PINA IS AN INTERDISCIPLINARY COMPETENCE CENTRE FOR EARLY CHILDHOOD EDUCATION RESEARCH WITH SEVERAL RESEARCH TOPICS IN POTS DAM.
Cognitive-affective maps as a tool to access pre-school teachers’ beliefs about interaction quality in early education / Jasmin Luthardt

Young children’s learning by action imitation: impact of emotional and verbal cues / Birgit Elsner, Christiane Patzwald

Assessing quality in Norwegian kindergartens using Environmental Rating Scales / Thomas Moser, Elisabeth Bjørnestad

When do toddlers prefer adults to peers as informants? / Gregor Kachel, Richard Moore, Robert Hepach, Michael Tomasello

Why do infants attend to infant-directed speech? / Vivien Radtke, Melanie Steffi Schreiner, Tanya Behne, Nivedita Mani

How do infants build internal models in a changing world? / Ezgi Kayhan, Marlene Meyer, Jill O’Reilly, Sabine Hunnius, Harold Bekkering

Negotiations among children in kindergarten: The sharing of world experiences and the creation of orders on a continuum between experiences of intercommunity and difference / Claudia Geißler

Making the quality of interaction in educational settings and care of small children visible / Eva Pölzl-Stefanec, Catherine Walter-Laager, Lea Mittischek, Christina Bachner

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PINA

POTSDAM RESEARCH INSTITUTE FOR EARLY LEARNING & EDUCATIONAL ACTION

is an interdisciplinary research association run jointly by the Potsdam University of Applied Sciences and the University of Potsdam. The institute is an early childhood education research center and serves as exchange forum for scientists and practitioners alike. PINA works on early childhood development and education with a special focus on cognitive and socio-emotional development, teacher-child interaction, and the development of quality in early education.

PINA was founded in 2017, emerging from EQUIP – a cooperative research program focused on quality and interaction in everyday pedagogy. EQUIP itself was funded by the Federal Ministry for Family Affairs, Senior Citizens, Women and Youth, and jointly run by the University of Potsdam and the Potsdam University of Applied Sciences. The Potsdam University of Applied Sciences and the University of Potsdam offer a joint, research-focused Master’s program in early childhood research, with PINA members taking part in research and teaching there. PINA also contributes to the central joint platform of the new site for early childhood education research in Potsdam.

PINA hosted its first conference on October 4 and 5, 2018, providing researchers and experts in early childhood education, development, and learning with a forum to network and exchange information. The conference featured discussions on early childhood education and psychology, the effects of early learning and the processes underlying education, and looked towards the evidence-based formation of new methods, instruments, and transfer strategies connected to the development of elementary education.

The following section contains the abstracts of the PINA Conference 2018.
COGNITIVE-AFFECTIVE MAPS AS A TOOL TO ACCESS PRE-SCHOOL TEACHERS’ BELIEFS ABOUT INTERACTION QUALITY IN EARLY EDUCATION

Jasmin Luthardt — Potsdam University of Applied Sciences

This project focuses on the beliefs of pre-school teachers about adult–child interaction. One of the key questions here is how to change such beliefs in light of scientific findings in a sustainable way. Cognitive-affective maps (CAMs) of belief systems are therefore generated at three levels: (1) education policy and programs of educational training providers, (2) day care centers (as organizations), and (3) individual belief systems of pre-school teachers. CAMs are based on Thagard’s theory of emotional coherence. A CAM is a network diagram or concept graph that not only displays the conceptual structure of people’s views but also their emotional nature, revealing the positive and negative values attached to concepts and goals. The initial results of the CAM comparison show that “interaction” is linked to a variety of other concepts. There are strong similarities between all CAMs with regard to the cognitive expression of the concepts, e.g. ‘daily routine’, ‘ability to act’, ‘image of the child’, and ‘workload’, while there are differences in their emotional connotations. The concept of ‘daily routine’, for instance, is seen both as a resource in educational policy and as a decisive obstacle to stimulating interaction by educational training providers, some day care centers, and individuals. There is reason to believe that those inconsistencies, found across all networks, inhibit professional educational innovations such as formats of sustained shared thinking. One possible interpretation emerging from CAMs is that certain supposedly shared knowledge content is perceived differently in a fundamental way, so that important information is lost between levels.
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Assessing Quality in Norwegian Kindergartens Using Environmental Rating Scales

Thomas Moser — University of South-Eastern Norway (USN)
Elisabeth Bjørnestad — Oslo Metropolitan University (OsloMet)

This paper is based on data from the recently finalized (2018) longitudinal study Better Provision for Norway’s Children in Early Childhood Education and Care (BePro). The aim of this presentation is to share and discuss some main aspects of quality in a representative sample of kindergartens in Norway when using the Infant/Toddler Environment Rating Scale – Revised (ITERS-R) [3] and the Early Childhood Environment Rating Scale – Revised (ECERS-R) [4]. In this presentation, we provide (a) an overview of the quality of Norwegian kindergartens, (b) an investigation into the relation between quality and organizational forms of kindergartens and staff–child ratio, and (c) reflections on methodological issues in presenting the results of traditional (stop-scoring procedure) and alternative (full) scoring procedure (ITERS-R).

At T1, 206 groups (group size ranging from 7–56 children) from 93 kindergartens, including 2,556 children (2.5 years of age) and 758 staff members, were assessed by ITERS-R. At T2, 205 groups (group size ranging from 7–45 children) from 95 kindergartens, including 3,489 children (average age 5 years) and 684 staff members, were assessed by ECERS-R. Children participating in BePro were born in 2011 and 2012.

We observed considerable variations of quality for younger (ITERS-R) and older children (ECERS-R). Surprisingly, the Norwegian quality, measured with ITERS-R and ECERS-R, scores at the minimal level of the scales. The average total score for ITERS-R is 3.9 and for ECERS-R 4.2 on a 7 point scale. At the ITERS-R subscale level, the quality ranges from an average score of 3.5 for both Personal Care Routines and Activities to a score of 4.7 for Interaction. None of the ITERS-R subscales score 5 or above. The quality in the ECERS-R subscales is slightly higher except for Activities with an average score of 3.3. Only the Program structure subscale scores at a good level of quality, with an average score of 5. Figure 1 and 2 show the total and subscale scores for ITERS-R and ECERS-R.

In Norway, ECEC institutions normally organize either as fixed group settings with stable group compositions that have specific physical rooms (“their rooms”) and more flexible (open) group organizations consisting of larger groups of children sharing the entire area of the institutions. In the latter case, there are a number of “thematic rooms” (special rooms) for specific activities, used by children based on their interests and choices. Comparing quality between these two organizational forms for the 2- to 5-year-olds revealed that stable groups scored significantly higher than flexible groups, both with regard to the total ITERS-R score (stable groups M = 4.05, SD = .75, flexible groups M = 3.44, SD = .78; t(204) = 4.98, and p = .00), and on all subscale levels, except for Personal Care Routines.

Furthermore, the staff-to-child ratio correlates with quality in this age group [1]. By comparing units with a staff-to-child ratio of 1:3 or less (≤ 1:3) with provisions that have ratios higher than 1:3 (> 1:3) we found significant differences in quality in the total ITERS-R scores (for ratio ≥ 1:3, M = 3.99, SD = .79; for ratio < 1:3, M = 3.76, SD = .78; t(204) = 2.066; p = .04). Significant differences were also observed for the subscales of Listening and Talking (for ratio ≤ 1:3, M = 4.52, SD = 1.34; for ratio > 1:3, M = 4.10, SD = 1.37; t(204) = 2.212, p = 0.02) and for the Interaction subscale (for ratio ≤ 1:3 M = 5.02, SD = 1.45;
for ratio > 1:3 M = 4.33, SD = 1.48; t(204) = 3.416, p = .00). The analysis of the ECERS-R data for children at age 5 is still ongoing; however, preliminary analyses indicate minor or no differences between provisions with low and high staff–child ratios.

The items of ITERS-R (and the ECERS-R) are organized along hierarchical scales with basic needs and requirements in the lower part (scores 1–3) and more stimulating best practice and educational activities and interactions in the upper part of the scales (scores 5–7). If the requirements (indicators) at a lower level of the scale are not fulfilled, the observers stop scoring and higher values cannot be achieved. The scales have been criticized for this stop-scoring procedure [2].

In addition to the stop-scoring procedure, we therefore also scored all indicators of an item along the entire scale to obtain additional information about the quality in the kindergarten units observed (ITERS-R). The alternative scoring procedure calculates item scores based on the total number of yes and no observations regarding the indicators for each item, and fitted the original range of the scale (1-7). Not surprisingly, the scoring of observations in this way resulted in consistently higher scores compared to the traditional stop-scoring approach. However, the kindergarten units traditionally scoring low improved more than did units that scored better in the traditional stop-scoring method. The correlations between traditional and alternative scoring were medium to high, ranging from .58 to .98, indicating that both scoring forms for the ITERS-R at least partly measure the same concept. However, we observed consistently lower correlation in some items related to the three subscales of Activities, Personal Cares and Routines, and Space and Furnishing. This indicates that an alternative scoring procedure might provide a somewhat different assessment of quality that might be valuable.

Figure 1: ITERS-R total score and subscale scores.

Figure 2: ECERS-R total score and subscale scores.
WHEN DO TODDLERS PREFER ADULTS TO PEERS AS INFORMANTS?

Gregor Kachel — Potsdam University of Applied Sciences
Richard Moore — Berlin School of Mind and Brain
Robert Hepach — Leipzig Research Center for Early Child Development
Michael Tomasello — Duke University, Durham, North Carolina, U.S.

Throughout the second year of life, infants’ and toddlers’ encounters with age-mates provide opportunities for social learning that are qualitatively different from the structured interactions they have with adult caregivers. The distinct social affordances that interactions with peer and adult partners provide are likely to shape the expectations and motivations with which young children will engage in both social contexts subsequently. 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.
WHY DO INFANTS ATTEND TO INFANT-DIRECTED SPEECH?

Vivien Radtke — University of Göttingen
Melanie Steffi Schreiner — University of Göttingen
Tanya Behne — University of Göttingen
Nivedita Mani — University of Göttingen

Caregivers typically use infant-directed speech (IDS), an exaggerated form of speech, with their infants. Infants prefer IDS to adult-directed speech (ADS) and IDS is functionally relevant in child-directed communication.

