhood”** by Melanie Kubandt, Universität Osnabrück, Germany was canceled and therefore removed from session C3.
- The paper with the title **“Vocabulary instruction practices and its relationship with the vocabulary of prekindergarten children”** by Paulina Pizarro, Pontificia Universidad Católica de Chile, Chile was canceled and therefore removed from session C4.
- The paper with the title **“Engaging pre-service primary teachers in science through climate change”** by Giulia Tasquier, Alma mater Studiorum - University of Bologna, Belgium was canceled and therefore removed from session C5.
- The paper with the title **“Metacognitive intervention in the kindergarten: The what, the how and the learning outcomes”** by Zemira Mevarech, Bar-ilan University, Israel was canceled and therefore removed from session D1.

- The paper with the title **“Development of mathematical reasoning in early mathematics education”** by Esther Brunner, Pädagogische Hochschule Thurgau, Switzerland was canceled and therefore removed from session D1.
- The paper with the title **“Teachers' Views About the Use of Mother-tongue in Teaching Early Childhood Education in Botswana”** by Elizabeth Seeco, University of Botswana, Botswana was canceled and therefore removed from session D1.
- The paper with the title **“Comparison between cognitive functioning of children attending musical and nonmusical school”** by Agata Rodziewicz, SWPS University of Social Sciences and Humanities, Poland was canceled and therefore removed from session D4.
- The paper with the title **“Home and daycare quality index: a proposal for all the child development environments”** by Anita Díaz, Pontificia Universidad Católica de Chile, Chile was canceled and therefore removed from session D5.
- The paper with the title **“Associations between structural/pragmatic language, pretend play and social skills from 5-6 years”** by Jenny Gibson, University of Cambridge, United Kingdom was canceled and therefore removed from session E3.
- The paper with the title **“Narrative abilities in bilingual preschoolers in Germany – relevance of socioeconomic variables”** by Carina Müller, Leibnitz University of Hannover, Germany was canceled and therefore removed from session F1.

Keynote Session

Wednesday, 29 August 2018, 11:30 am – 12:30 pm

Motivating Math Instruction for Young Children

Keywords: Emotion, Instructional practices, Motivation, Science education

Chairperson: Elisa Oppermann, Freie Universität Berlin, Germany

Keynote speaker: Deborah Stipek, Stanford University, United States

Deborah Stipek will discuss what is known about the features of math instruction that promote self-confidence and engagement in young children and how they fit within debates about child-centered, “play-based” instruction versus teacher-directed instruction. She will describe the qualities of instruction that capitalize on both the motivational benefits of child-centered instruction and the positive effects on math skills associated with teacher-directed instruction. To do this Deborah Stipek will introduce and provide examples of instructional approaches she refers to as “playful math” – instruction that is intentional, planned, and has clear learning goals, but that also engages children actively and often collaboratively in problem solving. She will also discuss some of the challenges of measuring different dimensions of young children’s motivation related to math, including beliefs (e.g. perceptions of competence, expectations for success) and behavior (attention, challenge seeking, persistence), such as the bias toward positive beliefs in young children and the instability of behavior across settings. The problem of measuring motivation related to math is complicated by children’s varying concepts of “math.” Deborah Stipek will share a new measure she is currently using in research that tries to address this problem by using pictures to ask children what they consider to be a math activity (e.g., worksheets, blocks, counting, patterning, games), what activities they do in their class, how good they are and how much they enjoy each activity. Children also report on the nature of math instruction, including how the teacher responds to mistakes and whether she encourages alternative solution strategies. Deborah Stipek will summarize research on the psychometric properties of the measure and associations with children’s math skills and with observations of teaching.

Session A

Wednesday, 29 August 2018, 01:30 – 03:00 pm

Session A 1

Symposium: Individual language support in heterogeneous children’s groups

Keywords: At-risk children, Inclusion, Interventions, Language education, Low SES, Minority groups, Parental involvement, Process quality, Professional development, Social interaction, Teacher-child interaction

Chairperson: Christine Beckerle, Leibniz Universität Hannover, Germany

Discussant: Franziska Vogt, University of Teacher Education St. Gallen, Switzerland

Children in Early Childhood Education and Care (ECEC) settings differ in terms of age, gender, family background, and developmental conditions worldwide. Consequently, these children have different language competencies and needs for language support. This interdisciplinary symposium addresses dimensions of individual language support in heterogeneous groups. It consists of four papers from three different countries that deal with the question of how ECEC settings can individually support children in their language development. Two papers focus on the role of ECEC professionals and which strategies they can use; one paper addresses the role of peers in ECEC language acquisition; another paper analyses the support by parents, who are instructed by volunteers. The four papers share a common interest in book reading situations, which are prototypical language support situations in ECEC settings. While some papers present results of interventions, others discuss approaches how to measure the individual adaptation of language support. Implications for pedagogical practice and further research will be addressed in all presentations and the discussion.

Dyadic book reading with preschool children of different stages of language development

First Author: Christine Beckerle, Leibniz Universität Hannover, Germany; **Co-Author:** Julian Heil, Pädagogische Hochschule Weingarten, Germany; **Co-Author:** Katja Mackowiak, Leibniz Universität Hannover, Germany; **Co-Author:** Cordula Löffler, Pädagogische Hochschule Weingarten, Germany; **Co-Author:** Katja Koch, TU Braunschweig, Germany; **Co-Author:** Tina von Dapper-Saalfels, TU Braunschweig, Germany

This paper deals with the question of how early childhood professionals (ECP) arrange dyadic bookreading with children of different stages of language development. In the study “alle“, 78 bookreading situations with one ECP and one child were filmed. The children were tested with the language test “SETK 3-5” (Grimm et al., 2010). Results show T-scores ranging from 29.25 to 65.75. Their spontaneous speech was explored in the videos with a coding system (Löffler et al., 2017); analyses display a heterogeneous picture of their language competencies.

The ECPs’ usage of language supporting techniques was also analyzed in the videos with a coding system (Beckerle et al., in press); they use 87.16 techniques on average within 15 minutes. Additionally, a rating system on the adaptivity of the language support is in work. First results will be part of the presentation. The results will give insight into the language supporting practices in preschool that deal with heterogeneous groups of children. It will be discussed if and how ECPs adapt their practices to the individual child’s competencies (Justice, 2004).

Beckerle, C. et al. (in press). “Der Einsatz von Sprachförkertechniken in unterschiedlichen Settings im Kita-Alltag.”

Frühe Bildung. Grimm, H. et al. (2010). SETK 3-5. Sprachentwicklungstest für drei- bis fünfjährige Kinder (2nd Ed.). Göttingen: Hogrefe Justice, L. M. (2004). “Creating Language-Rich Preschool Classroom Environments.” TEACHING Exceptional Children, 37 (2), 36-44.

Löffler, C. et al. (2017). “Evaluationsprojekt alle). Sprachstandserhebung – Testverfahren und Spontansprachprobe im Vergleich.” Presentation at the Congress DGfE-Grundschulforschung, Landau, 29.09.2017.

Supporting children's language development through reflexive interaction during planned pretend play

First Author: Gillian Lake, DCU, Ireland

A recent European Union report, *Key Data on Early Childhood Education and Care* (2014) found that there was currently a balance between adult- and child-initiated activities in the Early Years in the UK. However, there was little support material for practitioners on how this should manifest itself on a daily basis in settings (European Commission, 2014). This can lead to confusion of what exactly is the role of the adult (Baldock *et al.*, 2013; Lillard *et al.*, 2013; Whitebread, 2012). This study designed and delivered an intervention *Let's Talk*, which supported young children's oral language development and evaluated it by RCT. Ninety-four heterogeneous children were tested at pre-and post-test on a battery of oral language assessments. Results showed statistically significant effects on the receptive and productive vocabulary and the *Mean Length of Utterance* of the children in the treatment group. This intervention highlights the benefits of adults joining in pretend play and can be used as a universal Professional Development tool for supporting language development in the Early Years.

Baldock, P Fitzgerald D & Kay J, (2013) *Understanding Early Years Policy* London: SAGE

European Commission/EACEA/Eurydice/Eurostat (2014) *Key Data on Early Childhood and Care in Europe*, Luxembourg: Publications Office of the EU

Lillard, A *et al.*, (2013) The Impact of Pretend Play on Children's Development: A review of the evidence, *Psychological Bulletin*, Vol. 139 (1), p1-34

Whitebread, D (2012) *The Importance of Play*, Brussels, Toy Industries Europe

Effects of a Dutch voluntary home-reading program on children's literacy skills, motivation and HLE

Author: Aike Senna Broens, Erasmus University Rotterdam, Netherlands

This presentation reports on a study that evaluates the effects of VoorleesExpress, a program in which volunteers pay 20 visits to read with children with a language deficit and their families. The target group is low SES and/or migrant families. We conduct a quasi-experimental study, comparing children participating in VoorleesExpress ($n=103$) and a waiting-list control group ($n=81$). To measure child-level dependent variables, we administered a standardized receptive vocabulary test and a narrative comprehension test (Verhoeven & Vermeer, 2001), a book-cover recognition test and the Motivation for Reading Scale (MRS, Baker & Scher, 2002). For measuring the HLE, the Stony Brook Family Reading Survey (Payne *et al.*, 1994) was used. The measures were administered at pretest (September 2017), immediate (February 2018) and delayed posttest (May 2018). We expect VoorleesExpress to have positive effects on both children and families. This study will contribute to the understanding of how family literacy programs can be used to support language acquisition of at-risk children through engaging their parents.

Baker, L., & Scher, D. (2002). BEGINNING READERS' MOTIVATION FOR READING IN RELATION TO PARENTAL BELIEFS AND HOME READING EXPERIENCES. *Reading Psychology*, 23(4), 239-269.

Payne, A. C., Whitehurst, G. J., & Angell, A. L. (1994). The role of home literacy environment in the development of language ability in preschool children from low-income families. *Early Childhood Research Quarterly*, 9(3-4), 427-440.

Verhoeven, L. T. W., & Vermeer, A. (2001). *Taaltoets Alle Kinderen*. Diagnostische toets voor de mondelinge vaardigheid Nederlands bij kinderen van groep 1 tot en met 4.

Mediating language intervention through peers

Author: Ulla Licandro, University of Oldenburg, Germany

Peers play a unique role in each other's (second) language acquisition (Cekaite et al., 2014; Justice et al., 2011). The present study aimed to explore the effects of a peer-mediated narrative-based language intervention on dual language learning (DLL) preschoolers' story generation skills. Four- to five-year-old DLL children ($N = 24$) who were struggling narrators were randomly assigned to an intervention, comparison, or control condition. Children in the intervention and comparison group were matched with a tutor who was advanced in narrative skill to jointly participate in a 10-week intervention based on wordless picture books. Narrative pre, post, generalization, and maintenance probes were analyzed using CLAN. The intervention had a significant effect on measures of narrative macrostructure (i.e., the overall story organization) and lexical diversity. The study extends peer-assisted activities DLL preschool-aged children and adds to the knowledge base that supports employing peers as mediators in language intervention.

Cekaite, A., Blum-Kulka, S., Grøver, V., & Teubal, E. (Eds.). (2014). *Children's peer talk: Learning from each other*. Cambridge, UK: Cambridge University Press.

Justice, L. M., Petscher, Y., Schatschneider, C., & Mashburn, A. (2011). Peer effects in pre-school classrooms: Is children's language growth associated with their classmates' skills? *Child Development*, 82, 1768–1777.

Session A 2

Symposium: Family Support to Foster Early Childhood Development

Keywords: Cognitive development, Culture, Interventions, Longitudinal study, Low SES, Meta-Analysis, Minority groups, Process quality, Programs, Social-emotional competencies, Structural quality

Chairperson: Kerstin Schütte, Leibniz Institute for Science and Mathematics Education (IPN), Germany

Discussant: Joana Cadima, University of Porto, Portugal

Research on early childhood education needs to provide policy-makers and administrators with evidence-based information on how to improve life opportunities of children from disadvantaged families. First of all, rigorous research needs to substantiate the nature of current social inequality. Based on a large-scale panel study the first paper gauges disparities in scientific literacy between children with and without a migration background and identifies predictive structural quality and process quality characteristics. Effectively supporting disadvantaged families is likely contingent on the target groups positively evaluating available services. The second paper therefore investigates how different disadvantaged groups across

Europe make use of and evaluate home-based as well as center-based family support services. Their analysis of within-group differences and of differences between disadvantaged groups within a country will further our understanding of how to increase disadvantaged families' utilization of targeted support. Striving to maximize the amount of time small children spend in childcare is a controversial issue, because the question is unresolved whether or not it might entail negative socio-emotional outcomes. The meta-analysis presented as the third paper places particular emphasis on educational quality as a potential moderator of the relationship between early childhood education and care experiences and children's socio-emotional outcomes. Finally, the fourth paper introduces an approach to foster early childhood development of children from disadvantaged families: linking existing programs that have proven effective. The associated quasi-experimental study investigates whether such a systematic, long-term chain of interventions is an effective and efficient means to promote comprehensive policy for early childhood.

Effects of social background and learning environments on disparities in early scientific literacy

First Author: Jana Kähler, Leibniz-Institute for Science and Mathematics Education, Germany; **Co-Author:** Inga Hahn, Leibniz Institute for Science and Mathematics Education (IPN), Germany; **Co-Author:** Katrin Schöps, Leibniz Institute for Science and Mathematics Education (IPN), Germany

Ethnic and social educational inequalities can be found throughout the school career. Children from migrant families already lag behind in qualifications when they start school (Becker & Biedinger, 2006). TIMSS 2011 results demonstrated that, in Germany, fourth grade students whose first language is German outperformed students who do not speak German at home in mathematics as well as in science tests (Bos et al., 2012). Despite the importance of scientific literacy (Bybee, 1997) we still lack information on early scientific literacy and on which structural and process-based features (Baumert, Watermann & Schümer, 2003; Roux & Tietze, 2007) of the learning environments influence young children's scientific literacy. This study addresses the question on whether these disparities are already present in the scientific literacy of 4- to 6- year-old children with and without a migration background. Data from the German National Educational Panel Study are also used in a structural equation model in order to identify structural and process-based features associated with scientific literacy and its variance. The results illustrate that the receptive German vocabulary is the strongest predictor for preschool children's scientific literacy. Consequently, children with a migration background scored significantly lower in the scientific literacy test than children without a migration background ($d = 2.08$). The results emphasize the importance of early childcare and the quality of the home learning environment for children's language acquisition and their acquisition of scientific literacy.

The use and evaluation of family support services in disadvantaged groups across Europe

First Author: Martine Broekhuizen, Utrecht University, Netherlands; **Co-Author:** Katharina Ereky-Stevens, Oxford University, United Kingdom; **Co-Author:** Thomas Moser, University College of Southeast Norway, Norway; **Co-Author:** Helga Norheim, University College of Southeast Norway, Norway

The early years are formative for children's cognitive and socio-emotional skills, and poverty and social exclusion during these years can have substantial negative effects on children's development (Shonkoff et al., 2010). Research shows that family support services can partially compensate for these negative effects (e.g., Engle et al., 2011), however, the availability and thus use of these services differs between countries, and little is known about parent's evaluation of these services. The current study reports on both the use and evaluation of home-based and center-based family support services in different disadvantaged groups (parents with a Maghrebian, Turkish, Roma and low-income native background) across Europe. Data comes from a large-scale quantitative survey in ten European countries (Czech Republic, England, Germany, Greece, France, Italy, the Netherlands, Norway, Poland, and Portugal; $N = 250\text{--}300$ per group per country). Preliminary analyses show that there is considerable variation in both the use and evaluation of home-based and center-based family support services within disadvantaged groups across different countries (e.g., between Turkish families in the Netherlands, Germany, and England), and between disadvantaged groups in the same country. These differences will be interpreted in relation to context characteristics (e.g., accessibility of services) and known differences between groups (e.g., cultural differences). Finally, analyses show that measured family-factors (parent's educational level and perceived own cultural identity) also relate to the use and evaluation of services. Results from this study can inform interventions to improve the accessibility and quality of family support services.

A meta-analysis on the relationship between time spent in childcare and social-emotional outcomes

First Author: Katrin Wolf, Freie Universität Berlin, Germany; **Co-Author:** Hannah Ulferts, OECD Directorate for Education and Skills, France; **Co-Author:** Yvonne Anders, Freie Universität Berlin, Germany

Studies demonstrate the positive effect of very early childhood education and care (ECEC) experiences on children's cognitive competencies (Heckman, 2006). At the same time, there are concerns that extensive childcare in the first years could have negative effects on socio-emotional outcomes (Loeb et al., 2007). Reviews on the impact of childcare on socio-emotional competencies report inconsistent results (e.g., Melhuish et al., 2015). This meta-analysis examines the relationship between the extent of ECEC experiences and socio-emotional skills at the transition to school in more detail. A non-linear, inverse U-shaped relationship between the variables is expected. The database includes all European studies published since 2000 that report empirical correlations between indicators of ECEC experiences and socio-emotional outcomes at transition to school. The mean effect size is determined in a random-effect model. Mixed-effect models investigate the influence of the moderator educational quality. The discussion focuses on the impact for the political debate on the expansion of childcare for under-three-year-olds.

Literature:

Heckman, J. J. (2006). Skill formation and the economics of investing in disadvantaged children. *Science*, 312(5782), 1900–1902.

Loeb, S., Bridges, M., Bassok, D., Fuller, B. & Rumberger, R. W. (2007). How much is too much? The influence of preschool centers on children's social and cognitive development. *Economics of Education Review*, 26(1), 52–66.

Melhuish, E., Ereky-Stevens, K., Petrogiannis, K., Ariescu, A., Penderi, E., Rentzou, K. et al. (2015). *A review of research on the effects of early childhood education and care (ECEC) on children development*.

Retrieved from http://ecec-care.org/fileadmin/careproject/Publications/reports/CARE_WP4_D4__1_review_of_effects_of_ecec.pdf

Linking existing programs to foster early childhood development of disadvantaged children

First Author: Kerstin Schütte, Leibniz Institute for Science and Mathematics Education (IPN), Germany; **Co-Author:** Olaf Koeller, Leibniz Institute for Science and Mathematics Education, Germany; **Co-Author:** BRISE group, Germany

Disparities in academic achievement associated with children's family background pose a pressing education policy challenge in Germany. Targeted measures should begin long before children start formal education to effectively limit the emergence of disparities. The literature suggests that continuous support from pregnancy until after the child enters primary school might not only be an effective approach to positively impact the development of children from disadvantaged families, but it might also be efficient. Our study seeks to identify the cumulative effects of a systematic, long-term chain of interventions on the cognitive, social and emotional development of children from socially and culturally disadvantaged families. In a quasi-experimental design, families in the intervention group are enrolled in a sequence of existing programs that have proven effective, thus ensuring continuous support; families in the control group enroll in whatever programs and facilities they prefer, as is the standard of practice. This intervention chain involves home-based as well as center-based programs. Prior to having collected data from a sufficiently large sample, our approach has the potential to stimulate discussion and further pertinent research. Results of this unique study will have meaning for the greater public, particularly for policy-makers and administrators who obtain evidence-based information on how to improve early childhood education, especially with a view to greater equity.

Session A 3

Symposium: On working mechanisms of early interventions: Dutch and German perspectives

Keywords: At-risk children, Beliefs, Experimental design, Home learning environment, Interventions, Literacy, Longitudinal study, Low SES, Parental involvement

Chairperson: Sanneke de la Rie, Rotterdam University of Applied Sciences, Netherlands

Discussant: Ruben Fukkink, University of Amsterdam, Netherlands

Children differ strongly in their emergent literacy skills when entering school and these differences have a profound impact on their subsequent reading and writing development (Burgess, Hecht, & Lonigan, 2002; Spira, Bracken, & Fischel, 2005). Early skill differences are largely dependent on the quality of the home literacy environment (Sylva et al., 2004; Sénéchal, 2006). Family literacy programs (FLPs) have been developed to stimulate this home literacy environment, particularly in disadvantaged families. However, meta-analyses show that effects on child outcomes are moderate (Manz et al., 2010; Van Steensel et al., 2011). Certain programs proved to be effective for subgroups of children, but not for others, and it has been

suggested that this can be partly explained by variability in implementation quality. Recent research therefore focuses more on possible working mechanisms, such as quality of parent-child interactions during program-activities, in order to gain insight into program success. This symposium combines research from the Netherlands and Germany. In the first two studies, we investigate parent-child interaction quality during different literacy-activities (commonly incorporated in FLPs) and associations with early literacy skills. The final two studies present effects of two German FLPs, that focused on enhancing parent-child interaction quality. We examine the relationship between parental beliefs on stimulating their child's development and interaction quality, and the effects of parental training on these beliefs and behavior. The aim of the symposium is to provide new understandings about the effectiveness of early interventions in disadvantaged families. Implications for future research, policy, and practice will be discussed. (250 words)

Level of abstraction in parent-child interactions and early literacy: The role of activity and SES

First Author: Sanneke de la Rie, Rotterdam University of Applied Sciences, Netherlands; **Co-Author:** Roel Van Steensel, Erasmus Universiteit Rotterdam, Netherlands; **Co-Author:** Amos van Gelderen, University of Amsterdam / Rotterdam University of Applied Sciences, Netherlands; **Co-Author:** Sabine Severiens, Erasmus University Rotterdam, Netherlands

Children's emergent literacy skills are related to both the quantity and quality of home literacy activities (Rowe, 2012). Quality features particularly refer to cognitive demand during parent-child interactions, measured by the amount of abstract, decontextualized talk (Van Kleeck, 2008). The level of abstraction (partly) depends on the activity. Shared reading seems to elicit most abstract talk. There are other activities that provide opportunity for abstract talk, but limited research exists (Yont et al., 2003). One example are 'prompting boards', complex pictures, depicting a scenario (Rémi, 2011). In a pilot-study we compared mother-child interactions ($N=19$) during prompting boards and shared reading. For the current study ($N=44$) our goal was to replicate the pilot-study and additionally examine the role of SES. Furthermore, we analyzed relations between abstract talk and children's emergent literacy. We coded transcripts of videotaped parent-child observations regarding level of abstraction (Van Kleeck et al., 1997/2009). Children (M_{age} : 63 months) were tested on literacy, language and vocabulary skills. Results show that prompting boards elicited both more and more highly abstract speech (particularly, inferencing) than shared reading, and children contributed more often to the conversations. Additionally, speech on the lowest level occurred more during prompting boards (e.g., labeling). High-SES dyads produced more inferencing and less labeling utterances than low-SES dyads. Shared reading did not attenuate SES differences in abstract interactions. Finally, parents' abstract talk during prompting boards predicted children's literacy skills, whereas their abstract talk during shared reading did not. Implications for research and practice (e.g., regarding FLPs) are discussed.

Quality of parent-child interactions and early literacy: the role of parental literacy beliefs

First Author: Eke Krijnen, Erasmus University Rotterdam, Netherlands; **Co-Author:** Roel Van Steensel, Erasmus University Rotterdam, Netherlands; **Co-Author:** Marieke Meeuwisse, Erasmus University Rotterdam, Netherlands; **Co-Author:** Sabine Severiens, Erasmus University Rotterdam, Netherlands

The differential effects of family literacy programs (FLPs) on diverse groups of families might be explained by the degree of contingency between parental literacy beliefs and program content (Manz et al., 2010; Van Steensel et al., 2011). However, literacy beliefs are largely overlooked in FLP-research. This study aimed to a) examine the literacy beliefs in a sample of 35 parents with diverse demographic backgrounds, participating in an FLP, b) investigate associations between literacy beliefs and interaction quality during joint activities of parents and children, and c) examine associations between interaction quality and children's literacy skills. We videotaped 35 parent-child dyads (child M_{age} : 70 months) while conducting a literacy activity (prompting board). Transcripts of the videos were coded for interaction quality based on Hindman, Connor, Jewkes, and Morrison (2008). Parent interviews resulted in scores for a code-oriented perspective (literacy is a set of decoding skills to be instructed) and meaning-oriented perspective (literacy is to be acquired as an integrated whole by engaging in meaningful interaction with others) (Lynch, Anderson, Anderson, & Shapiro, 2006). Children's literacy skills were measured using four standardized tests. Multiple-regression models were fit to the data. Preliminary results show that most parents held a meaning-oriented perspective. Beliefs were not related to parental interaction quality, nor did parental interaction quality predict child outcomes. However, child print references were positively associated with children's literacy skills. Findings indicated that other, not exclusively parent-centered, variables might determine differences in children's literacy skills.

Training parental scaffolding: How do parents of full- and preterm born toddlers' benefit?

First Author: Kim Gärtner, Heidelberg University, Germany; **Co-Author:** Verena Vetter, University Hospital Heidelberg, Germany; **Co-Author:** Michaela Schäferling, University Hospital Heidelberg, Germany; **Co-Author:** Gitta Reuner, University Hospital Heidelberg, Germany; **Co-Author:** Silke Hertel, Ruprecht-Karls-Universität Heidelberg, Germany

Preterm children have an increased risk for prolonged impairments in developmental outcomes, including literacy skills and self-regulation (Barre, Morgan, Doyle, & Anderson, 2011; Treyvaud et al., 2016). Research has shown that sensitive parenting and scaffolding behavior in toddlerhood is predictive of these skills from preschool to school age (Dieterich, Assel, Swank, Smith, & Landry, 2006; Landry, Miller-Loncar, Smith, & Swank, 2002; Treyvaud et al., 2016). Parent training thus presents a promising way to counteract the negative consequences of preterm birth. We compared the effectiveness of a basic scaffolding and a combined scaffolding/sensitivity training to an active treatment control group (stress management), and examined from which training condition parents of preterm and full-term children benefited the most. A total of 87 parents of full-term and 35 parents of preterm toddlers (M_{age} : 27 months, corrected for prematurity) participated. Based on a quasi-experimental pretest-posttest follow-up design, parents were randomly assigned to treatments. Current results are limited to questionnaire data on parents' domain-specific self-efficacy (DSSE), domain-general self-efficacy (DGSE) and beliefs on parental co-regulation and the promotion of learning (BCL). An overall increase resulted from pre- to posttest and/or follow-up. Parents' BCL changed significantly stronger in the combined training than in the control group, while not differing significantly from parents of the basic training group. The combined training enhanced BCL among parents

of full-term and preterm children the most. If such training also yields improvement on the behavioral level (which is subject to current analyses), this will advance preterm aftercare.

Longitudinal effects of different course-types on children`s social-emotional and vocabulary skills

First Author: Franziska Cohen, Freie Universität Berlin, Germany; **Co-Author:** Juliane Schünke, Freie Universität Berlin, Germany; **Co-Author:** Yvonne Anders, Freie Universität Berlin, Germany

By the beginning of primary school children vary significantly in their cognitive skills depending on their family`s social background (Magnuson, 2004; OECD, 2017). Particularly, the home-learning environment plays a significant role in children`s development (Rodriguez & Tamis-LeMonda, 2011; Skwarchuk, Sowinka & Le Fevre, 2014). Children from families that cannot provide a rich home learning environment can be defined as disadvantaged. Family support programs are needed. ‘Chancenreich’ is one example of such an intervention program which aims, among other things, at encouraging the interaction and relationship between parents and children through two different courses of action: parenting-skills-focused-courses and parent-child-interaction-focused courses. The present study examines the interim effects of these two course types on children`s social-emotional (SDQ) and language development (PPVT, Vineland). The study follows a longitudinal design with two points of measurements (M_{age} : 41 months (T1), 68 months (T2) and uses a sample of 184 parents and their children (T2: N=122) in the intervention group and 58 parents and their children (T2: N=42) in the comparison group. Regression analyses including control variables were conducted. Missing values were considered by using the FIML approach. Findings indicate that children`s vocabulary development (PPVT) between the age of three and five benefits from the parent`s participation in parenting skills trainings at the age of three. Furthermore, parent-child- interaction-focused courses at the child`s age of five relate to better listening and understanding competences (Vineland) at the same age.

Session A 4

Symposium: PAPILIO-program in promoting social-emotional competencies and preventing behavior problems

Keywords: Attachment, Evaluation study, Interventions, Programs, Social interaction, Social-emotional competencies, Teacher-child interaction

Chairperson: Merja Koivula, University of Jyväskylä, Finland

Discussant: Claudia Hruska, Freie Universität Berlin, Germany

The intervention program “Papilio-3bis6” aims at preventing behavior problems and promoting social-emotional competencies of 3-6 year-old children in daycare centers. The program development followed principals of developmentally appropriate prevention of behavior problems and developmentally appropriate practice. Following a successful state-of-the-art evaluation (effectiveness, process) the program has been implemented in over 1,200 daycare centers in Germany to date. Meanwhile, the program has been transferred to Finland and two modified program versions have been developed: Papilio-U3 and “Papilio-

6bis9". Expanding the age range of children reached by this present comprehensive prevention approach provides the opportunity to accompany children's development from their first day of professional care until their transition to school. In this symposium, we explore first the principles, implementation, and the applicability of the "Papilio-3bis6" program in the Finnish ECEC context from the perspective of teachers and children. The results suggest that implementing "Papilio-3bis6" has altered teachers' and children's roles, increased naming of emotions and emotion related conversations, strengthened children's social relationships and increased imagination in children's play. The second and third presentations introduce expansions of the "Papilio-3bis6" program for toddlers and elementary school starters, respectively. These new programs integrate experiences of the implementation in diverse contexts and consider the requirements of new target groups. Consequently, the focus of Papilio-U3 will be to promote attachment security of the caregiver-toddler-dyad, whereas "Papilio-6bis9" includes reflection of the teacher-student relationship, secondary emotions, friendship, and pro-social skills as well as teaching problem solving skills and promoting executive functions.

"Papilio-3bis6" program in early childhood education in Finland

First Author: Merja Koivula, University of Jyväskylä, Finland; **Co-Author:** Marja-Leena Laakso, University of Jyväskylä, Finland; **Co-Author:** Riitta Viitala, University of Jyväskylä, Finland; **Co-Author:** Marita Neitola, University of Turku, Department of Teacher Education, Rauma Unit, Finland

This presentation investigates the implementation of "Papilio-3bis6" in Finnish preschools. The "Papilio-3bis6" program, originally developed in Germany, is a developmentally focused, scientifically-based intervention program that focuses on the prevention of behavior problems and social-emotional competence support in preschool children (Scheithauer et al., 2008). The aim of the current study is to evaluate, whether this program, was successfully implemented in the Finnish ECEC context, which has lacked this type of comprehensive social-emotional learning program for young children. The "Papilio-3bis6" program was piloted in five Finnish kindergartens. Finnish preschool teachers received training prior to implementing the program measures. The implementation process was evaluated using the thematic analysis of qualitative data (e.g. interview, video-observation, and questionnaire data). Furthermore, the teachers' perspectives and their experiences during the implementation of "Papilio-3bis6" as well as the program's applicability were examined. Our results revealed that only minor modifications were necessary for the implementation of the program in Finnish preschools. However, the teachers reported some difficulties with the execution of this structured, manualised program in the preschools' daily routines. For example, Toys-go-on-holiday day, during which the children play without regularly used toys, was initially challenging to implement. Nevertheless, the teachers also reported many positive impacts of the "Papilio-3bis6" program. The children's emotion recognition and self-management skills improved, their social relationship networks extended, and their socially responsible behavior increased. Hence, the implementation of "Papilio-3bis6" measures resulted in meaningful learning of both children and teachers and advanced the children's social-emotional competence.

"Papilio-U3" in promoting social-emotional competencies and attachment security of toddlers

First Author: Niklas Ortelbach, Freie Universität Berlin, Germany; **Co-Author:** Jennifer Gerlach, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany; **Co-Author:** Ina Bovenschen, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany; **Co-Author:** Charlotte Peter, Papilio e.V., Augsburg, Germany; **Co-Author:** Herbert Scheithauer, Freie Universität Berlin, Germany

Aim of the presentation is to illustrate the need of early daycare preventive interventions, to give an overview of the development of the Papilio-U3 program, its measures, and the accompanying evaluation study. Additionally, results of the first measurement occasion will be presented. Papilio-U3 contains intervention elements on the caregiver and toddler levels as well as the dyad they form. Caregivers complete practical training including information on early social-emotional development, attachment and child temperament as well as reflective elements, in-vivo training and video feedback to enhance external emotion regulation and child-oriented communication strategies, dyadic caregiver sensitivity, and group-oriented sensitivity. Additionally, they are provided with in-vivo exercises, games, and songs to promote their children's emotional vocabulary and early executive functions. Caregivers are supported to transfer those competencies and procedures to daily routines. The effectiveness evaluation employs a controlled (intervention vs. waiting-list control groups) randomized pretest-posttest-follow up-design. The sample consists of 60 German day caregivers and their groups of 12 to 36 months old toddlers. Based on parents' and caregivers' information on risk factors as well as social-emotional and behavioral problems (BITSEA) and temperament (ECBQ) 120 high and low risk toddlers are selected and observed prospectively by measures of cognitive development and attachment security. The presentation of T1 results is concluded by a discussion of the selection of the index groups and an outlook on further evaluation processes.

Papilio-6bis9: Fostering social-emotional learning, preventing behavior problems in primary school

First Author: Viola Braun, Freie Universität Berlin, Germany; **Co-Author:** Charlotte Peter, Papilio e.V., Augsburg, Germany; **Co-Author:** Niklas Ortelbach, Freie Universität Berlin, Germany; **Co-Author:** Herbert Scheithauer, Freie Universität Berlin, Germany

An overview of the development of the prevention and social emotional learning (SEL) program "Papilio-6bis9" for elementary children aged 6 to 9 and its measures as well as the design of the associated evaluation study is presented. Main aims of the program are (1) to improve students' social competences based on the enhancement of executive functions and self-regulation skills as well as positive social interaction skills, (2) to improve emotional competences including secondary emotions, emotion regulation and problem solving skills, (3) to establish a positive class-/school- climate by fostering positive teacher-student-/peer-to-peer-relationships, and (4) to improve children's behavior and academic performance. Following a four day-training, teachers implement the program in regular school lessons over twelve consecutive ninety-minute lessons. The effectiveness evaluation consists of a controlled (intervention vs. waiting-list control groups) randomized pretest-posttest-follow up-design. Additionally, index-groups are tested. The sample consists of ca. 25 German elementary schools and their first grades. Based on teachers' information of a brief behavioral screening questionnaire (SDQ-Deu) a difficulty score is built, which helps to identify

children with high rates on emotional and behavioral problems (index-group children), which get a further testing of social-emotional competences at the first and third measurement occasion (IDS-SEK). Additionally, teachers get asked about children's executive functions (CHEXI), social skills (SSIS-RS) and the perceived teacher-child-relationship (Student-Teacher Relationship Scale). Furthermore, children's wellbeing is measured regularly on childrens' information. It is expected that school based SEL interventions also have positive effects on students' academic performance. Therefore, we plan to evaluate academic achievements at the third measurement occasion.

Session A 5

Symposium: Tackling Educational Inequalities through Promising and Evidence-based Interventions around Europe

Keywords: At-risk children, Curriculum, Home learning environment, Instructional practices, Interventions, Low SES, Minority groups, Parental involvement, Preschool quality, Professional development, Professional knowledge

Chairperson: Paul Leseman, Utrecht University, Netherlands

Organiser: Joana Cadima, University of Porto, Portugal

Organiser: Paul Leseman, Utrecht University, Netherlands

Discussant: Tove Mogstad Slinde, Ministry of Education and Research Norway, Norway

The main overarching aim of the ISOTIS project is to contribute to educational equality and social inclusion of groups and communities that face persistent disadvantages and risks of marginalization in current European societies. Within this project, by critically assessing the evidence base and through identification of promising approaches, three inventories of effective and promising interventions involving several countries were developed. In the symposium, we will share the findings from this work. The chair will start by providing a brief overview of ISOTIS and its main objectives. The first paper will share findings on parent- and family support programs for children. The second paper follows by sharing findings on curriculum, pedagogy, and classroom and school climate programs focusing on multilingualism and inclusion. The third paper will present data on professional development programs and approaches in ECEC centers. The three papers will present the steps undertaken, namely the collection of research evidence and expert consultation, and will present a summary of the evidence and promising approaches that were identified. The discussion will focus on current challenges in the support of disadvantaged groups, as well as on the common principles of effectiveness that can be extracted from the analyses.

Parent- and Family-Support Interventions: An Inventory of Promising programs in 7 European countries

First Author: Gil Nata, University of Porto, Portugal; Germany; **Co-Author:** Maria Evangelou, University of Oxford, United Kingdom; **Co-Author:** Joana Cadima, University of Porto, Portugal; **Co-Author:** Yvonne Anders, Freie Universität Berlin,

Over the past years, many countries have set up center-based, home- and community-based approaches to support families and to promote the quality of the home learning environment. However, the effectiveness of many approaches still needs to be evaluated in the European context. Although reviews and meta-analyses exist, they are often based on North-European and US-American programs. But contextual factors and challenges vary greatly between countries, so consideration of other countries is highly needed. Furthermore, ethnic and immigrant minorities have brought additional challenges, namely cultural and linguistic, that need to be addressed and integrated within each country's system and programs. This paper presents an inventory of promising and evidence-based parent- and family support approaches for the Czech Republic, England, Germany, Netherlands, Norway, Poland and Portugal. It will start by briefly providing an up-to-date overview of social indicators of family support and educational inequalities, as well as a description of how countries' family services deal with equality issues, monitoring, and language support. In addition, a review of evidence-based and promising family support services/programs will be presented. Over 50 programs were identified. Analysis yielded a great variety of underlying theoretical frameworks. In addition, the international coverage of some programs suggests that countries are communicating and learning from each other's experiences. Findings will be discussed in relation to the existing challenges, with a particular emphasis on outreach, multicultural challenges, effectiveness on reducing educational inequalities, and consideration of pre-existent services. Recommendations for potentially effective interventions will also be discussed.

