Book of Abstracts

17th International Conference on Motivation
TU Dresden, August 24 – 25, 2022

Joint Day of the EARLI-SIGs 8 and 16
TU Dresden, August 26, 2022

Conference Program with Abstracts

This is the full version of the conference program (incl. rooms, co-authors, abstracts, etc.).

Please be aware of possible program changes. Changes will be posted outside of the venue rooms, at the conference registration desk, and in the virtual venue

Last update: August 15, 2022

EARLI SIG #8   EARLI-SIG 16 METACOGNITION   TECHNISCHE UNIVERSITÄT DRESDEN   Psychology of Learning and Instruction

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2. EARLI – SIG08 – coordinators – Fani Lauermann, Hanna Järvenoja, Hanna Gaspard
3. EARLI – SIG16 – coordinators – Anique DeBruin, Charlotte Dignath, Yves Karlen

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Contact Information

Chair of Psychology of Learning and Instruction

Faculty of Psychology

Technische Universität Dresden

01062 Dresden

Email: info@SIG8meetsSIG16-Dresden.de

Phone: +49 (0) 351 / 463 33263

Drawings – Rebecca Narciss; Photos of Dresden – Rebecca Narciss; Susanne Narciss

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Maarten Vansteenkiste

Maarten Vansteenkiste is since 2014 a full professor in the Department of Developmental, Personality, and Social Psychology. He has substantially contributed to the extension, refinement, application and dissemination of the Self Determination Theory (SDT). His work addresses novel topics in the motivational literature, such as the study of motivational profiles, individuals' multiple reasons for lacking motivation, the interface between psychological and physiological needs, and the development of a more fine-grained and holistic understanding of how different (de)motivating practices of socializing agents (e.g., teachers, parents) relate to each other. His work has had a strong scientific impact as it is highly cited (h-index = 77 in web of science and 120 on google scholar), with diverse publications in high impact journals in diverse fields of psychology.

In terms of societal impact, his work has had a strong influence on the domains of education, sports, and parenting, with the publication of the handbook 'Vitamins for growth', followed by the publication of a practice-friendly book 'Motivating coaching in the sport'. He played a critical role during the coronacrisis leading a consortium of scholars who tracked diverse aspects of individuals' psychological functioning (motivation, well-being, vaccination) across 2,5 years during the pandemic.

Professor
Department of Developmental,
Personality, & Social Psychology,
Ghent University, Belgium

Nourishing Learners' and Teachers' Engagement and Growth?
The Critical Role of Basic Psychological Needs and Need-supportive Socialization

At the heart of Self-Determination Theory is the claim that all people have basic psychological needs for autonomy, competence, and relatedness, the satisfaction of which is beneficial for learners' psychological growth and the frustration of which increases risk for ill-being and maladjustment. In the present presentation, the key criteria to characterize basic needs are addressed, together with supportive diary, longitudinal, and experimental research in diverse age groups, some of which was collected as part of a large-scale population study across the pandemic (www.motivationbarometer.com). Although basic needs are presumed to play a universal critical role across different developmental phases and challenges, there is room for contextual variation in the support of basic needs by key socialization figures (i.e., teachers, parents). Indeed, there is not a one-size-fits-all approach to support learners' psychological needs. Recent work grounded in a circumplex-based approach on need-supportive and need-thwarting contextual conditions, thereby providing a deeper insight in the dynamic interplay between autonomy support (relative to control) and structure (relative to chaos), shows that different (but not all) roads can lead to Rome. Accordingly, the provision of adequate need support becomes a matter of calibration and of tailoring support to individual differences between students and situational demands. Finally, apart from contextual support of basic needs, individuals can also get their basic needs met through need crafting. This promising line of correlational and intervention research on need crafting testifies to the pro-active and growth-oriented nature of the human organism.