We examined the interaction among these three effects across development (at 6 and 13 months). First, to assess the quality of maternal IDS, mothers were recorded using ADS and IDS. Second, we examined infants’ preference for IDS over ADS. Third, to assess the functional relevance of IDS, infants’ gaze-following was compared for gaze cues accompanied by IDS and ADS (Senju & Csibra, 2008).

Results show a preference for IDS over ADS and improved gaze-following behavior after IDS only at 6 months. We did not find changes in the quality of IDS across development. Correlations between the mothers’ speech and infants’ preferences showed shorter listening times to ADS, if the mothers’ IDS was more infant-directed at 6 months, r = -.51, p = .007. At 13 months, the higher the minimum pitch in maternal IDS, the less infants listen to IDS, r = -.46, p = .017. Correlations between the preference of infants and their gaze-following behavior found that infants who showed a preference for ADS looked more to the model after ADS presentation at 6 months, r = .38, p = .052. No other correlations were found.

We interpret these results as indicating a more active role for infants in early language development. At the same time, we highlight the functional relevance of IDS early on.
HOW DO INFANTS BUILD INTERNAL MODELS IN A CHANGING WORLD?

Ezgi Kayhan — Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig; Donders Institute for Brain, Cognition and Behavior, the Netherlands

Marlene Meyer — University of Chicago, Illinois, U.S.

Jill O’Reilly — University of Oxford, Oxford Centre for Functional MRI of the Brain, Nuffield Department of Clinical Neurosciences, John Radcliffe Hospital, U.K.

Sabine Hunnius — Donders Institute for Brain, Cognition and Behavior, the Netherlands

Harold Bekkering — Donders Institute for Brain, Cognition and Behavior, the Netherlands

Understanding how young children learn is of crucial importance to enhancing learning outcomes. For example, examining the current model that children have about a certain task is useful in employing strategies to improve the comprehension of that given task. In this study, we investigated how infants and adults learn the structure of a dynamic experimental environment, that is, how they build internal models of an experimental task. Particularly, we examined whether they dissociate different types of unexpected events to the extent to which they are relevant to modulating their internal models. Participants observed differently colored bees that appeared at an unexpected location every few trials. The cues indicated whether the subsequent bees would appear at this new location (i.e. update trials) or at the same location as previously (i.e. no-update trials). Results of the eye tracking study revealed that 14-month-old infants dissociated different forms of unexpected information to adjust their internal models accordingly. In the EEG study, data revealed that 9-month-old infants formed an internal model of the experimental structure and updated their models in response to environmental changes. Remarkably, when an expected change did not happen, infants responded with an amplified neural response suggesting a top-down modulation of sensory processing in infants. These studies shed light on the behavioral and neural mechanisms underlying infants’ learning. The findings of these studies are relevant to designing educational policies and planning tailored approaches for home and kindergarten settings to improve learning outcomes.
NEGOTIATIONS AMONG CHILDREN IN KINDERGARTEN: THE SHARING OF WORLD EXPERIENCES AND THE CREATION OF ORDERS ON A CONTINUUM BETWEEN EXPERIENCES OF INTERCOMMUNITY AND DIFFERENCE

Claudia Geißler — Karl-Franzens-Universität Graz, Austria

Although different emphases are placed within the German-speaking discourse of early childhood education, it is agreed that education is a social process in which children actively participate. For instance, Fthenakis (2012) stated that education is a co-constructive process that takes place in shared interactions. Especially in recent years, research efforts regarding the implementation and quality of child–teacher interactions has increased, while the interaction among children has received only marginal notice. According to Youniss (1994), co-operation among peers offers beneficial conditions for negotiation processes and child learning, as it is characterized by a more symmetrical reciprocity (see also Völkel, 2007; Fried, 2004). While such co-constructive processes among children in schools are well researched, there is a lack of studies on interaction processes among children in early educational settings. This dissertation thus pursues the following research question: How do children interact in preschool? The study focuses on the interactions among children and their framing by the educational setting. Focused ethnographies were carried out in three preschools. The data collection included video and observational data and also contained documentation of spatial structural conditions. Based on the video interaction analysis, the material is analyzed within interpretation groups. Through comparison and contrast, the ongoing study explores the ways in which interactions are organized in different cases and settings. Preliminary results reflect on the multifaceted negotiations of the peer group as well as their connection with the educational setting.
In Austria, more and more children under three years of age attend day care centers. It must therefore be ensured that the design of the educational work of these institutions has a positive impact on child development (Statistik Austria, 2016). International studies illustrate that the quality of educational work is an important indicator of the effects of attending early childcare institutions (Pianta, 2017). Special importance is attributed to the characteristics of the interaction between qualified personnel and children. This study introduces a completed project in which eleven best practice criteria were specified from existing quality checklists as the result of systematic research of the literature, with these criteria illustrated by video examples from real-life situations (Walter-Laager et al., 2018). These scientifically sound criteria for determining interaction quality can be linked to the two dimensions of “relationship” and “stimulating educational environment”. A high quality relationship is necessary in order to make children feel comfortable and free to explore their environment.

Child development is supported by encouragement that focuses on reaching the next level of development to be attained. Also, with respect to Wertfein et al. (2017), we show how, with the help of best practice criteria, a connection can be found with the improvement of training for kindergarten teachers and further education for the heads of child care centers and their teams. These processes can be regarded as part of the professionalization of elementary education.
It is important to involve parents in their children’s education in order to achieve good learning processes (Hara & Burke, 1998). This is also true for institutional early childhood settings, which is one reason why communication between parents and kindergarten teachers has received increased attention internationally. Although the need for communication between parents and kindergarten teachers has also been discussed in “the German speaking area” (Stange, 2012) and in Austria (Rodriguez Lopez & Kicker, 2014), there is no solid scientific theoretical framework that explains both the relevance of communication between parents and kindergarten teachers and what forms good communication could take. There is also a lack of empirical research on the character of communication in the German-speaking area. My dissertation therefore involves the investigation of the frequency of forms and content of parent–teacher communication in preschools in Tyrol, Austria.

The focus of the presentation is to explain the relevance of communication between parents and preschool teachers. The relevance at the theoretical level will be demonstrated by drawing upon Bronfenbrenner’s bioecological model (1981). The relevance at the empirical level will be underlined by presenting research done in the U.S. about the effects of parental involvement (e.g., Reynolds, Ou & Toupitzes, 2004).

Lastly, it will be shown why systematic empirical research on the issue is needed in the German-speaking area. An ongoing study will also be presented briefly.
CONCEPTUAL UNDERSTANDING OF CHILDREN AGED BETWEEN FOUR AND SIX YEARS OF THE GEOMETRICAL TERM ‘QUADRANGLE’

Elisabeth Unterhauser — Osnabrück University
Hedwig Gasteiger — Osnabrück University

Early geometrical education must be propaedeutic to enable meaningful coherent learning and should therefore be theoretically and empirically based. Even though studies have found that many misconceptions, e.g. a prototypical or non-hierarchical understanding of the concept ‘quadrangle’, introduced in early childhood, can persist at least until high school (e.g., [5]) or even university (e.g., [6]), little detailed research has been carried out regarding the development of geometrical competences (e.g., [7]). To investigate the conceptual understanding of the geometrical term ‘quadrangle’ and its attributes, 120 children (N = 120, M = 66 months, SD = 7.71) were interviewed. They had to identify quadrangles (9 examples, 4 non-examples) presented on a computer screen (see figure 1). The examples, varying in mathematically irrelevant attributes (e.g. orientation), were both prototypical and atypical. The non-examples lacked attributes, e.g. the straight sides necessary for the concept of ‘quadrangle’.

The Bravais-Pearson correlation coefficient between age and the identifications made is not significant (r = .03, p = .776). On average, children identify non-examples significantly more correctly than examples (t(119) = -4.18, p < .001, d = .72). Identification rates for prototypical quadrangles, e.g. squares, are significantly better than for atypical ones, e.g. diamonds, (t(119) = 11.57, p < .001, d = 0.87). The McNemar test was significant (χ² between 9.63 and 67.01, p ≤ .002) for 7 pairs of shapes differing in one mathematically relevant or irrelevant attribute. The results show that non-examples are identified correctly and mathematically irrelevant attributes influence identifications of atypical examples (see figure 2).

In sum, children’s conceptual understanding of the geometrical term ‘quadrangle’ can be characterized as prototypical.

Detailed information on the study and the results are presented in [26].
Figure 1: Figures presented for the identification of quadrangles

Figure 2: Identification of quadrangles
AGE OF ACQUISITION: THE BRIDGE BETWEEN CONCRETE CONCEPTS AND ABSTRACT THOUGHT

Alex Miklashevsky — Potsdam Embodied Cognition Group (PECoG), University of Potsdam

Age of acquisition (AoA), the age at which a particular concept or word is acquired, influences a wide range of cognitive tasks, such as picture naming, object recognition, word naming, lexical decision tasks, eye fixation times, and face recognition (Juhasz 2005; Zevin and Seidenberg 2002). Here, AoA data was systematically collected for a sample of 506 Russian nouns along with other psycholinguistic variables of potential interest for embodied cognition theories, such as relatedness to different perception modalities (vision, touch, hearing etc.), manipulability, and imageability. Multiple significant correlations were revealed – negative ones between AoA and perception-related word semantics (except for the auditory modality) as well as word frequency, but also positive correlation between AoA and word length. Factor analysis suggests that AoA is a complex variable, almost equally loading on two factors: (1) visuospatial and motor experience associated with the word; and (2) surface word form and its functioning. The earlier the word is acquired, the stronger it is associated with perceptual and motor experiences, and at the same time the shorter and the more frequent the word tends to be. A small group of grammatically abstract nouns that are, however, strongly related to sensorimotor experience is revealed (e.g., sleep, pain, joy, run, jump, fear). Interestingly, these words are acquired simultaneously with the majority of concrete words, i.e., much earlier than most other abstract words. I argue that these words are particularly important for the development of abstract thought, providing children with a linguistic mechanism that makes a later drift from perceivable events and objects (concrete concepts) to non-perceivable ones (abstract concepts) possible.
LEARNING POTENTIALS IN TODDLER PEER INTERACTION

Susanne Viernickel — University of Leipzig

The presented research focuses on the question if and to what extent peer interactions and peer-related activities bear learning potentials for one- and two-year-old children in childcare.