An inventory of curriculum, pedagogy, and social climate interventions in 8 European countries

First Author: Cecília Aguiar, ISCTE-Instituto Universitário de Lisboa, Portugal; **Co-Author:** Carla Silva, ISCTE-Instituto Universitário de Lisboa, Portugal; **Co-Author:** Rita Guerra, ISCTE-Instituto Universitário de Lisboa, Portugal; **Co-Author:** Giulia Pastori, University of Milano-Bicocca, Italy

This paper presents an inventory of effective and promising interventions, within the classroom and school microsystems, aiming to promote educational equality and belongingness for immigrant, Roma, and low-income children attending early childhood and primary education provision in the Czech Republic, England, Germany, Greece, Italy, the Netherlands, Poland, and Portugal. Promising interventions were defined as innovative, highly-considered practices for which there is not yet sufficient evidence supported by high-quality research. Over 500 interventions were identified. Based on eligibility and priority criteria, 78 interventions were selected for analyses. Key findings will be presented. For example, while 79% of the interventions provided some type of language support, only 32% considered children's heritage language, even though 72% of the interventions targeted immigrant, Roma, or mixed groups of children. Furthermore, only 6% of the interventions reported collaborative learning activities and only 4% mentioned the social composition of peer groups/dyads, typically based on performance homogeneity. Anti-bias activities were reported for 4% of the interventions. Overall, findings suggest that participating countries are testing or implementing a considerable number of interventions targeting social and educational inequalities through curriculum, pedagogy, and social climate. Language support seems to be widespread, recognizing the foundational nature of language skills for learning, communication, and belongingness. However, there is room for further development in design, implementation, monitoring, and evaluation. Im-

portantly, comprehensive, multicultural policies that explicitly support culture maintenance, communication and positive contact among minority or disadvantaged and majority or advantaged students, through equity pedagogies, may be especially valuable in guiding future developments.

Professional development aimed at cultural/linguistic diversity: inventory in 10 European countries

First Author: Pauline Slot, Utrecht University, Netherlands; **Co-Author:** Bodine Romijn, Utrecht University, Netherlands; **Co-Author:** Olga Wysowska, Faculty of Education, University of Warsaw, Poland

Numerous studies have shown the added value of professional development (PD) in improving (educational) practice (e.g. Egert, 2015; Zaslow et al., 2010). However, research on PD that is aimed at promoting professionals' competences in dealing with cultural and linguistic diversity is still scarce. This inventory addresses this gap by bringing together findings from 10 different European countries. In the conceptual framework different PD components are distinguished: the *who* (features of the learners), the *what* (PD content) and the *how* (PD strategies and delivery modes). In the transactional model, professionals' knowledge, skills, attitudes and beliefs are hypothesized to have a bidirectional relation with behavior and practices, which is facilitated by enactment (the translation of new beliefs into action) and reflection (blinded for review). A total of 57 interventions were included in the inventory. The results showed that the interventions focused at cultural diversity were mainly targeted at professionals working in ECEC, NGO's and social services, whereas interventions aimed at multilingualism mostly targeted professionals working in schools. Further it appeared that interventions aiming at cultural diversity more often included a focus on knowledge, skills, and attitudes, whereas interventions targeting multilingualism focused at knowledge and skills only. Relatedly, interventions aimed at cultural diversity relied more heavily on reflection as strategy whereas interventions focused at multilingualism more often used a training approach. The results of the inventory will be discussed in view of implications for policy and practice in light of developing models of on-going professional development within a team of professionals.

Session B

Wednesday, 29 August 2018, 03:30 – 05:00 pm

Session B 1

Single paper session: Preschool quality and teacher-child-interactions

Keywords: Child participation, Cognitive development, Instructional practices, Low SES, Preschool quality, Preschool teachers, Process quality, Teacher-child interaction, Wellbeing

Chairperson: Hanno van Keulen, Windesheim Flevoland University of Applied Science, Netherlands

Does cultural diversity affect interaction quality in German preschool classrooms?

Keywords: Preschool quality, Process quality, Teacher-child interaction, Preschool teachers

First Author: Heike Wadepohl, Leibniz University Hanover, Germany; **Co-Author:** Katja Mackowiak, Institute for Special Education, Germany

The recent debate on the effects of early childhood education and care (ECEC) has underlined the importance of high-quality teacher-child interactions as a central driver for children's learning and development. Up to now, influencing factors on the interaction quality in German preschools are mainly investigated with regard to boundary conditions and teacher variables whereas classroom or group factors are rarely taken into account (Viernickel & Fuchs-Rechlin, 2015). This paper focuses on cultural diversity of the classroom as a factor of heterogeneity and its correlations with the teachers' interaction quality and relies on a sample of 88 preschool teachers in Germany and the German-speaking part of Switzerland. Cultural diversity in the classroom is assessed via questionnaire; interaction quality is measured via the CLASS Pre-K system (Pianta et al., 2008) coding videos of free-play situations in the classrooms. Current results show significantly negative correlations between the degree of cultural diversity and the three CLASS-domains (instructional support: $r = -0.533$, $p = 0.001$, emotional support: $r = -0.553$, $p = 0.000$, classroom organization: $r = -0.489$, $p = 0.002$) which means that classrooms with a higher level of cultural diversity receive lower scores in interaction quality. The results support the hypothesis that demanding groups or settings, in this case operationalized via the cultural diversity as one factor of heterogeneity, could explain lower performance levels of the teachers. Other explanations (e.g. a possible confounding with socio-economic variables) will be discussed in the presentation.

Teacher stress, work engagement and the quality of teacher-child interactions in preschool

Keywords: Preschool quality, Wellbeing, Teacher-child interaction, Preschool teachers

First Author: Viola Penttinen, University of Jyväskylä, Finland; **Co-Author:** Eija Pakarinen, New York University Abu Dhabi/ University of Jyväskylä, Finland; **Co-Author:** Marja-Kristiina Lerkkanen, University of Jyväskylä, Finland

Teachers need to cope with a number of challenges and demands in their classrooms that may decrease their wellbeing and thereby negatively impact their ability to create a positive learning environment and to engage in supportive interactions with children. The aim of the present study was to examine to what extent is teacher-perceived stress associated with the observed quality of teacher-child interactions in Finnish preschool classrooms. The participants of the study were 51 preschool teachers with their preschool groups. Data consisted of teacher stress surveys and video recordings, which were used to assess the quality of teacher-child interactions with The Classroom Assessment Scoring System (CLASS Pre-K; Pianta, La Paro, & Hamre, 2008). Preliminary results showed that teachers' stress and the quality of teacher-student interactions were negatively associated: teachers who experienced more teaching-related stress had lower quality classroom organization. In addition, higher cynicism and inadequacy were related to emotional support of a lower quality. Moreover, instructional support was observed to be of a higher quality among teachers who reported higher levels of absorption in work. Findings from this study can be used to improve teacher training and to develop interventions to support teachers' wellbeing. Key words: teacher-child interactions, teacher stress, work engagement, preschool

Session B 2

Single paper session: Preschool quality and process quality

Keywords: Child participation, Inclusion, Play, Preschool quality, Process quality, STEM, Structural quality, Teacher-child interaction

Chairperson: Andrea G. Eckhardt, Hochschule Zittau/Görlitz - University of Applied Sciences, Germany

The relationship between structural factors and interaction quality in Norwegian ECEC for toddlers.

Keywords: Preschool quality, Process quality, Structural quality, Teacher-child interaction

First Author: Ingrid Midteide Løkken, University College of Southeast Norway, Norway; **Co-Author:** Elisabeth Bjørnstad, Oslo Metropolitan University, Norway; **Co-Author:** Martine Broekhuizen, Utrecht University, Netherlands; **Co- Author:** Thomas Moser, University College of Southeast Norway, Norway

The aim of this study is to investigate the relationship between two structural quality factors for ECEC-provisions, (1) organization (stable groups versus flexible groups) and (2) staff-child ratio (staff per child), and interaction quality in toddler groups in Norwegian Early Childhood Education and Care (ECEC). Stable groups (SG) have a clear and a relatively constant composition of the child group over time, while flexible groups (FG) have a shared-interest area with a rather temporary and dynamic composition of child (sub-) groups. The Norwegian Kindergarten Act does not provide binding regulations on how many assistant teachers should be in a group, but the recommendation is one staff member (including both assistants and teachers) per three children under the age of three. Data were collected in 206 ECEC provision groups, including 1211 children in the period from 2013 to 2015. Structural quality factors were registered through questionnaires to the pedagogical leaders of the units. Interaction quality was operationalized through three of the subscales of the Infant/Toddler Environment Rating Scales–Revised (ITERS-R); Interaction, Listening and talking and program structure. A two-way MANOVA revealed that small, stable groups and a staff-child ratio of three or less children per staff member were independently related to higher interaction quality. These findings have clear implications for policy and the training of kindergarten staff. It is important that they organize their groups, with three or fewer children per staff and if they organize their groups in SG.

Classroom quality, activity setting and children's engagement in inclusive preschools

Keywords: Preschool quality, Process quality, Inclusion, Child participation

First Author: Vera Coelho, Porto University, Portugal; **Co-Author:** Joana Cadima, University of Porto, Portugal; **Co- Author:** Ana Isabel Mota e Costa Pinto, University of Porto - Portugal, Portugal

Preschool process quality and activity-setting are considered important aspects affecting children's outcomes, namely their engagement (Booren et al., 2012; Tsao et al., 2008). Engagement is particularly relevant in early ages as it is related to concurrent and future learning and development (e.g., Aydogan et al., 2015). As such, it is important to understand how educational environments can better promote engagement for all children. Considering the significance of high-quality preschool on children outcomes, this study describes inclusive preschools process quality and activity-setting and explores relations between these and children's engagement. Participants were 247 preschool aged children attending 42 classrooms. Three groups of children were considered: with disabilities ($n=54$); at-risk ($n=78$); typically developing ($n=115$). Child engagement and activity-setting were documented with Child Observation in Preschool (Farran, 2006); and classroom quality with Classroom Assessment Scoring System (Pianta et al., 2008). Results showed that inclusive preschools presented mediocre levels of teacher-child interaction quality ($M=3.99$; $SD=0.82$), with Emotional Support presenting higher levels ($M=4.85$; $SD=0.74$), and Instructional Learning Support lower scores ($M=2.70$; $SD=0.96$). The predominant activity setting was whole-group (47% of time). Free-play was observed for 12% of time. Time in free-play, but not time in whole-group was positively associated with all quality dimensions. More time in whole-group was negatively associated with children's engagement; Time in free-play, Emotional Support and Classroom Organization were positively associated with children's engagement. Correlations were stronger for at-risk children. Results contribute to inform teachers regarding the importance of their interactions and planning of activity-settings to promote all children's engagement and participation in inclusive settings.

Designing Preschool Physical Learning Environments – The Children's Voice

Keywords: Play, Preschool quality, Process quality, STEM

First Author: Netta Perry, Bar-Ilan University, Israel; **Co-Author:** Esther Adi-Japha, Bar-Ilan University, Israel; **Co- Author:** Ornit Spektor-Levy, Bar-Ilan University, Israel

To foster learning, exploration and curiosity, internal and external learning spaces need organization and design. Considering that learning environments bear much influence on children's learning, this study sought to hear the voices of the children regarding their learning environments, with a particular focus on *science and nature centers*. The current study is part of an extended study on a research population of 150 preschoolers (5–6 years of age). This paper presents preliminary results. During semi-structured interviews, preschoolers were asked to photograph their favorite spaces and to explain their choices. Next, children were presented with photos of three differently designed preschools, were asked to select one preferred environment, and to explain why. The preschoolers' perceptions were also surveyed through a Likert questionnaire using pictorial icons of happy and unhappy faces. Findings reveal that very young children do hold preferences regarding the design of their learning environment, and they are able to discuss their preferences. Their explanations show that most children enjoy the opportunity to engage in active learning, hands-on experiences, and collaborative play. Most of them liked the organization of their own classroom. However, almost half disagreed with the statement that one can learn a lot from what is on the walls and in the various centers. These preliminary results underscore the importance of hearing preschoolers' voices when designing age-appropriate, physical learning environments, with a focus on explorative science spaces. Further data and conclusions will be presented at the conference presentation.

Organizational hybridity and diversity, inclusion, and pedagogical quality in Dutch ECEC

Keywords: Preschool quality, Process quality, Structural quality, Inclusion

First Author: Willeke van der Werf, Utrecht University, Netherlands; **Co-Author:** Paul Leseman, Utrecht University, Netherlands; **Co-Author:** Pauline Slot, Utrecht University, Netherlands; **Co-Author:** Patrick Kenis, Tilburg University, Netherlands

Organizational hybridity and diversity, inclusion, and pedagogical quality in Dutch ECEC

In 2005, legislation in the Netherlands introduced market-mechanisms in the public ECEC-sector. A hybrid system was created with divergent public policy ambitions for both market (for-profit) and public (non-profit) organizations. A variety of ECEC organizations emerged with varying strategies. The aim of the research is to address how, in this hybrid system, ECEC organizations differ and how organizational differences are related to performance regarding inclusiveness, diversity and pedagogical quality. Using 2012 data of the national pre-COOL cohort study into the quality and effectiveness of ECEC in the Netherlands, four organizational configurations were identified with cluster analysis of managers' reports (N=127), fitting Mintzberg's theoretical framework of organization-types well. The identified clusters were subsequently related to measures of organizational performance based on staff reports (N=155) and independent observations (N=103) of practice using the CLASS Toddler, in particular of emotional and instructional process quality. Engaged professional organizations outperformed all other types of organizations; they were culturally more diverse and inclusive, and provided high, observed pedagogical process quality. Large market-driven organizations performed the worst. Traditional, professional organizations served a diverse group of clients without engagement. They provided average pedagogical process quality, but performed worse on job-satisfaction, and staff-diversity. Small-scale for-profit and non-profit organizations had more staff-diversity and less client-diversity than large market-driven organizations but scored equally low on most performance measures. The theory-derived organizational configurations are clearly linked to practice, suggesting high impact of system-hybridity policy on organizations, pedagogical quality, diversity and inclusion.

Session B 3

Single paper session: Social-emotional competencies and social interaction

Keywords: Child participation, Executive functioning, Instructional practices, Longitudinal study, Multilevel analysis, Play, Preschool quality, Science education, Self-regulation, Social interaction, Social-emotional competencies, STEM

Chairperson: Anne-Kristin Cordes, State Institute of Early Childhood Research (IFP Bayern), Germany

Toddler's engagement and their development of self-regulation

Keywords: Executive functioning, Self-regulation, Child participation, Social interaction

First Author: Teresa Aguiar, Faculty of Psychology and Educational Sciences, University of Porto, Portugal;

Co-Author: Carolina Guedes, Faculty of Psychology and Educational Sciences, University of Porto, Portugal; **Co-Author:** Joana Cadima, University of Porto, Portugal

Previous studies suggest that preschool children's engagement predicts gains in self-regulation (e.g. Williford, Whittaker, Vitiello, & Downer, 2013). In the current study, we aim to extend this line of research by investigating the associations between toddlers' engagement with teachers, peers and tasks and their development of self-regulation skills. The sample included 104 toddlers (Mage = 30 months, SD = 3.8) enrolled in 28 toddler classrooms. Toddler's engagement with teachers, peers and tasks was observed throughout the day, across several activities, with an observation tool (inCLASS; Slot, Bleses, & Downer, 2016) in the middle of the school year. Several self-regulation components were directly assessed: selective attention (NEPSY Selective visual attention task), working memory (Six Boxes Task) and inhibitory control (PSRA - Toy Wrap; Go-no-go task) at two moments: at the beginning and end of the school year. Our results revealed that, after controlling for group size, child age, sex and prior self-regulation skills, children's engagement with tasks and teachers predicted gains in selective attention and inhibitory control components of self-regulation, while children's engagement with peers only predicted gains in selective attention skills. These findings highlight the benefit of observing and targeting children's engagement in early childhood care settings as a means to improve their self-regulation skills, especially selective attention.

Positive effects of early child care on socio-emotional outcomes

Keywords: Preschool quality, Social-emotional competencies, Longitudinal study, Social interaction **First Author:** Anja Linberg, Leibniz Institute for Educational Trajectories, Germany; **Co-Author:** Lars Burghardt, University of Bamberg, Germany; **Co-Author:** Jan-David Freund, University of Bamberg, Germany; **Co-Author:** Sabine Weinert, University of Bamberg, Germany

International study results point to potential negative associations of time spent in early childhood education and daycare (ECEC) centers in the first three years of a child's life and socio-emotional outcomes. While there is quite a range of international studies on this topic, comparatively little is known with respect to the German ECEC system. Thus, the transferability of international results as well as the effects of characteristics of the home learning environment and the child on this association remain unclear. Therefore, we investigate (a) whether the time spent in ECEC is associated with child's socio-emotional outcomes (pro-social and problem behavior measured by the SDQ) and (b) whether results differ according to the child's temperament and parental interaction behavior. We used data of four waves of the Newborn Cohort of the German National Educational Panel Study (NEPS, n=1820), as it provides a representative sample of children under the age of three in Germany. Results indicate that one or more years spent in early childcare are significantly related to lower rates of problem behavior, while there is no association with pro-social behavior and no interaction effects. Contrary to international study results we find that children

seemed to benefit from ECEC, irrespective of their temperament or the experienced parental interaction behavior at home. Study limitations like parental report of social-emotional skills are discussed and insights into analyses considering quality aspects of the ECEC setting are given.

Exploration of indoor play space in center-based childcare during unguided free play time

Keywords: Play, Preschool quality, Multilevel analysis, Social interaction

First Author: Ine van Liempd, Utrecht University, Netherlands; **Co-Author:** Ora Oudgenoeg-Paz, Utrecht University, Netherlands; **Co-Author:** Paul Leseman, Utrecht University, Netherlands

Various studies show that children in center-based childcare spend a significant part of the day engaged in free play. During these free play episodes children can make their own choices as to where, with what and with whom they play. The role of free play vs. teacher-child interaction in child development is much debated. However, to truly understand how free play might be related to development, more research into what actually happens during these sessions is needed. In this study we examined how play behaviors relate to children's exploration of the indoor play room space. 61 children (aged 11 to 48 months) were observed during unguided free play time. Play behavior was scored, distinguishing play (social, parallel, solitary) and non-play behaviors (transition, onlooker, unoccupied). Exploration behavior was assessed with an instrument based on Gibson's ecological concept of affordances, scoring how intensively children explored the different affordances offered by spatial components (depth of exploration). Results show that non-play behaviors occurred more than half of the time, with transition being the most frequent type of behavior. The free floor space was used most often in all activities, but almost twice as often during transitions. Transition behavior was negatively related to depth of exploration, suggesting that transitions were actually 'in-between moments' with brief exploration of several affordances. There was a small positive effect of social play on in-depth exploration. Further qualitative analyses of the data will be discussed, and also the meaning of the results for the discussion about the importance of free-play.

Pre-school children's multimodal communicative resources in socially shared science inquiry

Keywords: Instructional practices, Science education, STEM, Social interaction

First Author: Jenni Vartiainen, University of Helsinki, Finland; **Co-Author:** Kristiina Kumpulainen, University of Helsinki, Finland

Grounded in the sociocultural perspective on science education, this presentation discusses a qualitative case study on young children's use of multi-modal communicative resources in the context of socially shared scientific inquiry. Altogether 31 preschool children (aged 5-6 years old) participated in the study. The children worked in small groups on science inquiry tasks which included investigations into color formation, water cycle, solubility, air resistance and gas formation. Children engaged in scaffolded inquiries which consisted of three phases: motivating, experimenting and communicating about results. Video and observation data were gathered in a Finnish preschool context over a 6-week period. The analysis focused on multi-modal communicative resources (Mondada, 2016) depicted from children's interactions in the process of scientific inquiry. The results show how children's use of multi-modal communicative resources

supported their socially shared science inquiry processes in terms of gathering the data, sharing their observations and inferences, reasoning, and explanation generation. However, how to enhance children's critical thinking and ability to challenge each other's sense making deserves careful pedagogical attention. Altogether, the study shows how opportunities for multi-modal communication can enhance diverse young children's participation in scientific inquiry already early on.

Session B 4

Single paper session: Emotional and cognitive development

Keywords: At-risk children, Cognitive development, Emotion, Home learning environment, Literacy, Longitudinal study, Motivation, Multilevel analysis, Wellbeing

Chairperson: Annerieke Boland, Netherlands

School entry prediction of poor reading by the end of Grade 1 - a Finnish-Norwegian comparison

Keywords: Cognitive development, Literacy, At-risk children, Longitudinal study

First Author: Oddny Judith Solheim, The Norwegian Reading Centre, Norway; **Co-Author:** Minna Torppa, University of Jyväskylä, Finland; **Co-Author:** Per Henning Uppstad, Centre for Reading Education and Research, Norway; **Co-Author:** Marja-Kristiina Lerkkanen, University of Jyväskylä, Finland

Early identification of children who are at risk of reading difficulties is crucial to enable effective intervention and ensure educational and social inclusion in the classroom. Preferably, these students should be identified already at school entry since reading failure, even at the very early stages of instruction, may seriously affect the child's learning motivation. In this study, we investigate differences in prospective classification of poor reading by the end of Grade 1 in samples of Norwegian (N = 938) and Finnish (N = 378) first grade students. Results indicated higher emergent literacy levels and a higher percentage of beginning readers at school entry in Finland compared to Norway. Furthermore, the unique school entry predictors of poor reading differed between samples. In Norwegian, letter knowledge, first phoneme isolation and RAN were significant predictors of difficulties in word reading, while only letter knowledge and RAN were significant predictors of difficulties in non-word reading. In Finnish, gender, phoneme blending, RAN and reading accuracy were significant predictors of later difficulties in word reading, while only letter knowledge and reading accuracy were significant predictors of difficulties in non-word reading. Finally, the predictive model correctly classified a significantly higher percentage of Finnish poor readers than Norwegian poor readers. This work extends previous cross-linguistic research by investigating the complex interaction between orthography and educational context in identification of at-risk students in early reading development.

Heterogeneity in affective reactivity in children: Testing the differential susceptibility theory

Keywords: Emotion, Wellbeing, Longitudinal study, Multilevel analysis

First Author: Andrea Kramer, German Institute for International Educational Research (DIPF); IDeA-Research Center, Germany; **Co-Author:** Andreas Neubauer, German Institute for International Educational Research (DIPF); IDeA- Research Center, Germany; **Co-Author:** Anja Leonhardt, Zentralinstitut für Seelische Gesundheit (ZI), Mannheim, Germany; **Co-Author:** Judith Dirk, German Institute for International Educational Research (DIPF); IDeA-Research Center, Germany; **Co-Author:** Florian Schmiedek, German Institute for International Educational Research (DIPF); IDeA-Research Center; Goethe University Frankfurt, Germany

Affective well-being represents an important resource to cope with challenges in learning contexts. However, affective well-being is not stable in school children but varies on a daily basis. In adults, affect fluctuations are associated with positive and negative events but for children this relation is less evident, especially in daily life. Differential Susceptibility Theory (DST) assumes that children differ in their sensitivity to events with those being more susceptible to negative events also benefiting more from positive events. We conducted an intensive longitudinal study across 31 days to test this prediction in elementary school children's daily lives. Using study smartphones, 110 children (8-11 years) responded to daily questionnaires assessing affect as well as the occurrence of positive and negative events. To investigate differences between children in the degree to which their affect is linked to event occurrence, we estimated multi-level models with random effects. Significant random effects indicated that children varied substantially in the extent to which their daily affect was related to positive or negative events. Correlations between random effects revealed that the more children benefited from positive events the less susceptible they were to negative events. In summary, the results promote the understanding of daily emotional processes in children but do not provide evidence for the DST.

A Revised Cross-Lagged Model for Leisure Reading and Reading Skills from Grade 1 to Grade 9

Keywords: Literacy, Motivation, Home learning environment, Longitudinal study

First Author: Minna Torppa, University of Jyväskylä, Finland; **Co-Author:** Pekka Niemi, University of Turku, Finland; **Co-Author:** Kati Vasalampi, University of Jyväskylä, Finland; **Co-Author:** Asko Tolvanen, University of Jyväskylä, Finland; **Co-Author:** Marja-Kristiina Lerkkanen, University of Jyväskylä, Finland; **Co-Author:** Anna-Maija Poikkeus, University of Jyväskylä, Finland

This study examines if leisure reading predicts reading skill development from grade 1 to 9 and vice versa. Reading fluency, reading comprehension, and leisure reading were assessed in grades 1, 2, 3, 4, 6, 7, and 9. Data (n=2525) was analyzed with a revised version of cross-lagged panel model that avoids the problematic mixing of between-person and within-person effects in the traditional cross-lagged models. The results suggested that reading skills predict leisure reading in grades 1-3 whereas leisure reading (book reading in particular), support reading comprehension from grade 3 onwards. Negative paths were found between online reading and reading skills in grades 4-7. The findings suggest that the longitudinal correlations reported between book reading and reading comprehension are not representing only differences between individual (better readers read more) but also changes within individuals; becoming a more active reader promotes reading comprehension.

Session B 5

Single paper session: Social-emotional development and parental involvement

Keywords: Child participation, Emotion, Home learning environment, Interventions, Measurement, Parental involvement, Self-regulation, Social-emotional competencies, Technology

Chairperson: Katharina Kluczniok, Otto-Friedrich-University of Bamberg, Germany

Repeated parent-child shared book reading and preschoolers' socio-emotional competence

Keywords: Social-emotional competencies, Home learning environment, Child participation, Parental involvement

First Author: Rotem Schapira, Levinsky College of Education and Tel Aviv university, Israel; **Co-Author:** Dorit Aram, Tel Aviv University, Israel; **Co-Author:** Margalit Ziv, Kibbutzim College of Education, Israel

Parent-child shared book reading (SBR) interactions provide a fertile context for a discussion of socio-emotional issues. The purpose of the current study was to explore the relations between the nature of parents' and children's contributions to the conversation during and following repeated SBR and children's socio-emotional competence. Participants were 50 children (4-5 years old) and their parents. Over two weeks we videotaped the participants at their homes during three SBR interactions with a previously unknown book. We counted parents' and children's socio-emotional (e.g., reference to relationship) and general (e.g., description of the situation) extra-textual utterances, during and following the readings. We assessed children's socio-emotional competence directly within the preschool. Regression analyses revealed that parents' socio-emotional utterances and child's socio-emotional and general utterances explained children's socio-emotional competence, controlling for the family SES and the children's language level. Daily SBR interactions serve as a repeated opportunity for parents to teach their children about the socio-emotional world in which we live. Children's active participation in the conversation is an important way for them to gain an understanding of others.

Evaluating a parent app promoting play at home: a clustered RCT study

Keywords: Self-regulation, Technology, Interventions, Parental involvement

First Author: Kathy Sylva, University of Oxford, United Kingdom; **Co-Author:** Fiona Jelley, University of Oxford, United Kingdom

This paper presents a clustered RCT evaluating the effectiveness of the EasyPeasy parent app on child and parent outcomes. It is the second evaluation of this app, using a different design in a new city. There is growing literature on the importance of '21st century skills', including self-regulated learning, that underpin school readiness (Blair & Raver, 2015). Parents' vital role in nurturing these skills has been identified

and interventions developed to support home learning. EasyPeasy is a parent ‘coaching’ app that sends game ideas directly to parents’ smartphones. A two-armed, cluster-randomized trial was conducted to assess the effects of EasyPeasy’s use over 3 months. Participants were drawn from eight children’s centers and allocated to intervention (‘early starter’) or control (‘late starter’) groups. Altogether 302 families with children aged 3-4 years were recruited (130 in intervention group and 172 in waiting list control). Although using a cluster design, preliminary analysis showed no center (level 2) effects, so ANCOVAs were used throughout. After controlling for child’s age, gender and pre-test scores, ANCOVAs showed significant effects on parents’ self-efficacy regarding their sense of control (TOPSE ‘control’ subscale) and parent-reported child cognitive self-regulation (CSBQ ‘cognitive’ subscale). Both showed positive effect sizes (Hedges g) in favor of the intervention group: TOPSE control 0.32 (CI 0.08-0.56) and CSBQ cognitive self-regulation 0.35 (CI 0.11-0.59). EasyPeasy was associated with moderate positive effects on parenting self-efficacy and children’s cognitive self-regulation. Thus, this second trial using more multi-cultural sample supports and extends previous findings through new methodology and a target group.

Impact of education goals and ECEC quality on the judgment of early social-emotional development

Keywords: Emotion, Social-emotional competencies, Measurement, Parental involvement

First Author: Claudia Hruska, Free University Berlin, Germany; **Co-Author:** Gerlind Grosse, Early Childhood Education Research, Germany

The qualities of childcare settings – at home and in ECEC centers – differ in their impact on child development – this is especially so for children under three years of age and with a suboptimal background. On the one, hand there are empirical indicators concerning negative effects of extensive early use of low-quality extra-familial care, on the other hand, compensatory effects of high-quality ECEC for children of disadvantaged families have been documented. Some evidence points to the possibility of interaction effects of the different childcare settings. The present study addresses this question in depth: How does the interaction between child care qualities at home and in ECEC centers impact children’s social-emotional development? Based on previous research, we hypothesize that interactions of the different educational goals, relationship and process qualities as well as the parent-teacher relationship have an impact on children’s (1) social- emotional development (ITSEA), problem behavior (CBCL) and well-being. We analyze data from the NUBBEK-Study (National Study of Education and Care in Early Childhood) with N = 534 two-year old children attending extra-familial care. Multivariate analyses (GLMM) controlling for psychological variables, care duration and socio-economic status reveal main effects for all predictors. Furthermore, we find that children’s assessment on scales (ITSEA, CBCL) correlates highly with the relationship quality with the assessing person (mother or teacher, resp.). These results point to new challenges concerning measurement theory, which we will discuss in the presentation, and take into account in all further analyses.

Session B 6

Poster presentation session: Science and language education, and preschool teacher's job stress

Keywords: Cognitive development, Curriculum, Health, Instructional practices, Language education, Literacy, Mathematics education, Numeracy, Preschool quality, Preschool teachers, Science education, Social interaction, Teacher-child interaction, Technology, Wellbeing

Chairperson: Rianne van den Berghe, Utrecht University, Netherlands

Preschool head teachers' occupational stress and job satisfaction

Keywords: Preschool quality, Wellbeing, Health, Preschool teachers

First Author: Mailis Elomaa, University of Jyväskylä, Finland; **Co-Author:** Eija Pakarinen, New York University Abu Dhabi/ University of Jyväskylä, Finland; **Co-Author:** Sirpa Eskelä-Haapanen, University of Jyväskylä, Finland; **Co- Author:** Leena Halttunen, University of Jyväskylä, Finland; **Co-Author:** Marja-Kristiina Lerkkanen, University of Jyväskylä, Finland

The central role of head teachers is to support teachers in their work and to provide leadership that brings about continual improvement in teaching and learning in a school community (Webb, 2005). To best support head teachers in their work, it is important to understand which individual and institutional factors predict occupational stress and job satisfaction in head teachers and what are their ways of dealing with stress. The present study used a mixed method approach and aimed to examine, what the sources of work-related stress for head teachers are and to what extent individual and institutional factors predict head teachers' occupational stress and job satisfaction. The participants were 18 Finnish female preschool head teachers from the TESS study. Data were collected by using questionnaires, which included both open-ended questions and questions with Likert scale. Qualitative data were analyzed by using problem-driven content analysis. Quantitative data on the individual and institutional factors related to stress will be analyzed by using hierarchical linear regression analysis. The results of qualitative data analysis showed that for head teachers, the most important work tasks are leading schools/kindergartens' pedagogical work and stuff. Occupational stress is mostly caused by managing oneself in both personal and professional level. Head teachers seem to be aware of that stressor because managing oneself was also found to be the best way to deal with their work-related stress. The implications for theory and practice will be discussed.

Fact and fiction when using non-fiction books to learn about evolution

Keywords: Curriculum, Instructional practices, Literacy, Science education

Author: Anna Backman, University of Gothenburg, Sweden

The focus in this planned study is on children's non-fiction books and the use of non-fiction books in preschool education on a scientific content - evolution. The overall aim is to identify challenges in the complex relation between fact and fiction when using non-fiction books to learn about evolution. Non-fiction books for young children contains a lot of fiction (Skyggebjerg, 2011). However, Nikolajeva (2014) points out that novice readers have limited experience of real-life and of encyclopedic knowledge, which means that they are less able to separate fact from fiction and real from pretend. Although children's non-fiction books contain a lot of fiction, they can be usable in preschools according to Broemmel and Rearden (2006), as

well as Mantzicopoulos and Patrick (2011). They argue that it is the preschool teacher's assignment to contrast fact from fiction in conversations about the books' content. Based on ideas from Variation Theory (Lo, 2014; Marton, Runesson & Tsui, 2004; Marton, 2015), one could say that if all you could read in the world were facts, facts could not be discerned. In order to discern facts as facts, facts must be discerned in relation to at least one other presentation. To be able to discern both fact and fiction, these two must be separated from each other. To study the relationship between fact and fiction when using non-fiction books to learn about evolution, a 'learning study' is planned.

Effect of inquiry- and context-based science activities on preschoolers' conceptual understanding

Keywords: Cognitive development, Instructional practices, Science education, Wellbeing

First Author: Pamela Flores, Ludwig-Maximilians-University Munich, Germany; **Co-Author:** Lucia Kohlhauf, LMU Munich, Germany; **Co-Author:** Janina Klemm, LMU Munich, Germany; **Co-Author:** Birgit J. Neuhaus, LMU Munich, Germany

Early science education is inspired by children's thirst for knowledge and their existing cognitive abilities to reason scientifically. Two important approaches for engaging children in science activities consist of (1) using all steps of the scientific inquiry method and (2) framing the instruction with contexts that relate to children's interests. This study focuses on the effect of such approaches on preschoolers' involvement during a museum activity and their understanding of the biological concept of structure and function. For this, a museum exhibition was developed in which children can explore this concept by learning how seven forest habitants master various challenges and perceive their environment. In the pilot phase, 31 preschoolers were divided in small groups and guided through the exhibition with two different tours; one with a storyline (context group) and one without it (control group). Children's high levels of involvement – assessed using the Leuven Involvement Scale (Laevers, 2007) – demonstrate that the materials and tours are age-appropriate and ideal to address the research question. For the main study, four types of tours will be developed: An *inquiry tour* (inquiry-based guidance), a *context tour* (guidance through a storyline), an *inquiry & context tour* (mixture of both) and a *control tour* (guidance without inquiry or storyline). The involvement level of each child will be assessed using the Leuven Involvement Scale and their conceptual understanding of structure and function will be analyzed quantitatively before and after the activity using a test designed especially for this study.

Quality of Teacher-Child Interactions and Linguistic Responsivity in Toddler Classrooms in Germany

Keywords: Instructional practices, Language education, Preschool quality, Teacher-child interaction **First Author:** Verena Dederer, Staat Institute for Early Education Research IFP Bayern, Germany; **Co- Author:** Franziska Egert, State Institute of Early Childhood Research (IFP Bayern), Germany; **Co-Author:** Julia Quehenberger, State Institute of Early Childhood Research (IFP Bayern), Germany; **Co-Author:** Anne-Kristin Cordes, State Institute of Early Childhood Research (IFP Bayern), Germany

High quality teacher-child interactions are known to foster language development of young children. However, the quality of teacher-child interactions has mostly been investigated in preschool or kindergarten

settings in Germany, whereas results are scarce for infant-toddler contexts. Therefore, our explorative study focused on infant-toddler settings. We analyzed the quality of teacher-child interactions and language promoting strategies in a subsample of the BiSS E1 and BiSS E2 research projects (Bildung durch Sprache und Schrift). Video-interaction analysis was accomplished by certified independent coders for 43 videos of different child care routines. We used the *Classroom Assessment Scoring System - Toddler* (CLASS-Toddler, La Paro et al., 2012) and the *Teacher Interaction and Language Rating Scale* (TILRS; Girolametto, Weitzmann & Greenberg, 2000). Overall quality in book reading situations measured with the CLASS-Toddler ($M=4.9$, $SD=.7$) and the TILRS ($M=4.0$, $SD=.7$) was at a moderate level. Hierarchical regression showed that the CLASS-Toddler total score (adj. $R^2=.20$) and the CLASS-domain *Emotional and Behavioral Support (EBS)* (adj. $R^2=.13$) in book reading situations were mainly explained by the child centered strategy *Wait and Listen* when the number of children in situation was controlled for. During book reading situations, the CLASS-domain *Engaged Support for Learning (ESL)* is predicted by the number of children in situation ($\beta=-.36$; adj. $R^2=.11$) and the quality of *Language Supporting Strategies* ($\beta=.47$; additional adj. $R^2=.20$). The results indicate that group size is an important factor for learning experiences and language promotion. Furthermore, child-centered strategies should play a more important role in teachers' professional development.