Gale M. Sinatra

Gale M. Sinatra is the Stephen H. Crocker Chair and Professor of Education and Psychology at the Rossier School of Education at the University of Southern California where she serves as the Associate Dean for Research. She received her B.S., M.S., and Ph.D. in Psychology from the University of Massachusetts, Amherst. She heads the Motivated Change Research Lab http://www.motivatedchangelab.com/, the mission of which is understanding the cognitive, motivational, and emotional processes that lead to attitude change, conceptual change, STEM learning, and public understanding of science. Sinatra's model of conceptual change learning (Dole & Sinatra, 1998; Sinatra, 2005; Sinatra, 2022) describes how motivational factors contribute to the likelihood that individuals will change their thinking about a scientific topic. She is a Fellow of AERA and APA and a member of the National Academy of Education. She is the co-author (with Barbara Hofer) of
Science Denial: Why It Happens and What to Do About It
https://www.sciencedenialbook.com/.

Professor & Associate Dean for Research
Stephen H. Crocker Chair of
Education and Psychology,
Rossier School of Education,
University of Southern California, USA

There Is No Denying It: Motivation and Emotion Play Key Roles in Public Understanding of Science

Many individuals are perplexed by family members, friends, and co-workers who avoid vaccinations or believe climate change is a hoax. Science doubt, resistance, and denial are in the news daily, whether reporting on the fear of adverse effects from vaccines or erroneous beliefs that climate change is naturally caused. What's commonly misunderstood is that it is "other people" who have this problem, when in fact we are all susceptible to misinformation and resisting aspects of science. Democracies depend on educated citizens who can make informed decisions about scientific issues. The COVID-19 pandemic brought these issues into sharp relief. In *Science Denial: Why It Happens and What to Do About It*, Sinatra and co-author Barbara Hofer examine the motivational and emotional factors contributing to science doubt, resistance, and denial. This presentation will focus on the themes from the book including the role of psychological constructs such as cognitive biases, emotions, identity, epistemic cognition, and motivated reasoning in public (mis)understanding of science. Sinatra will overview significant motivational and emotional challenges to public understanding of science and provide research-based solutions to each challenge for individuals, educators, policy makers, science communicators.

Thomas Goschke

Professor of General Psychology
Faculty of Psychology
Technische Universität
Dresden, Germany

Thomas Goschke is Professor of General Psychology at the Faculty of Psychology of the TU Dresden. From 2014-2018 he served as Head of the Department of Psychology and from 2014-2022 was Dean of the Faculty of Psychology. Since 2012, he is spokesperson of the Collaborative Research Center (SFB 940) "Volition and Cognitive Control". In the center, more than 70 scientists from psychology, neuroscience, clinical psychology and psychiatry, and computational modeling join forces to elucidate mechanisms and modulators of volitional action and self-control at behavioral and neural levels of analyses, and investigate dysfunctions of cognitive control in selected mental disorders. Dr. Goschke published more than 170 journal articles and book chapters in the area of volition, cognitive control, and self-control. The overarching aim of his research is to elucidate cognitive and neural mechanisms that underlie the human capacity to anticipate future action outcomes, to adapt behavioral dispositions flexibly to changing goals and task demands, and to override impulsive or habitual responses in order to render behavior congruent with long-term goals. To this end, his group combines behavioral tasks, neuroimaging methods, and ecological momentary assessments of self-control in real-life contexts.