When exposed regularly to other children, toddlers show lively interest in their peers and frequently engage in diverse kinds of peer interaction, including functional and symbolic play, acts of sharing, helping, comforting, and conflict (Viernickel, 2009). Still, not much is known about the impact of these experiences on learning and development.

To find out how often and to what extent toddlers activate learning potential in peer interaction and during peer-related activities, videotapes of free play sessions of 140 children (12–35 months) from 35 childcare centers in Berlin, Germany, were analyzed. Drawing on Gerd E. Schäfer’s theory of early learning (Schäfer, 2014), we consider a situation to hold learning potentials if the child engages him/herself physically and emotionally, shows concentration and persistence, and uses sensory-perceptive clues and representational functions (e.g. symbolic play, verbal communication). We assessed the relationships between the degree of activation of learning potentials and the child’s orientation towards peers, his/her involvement in direct peer interaction and small group activities with same-age- as well as somewhat older and younger children.

The discussion will focus on a) the questions of if and under which conditions peers and peer groups serve as contexts where toddlers activate learning potentials and b) the reliability and validity of our observational approach.
Evidence clearly indicates that providing high quality early childhood education and care (ECEC) shapes children’s later learning and development. Especially process quality in ECEC classrooms has been shown to be a critical feature affecting children’s self-regulation [8] and social-emotional skills [9] as well as emergent academic skills such as pre-skills for math and numerosity [10] and literacy skills [11]. A number of studies have shown that children who experience high quality ECEC at young ages are more likely to have better educational and social outcomes than children in low quality ECEC settings [12, 13].

This body of research often involves the concept of quality. The term quality is a multi-dimensional construct that refers to the extent to which an environment enhances child development. Both the quality of teacher–child interaction [14] and teachers’ effective pedagogical practices [15] are associated with child outcomes [16]. An important conceptualization of process quality follows that of the Teaching Through Interactions framework (TTI; [17]), encompassing three broad domains (i.e., Emotional Support, Classroom Organization, and Instructional Support). In recent years, research on classroom process quality, especially in the U.S., has seen a surge in large-scale quantitative studies employing the TTI framework and the structured CLASS assessment measure [14] as a tool to assess the quality of emotional, organizational, and instructional support within teacher–student interaction. Most typically, the focus has been on classroom level differences in process quality and their relation to child outcomes. At the same time, studies focusing on effective teaching have been conducted with a stronger emphasis on aspects of pedagogy and teachers’ practices (e.g., [18]).

Even though evidence on the benefits of process quality on child development and learning is rapidly growing, there is a clear gap in research concerning the youngest children in ECEC. Thus far, most of the research has involved children between 4 and 5 years of age or older. Substantially less is known about the process quality features of toddler classrooms (2- to 3-year-olds) and their associations with children’s learning and development later on. Particularly, longitudinal studies on associations between toddler classroom quality and later educational and developmental outcomes are scarce.

The presentation attempts to describe how the quality of teacher-child interactions and effective teaching practices observed in ECEC classrooms influence children’s emergent academic skills, social skills, self-regulation, and interest in learning in the Finnish context. The Finnish system as a whole is based on high-quality public services. The goals of the Finnish early childhood education curriculum place greater emphasis on fostering the child’s personal and social development than on the formal or systematic teaching of academic skills. The results, which will be presented in the conference, are based on two observation studies in Finnish ECEC classrooms, using two different observation tools: CLASS [14] and ECCOM [18]. Overall, the results of these studies suggest that we need to be aware of what we would like to study and observe and choose the observation tools in accordance with that goal.
EXAMINING THE ROLE OF WORKING MEMORY IN SCHOOLCHILDREN’S SPATIAL REASONING

Kevin Demiddele – KU Leuven, Belgium
Tom Heyman – KU Leuven, Belgium
Walter Schaeken – KU Leuven, Belgium

Part of what it means to be rational is to reason well. In reasoning, however, rational behavior is sometimes limited by e.g. working memory limitations. As such, it can be hard to judge whether children have more limited working memory or whether they are less rational than adults, or both. We investigated whether allowing children to take notes while solving reasoning problems would improve their reasoning performance. The assumption was that taking notes reduces working memory load.

We presented 217 children (10- and 12-year-olds) with simple spatial order reasoning problems. For problems in which constructing 1 mental model led to the correct answer, the results were as one would expect: the children that could take notes performed significantly better than those that could not. However, for ambiguous problems where it was required to take multiple possibilities into account for arriving at the correct answer, we observed the opposite effect: the children that could take notes performed significantly worse. They almost exclusively drew just one, “preferred model” (cf. Ragni & Knauff, 2013).

Their reasoning behavior was rational only under the assumption that the presented information was unambiguous. We explicitly pointed this out to children in a replication of the experiment (n = 132). While there was significant improvement, it was not enough for the children taking notes to exploit this to their advantage for the ambiguous problems as well. We will interpret these results in terms of “rational thinking dispositions” (cf. Stanovich, 2016) and the development of rationality.
One central aspect of human rationality is the ability to explain, predict, and justify behaviour by giving reasons that speak for it. Reasons stand in inferential/evidential relations to each other. Given certain goals or needs, it is rational to react to the environment in certain ways. This is the assumption of rationality. Furthermore, reasons must be someone’s reasons in order to be explanatory. In this sense, reasons are the contents of certain mental states that bring about an intention to act. This is the assumption of subjectivity. The development of rationality, in the sense of being able to give and ask for reasons, centrally rests on an understanding of both the inferential/normative and the mental/subjective dimensions of reasons. While understanding the inferential/normative aspect of reasons depends on knowledge of a given domain of interest, behavioural goals, and general reasoning skills, understanding the subjectivity of reasons requires a Theory of Mind (ToM). Otherwise, reasons could not be conceived of as the contents of mental state. In a recent study we found that the kinds of explanations offered by children for a simple intentional behaviour depended on ToM capacities. Children who pass a standard explicit unexpected-location FBT are significantly more likely to give explanations that presuppose the attribution of mental states than are children who do not pass the FBT. Children who do not pass the FBT nonetheless give explanations that fulfil the assumption of rationality. These findings confirm that the kinds of explanations offered by children depend on ToM capacities in the expected ways.
Heterogeneity in the verbal competence of children is something that professionals are faced with in kindergartens and primary schools. The objective of the KoPra longitudinal study is, on the one hand, to investigate the pragmatic development of children in various kindergartens and primary schools. The purpose of this data collection is, on the other hand, to determine what behavioural and verbal styles of professionals in kindergarten and primary school yield a beneficial effect on children’s communicative skills in interaction.

Assessments of pragmatic competencies are carried out with preschool children and first graders in order to gain an understanding of pragmatic development during the transition from kindergarten to primary school and to determine institutional as well as familial factors of influence. The development of communication skills among children aged 5–7 years is analysed based on videotaped sequences of communication of some of the children from the sample with their educators in daycare centres, whilst taking into account the perspective of those professionals on the communicational behaviour of the videotaped children in daily life.

Definition: Pragmatic and Communicative Competences [19]

1) Pragmatic Basic Competence I = person-specific language
2) Pragmatic Basic Competence II = situation-specific language
3) Discursive Basic Competence = verbal cooperation, narration etc.
The quantitative results of KoPra have shown that the transition from kindergarten to primary school is an important period for the development of pragmatic abilities due to significant increases in skills, especially in children with below-average abilities or a low starting level in their pragmatic competences. These children, however, are not able to compensate for receptive deficits until the start of school and do not adjust their productive impairments to an average level until the end of first grade [20]. Therefore, there is a need for professional support with regard to the acquisition of pragmatic skills during the transition from kindergarten to primary school. KoPra was introduced in the presentation of the longitudinal study. The overall focus has been on the qualitative analyses of videotaped interactions between children demonstrating different pragmatic competences in their test results with their educators. Their development (5x kindergarten, 5x primary school) of narrative skills and communicative strategies were discussed considering the input of the educators and its effects. For instance, the verbal cooperation of children, the change in their speech acts over time and the educator’s adaptation in their dialogue were all addressed. The discussion also included how children’s narrative skills become more elaborate over time in contrast to the steady input of educators during those narration sequences. All the analyses of the videography will be presented in Bergau’s dissertation (in preparation) (corpus: 60 videos, 5 children, 10 educators, 8 institutions, 2 settings (different stimuli for communication and narration)). Intraindividual as well as interindividual developments and competence profiles of children in pragmatics and communication will be shown in this corpus. The conversational skills of educators will be evaluated in terms of whether they fit the competence profiles and support the development of the children’s skills. The overall aim is to draw consequences for educators in kindergartens and schools.

Interested readers can visit [21] in order to find out more information on the project.

Figure 2: KoPra videography of setting "game of dice"
Children begin to participate in collaborative activities around two years of age (Brownell & Carriger, 1990, 1991). At age three, children begin to understand joint commitments (Hamann et al., 2012; Gräfenhain et al., 2009).

In my talk I will present recent work investigating young children’s understanding of joint commitments.

First, we explored children’s reactions to a partner’s failure to perform their role in a joint commitment. We found that 3-year-olds protest against partners who defect selfishly and knowingly, but restrain from protest if partners stop cooperating due to reasons outside of their control. Interestingly, they also try to teach their partners if they appear willing but incompetent.

Second, we investigated whether 3- and 5-year-olds can be bribed to abandon a collaborative partner who depends on them (implicit joint commitment), a dependent partner with whom they made an explicit joint commitment, and an independent partner. We found that children of both ages showed some level of commitment to their partner in the face of alternative individual rewards if an explicit joint commitment was formed. Only 5-year-olds understood a partner’s dependence as a binding obligation.

In the third study, we asked whether children understand the dissolvability of joint commitments and explored their reaction to a partner’s disengagement from a joint task depending on how the partner dissolves the commitment. Children accepted a partner’s disengagement after a proper joint revocation and resented a partner who just left the task or did not dissolve appropriately.
WHAT CHILDREN KNOW ABOUT TIME: IMPLICATIONS FOR EARLY CHILDHOOD EDUCATION

Judith Hudson — Rutgers University, New Jersey, U.S.