Preschool children's discernment of different forms of numbers

Keywords: Instructional practices, Mathematics education, Numeracy, Preschool teachers

First Author: Maria Alkhede, Malmö University, Sweden; **Co-Author:** Mona Holmqvist, Malmö University, Sweden

The aim of this study is to describe in what way preschool activities contribute to the development of children's knowledge of different forms of numbers; symbols, ordinal and cardinal. Video-recordings from three different groups of preschool children aged 3 to 5 years old have been analyzed based on variation theory (Marton, 2015) to describe the children's discernment of numbers. The activities were planned and enacted by preschool teachers. The teachers' intentions were to teach the children numerosity (Hannula-Sormunen et.al., 2016). The activities offered learning possibilities during the activities, e.g. to sort digits by magnitude, value or just to match symbols. The video-recordings were analyzed to capture what aspects of the numbers the children were offered to discern, and what aspects were not offered to discern during the different activities. Simultaneous discernment of numbers in different forms are important for children's future mathematical performance (Hannula-Sormunen et.al., 2015). The findings unveil the teachers' challenges to design preschool activities offering children simultaneously discernment of numbers' different forms. The activities mainly make the children discern numbers as symbols to match or as magnitude, while the cardinal form occurred only to a limited extent.

Embodied knowledge's impact on volition during technology play

Keywords: Curriculum, Science education, Technology, Social interaction

Author: Kristina Thorshag, Malmö University/ University of Gothenburg, Sweden

The aim of this study is to explore in what way children's knowledge affect volition during technology activities in pre-school. Technological knowledge is, according to Sjöberg (2001), to 'know how'. Technology differs from science, for example, which produces theories about the world (knowing what), while technology knowledge is enacted in pre-school during play. This enables the study of volition, described as the power to make and enact your own choices or decisions (Corno, 1993). Two technology activities were captured at two different pre-schools with children aged 3-5 years. The methods used were field notes and video-recorded observations. Firstly, the video recordings were analyzed to capture the activity. Secondly, the videos were analyzed twice from each participating child's perspective, analyzing a) verbal, and b) body language. Finally, the child's collaborative activities with other children were analyzed. The analysis is based on variation theory (Marton, 2015). Aspects of volition were captured through the observed activities, and communication between the children during technology activities. The object of learning focused in this study is equilibrium. The result shows how the children's knowledge is embodied, shared and explored together with other children, and possible to unveil through their actions. Children with less pre-knowledge also show weaker volition and tend to lose interest in the activities faster than the rest.

Session C

Thursday, 30 August 2018, 10:00 – 11:30 am

Session C 1

Single paper session: Early mathematics education

Keywords: Cognitive development, Cross-sectional study, Gender, Language education, Longitudinal study, Mathematics education, Numeracy

Chairperson: Kathy Sylva, University of Oxford, United Kingdom

Spontaneous focusing on Arabic number symbols in relation to early mathematical competencies

Keywords: Cognitive development, Mathematics education, Numeracy, Cross-sectional study

First Author: Sanne Rathé, KU Leuven, Belgium; **Co-Author:** Joke Torbeyns, KU Leuven, Belgium; **Co-Author:** Bert De Smedt, KU Leuven - University of Leuven, Belgium; **Co-Author:** Lieven Verschaffel, KU Leuven, Belgium

Children's tendency to spontaneously attend to and use exact numerosities in their everyday surroundings (i.e., SFON) has been identified as an important contributor to their early mathematical competencies. In this new line of research, SFON has been operationalized exclusively as spontaneous focus on numerosities. As such, children's tendency to spontaneously attend to Arabic numerals has not yet been addressed in this research. The present study aimed to address this gap by exploring whether there exists a separate tendency to spontaneously focus on Arabic number symbols (SFONS). More specifically, we studied children's SFONS, in relation to their SFON, their early numerical abilities, and teacher ratings of their mathematical competence. Participants were 111 kindergartners (59 boys; $M_{age} = 4$ years 8 months) coming

from three different kindergarten years. All children completed a battery of five tasks, namely a SFON Picture task, a SFONS Picture task, an Arabic numeral identification task, a verbal counting task, and a counting objects task. Children's mathematical competence was rated on a 4-point Likert scale by their kindergarten teachers. Findings revealed that children largely differed in their tendency to spontaneously attend to Arabic number symbols in the pictures they had to describe. We also found significant associations between children's SFONS, their early numerical abilities, and teacher ratings of their math competence, but no association with SFON. These results suggest that SFONS is a relevant component of children's early mathematical development.

Four-year olds' patterning understanding: Repeating and growing patterns

Keywords: Cognitive development, Mathematics education, Numeracy, Cross-sectional study

First Author: Nore Wijns, KU Leuven, Belgium; **Co-Author:** Joke Torbeyns, KU Leuven, Belgium; **Co-Author:** Merel Bakker, KU LEUVEN, Belgium; **Co-Author:** Bert De Smedt, KU Leuven - University of Leuven, Belgium; **Co-Author:** Lieven Verschaffel, KU LEUVEN, Belgium

Recent longitudinal studies have documented the value of young children's patterning abilities for their mathematical development. The main focus of these studies has been on repeating patterns, whereas growing patterns have been largely neglected. Moreover, this line of research has been developing rather separately from the one on early numerical ability, a widely acknowledged precursor for mathematical development. The aims of this study were therefore twofold: (1) to explore the impact of pattern type and activity on four-year olds patterning performance; and (2) to analyze the concurrent association between early patterning and early numerical ability. Participants were 401 Flemish four-year olds from a wide range of socio-economic backgrounds. A patterning measure that systematically assessed children's performance on three patterning activities (i.e., extending, generalizing, and identifying the unit of repeat) for two types of patterns (i.e., repeating or growing) was developed. Results indicated that activities with repeating patterns were easier than those with growing patterns. Generalizing a pattern was easier than extending it, which was easier than identifying the unit of repeat of a pattern. We also found an interaction between patterning type and activity: the difference in difficulty between the two types of patterns was the largest for extending and the smallest on generalizing. Furthermore, children's performance on both types of patterns uniquely contributed to their early numerical ability. These findings support the importance of growing patterning ability, in addition to the ability to handle repeating patterns, in the early stage of children's mathematical development.

Gender and early math: unfolding the role of early numeracy skills across the kindergarten years

Keywords: Cognitive development, Numeracy, Gender, Longitudinal study

First Author: David Munez, National Institute of Education / Nanyang Technological University, Singapore; **Co- Author:** Rebecca Bull, National Institute of Education/Nanyang Technological University, Singapore, Singapore; **Co- Author:** Kerry Lee, The Education University of Hong Kong, Hong Kong

Gender has long been a relevant variable in studies tackling early childhood and math ability. Evidence of gender differences at earlier grades of formal schooling suggests that males and females may develop differently across the kindergarten years. During that period, the acquisition of early numeracy skills set foundation for later math achievement. Indeed, some studies indicate that males might have stronger basic numerical representation skills. However, findings are mixed and relate to 7-10-year-old children. Thus, it is unknown whether gender may influence the development of early numeracy skills across the kindergarten years. The present study addresses that issue, and unfolds the relation of one particular early numeracy skill—fluency in accessing and manipulating quantities related to Arabic numbers and math ability over time. Our study sheds light on reciprocal processes between both variables. Results from a multivariate latent growth curve model show that quantity fluency at kindergarten entry correlates with children's math ability two years later ($N=1422$). Over that period, the patterns of reciprocal relations reveal that earlier math skills positively and significantly predict subsequent quantity fluency scores across K1 and K2. The magnitude of that relation decreases with time whereas the magnitude of the opposite relation increases. Importantly, that pattern differs for males and females. For males, the acquisition of quantity fluency occurs at kindergarten entry, whereas for females that process takes longer. Findings of the current study indicate that males and females show different developmental trajectories in the acquisition (and impact) of certain early numeracy skills.

The influence of language competencies on mathematical skill development at the beginning of school

Keywords: Cognitive development, Language education, Mathematics education, Numeracy

First Author: Antje Ehlert, University of Potsdam / University of Johannesburg, Germany; **Co-Author:** Annemarie Fritz-Stratmann, University of Duisburg-Essen, Germany

Theoretical background: Various studies have shown a strong connection between language competencies, such as the knowledge of number words, and mathematical skill development (e.g., Göbel et al., 2014). Phonological awareness (e.g., Passolunghi et al., 2007), oral language skills (Mücke, 2007), reading competency (e.g., Prediger, 2010) and the acquisition and recall processes of mathematical concept understanding (e.g., Paetsch et al., 2015) are described as meaningful influencing factors. **Research questions:** To what extent do language competencies influence mathematical skill development? Which specific language competencies have the strongest influence on mathematical skill development? **Methodology:** The study was conducted in the first half of the school year with 300 first grade students. All students attempted a screening for mathematical concept comprehension as well as various language comprehension tasks (from MSVK: sentences and instructions comprehension), expressive language (from BUEGA) and grammatical understanding (from TROG-D). The cognitive capabilities were measured with the CFT 1-R test. **Results:** The students' mathematical performance data was Rasch scaled using a simple dichotomous Rasch model. The linear regression showed 45% explained variance for arithmetical competencies. There were significant Beta-coefficients for: expressive language, comprehension of instructions and grammatical understanding as well as for cognitive capabilities. **Discussion:** The study at hand suggests a detailed look at the specific language competencies at the beginning of school as expressive language and thus the correct use of grammatical knowledge seem to have the strongest influence on mathematical learning.

Session C 2

Single paper session: Teachers' beliefs and teacher-child interactions

Keywords: Beliefs, Cross-sectional study, Gender, Instructional practices, Measurement, Process quality, Professional development, Social-emotional competencies, STEM, Teacher-child interaction

Chairperson: Rianne van den Berghe, Utrecht University, Netherlands

Associations and gender differences among emotional support, self-concept and reading achievement

Keywords: Beliefs, Measurement, Gender, Teacher-child interaction

First Author: Maria Therese Jensen, The Norwegian Reading Centre, Norway; **Co-Author:** Oddny Judith Solheim, The Norwegian Reading Centre, Norway

Aims: The aim of the current study was to examine the associations among perceived teacher emotional support, reader self-concept, and reading achievement in a sample of children ($n = 2888$) at the end of first grade. An additional aim was to examine differences in the mentioned relationships among boys and girls.

Methods: The sample in the current study included first graders, and data were collected during May and June 2017 at the end of first grade (mean age 7 years old). In total this entailed a sample of 2888 students distributed on 150 classes at 150 different schools.

Results: A positive relationship was found between reader self-concept and reading achievement ($\beta = .47, p < .001$), and between perceived teacher emotional support and reader self-concept ($\beta = .32, p < .001$). Results demonstrated that reader self-concept fully mediated the relation between perceived teacher emotional support and reading outcomes ($\beta = .15, 95\% [CI, .11, .20] p < .001$). The association between perceived teacher emotional support and reader self-concept was significantly stronger for boys ($\beta = .37, p < .001$) than for girls ($\beta = .22, p < .001$).

Theoretical and practical significance

Reader self-concept plays a significant role in the relation between perceived teacher emotional support and reading achievement. Teachers should keep in mind that supporting the children emotionally will contribute to higher reader self-concept and ultimately better reading performance. Teachers should be aware of whether they favour some children over others, and whether they favour girls over boys.

Pre-Service Special Education Teachers' Discourse during Shared Reading

Keywords: Instructional practices, Professional development, Beliefs, Teacher-child interaction

First Author: Yael Roth-Barkai, Tel-Aviv University, Israel; **Co-Author:** Dorit Aram, Tel Aviv University, Israel

Pre-Service Special Education Teachers' Discourse during Shared Reading amongst Children with and without Visible Disabilities Abstract: The study presents pre-service special education teachers' explicit attitudes towards people with disabilities, and their implicit attitudes as reflected in the nature of shared book reading and discourse with children with seen or unseen disabilities, or without disabilities. Participants included 40 pre-service special education teachers and 120 7-8-year-old children-40 with learning disabilities (LD), 40 with cerebral palsy (CP), and 40 typically developing. Pre-service teachers completed questionnaires on their attitudes towards people with disabilities. They also read two books, twice, to three children (one with LD, one with CP, with cerebral palsy, and one typically developing child). All 480 transcriptions were analyzed and evaluated for discourse style. While the pre-service teachers reported positive attitudes towards people with disabilities, they used more extra-textual utterances and more open-ended questions in the discourse with children without disabilities. They directed more expansions and reinforcements towards children with CP compared to those with LD, but directed more open-ended questions and factual questions toward children with LD compared to those with CP. The study highlights the need to help pre-service special education teachers develop their beliefs and professional identity. Additionally, with a lack of studies exploring shared book reading amongst early elementary school children, it is important to raise educators' awareness of this topic, and particularly, how it relates to children with disabilities.

Are child-care experiences associated with 2- and 4-year-olds' empathetic concern for others?

Keywords: Social-emotional competencies, Beliefs, Cross-sectional study, Teacher-child interaction

Author: Daniel Schmerse, Leibniz Institute for Science and Mathematics Education, Germany

Associations between children's *empathetic concern for others* and measures of mother-child and teacher-child relationship, maternal and teacher socialization goals and interaction quality in settings of early childhood education and care (ECEC) were assessed using cross-sectional data from the German National Study of Child Care in Early Childhood (Tietze et al., 2013) including samples of $N = 804$ two-year-old and $N = 714$ four-year-old children. Results showed that maternal prosocial socialization goals were positively correlated with both teacher and mother ratings of 4-year-olds' *empathetic concern for others* while maternal socialization goals of *obedience* and *autonomy* showed significant negative associations with both teacher and mother ratings. On part of predictors of the ECEC setting conflict in teacher-child relationship was negatively associated with both teacher and mother ratings of 4-year-olds' *empathetic concern for others* while teachers' socialization goals did not reveal systematic correlations. No significant impact was observed for the quality of caregiver interaction. For the 2-year-olds, conflict in mother-child relationship was associated negatively with children's prosocial behavior, but no other systematic associations were observed. While previous research has found associations between child care quality and children's compliance with adults' requests for prosocial behavior (NICHD, 1998), the present study found limited evidence to suggest that child care experiences are related to prosocial behavior motivated by the concern for others. However, future research needs to address peer interactions in ECEC settings as a source of

early prosocial behavior and must rely on stronger longitudinal designs to examine questions of directionality of influence.

Session C 3

Single paper session: Early science and language education in diverse contexts

Keywords: At-risk children, Cross-sectional study, Interventions, Language education, Preschool teachers, Professional development, Professional knowledge, Science education, STEM

Chairperson: Bodine Romijn, Utrecht University, Netherlands

The contribution of professional development and professional exchange for early science education

Keywords: Professional development, Science education, STEM, Preschool teachers

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Science-specific professional development courses for preschool teachers are assumed to foster the frequency of science learning opportunities in preschool. Professional exchange among preschool teachers regarding science content, as one indicator of the degree to which science is implemented in preschool, may be relevant for a successful appliance of professional development content into practice. As there is a lack of findings in the context of early science education, we aim to investigate the role of professional exchange among preschool teachers in the relation between professional development and the frequency of science learning opportunities provided by preschool teachers. 298 preschool teachers were asked about the amount of professional development in science, the frequency of science content in team meetings and the frequency of science learning opportunities using a questionnaire. We answered our research questions using path analyses. Results of our path model revealed a positive correlation between professional development in science and the frequency of science content in team meetings, which in turn was positively associated with the frequency of teachers' science practices. We also found a significant indirect effect of professional development on frequency of learning opportunities. Overall our results indicate that the effect of domain-specific professional development might succeed more easily, if the education sector is already well implemented in the preschool. Therefore, besides structural characteristics, quality and frequency of learning opportunities the quality of implementation should be taken into account in future studies.

Fostering early language skills: Comparing ECEC settings with varying governmental financial support

Keywords: Language education, Cross-sectional study, Preschool teachers, Professional knowledge

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Recent research shows that 22% of all five-year-old children in Germany lag behind in their language skills. Early childhood is seen as a critical period for language acquisition, allowing children to succeed in formal educational settings. Thus, language fostering in ECEC settings has become increasingly important in Germany. Since 2014 state regulations in North Rhine-Westphalia require language education to be implemented as part of the daily routines in ECEC. To endorse this, the federal state of North Rhine-Westphalia has allocated additional funds to child care centers with high quotas of children in need of additional support in their (language) development. These additional funds must be spent on qualified ECEC professionals. In the current study a quantitative survey ($N = 1679$) and qualitative interviews ($N = 27$) were conducted in order to investigate ECEC professionals' attitudes towards language education, how language education is implemented and whether systematic differences exist between child care centers receiving or not receiving additional governmental funds. Analysis show systematic differences regarding the implementation of and the attitudes towards language education as well as the qualifications of the staff members conducting language education in favor of the child care centers receiving additional funds. The interviews reveal very heterogeneous implementation practices despite homogeneous knowledge regarding language education. Whether the differences are caused by the additional funds or existed previously cannot be answered on the basis of the existing cross-sectional data. These results and further analysis shall be discussed with regard to implications for research and practice in ECEC.

Waiting for word learning in special language education groups

Keywords: Language education, Interventions, At-risk children, Preschool teachers

First Author: Marike Kempen, Utrecht University AND Royal Dutch Auris Group (Rotterdam), Netherlands; **Co- Author:** Maartje Kouwenberg, Dutch Royal Auris Group, Netherlands; **Co-Author:** Connie Fortgens, Dutch Royal Auris Group, Netherlands; **Co-Author:** Paul Leseman, Utrecht University, Netherlands

Aims: Many young children with developmental language disorders (DLD) have persistent vocabulary delays (Trauner, Wulfeck, Tallal & Hesselink, 2000; Rice & Hoffman, 2015), but individual differences in vocabulary growth are large (Rice & Hoffman, 2015). To improve vocabulary growth, communication and school success, young children with DLD need early adaptive vocabulary intervention, including enough repeated and explicit exposure to well-selected words (Kempen, Kouwenberg, Fortgens & Leseman, in progress). Teachers of the Dutch Royal Auris Group use the didactics of *Words Everywhere* (Van den Nulft & Verhallen, 2009). The current study aims to investigate how teachers incorporate *Words Everywhere* in the total educational program of special language education groups for young children with DLD (2-6 years). **Methods:** The study used a multi-method design involving 11 special (pre-) kindergarten groups for children with DLD, with 64 children in total. Firstly, semi-structured interviews with the teachers were conducted. Secondly, detailed snapshot observations during two whole days were conducted using a cyclic 10 second interval sampling design to follow children and teachers. **Results:** Participating teachers reported to struggle with the adaptive use of *Words Everywhere*. Target words were repeated on average

8% of the observed time intervals per group (range 2% - 22%). If target words are repeated relatively often, a variety of activities within the whole educational program was involved with these target words. Conclusion: Teachers have to improve the adaptive use of *Words Everywhere*, so that enough repeated and explicit exposure to target words rather becomes a habit than an exception.

Classroom practices and curricular resources in teaching early mathematical knowledge

Keywords: Curriculum, Instructional practices, Mathematics education, Preschool teachers

First Author: Inés Rodríguez, University of Salamanca, Spain; **Co-Author:** Jorge Martín, University of Salamanca, Spain; **Co-Author:** Elena Ramirez, University of Salamanca, Spain; **Co-Author:** Inmaculada Martín, University of Salamanca, Spain

The curricular aspects studied in this work is the process of teaching early mathematical knowledge; in other words, an analysis is conducted of the classroom practices involving pupils aged 3, 4 and 5. This paper explores the link between the indications made by curricular resources and the actual classroom practices involved in mathematical knowledge. The research has adopted an intensive case-study model that has provided access to a systematic analysis of the classroom practices of the teachers involved (a total of 5 teachers, from 3 different schools), as well as to the curricular resources they use for teaching mathematical knowledge. The following procedure has been used: a video and audio recording was made of up to 27 sessions lasting around one hour for the 5 cases. The recordings were then transcribed in order to analyze the tasks into a system of categories. The results in which the data appear to be heading an important coincidence among the curricular proposals of the materials, the teachers' practical activities and the curriculum regulations. This way, teaching focuses on logical reasoning, followed by the work on geometry and numbers, being measuring units the least appearing of the contents. This is the case every year. Also, teaching practices of mathematical knowledge is done in very formally thought over, very academic school situations, created for very well-defined contents.

Session C 4

Single paper session: Instructional practices and literacy

Keywords: Child participation, Cognitive development, Curriculum, Instructional practices, Language education, Literacy, Longitudinal study, Motivation, Play

Chairperson: Katharina Kluczniok, Otto-Friedrich-University of Bamberg, Germany

Young Children's Perspectives on Why They Like and Dislike Specific Learning Centers

Keywords: Curriculum, Instructional practices, Play, Child participation

Author: Hsueh-Jung Liu, National University of Tainan, Taiwan

In the process of curriculum reform, it is crucial to involve children's points of view to establish a respectful relationship with children. However, there has been relatively little research conducted especially on young children's voices about their learning. Therefore, this study aimed to access young children's perspectives on learning as their preschool curriculum being reformed. In one private preschool changing its implementation of learning centers, 40 3- to 6-year-old children enrolled were interviewed about their experiences in learning centers. The semi-structured interviews focused on the reasons why young children themselves like and dislike to go to specific learning centers. Data were analyzed using analytic induction. Young children's responses indicated a variety of reasons related to their willingness to stay in certain learning centers, including settings and organization of learning centers, peer companionship, playfulness, children's prior experiences, as well as teachers' attitudes and expectations. The results suggest that although teachers plan for curriculum reform in advance, what young children truly care about may be teachers' consideration. Therefore, listening to young children's voices is needed. To conclude, this study may be of importance in emphasizing the involvement of young children's perspectives in planning learning experiences, as well as providing practitioners with the possible reasons related to young children's preferences for certain learning centers from children's perspectives.

First Grade Reading Skill and Motivation Dynamics

Keywords: Instructional practices, Language education, Motivation, Longitudinal study

First Author: Bente Walgermo, Centre of Reading Education and Research, Norway; **Co-Author:** Njål Foldes, BI, Norwegian Business School, Norway; **Co-Author:** Per Henning Uppstad, Centre of Reading Education and Research, Norway; **Co- Author:** Oddny Judith Solheim, Centre of Reading Education and Research, Norway

Previous studies have documented robust relationships between emergent literacy and later reading performance. A growing body of research has also reported associations between motivational factors and reading in early phases of reading development. However, there is less research about cross-lagged relationships between motivational factors and reading skills in beginning readers. To examine relationships between early reading skills, literacy interest and reader self- concept, we tested 1,141 children twice during their first year of formal reading instruction in school. Cross-lagged analysis showed strong stability in reading skills and medium stability in literacy interest and reader self-concept over the first school year. We also found bidirectional relationships between reading skills and self-concept and between the motivational components of literacy interest and reader self-concept.

The roles of meta-cognitive knowledge, vocabulary and task orientation in narrative comprehension

Keywords: Cognitive development, Language education, Literacy, Motivation

First Author: Janne Lepola, Univ. of Turku, Finland; **Co-Author:** Anu Kajamies, University of Turku, Finland; **Co- Author:** Eero Laakkonen, University of Turku, Finland; **Co-Author:** Pekka Niemi, University of Turku, Finland

Narrative comprehension is a complex meaning-making process and it draws on the development of many skills such as vocabulary, memory, perspective-taking and theory of mind. *The aims of the present study* were, first, to examine the extent to which the children's meta-cognitive knowledge (MC), vocabulary and task-oriented behavior (TO) in preschool (at age 5) are related to initial levels of (at age 5) comprehension of picture book narrative, and second, the extent to which MC, vocabulary and TO predict changes in children's comprehension of picture book narrative (from age 5 to age 9). Ninety Finnish-speaking children participated. Narrative comprehension was assessed by retelling task and 10 prompted questions, Children's knowledge about memory, comprehension and learning were assessed by meta-cognitive knowledge test. Vocabulary knowledge was assessed by a word definition test. Teachers were asked to rate the student's task-oriented behavior by five items. The findings based on latent growth curve modeling showed statistically significant inter-individual differences in both initial level and linear growth components of narrative comprehension. The children with initial low narrative comprehension catch-up to the children with initial high narrative comprehension. After controlling for the initial level of narrative comprehension, meta-cognitive knowledge and task orientation emerged as significant positive predictors of its subsequent development.

Session C 5

Poster presentation session: Quality of early childhood education, science education, and children's play

Keywords: Beliefs, Child participation, Cognitive development, Interventions, Play, Preschool teachers, Process quality, Professional development, STEM, Teacher-child interaction, Technology **Chairperson:** Timo Reuter, University of Koblenz-Landau, Germany

Developing Educational Support in STEM - play scenario's in first grade

Keywords: Play, Professional development, STEM, Teacher-child interaction

First Author: Mariska Venema, Windesheim Flevoland University of Applied Science, Netherlands; **Co-Author:** Conny Boendermaker, Windesheim Flevoland University of Applied Science, Netherlands; **Co-Author:** Hanno Van Keulen, Windesheim Flevoland University of Applied Science, Netherlands

In an educational design research project (McKenney & Reeves, 2012) first grade teachers participate in Teacher Design Teams (TDT) ($N=5$) (Handelzats, 2009) and develop scenario's for children's play (age 6-7). Role play and play in a rich material learning environment in which children simulate life-world situations, combined with high quality teacher-child interactions, provide children with opportunities to learn social and academic skills (Slot, 2014). The play scenarios in this research project are derived from Science, Technology, Engineering, and Mathematics (STEM) contexts. An example is playing that we are a Construction Shop, or a Bridge Building Company. The TDT team is complemented with a researcher and science and technology coach who helps deepen the relevant Subject Matter Knowledge (SMK) and Pedagogical Content Knowledge (PCK). In the project, there will be two iterative cycles of design and testing the scenarios. Before and after implementation of the play design the level of educational support is measured with the

Classroom Assessment Scoring System Pre-Kindergarten (CLASS-PreK) (Pianta, La Paro & Hamre, 2008). A focus group (Liamputtong, 2011) is organized to gain insight in which elements effect possible change in teacher-child interactions and teachers self-efficacy on science and technology education embedding in play scenarios. The aim of this research project is to identify core design principles (McKenney & Reeves, 2012), and use these to elaborate pre-service curricula in which future professionals Early Childhood Care and Education can develop educational support competencies.

Coding in the Crib: Changing trends in children's exposure to computer coding concepts

Keywords: Cognitive development, STEM, Technology, Child participation

First Author: Sarah Gerson, Cardiff University, United Kingdom; **Co-Author:** Richard Morey, Cardiff University, United Kingdom; **Co-Author:** Johanna van Schaik, University of Leiden; Vrije Universiteit Amsterdam, Netherlands

To shed light on how digital literacy and exposure to computers and coding technology has changed across generations, we asked parents to tell us about both their own and their children's experience with digital technology and coding. In a widely distributed survey, we investigate how and when parents (N = 226) and children of different ages (N = 343; newborn to 17 years) engage with computers and coding. Consistent with shifting technology, children were more likely to be exposed to computers in their first ten years of life than their parents. Importantly, 14% of the children below four years of age were reported to have already gained some experience with coding, and by the start of elementary school, half of the children had experience. We further explore individual differences in children's exposure to technology and coding relative to age, sex, and parents' experience with coding, education, and income. Together, this new data indicates that coding experience is occurring ever-earlier and is beginning to span across gender stereotypes and social-economic barriers. While early exposure, particularly experience with hands-on coding toys prior to school is likely important for motivational and social aspects of STEM learning, how well children are able to transfer experience from setting to setting is still unclear. Identifying when and how children are first gaining experience with these newer technologies contributes to optimizing the integration and teaching of these new technologies into early childhood classrooms.

Participation and quality in ECEC: A multi-method approach

Keywords: Process quality, Beliefs, Child participation, Preschool teachers

First Author: Nadine Correia, University Institute of Lisbon (ISCTE - IUL), Portugal; **Co-Author:** Carla Silva, ISCTE – Instituto Universitário de Lisboa, CIS-IUL, Lisbon, Portugal, Portugal; **Co-Author:** Margarida Fialho, ISCTE – Instituto Universitário de Lisboa, CIS-IUL, Lisbon, Portugal, Portugal; **Co-Author:** Cecília Aguiar, ISCTE – Instituto Universitário de Lisboa, CIS-IUL, Lisbon, Portugal, Portugal; **Co-Author:** Helena Carvalho, ISCTE – Instituto Universitário de Lisboa, CIES- IUL, Lisbon, Portugal, Portugal

Children's right to participation has gained ground in different research fields. The positive relation between children's participation and the quality of ECEC settings is documented, suggesting that children

attending high-quality settings report more opportunities to participate and exert influence (Sheridan, 2007). ECEC teachers develop their pedagogical practices largely based on curriculum guidelines, values, and objectives, but also on their inner beliefs about participation. Because children's participation is a criterion to be considered when assessing ECEC quality, teachers' beliefs and practices are greatly important for understanding and improving educational processes, and there are few measures and empirical evidence on children's right to participation, we aim to investigate the associations between teachers' ideas and teacher's practices regarding children's right to participation, and classroom quality. Specifically, classroom quality (i.e., teacher-child interactions' quality) will be tested as a moderator of the relation between teachers' ideas and practices (i.e., teachers' perceived practices and independently observed teachers' practices) to promote children's right to participation in ECEC. Participants were (a) 58 ECEC teachers, who filled in the questionnaire on "Teacher's perceptions about the implementation of children's participation right in ECEC settings"; and (b) 58 ECEC classrooms of the Lisbon area, observed with the "Classroom Assessment Scoring System" (CLASS; Pianta, La Paro, & Hamre, 2008), and with the observation measure "Teachers' practices to promote children's participation in ECEC". Associations between variables will be analyzed through moderation analysis, and results presented, aiming to expand research on this topic within a multi-method approach.

Promoting children's pretend play: Is providing role play material enough?

Keywords: Play, Interventions, Child participation, Preschool teachers

First Author: Isabelle Kalkusch, University of Konstanz (Germany) and Thurgau University of Teacher Education (Switzerland), Switzerland; **Co-Author:** Ann-Kathrin Jaggy, University of Teacher Education Thurgau, University of Konstanz, Switzerland; **Co-Author:** Sonja Perren, University of Konstanz, Germany; **Co-Author:** Carine Burkhardt Bossi, Thurgau University of Teacher Education, Switzerland; **Co-Author:** Barbara Weiss, Thurgau University of Teacher Education, Switzerland; **Co-Author:** Fabio Sticca, Marie Meierhofer Institut für das Kind, Switzerland

Social pretend play may have a positive impact on children's social development because it involves positive peer interactions and challenges their social-cognitive abilities. Promoting children's social pretend play may thus be a potential pathway to support children's social development. The results of an earlier investigation from our research group have shown that active pretend play tutoring positively influenced children's social pretend play level. The current study aims to investigate whether the provision role play material can already promote children's pretend play level. In this controlled intervention study N = 104 children (3-4 years old) out of 14 Swiss play groups were participating. These groups were randomly allocated to the one of three activity groups: "play tutoring", "material only" or "treatment as usual". The behavior of children and adults was videotaped in all conditions and rated with standardized manuals to assess play activities, level of children's social pretend play and the level of active play tutoring. We hypothesize that the material group show higher levels of social pretend play level and active play tutoring than the control group but lower levels than the play tutoring group. Furthermore, we will investigate whether the positive impact of active play tutoring can be found in all three conditions. Preliminary qualitative results show that providing role play material motivates at least some children to pursue role play activities. The results can

provide information for early childhood educators to develop their behavior strategies for promoting children's social pretend play in institutional settings.

Session C 6

Single paper session: Motor and cognitive development

Keywords: Beliefs, Cognitive development, Culture, Experimental design, Infants, Motor skills, Play, Self-regulation, Social interaction, STEM

Chairperson: Jenni Salminen, University of Jyväskylä, Finland

A Bridge Over Troubled Water: Tracing Indications of Early Engineering among Preschoolers

Keywords: Cognitive development, Play, Self-regulation, STEM

First Author: Ornit Spektor-Levy, Bar-Ilan University, Israel; **Co-Author:** Taly Shechter, Da-Gan Center, The National Teacher Center for the Advancement of Scientific, Technological and Mathematical Education in Preschool, Israel; **Co- Author:** Sigal Eden, Bar-Ilan University, Israel

Early childhood education is currently seeing a trend towards developmental engineering, a precursor of early engineering thinking. Engineering thinking assists children in arriving at creative solutions while involved in invention processes; thus, promoting achievements in science, math, and technology. The Royal Academy of Engineering has recommended engaging in engineering education from childhood, specifying six Engineering Habits of Mind (EHoM): systems-thinking, problem-finding, visualizing, creative problem-solving, adapting, improving. However, few educational initiatives foster engineering thinking in young children, and few studies have been published. The aim of this study was to identify indications of early EHoM among young children during a problem-solving play-like task: Building a bridge with LEGO bricks. As part of an extended study encompassing 250 preschoolers (5–6 years of age), this paper presents preliminary results. All participants and their problem-solving processes were video-recorded, and an analysis rubric was developed. The preliminary results show very young children's verbal and behavioral responses that might indicate nascent, emerging engineering thinking. These responses, coupled with the bridge construction processes and analysis of the finished bridges, may reveal Engineering Habits of Mind: systems-thinking (i.e., criteria regarding *bridge components*); problem-finding (i.e., considerations about the task's requirements); creative problem solving (i.e., criteria such as *complexity of construction*, *colors of bricks for the bridge*); improving. The data analysis also revealed competencies for self-regulation (i.e., *planning*, *monitoring*, and *changing strategy*), all key traits of engineers. Additional results from a larger sample will be presented at the conference.

Learning from peers and adults – When do toddlers use age as a proxy for informativeness?

Keywords: Cognitive development, Infants, Experimental design, Social interaction

First Author: Gregor Kachel, FH Potsdam, Germany; **Co-Author:** Robert Hepach, LFE, Germany; **Co-Author:** Richard Moore, School of Mind and Brain, Humboldt Universität zu Berlin, Germany; **Co-Author:** Michael Tomasello, Duke University, NC, United States

Interactions with peer and adult interlocutors provide two of the most salient and distinct social contexts that even very young children encounter frequently in their everyday life. The experiences they make in interactions with age-mates and caregivers, especially throughout the second year, are naturally distinct and very likely to inform expectations about the social affordances and informativeness of both social categories and, hence, give rise to early emerging learning biases. By testing two-year-olds with adults and age-mates under matched conditions, we might be able to elicit differences in behavior that are reflective of such early acquired learning biases and that have the potential to inform a variety of debates on social learning, social categorization and communicative development broadly construed. In my talk, I would like to present three studies and an ongoing project speaking to this conceptual frame by testing two- and three-year-olds' propensity to follow gaze, use informative pointing gestures, learn novel words, or over-imitate with peer and adult models. The findings will be discussed in the light of work on children's early preparedness for and active contribution to social learning in infant-caregiver interactions.

Keynote Session

Thursday, 30 August 2018, 11:45 am – 12:45 pm

Early STEM: The Implications of Embodied Technologies

Keywords: Child participation, Digitalization, ICT, Technology

Chairperson: Franziska Cohen, Freie Universität Berlin, Germany

Keynote speaker: Andrew Manches, University of Edinburgh, United Kingdom

In light of the way technologies are changing the world we live in and the types of jobs we expect in the future, there has been increasing drive to improve STEM education across nations. At the same time, we have become increasingly aware of the impact of early learning on later outcomes, notably in areas such as STEM. The resulting emphasis on early years STEM has re-surfaced a range of pedagogical questions, one of which is concerned with the type of materials we provide children to support their learning. This talk focuses on a particular type of educational material: manipulatives. Manipulatives are physical representations of abstract concepts designed to support learning (especially in STEM subjects), such as rods, tiles or balance beams. The last decade has witnessed renewed interest into manipulatives for at least two reasons. Firstly, understanding the role of physical interaction in learning is key to the design and evaluation of new forms of interaction afforded through technology: from current screen-based representations (virtual manipulatives) to digitally-augmented physical objects ('digital manipulatives'). Secondly, research involving manipulatives has contributed empirically to recent theoretical arguments claiming that cognitive processes such as learning, memory, and comprehension are embodied: they are grounded in bodily processes of action and perception. This talk will draw upon research from several funded projects over the last ten years that have explored the role of physical interaction in cognitive development and the implications for emerging technologies. By sharing video data illustrating how children communicate their

STEM thinking through gestures, the talk offers a critical perspective of some technologies that can constrain physical interaction, whilst drawing attention to ways we can leverage embodied learning mechanisms in the design of emerging technologies, or simply in the way we gesture when communicating with children.

Discussion Panel

Thursday, 30 August 2018, 01:45 – 02:45 pm

Chances and risks of ICT in Early Childhood Education and Care

Chairperson: Iram Siraj, University of Oxford, United Kingdom

Discussant: Janna Pahnke, Stiftung Haus der kleinen Forscher, Germany;

Discussant: Andrew Manches, University of Edinburgh, United Kingdom;

Discussant: Jerry Andriessen, Wise & Munro, Netherlands;

Discussant: Klaus Fröhlich-Gildhoff, Evangelische Hochschule Freiburg, Germany

Session D

Thursday, 30 August 2018, 03:00 – 04:30 pm

Session D 1

Single paper session: Early mathematics education and cognitive development

Due to several cancellations this single paper session was cancelled.