Volition and self-control: From executive functions to meta-control

Human action rests on remarkable cognitive control capacities, including the ability to adapt behavior flexibly to changing contexts and to override impulsive or habitual responses in favor of long-term goals. Impairments of these control and self-regulation capacities have been related to harmful behaviors like insufficient academic effort, unhealthy eating habits and addictive behaviors. In the past decades, impressive progress has been made in elucidating the cognitive, computational, and neural mechanisms underlying volition and self-control. Questionable concepts that conceived of self-control as a limited resource or postulated a homunculus-like 'central executive' have been replaced by models specifying how volitional control emerges from interactions between distributed brain networks, how these networks are adapted to changing goals, and how they are modulated by emotion and motivation. I give an exemplary overview of this research with a focus on three key themes. First, based on a neurocognitive process model of self-control, I present evidence from a multilevel study that combines behavioral and neuroimaging tasks with ecological momentary assessments and showed that individual differences in real-life self-control failures are predicted by dysfunctional interactions between performance-monitoring, cognitive control, and valuation networks. Specifically, results indicate that self-control failures do not always reflect impaired control *competencies*, but insufficient *mobilization* of control due to deficient monitoring. Secondly, I will present new results that challenge the view that cognitive control is always experienced as costly, but suggest that people can learn to assign intrinsic value to cognitive effort. Finally, I discuss this research within a more general theoretical framework, according to which goal-directed action in changing environments confronts agents with fundamental "control dilemmas", which require a context-sensitive balancing of antagonistic adaptive constraints (cognitive stability vs. flexibility; goal persistence vs. disengagement; exploitation vs. exploration). Elucidating the *meta-control* processes underlying the adaptive regulation of such control dilemmas is a key challenge for the next decade of cognitive control research.

Patricia A. Alexander

Professor
Department of Human Development and Quantitative Methodology,
University of Maryland, USA

Dr. Patricia Alexander is a Distinguished University Professor, the Jean Mullan Professor of Literacy, and Distinguished Scholar-Teacher in the Department of Human Development and Quantitative Methodology at the University of Maryland where she heads the Disciplined Reading and Learning Research Laboratory. She has served as President of Division 15 (Educational Psychology) of the American Psychological Association, Vice-President of Division C (Learning and Instruction) of the American Educational Research Association, and Past-President of the Southwest Educational Research Association. Dr. Alexander received her reading specialist degree from James Madison University (1979) and her PhD in reading from the University of Maryland (1981). Dr. Alexander has published over 330 articles, books, chapters, and monographs in the area of learning and instruction. She has also presented over 450 papers or invited addresses at national and international conferences. She served as the senior editor of Contemporary Educational Psychology for over 20 years, was past editor of Instructional Science and Associate Editor of American Educational Research Journal-Teaching, Learning, and Human Development, and presently serves on 12 editorial boards including those for Learning and Instruction, Educational Psychologist, Review of Educational Research, and the Journal of Educational Psychology.
Dr. Alexander is a member of the National Academy of Education, and a Fellow of the American Psychological Association, the American Educational Research Association, and the Society for Text and Discourse. Her honors include the Oscar S. Causey Award for outstanding contributions to literacy research from the Literacy Research Association (2001), the E. L. Thorndike Award for Career Achievement in Educational Psychology from APA Division 15 (2006), and the Sylvia Scribner Career Award from AERA Division C (2007).

Skill, Will, and Thrill: The Complex Interplay of Cognition, Metacognition, Motivation, and Emotion in Learning and Development

It is a truism to proclaim that learning is an immensely complex process and that the path to becoming a competent learner in any field can be perilous and uncertain. Still, for more than 40 years, I have made it my mission to investigate the nature of academic learning and to map out a path toward increasing competence. In this presentation, I will chronicle some of that exploration and several course adjustments that occurred due to shifting theoretical and methodological currents in educational and psychological science, as well as to personal theoretical and methodological re-orientations. Those re-orientations involved mounting evidence that the attainment of competence cannot be attributed solely to cognition (skill), metacognition (will), motivation or emotion (thrill). Rather, it is the continual interplay of these components within learning environments and societal contexts that either fosters students' academic development or frustrates it. With this path to competence mapped out, I will offer guidance on embedding skill, will, and thrill in learning environments to promote students' academic development.

Barbara Flunger

Barbara Flunger studies how student motivation can be improved. To this end, she is interested in understanding the educational and psychological factors that facilitate motivation, learning behavior and achievement of heterogenous students, using advanced variable- and person-centered research methods.

Barbara Flunger studied education, psychology, and child-and youth psychiatry at the Ludwig-Maximilians-University in Munich, where she graduated in 2007. She completed her PhD dissertation titled "Importance of explicit need strength for the learning process" in 2012. Subsequently, she was a post-doctoral researcher at the Hector Research Institute of Education Sciences and Psychology at the University of Tübingen. Since 2015, she has been working as an assistant professor of education at Utrecht University.