The findings from the papers presented in this session can be applied to early childhood education in several ways. Most temporal instruction in the early childhood classroom focuses on learning names for weekdays and months during discussion of calendars, or “calendar time.” However, Mayhew found that only 50% of children from 4.5 to 5.5 years old can name all the days of the week. Time instruction often involves using the terms ‘yesterday’ and ‘tomorrow’ when it is not until age 5 that children reliably know that ‘yesterday’ refers to the past and ‘tomorrow’ to the future (Zhang); this may be a generic distinction between past and future versus now. In addition, children understand yesterday before tomorrow, regardless of language structure, which may be an indication that thinking about the past is easier than reasoning about the future (Zhang).

In contrast to calendar time talk, conversations about past and future events with adults (both teachers and parents) provide children with exposure to many kinds of temporal language (Andrews). Young children’s temporal language use, although sparse, is related to adults’ use in adult-child conversations. These findings are consistent with those of Hudson (2011) showing that the amount of maternal temporal language used in mother-child conversations when children were 4 years old predicted children’s temporal understanding on a timeline task at age 6.

Furthermore, although teachers focus on talking about days of the week, children’s ability to sequence the events in a preschool day correlates significantly with children’s ability to include more items in script reports, name the days in the week, know the parts of a day, and with their pattern reasoning ability (Mayhew).

Overall, the findings from these studies suggest that the first step in learning time concepts may be understanding the sequence of daily events. Early childhood instruction should focus on making this knowledge explicit and using the daily event sequence to help children (1) sequence actions, (2) understand the regularity and cyclical nature of days, and (3) use sequence language (before, after, next, again). Visual aids and games could be used to give children practice in sequencing parts of the day and mapping daily activities onto an external representation, such as a timeline or clock.

The next step in learning conventional time measurement systems is the understanding of the repeated nature of daily event sequences (i.e., that the daily script repeats every day), and reasoning about sequences of days. This provides the foundation for understanding the relationships between yesterday, tomorrow, and now, and for sequencing the days of the week. Thinking about tomorrow and yesterday may best be facilitated through conversation and discussion of activities children actually experienced or will experience, instead of in relation to an abstract calendar. Teachers can learn how to facilitate these conversations which may be more effective for learning about time than direct instruction.

Introducing calendars to represent days, weeks, and months may be more beneficial after children already have an understanding of the sequence of days and how weeks are constructed from days. Calendars could be introduced in kindergarten to reinforce children’s understanding of how days repeat, the names of the days in the week, the repeated pattern of seven days per week, and to illustrate the way in which months are composed of weeks and days.
WHEN DO PRESCHOOL TEACHERS USE TIME TALK  
AND TO WHAT EFFECT?

Estelle Mayhew — Rutgers University, New Jersey, U.S.

Adults use ‘time’ and many other temporal concepts to organize their experience, both prospectively and retrospectively. How and when do children master these very abstract concepts? The largest source of exposure to temporal terms is incidental exposure at home and in preschool, but children in preschool may also receive direct instruction in temporal terms related to the calendar. The goal of this study was to delineate both exposure to and understanding of temporal terms in preschoolers. We collected 180 hours of observations of temporal term use in 20 preschool classrooms with children aged 3–6 years, including about 15 hours of circle time. Additionally we tested 185 3- to 6-year-old children on various aspects of temporal understanding.

Not surprisingly, teachers were the main users of temporal language in the classroom. The most commonly heard temporal terms in the preschool context were ‘today’ and ‘now’, both used to set the temporal framework for behavioral direction and activity instruction. Other than this, most usage involved sequence terms (e.g. next, later, first, almost). Most of the exposure to conventional temporal terms occurred during ‘calendar time’, during which teachers expended a lot of effort on direct instruction of calendar-related concepts such as the days of the week, the months of the year and dates.

In spite of their teachers’ efforts at instruction, when children were asked to name the days of the week it was only at 4.5 years of age that 50% of children could name all seven days, and below that age at least 50% of children could not name any. In examining children’s understanding of ‘yesterday’ and ‘tomorrow’, it was also at 4.5 that more than 50% of children could place ‘yesterday’ correctly on a timeline, and not until 5 years of age that this was the case for ‘tomorrow’.

When controlling for age, being able to give richer accounts of the events in a day, being better at sequencing the events of the day and being able to name the parts of the day during which events occur (morning, afternoon, evening), was related to being able to name more days of the week. So children with a better understanding of the sequence of daily events were better at mastering the sequence of weekdays.

These data suggest that it may be helpful for teachers of younger preschoolers to focus on the prerequisites for understanding the calendar, such as the recurring sequence daily events, and the notion of a day, before moving on to ‘yesterday’ and ‘tomorrow’ and the week, month, and year.
“REMEMBER WHEN WE WENT TO THE LIBRARY, INTO THE CITY?” TEMPORAL LANGUAGE IN REMINISCING AND FUTURE TALK CONVERSATIONS WITH YOUNG CHILDREN

Rebecca Andrews – Macquarie University, New South Wales, Australia

This study investigates how educators, mothers, and children use temporal language in reminiscing and future talk conversations. Eighty-five educator-child dyads from seven long day-care centres in Sydney, Australia engaged in counterbalanced reminiscing and future talk conversations at two time points. The younger children (n = 40) were 27–36 months and the older children (n = 45) were 48–60 months. Each educator-child dyad discussed in total four events about the past and four events about the future. To determine how conversations might vary, event temporal focus (past/future) and event novelty (novel/familiar) were manipulated. To enable comparisons between educator-child use of temporal language and mother-child use of temporal language, a subsample of mother-child dyads (n = 42) also completed the same tasks. The findings were threefold. First, educators’ temporal language differed by temporal focus (past/future) but not event novelty (novel/familiar). Second, older children used both future action and future hypothetical references, including predictions, in association with their educators in future familiar conversations, and talked about their and others’ future actions in future novel conversations. Third, mothers’ use of temporal language was associated with greater instances of child use of temporal language when compared to educator-child conversations. Taken together, the findings highlight that children received different temporal language support from their different conversational partners.
UNDERSTANDING OF ‘YESTERDAY’ AND ‘TOMORROW’ IN ENGLISH- AND MANDARIN-SPEAKING CHILDREN

Meng Zhang — Rutgers University, New Jersey, U.S.

This study investigated the cognitive and linguistic processes involved in understanding time, specifically, preschool children’s understanding of temporal adverbs. The performance of English- and Mandarin-speaking children were compared to investigate effects of language structure (as tense is not marked on the verb in Mandarin) on children’s understanding of “yesterday” and “tomorrow”. We tested 153 native English-speaking 3- to 6-year-olds and 158 native Mandarin-speaking 3- to 6-year-olds with the sentence-picture matching paradigm. Children listened to a sentence, such as, “Yesterday I carved the pumpkin” or “Tomorrow I’m gonna carve the pumpkin”, and then viewed two pictures (a carved pumpkin and an intact pumpkin) and were asked questions such as “What does it look like now?” or “What will it look like tomorrow?” Both English- and Mandarin-speaking children performed significantly better at reasoning forward from yesterday to now (83.62% correct) than reasoning backward from tomorrow to now (28.60% correct). In contrast, no significant differences were found when children reasoned backwards from tomorrow to the present and from the present to yesterday. Regardless of direction of temporal reasoning, children performed better when asked about yesterday than tomorrow. This indicates that understanding “tomorrow” is harder than understanding “yesterday” in both English and Mandarin. Further, children’s difficulty in temporal reasoning may have more to do with their ability to reason about temporal sequence than their ability to understand specific linguistic markers.
Preschoolers’ use of electronic storybooks and interactive audio pens and its relation to home literacy activities

Maximilian Pfost — Otto-Friedrich-Universität Bamberg

Over the past several decades, researchers from the field of early education have accumulated considerable evidence for the importance that the home literacy environment has on children’s cognitive competencies (e.g., [22]). With regard to children’s oral language and emergent literacy skills, the activity of joint storybook reading has shown to be especially important [23]. In addition to traditional storybooks, parents currently face several technological innovations, such as electronic multimedia storybooks and e-book apps or interactive audio pens. In the current paper, we focus on data collected from 103 German preschool children – aged 4 to 6 – and their parents from the region of Upper Franconia, Germany. Our results show that more than every second child in our sample had access to an interactive audio pen at home. Furthermore, a large proportion of parents indicated that their children use these interactive audio pens without parental support/autonomously. Electronic storybooks were less prevalent and were less often used autonomously. Exploring relations to further home literacy activities within the families (e.g. storybook reading), we did not find strong relations to formal or informal family literacy activities. Theoretical and practical implications with regard to the home literacy environment and competence development will be discussed at the conference (cf. [24], [25] for further findings and discussion).
CHILDREN’S WHY-QUESTIONS: EPISTEMIC EMOTIONS IN EXPLANATORY REASONING

Alexander Scheidt — Potsdam University of Applied Sciences

Human beings seek explanations. Asking and answering why-questions is a central aspect of younger children’s everyday conversations and also a fundamental characteristic of scientific inquiry.

Current theories of explanation depend on the notion of counterfactual causality in Bayesian models (Gopnik & Wellman, 2012) or rely on probabilistic considerations about explanatory virtues, like coherence, unification, or simplicity (Lipton, 1991; Lombrozo, 2012; Johnston, Johnson, Koven, & Keil, 2017).

However, causal theories of explanatory reasoning do not account for explanations that refer to reasons or intentional actions. Likewise, causal theories tend to evade the pragmatic aspects of explanations like the context or the epistemic state of an agent who is seeking an explanation.

In order to give a more precise model of human explanatory reasoning, I focus particularly on the epistemic state of a person who is asking a why-question. I argue that different levels of curiosity determine the adequate choice of an explanatory answer. I hypothesize that the variety of explanatory inferences can be mapped one-to-one onto a set of curiosity states.

I anticipate this model of explanatory reasoning to be useful for empirical research in developmental psychology, especially empirical research regarding children’s why-questions in their explanatory ‘a-ha’ phase (Isaacs, 1950; Chouinard, 2007; Frazier, Gelman, & Welman, 2009).