Session D 2

Single paper session: Professional development and ICT in preschool

Keywords: Cognitive development, Evaluation study, Interventions, Literacy, Mathematics education, Pre-school quality, Professional development, Technology

Chairperson: Mailis Elomaa, University of Jyväskylä, Finland

Fostering Effective Early Learning through Evidence based Professional Development

Keywords: Cognitive development, Preschool quality, Professional development, Interventions

First Author: Iram Siraj, University of Oxford, United Kingdom; **Co-Author:** Denise Kingston, Sussex University, United Kingdom

The Fostering Effective Early Learning (FEEL) study is a cluster randomized controlled trial for evaluating the benefits of a professional development (PD) program for early childhood educators. Ninety long-day care and preschool centers in Australia, were selected to ensure representation across National Quality Standards (NQS) ratings, location, center type and socioeconomic areas. Participating centers were randomly allocated to one of two groups (1) an *intervention* group (45 centers) receiving a PD or (2) a *control* group (45 centers) that continues engaging in typical classroom practice. Randomization to these groups occurred after the collection of baseline environmental quality ratings. Primary outcomes, at the child level, are two measures of language development: verbal comprehension and expressive vocabulary. Secondary outcomes at the child level are measures of early numeracy, social development and self-regulation. Secondary outcomes at the center level are measures of environmental quality derived from full-day observations. In all cases, data collectors are blinded to group allocation. The PD focused on activities previously found to be influential in children's early language, numeracy, social and self-regulatory development. Results showed a discernible improvement in children's development for three (of four) child cognitive outcomes: a. Language development, as measured by verbal comprehension, showed twice the growth (102%) in the intervention group relative to the control group, while expressive vocabulary showed essentially no difference between the two groups. b. Numeracy development improved in the intervention group for number concepts, there was 23% more growth in the intervention group and, for early numeracy, the improvement was 28%.

Raising Early Achievement in Maths with Interactive Apps: A Randomized Control Trial

Keywords: Mathematics education, Technology, Interventions, Evaluation study

First Author: Laura Outhwaite, University of Nottingham, United Kingdom; **Co-Author:** Marc Faulder, Burton Joyce Primary School, United Kingdom; **Co-Author:** Anthea Gulliford, University of Nottingham, United Kingdom; **Co- Author:** Nicola Pitchford, University of Nottingham, United Kingdom

Aim: This study addressed calls from recent research and policy emphasising the need to improve provision and raise achievement in early mathematics. Child-centred apps delivered on hand-held tablet devices could develop strong foundations in maths as they provide one-to-one instruction. However, rigorous research is needed to evaluate the use of this technology in early years settings. **Methods:** A pupil-level randomised control trial with 389 children, aged 4-5 years old was conducted to evaluate a series of interactive maths apps designed for early years. Children were randomly allocated to receive the maths apps as well as standard maths practices (Group 1, treatment), instead of a small group maths activity (Group 2, time-equivalent treatment), or to receive regular maths practice only (Group 3, control). The maths apps were implemented by teachers for 12 weeks and children were assessed on mathematics before and immediately after the intervention. **Results:** Results showed children made significantly greater maths learning gains in both forms of app implementation (Group 1 & 2) compared to standard maths practice (Group 3). There were no significant differences between the two forms of maths app implementation, suggesting the maths apps can be implemented in a well-balanced curriculum. **Discussion:** Features

of the interactive apps, which are grounded in instructional psychology and combine aspects of direct instruction with play, may account for the observed learning gains. These novel results suggest that interactive apps can provide a vehicle for efficiently delivering high-quality maths instruction in a classroom context to effectively raise early maths achievement.

Promoting early literacy in Hebrew using a computerized writing game

Keywords: Literacy, Preschool quality, Technology, Interventions

First Author: Dorit Aram, Tel Aviv University, Israel; **Co-Author:** Adi Elimelech, Tel Aviv University, Israel

Promoting early literacy in Hebrew using a computerized writing game: The unique contribution of auditory and visual digital aids. Children who are exposed to reading and writing in their environment and demonstrate interest in the stepping-stones for reading and writing in early childhood. A child encounters writing in various situations, such as identifying and writing their name and those of their friends, directional signs, and being read to by adults, and often then tries to read and write on his/her own. Evidence has shown that interventions in early childhood that use writing for the practice of letter knowledge and phonological awareness predict effective acquisition of reading and writing. Additionally, research has indicated that supporting word analysis for sounds and linking sounds to letters while writing is an effective strategy for advancing the understanding of the writing system in Hebrew. Based on these findings, the current study evaluates an intervention to promote kindergarteners' literacy using a computer game to practice writing, including the relative advantages of auditory and visual aids. The study was conducted amongst kindergarten children from a low socio-economic status (SES). Focusing on this group stemmed from reports of academic gaps that exist, even in early childhood, between children from a low SES and those from a middle SES, and the need to promote these children's literacy.

Pre-school quality improvement and identifying effective elements of Professional Development

Keywords: Preschool quality, Professional development, Interventions, Evaluation study

First Author: Denise Kingston, University of Sussex, United Kingdom; **Co-Author:** Iram Siraj, University of Oxford, United Kingdom

This study employed a randomized controlled trial design with mixed methods to evaluate the impact of a bespoke professional development (PD) on early childhood educators' pedagogy and practice supporting quality improvement. A sample of fifty private, voluntary and independent (PVI) pre-school settings with matched controls, from one Local Authority in England, were selected to ensure representation across initial ratings on the Early Childhood Environment Rating Scales (ERS) [ECERS-R and E, (Harms et al., 2005; Sylva et al., 2003)], the Office for Standards in Education (Ofsted) ratings, location, center type and socio-economic areas. The PD was devised to support educators' implementing: · collaborative, evidence-based practice, · their role, including interpreting and using the early years framework, · effective practice and research on: § the early Home Learning Environment, § children's behavior for learning, § engaging with sustained shared thinking (SST) and § quality improvement processes. The PD data (ERS scores, focus groups, interviews and questionnaire responses) suggested that a short evidence-based PD can have an

impact on practice predictably and consistently. Initial quality ratings (at pre-test) were predictive of modest improvements following the PD (at post-test), in areas related to the content of the PD. The data considering perceptions of what worked in the PD, linked to and extended current thoughts in the literature identifying key or effective elements of PD. These were organized into three domains: content, affect and delivery.

Session D 3

Single paper session: Social interaction and STEM education

Keywords: Child participation, Cross-sectional study, Evaluation study, Executive functioning, Mathematics education, Measurement, Play, Process quality, Science education, Social interaction, Teacher-child interaction, Technology

Chairperson: Kathy Sylva, University of Oxford, United Kingdom

Observing children's interactions in preschool: Findings from an empirical study using the inCLASS

Keywords: Process quality, Measurement, Child participation, Social interaction

First Author: Katharina Kluczniok, Otto-Friedrich-University of Bamberg, Germany; **Co-Author:** Magdalena Riedmeier, University Koblenz-Landau, Campus Landau, Germany; **Co-Author:** Thilo Schmidt, Universität Koblenz- Landau, Campus Landau, Germany

Observing children's interactions in preschool: Findings from an empirical study using the inCLASS. Numerous studies refer to the high importance of children's interaction processes in preschools and their quality for the children's development and educational success. However, most studies measure the quality of interactions at a group level with the consequence that detailed knowledge on the quality of interactions at single child level is lacking. This paper aims to address this limitation by investigating interaction quality on the individual level (n=240 children) in preschools in Germany using the relatively new and not yet widespread observational instrument *Individualized Classroom Assessment Scoring System* (inCLASS) including three domains of high-quality interactions of children: interactions with teachers, peers and tasks. The inCLASS is based on live observations of four target children in preschools using a 15-minute cycle (10 minutes observing, 5 minutes scoring) which will be repeated up to four times and rotating through four children in a classroom. In addition, the relations to children's competencies are analyzed. First, results show a low to medium quality of children's interactions with teachers and peers and slightly higher scores for task orientation. Second, there are moderate correlations with children's competencies reported by preschool teachers. Based on these findings implications for policy and practice with regard to the quality of interactions at single child level are discussed.

The relation between neuropsychological tests and programming skills in young children

Keywords: Executive functioning, Play, Technology, Measurement

First Author: Corrie Urlings, Maastricht University, Netherlands; **Co-Author:** Karien Coppens, Maastricht University, Netherlands; **Co-Author:** Lex Borghans, Maastricht University School of Business and Economics, Netherlands

Technology is becoming more and more embedded in our everyday lives. The possibilities are great, also in education, where technology is often used to stimulate skills, especially given the increased focus on STEM-related education. In this study, we examine the use of technology by children in classrooms to assess their skills. More specifically, we aim to increase the insight into complex skill sets, such as executive functions, by looking at how young children play with robotic toys. Studying the relationship between complex skills and their play behavior is of added value since the understanding of children's skills mostly stems from school tests that focus on academic achievement in the fields of math and language and observations. We specifically use a programmable toy, a Bee Bot, in Kindergarten, and relate the performance of children on three self-developed tasks with the Bee-Bot to neuropsychological tests administered. Using factor analysis, we explore the possibility of using robotic toys to understand young children's ability. These insights are most valuable in classrooms with young children, since gaining insight into the skills of Kindergartners is particularly challenging.

Quality of Early Mathematics Education in an International Comparison – Austria and Switzerland

Keywords: Mathematics education, Process quality, Measurement, Teacher-child interaction

First Author: Lars Eichen, Karl-Franzens-Universität Graz, Austria; **Co-Author:** Karoline Rettenbacher, Karl-Franzens-Universität Graz, Austria; **Co-Author:** Mailina Petritsch, Karl-Franzens-Universität Graz, Austria; **Co-Author:** Manfred Pfiffner, Pädagogische Hochschule Zürich, Switzerland; **Co-Author:** Catherine Walter-Laager, Karl-Franzens-Universität Graz, Austria

A high level of process quality has an influence on the children (mathematic) learning outcomes (e.g. Lehrl et al., 2016)

Aims: How the process quality of early mathematics education looks like in an international Comparison (Austria and Switzerland)?

Method: The data from kindergartens/preschools in Switzerland and Austria are being compared. In total 13 groups agreed to participate. Seven videos from the age group 3-4 years ("space and shape") and six videos from the age group 5-6 ("measurement") years were taped. $N = 20$ video sequences in each country are analyzed. Two observational instruments (COEMET, Clements & Sarama, 2007); developed rating scale based on the KES-R (Tietze, 2005)) are being used to analyze the process quality in the early math activities.

Findings: The results show that there is a significant difference in the process quality between the two countries. So far, the early math activities of Swiss early childhood teachers show a higher process quality. The interactions between the children and the early childhood teachers differ in how they introduce the mathematical topics and engage the children in the math activities. Swiss early childhood teachers tend to create a more open setting.

Discussion: The results indicate that there are differences in the process quality in the field of mathematics between the two countries. Due to the small sample it is necessary to underlay the found results empirically with a bigger sample. However, there is a reason for further research in order to explore the predictors that cause those differences.

Initial psychometric properties of the Science Learning Assessment (SLA) in Greek ECE

Keywords: Science education, Measurement, Cross-sectional study, Evaluation study

First Author: Vasilis Grammatikopoulos, University of Crete, Greece; **Co-Author:** Nikolaos Tsigilis, Aristotle University of Thessaloniki, Greece; **Co-Author:** Athanasios Gregoriadis, Aristotle University of Thessaloniki, Greece; **Co-Author:** Michalis Linardakis, University of Crete, Greece

Science learning is a very important subject in education, and it is anticipated that future demands for science knowledge will increase due to emerging challenges in the fields of feeding, growing population, spread of diseases, water supply, climate change etc. Opposed to the Piagetian perspective that children in this stage have limited skills of learning science, it is widely acknowledged now that science learning becomes critical in the early childhood education (ECE). Thus, having valid and reliable instruments assessing children's science learning becomes critical in early childhood education (ECE). The main goal of the current study was to examine the psychometric properties of the Greek version of the Science Learning Assessment (SLA), an instrument developed in the USA to assess science learning in ECE. From 53 early childhood education units in Greece, 528 children were randomly selected and administered with the Greek version of the SLA. Advanced statistical methods (CFA, IRT framework) were employed to analyze the data and the results showed that the Greek version of the SLA appeared to have acceptable psychometric properties. Therefore, the Greek version of the SLA might be considered that produce valid and reliable scores for assessing children's science knowledge in ECE.

Session D 4

Poster presentation session Children`s cognitive development during preschool years

Keywords: Cognitive development, Cross-sectional study, Executive functioning, Infants, Interventions, Longitudinal study, Mathematics education, Measurement, Numeracy, Science education, Self-regulation

Chairperson: Gabriel Kappeler, Haute école pédagogique du canton de Vaud (HEP Vaud), Switzerland

Preschoolers' abilities in context-free Control of Variables Strategy

Keywords: Cognitive development, Science education, Measurement, Interventions

First Author: April Moeller, Ludwig-Maximilians-Universität München, Germany; **Co-Author:** Beate Sodian, Ludwig-Maximilians-Universität (LMU), Germany

Recent research with elementary school children has revealed competence in selecting controlled experiments and interpreting unconfounded evidence, however, there is limited research on preschool children's abilities in experimentation, specifically in Control of Variables Strategy (CVS) tasks. Further, many CVS tasks are influenced by prior knowledge and may be too complex for children aged four to six. The question remains if even preschoolers have an understanding of CVS and if more developmentally-sensitive tasks can help with detection. The present study aims to develop a context-free CVS task. In this novel task preschoolers are shown confounded evidence (a stick of three differently colored bricks activates a lightbox). They are then given a hypothesis: a particular brick activates the lightbox. Following the hypothesis statement, they are provided with three additional sticks from which they may only choose one to place on the lightbox to test the hypotheses. One choice, the correct one, controls two of the original colors and varies the color in question. The other choices vary two or three colors. Results show that young preschool children ($n = 14$, $M = 55$ months) did not differentiate between the choices. Older preschool children ($n = 20$, $M = 69$ months) showed a tendency toward the correct CVS choice. Further, no younger preschoolers provided a CVS-based justification, while half of older preschoolers did. These results suggest this context-free CVS task may be appropriate for investigating the development of CVS in young children and may further indicate a beginning competence at CVS in preschool age.

Effects of music and math training on mathematical and working memory performances

Keywords: Cognitive development, Mathematics education, Numeracy, Interventions

First Author: Ingo Roden, Carl von Ossietzky University Oldenburg, Germany; **Co-Author:** Silja Mansholt, Carl von Ossietzky Universität Oldenburg, Germany; **Co-Author:** Gunter Kreutz, Carl von Ossietzky Universität Oldenburg, Germany; **Co-Author:** Juliane Schlesier, Carl von Ossietzky Universität Oldenburg, Germany; **Co-Author:** Dietmar Grube, University of Oldenburg, Germany

Music training has been associated with cognitive transfer effects. The present study examined the effects of music and math training on mathematical abilities and visuospatial working memory capacity in kindergarten children. A total of $N = 32$ children (mean age: 5.46 years; $SD = .29$) was randomly assigned to three groups. Music children ($n=10$) received weekly sessions of 60 min music training over a period of 8 weeks; math children ($n = 11$) received the same amount of training focusing on mathematical skills. The third group ($n = 11$) served as waiting controls. The groups of children were matched for sex, age, IQ and previous music experiences at baseline. Pre-Post intervention measurements revealed a significant interaction effect of group x time, showing that children in both music and maths groups significantly improved their early numeracy skills, whereas children in the control group did not. No significant differences between groups were observed for the visuospatial working memory performances. These results confirm and extend previous findings on transfer effects of music training on mathematical abilities. They show that music and maths interventions are similarly effective to enhance children's mathematical skills. More research is needed to establish, whether cognitive transfer effects arising from music interventions might facilitate children's transition from kindergarten to first-grade.

Exploring the relation between the acquisition of words for objects and for numbers at 30 months

Keywords: Cognitive development, Numeracy, Infants, Longitudinal study

First Author: Antje Ehlert, University of Potsdam / University of Johannesburg, Germany; **Co-Author:** Flavia Adani, University of Potsdam, Germany; **Co-Author:** Tom Fritzsche, University of Potsdam, Germany

Early development of language and numeracy skills are interdependent. Like in any learning of content words, the acquisition of number words involves fast mapping. This study focuses on fast mapping of novel words and its relation with the acquisition of number words for small quantities. We predict a positive correlation between novel word retention and children's individual comprehension of number words at 30 months. Thirty German-learning 30-month-olds took part in an eye-tracking study, in which they were asked to identify the referents of familiar and novel words. Upon completing a Give-a-Number task, that requires participants to give one to five chips, each child was assigned to a knower-level. The eye-gaze data reveal that 30-month-olds look significantly longer to the target referent (compared to a distractor referent) when they are presented with two familiar objects, but also with one familiar and one unfamiliar object and with two unfamiliar objects (all p-values

Latent Structure of Executive Functions in Preschoolers

Keywords: Cognitive development, Executive functioning, Self-regulation, Cross-sectional study

First Author: Melanie Otto, ZNL TransferCentre of Neuroscience and Learning, University of Ulm, Germany; **Co-Author:** Carmen Deffner, TransferZentrum für Neurowissenschaften und Lernen ZNL, Germany; **Co-Author:** Laura Walk, ZNL Transfer Center for Neuroscience and Learning, Germany; **Co-Author:** Petra Arndt, ZNL Transfer Center for Neuroscience and Learning, Germany

Aim: In theory executive functions (EF) consist of three aspects: working memory (WM), inhibition (IN) and cognitive flexibility (CF). Miyake et al. (2000) tested the construct empirically in adults and found the three factors of EF. First studies, that investigated the latent EF structure of preschoolers show different structures. Some researchers see WM and IN as first to develop and as foundation for later CF. **Methods:** 214 German preschoolers (M = 53,38 months, SD = 10,55 months, range 36 to 77 months, 53,3% boys) participated in the study. EF were assessed using the Head-Toes-Knees-Shoulders Task (HTKS 1 = WM, HTKS 2 = IN), Night and Day Stroop (ND = IN), Block Recall (BR = visuospatial WM), Digit Span (DS 1,2 = phonological WM) and the Heart and Flower Task (HF 1 = WM, HF 2 = IN). We used an exploratory factor analyses to determine latent EF factors. **Results:** Our results show a single factor solution to fit best the latent structure underlying EF- tests in preschoolers. The single factor solution shows to declare up to 40,94 % of the variance. Correlations of the tests with the extracted component are all (except one) above 0.500: HTKS 1= 0.591, HTKS 2= 0.704, ND= 0.489, DS 1= 0.504, DS 2= 0.726, BR= 0.678, HF 1= 0.657, HF 2= 0.720. **Discussion:** Our results show a single factor solution for preschoolers' EF and good correlations with the tests used. Further studies are needed to investigate whether the single factor disentangles in older preschoolers or not.

Securing young minds from Violence through ECE Intervention - a case of conflicted area of Pakistan

Keywords: At-risk children, cognitive development, Emotion, Interventions

First Author: Salima Sewani, Chand Tarey Academy, Pakistan

Early Childhood Education is crucial for the holistic development of young minds (Samuelsson & Kaga, 2008). With that, peaceful environment is crucial for the social and emotional stability of children. In this regard, the role of teachers and parents is critically important. The paper presents a case of early childhood module, contextually designed with the aim to prevent young minds from violence and extremism. Chand Tarey Academy- the first early childhood education centre for children prone to violence is selected for pilot study. Five Teachers and ten parents were selected from the school. Training was provided by the experts for the duration of two months. The efficacy of the module was assessed through pre and post-test in addition to interviews. The module proved as one of the most effective ways to prevent young minds from violence. During the next two months, five teachers implemented the module among fifty children, enrolled in early childhood section of the same school. The module focused on building strong social relationship, strengthening moral values and providing them global competencies. The module lasted for two months. Data was collected through observations. Module helped learners to build strong social and emotional relationships with teachers. Further it helped to gain skills, necessary for the sustenance of peace and harmony among children. The course further helped to reduce intolerance and hatred among them. Different strategies such as role-play and storytelling proved as effective teaching methods. This pilot study is now the part of formal curriculum of the same school.

Session D 5

Poster presentation session: Quality of ECEC and cognitive development

Keywords: Beliefs, Cognitive development, Emotion, Instructional practices, Longitudinal study, Play, Process quality, Self-regulation, Social interaction, Social-emotional competencies, Teacher-child interaction

Chairperson: Sanne Rathé, KU LEUVEN, Belgium

Teachers' beliefs about the emotion regulation of boredom and anger in primary school children

Keywords: Emotion, Self-regulation, Beliefs, Social interaction

First Author: Juliane Schlesier, University of Oldenburg, Germany; **Co-Author:** Barbara Moschner, Carl von Ossietzky Universität Oldenburg, Germany; **Co-Author:** Ingo Roden, Carl von Ossietzky University Oldenburg, Germany

In recent years, educational psychological research mainly focused on the achievement emotion test-anxiety, but not on boredom and anger in classroom contexts. That is why, only little is known about the regulation of boredom and anger in the context of primary school. For that purpose, the present study explored 30 primary school teachers' beliefs within focused, structured, guideline-based interviews. These interviews were inductively summarized and analyzed via content analyses (paraphrasing, generalization, and reduction). First results show that teachers tend to observe boredom among students in higher grades, manifesting by talking during school lessons, being inattentive or distracted. From the perspective of the teachers, the teachers themselves are able to positively regulate the emotion boredom by changing met

hods, or materials. In contrast, anger tends to manifest in early primary school years, and it is regulated externally through the teacher by short-term isolations. However, this regulation may lead to disadvantageous development of anger expression. Therefore, teachers should integrate, in cooperation with students, alternative strategies that enables the students to internally regulate their anger in school lessons.

Teacher-child-interactions and their relationship to children's explorative behavior

Keywords: Cognitive development, Instructional practices, Process quality, Social interaction

First Author: Karoline Lohse, University of Potsdam, Germany; **Co-Author:** Caroline Wronski, University of Applied Sciences Potsdam, Germany; **Co-Author:** Frauke Hildebrandt, University of Applied Sciences Potsdam, Germany

Effective pedagogy in early child care settings has been found to have long-term effects on children's academic development. It has been argued that, particularly, verbal adult-child-interactions are likely to promote the development of domain-general competencies, such as verbal and reasoning skills. Effective verbal interactions have been described in terms of the *elaborative style* of adults' speech-acts or *Sustained Shared Thinking* in dialogic situations. Characteristics of these verbal interactions are, e.g., adults' open-ended questioning and taking up and elaborating on children's utterances. For *directive* pedagogical interactions an experimental study has evidenced limiting effects on children's explorative behavior, suggesting that pedagogy differentially applies to specific learning contexts. The present study investigates the potential relationship between the teacher-child interactions and children's self-directed explorative behavior in a standardized, though natural, early educational setting. In a quiet room of their day-care-centers 40 teacher-child dyads were asked to (visually) explore a new object together. Subsequently, children were invited to physically explore the object. All sessions were videotaped. Individual differences in children's exploration, as well as differences in teachers' work experience and training background were assessed. Employing a micro-analytic approach, the quality of interactions was measured by the frequency of potentially effective speech-acts uttered by the teachers. Children's subsequent physical exploration of the object was coded in terms of *time of exploration*, *fluency of actions*, and *functions discovered*. Following up on the educational and developmental psychology literature, positive correlations between teachers' verbal interactions and children's exploration are expected.

Children's explanations and justifications of intentional behavior

Keywords: Cognitive development, Beliefs, Social interaction, Teacher-child interaction

First Author: Ramiro Glauer, University of Applied Sciences Potsdam, Germany; **Co-Author:** Andrea Hildebrandt, University Greifswald, Germany; **Co-Author:** Frauke Hildebrandt, University of Applied Sciences Potsdam, Germany

Intentional behavior can be predicted and explained on the basis of internal or external reasons. While an external reason is a reason that obtains independently of whether the behaving subject is aware of it, an internal reason is one that obtains from the perspective of the behaving subject. Furthermore, explanations of intentional behavior may provide justifications of internal reasons, such as their perceptual source.

An understanding of this distinction and of reasons' amenability to justification is key to our developed social-cognitive competence. The main purpose of our study is to investigate how theory of mind (ToM) abilities relate to the ability to give reason and justification explanations of intentional behavior. ToM is probed by a standard verbal unexpected location false-belief task. And the main task is to give an answer to a why question that requires an internal reason or justification explanation. Answers that rely on external reasons alone indicate a lack of understanding of the epistemic dimension of intentional behavior. Preliminary results on a sample of 80 children show that children who do not pass the false-belief task offer external reason explanations more frequently than children who do pass the false-belief task. Furthermore, among the 46 children who pass the false-belief task, fewer external reason explanations are given for the behavior of another than for their own behavior. This indicates that the ability to give internal reason or justification explanations might first be acquired for others and only then becomes applied to oneself.

Pragmatic Language and Social Skills in the first two years of school

Keywords: Cognitive development, Social-emotional competencies, Longitudinal study, Social interaction
First Author: Silvana Mareva, University of Cambridge, United Kingdom; **Co-Author:** Elian Fink, University of Cambridge, UK, United Kingdom; **Co-Author:** Jenny Gibson, University of Cambridge, United Kingdom

It has been suggested that the way a child uses language in social contexts may be more relevant to their social success than their competence in the more traditionally assessed structural aspects of language. Most of the evidence in support of this account comes from studies assessing concurrent associations, whereby both pragmatic and social abilities are rated by the same informant. To overcome the issue of same informant variance and the limitations of concurrent associations, we investigated how parent reports of pragmatic language skills relate to teacher's ratings of social competence over the first two years of school ($N=113$, T1: $M_{age}=5.24$, $SD=.35$; T2: $M_{age}=6.05$, $SD=.39$). At both time-points, children's Expressive and Receptive language abilities were formally assessed (CELF-Preschool), whilst teachers rated Social Competence (Social Skills Rating System) and parents reported on Pragmatics and communication skills (Children's Communication Checklist). Preliminary analyses suggest that after adjusting for the Social Competence at T1, Pragmatic language, but not Expressive or Receptive language in the first year of school, predicts Social Competence ratings in the following school year. Using this multi-informant longitudinal design, we were able to observe a link between Pragmatic language abilities and Social Competence, suggesting that a child's ability to use language according to context plays an important role in the development of social skills during the first year of school.

Longitudinal relations between quality of pretend play and linguistic competence in early childhood

Keywords: Cognitive development, Play, Longitudinal study, Social interaction
Author: Hannah Sand, University of Konstanz, Thurgau University of Teacher Education, Germany

Pretend play, especially high-quality pretend play, is considered to provide a relevant learning context in young children's development. Current research provides no distinct conclusion about the underlying

mechanisms. Regarding the preliminary skills that promote high-quality pretend play not much research has been done either. This study investigates possible relations between the quality of pretend play and linguistic competence. The predominant question is whether the quality of pretend play is a predictor for changes in linguistic competence or if rather linguistic competence influences quality of pretend play. The paper draws on the longitudinal data of 66 children ($M=3.87$ years) collected as part of a randomized controlled intervention study in Switzerland. To examine the reciprocal predictions structural equation models using a Cross-Lagged-Panel-Design were specified. In the study two complementary measuring instruments were employed to detect the quality of pretend play that were considered in separate models for comparative purposes. Group assignment (treatment/control), age and gender were taken into account. The analysis indicates that the constructs pretend play and linguistic competence correlate positively in cross-section. A predictive relation between the quality of pretend play and changes in linguistic competence could not be found. Considering group assignment, it became apparent that irrespective of age and gender, linguistic competence is a predictor of change in pretend play quality. A comparison of the two instruments used to analyze the quality of pretend play indicates that coherences depend on the setting and the playmate. Points for further research and practical implications are discussed.

Session D 6

Symposium: The effectiveness of different types of professional development on classroom quality

Keywords: Evaluation study, Experimental design, Language education, Meta-Analysis, Preschool quality, Preschool teachers, Process quality, Professional development, Teacher-child interaction

Chairperson: Franziska Egert, State Institute of Early Childhood Research (IFP Bayern) Germany

Discussant: Ruben Fekkink, University of Amsterdam, Netherlands

In early childhood education and care (ECEC), teachers are required to display a wide range of skills during their interactions with young children. Teachers offer young children emotional support and are also responsible for classroom organization and the support of cognitive development of the children (Hamre, 2014). However, large scale studies indicate that the quality of cognitive and language stimulating interactions is low in North America and most of the European countries (e.g., Mashburn et al., 2008; Pakarinen et al., 2010; von Suchodoletz et al., 2014). The importance of ongoing in-service training for teachers as a key mechanism for classroom quality is widely acknowledged in policy and practice. An important theme for research is to find out which professional development formats are most effective in improving teacher- child interactions. Therefore, the symposium provides experimental evidence from three recent in-service training studies with different training formats and a meta-analysis. First, Katrien Helmerhorst present results from a RCT-study on intensive on-site video feedback training. Second, Nesiré Schauland provides experimental evidence on a short-term distance coaching intervention. Insights on the role of center director in the training process are presented by Christa Japel. Two different training formats (director training plus staff coaching; director training only) were compared with a control group. Further, Franziska Egert outlines meta-analytic evidence from 15 treatments indicating that teacher training im-

proves interactional quality, but growth is also moderated by key characteristics of professional development. Finally, results are discussed by Ruben Fukkink with regards to implications for research and practice.

Effects of the CIP-Training on Caregiver–Child Interactions in Dutch Child Care Centers: An RCT-study

First Author: Katrien Helmerhorst, Erasmus University Rotterdam, Netherlands; **Co-Author:** J. Marianne A. Risken-Walraven, Radboud University Rotterdam, Behavioural Science Institute, Netherlands; **Co-Author:** Ruben Fukkink, University of Amsterdam, Netherlands; **Co-Author:** Louis Tavecchio, University of Amsterdam,, Netherlands; **Co-Author:** Mirjam J. J. M. Gevers Deynoot-Schaub, Kohnstamm Institute Amsterdam, Netherlands

Previous studies underscore the need to improve caregiver–child interactions in early child care centers. In this study we used a randomized controlled trial to examine whether a 5-week video feedback training can improve six key interactive skills of caregivers in early child care centers: Sensitive responsiveness, respect for autonomy, structuring and limit setting, verbal communication, developmental stimulation, and fostering positive peer interactions.

A total of 139 caregivers from 68 early child care groups for 0- to 4-year-old children in Dutch child care centers participated in this RCT, 69 in the intervention condition and 70 in the control condition. Caregiver interactive skills during everyday interactions with the children were rated from videotape using the Caregiver Interaction Profile (CIP) scales at pretest, posttest, and follow-up 3 months after the posttest.

Results at posttest indicate a significant positive training effect on all six caregiver interactive skills. Effect sizes of the CIP training range between $d = 0.35$ and $d = 0.79$. Three months after the posttest, caregivers in the intervention group still scored significantly higher on sensitive responsiveness, respect for autonomy, verbal communication, and fostering positive peer interactions than caregivers in the control group with effect sizes ranging between $d = 0.47$ and $d = 0.70$.

This study shows that the quality of caregiver–child interactions can be improved for all six important caregiver skills, with a relatively short training program. Possible ways to further improve the training and to implement it in practice and education are discussed.

Effects of a web-based video feedback intervention on language-modeling of educators in Germany

Author: Nesiré Schauland, State Institute of Early Childhood Research, Germany

The results of meta-analyses suggest that formats like coaching or feedback are particularly well suited to improve the quality of interactions between early childhood educators and children (Egert, 2015). This study examined the impact of a single web-based video feedback session on educators' linguistic interactions using a randomized pretest-posttest control group design. In total, 96 educators from 45 German preschools who care for children aged between three and six years participated in the study, 48 in each group. With a gap of about four weeks, two book-reading situations were videotaped for each preschool

teacher. All videotapes were rated with the dimension “Language Modeling” of the „Classroom Assessment Scoring System” (CLASS Pre-K; Pianta, La Paro & Hamre, 2008). Additionally the frequency of used language-facilitation strategies like questions or feedback was determined with a coding system. Based on the video recording of the pretest, educators in the intervention condition received about two weeks after the pretest a video feedback in which the educators’ language-promoting behavior was reflected online using a video conference software. Educators in the feedback condition demonstrated significantly greater improvements in language stimulation than educators in the control group. The significant positive feedback effect could be observed for the CLASS dimension „Language Modeling” ($\eta^2=0.19$) as well as the quantity of questions, language stimulating requests, feedback and follow-up statements ($\eta^2=0.04$ to 0.25). This study indicates that language-facilitating interactions of early childhood educators can be enhanced with a single feedback session.

Improving ECEC quality in Québec: Results from an on-site coaching program

First Author: Christa Japel, Université du Québec à Montréal, Canada; **Co-Author:** France Capuano, Université du Québec à Montréal (UQAM), Canada

Quebec is unique in Canada regarding ECEC provision. It has the largest number of regulated child care spaces and offers publicly-funded daycare at a low price. Studies examining the network’s educational quality reveal, however, that the latter is generally wanting. Given these results, over the past decade, a number of associations of non-profit child care centers (CPE, Centres de la petite enfance) have undertaken various initiatives to improve the quality of the educational environment in their settings. One of these initiatives started in 2005 with a pilot project that aimed at improving quality in early childhood centers through training of directors and standard-based on-site coaching sessions for staff. Using a quasi-experimental design, 30 CPEs were assigned to 3 different levels of intervention (director training plus staff coaching; director training only, no intervention). All three groups were evaluated using the ECERS-R and received their quality profile at the beginning of the project. Post-tests were carried out 3 months after the end of coaching and one year later among all the groups. Results revealed that training directors accompanied by working with staff to address particular needs regarding quality improvement was associated with larger gains in quality than only receiving a profile without follow-up. The encouraging results of this pilot project inspired a number of associations who subsequently integrated this program into their service offer. Results of this second phase will also be presented as well as a discussion of the multiple challenges when implementing the program on a larger scale.

Training effects on classroom organization, emotional and instructional support. A meta-analysis

Author: Franziska Egert, State Institute of Early Childhood Research (IFP Bayern), Germany

Several investigations in European countries and the US showed that the quality of Emotional Support and Classroom Organization is medium-to-high, while the quality of Instructional Support is in a low-to-mid range (e.g., Hamre et al. 2008; Pakarinen et al. 2010; von Suchodoletz et al. 2014). High quality instructions are crucial for cognitive and language learning of young children (Mashburn et al. 2008). In politics and

practice, teacher professional development is seen as key mechanism to improve classroom quality. Unfortunately, only a small number of programs are evaluated. Our meta-analysis aggregates the impact of in-service trainings on interaction quality measured with the Classroom Assessment Scoring System (CLASS Pre-K; Pianta, La Paro & Hamre, 2008). The systematic search of studies that were published between 1970 and 2015 (i.a. in ERIC, PsycINFO, SocINFO, ProQuest D&T) revealed 475 hits. Abstracts and full texts were coded by two independent reviewers. In total, 12 relevant quasi-experimental studies including 15 treatments were identified. Statistical data was transformed into Hedges' g . The 121 effect sizes ranged from $g = -0.38$ to 3.22 . A variance weighted multi-level random effects model was used to aggregate training impact. Aggregated training impact was small for Classroom Organization and small-to-medium for Emotional and Instructional Support. While there was no significant linear relation between effect sizes and training intensity, quality indicators of training seem to matter. Implications for further research and training programs will be discussed.

Session E

Thursday, 30 August 2018, 04:45 – 06:15 pm

Session D 1

Symposium Contributions of self-regulation to academic achievement in elementary students across Europe

Keywords: Cognitive development, Executive functioning, Literacy, Longitudinal study, Mathematics education, Numeracy, Self-regulation

Chairperson: Catherine Gunzenhauser, Leipzig University, Germany

Discussant: Joana Cadima, University of Porto, Portugal

Self-regulation is a crucial component of school readiness and facilitates academic achievement in elementary school and beyond. The proposed symposium is Part II of two related symposia that aim at providing an overview of recent research on the associations between self-regulation and academic achievement in children across Europe. While Part I of the symposium will focus on preschool-aged children, Part II will address the elementary school period. After age five, self-regulatory skills typically improve at a slower rate than in early childhood. Nevertheless, important changes can be observed throughout the elementary school period, with diverse aspects of self-regulation following distinct developmental trajectories (Best, Miller, & Jones, 2009; cp. Friedman & Miyake, 2017). The proposed symposium addresses this discussion from an educational perspective. Three longitudinal studies with findings from the Netherlands (ten Braak and colleagues), Kosovo (Uka & Suchodoletz), and Germany (Gunzenhauser & Saalbach) will be presented. Each study provides a fine-grained analysis by including theoretical and empirical distinctions within the construct of self-regulation (e.g., specific components of executive functioning, but also motivational and behavioral aspects of self-regulation) and by examining their distinct influences on domain-specific academic achievement. This offers a starting point for interventions to support students' learning by targeting individual strengths and weaknesses in self-regulation. The discussants of both parts of the two related

symposia will collaborate to provide an integration of the findings. The discussion will outline recommendations for next steps concerning research and policy efforts aimed at supporting children's school readiness to reduce early inequalities.

The Role of Attentional and Behavioral Control in Early Literacy and Numeracy Development

First Author: Dieuwert ten Braak, University of Stavanger, Norway; **Co-Author:** Tijs Kleemans, Radboud University Nijmegen, Netherlands; **Co-Author:** Ingunn Storksen, University of Stavanger, Norway; **Co-Author:** Ludo Verhoeven, Radboud University Nijmegen, Netherlands; **Co-Author:** Eliane Seegers, Radboud University, Netherlands

Despite consensus on the importance of children's self-regulation for the development of academic skills in kindergarten and first grade, relatively little is known about domain specific effects of different aspects of self-regulation. The present longitudinal study addresses this gap by focusing on the direct and indirect contributions of two components of self-regulation: attentional and behavioral control, to the development of early literacy and numeracy in kindergarten and first grade. Ninety children from the Netherlands ($M_{\text{age}} = 72$ months) were assessed on multiple direct measures of self-regulation, as well as phonological awareness and number sense in kindergarten, and word decoding and mathematics in first grade. Structural equation models showed that both attentional and behavioral control predicted phonological awareness and number sense in kindergarten. Domain specificity emerged as attentional control predicted first grade word decoding, whereas behavioral control predicted first grade mathematics. Furthermore, the analyses showed a significant indirect effect from attentional control to decoding via phonological awareness, whereas the path from behavioral control to mathematics remained direct when controlling for number sense. It can thus be concluded that attentional and behavioral control differentially relate to the development of early literacy and numeracy. The findings provide insight to how children's early literacy and numeracy skills might be supported by focusing on specific aspects of self-regulation.