Assistant Professor
Faculty of Social and Behavioural Sciences, Department of Education and Pedagogy,
Utrecht University, The Netherlands

Promoting Student Motivation: But How and for Whom?

Students' motivational problems can have substantial societal costs: From poor performance to drop-out (ranging from 20-46% in European countries). Therefore, it is essential to study how motivation can be improved. A body of research has confirmed that teachers' autonomy support can boost students' academic outcomes. Yet, if teachers use autonomy support in their classrooms, will all of their students become more motivated and engaged? In order to reveal differences between students, our research considers distinct educational and psychological factors that facilitate motivation, learning behavior and academic achievement of heterogenous groups of students. Our findings showed that students with distinct levels of motivation and engagement can benefit from motivational support. The few differential effects we revealed highlighted that relatively high initial motivation can function as a motivational resource and increase the benefits of autonomy support. Yet, our findings also suggest that students may observe differences in how teachers provide autonomy support within their classroom. When teachers adjust their autonomy support to individual students, students can perceive inequalities in the amount of support they receive compared to the overall class and specific classmates. Differences in teachers' autonomy support in the classroom may not per se trigger negative outcomes in students: We found that students' perception that other students received more support than they did is associated with students' extrinsic motivation. Thus, teachers should be mindful to evenly distribute individual autonomy support within their classroom. Students might thrive most if they perceive their teachers to be autonomy-supportive in distinct situations, when teachers interact with the entire classroom and with individual students.

Heta Tuominen

Heta Tuominen's work links the study of motivation with well-being and explores both among children and young people. Specifically, she investigates individual differences in and developmental trajectories of achievement motivation and their associations with various educational and emotional outcomes. After completing her PhD in 2012 at the University of Helsinki, she continued as a post-doctoral researcher and as a PI of a project funded by the Academy of Finland. In 2018, she started as a university lecturer at the Department of Education, University of Helsinki but, during 2019-2021, she worked as a collegium researcher at the Turku Institute for Advanced Studies. Heta Tuominen is a Docent of Education, especially research on student motivation and well-being, and she coordinates research networks around these themes (e.g., the Educational Psychology and Learning Research Special Interest Group and the Motivation, Learning, and Well-Being research collective).

University lecturer
Faculty of Educational Sciences, Department of Education,
University of Helsinki, Finland

Balancing Doing Well with Feeling Well: Dynamics between Student Motivation and Well-being

Recent evidence indicates that there is a worrying increase in academic pressure and burnout among students and that perfectionism has increased among youth. Therefore, a need to study young people's motivation, perfectionistic tendencies, and well-being appears pressing. Despite the increasing prevalence of study-related burnout, significant individual differences in these developments take place. A possible key to the patterning of these differences lies not only in the *level* of goals the students seek to attain, but also in the *type* of goals striven for. *Achievement goal orientations* and *perfectionism* are two instrumental frameworks for understanding how students set goals, how they meet their imposed demands, and how they interpret achievement situations. In a series of studies, we have explored students' simultaneously salient multiple goals and demonstrated that they contribute to student well-being. For example, when a student aims to excel and outperform others, this sort of performance mode might result in not only academic success but also vulnerability for experiencing pressure, psychological cost, and exhaustion. Furthermore, we have examined students' perfectionistic profiles and how they predict well-being. Especially students with profiles characterized by high concerns (concerned and perfectionists) are at risk of study-related burnout. Our findings have also indicated that university students' perfectionistic profiles are linked with their stress experiences, coping, and recovery during the COVID-19 pandemic. Particularly a combination of high strivings and concerns seems to threaten university students' well-being. The findings add to our understanding of how both, the level and quality of goals, contribute to well-being.