My study has an interdisciplinary focus on early childhood cognitive psychology as well as on epistemology. From this perspective, I logically analyze examples of why-questions by younger children from different sources (Sully, 1896; Piaget, 1929; Isaacs, 1950; Callanan & Oakes, 1992; Chouinard, 2007). In addition, I examine various accounts, which explicate the notion of scientific explanation (Hempel, 1965; Salmon, 1989; van Fraassen, 1980).

I argue that, in principle, why-questions and explanations are at the center both of concept acquisition in early childhood and of scientific theory formation. My aim is to present a general inference scheme under which all semantic types of why-questions can be subsumed.
REFERENCES


Since its founding in 2016, the EQUIP project (Quality and Interaction in Everyday Pedagogy) at the Potsdam University of Applied Sciences (FHP) and the University of Potsdam (UP) has contributed significantly to the development of Potsdam as a center for research on early childhood education. There has been a cooperative Master’s course in the field since 2016, which is closely connected to the projects at EQUIP. A working group with three professors and ten researchers at the universities has also been put together and will provide an ongoing basis for the research and teaching infrastructure in the field. The following organizational units are linked to the EQUIP program through common structures, content, and/or membership:

A) COOPERATIVE MASTER’S PROGRAM ON THE RESEARCH OF EARLY CHILDHOOD EDUCATION AT THE FHP UND UP

A joint cooperative, research-oriented Master’s program on the Research of Early Childhood Education has been developed in close cooperation with the EQUIP program, culminating in a Master of Arts (M.A.) degree issued by FHP and UP. The research focuses on educator interaction, practice development and transfer, as well as heterogeneity and language development. Two new professorships were created to coincide with the introduction of the program, (Early Childhood Education Research, Prof. Dr. Gerlind Große, FHP; and Empirical Childhood Research, Prof. Dr. Jan Lonnemann, UP). The innovative, research-oriented curriculum is closely interwoven with the research topics pursued at EQUIP, with a view to involving students in the research projects as an essential part of their study programs.
B) RESEARCH LABS FOR THE MICROANALYSIS OF EARLY CHILDHOOD EDUCATION PROCESSES

Experimental labs at the FHP and UP
A combination of laboratory and field research is characteristic of the methodological approach of this basic applied research. A research laboratory for developmental psychology and educational studies has been established at the FHP site, which will include two observation rooms equipped with modern video technology and a room for technical operations. The lab opened in November 2018. The lab will make it possible to study the cognitive, emotional, and social aspects of educational processes under controlled conditions. At the UP site, the research group has access to a research laboratory that supports electroencephalographic and electromyographic studies as well as analyses of both eye movement and body movement. Mobile observation units have been purchased for field use as well. The EQUIP project also offers new research opportunities for the targeted investigation of educational microprocesses within the framework of this innovative research infrastructure.

External lab at the Blossin Youth Education Center
In addition to the research laboratories, the Blossin Youth Education Center, an independent educational workshop for children and teachers, also serves as an external location that combines the development of research and practice. The location is marked by its long-standing cooperation with institutions for early childhood education in the German state of Brandenburg. Independent and public day care centers make extensive use of the further education and training provided there. The programs with educators and groups of children are designed and monitored in collaboration with researchers at the EQUIP project. EQUIP subprojects, moreover, investigate educational interaction processes there under ecologically valid conditions with regard to their functional mechanisms, their effects, and their implementation potential.
EPISTEMIC MARKERS AND EXPLORATION

Andreas Domberg, Azzurra Ruggeri (MPIB Berlin), Frauke Hildebrandt

This study looks at how preschoolers discover and test hypotheses to understand a mechanism, and how adults might support the children’s tendency to explore it. To this end, we present kids with a novel box with four buttons and a light on top of it, with the goal of getting it to light up. The children’s discovery begins either without any additional input, or we give them one of four hints that result from all the combinations of two variables: Some children are told that the correct button combination contains the white button, others that this is only perhaps the case. And some are told that the white or the red button is part of the successful combination, while others hear that this is only perhaps the case. Does it make a difference when adults qualify their hints to express uncertainty? Does it make a difference when they offer several candidate solutions? And do these two things interact?

LEARNING FROM SPEAKERS – LEARNING ABOUT SPEAKERS

Andreas Domberg, Silke Brandt (University of Lancaster), Ramiro Glauer, Frauke Hildebrandt

When speakers tell us about the world, we can learn about the world. But we can also learn about speakers. Drawing valid inferences about speakers is an important aspect of pragmatic competence. In this experiment, children hear speaker A say about individual B either that they think something is the case, or that they know something is the case. The key difference between these mental state verbs is that their user either does or does not subscribe to the belief ascribed to B. Do children, on the basis of this contrast, make different predictions about the speakers’ next actions, which reflect that children systematically do or do not believe that they hold the belief in question? This issue also touches upon children’s false belief competences and the insight that there can be incompatible perspectives on reality, not just an absolute true/false state for any given proposition.
REASONS FOR ACTION AND BELIEF

Ramiro Glauer, Frauke Hildebrandt, Andrea Hildebrandt

This set of studies is concerned with how children develop an understanding of reasons for action and belief. Being able to give and understand reasons is a major step in the development of rationality. In one study, children are asked for a number of explanations of observed actions. Explanations that state the goal of an action are distinguished from explanations that give a reason for believing that something is the case. In a second study, it is explored whether children tend to give belief or desire explanations for different unusual actions. Finally, in a follow-up study we investigate whether belief or desire explanations can be triggered by providing matching explanations before testing.

AN OPEN-SOURCE ANIMATION TOOLBOX FOR THE CREATION OF VIDEO STIMULI IN BEHAVIORAL RESEARCH

Gregor Kachel, Gerlind Große

In an interdisciplinary project bringing together animation artists, programmers, and psychologists, we are aiming to create an open-source toolbox that allows researchers with little to no expertise in CGI and character animation to create short animated videos as stimulus material for their studies. The toolbox will consist of a library of (1) rigged 3D avatars varying in age, sex, and various morphological features, (2) a collection of movement patterns, (3) various objects and background settings. The toolbox will be implemented using only free software (e.g., Blender for 3D animations) and will be open to contributions and improvements at every level. Backed by funding from FH Potsdam’s research and development fund, we will complete a first module for the animation of hands and objects in interaction within 2019 (see illustration). The material will be piloted in a collaborative project on infants’ action anticipation at the BabyLab of the University of Potsdam in summer 2019.
My project focuses on the question of why social innovations, including innovative interaction formats such as sustained shared thinking (SST), seem so difficult to establish in practice. At a variety of levels, I investigate what the individuals directly concerned with introducing innovations generally think about SST: What does education policy communicate and what do training providers understand by stimulating interaction? What do kindergarten teams and individual pedagogues think about SST and how do they value their ability to implement this innovative interaction format? To visualize the different perspectives of our focal individuals, I employ a new method: Cognitive-Affective Mapping. Cognitive-Affective Maps (CAMs) are belief networks that can represent both knowledge and related emotions. This is important because not only knowledge guides our actions, but also attributive affects. If we compare networks, we are able to visualize both similarities and differences. The differences are of great interest because they can be interpreted to be the cause of hampered innovation. With this research approach we want to facilitate future innovation processes in the field of early education and care.
IMPLICIT MEASURES OF ATTITUDES TOWARDS EDUCATOR TRAINING

Ruben Maué, Caroline Wronski, Frauke Hildebrandt

We are interested in the evaluation of in-service professional development training and in the identification of underlying mechanisms that promote effective theory-practice transfer. On the basis of social-psychological work on behavioral changes, we hypothesize that effective training needs to change a person’s attitude towards the training’s contents as a prerequisite for theory-praxis transfer and ultimately a change in that person’s behavior. To that end, we are currently developing instruments to measure a person’s attitude towards types of training that promote verbal stimulation methods for child–teacher interaction. Because of the limitations of explicit measures like questionnaires (e.g. social desirability bias), it is necessary not only to construct a reliable scale, but also to match it with implicit measures of attitude. Those instruments can be used to discern the extent of attitude changes in different training forms in order to determine which training properties are most effective. Future types of training could benefit from this research by incorporating those findings into their conceptualization.

CHILD INVOLVEMENT IN DAYCARE PROCESSES

Stephanie Pigorsch, Frauke Hildebrandt

This project is about how participative interactions with children can be shaped when it comes to the question of change processes in daycare settings. The focus is placed especially on those situations that consider children to be rightful, self-determined, and social subjects in the supportive daily environment a preschool provides. How can children be sensibly involved in the specific change processes of mealtime, sleep time, and hygienic needs issues? To that effect we elicit the everyday expertise of daycare professionals and work together with them to edit a vibrant handbook drawn from practice—for the purpose of better practice.
EXPECTATION SIGNALING AND BEHAVIORAL CONFIRMATION IN ADULT-CHILD INTERACTIONS

Uwe Peters, Frauke Hildebrandt

In pedagogical contexts, when adults interact with children, they have expectations of them (concerning abilities, behavior, gender, personality etc.). There is much research showing that expectations often initiate behavioral confirmation from children (“self-fulfilling prophecies”). Yet, many important questions remain unexplored in that context. For instance, how do adults’ own attitudes towards their expectations of children (i.e., whether they believe in them, want them to be true, reject them), and the way they signal their expectations (verbally, explicitly, implicitly, etc.) affect children’s tendencies to behaviorally confirm them? Are negative expectations stronger in this respect than positive ones (and explicit compared to implicit expectations)? What is the most effective way for adults to convey expectations to children and harness them to assist children in their development? We explore these questions by integrating work from social psychology, philosophy, and developmental psychology. The aim is to develop a practically useful account of strategies to help boost developmental progress in children via expectation signaling and behavioral confirmation.