The influence of executive functioning on academic achievement among elementary school students

First Author: Fitim Uka, University of Freiburg, Germany; **Co-Author:** Antje von Suchodoletz, New York University Abu Dhabi, United Arab Emirates

There is a strong body of research supporting the relationship between executive functions (EF) and academic achievement. However, most research focused on the early years and on adolescence while less is known about how EF components influence academic achievement throughout middle childhood. Addressing this gap in the literature, the study investigated associations between components of EF (e.g., attention shifting, inhibitory control, working memory) and Grade Point Average (GPA) among first, third and fifth graders. In total, 298 children (51.5% male) from elementary schools in Kosovo participated. Students completed a battery of EF tasks, including Dimensional Change Sorting Task (Zelazo et al., 2003), Go/No Go task (Garavan, Ross, & Stein, 2000) and Working Memory test (Petermann & Petermann, 2011). To assess children's intelligence, we used Culture Fair Test (CFT 20-R; Weiß, 2006). In addition, the GPA

was calculated for each child at the end of the academic year. Regression analyses showed that each component of EF significantly predicted GPA after controlling for intelligence. Also, results showed that there are no significant differences across groups with regard to slopes and intercepts for working memory, attention shifting and inhibitory control on GPA. The results add to the literature on the importance of EF for academic achievement. Implications for the development of strategies to support EF among elementary school students will be discussed.

Contribution of Executive Functions and Self-Control to Mathematics Performance in Third Graders

First Author: Catherine Gunzenhauser, Leipzig University, Germany; **Co-Author:** Henrik Saalbach, University of Leipzig, Germany

Self-regulatory skills are crucial for acquiring mathematical competencies in elementary school. However, different aspects of self-regulation (originating from different research traditions) have mostly been investigated separately from one another. The present longitudinal study aimed at disentangling the relationship between executive functions (EF) and self-control and at investigating their distinct and joint influences on mathematics performance in third graders. Participants were $N = 257$ third graders from East Germany ($M_{\text{Age}} = 8.59$ years, $SD = 0.57$ years; 51% girls) as well as children's mathematics teachers. The project included two time points (6-month interval). At both time points, children's EF, self-control capacity, mathematics performance as well as several control variables (nonverbal intelligence, mathematics self-concept) were assessed. Findings show that self-control that children exerted in the context of mathematics instruction (mathematics self-control) explained slightly more variance in mathematics performance than children's general self-control. Children's mathematics self-control was predicted by both EF and mathematics self-concept as a domain-specific motivational factor. Both EF and mathematics self-control made unique contributions to children's later mathematics performance after controlling for prior mathematics performance. Moreover, there was a significant indirect effect of EF on children's mathematics performance through mathematics self-control. Findings suggest that programs designed to support children's mathematics performance might benefit from taking into account children's individual strengths and difficulties with regard to both EF and self-control.

Session E 2

Symposium: Play-based didactics in Early Childhood Education

Keywords: Child participation, Curriculum, Instructional practices, Play, Preschool teachers, Professional development, Teacher-child interaction

Chairperson: Ingrid Pramling-Samuelsson, University of Gothenburg, Sweden

Discussant: Mona Holmqvist, Malmö University, Sweden

In this symposium will be three presentations, all focusing on questions about play in ECE, an area that to a large extent is taken for granted in ECE, thus seldom problematized. The Swedish project is an on-going collaboration between the University of Gothenburg and preschool teachers with the aim of theoretically developing play-based didactics. Based on empirical data the developmental potentials of play and how teachers response in such activities can support children's development are studied. Critically, we explore teachers' contributions to children's play and development in such activities and how this can be done without transforming play into non-play. The presentations from research in Switzerland look at how teachers are mediating children's learning during free play. Three teachers are followed in their guiding process during play. The third presentation from Switzerland focuses on: 1) how children reinvest curriculum knowledge during free play; 2) how teachers promote the link between this knowledge and the activities initiated by children; and 3) how this knowledge makes free play evolve. Two situations are analyzed (puppet theater and "semolina handling") during which the teachers' interventions support the evolution of free play, and therefore permitted a better experiment of knowledge as tools of the mind. In all three empirical studies, video recordings are analyzed. The projects will all together raise questions about if and how play can be used in thinking about a didactic that is built on an active child and an active teacher in dialogical interaction, also in play.

Play-based teaching in preschool

First Author: Ingrid Pramling-Samuelsson, University of Gothenburg, Sweden; **Co-Author:** Hanna Palmér, Linnaeus University, Sweden; **Co-Author:** Maria Magnusson, Linnéuniversitetet Department of Education and Teachers' Practice, Sweden

We present recent and on-going empirical research on how to facilitate children's learning and development in play-based settings. Critically, we investigate how to develop teaching practices that are responsive, not counter, to play and playfulness. In the project, which is a combined research and development project, preschool teachers document with video (e.g., with a computer tablet) children's play and how the teachers themselves try to contribute to the development of play and of insights developed through play. These films are reviewed and discussed by preschool teachers, heads and researchers at mutual seminars. At these seminars, the researchers also give short lectures on children's play and learning. This process is then iteratively repeated. The preschool teachers generate empirical data in three forms; where they intend to contribute to develop children's play and learning by: (i) entering as play partners in children's ongoing play, (ii) being responsive to recurring play patterns (plays) and contribute to developing these, and (iii) establishing new narrative frames for playing, for children to play in and in extension of. Based on this empirical data the developmental potentials of play and how teachers' response in such activities can support children's development are studied. Critically, we explore teachers' contributions to children's play and development in such activities and how this can be done without transforming play into non-play.

Teachers' mediation during free play as a lever for pupils' learning

First Author: Anne Clerc-Georgy, University of Teacher Education du canton de Vaud, Switzerland; **Co-Author:** Marie-Laure Michel, HEP Vaud (University of Teacher Training, Lausanne, Switzerland), Switzerland

In the world as it is evolving, less and less time is given for children to play. However, following amongst others the work of Vygotski, we argue that free play is essential for the child's development dialectically linked with more structured learning at school (Clerc-Georgy, 2015) and often not present outside school anymore either. Our aim is two-fold. First, we intend to document teachers' mediations during free play. In fact, a lot of work has been done on the importance of play, but very few on the teachers' guidance that can help immature play develop into mature play (see for example Bodrova, 2013). Second, our aim is to end up with guidelines that will help future teachers have a better understanding of their role during free play to enhance learning. According to the historico-cultural paradigm, we implemented a research design in 3 classes in Switzerland: 3 weeks in each class were filmed, 9 interviews made with the teachers and notebooks extensively completed. Multimodal analysis is being conducted on the films, always confronted with the interviews and notebooks. The 3 teachers we followed, all experts in guiding free play, may have different guiding types but one same pedagogical aim: to link this time to some kind of learning, as Pramling Samuelsson & Asplund Carlsson (2008) precisely show is accurate. This communication will allow us to illustrate how these teacher's mediate free play by presenting the fine analysis of different interactional situations. Keywords: free play, learning, Vygotskian perspective, mediations

Thinking Play and Learning dialectically

First Author: Maire Sardi Béatrice, HEPL, Switzerland; **Co-Author:** Daniel Martin, University of Teacher Education, State of Vaud, Switzerland

In our context, we observe the gradual disappearance of free play at preschool and that teachers' practices imitate more and more the ones of primary school. These changes shed light on the traditional tensions between the social-pedagogical and the preparation-for-school traditions, between play and learning, and, in a vygotskian perspective, between spontaneous and reactive learning (Vygotski, 1935/1995). To overcome these tensions, we defend the need to develop a third way, a dialectical way (Author, 2016), a play-based didactics. At preschool age, the child experiments cultural tools according to his own interests. To do it, free play seems the most conducive activity. However, development cannot be considered as the only result of a maturation's process nor learning as only experiences where children are expected to discover established knowledge on their own (Pramling, Doverborg & Pramling Samuelsson, 2017). We try to better understand: 1) how children reinvest curriculum knowledge during free play; 2) how teachers promote the link between this knowledge and the activities initiated by children; 3) how this knowledge makes free play evolve. We analyzed two situations (puppet theater and "semolina handling") during which the teachers' interventions support the evolution of free play, and therefore permitted a better experiment of knowledge as tools of the mind (Bodrova & Leong, 2012). In this communication, we will present the results of this analysis from 2 points of view: the implemented teaching practices on one hand, the changes in children's play on the other.

Keywords: Play, Learning, Didactics, Teachers' practices.

Session E 3

Symposium: Let's play together! The role of pretend play for children's social-emotional and language skills

Keywords: Interventions, Language education, Longitudinal study, Play, Social interaction, Social-emotional competencies

Chairperson: Sonja Perren, University of Konstanz, Germany

Discussant: Lieselotte Ahnert, University of Vienna, Austria

Social pretend play is an activity through which children acquire and train social-emotional and language skills. In particular, pretend play allows children to create different make-believe scenarios in which they can use pretense and symbolism to take on different roles and perspectives. Herein, children have the possibility to experiment with themselves, their peers, adults, and their environment, which is an ideal ground for developing social-cognitive, social skills and positive peer relations. We will present results from three longitudinal studies, two of them including a controlled intervention design. All studies demonstrate the importance of pretend and role play in young children. Paper 1 presents results from a longitudinal study in 5-6-year-old children on associations between pretend play, language and social skills. Paper 2 presents results from a controlled intervention study which investigated the effect of a fairy-tale intervention in kindergarten on children's social and emotional skills (4-6-year-old children). Paper 3 presents results on the efficacy of pretend play tutoring on three-to four-year old children's emotional, socio-cognitive and social skills. The results of the papers are discussed regarding the role of play, especially pretend and role play, in early childhood education.

An Evaluation of a Fairytale-Based Play Intervention for Socio-Emotional Competences in Preschoolers

First Author: Manfred Holodynski, University of Münster, Germany; **Co-Author:** Dorothee Seeger, University of Münster, Germany; **Co-Author:** Sophia Herrmann, University of Münster, Germany

Preschoolers are presented with the developmental task of learning to regulate their emotions volitionally. This requires them to become aware of their inner feelings (Halberstadt, Denham & Dunsmore, 2001). Developed make-believe playing with peers is one way for children to learn these competences (Fleer & Hammer, 2013). We designed a fairytale-based role-play intervention to promote the above-mentioned socioemotional competences in preschoolers. Listening to and re-enacting emotion-loaded fairytales provide them with the opportunity to explore emotional episodes within an as-if mode, which enables them to become aware of their (dramatized) emotions. To test the efficacy of the fairytale-based intervention, we applied a quasi-experimental pre-post-follow-up control group design. Children (N = 97, M = 60 months, 54% boys) were assigned to one of three groups. The Enactment Group participated in 15 role-play sessions (two per week) with 6 children per play group, which were guided by a play tutor. The Reading Control Group experienced only a dramatized reading of the same fairytales, but without enacting them. An untreated Control Group was matched by age and gender. As dependent variables, we used the

understanding of socio-emotional situations and the quality of socio-emotional competences evaluated by children's preschool teachers. Children in the Enactment Group increased their understanding of socio-emotional situations more than both other groups while the ratings of the preschool teachers did not reveal the expected interaction effect. Results are discussed in terms of how a fairytale-based role-play intervention can serve as an effective means of fostering socio-emotional competences in pre-school children.

The impact of social pretend play on pre-schooler's emotional, social-cognitive and social skills

First Author: Ann-Kathrin Jaggy, University of Teacher Education Thurgau, University of Konstanz, Switzerland; **Co- Author:** Isabelle Kalkusch, Thurgau University of Teacher Education, Switzerland; **Co-Author:** Carine Burkhardt Bossi, Thurgau University of Teacher Education, Switzerland; **Co-Author:** Barbara Weiss, Thurgau University of Teacher Education, Switzerland; **Co-Author:** Fabio Sticca, Marie Meierhofer Institute for the Child, Switzerland; **Co-Author:** Sonja Perren, University of Konstanz, Germany

Social pretend play occurs early in young children's development and is presumed to foster children's positive development. Empirical findings confirm associations between children's social pretend play and social-emotional and social-cognitive skills. However, the causality of these associations is not clarified yet. The present intervention study investigates whether social pretend play tutoring effectively promotes children's pretend play quality and thereby their emotional, social-cognitive and social skills. For this purpose, 16 Swiss playgroups ($N = 100$ three- to four-year-olds) were randomly assigned to the intervention group (play tutoring), the material group (half-dose) and the control group (treatment as usual). The treatment groups took place once a week over 6 consecutive weeks. Pre-tests, post-tests and a follow-up were made. Children's social pretend play quality was assessed at each time-point with a multi-informant-multi-method approach including 3 methods: Dyadic Pretend Play Assessment (DPPA), Tools of the Play Test (Seeger & Holodyski, 2016) and an educator questionnaire. Standardized tests were used to assess children's Theory of Mind (ToM-Scale), emotion comprehension (IDS-P) and language comprehension (SETK 3-5). Educators as well as parents completed a questionnaire on children's social skills (SOCOMP). Results from an antecedent pilot study show, that active play tutoring can promote children's pretend play quality during the intervention ($\beta=.35$). A second pilot study showed strong associations between children's pretend play quality, assessed through the multi-informant-multi-method approach, and children's emotion comprehension ($\beta=.40$) and social competences ($\beta=.78$). First results regarding hypothesized intervention effects on children's emotional, social-cognitive and social skills will be presented at the conference.

Session E 4

Symposium: Professional development to embrace diversity

Keywords: Culture, ICT, Inclusion, Preschool quality, Process quality, Professional development, Structural quality

Chairperson: Bodine Romijn, Utrecht University, Netherlands

Discussant: Paul Leseman, Utrecht University, Netherlands

With growing diversity in European societies, one of the major challenges for professionals is that they feel they are ill prepared in dealing with diversity and multilingualism (Michel & Kuiken, 2014). Despite the growing body of research that stresses the importance of in-service training to influence professionals' attitudes and practices, professional development (PD) focused at diversity and creating inclusive learning environments is still scarce. As professionals are agents within a wider context, characteristics of the team and organization are increasingly recognized to be of special importance in effective PD. Several studies indicate that strong pedagogical leadership, shared vision within the organization and the collaboration and exchange between professionals in professional learning communities affect professionals' attitudes and practices (e.g. Vescio, Ross, & Adams, 2008). The first presentation reports on the experiences of teachers involved in a professional development program that encourages them to collaborate in a professional learning community aiming to appreciate and exploit diversity within an inclusive learning environment. The second presentation focuses on in-service professional development regarding cultural diversity in light of the current reforms in Italy's ECEC system. The final presentation will give insight on how differences in quality and inclusive practices can be explained by PD and organizational characteristics of early childhood and care provisions. The discussion will highlight the importance of continuous PD embedded within an organizational system in which there is a shared view and effort to make a difference and embrace diversity in order to make sustainable changes.

Professional development strengthening the Power to teach all

First Author: Marijke Wilssens, Artevelde University College Ghent, Belgium; **Co-Author:** Piet Van Avermaet, Ghent University, Belgium; **Co-Author:** Elke Struyf, University of Antwerp, Belgium

Schools are facing a growing diversity. To address this and specifically, to realize inclusive education, teacher competences play a crucial role (Leyser et al., 2011). The project Potential - Power to teach all - supports teachers in strengthening their competences to create inclusive learning environments. In this symposium, we will present the professional development program (PDP) that we developed to reach the following goals: developing teacher competences to 1) appreciate and exploit diversity in the classroom and 2) realize collaborative teaming with pupils, parents, colleagues and other partners. The program was based on nine criteria of effective professional development as found in a recent literature review (Merchie et al. 2015). It was inquiry based and used an appreciative, collaborative approach. It was implemented in professional learning communities in 18 elementary schools and 10 secondary schools, under the guidance of local coaches. The competences of the participating teachers were closely monitored before and after the PDP. An insight into the learning process of the teachers will be given from the insider perspective of the coach in five of these schools. This perspective is based on the audiotaped sessions in these schools and on the reflective audio-diary of the coach after each session. It focuses on what the coach experienced as barriers and supporting conditions to promote ownership, an inquiring attitude, transfer to the teaching practice and sharing of knowledge and actions.

Professional development and organizational climate as predictors of quality and inclusive practices

First Author: Bodine Romijn, Utrecht University, Netherlands; **Co-Author:** Pauline Slot, Utrecht University, Netherlands; **Co-Author:** Paul Leseman, Utrecht University, Netherlands

The relation between structural and process quality in early childhood education and care (ECEC) has been frequently studied, but the results are inconclusive. Previous research shows that in a strongly regulated system as the Netherlands, commonly studied structural quality characteristics at the group level (e.g. teacher-child ratio and group size) are unrelated to process quality. However, professional development (PD) has shown to contribute to process quality in general (Slot, Leseman, Verhagen, & Mulder, 2015) and professionals' attitudes towards diversity and inclusiveness in particular (DeCastro-Amrosetti & Cho, 2005). Although professionals are nested in organizations, little research exists that examined the extent to which organizational features contribute to process quality (Slot, 2018). Therefore, in the current study a mediation model is tested to give insight to how differences in process quality and inclusive practices can be explained by organizational characteristics and PD activities. A secondary data analysis was conducted on the Dutch national cohort study of early child care provisions ($N=147$) from 2011. First, based on questionnaire data provided by managers, participating centers are clustered into different types of organizations based on characteristics such as size, center management, flexibility, and external profile (Van de Werf, Slot, Kenis, & Leseman, in preparation). Second, using data from classroom observations, differences in process quality are explained by these organizational characteristics. Third, data from a teacher questionnaire on professional development practices are used as a mediator. A similar mediation model is used to investigate the effect of organizational characteristics and PD on inclusive practices as well.

Opportunities to improve: (research) perspectives from the Italian early childhood education reform

First Author: Lisa Bugno, University of Padova, Italy, Italy; **Co-Author:** Luca Agostinetto, University of Padova, Italy

As the OECD states, until 2017 Italy had 'a split Early Childhood Education and Care (ECEC) system, with different authorities in charge of ECEC' (2017). Different government entities licensed public nurseries and pre-primary schools: municipalities ran the former, while regions were in control of the latter. However, in the last few months, due to a reform of the education system for children from zero to six-years-old (Italian government, 2015; Council of ministers, 2017) significant changes have occurred. The consequence of these modifications will be a national synchronization of regional and local norms: a model of an integrated education system from birth to six-years-old is designed by the reform. The reform's most important point for this paper: the use of specific courses to create a homogeneous university level qualification of educators. While a degree is necessary in order to work as pre-primary teachers, this was already planned by the most recent regional regulations, but not at the national level. For early childhood educators, a university degree will be necessary starting from the scholastic year 2018-2019, and the issue will be the in-service educators professional development. The University of Padova is working with the municipality in order to establish a plan on how to accomplish the reform's provisions: this is an ongoing process, for which implementing decrees from the Ministry are forthcoming. We plan to report about the

progress on this issue and the research we will design focusing on cultural diversity at the Earli Sig 5 Conference in August.

Session E 5

Symposium: Factors influencing complex reasoning in early childhood

Keywords: Cognitive development, Executive functioning, Instructional practices, Language education, Motivation, Science education, Social-emotional competencies, STEM

Chairperson: Johanna van Schaik, University of Leiden; Vrije Universiteit Amsterdam, Netherlands

Organiser: Maartje Raijmakers, University of Amsterdam, Netherlands

Discussant: Susanne Koerber, University of Education Freiburg, Germany

In formal (school) contexts, early childhood is often overlooked as an opportunity to challenge children in complex reasoning tasks. Indeed, in free contexts executive functions limit the extent to which young children are able to focus on information beyond the most obvious solution, to persevere in thinking through a problem, and to switch to novel ideas when necessary. Hence, creating optimal contexts, possibly adapted to individual needs, is crucial to stimulating complex reasoning skills in early childhood. The current symposium presents four studies investigating how both task and individual characteristics influence young children's complex reasoning. In the first, task characteristics during kindergartners' inquiry-based learning on the balance-scale were manipulated, and this study indicated that scaffolding through limiting task options facilitated learning. Second, the effect of instruction on inquiry-based learning contexts was investigated in relation to curiosity. Results revealed dichotomous processes: the importance of instruction on exploration quality as well as the importance of curiosity for knowledge acquisition. Utilizing the tower of London task, the third contribution revealed a relation between language competencies, executive functions, and problem-solving abilities. Furthermore, prompting self-directed speech during problem-solving improved performance in low-IQ pre-schoolers. Finally, an investigation into the development of social complex reasoning identified that the three distinct abilities of Advanced Theory of Mind are likely a product of conceptual development beyond merely increased information-processing skills. The symposium will be closed by discussing how the formal (school) context could take advantage of these insights into the contextual and individual factors influencing children's complex reasoning.

Surprising Science: Triggering and scaffolding young children's experimentation on the balance-scale

First Author: Johanna van Schaik, University of Leiden; Vrije Universiteit Amsterdam, Netherlands; **Co-Author:** Maartje Raijmakers, University of Amsterdam, Netherlands

Proportional reasoning tasks are complex for young children as their naïve physics concepts often consider only one out of two causal dimensions. Presenting evidence contradicting a child's concept (i.e. surprising

evidence) stimulates children to perform unconfounded experiments, but these test the known, and not the unknown (e.g. distance), dimension (van Schijndel et al., 2015). The present study investigates whether limiting children's experimentation facilitates hands-on learning of balance. In a between-participants pre- to post-test design, 135 5 to 7-year-olds were shown surprising evidence on the balance-scale. In a subsequent hands-on experimentation session, the experimenter taped off equidistant hooks on either side of the fulcrum for half of the children (high-scaffolding condition), while for the other half (low-scaffolding condition) the number of possible experiments was held constant but children could use hooks at both equal and unequal distances on either arm. Children in the high-scaffolding condition performed more unconfounded distance experiments than in the low-scaffolding condition (Bayes Factor=8,680,000), indicating that limiting experimentation leads to more informative experiments. Additionally, there was extreme evidence for learning on distance-items (BF=2270) and conflict-items (BF=506105). However, these learning effects did not differ between the conditions (BF_{null}=2.19; 4.07), suggesting that both conditions facilitated learning. Yet, there was very strong evidence for a correlation between the number of distance experiments performed and learning on conflict-items ($\tau = -.19$, BF=35), supporting the efficacy of hands-on learning for proportional reasoning. Current EEG research is examining the mechanisms contributing to the effect of surprise on learning and experimentation.

Do individual differences in children's curiosity relate to their inquiry-based learning?

First Author: Maartje Raijmakers, University of Amsterdam, Netherlands; **Co-Author:** Brenda Jansen, University of Amsterdam, Netherlands; **Co-Author:** Tessa van Schijndel, University of Amsterdam, Netherlands

The present study investigates how individual differences in 7- to 9-year-old children's curiosity are related to the inquiry-learning process (quantity and quality of exploration) and outcomes (knowledge acquisition), in environments differing in structure. The focus on curiosity as individual differences variable was motivated by curiosity being considered an important factor in science education, and uncertainty being at the core of both the definition of curiosity and the inquiry-learning environment.

Methods: Curiosity was assessed with the Underwater Exploration game (Jirout & Klahr, 2012). Inquiry-based learning was assessed with the newly developed Scientific Discovery task, which focuses on the principle of designing informative experiments. Structure of the inquiry-learning environment was manipulated by either explaining this principle or not. As intelligence relates to learning and possibly curiosity, children's intelligence was taken into account.

Results: Main results showed that children's curiosity was positively related to their knowledge acquisition, but not to the quality of their exploration. For low intelligent children, environment structure positively affected the quality of their exploration, but not their knowledge acquisition. There was no interaction between curiosity and environment structure.

Discussion: These results lend support for the existence of two distinct processes in inquiry-based learning: the designing of experiments on the one hand, and the reflection on performed experiments on the other hand (e.g., Dunbar & Klahr, 1989), and establish the link between children's curiosity and the latter process. In addition, the results tentatively suggest the need for educators to adapt the structure of the inquiry-learning environment to individual children.

Language and non-verbal executive functions in preschoolers: The role of self-directed speech

First Author: Franziska Stephan, University Leipzig, Germany; **Co-Author:** Catherine Gunzenhauser, Leipzig University, Germany; **Co-Author:** Henrik Saalbach, University of Leipzig, Germany

Language plays an important role in self-regulation and executive functions (EF). Although there is evidence that language abilities mediate non-verbal EF but not vice versa (Botting et al., 2016), it is not clear what the underlying mechanism of this effect is. We assume that *self-directed speech* mediates the effect of language. Self-directed speech serves as a cognitive tool that helps to organize and to regulate representations and problem solving (Vygotsky, 1987). The present study thus aims at examining the relation between language competencies and EF in children by testing verbal mediation during non-verbal problem-solving tasks using three approaches: articulatory suppression, intervention, as well as qualitative and quantitative analysis of self-directed speech. To this aim, we tested 73 native German-speaking preschoolers ($M_{age} = 5.09$; $SD = 0.36$) on Tower of London task (ToL) tasks, two other EF-tasks, language ability, and non-verbal IQ. In the ToL, we either captured, suppressed, or prompted self-directed speech. We found an advantage for children with better language abilities in all three EF-tasks, confirming previous findings on the relation between language and EF. Results concerning verbal mediation were mixed: on one side, children (with lower non-verbal IQ) profit when prompting speech during the ToL task; on the other side, however, results indicate that verbal suppression does not influence problem-solving performance suggesting that self-directed speech may not be as important as expected for preschoolers' complex problem-solving. Self-directed speech during the ToL task is currently being analyzed and will be presented at the symposium.

Which factors promote the development of advanced theory-of-mind reasoning?

First Author: Christopher Osterhaus, Ludwig-Maximilians-Universität (LMU), Germany; **Co-Author:** Susanne Koerber, University of Education Freiburg, Germany

Advanced theory-of-mind (AToM) comprises numerous abilities, including higher-order false-belief reasoning, social understanding, mental-state recognition, and perspective-taking abilities. A recent study of elementary-school social cognition (Osterhaus, Koerber, & Sodian, 2016, *Child Development*) revealed that AToM involves three distinct factors: social reasoning, reasoning about ambiguity, and recognizing transgressions of social norms. The present study asks whether children's abilities in these three aspects of AToM rest on a conceptual development that goes beyond the one involved in first-order theory of mind (ToM), or whether progress is simply brought about by children's increased general information-processing skills. We assessed ToM (6 tasks), AToM (18 tasks), as well as inhibition and language skills in 229 kindergarten and elementary-school children (aged 5 to 8). Rasch and factor analyses replicated the three-factor model of AToM. First-order ToM was related to all aspects of AToM, but it was a prerequisite only for children's social reasoning and their reasoning about ambiguity. For these two reasoning factors—but not for recognizing transgressions of social norms—evidence for an additional conceptual development (going beyond ToM) was found. Inhibition was significantly associated with ToM and AToM; language skills

correlated only with ToM and social reasoning. Together our findings show that preschool and early elementary-school AToM comprises three distinct abilities that are differently related to ToM and children's information processing. Importantly, our results suggest that there is a conceptual development underlying the emergence of AToM, showing that there is development in children's social cognition after preschool.

Session E 6

Educational partnerships in ECEC in a context of cultural diversity

Keywords: At-risk children, Child participation, Cognitive development, Cross-sectional study, Culture, Gender, Inclusion, Language education, Literacy, Longitudinal study, Minority groups, Play, Preschool quality, Preschool teachers

Chairperson: Martine Broekhuizen, Utrecht University, Netherlands

Discussant: Tove Mogstad Slinde, Ministry of Education and Research Norway, Norway

The importance of strong educational partnerships between parents and ECEC settings to support children's socio-emotional and cognitive development, is widely acknowledged (Halgunseth, et al., 2009). Establishing educational partnerships, however, can be demanding, especially in a context of cultural diversity in which language and cultural differences can pose serious challenges. This symposium aims to highlight some of those challenges, though especially possible opportunities, to create strong educational partnerships in a context of increasingly diverse societies throughout Europe. The first study focuses specifically on mothers with a Turkish and Maghrebian background in multiple European countries, and reports on their experienced trust, communication, involvement and participation in ECEC provisions. The second study concentrates on Roma families in three countries as one of the most disadvantaged communities in the current European society, and will explore these families' educational resources, experiences, and aspirations. The third and fourth presentation focus on opportunities and promising methods to establish or strengthen educational partnerships with diverse families. The third presentation reports on the experimental effects of the Portuguese 'Playgroups for Inclusion' program, targeting 0-4-year-old children and their caregivers (i.e., dyad-focused) that are not participating in regular ECEC services. The final presentation is on a project that aims to alleviate language minority families distress about children's language issues and wants to empower early childhood professionals in their approach toward language minority parents through the use of several internet applications. Together, these presentations aim to give recommendations for supporting strong educational partnerships in ECEC in contexts of high cultural diversity.

Family-preschool partnerships: mothers with a Turkish and Mahgrebian background in Europe

First Author: Martine Broekhuizen, Utrecht University, Netherlands; **Co-Author:** Ryanne Francot, University Utrecht, Netherlands; **Co-Author:** Paul Leseman, Utrecht University, Netherlands

For children with an immigrant background, education plays an important role in their integration and upward social mobility. However, whether education can achieve this goal, depends on their family's participation and involvement. ECEC settings are often the first educational setting in which families can develop positive educational partnerships, which can model future partnerships. Differences in heritage language, diverging beliefs about education, and perceived discrimination, however, can pose significant challenges for positive partnerships characterized by family participation, reliable two-way communication, and extension of learning activities at home. The current study uses data from an ongoing large-scale interview study from the EU-funded ISOTIS project (www.isotis.org) and focuses specifically on educational partnerships in a large sample of mothers of 3-5-year old's with a Turkish (N = 1200) or Maghrebian (N = 900) immigrant background. These two groups have settled in several European countries with different education systems and integration policies. The Turkish group is studied in England, Germany, the Netherlands and Norway, and the Maghrebian group in France, Italy, and the Netherlands. Preliminary analyses show that there are relatively high levels of parent-preschool trust and communication, and parents participate in and are involved with their child's early education. However, there is substantial within-group and between-country variation, and follow-up analyses will explore whether these partnership indicators can be predicted by structural family characteristics (e.g., educational background and majority language skills) and the level of perceived discrimination in preschool. Moreover, we will explore whether these partnership indicators also predict characteristics of the home learning environment.

Roma mothers' resources, experiences, and aspirations in the Czech Republic, Greece, and Portugal

First Author: Konstantinos Petrogiannis, Hellenic Open University, Greece; **Co-Author:** Cecília Aguiar, ISCTE-Instituto Universitário de Lisboa, Portugal; **Co-Author:** Jana Obrovská, Masaryk University, Czech Republic

Several studies the last two-three decades point to numerous problems encountered by Roma throughout their education. Partly, these problems are a direct consequence of poverty and negative and depressing socioeconomic conditions. Other difficulties stem from the inability of uneducated and often illiterate Roma parents to support the academic efforts of their children. Research has also documented the low motivation of Roma students and lack of appreciation for education on behalf of their parents. Because of these complex individual and contextual conditions, many Roma parents and children outright reject the dominant education system, deeming it a hostile learning environment when compared to the security found in their Roma community; therefore, Roma parents may feel they are protecting their children by keeping them in an environment that is isolated from wider society. Based on the same ongoing large-scale interview study within the ISOTIS project (see first presentation) the present paper will explore Roma mothers' educational resources, experiences, and aspirations regarding their 3-5-year old children in Czech Republic, Greece and Portugal (N = 720). Several factors were addressed through individual interviews to capture structural, procedural, educational, socio-demographic, and other critical parameters in a number of Roma families in these three countries, with their own socio-historical particularities and regimes as well commonalities rooted in a European tradition. The paper will attempt to reveal differences and similarities in the above-mentioned dimensions as a first analytical attempt in the context of the ISOTIS project focused on this particular disadvantaged community in Europe.

Playgroups for Inclusion: Impacts development, temperament and behavior of minority children

First Author: Joana Dias Alexandre, University Institute of Lisbon (ISCTE-IUL), Portugal; **Co-Author:** M. Clara Barata, University of Coimbra, Portugal; **Co-Author:** Catarina Leitão, University of Coimbra, Portugal; **Co-Author:** Bruno De Sousa, University of Coimbra, Portugal; **Co-Author:** Vanessa Russo, University Institute of Lisbon (ISCTE - IUL), Portugal

The project 'Playgroups for Inclusion' was an innovative educational policy for Early Childhood Education and Care (ECEC), targeting children aged 0-4 and their families, not participating in the currently available ECEC services in Portugal. This policy aimed to increase access to high-quality ECEC, providing twice-weekly sessions to up to 10 children and caregivers dyads. Research evidence about playgroup benefits provides indication that playgroups have the potential to improve a range of outcomes for children (Deutscher, Fewell, & Gross, 2006; Hackworth et al., 2013). Results of the experimental trial conducted indicated a modest set of positive impacts on child development, particularly on Performance (visuospatial skills). Program effects varied by ethnicity. Playgroup children that belong to ethnicities other than Caucasian or Roma presented higher scores in Hearing and Language skills, than their Control counterparts in terms of ethnicity, particularly in comparison to Caucasian children. Playgroup children that belong to ethnicities other than Caucasian or Roma scored lower in Effortful Control (ability to inhibit behavior and mobilize attention resources to regulate behavior and emotions), when compared to their Control counterparts in terms of ethnicity. Playgroup Caucasian and Roma children saw (albeit small and non-significance) increases to their Effortful Control skills. Results will be discussed in light of low attendance, high dropout and quality monitoring.

Promoting early multilingualism in childhood and childcare in Flanders

Author: Orhan Agirdag, KU Leuven / University of Amsterdam, Belgium

Although language diversity poses short-term challenges, early multilingualism and multi-literacy come with great benefits, at least, when it is correctly supported. Currently, many language minority (LM) families are distressed about language issues and many early childhood (EC) professionals (such as parenting advisors and childcare staff) feel insecure in their approach toward LM families. This project (ProEMC²) aims to address this societal problem. In the first phase of the project, large-scale data (survey with 1000 parents and 500 professionals) and small-scale data (in-depth observations with both) will be collected. This will generate critical insights about the needs of LM families and competencies of EC professionals. In the second phase, this knowledge will be integrated into five valorisation applications that will address the broad field of EC professionals. These are: 1- ProFeed: a virtual platform for knowledge transfer that will feed the other four applications and will be released to the general public. 2- ProDev: a professional development trajectory program, co-created by parenting advisors. 3- ProMOOC: an open online course for educators of EC professionals. 4- ProBib: a hybrid library to promote early multiliteracy, co-created by librarians. 5- ProMemoQ: a quality-assurance and self-assessment tool for childcare institutions. To ensure that the project results have real societal impact, the applications will be implemented during the project

and disseminated by the societal organizations who were co-initiators of this study. The implementation processes will be closely monitored using mixed method approaches, and based on these results, the valorisation applications will be modified and sustainably implemented.

Session F

Friday, 31 August 2018, 09:30 – 11:00 am

Session F1

Single paper session: Multilingualism and sustained shared thinking

Keywords: Child participation, Cognitive development, Culture, Inclusion, Language education, Parental involvement, Play, Social interaction, Teacher-child interaction

Chairperson: Sanne Rathé, KU LEUVEN, Belgium

Interacting with children: sustained shared thinking in make-believe play

Keywords: Cognitive development, Language education, Play, Teacher-child interaction

First Author: Annerieke Boland, Hogeschool iPabo Amsterdam, University of Applied Sciences, Netherlands; **Co- Author:** Marieke Tjallema, Marnix Academie, Netherlands; **Co-Author:** Eefje van der Zalm, Marnix Academie, Netherlands

In this practice-based research we tried to find ways to guide make-believe play of children between 3 and 6, in such a way that a professional stimulates the quality of play, the production of language and sustained shared thinking. The first phase of the project consisted of Design Based research. Together with ECEC-professionals several interaction strategies in play guidance were formulated, tested in practice, evaluated and revised. This led to a prototype of ten key-strategies for the professional, such as supporting the make-believe world by taking a role and using role speech or creating a 'problem' in the scenario of the play. The second phase was a multiple case study. Eight professionals applied the prototype in their group. For each professional, three play sessions with two target-children were filmed, to find out the effect of the key-strategies. The films were transcribed and encoded for the professional's language and guidance and for the children's language and play. Quantitative and qualitative analyses were applied. The ten verbal and nonverbal key-strategies appeared effective for stimulating language and play, if they were combined. Guidelines for establishing intersubjectivity and creating space for children's initiative appeared to be conditional for the success of enriching play. Children's levels of involvement, role-play and cooperative play increased when the professionals guided play and remained higher afterwards. The project resulted in a website with instruction and good practices to support professionalization in play guidance, both for in-service and pre-service teachers.