Program Overview

WEDNESDAY, 24 AUGUST 2022	
09:00	Registration opens
10:00-10:30	**Conference Opening**
10:30-11:00	Coffee Break
11:00-12:30	**Session Block I:** **Symposia 1, 2, 3** Paper Sessions 1, 2, 3, 4
12:30-13:30	Lunch Break
13:30-14:30	**Keynote 1**
14:40-16:10	**Session Block II:** **Symposia 1, 2, 3, 4** Paper Sessions 1, 2, 3, 4
16:10-16:30	Coffee Break
16:30-18:00	**Session Block III:** **Symposia 1, 2, 3** Paper Sessions 1, 2, 3, 4, 5
18:15-19:15	**Keynote 2**
20:00	Welcome Event – Guided City Tour
THURSDAY, 25 AUGUST 2022	
09:00-10:30	**Session Block IV:** Poster Sessions 1, 2, 3, 4, 5
10:30-11:00	Coffee Break
11:00-12:30	**Session Block V:** **Symposia 1, 2, 3** Paper Sessions 1, 2, 3, 4, 5
12:30-13:30	Lunch Break
13:30-14:30	**Keynote 3**
14:40-16:10	**Session Block VI:** **Symposia 1, 2, 3** Paper Sessions 1, 2, 3, 4, 5
16:10-16:30	Coffee Break
16:30-18:00	**Mid – Career – Keynotes**
18:15-19:15	EARLI SIG-8 Business-Meeting
20:00	Conference Dinner
FRIDAY, 26 AUGUST 2022	
09:00-10:00	**Keynote 4**
10:00-10:30	Coffee Break
10:30-12:30	**Invited Interactive Symposia I: 1, 2, 3**
12:30-13:30	Lunch Break
13:30-15:30	**Invited Interactive Symposia II: 4,5**
15:30-16:00	Coffee Break
16:00-18:00	**Oxford Style Debate**
19:00	Wrap-up Joint Day

Program Overview Wednesday, 24.8.2022

WEDNESDAY, 24 AUGUST 2022

Time								
09:00	Registration opens							
10:00	**Conference Opening** • Welcome – Conference President: Susanne Narciss • Welcome – SIG8 Coordinators: Hanna Järvenoja, Hanna Gaspard • Welcome – Rector TU Dresden: Ursula Staudinger							
10:30	Coffee Break							
11:00	**SYMP 1 | E04** Students' emotions in school and in HE: antecedents, consequences C: Julia Gorges, Gerda Hagenauer D: Hanna Jarvenoja	**SYMP 2 | E08** Antecedents and consequences of teacher motivation C: Rebecca Lazarides D: Markku Niemivirta	**SYMP 3 | 114** Gender, ethnic/ migration back-ground (...) students' motivational beliefs C: Elisa Oppermann D: Hanna Gaspard		**Paper 1 |216** Perfectionism and well-being C: Antti Pulkka	**Paper 2 |213** Assessing and promoting teacher's self-efficacy C: Doris Holzberger	**Paper 3 |105** Role of parents – educators C: Miriam Compagnoni	**Paper 4 |214** The dynamics and effects of stress and resilience in teachers C: Gyde Wartenberg
12:30	Lunch Break – Tusculum							
13:30 14:30	Keynote 1 I E11 Maarten Vansteenkiste – University of Ghent, Belgium Nourishing learners' and teachers' engagement and growth? The critical role of basic psychological needs and need-supportive socialization							
14:40	**SYMP 1 | E04** Innovative student-directed learning approaches C: Sabine Schweder, Diana Raufelder D: Lisa Bardach	**SYMP 2 | E08** Advances in emotion regulation research: A self-determination theory perspective C: Moti Benita D: Guy Roth	**SYMP 3 | 114** Parental involvement and children's learning outcomes: Different aspects, modes, and trajectories C: Eleftheria Gonida D: Idit Katz	**SYMP 4 | E11** Interest development during higher education: What changes and how? C: Kathleen Quinlan D: K. Ann Renninger	**Paper 1 |214** Expectancies, values and costs C: Daria Benden	**Paper 2 |213** Student wellbeing, alienation C: Julia Morinaj	**Paper 3 |105** Development of goal orientation, role of peers, teachers, classroom C: Junlin Yu	**Paper 4 |216** Promoting teachers' knowledge and use of motivational and SRL strategies C: Lars Jenßen
16:10	Coffee Break							
16:30	**SYMP 1 | E04** Emotion regulation in achievement contexts: How can we promote adaptive achievement emotions? C: Elisabeth Vogl, Ulrike Nett D: Stephanie Lichtenfeld	**SYMP 2 | E08** Teacher emotions, emotion regulation and student motivation C: Katharina Hilger D: Dave Putwain	**SYMP 3 | 114** How network methods are innovating the research on multi-facetted motivation constructs C: Julia Moeller D: Laura Bringmann	**Paper 1 |214** Role of motivation and/or emotion in STEM education C: Rachel Sparks	**Paper 2 |213** Motivation research based on Self-Determination Theory C: Ralph Meulenbroeks	**Paper 3 |105** Motivation and self-regulated learning interventions C: Markus Pedaste	**Paper 4 |216** Measuring motivation, emotion, and SRL C: Iva Stuchlikova	**Paper 5 |E11** Motivational, emotional, and metacognitive perspectives on reading C: Enrica Donolato
18:15 19:15	Keynote 2 I E11 – online Gale Sinatra – University of Southern California, USA There is no denying it: Motivation and emotion play key roles in public understanding of science							
20:00	Welcome Event – Guided City Tour							