TELEOLOGICAL ACTION EXPLANATION IN CHILDREN AND ADULTS

Frauke Hildebrandt, Uwe Peters

In research on action explanations, philosophers and developmental psychologists such as Josef Perner have recently advocated a “teleological” account. It holds that we typically do not explain agents’ actions by appealing to their subjective mental states but rather by referring to the objective facts of the world that count in favor of performing the action to achieve a certain goal. Advocates of the teleological account make two central claims: (1) young children use this explanatory strategy before they understand mental states, and (2) adults continue to employ it as their main way of explaining people’s actions. The project analyzes the arguments and empirical support for these claims and explores two alternative hypotheses. In opposition to claim (1), young children already need to understand mental states in order to understand objective facts, and in opposition to claim (2), considerations on “Moore’s paradox” and social psychological evidence suggest that adults routinely explain actions with reference to mental states, not objective facts. The project helps advance research on how young children make sense of people’s behavior, and aims to determine which types of action explanations by caregivers best assist young children in developing their own ability to explain and offer reasons for actions.
EFFECTS OF SUSTAINED SHARED THINKING I: BEHAVIOR

Karsten Manske, Frauke Hildebrandt — in collaboration with
Werner Sommer, Andrea Hildebrandt, Julia Festman

This research project is focused on a deeper understanding of the underlying mechanisms of Sustained Shared Thinking (SST) as one promising systematic format for adult and child interaction in preschool education. We consider basic principles of SST, such as the degree of commonality in the epistemic status between adult and child, and employ them as experimental manipulations to investigate the effects of SST. In a first series of experiments, we examined the influence of SST on the formation of causal hypotheses and their reproduction from memory. Our results show an increased formation of children’s own hypotheses through SST and indicate that children prefer to recall their own hypotheses over reproducing explanations given by an adult. These findings refer to children as active learners and underline the positive role of SST in actively assessing causal relationships.
In the context of our investigations on the effects of Sustained Shared Thinking (SST), our work group also focuses on the special importance of modal markers within this interaction format. For example, it has been shown that the sole use of the modal marker “perhaps” decisively increases the formation of children’s own causal inferences in dialogical interaction with adults. To better comprehend the underlying mechanisms of information representation initiated by the use of the modal marker “perhaps”, we take a closer look at its modulation in sentence processing and the representation of alternatives by recording event-related potentials. With this ERP study we aim to shed light on the impact of modal markers as a typical type of cognitively stimulating interaction that influences children’s representations of given information.
OBJECT INDIVIDUATION

Frauke Hildebrandt, Jan Lonnemann, Ramiro Glauer, Gregor Kachel

Cultural learning builds on infants’ capacity to triangulate, i.e., the ability to share attention to an object with a caregiver. Within the referential triangle of child, caregiver, and object, infants can learn about their environment by connecting their interaction partner’s actions, emotions, and utterances to salient aspects of a situation. While research in early social learning almost exclusively focuses on the social side of the triangle, we are interested in how infants conceptualize objects. Whether, for example, young children can individuate objects as particulars or only understand them as exemplars of a kind, sets a limit to the ways in which they can learn from ostensive communication.

It is generally assumed that 12-month-olds can individuate objects based on spatiotemporal information (Xu, 2007; Xu, Carey, & Quint, 2004). However, given the conceptual complexity of object individuation (Evans, 1982; Tugendhat 1976), we are skeptical of one-year-olds’ abilities and aim at developing novel behavioral paradigms to investigate the ability of young children to learn about and refer to particulars.

In an initial study, we are testing one- and two-year-olds in a set-up in which an object is established as being special by having the experimenter and child engage with it briefly. Then, two additional objects are revealed that look just like the first one. While all of the objects are identical with regard to surface features, one of them is special due to the shared history the experimenter and child have with it. The child is prompted to retrieve the special item from the set of three indistinguishable objects relying solely on its location. In order to solve this task, children have to go beyond feature-based object-discrimination and identify an object based on its location.

In another ongoing project, we are testing how one- and two-year-olds interpret reference to particulars in the presence of featurally indistinguishable distractors. In this study, the experimenter points at one of three identical objects with a clearly positive expression to establish her preference. The experimenter changes positions so that the items are out of reach, before requesting one of the items with an ambiguous reaching gesture. The item she referred to previously is then the most inconvenient one for the child to reach. If the children were to interpret the items to be equivalent, they might well hand over the one that is easiest to reach. If, however, the pointing gesture is interpreted as a reference to a particular, children could put in the additional effort of moving to retrieve the special one.
MODAL MARKERS, WHY-QUESTIONS AND SHARED THINKING IN EARLY EDUCATION

Karoline Lohse, Andrea Hildebrandt, Frauke Hildebrandt

The quality of adult-child verbal interactions in pedagogical settings has been found to support the development of children’s cognitive and linguistic skills. Micro-analyses of potentially effective interactions have identified characteristic linguistic elements, e.g. open-ended questioning (Why is...?), the use of epistemic markers (He thinks ...), and modal markers (Maybe it is...). A series of projects within the work group investigates the effects of specific linguistic markers in adults’ speech on children’s reasoning and verbalizations. In this study we are interested in the effect of open-ended questioning and modal markers on children’s generation and verbalization of their own explanations. We hypothesize (1) that open-ended questioning directly encourages children to give longer verbal responses and (2) that the use of modal markers is particularly effective for children with theory of mind.

MARKING ONE’S OWN PERSPECTIVE AND EPISTEMIC STATUS IN ADULT-CHILD INTERACTIONS

Juliane Burmester, Andreas Domberg, Frauke Hildebrandt

Within the framework of Sustained Shared Thinking (SST), the marking of one’s own perspective and epistemic status by using speech actions such as “I know...”, “I wonder...”, or “I believe...” has been proposed as one of multiple elements that potentially support SST. In the present study, we aim more specifically to characterize the impact of marking one’s own (adult) perspective and degree of certainty in the form of “I believe that...” on children’s verbal behavior when looking at pictures together. Children might be especially inspired to express their own perspective on a picture when adults mark theirs using either first-person markers or mental verbs such as “believe”, which can signal a degree of uncertainty in comparison to “I know” or no marking at all. We assume that instructive speech actions leave less room for children to question a given utterance and to self-generate explanations. We are convinced that it is important for children’s cognitive development to know about the different perspectives of speakers relative to their explanation of concepts and situations, which enables children to evaluate utterances in their daily environments themselves.
TEACHER-CHILD INTERACTIONS AND THEIR RELATIONSHIP TO CHILDREN’S EXPLORATIVE BEHAVIOR

Karoline Lohse, Caroline Wronski

Children learn about their surroundings through exploration. Evidence from natural observations, e.g. in museums, suggests that adults support children’s self-directed learning in explorative contexts by providing adequate verbal cues and questions. The project investigates the potential relationship between adult-child interactions and children’s self-directed explorative behavior. In a standardized, though natural, early educational setting we ask teacher-child dyads to visually and verbally explore a novel object together in phase 1. The quality of interactions is measured by the frequency and variety of potentially effective speech acts uttered by the teacher. In a second phase the child is allowed to physically explore the novel object. We hypothesize a positive correlation between the quality of interactions in phase 1 and children's explorative behavior in phase 2.
SPATIAL CONCEPTS OF POSITION AND THE ACQUISITION OF NUMERICAL KNOWLEDGE

Jan Lonnemann, Frauke Hildebrandt

According to recent theoretical approaches, the acquisition of increasingly precise knowledge of numerical magnitude is the common core of numerical development. It is assumed that numerical magnitudes are represented along a mental number line and can be localized spatially. The assumed spatial character of numerical representations raises the question of whether an understanding of spatial concepts of position (e.g., in front of and behind) are relevant to the processing of numerical magnitudes and their relationships. Our project aims at investigating the role of children’s understanding of spatial concepts of position in the acquisition of numerical knowledge.

CHILDREN’S EARLY UNDERSTANDING OF SCALAR INFERENCES

Gerlind Große

Even though children have been shown to have a wide range of communicative competences in place by the age of two, previous studies have found them to show limited competence with certain types of pragmatic inferences based on informativeness (so-called “scalar implicatures”) until the age of 5 ½ years. The current study aims to explore novel paradigms to test children’s proficiency in interpreting these terms in the easiest possible situation. In experiment 1 (zoo paradigm), we use an act-out task which provides a clear context for the interpretation of the scalar terms. We explore 3- and 5-year-old children’s performances in interpreting the scalar terms “all”, “some”, and “none”. In experiment 2, we use another child-friendly act-out task which presupposes children’s interpretations of the scalar terms “all”, “some”, and “none” in order to search for necessary objects at the correct location. We hypothesize that in both cases, 3-year-old children will, under these circumstances, also interpret “some” in an adult-like way as “some, but not all”.

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CHILDREN’S EMOTIONAL COMPETENCES AND LANGUAGE DEVELOPMENT

Gerlind Große – in collaboration with the Saalbach lab, University of Leipzig

A substantial body of research indicates that language skills and emotion regulation skills are positively associated. It has been suggested that language supports emotion regulation by improving the representation of emotional concepts, by mediating both action regulation in emotionally challenging situations and cognitive emotion regulation, and by facilitating communication. Informed by these approaches, the proposed project will use a multimethod approach to investigate the processes and causal mechanism to explain the association between language skills and emotion regulation development.

PROCESS QUALITY IN ECEC SETTINGS AND ITS EFFECT ON EARLY CHILD DEVELOPMENT

Gerlind Große – in collaboration with Marja-Kristiina Lerkkanen and Jenni Salminen, University of Jyväskylä

Based on the Finnish project “VUOKKO”, the present project investigates, with a longitudinal design, the effect of teacher-child interactions in ECEC-settings on children’s development of early math, literacy, and self-regulative skills.

DEVELOPMENT OF THE COLOR LEXICON IN GERMAN CHILDREN

Gerlind Große – in collaboration with the Saalbach lab, Cornelia Schule and Frederike Svensson, University of Leipzig; and Mutsumi Imai, Noburo Saji, Keio University, Japan

The meaning of a word and the boundaries of that meaning are determined by the meaning of the words belonging to the same semantic domain. This is particularly critical for color words, as compared to object names, because the continuous visible color spectrum does not have natural partitions. Thus, in order to acquire the color lexicon, children need to learn clusters of color words to delineate the boundaries among them (Saji et al., 2011). The present study investigates: How do adult German speakers delineate the boundaries between 93 color patches? How do 3- and 5-year-old children discover the boundaries of color names? How does SES influence the acquisition of color names?
DEVELOPMENT OF ATTACHMENT STYLE AND EMOTION REPRESENTATION

Gerlind Große — in collaboration with
Tatyana Kotova, Russian Presidential Academy of National Economy and Public Administration (RANEPA), Department of Psychology, Centre of Cognitive Studies

The aim of the collaborative research project is to better understand the developmental trajectory of children's social learning and emotion regulation ability. Both are very important mechanisms of child development that are influenced by caregiver emotion socialization. Research questions: 1) How does caregiver emotion socialization influence social learning and emotion regulation skills via attachment style and emotion representation ability? 2) How can we differentiate between different working hypotheses about developmental paths?