Linguistic Complexity in Mother-Child Interaction: The Role of Situational Context and Culture

Keywords: Language education, Culture, Social interaction, Parental involvement

First Author: Elena Doering, New York University Abu Dhabi, United Arab Emirates; **Co-Author:** Kevin Schluter, New York University Abu Dhabi, United Arab Emirates; **Co-Author:** Joscha Kaertner, WWU Münster, Germany; **Co- Author:** Antje von Suchodoletz, New York University Abu Dhabi, United Arab Emirates

It is widely accepted that quantity and quality of parental language input influence young children's language development. To date, however, research focused on the amount of parental language input and less is known about the role of specific qualities of parental child-directed speech, such as linguistic complexity (LC), over and above quantity, in promoting children's language development. Research also suggests that parent-child conversational exchanges are influenced by the situational context and culture. This study investigates the quantity and linguistic complexity (i.e., quality) of child and child-directed speech across situations and cultures. Participants were 35 middle-class mother-child dyads from India, USA and Germany who were video-recorded during a free-play, structured-play, and book-reading situation. Mothers' and children's utterances were analyzed for quantity (amount of utterances) and quality (parts of speech, mean length of utterance, mean length of three longest utterances, amount of verbs per utterance, conversational function). Preliminary findings of six dyads (USA: 3, Germany: 3) showed that quantity and quality differed between situations. The quantity also varied between German and US dyads. Culture-specific findings of speech quality were inconsistent. The child's responses to high quantity and quality of the mother's speech were characterized by less complex utterances. To this point, data suggests variations in the quantity and quality of child and child-directed speech during mother-child interactions across contexts and cultures. Understanding context-specificity of children's language development may help creating an optimal learning environment for the child. For the final presentation, the full sample size will be analyzed.

Translation as translanguaging practice in early childhood education

Keywords: Language education, Inclusion, Child participation, Teacher-child interaction

Author: Anne Kultti, University of Gothenburg, Sweden

Education that supports children learning new languages is an actual issue in several cultural contexts. This challenge is met by taking a new approach to the study of the development of linguistic and meta-linguistic awareness in children. In the study, we investigate how children negotiate meaning and explain linguistic features when faced with issues concerning translating from one language to another. More specifically we have analyzed: a) how translation activity can engage children in communication and meta-communication, b) how decisive matters of translation: taking an utterance literally and/or metaphorically, and the word order, are negotiated, and c) how translation is collaboratively constituted by the participants. The study is conducted in an immersion classroom with six to seven-year-old children along with their teachers. The negotiations of a children's song from Finnish to English has been audio-recorded and analyzed according to the principles of Interaction Analysis. The findings show how the teacher scaffolds the children's language learning. They provide contrast, use qualifying markers, and introduce synonyms and antonyms. The children respond to the challenge to translate in two ways. They talk about how something is done instead of the word meaning and by attending to sound. How a translation activity can function as a language-learning practice in early childhood education is discussed.

Session F 2

Symposium: Educators' linguistic behavior – Effects on children's language use and pedagogical implications

Keywords: Cognitive development, Language education, Preschool teachers, Process quality, Professional development, Professional knowledge, Teacher-child interaction

Chairperson: Claudia Wirts, State Institute of Early Childhood Research, Germany

Organiser: Anne-Kristin Cordes, Germany

Discussant: Jenni Salminen, University of Jyväskylä, Finland

Educators' linguistic behavior affects children's linguistic and cognitive development to a great extent. It is crucial that educators tailor their own language to individual and situational demands and seize opportunities for embedding language- fostering strategies naturally in everyday situations. The symposium's first aim is to describe the status quo in German and Swiss preschool settings with respect to the complexity of the language used by educators, their use of language- facilitation strategies and their use of supportive strategies. The second goal is to connect these input variables with child outcomes. Finally, we present findings from effective professional development and discuss implications for future professionalization. In the first study we analyzed audiotapes of free play situations in order to examine how grammatically complex educators' and children's speech is and whether they are related. The second study used videotaped book-reading activities to investigate how frequently educators use various language-facilitation strategies and whether they are connected to children's verbal engagement. In the third study, episodes of sustained shared thinking during videotaped interactive book reading activities were identified and analyzed using linguistic conversation analyses. They were further linked to factors promoting children's involvement in book-reading sequences. The fourth study evaluated how successful educators are at implementing language-fostering strategies in everyday situations after professional training. Event samples taken from video recordings were used to this end. The four studies provide new insights into which domains of educators' linguistic behavior should be targeted in professional development and what should be trained.

Parallels in the use of syntactic structures: Analyzing educators' and children's verbal interactions

First Author: Anne-Kristin Cordes, State Institute of Early Childhood Research (IFP Bayern), Germany; **Co-Author:** Julia Radan, State Institute of Early Childhood Research, Germany

Previous research suggests that the quality of language input children receive in early education settings affects their language development. Most studies focus on long-term, lagged effects of educators' input on children's language progress (Huttenlocher et al. 2002). The present study, however, examines the possibility of an immediate, on-line relation between the complexity of educators' and children's speech. Verbal interactions of 12 preschool teachers and the children in their care (age 3 to 6) were audiotaped and transcribed for ten-minute free play situations. All utterances were coded for syntactic complexity

according to Grieshaber's 7-level profile analysis scale (Grieshaber 2005). The syntactic complexity of educators' input correlated with the complexity of children's productions ($r=0.77$, $p<0.01$). At the same time, children produced considerably more short fragments, whereas educators used markedly more complex subordinate and embedded structures. Our findings suggest a close relation between the complexity of children's and educators' language use in interactions. We discuss the directionality of this association and potential mediating factors, such as situational demands (e.g. board games vs. gym time). Implications of our findings for professionalization are considered in the light of Vygotsky's zone of proximal development and syntactic priming research – in particular, we address the idea that adaptive linguistic input that is slightly more syntactically complex than children's own productions fosters children's acquisition of complex grammar.

Grieshaber, W. (2005). Sprachstandsdiagnose im Zweitspracherwerb: Funktional-pragmatische Fundierung der Profilanalyse.

Huttenlocher, J., M. Vasilyeva, E. Cymerman & S. Levine. (2002). Language input and child syntax. *Cognitive Psychology* 45, 337-374.

Educators' use of language-facilitation strategies—Correlations with children's verbal engagement

First Author: Claudia Wirts, State Institute of Early Childhood Research, Germany; **Co-Author:** Nesiré Schauland, State Institute of Early Childhood Research, Germany; **Co-Author:** Sina Fischer, State Institute of Early Childhood Research, Germany

The main aim of this presentation is to analyze how frequently educators use language-facilitation strategies such as questions, feedback or requests. A second goal is to examine whether different types of questions correlate with differences in children's verbal engagement. Based on the results of previous research (e.g. de Rivera et al., 2005) we assume that certain types of questions (i.e. open-ended questions) elicit more and longer responses of children than others. First we observed 96 educators from 45 preschools in Germany during book-reading sessions. We performed a video-based analysis of how frequently they used different language-facilitation strategies (different types of questions, feedback and language-stimulating requests). On average educators used two corrective ($SD=2.7$) and 23 non-corrective ($SD=16.37$) feedback strategies, six requests ($SD=7.06$) and 60 questions ($SD=36.85$) per book-reading activity ($M=18.87$ min). With a proportion of 41.66 %, yes-no questions were the most commonly used type of questions (out of $N=5788$ questions). Other closed questions accounted for 25% of all questions, as did open-ended questions. Within the framework of two evaluation projects (BiSS-E1 and BiSS-E2, funded by the German Federal Ministry for Family Affairs) dealing with language support in preschool settings, additional video data will be analyzed to examine correlations of teachers' use of different questions and children's verbal engagement. These analyses are still in progress. De Rivera, C., Girolametto, L., Greenberg, J. & Weitzman, E. (2005). Children's Responses to Educators' Questions in Day Care Play Groups. *American Journal of Speech-Language Pathology*, 14 (1), 14–26.

Sustained shared thinking and interactive picture book reading

First Author: Johanna Quiring, University of Teacher Education St. Gallen (PHSG), Switzerland; **Co- Author:** Alexandra Waibel, University of Education, St. Gallen, Switzerland, Switzerland; **Co-Author:** Laura von Albedyll, Pädagogische Hochschule Weingarten, Germany

The quality of educator-child interaction, particularly interactive picture book reading (Whitehurst et al., 1988) and sustained shared thinking (Siraj-Blatchford et al., 2002), has proven to be relevant for fostering children's language acquisition. This research examines the micro processes of how kindergarten teachers devise polyadic sustained shared thinking interactions during interactive picture book reading and how they ensure the participation of all children according to their capabilities. The studies, which are part of a larger mixed-method research project, adopt an explorative and qualitative approach. Teachers were videotaped throughout two mornings including a picture book reading session with a small group of children. Sustained shared thinking sequences are analyzed based on linguistic conversation analysis (Brinker & Sager, 2013) while interaction processes that lead to participation are examined using a micro ethnographic approach (Garcez, 2017). First results are presented using a video sequence. Pedagogical implications as how to use the potential of polyadic dialogues in heterogeneous groups for fostering language are discussed.

Brinker, K. & Sager, S. F. (2010). *Linguistische Gesprächsanalyse*. Berlin: Schmidt.

Garcez, P. M. (2017). Microethnography in the Classroom. In K. King, Y. Lai, & S. May (Eds.), *Research Methods in Language and Education*. Encyclopedia of Language and Education (Vol. 3, pp. 435-447). Cham: Springer.

Siraj-Blatchford, I. et al. (2002). *Researching effective pedagogy in the early years*. (Research Report 356). Nottingham: Department for Education and Skill. Whitehurst, G. et al. (1988). Accelerating Language Development Through Picture Book Reading. *Developmental Psychology*, 24(4), 552-559.

Language fostering in everyday interactions: Professionalization of educators in childcare settings

First Author: Franziska Vogt, University of Teacher Education St. Gallen, Switzerland; **Co-Author:** Cordula Löffler, PH Weingarten, Germany; **Co-Author:** Andrea Haid, University of Speech Therapy Rorschach, Switzerland

Language fostering integrated in everyday interactions requires a high professional competence of early childhood educators: Educators need to seize moments of shared attention with the child and venture on a dialogue of sustained shared thinking (Siraj-Blatchford & Sylva, 2004). Such dialogues provide the context for activating questions, language modeling and extending vocabulary. In this research project, strategies of language fostering in everyday practice were taught in a binational staff development. 45 educators working with 3 to 6 year old children in playgroups, day-care and kindergarten took part. Educators were videotaped during half a day before and after the intervention. In order to assess language fostering competence, three different sequences of 15 minutes with high educator-child interaction in different settings (free play, interactive picture book reading, snack time) were analyzed. The strategies used were coded using event sampling (Ostrov & Hart, 2013). Intercoder reliability was satisfying (> 70%). The results indicate the effectiveness of the intervention in the use of the strategies, so for example a significant rise in longer dialogues (Mt1 = 23.20; Mt2 = 27.22). All settings provide good opportunities for sustained-shared-

thinking. Implications for teacher education for language fostering in everyday interactions are presented and paths for further research discussed.

Ostrov, J. M. & Hart, E. J. (2013). Observational methods. In T. D. Little (Ed.), *The Oxford handbook of quantitative methods*. (pp. 285-303). Oxford: Oxford University Press.

Siraj-Blatchford, I. & Sylva, K. (2004). Researching pedagogy in English pre-schools. *British Educational Research Journal* 30 (5), 713-730.

Session F 3

Symposium: Interventions of learning skills in kindergarten and primary grades

Keywords: At-risk children, Cognitive development, Experimental design, ICT, Interventions, Literacy, Mathematics education, Self-regulation, Wellbeing

Chairperson: Piret Soodla, University of Tallinn, Estonia

Discussant: Tuire Koponen, University of Jyväskylä, Finland

In recent decades, learning to learn competence has been seen as a key competence necessary for individuals throughout their life course (Education Council, 2006). To be effective in learning, several subject-specific (e.g., in reading and mathematics) and more general learning strategies (e.g., memorization strategies) need to be acquired. The present symposium focuses on interventions aiming to support learning skills of kindergarten and primary school children from two neighbouring countries, Estonia and Finland. The aim of the symposium is to show how children's learning skills could be enhanced at a relatively young age and address future challenges in this field. The first paper reports findings from a Finnish intervention study aiming to accelerate mathematics word-problem skills of third grade children at risk for mathematics difficulties. The second paper presents data from an intervention study with second graders in Estonia where reciprocal teaching of reading strategies was combined with explicit instruction of self-regulated learning. The third study comes from Finland, comparing training effects of two different working memory interventions (working memory training with and without strategy support) on kindergarten children's working memory skills. Finally, the fourth paper focuses on an intervention study carried out in Estonia with an aim to teach memorization strategies in second and fourth grades.

References Education Council. (2006). *Recommendation of the European Parliament and the Council of 18 December 2006 on key competencies for lifelong learning*. Brussels: Official Journal of the European Union, 30.12.2006. <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:394:0010:0018:EN:PDF>

Accelerating mathematics word-problem solving performance among primary schoolers

First Author: Piia Björn, University of Eastern Finland, Finland; **Co-Author:** Aino Äikäs, University of Eastern Finland, Finland; **Co-Author:** Airi Hakkarainen, University of Eastern Finland, Finland; **Co-Author:** Minna Kyttälä, University of Turku, Finland; **Co-Author:** Lynn S. Fuchs, Vanderbilt University, United States

This study examined the results of an intervention study aiming to accelerate mathematics word-problem (WP) skills (N=136 Finnish third-graders). We identified 14 students (10.3%) at risk for MD (mathematics difficulties). These students were further randomly assigned to receive individual instruction within classrooms (n = 6) or small-group instruction outside classrooms (n = 8). Active control group (n = 103) without risk for MD received only strategy instruction on solving math WPs within classrooms. Another (passive control) group performing above average level (n = 19) was included. Intensity of the intervention for the MD risk groups was 3 times per week for 4 weeks; each session 45 min. Math skills of all students in all groups were accelerated to some extent. Students in the small-group condition outperformed those in the intensive individual instruction condition in terms of number of attempted tasks and arithmetic skills, whereas students in intensive individual instruction conditions outperformed those in small-group conditions on math WP skills. Implications for practice are discussed.

Combination of reciprocal teaching with instruction in self-regulated learning in primary grades

First Author: Piret Soodla, University of Tallinn, Estonia; **Co-Author:** Kristi Simso, Tallinn University, Estonia; **Co-Author:** Kaja Mädamürk, Tallinn University, Estonia

Reciprocal teaching of reading strategies was combined with explicit instruction in self-regulated learning to promote reading comprehension of second-grade students in Estonia. We expected that in transparent orthographies, students as early as in second grade (8–9 year-olds) benefit from explicit teaching of reading strategies integrated with the approach of self-regulated learning in terms of metacognitive knowledge of reading strategies, reading comprehension, and reading motivation. The sample consisted of second-grade students drawn from three primary schools in Estonia. The experimental and control groups involved students from six classes (N = 120) and four classes (N = 81), respectively. In a pretest–posttest–maintenance design, measures of reading comprehension and reading fluency, metacognitive knowledge of reading strategies, and reading motivation (self-efficacy and interest) were used. Four reading strategies (predicting, questioning, clarifying, and summarizing) were introduced and practiced in the experimental classes. The instruction was delivered by classroom teachers in 18 lessons (each lesson lasting 45 min) during a nine-week period, consisting of an introduction phase (three lessons), a practice phase (14 lessons), and a last lesson for overall feedback and reflection. Effects of the intervention on experimental group students' metacognitive knowledge of reading strategies and reading comprehension were positive whereas no effect on reading fluency or reading motivation were found. These findings are relevant for improvement of research of reading intervention in languages with transparent orthographies.

Training six-year-old children's working memory—the effects of computerized working memory game

First Author: Minna Kyttälä, University of Turku, Finland; **Co-Author:** Kaisa Kanerva, University of Helsinki, Finland

Working memory (WM) skills are related to (early) academic skills before school start, and WM resources measured before school start predict future academic performance. Previous studies have shown that training improves WM performance (Harrison, et al., 2014) and that the training effects are based on strategy enhancement (St. Clair-Thompson, et al., 2010). In this study we compared the effects of two different training conditions: 1) WM training without strategy support (N=17), and 2) WM training with adult-guided strategy support (N=17) on WM skills of kindergarten children. The five-week training was adaptive. WM skills before and after the intervention were measured with six AWMA (Alloway, 2007) subtasks. The ANOVAs showed that the group with adult-guided support gained significantly more in visuo-spatial WM (VSWM) during the intervention period than the other group. In verbal WM (VWM), such gain difference was not observed. Those children with more poor VSWM skills at the beginning gained significantly more in VSWM during the intervention period than the children with better baseline VSWM skills. In VWM, such gain difference between the skill groups was not observed. References Alloway, T. P. (2007). AWMA. Automated Working Memory Assessment. Pearson Education. London. Harrison, T. L., Shipstead, Z., Hicks, K. L., Hambrick, D. Z., Redick, T. S. & Engle, R. W. (2014). Working memory training may increase working memory capacity but not fluid intelligence. *Psychological Science*, 24, 2409–2419. St Clair- Thompson, H., Stevens, R., Hunt, A., & Bolder, E. (2010). Improving children's working memory and classroom performance. *Educational Psychology*, 30, 203-219.

Teaching to apply memorization strategies: When to start?

First Author: Eve Kikas, Tallinn University, Estonia; **Co-Author:** Teri Talpsep, Tallinn University, Estonia; **Co-Author:** Hardi Sigus, Tallinn University, Estonia; **Co-Author:** Liis Hennok, Tallinn University, Estonia

Using memorization strategies can make learning easier across subjects and is related to both children's achievement and well-being. Important strategies among others are passive rehearsal and elaboration (visualization, making connections to personal experience or prior knowledge, categorization). Although developmental studies have suggested that primary school students are capable of learning elaboration, studies have also shown that students rarely start to use elaboration independently, without explicit support and regularly use rehearsal until the end of middle school. Our intervention aimed to support an independent use of elaboration strategies among primary grade students. Four second and four fourth grade classes and their 8 homeroom teachers participated in the study. Students' strategy use was assessed before and after the intervention with computer-based and paper-and-pencil tests, and their task persistence in intervention lessons was evaluated by teachers. Intervention lessons included topics on memory and learning, memorization strategies, analyzing students' memorization strengths and weaknesses. Topics were incorporated into regular lessons and strategies were applied to math, science, and language lessons. The results showed that students reported using more elaboration strategies after the intervention. The findings were more visible for fourth than for second grade and depended on students' learning behavior. Practical implications on how and when to teach memorization strategies in school are discussed.

Session F 4

Symposium: Virtual Learning Environments and digital tools for ECEC

Keywords: Culture, Home learning environment, ICT, Inclusion, Language education

Chairperson: Rianne Francot, University Utrecht, Netherlands

Discussant: Paul Leseman, Utrecht University, Netherlands

One of the key challenges in Western societies for both professionals and policymakers is the growing cultural and linguistic diversity within families and ECEC (European Union, 2017). This challenge requires adaptations of our current educational system and support services. Given its expanding possibilities, ICT applications might support ECEC with this challenge and stimulate (professional) learning. The current symposium will discuss some of the many possibilities of Virtual Learning Environments (VLE's) and digital tools for ECEC practices and for families with young children within intercultural and multilingual societies. Three papers from different countries are discussed. The first paper explores the possibilities of a computer-based learning environment that offers bilingual support to language minority students. Outcomes of multilevel analyses indicate that the bilingual support stimulates the learning process of students. Implications for ECEC will be discussed. The second paper examines the development of inclusive digital tools based on the Universal Design for Learning framework and its use by preschool and primary school teachers. Finally, the third paper presents an action-research project on the educational partnership between parents and preschool in a culturally and linguistically diverse community. A digital tool is used to establish and stimulate this partnership. The different steps of the project and the results of a small scale research will be discussed. The findings and similarities of the studies, and their implications for the field of ECEC, will be discussed by Dr. Paul Leseman, an acknowledged expert in the field of multilingualism, diversity, and inclusion in ECEC.

Multilingual education in 'superdiverse' settings? Exploring a computer-based learning environment

First Author: Orhan Agirdag, KU Leuven / University of Amsterdam, Belgium; **Co-Author:** Evelien Van Laere, Universiteit Antwerpen, Belgium

Language minority (LMi) students are usually brought up in another language than the language of instruction used at school. This has been identified as one of the main factors for the achievement gap between those students and language majority (LMA) students. Computer-based learning environments (CBLEs) can be a promising means to support these students in their acquisition of challenging knowledge and skills through integrating authentic support in their home language. This study aimed to identify student- and classroom characteristics related to fourth-grade students' use of bilingual support in the CBLE E-Validiv (n=250). This CBLE is aimed at supporting students' knowledge acquisition in the domain of science education through offering content in the language of instruction and one of six other languages. For LMi students, the other language is set to their home language if it is available in E-Validiv. Throughout the CBLE, students can switch between the two languages via a language switch button. Multilevel hierarchical

regression analyses show that especially LMi students who assess themselves as highly proficient in their home language spend more time in the other language and use the language switch button more often to go the other language than LMa students. However, even LMi students tend to focus mainly on the content offered in the language of instruction. This may indicate that they especially apply the content in their home language to support their learning process in the language of instruction. The theoretical and practical implications for ECEC are discussed.

Sustainable development of inclusive learning content: a study on annotated PDF's

Author: Andrea Mangiatordi, University of Milano Bicocca, Italy

The Universal Design for Learning (UDL) framework, introduced by Rose & Meyer (2002) suggests that, in order to support the variability of learners of any level, educators should provide them with multiple ways of representation, action and expression, and engagement. UDL provides a set of 9 guidelines and 31 checkpoints to support the design of learning content, giving educators a blueprint for building learning resources that are accessible to the widest possible public. In order to provide teachers with a sustainable and efficient way to design learning materials for use in formal contexts, it is necessary to select reliable technology that allows assembling, delivering and making use of multimedia content on different platforms. In this study the focus was on PDF files: they are widely used, and they are designed to work offline, yet their potential is generally not fully considered. A survey administered to N=30 Italian Pre-Primary and Primary school teachers who participated in a professional development course about inclusive technology showed that through annotated PDF files it is possible to comply with many different UDL checkpoints, while using a technology that a) does not require much extra time for lesson planning; b) was generally perceived as not too far from the competence level of participants; c) generated high levels of satisfaction and willingness to use the same technology again. Implications for the use of inclusive digital tools in ECEC are discussed, mainly concentrating on the use of visual and auditory channels to grant independence in accessing digital documents.

U-VLO project: Intercultural and Multilingual Practices in pre-schools

Author: Rianne Francot, University Utrecht, Netherlands

The U-VLO project, which stands for '*Virtual Learning Environments in Utrecht*' is an action-research project focusing on the educational partnership between parents and preschools in a culturally and linguistically diverse community. The goal of the project is to (a) enrich the ECEC practices with a cultural and multilingual focus and (b) enhance the engagement of parents with the preschool by incorporating the parents as an important resource. A digital tool (*Padlet*) is used to establish and maintain this intercultural and multilingual partnership. This free app creates a digital platform for both parents and the professional. Here the parents give input for classroom practices, for example pictures or oral stories that expose the cultural and linguistic richness of the families. On the other hand, the professional can upload educational activities that have been done at the preschool and that can also strengthen the home learning environment. The current presentation will discuss the different steps of this design-based research project: The

close collaboration with the parents and preschool, the intercultural and technical challenges that occurred during the implementation, and the small-scale action-research (n=18) that examined the influence of the project and digital tool on the educational partnership, the home learning environment of families, and the intercultural and multilingual focus within the preschool. These results, combined with the results of several focus groups, observations and evaluations among stakeholders will provide some clear implications for further use of digital tools within ECEC in these intercultural and multilingual settings.

Session F 5

Symposium: Social Robots for Language Learning

Keywords: Experimental design, ICT, Language education, Technology

Chairperson: Rianne van den Berghe, Utrecht University, Netherlands

Organizer: Rianne van den Berghe, Utrecht University, Netherlands

Discussant: Paul Leseman, Utrecht University, Netherlands

Technological developments have made it possible for social robots to enter the field of education. Robots have been employed as tutors for mathematics, science, and language. The aim of this symposium is to deepen our understanding of the potential of robots' for educational purposes, and for second language teaching in early education in particular. Robots have great potential for teaching language. Compared to other technologies such as tablets, robots have the advantage of being a physical entity, allowing them to have more natural interactions with people, for example, through gestures. However, our understanding of the best way to incorporate robots in early (language) education is still very limited. The aim of the L2TOR project is to investigate whether social robots can support young children to learn a second language. In this symposium, researchers from this project will provide an overview of several studies conducted within the project, which together provide a comprehensive view of the possibilities of social robots for second language learning in early education. The four papers in this symposium explore the effects of multiple aspects of the robot's behavior during language lessons on actual learning. The papers focus on gestures, feedback, the robot's ability to speak the child's first language, and how a robot as a peer learner may stimulate children's learning. The symposium will conclude with a discussion, integrating these findings and focusing on the current possibilities and limitations of using social robots for language learning.

Personalized and multimodal interactions for second language tutoring using a social robot

First Author: Paul Vogt, Tilburg University, Faculty of Humanities, Netherlands; **Co-Author:** Bram Willemssen, Tilburg University, Netherlands; **Co-Author:** Jan de Wit, Tilburg University, Netherlands; **Co-Author:** Mirjam de Haas, Tilburg University, Netherlands; **Co-Author:** Emiel Krahmer, Tilburg University, Netherlands

Iconic gestures, personalization, and feedback are recognized as key ingredients for effective second language learning for children. When designing a social, humanoid robot as a second language tutor, it is

theoretically desirable to include them. However, the question is to what extent these ingredients are transferable to robot tutoring. Two studies are presented, exploring 1) the effectiveness of gesture use and personalized content presentation, and 2) the effect of different forms of feedback on learning English vocabulary as a second language for Dutch preschool children. In both studies, a NAO robot interacts with children (study 1: 5-6 years old; study 2: 3 years old), teaching them English target words in a single short session. In study 1 (a 2 x 2 between-subjects experiment) the 6 target words are animal names, presented either with or without an iconic gesture depicting the animal, and in an adaptive or random order based on children's effectiveness in playing the game. In study 2, the children learned to count words 1 to 5, and either received feedback in an adult-like manner, a peer-like manner, or not at all. Results indicate that the use of gestures is effective in retention of learned target words. Adaptive, personalized tutoring has a small effect on the engagement of children, but not on learning. Varying feedback did not reveal any effects on learning or engagement. In conclusion, these studies indicate the potential of language tutoring using robots to young children, but that effective interactions need to be designed with great care.

How do robot gestures help second language learning?

First Author: Junko Kanero, Koç University, Turkey; **Co-Author:** Özlem Ece Demir-Lira, Koç University, Turkey; **Co- Author:** Sümeyye Koşkulu, Koç University, Turkey; **Co-Author:** Cansu Oranç, Koç University, Turkey; **Co-Author:** Idil Franko, Koç University, Turkey; **Co-Author:** Aylin C. Küntay, Koç University, Turkey; **Co-Author:** Tilbe Göksun, Koç University, Turkey

A unique strength of robots as a language education tool is their ability to perform gestures because the mere presence of gestures can increase children's attention to learning materials (Valenzano et al., 2003). Importantly, however, gestures do not always facilitate learning (Hostetter, 2011), and it is critical to understand *under what conditions* robot gestures are beneficial for young learners. Our first study examines *types of gestures* performed by a robot. Turkish-speaking preschoolers learn six pairs of English words with a robot and a tablet. The words are presented either with an *iconic gesture* representing the word meaning (e.g., extending arms for "big"), with *adeictic gesture* clarifying the reference (e.g., pointing to a picture of a big ball on the tablet screen for "big"), or without a gesture. Our second study focuses on the *match between words and gestures* - how well gestures represent or correspond to words. We first conducted studies with adults to identify seven word-gesture pairs that vary in the degree of match. The robot teaches preschoolers the words with the gestures, and a regression analysis will be conducted to see whether the degree of match between words and gestures predicts children's performance. Both studies will advance our understanding of effective ways to utilize robot language tutors. References: Valenzano, L., Alibali, M. W., & Klatzky, R. (2003). Teachers' gestures facilitate students' learning: A lesson in symmetry. *Contemporary Educational Psychology*, 28, 187–204. Hostetter, A. B. (2011). When do gestures communicate? A meta-analysis. *Psychological Bulletin*, 137, 297–315.

Bilingual robots teaching L2 vocabulary to immigrant children

First Author: Hanneke Leeuwestein, Utrecht University, Netherlands; **Co-Author:** Marie Barking, Tilburg University, Netherlands; **Co-Author:** Hande Sodaci, Tilburg University, Netherlands; **Co-Author:** Rian Aarts, Tilburg University, Netherlands; **Co-Author:** Jan de Wit, Tilburg University, Netherlands; **Co-Author:** Ora Oudgenoeg-Paz, Utrecht University, Netherlands; **Co-Author:** Josje Verhagen, Utrecht University, Netherlands; **Co-Author:** Paul Vogt, Tilburg University, Faculty of Humanities, Netherlands

Many children grow up with a first language (L1) that is not the language of the educational system, and therefore have to learn a second language (L2) when starting formal education. These children often lag behind their monolingual peers in academic performance. Previous research suggests incorporating children's native language into L2 interventions could benefit L2 learning. However, no consensus has yet been reached on the question as to how children's L1 could support L2 acquisition. This study investigates whether providing L1 translations in an L2 vocabulary training could facilitate L2 word learning. Participants were 67 Turkish-Dutch preschoolers in the Netherlands. A NAO robot was used that spoke either only Dutch or both Turkish and Dutch. These robots were presented to children as a monolingual or bilingual robot, respectively. Children were taught six Dutch (L2) words for which they knew the Turkish (L1) but not the Dutch label. Using a within-subjects design, half of the target words were taught by the bilingual robot, alongside their Turkish translations; the other half were taught by the monolingual robot, using Dutch only. The results showed no significant differences in target word retention between the 'monolingual robot' and 'bilingual robot' condition, although children indicated they preferred the bilingual robot. In the presentation possible moderators will be discussed, including children's vocabulary knowledge in Dutch and Turkish, and which robot the children preferred working with. Suggestions for future research will be proposed to further investigate how children's L1 could effectively be used in L2 tutoring.

The effect of a robot peer on second language vocabulary learning gains

First Author: Rianne van den Berghe, Utrecht University, Netherlands; **Co-Author:** Sanne van der Ven, Utrecht University, Netherlands; **Co-Author:** Josje Verhagen, Utrecht University, Netherlands; **Co-Author:** Ora Oudgenoeg-Paz, Utrecht University, Netherlands; **Co-Author:** Fotios Papadopoulos, Plymouth University, United Kingdom; **Co-Author:** Paul Leseman, Utrecht University, Netherlands

Previous research has shown that the presence of a human peer during a learning task can positively affect learning outcomes. We aimed to find out whether robot peers may have similar benefits for learning. Specifically, we investigated how second language (L2) vocabulary learning gains differ depending on whether children are learning by themselves, with a child peer, or with a robot peer. Sixty-seven Dutch four- to six-year-old children were administered an L2 vocabulary training in one of these three conditions. During this training, children were taught six English words, and asked to manipulate 3D images of objects on a tablet. Children's word knowledge was measured in an immediate post-test directly after the training and in a delayed post-test one week later via four vocabulary tasks, measuring both receptive and productive vocabulary. Contrary to our expectations, children learning by themselves outperformed children in the peer conditions on one out of the four vocabulary tasks during the delayed post-test. On the other tasks, there were no differences between the three conditions. A possible explanation for the lack of differences between conditions is that the vocabulary training did not allow for enough interaction between

the learner and the peer. Such interaction might be necessary for the learner to actually benefit from the peer. Future studies should employ more interactive learning tasks in which robots can take a more active role in supporting children's learning, and to conduct qualitative analyses comparing interactional patterns between child-child and child-robot dyads.

Session F 6

Symposium: Emotion knowledge, Emotion Regulation, and Development in Young Children

Keywords: Cognitive development, Emotion, Instructional practices, Language education, Longitudinal study, Self-regulation, Social-emotional competencies

Chairperson: Antje von Suchodoletz, New York University Abu Dhabi, United Arab Emirates

Discussant: Manfred Holodyski, University of Münster, Germany

Knowledge about emotions and the expression and regulation of emotions are integral aspects of emotional competence (Eisenberg, Cumberland, & Spinrad, 1998). Learning to regulate emotional responses according to situational and social demands is an important developmental task in early and middle childhood that has received much attention in recent research (Adrian, Zeman, & Veits, 2011). Dynamic systems theories (Bronfenbrenner & Morris, 2006; Lerner, 2006; Thelen & Smith, 2006) argue that the development of early competencies, such as emotional competence, is best understood if considered in the context of other skills, assuming overlapping developmental processes. The first two papers aim to disentangle associations between emotion skills and other domains of functioning, i.e., self-regulation (von Salisch, Wübker, & Voltmer) and language (Gunzenhauser, Streubel, Grosse, & Saalbach). Because dynamic processes may be positive or negative in their consequences for development, understanding the interrelations between domains or competencies may offer a potential for interventions to support young children's development of emotion skills. The third and the fourth paper report two innovative intervention approaches aimed at improving emotion skills in young children, the *Papilio* program (Koivula & Laasko) and the *Thinking Emotions* program (Lucas-Molina, Sarmiento-Enriquez, Quintanilla, & Giménez-Dasí). The findings of the studies, and their implications for theory, policy and practice, will be discussed by Dr. Manfred Holodyski, an acknowledged expert in the field of emotion and emotion development throughout the lifespan.

Young Children's Emotion Knowledge and Self-Regulation

First Author: Maria von Salisch, Institute for Psychology, Germany; **Co-Author:** Marieke Wubker, Leuphana University Lüneburg, Germany; **Co-Author:** Katharina Voltmer, Leuphana University Lüneburg, Germany

Between 3 and 6 years of age, children's emotion knowledge and their self-regulation develop in rapid strides. Both are intertwined, because emotion knowledge includes a growing understanding of emotional expressions, situational elicitors and emotional appraisals (tom) that call for self-regulation. On the other hand, better-regulated children are able to profit more from opportunities for learning about emotions. The aim is to disentangle relations between emotion knowledge and self-regulation while controlling for

language skills, because both emotion knowledge and self-regulation are furthered by caregivers' emotion talk. $N = 190$ children (mean 49.3 months, range 35-67 months) were tested individually on their emotion knowledge (with the TEC and the new ATEM), on their language skills (with the SETK- understanding sentences), and on their self-regulation with the Head Toes Knees Shoulder Task (HTKS) at T1 and T2. Hierarchical regression analyses suggest that children's emotion knowledge explained their self-regulation even after age and verbal skills were taken into account. Children's TEC scores in the final step ($\beta = .13$, $T = 1.89$, $p = .60$) were significant as a trend ($R^2 = .276$). Their ATEM scores in the final step ($\beta = .168$, $T = 2.04$, $p = .043$) were also significant ($R^2 = .271$). However, the other direction of effects was also significant with the HTKS in the final step ($\beta = .156$, $T = 2.04$, $p = .043$) explaining the ATEM ($R^2 = .323$). Data from T2 will be used to disentangle the direction of effects.

Functions of language in children's development of emotion regulation

First Author: Catherine Gunzenhauser, Leipzig University, Germany; **Co-Author:** Berit Streubel, Leipzig University, Germany; **Co-Author:** Gerlind Grosse, Early Childhood Education Research, Germany; **Co-Author:** Henrik Saalbach, University of Leipzig, Germany

Development of emotion skills is related to developmental gains in other cognitive domains (e.g., Calkins, 2007). Specifically, there are substantial associations between individual differences in children's language competence and emotion regulation skills, both concurrently and over time (Roben, Cole, & Armstrong, 2013). It has been suggested that language competences help children to adequately represent emotional concepts and related causes and reactions, to communicate with others and thus support coping efficiency, to regulate emotion-related action tendencies and to support cognitive emotion regulation. However, empirical investigations of the processes involved are scarce. This contribution will provide an overview of an ongoing research program aimed at investigating functions of language in children's development of emotion regulation. Moreover, findings of one specific empirical study will be focused in detail. This study investigated the association between language competence and children's generation of emotion regulation strategies. Participants were $N = 120$ children (native German speakers) from four age cohorts (approx. 5 years, 7 years, 9 years and 11 years). Children's general vocabulary, domain-specific emotion vocabulary, and generation of emotion regulation strategies with regard to specific emotions were assessed. Preliminary findings show that children with better language competences tend to generate more adaptive cognitive emotion regulation strategies. These findings add to the evidence that children with well-developed language competence might show better emotion regulation skills because they are better able to represent emotional concepts including a repertoire of adequate situation-specific reactions. Distinct contributions of general and domain-specific vocabulary as well as age differences will be discussed.

Behavior vs. knowledge: Keys to improve socio-emotional skills through longitudinal interventions

First Author: Beatriz Lucas Molina, Faculty of Psychology. University of Valencia, Spain; **Co-Author:** Renata Sarmiento-Enriquez, University of Valencia, Spain; **Co-Author:** Laura Quintanilla, University of Valencia, Spain; **Co-Author:** Marta Giménez-Dasí, University of Valencia, Spain

The aim of this work is to present the results of a longitudinal intervention to improve emotion knowledge, emotion regulation, theory of mind and social competence in a group of 3-year-old children during 3 consecutive years. The participants were 91 children ($M = 41.76$, range 36-47, 44 children and 47 girls) divided into experimental ($N = 50$) and control group ($N = 41$). Children were evaluated at 6 different time points throughout the 3 years. The children of the experimental group followed the educational intervention program *Thinking Emotions* (Giménez-Dasí, Fernández-Sánchez and Daniel, 2013) during school hours in weekly sessions of one hour. The children in the control group did not follow any type of intervention. The results showed that the children of the experimental group improved significantly in emotional regulation and social competence compared to the control group. They also reached higher scores in emotional knowledge and theory of mind but differences were not significant. The possible reasons and implications of these results will be discussed.