Program Wednesday, 24.8.2022

Wednesday 10:00–10:30	**CONFERENCE OPENING** **E11 I F-to-F**
	Welcome – Note – Conference president **with stream**
	Welcome – Note – SIG8 Coordinators
	Welcome – Note – Rector TU Dresden

Wednesday 11:00–12:30	Session Block I - Symposia

SYMP 1:   **Students' emotions in school and in HE: antecedents, consequences,**   **E04 I F-to-F**
           and methodological challenges

Chairs: Julia Gorges, Gerda Hagenauer   **Discussant**:   Hanna Järvenoja

Abstract: Investigating the role of emotions in education has been on the agenda of educational research for the last decades. Investigating emotions comes with major methodological challenges, as emotions are multifaceted phenomena. In addition, they are reciprocally linked with the learning environment and learning outcomes. In recent years, researchers have developed sophisticated research methods, designs and analytical approaches to understand the role of emotions. The present symposium brings together four quantitative research projects that employ different methodological approaches to investigate emotions in education, their antecedents and effects on learning and achievement in school and at university.

The first two presentations conducted an experience sampling study to assess state emotions of students in high school and at university. Experience-sampling studies using digital devices to assess emotion in situ help overcome the hindsight bias in emotion self-report. The first presentation aimed to understand to dynamic interplay between emotions and emotion regulation of first- and second-year university students right before an exam. The second presentation examined the impact of different facets of autonomy support on secondary school students' emotions using subject-specific student-based and teacher-based data. The third contribution employed a longitudinal design to investigate high school students' trait emotions and their reciprocal interrelation with engagement over time. Finally, the fourth presentation conducted an experiment using a dual task paradigm to identify effects of individuals' affective memories on their motivation when facing known and unknown learning content.

The discussant will take a multidisciplinary researcher's perspective and reflect on the contribution of different methodological approaches.

1. Emotions, regulation and performance over the first year of university: An experience sampling study
Ulrike Nett, Anna-Lena Rottweiler

Abstract: Over the past decades, the importance of emotions in the context of learning and achievement has become evident. Achievement anxiety can have negative effects on outcomes such as performance, self-regulated learning behaviour and well-being. In contrast, achievement hope has positive effects on students and their learning behaviour. It is therefore important for students to regulate these emotions, or in other words, to increase positive and decrease negative emotions. This regulation behaviour may be especially important during the first year of studies, as students must learn to regulate their emotions in a new environment.