THE DEVELOPMENT OF EARLY SCIENTIFIC INTEREST IN PRESCHOOL YEARS AND THE EFFECTS OF CHILDCARE CENTER QUALITY ON THIS DEVELOPMENT

Gerlind Große, Lis Sönsken — in collaboration with
Haus der Kleinen Forscher, Berlin

Accompanying the call for more early science teaching in preschool years (e.g., Lück, 2013) the pedagogical quality of child care centers has received more attention. Sustaining interests in conceptual domains can lead to a number of learning benefits in terms of increased knowledge and persistence (Hidi, 2000; Renninger, 1992), heightened attention (Renninger & Wozniak, 1985), and deeper levels of processing (Schiefele & Krapp 1996). The present research project aims to develop a short standardized observational measure of children’s early scientific interest and investigates the relation between the process and structural quality of the ECE center and the extent of children’s early scientific interest.
MEASURING PROCESS QUALITY – NETWORK OF GERMAN WORKING GROUPS FOR THE DEVELOPMENT OF VALID MEASUREMENT INSTRUMENTS FOR GERMAN EARLY CHILDHOOD EDUCATION AND CARE CENTERS

Gerlind Große, Frauke Hildebrandt — in collaboration with Yvonne Anders, FU Berlin

The aim of the initiative “MPQ – Measuring Process Quality” is to develop a new valid and practical instrument to measure process quality in German child care settings. This requires several things: an intense theoretical consideration of the challenges raised by measuring process quality, a vibrant exchange with international colleagues pursuing the same goals in diverse cultures, as well as the analysis of existing and newly developed scales and procedures. This project benefits from the expertise and support of an international board of experts.

SYMBOLOC LITERACY: YOUNG CHILDREN’S DEVELOPING UNDERSTANDING OF THE RELATION BETWEEN SYMBOLS AND REFERENTS IN THE GRAPHIC DOMAIN

Gregor Kachel

The acquisition of language and – much later – literacy are without doubt two of the most important achievements in cultural learning that young children attain in the first years of life. But even prior to literacy, children are permanently surrounded by symbolic artifacts in the form of iconic signs, pictures, and writing. In an ongoing project, I aim to investigate the process of enculturation that results from this exposure. In a series of studies, I will test children’s comprehension of deictic symbols, such as arrows and markers, as well as their ability to spontaneously find meaning in novel signs whose symbol-referent relationship is based in iconicity, pars pro toto, and analogies in shape, number, and spatial relationships. A third line of work aims at creating an adaptive test battery investigating preschoolers’ knowledge of conventional symbols such as iconic signs, Latin writing, and Arabic numerals. All of these studies are presented as symbolic object-choice tasks and implemented as computer-based games on touchscreen devices and should ideally result in the creation of a comprehensive within-subjects test battery of children’s comprehension of novel and conventional graphic symbols. The project goes beyond previous work on symbolic development by connecting children’s symbolic experience with their ability to interpret signs at an individual level. For the first time in this line of research, the subjects’ age will not be used to form tightly defined groups but will instead reflect a gradual range from the second to sixth birthdays to allow for a continuous model of development. Whereas previous work has focused almost exclusively on iconicity as a way of creating meaning, the studies outlined above investigate a wide variety of mapping relationships. The project has been submitted as a grant proposal to the DFG in February 2019 and is currently awaiting evaluation.
THE ROLE OF FINGER COUNTING GESTURES IN CHILDREN’S UNDERSTANDING OF NUMEROSITIES

Elena Sixtus, Jan Lonnemann — in collaboration with Karsten Werner (“Motor Control and Cognition” Research Group, University of Potsdam)

Most children use their fingers when first learning about the meaning of numbers. However, it is still a prevailing question as to whether finger counting actually helps to understand numbers. For example, there have been contradictory findings about whether children associate number words or finger counting gestures more strongly with corresponding numerosities. We aim to replicate previous findings in a computerized design which allows for analyses on reaction time data in addition to accuracy data. Furthermore, we introduce a more natural condition of number words paired with gestures as well as control conditions with dice patterns. These conditions should add to our knowledge on the role that finger counting gestures play in children’s understanding of numerosities.

SPATIAL REPRESENTATIONS OF ABSTRACT CONCEPTS IN CHILDREN AND ADULTS

Karoline Lohse, Elena Sixtus, Jan Lonnemann

Abstract concepts such as time and number are mentally represented in space. A common representation of numerals, e.g. in Western European adults, is the horizontal number line with smaller digits to the left of larger digits. Similarly, temporal information can be represented horizontally with temporally earlier events or shorter durations to the left of temporally later events or longer durations. There is additional evidence that temporal information might be represented relative to the body axes (sagittal, lateral) as well. This project investigates spatial representations of different temporal and numerical categories on body axes and coordinate axes. Using a behavioral paradigm, children’s and adults’ spontaneous spatial allocations of items that represent temporal or numerical relations are recorded. Spatial allocations are analyzed in terms of linearity, ordinality, and direction in order to compare dominant representations between concepts and across different age groups.
EFFECTS OF SUSTAINED SHARED THINKING ON CHILDREN’S VERBAL BEHAVIOR

Juliane Burmester, Tina Marusch, Jan Lonnemann, Frauke Hildebrandt — in collaboration with Julia Festman

In our project we have a special interest in investigating the role of sustained shared thinking (SST) from the perspective of children's linguistic and cognitive development. We aim at characterizing factors in SST-like adult-child interactions that induce a positive impact on the child’s verbalized thought processes as measured by, e.g., increased numbers of self-generated hypotheses, lengths of utterances, and conversational turns. To this end, we especially focus on the interplay of children’s verbal output with 1) child-specific factors (language and cognitive skills), and 2) the quality of the adults’ behavior (e.g., degree of SST-implementation). Analyses of video-recorded natural-like interactions show that 3- to 6-year-olds' verbal output is directly influenced by adults’ non-verbal and verbal SST-like behavior. For instance, social-emotional aspects of adults’ communication such as maintaining eye contact and acknowledging children’s statements, as well as adults’ question behavior (e.g., asking open-ended and why-questions) elicited more conversational turns and let children build more of their own explanatory hypotheses. Our findings suggest that the appropriate use of SST elements positively affects the child’s active participation in a joint intellectual exchange with adults.

CREATIVITY

Caroline Wronski — in collaboration with Birgit Elsner, Patricia Kanngießer, Eva Reindl, Ramiro Glauer

A current project in the category of “creativity” deals with the question of whether and under which conditions children display innovative and creative behavior in social (or pedagogical) interactions. In one project, we observe 3-year-olds’ imitative and divergent actions with a novel toy, depending on the type of instructions they receive from an adult (with Birgit Elsner, University of Potsdam). Another projects investigate whether dyads of preschoolers come up with new rules for a novel game, depending on whether they received the rules in a “normative” or an “exploratory” manner (together with Patricia Kanngießer, University of Leipzig). A third project looks at the influence of questions and prompts on preschoolers’ performances in an innovation task (together with Eva Reindl, University of St. Andrews). Lastly, we are interested in whether 6- to 8-year-old children reason abductively, specifically, if they come up with hypothetical common cause explanations when reasoning about correlated events (together with Ramiro Glauer, University of Applied Sciences, Potsdam).
Akademische Mitarbeiterin an der Universität Potsdam

Academic Staff, University of Potsdam
Juliane Burmester is a speech therapist working as a research associate in the project EQUIP (“Quality and Interaction in Everyday Pedagogy”). Her research focuses on how cognitively stimulating interactions, especially elements of Sustained shared thinking in adult-child-interactions, influence children’s verbal behaviour. A further emphasis of her research is studies on language comprehension and production in children and adults using behavioural and electrophysiological methods.
ANDREAS DOMBERG

domberg@mpib-berlin.mpg.de

Wissenschaftlicher Mitarbeiter am Max-Planck-Institut für Bildungsforschung in Berlin
Andreas Domberg ist wissenschaftlicher Mitarbeiter am Max-Planck-Institut für Bildungsforschung in Berlin. Dort erforscht er die Beziehung zwischen Handlungszielen und Informationssuche und wie Kinder in diesem Spannungsfeld manövrieren.

Postdoc at the Max Planck Institute for Human Development in Berlin
Andreas Domberg is a postdoc at the Max Planck Institute for Human Development in Berlin, where he investigates the relationship between action goals and information search, and how children coordinate these two.

BIRGIT ELSNER

birgit.elsner@uni-potsdam.de

Professorin für Entwicklungspsychologie
Birgit Elsner lehrt Entwicklungspsychologie an der Universität Potsdam und leitet das BabyLab (gemeinsam mit Prof. Dr. Barbara Höhle).
Ihre Forschungsschwerpunkte sind:
In der frühen Kindheit: die Entwicklung von sozialen und geistigen Fähigkeiten, auch im Zusammenhang mit der Sprachentwicklung. Im Grundschulalter: die Rolle von Handlungskontrolle und sozialem Verständnis für das Auftreten von Entwicklungsproblemen.

Professor for Developmental Psychology
Birgit Elsner teaches developmental psychology at the University of Potsdam and manages the BabyLab (together with Prof. Dr. Barbara Höhle). Her main areas of research are:
In early childhood: the development of social and cognitive skills, also in the context of language development. In primary school: the roles of behavioral control and social understanding for the emergence of developmental problems.

Academic Staff, University of Applied Sciences Potsdam
Ramiro Glauer is a research associate of EQUIP. His research interest is the development of rationality from a developmental psychological and philosophical perspective. Among other things, he investigates the influence that different speech acts performed by adult interaction partners have on the development of rationality.