Papilio program and “Paula and the Pixies in the Box” in supporting children’s emotion regulation

First Author: Marja-Leena Laakso, University of Jyväskylä, Finland; **Co-Author:** Merja Koivula, University of Jyväskylä, Finland

This study discusses supporting young children's emotion regulation skills through “Paula and the Pixies in the Box”- measure of Papilio program. Papilio program, originally developed for ECE in Germany, is a developmentally focused, research-based intervention program focusing on primary prevention of behavioral problems and on supporting the social- emotional competence of preschool children (Scheithauer et al., 2008). The ability to recognize one's own and others' emotions, regulate emotionally-grounded behaviors, and to understand the ways of social interaction are challenging skills, in the learning of which the child needs adult's support. The aim of this qualitative study is to explore how the Paula and the Pixies in the Box measure functions in the Finnish ECE to support children’s emotion regulation skills from the perspectives of the children and the kindergarten teachers. The data were collected by video observations of Paula and the Pixies in the Box sessions, and kindergarten teacher interviews. The data were analyzed using content analysis. The results suggest the children related positively on the Paula story. They became emotionally attuned to the Pixie-characters representing the basic emotions of sadness, anger, fear, and joy, and came up with their own strategies on coping with different emotions. In addition, the Pixie-characters served as an important aid in children’s emotion regulation by helping them to name and talk about emotions. The kindergarten teachers reported children’s emotion regulation skills were improved and talking about emotions was increased. In this presentation, these findings and their pedagogical implications will be discussed in detail.

Keynote Session

Friday, 31 August 2018, 11:30 am – 12:30 pm

Early social-emotional and motivational mechanisms in young children's educational pathways

Keywords: At-risk children, Cognitive development, Curriculum, Low SES

Chairperson: Yvonne Anders, Freie Universität Berlin, Germany

Keynote speaker: Lieselotte Ahnert, University of Vienna, Austria

Over the last decade, research revealed that young children's educational pathways are based on three foundations, i.e. the inborn mental architecture, the human ability to learn and social processes to transmit knowledge. In particular, social processes help to facilitate children's learning abilities and to involve them in acquiring cultural knowledge. But it is important to realize that adult-child attachments are especially useful for children's early education because they create favorable conditions for learning. The present talk thus argues that children's learning can optimally unfold if it is embedded in social processes which assure emotional security. That is, experiences of secure adult-child attachments promote children's exploration of the environment, guarantee pleasure in learning and support children's willingness to perform. This attachment-education association has hardly been considered, neither in traditional research on early education nor on attachment, even though it has been known for a long time that education is best transmitted through positive social relationships. In this talk, we review studies showing why children in secure care provider-child and teacher-child relationships tend to develop a greater motivation to learn and thus become better learners. Moreover, children's attachment experiences in kindergarten give rise to expectations about the teacher-child relationship and its impact on education. Thus, children's pre-school experiences with care providers in regard to the attachment-education association are proven to have a sustained impact on success in school. Finally, we present gender-based differences in children's learning strategies and discuss why gender sensitive learning environments are warranted.

Session G

Friday, 31 August 2018, 01:30 pm – 03:00 pm

Session G 1

Symposium: Variations in child care quality for children under three years

Keywords: Evaluation study, Process quality, Professional development, Social interaction, Structural quality, Teacher- child interaction

Chairperson: Andrea G. Eckhardt, Hochschule Zittau/Görlitz - University of Applied Sciences, Germany

Discussant: Pauline Slot, Utrecht University, Netherlands

Over the last years, enrollment rates for children under the age of three have increased in most OECD-countries. Provision of early childhood education and care (ECEC) for very young children varies considerably between countries ranging from unregulated care organized by child's parents over family day care until regular center-based ECEC. By now, more and more attention has been paid to quality of care (OECD 2017), but little is known about the quality of interactions and pedagogical activities very young children

experience in different settings. This symposium investigates process quality in ECEC for children under three years in different care arrangements in four European countries. All presentations are based on the NICHD conceptional framework of CHILD CARE STRUCTURE à PROCESS à OUTCOME and further developments by Anders, Roßbach, and Kuger (2016).

The first set of presentations investigates caregiver-child interactions in different situations over the course of the day in center-based care in Germany (Quehenberger et al.) and the effect of structural characteristics and group composition on quality in Switzerland (Perren, Reyhing & Diebold). The presentation by Eckhardt and Egert analyzes the influence of personal traits and educational beliefs on process quality in family day care and center-based care in Germany for children under three years. Finally, Bleses, Slot, and Leseman compare profiles of child care quality in Denmark and the Netherlands. Findings are discussed with respect to commonalities and differences of child care quality in different settings and conclusions for predictors of high-quality care for children under three are drawn.

Supportive caregiver-child interactions in Swiss day care groups

First Author: Sonja Perren, University of Konstanz, Germany; **Co-Author:** Yvonne Reyhing, Universität Konstanz, Germany; **Co-Author:** Tatiana Diebold, FernUni Schweiz, Switzerland

In Switzerland, many children start attending day care facilities before their first birthday. Children are usually cared for in mixed-age groupings (four months to five years). Only few studies on day care quality in Switzerland have been conducted until now. In this presentation we report results from two recent studies in 128 day care groups. Study 1 investigated the impact of structural characteristics (e.g. official caregiver-child ratio) and situational features (e.g. actual number of children present) on caregiver-child interactions. In Study 2, we specifically addressed the role of age composition. We used the CLASS toddler observation instrument (La Paro et al., 2012) to assess emotional/behavioral and active learning support. In each group, four observation cycles were conducted. For each cycle we registered situational features such as activity setting, number of children and age composition of the children present. Thus, we have a within-group design. To test our hypotheses, we conducted multilevel analyses. Results of study 1 showed that situational characteristics have a stronger impact on observed interactions than structural features. Guided group activities show the highest level of supportive teacher-child-interactions. The more children are present, the lower the quality of teacher-child-interactions. Results of study 2 showed that age range predicted less supportive caregiver-child interactions. Specifically, the number of children aged under 18 months predicted lower support. In summary, some situations involve challenging conditions for caregivers to provide highly supportive interactions for all children in the group. The studies reveal the importance of the everyday organization as a starting point for future quality development.

Quality of teacher-child interactions in toddler classrooms – Situational differences

First Author: Julia Quehenberger, State Institute of Early Childhood Research (IFP Bayern), Germany; **Co-Author:** Anne-Kristin Cordes, State Institute of Early Childhood Research (IFP Bayern), Germany; **Co-Author:** Franziska Egert, State Institute of Early Childhood Research (IFP Bayern), Germany; **Co-Author:**

Verena Dederer, State Institute of Early Childhood Research (IFP Bayern), Germany; **Co-Author:** Claudia Wirts, State Institute of Early Childhood Research, Germany

High-quality interactions in early childhood education are associated with greater learning gains in children (Mashburn et al. 2008). In preschools, interaction quality was shown to decrease over the course of the day (Suchodoletz et al., 2014) and significant differences were found for situations (Wildgruber et al., 2016). However, most of the studies were accomplished in preschool and kindergarten setting. In our national study (BiSS Bildung durch Sprache und Schrift) funded by the Federal Ministry for Family Affairs, Senior Citizens, Women and Youth, teacher-child interactions were assessed in toddler classrooms serving children under three years of age. The *Classroom Assessment Scoring System -Toddler* (CLASS-Toddler) was used to investigate the quality of teacher-child interactions. Forty-three teachers were observed in 121 situations – 52 free play situations, 48 mealtimes and 21 book-reading activities. We found quality of interactions in toddler classrooms to decrease over the course of the morning both for the domain *Engaged Support for Learning* and for the domain *Emotional and Behavioral Support*. Furthermore, several block-wise regressions revealed that *Engaged Support for Learning* was significantly higher during book-reading and free play activities than during mealtimes, when the number of participating children and the time of the day were controlled for. In contrast to findings in preschool settings (Wildgruber et al., 2016), there were no situational differences in teachers' *Emotional and Behavioral Support* in our toddler classrooms. Our findings on situated variations in quality provide new perspectives and important implications for professional development of educators working with children under age three.

The effect of personality traits and educational beliefs on process quality

First Author: Andrea G. Eckhardt, Hochschule Zittau/Görlitz - University of Applied Sciences, Germany;

Co- Author: Franziska Egert, State Institute of Early Childhood Research (IFP Bayern), Germany

In Germany, 33% of children under three years are in ECEC of which 14% attend family child care homes and 86% center-based care. In center-based care, children visit infant/toddler classrooms or various mixed aged classrooms (Autorengruppe Bildungsberichterstattung 2016). Until now, little is known on process quality in different care arrangements. We expand the scientific model of process quality (Anders, Roßbach & Kuger 2016, Sylva 2010) to test the influence of region, structural characteristics of educator and setting, educator's personality, and educational beliefs on process quality for children under the age of three years in different care settings. Analysis is based on the 2-year subsample of the NUBBEK-study (Tietze et al. 2013), a national representative sample. Mean process quality as measured with the ITERS-R and FCCERS-R was significantly higher in family child care settings compared to infant/toddler classrooms and mixed aged classrooms. Overall, process quality for infant and toddlers in all settings is moderate. Regression analysis revealed that structural characteristics play a major role in understanding process quality in center-based care. However, this is less true for family child care. Further analysis indicate that individual characteristics like personal traits contribute significantly to explain variations in process quality for young children but seem to be more important to center-based care. In addition, educational beliefs are important to understand variations in process quality, but are more related to family child care homes than

in center-based care settings. Findings are discussed with respect to teacher qualification or improvement of teachers through further education.

Danish and Dutch early childhood and care provisions: Identifying profiles of quality

Co-Author: Pauline Slot, Utrecht University, Netherlands; **Co-Author:** Dorthe Bleses, Trygfonden's Centre for Child Research and School of Communication and Culture, Denmark; **Co-Author:** Paul Leseman, Utrecht University, Netherlands

High quality, particularly the quality of caregiver-child interactions, has been shown to be related to favorable child outcomes in numerous domains (e.g. Melhuish et al., 2015). To date, little is known about ECEC quality for children under three years of age in Europe (Slot, 2018). The current study aims to contribute by investigating the process quality in 126 Danish and 64 Dutch ECEC centers. In a comparative analysis profiles of classrooms were investigated based on two commonly used measures: CLASS Toddler and ITERS. The CLASS Toddler distinguishes two domains of interactions: Emotional and Behavioral Support and Engaged Support for Learning. The ITERS is a comprehensive tool measuring: Space and Furnishing, Personal Care Routines, Listening and Talking, Activities, Interaction and Program Structure. Preliminary analysis revealed overall mid to high levels of emotionally supportive interactions and lower levels of support for children's development and learning in both Denmark and the Netherlands. For Denmark, three different profiles could be distinguished. The first cluster showed classrooms scoring high on all process quality measures (n=52). The second profile consisted of classrooms with slightly lower scores on the CLASS, particularly support for learning and comparatively higher scores on the ITERS (n=50). Lastly, the third type of classrooms received slightly lower scores on the CLASS, although higher than type 2 for support for learning, whereas the scores on the ITERS were the lowest (n=31). For comparison purposes a cluster analysis will be conducted with the Dutch data. The results will be discussed in light of international findings.

Session G 2

Symposium: Children's math and science motivation—Influencing factors and developmental trajectories

Keywords: Beliefs, Gender, Home learning environment, Longitudinal study, Mathematics education, Motivation, Numeracy, Preschool teachers, Science education

Chairperson: Elisa Oppermann, Freie Universität Berlin, Germany

Discussant: Deborah Stipek, Stanford University, United States

Math and science competencies are becoming increasingly relevant in our society. Yet, math and science are unpopular subjects in school and studies typically find that children feel inconfident about their math and science abilities (Aschbacher, Li, & Roth, 2010; Osborne, Simon, & Collins, 2003; Simpkins, Davis-Kean, & Eccles, 2006). These findings are alarming, as children's motivation is considered an important predictor of their future achievement and choices (e.g., Wang & Degol, 2013). In order to address this issue, research is required to provide a better understanding of the development of children's motivation in math and

science throughout their educational pathways. The present symposium responds to this gap in the research literature and investigates the influences, developmental trajectories and outcomes of early math and science motivation from preschool to primary school. The first two papers focus on influencing factors of motivation in children's preschool years. Paper 1 examines children's science-related home learning environment and its significance for girls' and boys' motivation. Paper 2 explores the interplay between preschool teachers' own motivation in science, their practices and children's motivation. Based on these findings, papers 3 and 4 address the developmental trajectories of children's motivation in early primary school. Study 3 examines the bidirectional relations between arithmetic fluency, ability beliefs, and task-preference from 1st to 2nd Grade in the mathematics domain. Study 4 focuses on the science domain and investigates the bidirectional relations between science related task values and ability beliefs from 1st to 2nd Grade. The four papers are subsequently discussed with regard to their theoretical and practical implications.

Preschool teachers as science educators and role models for the girls and boys in their classroom

First Author: Elisa Oppermann, Freie Universität Berlin, Germany; **Co-Author:** Martin Brunner, University of Potsdam, Germany; **Co-Author:** Yvonne Anders, Freie Universität Berlin, Germany

Children develop beliefs about science in their preschool years and these beliefs are important precursors of children's future science motivation. Yet, it remains unclear how children's motivational beliefs in science, i.e. their self-efficacy and enjoyment, are shaped by their preschool teachers' own beliefs and practices. In fact, over 90% of preschool teachers are female and studies typically find that they feel unconfident about science (Greenfield et al., 2009; Koballa & Crawley, 1985). The present study investigates these relations based on a sample of 234 German preschoolers (5-6 years) and 88 preschool teachers. Children were interviewed about their self-efficacy and enjoyment in science using the PSCM-Scale (Oppermann, Brunner, Eccles, & Anders, 2017). Preschool teachers filled out questionnaires about their self-efficacy beliefs in science ($\alpha=0.83$) and the frequency of their science practices. Results from multilevel path analyses revealed that teachers' self-efficacy predicted the frequency of their science practices. Moreover, teachers' self-efficacy beliefs were related to children's self-efficacy in science ($\beta=.20$, $p=.01$). No effect was found for teachers' practices ($\beta=.09$, $p=.27$). However, multi group analyses showed that these relations differed by gender: The relation between teachers' self-efficacy and children's motivation was significant stronger for girls than for boys (self-efficacy: $\Delta\beta=-.29$, $p=.03$; enjoyment: $\Delta\beta=-.24$, $p=.05$). In contrast, the relations between teachers' science practices and children's motivation was stronger for boys than for girls (self-efficacy: $\Delta\beta=.31$, $p=.02$; enjoyment: $\Delta\beta=.31$, $p=.07$). These findings provide novel evidence on gendered patterns in the association between teachers' self-efficacy beliefs, their science activities and children's science motivation.

Science-related home learning environment of pre-school girls and boys

First Author: Päivi H. Taskinen, Friedrich Schiller University Jena, Finland; **Co-Author:** Mirjam Steffensky, Leibniz Institute of Science and Mathematics Education (IPN), Germany; **Co-Author:** Elisa Oppermann, Freie Universität Berlin, Germany; **Co-Author:** Tobias Ziegler, Goethe-Universität Frankfurt, Germany; **Co-**

Author: Ilonca Hardy, Goethe-Universität Frankfurt, Germany; **Co-Author:** Yvonne Anders, Freie Universität Berlin, Germany

Research on preschoolers' science-learning in the context of their families has been slow to emerge. Thus, knowledge is largely lacking about how relevant science-learning in the family is for children's motivation and knowledge. To address this research gap, this study examined the relationships between the family learning environment (parental stimulation and parental instruction) and young children's science-related motivation and knowledge (N = 131 pre-schoolers and their parents).

Results of structural equation modeling indicated, first, gender differences in the associations among the indicators of science-related home learning environment (three indicators for parental stimulation and two for parental instruction). Second, the science-related home learning environment explained more variance in boys' science-related motivation than in girls'. Smaller associations were found with science knowledge, where the home learning environment explained a significant amount of variance in girls', but not in boys' science knowledge. All effects remained significant even when domain-unspecific characteristics of families were taken into account. These findings suggest that families may provide different science-related learning environments for girls and boys as early as in pre-school age.

Relations between arithmetic fluency, self-beliefs and task-preference from 1st to 2nd Grade.

First Author: Tuire Koponen, University of Jyväskylä, Finland; **Co-Author:** Kenneth Eklund, University of Jyväskylä, Finland; **Co-Author:** Riikka Heikkilä, University of Jyväskylä, Finland; **Co-Author:** Jonna Salminen, University of Jyväskylä, Finland; **Co-Author:** Mikko Aro, University of Jyväskylä, Finland

Aim. To explore to what extent self-efficacy, self-concept and task preference in math measured in grade 1 predict calculation fluency in grade 2 after controlling for arithmetic fluency in grade 1, and vice versa: to what extent arithmetic fluency in first grade predicts these non-cognitive factors in second grade after taking into account the same non-cognitive factors assessed a year earlier. **Methods.** Participants' (n=200) self-concept, self-efficacy, and task-preference in math and calculation fluency were assessed at the end of grades 1 and 2. Linear regression was used in analysis. **Results.** Arithmetic fluency, self-efficacy, self-concept and task preference in math were significantly associated at both time points ($r = .28-.43$ and $r = .36-.50$). Grade 1 self-efficacy in math explained a small but significant amount of the variance (1%) of grade 2 arithmetic fluency above and beyond the arithmetic fluency in the 1st grade. Grade 1 arithmetic fluency explained a significant amount of variance in self-efficacy (6 %) and in self-concept (10%) but not in task-preference in 2nd grade after taking into account the autoregressive effect of these skills. **Conclusion.** Reciprocal predictive relations between arithmetic fluency and non-cognitive factors were found among young elementary school children but the strength and direction of this relation vary according to the non-cognitive factor. Altogether, findings suggest that non-cognitive factors should be taken into account when planning the support at school.

Students' task values and ability beliefs in early science education - a longitudinal study

First Author: Janica Vinni-Laakso, University of Helsinki, Finland; **Co-Author:** Kalle Juuti, University of Helsinki, Finland; **Co-Author:** Anni Loukomies, University of Helsinki, Finland; **Co-Author:** Jari Lavonen, University of Helsinki, Finland; **Co-Author:** Katariina Salmela-Aro, Helsinki University, Finland

The aim of the study is to examine elementary school students' subjective task values (STVs), cost, and ability beliefs in science education. More specifically, we were interested on (1) How students' science related STVs, cost, ability beliefs, and general school engagement are interrelated between first and second grade, and (2) does first graders' science related task values, cost, ability beliefs, and engagement predict students' dream occupation a year later. At time 1, the participants were in 1st grade (7-8 years, N=333), and at time 2 the same participants were in 2nd grade (8-9 years) from seven elementary schools in Helsinki. Students filled in a self-report questionnaire assessing their subjective task values (importance, utility, and interest), cost (effort, exhaustion), and ability beliefs in science. Students were also asked to report their dream occupation, which were dummy coded to occupation level (support/professional), and if the reported occupation is on STEM (Science, Technology, Engineering, and Mathematics) field or not. We used cross-lagged panel model to examine the objectives of the study. We found that a) science related ability beliefs, cost, and general engagement remained rather stable between time points, and b) science related cost at the first grade predicted lower school engagement at the second grade (1). In addition, a) science related task values at the first grade predicted students' dream occupation at stem field, whereas b) science related ability beliefs, and general school engagement predicted students' dream occupation to be at non-stem field (2).

Session G 3

What do we know about the usefulness of language support in ECEC? Evidence from research syntheses

Keywords: Evaluation study, Interventions, Language education, Literacy, Meta-Analysis

Chairperson: Susanne Kuger, German Youth Institute (DJI), Germany

Discussant: Dominique Rauch, German Institute for International Educational Research (DIPF), Germany

Language development in early years is of utmost importance for later educational pathways and for participation in society in general. Taking a look at the research literature, the amount of available evidence on language acquisition in early childhood seems extensive. Numerous field studies and experimental interventions were implemented and evaluated, trying to clarify the different mechanisms involved in language development as well as refining our knowledge about potential measures to support healthy development and prevent aberrations. A closer look at the literature body reveals the great heterogeneity of evidence regarding the aspects of language acquisition studied, the research methodology and rigor, the publication format and the target audience. As a consequence, researchers and recipients in educational practice and policy alike find it difficult to grasp the overall picture and the greater lines of evidence. Against this background, the symposium brings together three research projects that applied systematic

review methodology to identify relevant literature from different sources, summarize the available evidence and evaluate their scientific contribution. One of the studies takes a closer look at interventions to support second language acquisition in ECEC world-wide. A second paper reviews the existing literature on precursors of later reading comprehension and a third review summarizes all documentation on language interventions in ECEC to support development in the instructional language German since 1949. The symposium's introductory talk characterizes the systematic review methodology, delineating how it can expand our understanding of the research literature particularly in early childhood research.

Learning from research: the role of systematic reviews in education

Author: Janice Tripney, University College London, Institute of Education, United Kingdom

Systematic reviews are a rigorous and transparent form of literature review that have been applied to a number of different fields and are increasingly used in the field of education. This session introduces systematic reviews as a method for research, outlines international standards and best-practice, as well as reflects on their role as part of educational decision making. The session will cover the following aspects: systematic review principles; the standard stages of the review process common to many reviews; how reviews vary; key issues to consider when commissioning or using a review. A concluding discussion will focus on potential applications in early childhood education research.

The effects of Language Interventions in ECEC on L1 and L2 Development of DLL's. A meta-analysis

First Author: Katarina Groth, Deutsches Jugendinstitut, Germany; **Co-Author:** Franziska Egert, State Institute of Early Childhood Research (IFP Bayern), Germany; **Co-Author:** Steffi Sachse, Heidelberg University of Education, Germany

A large and growing number of students in the US or Europe come from homes where the societal language spoken in educational contexts is not the primary language spoken at home. In ECEC, several language interventions are used to support language development of bilingual children before formal schooling. However, only a few interventions are evaluated. Based on (quasi-)experimental studies with at least 10 participants per condition, the given meta-analysis investigated the effectiveness of language interventions on the L1 and L2 development of multilingual children in ECEC. The systematic review procedure in electronic databases (FIS, Psynindex, WISO, PsycINFO, ERIC, ProQUEST) from 1970 to 2016 revealed 697 hits. In total, 114 references were identified as relevant. Full texts were coded by two independent reviewers. A variance weighted multi-level random effects model was used to aggregate findings. Treatment effects varied substantially between type of intervention (e.g., two-way immersion, dialogic reading, standardized curriculum). Moderator analysis suggests that the quality and fidelity of language intervention matters. Further, interventions were more effective in fostering receptive language skills in L2 in contrast to productive language skills in L2. Only a few studies reported skills in L1 development and further research is needed. Finally, the findings suggest that more efficient training opportunities for teachers are needed to provide high quality language interventions.

Preschool predictors of later reading comprehension ability: a Campbell systematic review

First Author: Hanne Næss Hjetland, Nordic Institute for Studies in Innovation, Research and Education, Norway; **Co- Author:** Ellen Irén Brinchmann, Department of Special Needs Education, University of Oslo, Norway; **Co-Author:** Ronny Scherer, University of Oslo, Norway; **Co-Author:** Monica Melby-Lervåg, Department of Special Needs Education, University of Oslo, Norway

Aims: Determining how to provide the best instruction to support children's reading comprehension requires an understanding of how reading comprehension actually develops. Understanding the development of reading comprehension and its precursors can help us develop hypotheses about what effective instruction must comprise to facilitate well-functioning reading comprehension skills. To promote our understanding of this process, this review summarizes evidence from observations of the development of language and reading comprehension from the preschool years into school. **Methods:** This review includes studies that observe the relations between preschool language and code-related skills and later reading comprehension. The included studies had to employ a longitudinal non- experimental/observational design and either include a sample of typically developing children or an unselected cohort. **Results:** A total of 64 studies were identified. Analyses of bivariate correlations showed that all the included predictors, except for non-word repetition, were moderately to strongly correlated with later reading comprehension. Meta-analytic structural equation modeling showed a significant indirect effect of code-related skills in preschool on reading comprehension via consecutive word recognition. Language had a moderately direct impact on reading comprehension. This impact increased with age, and linguistic comprehension becomes more important for reading comprehension when children master decoding. The overall individual variance in reading comprehension explained by the model was 59.5%. **Discussion of findings:** These results show that a broad set of language skills is important in developing reading comprehension, thus successful instruction for reading comprehension should target a broad set of language skills.

Language interventions in Germany from 1949 until today

First Author: Susanne Kuger, German Youth Institute (DJI), Germany; **Co-Author:** Jan-Henning Ehm, German Institute for International Educational Research (DIPF), Germany; **Co-Author:** Marcus Hasselhorn, DIPF, Germany; **Co- Author:** Jan Lonnemann, German Institute for International Educational Research (DIPF), Germany; **Co-Author:** Dominique Rauch, German Institute for International Educational Research (DIPF), Germany; **Co-Author:** Jolika Schulte, University of Vechta, Germany; **Co-Author:** Karin Zimmer, University of Vechta, Germany

Background and Aim: Over the last two decades, policy makers, practitioners, and researchers in Germany have devoted great effort in creating, implementing, and evaluating interventions to support children in their language development and to compensate delays or impairment in language acquisition. Until today, there is little agreement as to which programs can be implemented easily in early childhood education and care (ECEC) settings, and are able to foster language development for all children or for certain subgroups most effectively. **Method:** Using a systematic-review approach, the literature is searched regarding language interventions in German ECEC settings since 1949. The search was individually adapted to the

different sources: eight national and international literature data banks, private foundations, communities, federal and state administration, and the world-wide web. Besides painting a map of implemented interventions in Germany over the last 70 years, the literature is analyzed with regard to whether these interventions have been evaluated and to which degree they have proven successful. Preliminary Results: From the 2484 potentially relevant texts detected in the initial search 1400 sources have a direct reference to the research question. The 338 documents on implemented interventions are coded and analyzed in all due detail, detailing the types of interventions and the evaluation of their effectiveness. First results reveal four different types of literature sources (most to least frequent): programmatic statements without implementation, individual reports on small-scale interventions that lack research rigor, systematic documentation on interventions without effectiveness check, and original research papers on scientific intervention evaluations.

Session G 4

Symposium: Language and Emotions

Keywords: Cognitive development, Cross-sectional study, Emotion, Evaluation study, Experimental design, Language education, Literacy, Longitudinal study, Measurement, Self-regulation, Social-emotional competencies

Chairperson: Maria von Salisch, Institute for Psychology, Germany

Chairperson: Claudia Maehler, Institute for Psychology, Germany

Language serves not only communicative but also representational functions. Children with better language skills are usually better able to understand other people's mental states that are typically explored in false-belief tasks that are used to test their theory of mind. In the first paper, Claudia Mähler and Merle Skrowronek will examine relations between young children's language abilities and their theory of mind development in a language intervention study. Another intervention that has long been known to stimulate language development in young children is dialogic reading. Marco Ennemoser, Nils Hartung, Elena Hohmann and Monja Lehnigk will present a paper with two studies on the quality of adult-child interactions during the reading sessions as a moderator for the outcome of the intervention. Because of the growing recognition of social and emotional factors for children's educational careers, the last two papers will explore correlates of two related components of emotional competencies, i.e. emotion knowledge and emotion regulation. Katharina Voltmer and Maria von Salisch take up the representational nature of language and examine relations between young children's language abilities and their emotion knowledge in a new test that calls upon their theory of mind abilities in the domain of emotions. Niahm Oeri's paper focuses on individual differences in children's ability to self-regulate as a predictor of their performance on a battery of executive functions tasks.

Language Development and Theory of Mind in Young Children

First Author: Claudia Maehler, Institute for Psychology, Germany; **Co-Author:** Merle Skrowronek, Institute of Psychology, Germany

Currently many efforts are being made to promote children's early development. In the study reported here an intervention program was designed in order to improve the language teaching strategies of kindergarten teachers. The training program "Feeling, thinking, speaking" for kindergarten teachers intends to foster emotional and cognitive development in children via language development. There is ample evidence for a clear connection between children's language abilities and theory of mind (TOM) and for stronger effects from earlier language abilities to later false belief understanding than the reverse (Milligan, Astington & Dack, 2007). Yet, it is an open question whether TOM performance can be improved via language teaching in everyday routines in kindergarten. In our study, kindergarten teachers received 6 modules of training that focused on language development, emotion understanding, TOM and meta-representation. A sample of $N = 279$ children (51% girls) with a mean age of 4;2 years (SD 7.2 months) worked on a battery of several tasks: the TOM scale by Hofer and Aschersleben (2007), receptive and active vocabulary, grammar, understanding and memory of sentences, and intelligence (colored progressive matrices). At pre-test children showed the expected relationships between language and TOM ($r = .35^{**}$ for receptive vocabulary/TOM, $r = .33^{**}$ for active vocabulary/TOM and $r = .28^{**}$ for grammar/TOM). The training of the kindergarten teachers has taken place and currently the post-test of the training and control group is carried out. Results will be discussed with regard to the possibility of improving social-cognitive competences via language development.

Intervention fidelity as a moderator of dialogic reading intervention outcomes

First Author: Marco Ennemoser, Psychology, Germany; **Co-Author:** Nils Hartung, Justus-Liebig-Universität Giessen, Germany; **Co-Author:** Elena Hohmann, Justus-Liebig-Universität Giessen, Germany; **Co-Author:** Monja Lenigk, Justus-Liebig-Universität Giessen, Germany

Aim of the study: Two studies investigated the importance of intervention fidelity on the outcomes of a dialogic reading intervention in German preschools.

Method: The samples of the two studies comprised 231 or 374 children, respectively, who had been identified as being at-risk for language impairment using standardized screening measures. In both studies children were randomly assigned to the dialogic reading intervention or the control conditions. Intervention fidelity was assessed by videotape ratings of interaction quality during dialogic reading sessions. Short-term and long-term effects were estimated using intervention quality as a moderator variable.

Results: Results indicate that intervention fidelity, i.e. the quality of adult-child-interaction during dialogic reading sessions, significantly moderated the outcomes of the intervention. Establishing a video coaching for trainers did not lead to significant quality improvements in adult-child interactions assessed during dialogic reading sessions.

Young children's language abilities and their emotion knowledge: Evidence from the ATEM

First Author: Katharina Voltmer, Institute for Psychology, Leuphana University Lüneburg, Germany **Co-Author:** Maria von Salisch, Institute for Psychology, Germany;

Children's emotion knowledge and their language abilities are known to be strongly correlated. Both are also well-known predictors of children's later school success. The Adaptive Test of Emotion knowledge (ATEM) is a new measure of young children's emotion knowledge with components of varying difficulty. Not only items for the basic emotions happiness, sadness, anger, and fear are presented, but also items for surprise and disgust. The ATEM includes six components of emotion knowledge: Children are asked to recognize emotions in faces, based on external situations that evoke one or multiple emotions, based on internal causes (such as beliefs and desires), and in situations that call for masking emotional expressions. The ATEM is intended for three- to nine-year-old children, because item difficulties increase within and between components. Because of its adaptive design, the ATEM is likely neither to overstrain nor to bore children. In the BISS-project Feeling Thinking Speaking we tested 284 three- to five-year old children (143 male, $M_{age} = 49.83$ month, $SD = 7.22$) with the ATEM and German measures of expressive and receptive language abilities. The correlation between the total score of emotion knowledge and expressive language abilities was significant ($r = .57$, $p < .001$) as were relations with receptive language abilities ($r = .38 - .63$, $p < .001$). Correlations between individual components of emotion knowledge and measures of language abilities varied between $r = .17$, $p = .05$ and $r = .62$, $p < .001$. These results confirm previous research and the validity of the ATEM. Why language abilities and emotion knowledge are related, will be discussed.

Self-regulation in kindergarten children: An experimental approach

First Author: Niamh Oeri, University of Bern, Switzerland; **Co-Author:** Claudia M. Roebbers, Institute of Psychology, University of Berne, Switzerland

The aim of the present study was to experimentally examine the interplay between two self-regulatory components, i.e., cognitive regulation and emotional regulation in kindergarten children (mean age = 5 years, 6 months). There were two conditions; an experimental condition and a control condition. Subjects assigned to the control condition ($n = 74$) were presented with a cognitive regulation task (i.e., Minnesota Executive Function Scale (MEFS); Carlson & Zelazo, 2014). Subjects assigned to the experimental condition ($n = 75$) however, were mildly disappointed before solving the cognitive regulation task. Disappointment was induced by means of a modified version of the disappointing gift paradigm (Saarni, 1984). Surprisingly, results revealed no performance difference between the two groups. However, subsequent explorative analysis did reveal differences between the two groups: While an EF baseline measure predicted performance for the control group (i.e., cognitive regulation only) general self-regulation skills but not EF predicted performance for the experimental group (i.e., cognitive and emotional regulation). Overall, the results indicate that kindergarten children are able to regulate mild disappointment to engage in a cognitive task. In addition, the results provide preliminary evidence that if self-regulation demands are high (i.e., involve cognitive self-regulation and emotion self-regulation), general self-regulation skills seem crucial for cognitive performance.

Session G 5

Symposium: Kindergarten Teachers' Practices and Interactions with Children: Findings from Four Countries

Keywords: Child participation, Cross-sectional study, Culture, Instructional practices, Interventions, Longitudinal study, Motivation, Preschool quality, Process quality, Teacher-child interaction

Chairperson: Antje von Suchodoletz, New York University Abu Dhabi, United Arab Emirates

Discussant: Jenni Salminen, University of Jyväskylä, Finland

Over the past decades, policy attention on early education services has increased globally, shifting the focus from access toward quality to promote lifelong learning which is crucial to reduce inequalities. Although there is a fast-growing body of research indicating that high quality of provisions is essential for children's development, defining quality in education and its dimensions remains a challenge in terms of the methodology in research and the formulation of policy to enhance quality. Identifying developmentally appropriate practices that provide an optimal learning environment is therefore of the utmost importance. The proposed symposium combines quantitative and qualitative approaches to the study of classroom interactions and their role for children's development and learning. Findings from four different countries are presented: Finland, Switzerland, Ukraine, and United Arab Emirates. The first paper (Pakarinen et al.) examines reciprocal relations between the quality of teacher-child interactions and children's interest in learning. The second paper (Nadyukova et al.) investigates general and domain-specific associations between the quality of teacher-child interactions and children's pre-academic and social-emotional skills. The third (Muhonen et al.) and fourth paper (Bürgermeister et al.) focus on teachers' use of educational dialogue and scaffolding strategies during teacher-child interactions. Muhonen et al. compared the quality of educational dialogue across two countries. Using a standardized learning environment, Bürgermeister et al. examined the effectiveness of educational dialogues for children's active participation in learning. The discussion will integrate the findings and highlight research and policy implications to facilitate teaching and learning.

Educational Dialogue in Kindergarten Classrooms Across Two Cultures

First Author: Heli Muhonen, New York University Abu Dhabi, United Arab Emirates; **Co-Author:** Marja-Kristiina Lerkkanen, University of Jyväskylä, Finland; **Co-Author:** Eija Pakarinen, New York University Abu Dhabi/ University of Jyväskylä, Finland; **Co-Author:** Antje von Suchodoletz, New York University Abu Dhabi, United Arab Emirates

Research in various cultural contexts in kindergarten and elementary school has shown that teachers' talk dominates in the classrooms (Alexander, 2000; Muhonen, Rasku-Puttonen, Pakarinen, Poikkeus, & Lerkkanen, 2016). However, there is a lack of studies on the quality and amount of educational dialogue as a cultural phenomenon. The present study focuses its cross-cultural lens on educational dialogue during kindergarten learning sessions in Finland and the United Arab Emirates (UAE) for three main reasons: (1)

differences in the country-level results in international achievement studies, (2) differences in the education system history, and (3) differences in the focus of early childhood education programs. The data have been collected as part of a larger study on teacher stress, classroom interactions and child outcomes. The subsample for the present qualitative analysis consists of 13 female teachers from both countries. Transcribed kindergarten learning sessions were analyzed by identifying episodes of educational dialogue and categorizing them with respect to the patterns of dialogic teaching by Muhonen et al. (2016). In both countries, both teacher- and child-initiated moderate- and high-quality patterns of dialogic teaching were identified. Teachers made more initiatives compared to children across both countries. In addition, cross-country differences were identified: In the UAE, less educational dialogue was found and teachers asked fewer questions than in Finland. The findings suggest a need to understand the benefits of educational dialogue and increase and enhance dialogue in both countries.

Quantitative and Qualitative Aspects of Educational Dialogue during Early Science Instruction

First Author: Anika Bürgermeister, University of Leipzig, Germany; **Co-Author:** Gerlind Grosse, Early Childhood Education Research, Germany; **Co-Author:** Ueli Studhalter, ETH Zurich, Switzerland; **Co-Author:** Miriam Leuchter, University of Koblenz - Landau, Germany; **Co-Author:** Henrik Saalbach, University of Leipzig, Germany

The effectiveness of early education largely depends on the quality of teacher-child interactions. Research has particularly emphasized the importance of educational dialogues and adaptive instructional support. Kindergarten teachers, however, show deficits in engaging learners in active interaction and stimulating their thinking processes. This seems to be particularly true for early science instructions.

The study aims to examine the effectiveness of educational dialogues between teachers and children in kindergarten by combining different analytical approaches: analyzing effects of the proportion of children's and teachers' contributions and its interaction with the quality of teachers' scaffolds on children's domain-specific knowledge acquisition. A standardized learning environment was implemented, and teachers' use of scaffolding strategies was assessed within a longitudinal intervention study with 32 Swiss kindergarten classes. Children's knowledge was measured at three measurement points. Subsequently, videos were analyzed, by coding children's and teachers' proportions of talk as well as the number of spoken words.

We found the frequency of children's and teachers' comments being nearly equal; while teachers' contributions are much more extensively (number of spoken words). Furthermore, there is a positive interaction between children's active participation in dialogues and teachers' activation of prior knowledge indicating beneficial learning effects when children's active participation is supported while simultaneously activating their knowledge.

In conclusion, our findings suggest that an effect of learners' engagement in educational dialogue on learning outcomes depends on teacher's support and scaffolding strategies. Possible implications for instructional practice are discussed in the context of early childhood education.

Teacher-Child Interactions and Children's Developmental Outcomes in Kindergarten

First Author: Iryna Nadyukova, New York University Abu Dhabi, United Arab Emirates; **Co-Author:** Ross Larsen, Brigham Young University, United States; **Co-Author:** Antje von Suchodoletz, New York University Abu Dhabi, United Arab Emirates

A growing body of literature points to the importance of the quality of teacher-child interactions in early childhood education for children's social and academic development (Burchinal et al., 2008). Studies using the Classroom Assessment Scoring System (CLASS; Hamre et al., 2013) to measure teacher-child interactions, have most commonly applied a 3-domain structure. However, considering significant overlap between the three domains, a bifactor approach was suggested to examine general and domain-specific associations with child outcomes (Hamre et al., 2014). The present study tested the applicability of the bifactor approach to capture teacher-child interactions in kindergarten classrooms in Ukraine. Moreover, associations with children's pre-academic and social-emotional skills were examined. Participants were 55 kindergarten teachers and children in their classrooms ($n=1358$; 48% girls, $M_{\text{age}}=66.59$ months, $SD=8.89$). The quality of teacher-child interactions was assessed using pre-k version of the CLASS. Teachers reported on children's pre-academic (numeracy, literacy) and social-emotional skills (work habits, empathy, cooperation). Results indicated good model fit of the bifactor model, identifying one general factor (responsive teaching) and two sub-factors (proactive management and routines; cognitive facilitation). Responsive teaching was positively associated with social-emotional skills, but negatively with pre-academic skills. The opposite pattern was found for cognitive facilitation. In addition, proactive management and routines was negatively associated with social-emotional skills. Although the findings support the assumption of general and domain-specific aspects on teacher-child interactions, the negative associations with some child outcomes were unexpected and will be discussed with regard to possible adaptations to measuring teacher-child interactions in Ukrainian kindergarten classrooms.

Associations between Teacher-Child Relationships and Kindergarteners' Interest in Learning

First Author: Eija Pakarinen, New York University Abu Dhabi/ University of Jyväskylä, Finland; **Co-Author:** Marja- Kristiina Lerkkanen, University of Jyväskylä, Finland; **Co-Author:** Jaana Viljaranta, University of Eastern Finland, Finland; **Co-Author:** Antje von Suchodoletz, New York University Abu Dhabi, United Arab Emirates

The quality of children's relationships with their teachers shapes their experiences in classrooms and predicts children's academic and social development. Transactional models of teaching and learning (Cameron, 2012) suggest that relational patterns between teacher and children and children's attributes are reciprocally related. To date, however, studies taking a bidirectional point of view are limited and dominated by a focus on children's behavior problems (Doumen et al., 2008). The present study used a cross-lagged design to investigate bidirectionality between the quality of teacher-child relationships and children's interest in literacy and math. Furthermore, the role of gender in the associations was examined.

Participants were 504 Finnish kindergarteners (51% girls) and their teachers ($n = 51$). Teachers reported closeness and conflict with a particular child twice during the kindergarten year. Children were interviewed on their interest in literacy and math. In addition, they were tested on their pre-literacy and pre-math skills. Analyses were conducted by specifying cross-lagged path models with the COMPLEX option to account for the nested structure of the data. Children's age, pre-academic skills, and parental education were used as control variables.

The results showed that teacher-perceived conflict predicted lower interest in literacy and math. In addition, higher interest in math predicted less teacher-perceived conflict, but only among boys. For boys, a conflictual relationship with the teacher was also related to lower pre-math skills. The results emphasize the importance of reducing conflictual patterns of relationships for enhancing kindergarteners' interest in learning.

Session G 6

Symposium: The Complexity of Preschool Teaching in Mathematics: Going Beyond Teachers' Cognition

Keywords: Cognitive development, Evaluation study, Instructional practices, Longitudinal study, Mathematics education, Measurement, Preschool teachers, Teacher-child interaction

Chairperson: Markus Szczesny, Humboldt Universität zu Berlin, Germany

Discussant: Franziska Vogt, University of Teacher Education St. Gallen, Switzerland

Preschool teachers' professional competence concerning mathematics is obviously important to foster children's mathematical development. Professional competence can be seen as a multidimensional construct which includes affective-motivational and cognitive dispositions, situation-specific skills as well as performance (Blömeke, Gustafsson, & Shavelson, 2015). In the field of mathematics, some studies have attempted to interlink all these facets of professional competence (e.g. Lui & Bonner, 2016; Goldsmith, Doerr, Lewis, 2013). Nonetheless, research focusing on preschool teachers concerning this matter is lacking. Although interest in preschool teachers' professional competence with regard to mathematics is growing, the relation between the specific facets has not been clarified yet. Therefore, this symposium aims at clarifying the black box "preschool teachers' professional competence in the field of mathematics" by analyzing various relations between all of the above-mentioned individual elements.

Mathematical Pedagogical Content Knowledge of Early Childhood Teachers

First Author: Julia Bruns, University of Osnabrück, Germany; **Co-Author:** Hedwig Gasteiger, Osnabrück University, Germany

Measurement instruments of early childhood teachers' mathematical pedagogical content knowledge (MPCK) have to consider the special characteristics of early childhood teaching. Therefore, a situated measurement approach seems to be suitable. While McCray and Chen (2012) - following this approach - introduced a MPCK interview-instrument, there is still a lack of standardized instruments suitable for large-scale studies. As a first proposal to approach this gap, we developed a paper-pencil test with multiple

choice items measuring MPCK in a situated way. The test is based on four descriptions of typical kindergarten situations. Linked to each of these situations we developed a set of items measuring professional knowledge of children's abilities. Additionally, two multiple choice items to each situation assess professional knowledge of adaptive mathematical learning activities. The 35 items were piloted with a sample $N=28$ early childhood students and $N=43$ in-service early childhood teachers. The results show that 31 items fit to the Rasch-model. Therefore, the test seems to be a suitable first approach to measure MPCK in a situated way. Furthermore, we found differences in the test scores of in-service teachers and early childhood students in favor of the later, which might be related to the change in early childhood curricula and the accompanied changes in early childhood teacher training in Germany. McCray, J., & Chen, J.- Q. (2012). Pedagogical content knowledge for preschool mathematics: Construct validity of a new teacher interview. *Journal of Research in Childhood Education*, 26(3), 291-307.

The link between preschool teachers' performance and children's outcome in mathematics

Author: Lara Pohle, Humboldt-Universität zu Berlin, Germany

Due to the fact that many instruments observing and evaluating preschool classroom quality originate from the US, there is a compelling need to generate a tool that is in line with European countries following a more socio-pedagogical approach, such as Germany and Denmark. Additionally, instruments that allow for more subject-specific investigations complying with psychometric standards are demanded (Gasteiger & Benz, 2016). This presentation aims at illustrating the implementation of the requirements listed starting with the identification of indicators which allow to evaluate preschool teachers' quality of initiating mathematical stimuli in the field of numeracy. Moreover, the presentation attempts to make a contribution to the link between performance and children's outcome.

Can early education experts adequately assess mathematical abilities of kindergartners?

Author: Markus Szczesny, Humboldt Universität zu Berlin, Germany

Although it is assumed that the inadequacy of the assessment of mathematical abilities has a suboptimal influence on the individual performance development of kindergarten children in the field of mathematics, so far there are no studies that directly investigate this relationship. In the study presented here, $N = 43$ early-education specialists and $N = 496$ children are examined. While the early childhood educators assessed the mathematical abilities of the children 5 times, the (objective) mathematical abilities were measured twice (at the beginning and at the end of the study). Cross-lagged-panel models show that to a certain extent, early childhood educators succeed in assessing the mathematical abilities of the children they care for and contribute to the mathematical performance development of kindergartners.

Session H

Friday, 31 August 2018, 03:30 pm – 05:00 pm

Session H 1

Symposium: Guided play in early STEM education – adults' process competencies and children's outcomes

Keywords: Instructional practices, Interventions, Mathematics education, Measurement, Motivation, Parental involvement, Play, Preschool teachers, Process quality, Science education, STEM

Chairperson: Timo Reuter, University of Koblenz-Landau, Germany

Discussant: Hedwig Gasteiger, Osnabrück University, Germany

Educational researchers widely agree that STEM teaching can and should already begin in pre-school (Eshach, 2011). Yet we don't know how to put this claim into practice. In particular, an increase of drill and practice in pre-school at the expense of play-time is assumed (Hirsh-Pasek & Golinkoff, 2011). The dichotomy between play and learning is supposed to be bridged through guided play (Hirsh-Pasek & Golinkoff, 2011). In guided play, pre-school teachers offer a structured play- environment and scaffold children's activities. Children direct the process of play. However, there is a lack of systematic studies both on (1) process-quality during guided play and on (2) children's outcomes. The symposium reflects both perspectives. Paper 1 deals with kindergarten-teachers' guided play-related process competencies in the domain of mathematics. Paper 2 examines cultural differences in parental guidance of play. Paper 3 reports effects of guided block play on children's motivation. Paper 4 deals with children's learning about the functioning of gears in the context of guided play. Eshach, H. (2011). Science for Young Children. A New Frontier for Science Education. *Journal of Science Education and Technology*, 20 (5), 435-443. Hirsh-Pasek, K. & Golinkoff, R.M. (2011). The great balancing act: Optimizing core curricula through playful learning. In E. Zigler, W.S. Gilliam, & W.S. Barnett (Eds.), *The pre-K debates: Current controversies and issues* (pp. 110-115). Baltimore, MD: Brookes Publishing.

Effects of guided play on children's concepts and problem solving in the domain of gears

First Author: Timo Reuter, University of Koblenz-Landau, Germany; **Co-Author:** Miriam Leuchter, University of Koblenz - Landau, Germany

Developing *Engineering habits of mind* (EHoM) (Lucas, Hanson & Claxton, 2014) is an important objective of early science education (National Research Council, 2012). Therefore, we aim at developing a guided-play-based learning environment for preschoolers in the domain of gears. In the initial study, we investigated preschoolers' concepts regarding turning- direction (TD) and turning-speed (TS) of connected gears. Furthermore, we examined whether children were able to change these concepts through a short play-intervention. We conducted standardized interviews with $N=50$ preschoolers aged 4 to 5 years. First, we

presented varying gear-arrangements to the children and always asked them to predict TD (eight items) and TS (three items) of certain gears. Second, participants played with the gears and had to decide whether their predictions were correct or not. Third, they were asked to solve two corresponding problems. Play-processes were videotaped and coded for EHoM-related actions. Analyses are still being conducted. First results showed no consistent response-patterns regarding TD ($p_{KR20}=.394$) and TS ($p_{KR20}=.046$), indicating that preschoolers may not have developed (naïve) concepts yet. However, on average 78% of the children revised their wrong prediction after being confronted with evidence in the play situation. This indicates that preschoolers may develop conceptual knowledge respectively change (naïve) concepts about the functioning of gears by guided play. Lucas, B., Hanson, J., & Claxton, G. (2014). *Thinking like an engineer. Implications for the education system*, London: Royal Academy of Engineering. National Research Council (2012). *A framework for K-12 science education: Practices, crosscutting concepts, and core ideas*. Washington: National Academies Press.

Guided-play and children's statics knowledge

First Author: Anke Maria Weber, University of Koblenz-Landau, Germany; **Co-Author:** Miriam Leuchter, University of Koblenz - Landau, Germany

Theory:Playing evokes positive emotions and intrinsic motivation and contains elements of choice for children (Einsiedler, 1999). In play, adults' intervention may reduce children's motivation (Bonawitz et al., 2011), however without intervention they may have little learning gain (Stipek, Feiler, Daniels, & Milburn, 1995). We investigate if different ways of intervention interact with motivation and learning gains in the domain of statics.

Method: 166 preschool children took part in a pre-post-follow-up-study. Experimental group 1 received an intervention with structured materials for guided block play with verbal scaffolds, experimental group 2 without verbal scaffolds and a control group played with blocks freely.

Results: Growth curve analysis showed no difference in development of motivation for the groups. Moreover, we revealed learning gains in statics knowledge for the scaffolding compared to the materials-only group. However, considering motivation no difference between the groups could be uncovered.

Discussion: Adult's intervention through verbal scaffolding did not decrease children's motivation for learning in the domain of statics. Furthermore, guided play with verbal scaffolding helped to increase children's knowledge compared to a materials-only group. However, motivated children had learning gains in all groups.

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Intervention effects on early childhood educators' professional competence

First Author: Andrea Wullschleger, University of Zurich, Switzerland; **Co-Author:** Anuschka Meier, Interkantonale Hochschule für Heilpädagogik, Switzerland; **Co-Author:** Miriam Leuchter, University of Koblenz - Landau, Germany; **Co-Author:** Anke Lindmeier, Leibniz Institute of Science and Mathematics Education (IPN), Germany; **Co-Author:** Aiso Heinze, Leibniz Institute for Science and Mathematics Education (IPN), Germany; **Co-Author:** Franziska Vogt, University of Teacher Education St.Gallen, Switzerland; **Co-Author:** Elisabeth Moser Opitz, Institute of Education, University of Zurich, Switzerland

Educators' competences are important for the quality of mathematical learning in kindergarten. However, knowledge tests are not suitable to assess performance adequately. Lindmeier (2011) developed a model of teacher competence for mathematics education that establishes a more direct link between professional knowledge and teaching expertise. The model includes reflective competence (RC, planning and preparing learning units) and action-related competence (AC, providing adaptive learning support).

Aims: The longitudinal study seeks to assess the effectiveness of in-service training on early childhood educators' professional competences (RC and AC) regarding the quality of learning situations measured in their own professional setting (real life kindergarten situation).

Methods: All educators were provided with games for play-based mathematics learning. 42 educators attended an in-service training (3 x 3 hours) on RC, 43 on AC. 47 educators did not receive any training (control group, CG). Indicators for the quality of learning situations in the pre- and post-test stem from two data sources: Videotaped learning situations (four items rated for AC, e. g. adaptive learning support) and related interviews (four items rated for RC, e. g. planning).

Results: The group with the RC-training outperformed the two other groups (AC and CG) on the RC score. The group with the AC-training outperformed the two other groups (RC and CG) on the AC score.

The results show the effectiveness of in-service training targeting RC or AC in real life kindergarten situations.

Lindmeier, A. (2011). *Modeling and measuring knowledge and competencies of teachers: A threefold domain-specific structure model for mathematics*. Münster: Waxmann.

Cultural differences in parental guidance of preschoolers' play

First Author: Tessa van Schijndel, University of Amsterdam, Netherlands; **Co-Author:** Tania Cruz Cordero, Educational Sciences, University of Amsterdam, The Netherlands, Netherlands

Guided play-based activities are at the core of early STEM education. Not only teachers, but also parents have a significant role in guiding children's play during these activities. It has been shown that parents from different cultures differ with regards to their attitudes towards play (e.g. Parmar, Harkness & Super, 2004), and that these attitudes relate to the way parents interact with children during early STEM learning (Gaskins, 2008). In order to develop play-based STEM activities that serve all preschoolers and parents within multicultural societies, research on cultural differences in parental attitudes towards play and guidance of play is important.

We investigate differences between preschool parents of three cultural groups within The Netherlands. Study one uses structured interviews to investigate parental views on the developmental value of play, and the way parents guide play. Study two uses observations of child-parent dyads during STEM play to

investigate how parents interact with their child during play. Analysis of the interviews and observations will determine the extent to which play in the groups is child- or adult-directed, as well as the relation between parental views on the developmental value of play and parents' guidance of play. Data are being collected momentarily.

Gaskins, S. (2008). The cultural meaning of play and learning in children's museums. *Hand to hand*, 22(4), 1-2, 8-11. Parmar, P., Harkness, S., & Super, C. (2004). Asian and Euro-American parents' ethnotheories of play and learning: Effects on preschool children's home routines and school behaviour. *International Journal of Behavioral Development*, 28(2), 97- 104.

Session H 2

Symposium: Self-regulation and pre-academic skills in preschool children across Europe

Keywords: Cognitive development, Executive functioning, Language education, Longitudinal study, Measurement, Self-regulation

Chairperson: Catherine Gunzenhauser, Leipzig University, Germany

Discussant: Antje von Suchodoletz, New York University Abu Dhabi, United Arab Emirates

Self-regulation is a crucial component of school readiness and facilitates academic achievement in elementary school and beyond. The proposed symposium is Part I of two related symposia that aim at providing an overview of recent research on the associations between self-regulation and academic achievement in children across Europe. While Part I of the symposium will focus on preschool-aged children, Part II will address the elementary school period. During the preschool period, children typically experience a growth spurt in self-regulation skills (Center on the Developing Child at Harvard University, 2011). There are ongoing debates concerning the conceptualization of self-regulation (i.e., as unitary, domain-general construct or whether it involves several distinct subcomponents), and its measurement in young children. In addition, the direction and strength of associations between self-regulation and pre-academic skills remain to be fully understood (e.g., Bohlmann, Maier, & Palacios, 2015). The proposed symposium addresses these current issues, presenting findings from Germany, France, Finland, and Portugal. The first two papers examine measures of specific aspects of self-regulation, focusing on psychometric validation (Hubert & McClelland) and incremental validity in predicting pre-academic skills (Kerner auch Koerner & Gawrilow). The third and fourth paper (Lerkkanen and colleagues; Barata and colleagues) use longitudinal data to investigate reciprocal relations between self-regulation and pre-academic skills. The discussants of both parts of the two related symposia will collaborate to provide an integration of the findings. The discussion will outline recommendations for next steps concerning research and policy efforts aimed at supporting children's school readiness to reduce early inequalities.

The role of early self-regulation in the development of emerging academic skills

First Author: Eija Pakarinen, New York University Abu Dhabi/ University of Jyväskylä, Finland; **Co-Author:** Marja-Kristiina Lerkkanen, University of Jyväskylä, Finland; **Co-Author:** Jenni Salminen, University of Jyväskylä, Finland

The present study investigated the cross-lagged associations between behavioral self-regulation and children's emergent academic skills in a sample of 230 Finnish toddlers (47% girls, 53% boys; 2-3-year-olds). The prekindergarten teachers ($n = 100$) rated children's behavioral self-regulation skills in the fall and spring. Children were also tested twice on their emergent academic skills in individual test situations (fall and spring). Parents were asked to indicate their level of education. The analyses were conducted by specifying cross-lagged path models with the COMPLEX option. The models were constructed separately for emergent pre-literacy and pre-math skills. The results showed that higher behavioral self-regulation in fall positively predicted subsequent vocabulary and counting objects. In turn, print knowledge contributed to higher self-regulation. In addition, there was a marginally significant association between behavioral self-regulation and number sequence skills. The findings suggest that behavioral self-regulation plays an important role in development of both emergent literacy and math skills already at early age. The results emphasize the importance of paying closer attention to and supporting self-regulation skills in toddler classrooms for enhancing children's development of emergent academic skills.

Behavioral Self-regulation and Academic Achievement in Young Children in France

First Author: Blandine Hubert, Université de Lorraine, France; **Co-Author:** Megan McClelland, Oregon State University, United States

Several recent studies in the United States and abroad (i.e., Asia and Europe) have demonstrated that children's behavioral self-regulation, (which includes the cognitive processes of inhibitory control, working memory, attentional control) significantly predicts their academic achievement. The current study investigated the psychometric properties of a measure of behavioral self-regulation called the Head-Toes-Knees-Shoulders-Revised (HTKS-R) in France by assessing convergent validity, including relations to behavioral self-regulation assessed by parents, learning-related skills assessed by teachers and observational tasks, and predictive validity to academic achievement. 114 children from preschool and prekindergarten (Mean = 50.23 months, $SD = 6.37$ months) were followed from the fall to the spring of the school year in France. The results support the convergent validity of the HTKS-R task and indicate that HTKS-R scores significantly predicted literacy and numeracy achievement concurrently in the fall and spring of the school year. In addition, the HTKS-R was the only measure to significantly predict academic achievement after controlling for the other behavioral self-regulation measures. Results suggest that promoting strong behavioral self-regulation in young French children could be beneficial for their academic achievement.

Contribution of behavioral self-regulation and executive function to pre-academic skills

First Author: Julia Kerner auch Koerner, Helmut-Schmidt-University Hamburg, Germany; **Co-Author:** Caterina Gawrilow, University of Tuebingen, Germany

Behavioral self-regulation and executive functions (EF) are good predictors of early academic skills and later school performance. However, it is still discussed whether combined measures or individual measures for inhibition, shifting or working memory yield the better prediction. In this study we tested

whether a combined behavioral measure of self-regulation was a good predictor of early academic skills and to what account computerized measures of EF were helpful as an addition. 55 German children (27 girls, *M*-age 5.80 years, *SD* = 0.41) participated in their last year before school enrollment. Children performed in the Head-Toes-Knees-Shoulder-Task (HTKS), a task measuring behavioral self-regulation. To test EF children completed a Go/NoGo task (inhibition), a day night stroop (inhibition) and a backward digit span (working memory [WM]). Early math and literacy were assessed with a battery of tasks. Behavioral self-regulation and EF explained 66% of variance in early mathematical skills and 32% in early literacy skills. Behavioral self-regulation and WM added unique variance to the prediction. Inhibition only added in the prediction of math if it was entered before self-regulation. If WM was entered first in the prediction of literacy, behavioral self-regulation did not explain anymore variance. The measure of behavioral self-regulation, the HTKS, is a good general indicator for performance in early academics skills. However, computerized measures of WM still add to the prediction. The HTKS can be easily used in a preschool classroom and should be the first choice to examine self-regulation. However, if possible computerized testing is a good addition.

Self-regulation and language skills in toddlerhood: cross-domain effects

First Author: M. Clara Barata, University of Coimbra, Portugal; **Co-Author:** Joana Cadima, University of Porto, Portugal; **Co-Author:** Carolina Guedes, University of Porto, Portugal; **Co-Author:** Teresa Aguiar, Faculty of Psychology and Educational Sciences, University of Porto, Porto, Portugal, Portugal; **Co-Author:** Cecília Aguiar, ISCTE-Instituto Universitário de Lisboa, Portugal

Increasing evidence suggests that self-regulation skills are important for school readiness and later academic success (McClelland et al., 2007). Recently, studies have linked self-regulation and language skills in preschool (Bohlmann, Maier, & Palacios, 2015; Fuhs & Day, 2011; Fuhs, Nesbitt, Farran, & Dong, 2014; Weiland, Barata, & Yoshikawa, 2014). However, it remains unclear how these two developmental processes influence one another, particularly in toddlerhood, a period in which there is wide variation in language and self-regulation skills. In this study, we address this gap by examining the bidirectional associations between language and self-regulation in 268 toddlers from Portugal (Age at T1 = 30 months; 48% girls). Data was collected at two time points, using a set of self-regulation tasks and one direct measure to assess language skills. Results suggest that language skills play a particularly important role for self-regulation development. These findings have important theoretical implications by providing initial support for the integrative nature of development across domains; and also for practice, by suggesting that asking a toddler to talk aloud or to use their own words may be useful strategies that help children regulate their own behavior.

Session H 3

Symposium: Quality Matters: Understanding process quality beyond the classroom level

Keywords: Numeracy, Preschool quality, Process quality, Structural quality, Teacher-child interaction

Chairperson: Pauline Slot, Utrecht University, Netherlands

Organiser: Joana Cadima, University of Porto, Portugal

Discussant: Susanne Kuger, German Youth Institute (DJI), Germany

It is widely acknowledged that process quality, in particular the daily interactions teachers and children have with one another throughout each day, are key developmental aspects. Several studies have shown that both emotionally warm and cognitively-stimulating teacher-child interactions are linked to a range of young children's developmental outcomes (Hamre & Pianta, 2005; Mashburn et al, 2008). The assessment of process quality is typically at the classroom level. However recent research has starting to show that there are important variations of process quality within the classroom (Cabell et al., 2013) calling for further research. In this symposium, we use several lenses to look at process quality beyond classroom mean levels. The first paper examines the extent to which process quality varies as a function of daily activities in four European countries. The second paper examines process quality profiles in two European countries using a multi-method approach that combines classroom-level process quality with teacher-reported curriculum of activities. The third paper uses toddler engagement as an additional process quality indicator to investigate its associations with classroom-level process quality. The final paper investigates the extent to which consistency of observed process quality predicts children's emerging math skills above and beyond classroom-level quality. The discussion will outline potential contributors to consistency and variations of process quality across diverse cultural contexts. It will be also discussed the extent to which classroom-level process quality measures need to be combined with other measures to get a reliable picture of children's daily interactions with teachers.

Variations of process quality across daily activities in Poland, Portugal, Netherlands, and Finland

First Author: Joana Cadima, University of Porto, Portugal; **Co-Author:** Cecília Aguiar, ISCTE-Instituto Universitário de Lisboa, Portugal; **Co-Author:** Pauline Slot, Utrecht University, Netherlands; **Co-Author:** Olga Wysłowska, Faculty of Education, University of Warsaw, Poland; **Co-Author:** Marja-Kristiina Lerkkanen, University of Jyväskylä, Finland; **Co- Author:** Jenni Salminen, University of Jyväskylä, Finland; **Co-Author:** Carolina Guedes, Faculty of Psychology and Educational Sciences, University of Porto, Portugal, Portugal; **Co-Author:** Teresa Aguiar, Faculty of Psychology and Educational Sciences, University of Porto, Portugal, Portugal; **Co-Author:** M. Clara Barata, University of Coimbra, Portugal

Recent evidence indicates that the quality of teacher-child interactions is related to several developmental outcomes across diverse cultural contexts (Cadima et al., 2016; Mashburn et al, 2008; Pakarinen et al., 2011). However, we still know little about what contributes to the quality of teacher-child interactions. Recent studies have suggested teachers' use of different daily activities is likely to play a role in the type of opportunities created for interactions (Booren et al., 2012; Cabell et al., 2013). In this presentation, we extend prior research by examining how different activities affect the levels of teacher-child interactions in toddler classrooms. This study uses a sample of 30 toddler classrooms in 4 European countries (Finland, Netherlands, Poland, and Portugal; N=120). Four commonly provided activities that reflect children's regular experiences in the classroom were videotaped (Free play, pre-academic, aesthetics and routines). Videos were scored by independent, trained researchers using the CLASS-Toddler (la Paro et al., 2012) that

includes both aspects of emotional/behavioral support and engaged support for learning. Results suggested that there were important variations of teacher-toddler interactions across activities in all participating countries. The CLASS dimensions of Engaged Support for Learning were more amenable to variations compared to dimensions of Emotional and Behavioral Support. Findings further revealed country-specific features, in particular in regard to meals and free play. Findings will be discussed in light of a cross-cultural process-oriented approach. Practical implications of findings will also be discussed, namely how teachers can be thoughtful in using different activities to provide powerful learning opportunities throughout the classroom day.

Structural and Process Quality: a cross-national study using cluster analysis

First Author: Olga Wysłowska, Faculty of Education, University of Warsaw, Poland; **Co-Author:** Pauline Slot, Utrecht University, Netherlands

High quality ECEC provision has been shown to effectively enhance children's cognitive and socio-emotional development (Mashburn et al. 2008; Vandell et al., 2010). Quality encompasses two linked components – structural and process quality. Structural characteristics of the classroom are considered preconditions of process quality (Slot et al., 2015). The aims of the current study are to identify profiles based on process quality and to analyze which structural characteristics predict belongingness to each profile. Process quality was measured in 56 centers (28 Dutch and 28 Polish) with the CLASS Toddler (La Paro et al., 2012). CLASS Toddler focus on *Emotional and Behavioral Support* and *Engaged Support for Learning*. Teacher reports were used to gather information on classroom, teacher characteristics and provided curriculum of activities. First, a cluster analysis was used to identify process quality profiles using a multi-method approach including observed process quality and teacher-reported curriculum of activities. Subsequently, logistic regression was employed to determine which structural characteristics predicted belongingness to the process quality clusters. The cluster analysis revealed three different clusters of classrooms. The first is characterized by higher scores on Emotional and Behavioral Support, the second included higher Engaged Support for Learning and higher provisions of different activities, and the third one involved classrooms with low scores on all of quality domains. The results showed that country and involvement in on-going professional development appeared to be significant predictors of cluster belongingness. These findings will be discussed in view of possible, new directions of research into ECEC quality in different national contexts.

Quality from the child perspective: child engagement across activities

First Author: Carolina Guedes, Faculty of Psychology and Educational Sciences, University of Porto, Porto, Portugal, Portugal; **Co-Author:** Teresa Aguiar, Faculty of Psychology and Educational Sciences, University of Porto, Portugal, Portugal; **Co-Author:** M. Clara Barata, University of Coimbra, Portugal; **Co-Author:** Joana Cadima, University of Porto, Portugal

Child engagement can be perceived as an important quality indicator, adding valuable information to classroom quality (Chien et al., 2010). This study aims to examine the quality of individual child engagement

with teachers, peers and tasks and its associations with the quality of classroom-level teachers' interactions across a range of activities. A total of 104 children (Mage = 30 months, SD = 3.8) enrolled in 28 toddler classrooms in Portugal, participated in this study. Each child engagement was observed throughout the day, across several activities, using the inCLASS (Slot, Bleses, & Downer, 2016). At the classroom level, the quality of teachers' interactions was observed with the CLASS Toddler (La Paro, Hamre, & Pianta, 2012). Multilevel analyses revealed that, after controlling for child age, sex, and group size, child engagement with the teacher was positively associated with the quality of classroom-level support. However, when examining both child engagement and classroom-level quality across activities, different patterns emerged. Child engagement with teachers was higher in teacher-structured activities, whereas child engagement with peers and tasks was higher in free play. In addition, whereas in free play, both child engagement and classroom-level interactions were moderately high, during meals, child engagement with peers was relatively high, but classroom-level quality tended to be low. Findings suggest that different activities provide different opportunities for children to engage with teacher, peers or tasks, which could have important impact on teachers' plans of the school day.

Consistency of teacher-child interaction quality and its relation to children's emerging math skills First

Author: Jenni Salminen, University of Jyväskylä, Finland; **Co-Author:** Joana Cadima, University of Porto, Portugal; **Co-Author:** Marja-Kristiina Lerkkanen, University of Jyväskylä, Finland

The quality of teacher-child interaction is an important predictor of children's social and academic outcomes. In addition to its overall quality, the consistency of these interactions can significantly add to understanding children's early academic development in the classroom (Curby, Brock & Hamre, 2013). The present study investigates the degree to which the consistency of observed teacher-child interaction quality predicts children's emerging math skills above and beyond mean levels of teacher-child interaction quality in Finnish toddler classrooms (2-3-year-olds). Teacher-child interaction quality was observed in 41 classrooms in the spring 2016 by using the Classroom Assessment Scoring System (CLASS-Toddler, La Paro, Hamre, & Pianta, 2012). Children's (n = 230; 47% girls, 53% boys) emerging math skills were tested twice in individual test situations (fall and spring). Multilevel models showed that, after controlling for prior math and highest education level in the family, mean levels of CLASS domain of Engaged Support for Learning were positively associated with children's number production-, number naming-, and number symbol identification skills. A marginal significant effect was found between the consistency of Engaged Support for Learning across cycles and number naming skills. The results suggest that, despite the significant variation in teacher-child interaction quality across activities in the Finnish classrooms, particularly the average levels of quality on the domain of Engaged Support for Learning, are good predictors of emerging math competence in toddler classrooms. The results have practical implications for kindergarten teacher education and understanding the early antecedents of math learning.

Session H 4

Symposium: National research school for preschool teachers 2: Storytelling, drama pedagogy and literacy

Keywords: Cognitive development, Instructional practices, Language education, Literacy, Play, Preschool teachers, Professional development, Science education, Social interaction

Chairperson: Niklas Pramling, University of Gothenburg, Sweden

Discussant: Ingrid Pramling-Samuelsson, University of Gothenburg, Sweden

Swedish National Research School on Communication and Relations as Foundations for Early Childhood Education (FoRFa) (funded by the Swedish Research Council, 2014-2018, grant no. 729-2013-6848) takes hold of the fact that children participating in stimulating early childhood education gain developmentally, including to a higher degree succeed in school. The nature of teacher-child and child-child communication and the establishing and maintaining of developmental relationships are fundamental to facilitating such development. The research school offers preschool teachers education in this field of research to a Licentiate degree (PhD education). In the symposium we will present the research school, its thematics and organization; that is, how preschools and Universities collaborate. We will then give examples of empirical studies conducted within the research school. The examples that will be presented are: 1) Engaging children in basic chemistry through drama pedagogy 2) *Bildung* and/or representation: Fostering artistic perception through teaching in art-making 3) The processes of children retelling and remembering oral stories.

Engaging children in basic chemistry through drama pedagogy

First Author: Annika Åkerblom, Gothenburg University, Sweden; **Author:** Niklas Pramling, University of Gothenburg, Sweden

The purpose of this study is to clarify how young children in early childhood science education manage issues of representation. More specifically, we analyze how a group of 6-year-old children manage representations used in a playfully-formatted (van Oers, 2014) lesson at a culture center about basic chemistry. The study is based on interviews with the children after participating in a lesson where they were engaged in embodying, giving *gestalt*, to chemical processes. Lead by a drama pedagogue, dressed up and acting as if she were a water molecule, combined with experiments with water and coloring, attempts were made to engage children in making sense of features of basic chemistry. In the follow-up interviews we were particularly interested in finding out how the children understood the central concepts and processes enacted and in other ways represented in the lesson, that is, (water and sugar) molecule(s) and the solution of water and sugar in different temperatures. The interviews were analyzed as social practice, that is, how the children respond to the conceptual and communicative challenges they faced in the activity. The results show important differences in how the children make sense of the forms of representations used in

the lesson. We discuss how these differences are critical to developing representational insight and basic scientific understanding, and what the educational implications are. Keywords: representation, science, preschool, chemistry, early childhood education, playfulness

Bildung and/or representation: Fostering artistic perception through teaching in art-making

First Author: Kristina Melker, University of Gothenburg, Sweden; **Co-Author:** Ingrid Pramling-Samuelsson, University of Gothenburg, Sweden; **Co-Author:** Elisabet Mellgren, University of Gohenburg, Sweden

The aim of this presentation is to highlight how art and an artistic activity forms in preschool and what kind of art children socialize to during teaching in depiction creating. The research questions are: a) what kind of settings will be developed realized when children participate in an aesthetic activity? b) what kind of understanding of art implicates at this teaching session? A video camera has been used to generate data from the teaching session with focus to observe collaboration and communication between the preschool teacher and the six children. Data is also generated from audio recording and notes from the teacher team's planning before and after the teaching session. This study assumes a sociocultural approach on learning. Central concepts are Vygotskys' (1978) concepts: Perception of real objects and separating action and meaning. The teaching session is a depicting activity, the aesthetic/artistic perception that the activity implies is a form of realism. This result points out that the groups as a resource are not used when the children depict a still life, it is first at the end of the session the children are given opportunity to learn from each other. The results are discussed in relation to preschool teachers' management in classroom and the challenge to adapt the concept of teaching in preschool, a notion introduced not long ago in Swedish Early Childhood Education.

Keyword: Teaching, Aesthetic, Preschool, Sociocultural perspective

The processes of children retelling and remembering oral stories

First Author: Agneta Pihl, University of Gothenburg, Sweden; **Co-Author:** Louise Peterson, University of Gothenburg, Sweden

In the study we will present we ask: What do children pick up from a story told to them by their teacher and how do they transform the story when retelling it? Oral storytelling is a fundamental tool for communication and sense making. Telling stories is typically learned in early years but developed over time (Pramling & Ødegaard, 2011). Theoretically, the study builds on sociocultural perspective on remembering and learning. The presentation builds on a recent study on how preschool children orally retell stories they have been told by their teacher. The setting is a Swedish preschool, where children aged 4-5 years regularly participate in storytelling activities. These activities have been video recorded, transcribed and analyzed in lines with the principles of Interaction Analysis. The study follows the ethical guidelines of the Swedish Research Council. The findings show that the children remember details, introduce new elements and transform the story. When retelling the story the children remember (i) the story activity, that is, the manner in which the story was told and (ii) the story as such, its main events and as some of it's details. On a more general level, the study shows how children's retelling and remembering are clearly related in the

sense that they make of the story and the activity as they perceive it. This implies that when teachers support the processes of storytelling and remembering, they also support children's sense making and vice versa.

Keywords: storytelling, remembering, sense making, children, interaction analysis