Professor for early childhood education research
Gerlind Große is a developmental psychologist and educational researcher. She does her research and teaches at the University of Applied Sciences Potsdam in the programme “M.A. Early Childhood Research”. Her main interests are development in practical work and transfer; development of communication and language; socio-emotional development.
Professorin für Psychologische Methoden und Statistik

Professor for Psychological Methods and Statistics
Andrea Hildebrandt is Professor for Psychological Methods and Statistics at the European Medical School Oldenburg-Groeningen, University of Oldenburg. Previously, she was Assistant Professor for Psychological Assessment and Personality Psychology at the University of Greifswald. Her research is concerned with individual, developmental and aging related differences in social cognition and its pathologies. To this aim she is applying behavioral, molecular-genetic and neural assessments. Furthermore, she is involved in extending and evaluating statistical modeling techniques in the framework of structural equations along with the investigation of their applicability in behavioral sciences, neuroscience and biometrics.
**Frauke Hildebrandt**

*Professorin für Frühkindliche Bildungsforschung*

Frauke Hildebrandt ist Studiengangsleiterin des kooperativen Masterstudiengangs “Frühkindliche Bildungsforschung” der Fachhochschule Potsdam und Universität Potsdam und wissenschaftliche Leiterin mehrerer Forschungsprojekte. Ihre Forschungsschwerpunkte sind Qualität in Einrichtungen der Frühen Bildung sowie pädagogische Interaktion, Partizipation und Entwicklung von Rationalität.

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**Gregor Kachel**

*Akademischer Mitarbeiter an der Universität Leipzig*


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**Professor for Early Childhood Research**

Frauke Hildebrandt is head of the joint degree programme “M.A. Early Childhood Research” of the University of Applied Sciences Potsdam and the University of Potsdam. She is head of several research projects. Her main research areas are quality in early education as well as educative interaction, participation and development of rationality.

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**Academic Staff, University of Leipzig**

Gregor Kachel is a research associate the University of Leipzig. He cooperates with PINA-researchers on several projects. His research focuses on selective social learning in early peer interactions, gestural communication and the development of children's symbolic competence.
AKADEMISCHE MITARBEITERIN AN DER UNIVERSITÄT POTSDAM
Karoline Lohse ist wissenschaftliche Mitarbeiterin in der Empirischen Kindheitsforschung der Universität Potsdam und Lehrende im Masterstudiengang „Frühkindliche Bildungsforschung“. Ihre Forschungsschwerpunkte sind die Entwicklung zeitlicher Konzepte in der Kindheit sowie der Einfluss sozialer Interaktionen auf kindliche Lernprozesse.

ACADEMIC STAFF, UNIVERSITY OF POTSDAM
Karoline Lohse is research associate and lecturer at the University of Potsdam. Her research focuses on the development of children’s temporal reasoning and the influence of social interactions on children’s learning.

PROFESSOR FÜR EMMIRISCHE KINDHEITSFORSCHUNG
Jan Lonnemann ist an der Universität Potsdam tätig und lehrt im Studiengang „Frühkindliche Bildungsforschung“. Im Mittelpunkt seiner Forschungsinteressen stehen die Grundlagen des Erwerbs arithmetischer Fertigkeiten.

PROFESSOR FOR EMPIRICAL CHILDHOOD RESEARCH
Jan Lonnemann works at the University of Potsdam and teaches in the programme “M.A. Early Childhood Research”. His research interests focus on the basics of acquiring arithmetic skills.
JASMIN LUTHARDT
luthardt@fh-potsdam.de

Akademische Mitarbeiterin an der Fachhochschule Potsdam
Jasmin Luthardt ist wissenschaftliche Mitarbeiterin an der Fachhochschule Potsdam und promoviert im EQUIP Teilprojekt 2a zur Transformation von Einstellungen von Pädagog*innen in Kindertagesstätten. Neben Innovationsprozessen in Bildungseinrichtungen beschäftigen sie Fragen zur Qualität pädagogischer Prozesse im Feld der frühen Kindheit.

Academic Staff, University of Applied Sciences Potsdam
Jasmin Luthardt is an academic researcher at the University of Applied Sciences Potsdam and is doing her doctorate in EQUIP subproject 2a on pre-school teachers' beliefs about adult-child interaction in Kindergarden. In addition to processing innovations in educational institutions, she deals with questions about quality of pedagogical processes in the field of early childhood.

KARSTEN MANSKE
Kmanske@uni-potsam.de

Akademischer Mitarbeiter an der Universität Potsdam
Karsten Manske ist wissenschaftlicher Mitarbeiter im Projekt EQUIP („Entwicklung von Qualität und Interaktion im pädagogischen Alltag“). Mit Hilfe behavioraler und elektrophysiologischer Methoden untersucht er Grundlagen und Effekte kognitiv anregender Interaktionen zwischen Erwachsenen und Kindern in der frühen Kindheit.

Academic Staff, University of Potsdam
Karsten Manske is a research associate in the EQUIP (Quality and Interaction in Everyday Pedagogy) project. Using behavioural and electrophysiological methods, he has an emphasis on understanding the basics and effects of cognitively stimulating interactions between adults and children in early childhood.
TINA MARUSCH
marusch@uni-potsdam.de

Akademische Mitarbeiterin an der Universität Potsdam

Academic Staff, University of Potsdam
Tina Marusch is a psycholinguist and research fellow in the project "Quality and Interaction in Everyday Pedagogy" (EQUIP). She investigates cognitively stimulating conversations and their impact on children's language. She is also interested in neuronal foundations of cognitively stimulating conversations and uses behavioral and electrophysiological methods (EEG) to investigate this.

RUBEN MAUÉ
maue@fh-potsdam.de

Akademischer Mitarbeiter an der Fachhochschule Potsdam
Ruben Maué ist wissenschaftlicher Mitarbeiter und Projektkoordinator im EQUIP-Projekt. Er evaluiert Fortbildungen für pädagogisches Fachpersonal. Mit Methoden der Sozialpsychologie forscht er im Speziellen zu durch Fortbildungen bedingte Einstellungsänderungen der Fachkräfte.

Academic Staff, University of Applied Sciences Potsdam
Ruben Maué is a research associate and project coordinator of EQUIP. He evaluates in-service professional development programs for kindergarten employees. Specifically, he implements methods of social psychology to monitor attitude changes elicited by such programs.
**Stephanie Pigorsch**

`pigorsch@posteo.de`

Wissenschaftliche Mitarbeiterin am Deutschen Zentralinstitut für soziale Fragen (DZI)
Scientific Staff, German Central Institute for Social Issues

Stephanie Pigorsch ist wissenschaftliche Mitarbeiterin am Deutschen Zentralinstitut für soziale Fragen (DZI), vormals tätig an der Fachhochschule Potsdam. Ihre Forschungsschwerpunkte sind die Gestaltung von Partizipationsprozessen in Settings (sozial)pädagogischer Praxis sowie Fragen gelingender Repräsentationsmöglichkeiten marginalisierter Gruppen.

Stephanie Pigorsch is research associate at the German Central Institute for Social Issues (DZI). Beforehand she worked at the University of Applied Sciences Potsdam. Her research interests are the organization and development of participative processes in pedagogical settings as well as spaces for representation of marginalized groups.

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**Azzurr Ruggeri**

`ruggeri@mpib-berlin.mpg.de`

Forschungsgruppenleiterin am Max-Planck-Institut für Bildungsforschung in Berlin
Research Group Leader at the Max Planck Institute for Human Development in Berlin and Professor at TU München

Sie erforscht wie Kinder und Erwachsene aktiv Informationen sammeln, um Entscheidungen zu treffen, kausale Zusammenhänge zu identifizieren und Kategorisierungsaufgaben zu lösen.

Her research focuses on how children and adults actively search for information when making decisions, drawing causal inferences and solving categorization tasks.
Tobias Schröder

Professor für nachhaltige urbane Entwicklungsstrategien
Tobias Schröder lehrt und forscht am Institut für angewandte Forschung Urbane Zukunft der Fachhochschule Potsdam zu sozialpsychologischen und kognitionswissenschaftlichen Aspekten von Nachhaltigkeit und Innovationsprozessen in Organisationen und Städten.

Professor for sustainable urban development
Tobias Schröder works at the Institute for Urban Futures at the Potsdam University of Applied Sciences. He teaches and does research about social psychological and cognitive aspects of sustainable development and innovation in organisations and cities.

Elena Sixtus

Academische Mitarbeiterin an der Universität Potsdam
Elena Sixtus ist wissenschaftliche Mitarbeiterin in der Empirischen Kindheitsforschung der Universität Potsdam und Lehrende im Masterstudiengang „Frühkindliche Bildungsforschung“. Ihre aktuelle Forschung widmet sich vorwiegend der mentalen Zahlenrepräsentation im Kindes- und Erwachsenenalter sowie der Interaktion verschiedener mentaler Konzepte.

Academic Staff, University of Potsdam
Elena Sixtus is a research associate and lecturer at the University of Potsdam. Her current research focuses on children's and adults' mental number representations and on the interaction of various mental concepts.
LIS SÖNKEN
lis.soenksen@fh-potsdam.de

Akademische Mitarbeiterin an der Fachhochschule Potsdam
Lis Sönksen ist frühkindliche Bildungsforscherin und unterstützt als wissenschaftliche Mitarbeiterin das Nawi-Projekt an der Fachhochschule Potsdam. Der Forschungsschwerpunkt liegt bei naturwissenschaftlichem Interesse von Kindern im Elementarbereich.

Academic Staff, University of Applied Science Potsdam
Lis Sönksen is an (early) educational researcher and supports as a research associate a science-project at the University of Applied sciences Potsdam. The focus of this study is the interest in science among pre-school children.

CAROLINE WRONSKI
wronski@fh-potsdam.de

Akademische Mitarbeiterin an der Fachhochschule Potsdam
Caroline Wronski ist wissenschaftliche Mitarbeiterin in der Frühkindlichen Bildungsforschung an der Fachhochschule Potsdam. Sie forscht und lehrt zu frühkindlicher kognitiver Entwicklung. Sie ist Ko-Leiterin des Masterstudiengangs „Frühkindliche Bildungsforschung“ und des Projekts EQUIP („Entwicklung von Qualität und Interaktion im pädagogischen Alltag“).

Academic Staff, University of Applied Sciences Potsdam
Caroline Wronski is lecturer/researcher at the University of Applied Sciences Potsdam. She teaches cognitive development in early childhood, which is also her main research interest. She is co-director of the master studies programme “Early Childhood Research” and of the EQUIP project (“Quality and Interaction in Everyday Pedagogy”).