Thus, the current study aims to explore students' regulation behaviour when experiencing either anxiety or hope during the week before exams in semester 1 and 2. To examine this, 200 freshmen rated their emotion intensity and use of regulation strategies six times a day for seven days before an important exam. This process was also repeated in the second semester.

Results indicated that anxiety was regulated at semester 1, while the effects of hope and regulation strategies were rather found at semester 2, underlining the assumption that students may learn to regulate their emotions throughout their first year of university. Only effects concerning rumination were found in both semester 1 and 2. Moreover, different emotions appear to be regulated using different strategies and hope and performance were positively correlated. In sum, our results show different regulation patterns when experiencing hope compared to anxiety. Theoretical and practical relevance of these findings are discussed.

2. Lesson-specific autonomy support and students' boredom, frustration and anxiety in math and german
Barbara Flunger, Lisette Hornstra, Kou Murayama, Lissa Hollmann

Abstract: Expanding research on the relative impact of different autonomy-supportive strategies employed by teachers across domains, the present study investigated variation in 4 lesson-specific autonomy-supportive strategies (providing choices, rationales, accepting frustration, and stimulating interests) and 3 achievement emotions (frustration, boredom, and anxiety) in 2 school subjects with a repeated measurement design. For 3 weeks, 202 Dutch students from 8 eighth grade classes and 1 ninth-grade class and their 12 teachers completed lesson-specific measures at the end of math and German lessons. Students' perceptions of their teachers' autonomy support as well as their achievement emotions varied considerably across lessons within the same domain (within-student level variance ranged from 39% to 61%). In random intercept-random slope models, we found that the autonomy-supportive strategies showed meaningful associations with frustration and boredom, but not anxiety. We found no evidence of domain dependency in the associations, lending support to the universal effectiveness of autonomy-supportive teaching strategies.

3. The interplay between emotions and engagement of secondary school students in science education
Gerda Hagenauer, Josef Kriegseisen, Alexander Strahl, Franz Riffert

Abstract: Emotions play an important role in student learning as they influence learning behaviour and performance. The relationships between these factors are reciprocal. This reciprocity was postulated in the control-value theory of achievement emotions (Pekrun, 2006). However, they have rarely been empirically tested; in particular the mutual connections between various distinct emotions (e.g. joy, boredom, fear, shame) and student engagement have been widely neglected. Furthermore, so far, most research on student emotions has been realized in maths instruction, while studies in science education are rather scarce. At this point the presented research project ties in. It investigates the extent to which students' achievement emotions in science instruction are reciprocally associated with their behavioural and cognitive engagement. A longitudinal study with two measurement points (at the beginning of the school year and at the end of the school year) in lower secondary education was conducted. Altogether, 361 students in lower secondary schools (grades 6-8 at low track schools in Austria) filled in questionnaires based on well-established and standardized scales in the field (e.g. AEQ as developed by Pekrun and colleagues). The data was analysed by means of cross-lagged analyses in Mplus. The results show interrelations between the constructs over time. The impact of emotions on engagement was stronger than vice versa. The results are discussed with regard to the design of science instruction in lower secondary education.

4. Do you remember how you felt? Affective memories inform expectancy and value
Julia Gorges

Abstract: Emotions are a vital part of learning. Students may feel anxiety or even fear before class, enjoy learning or be bored, feel proud or frustrated. According to expectancy-value theory, individuals' affective memories of prior learning inform their expectancy of success and intrinsic task value. Empirical evidence supports the predictive validity of affect attached to affective memories for expectancy and value. However, in these studies, participants were instructed to recall affective memories prior to judging expectancy and value, which may lead to methodological artefacts. Against this background, the goal of the present study was to test whether individuals spontaneously recall affective memories when they assess their expectancies and value for academic learning content using an adapted experimental dual-task paradigm. Participants recalled a memory that could inform their expectancy and intrinsic task value regarding a known or unknown learning content after having counted vowels in the stimulus material (e.g., mathematics, interesting; control condition) or having judged whether a combination of learning content and motivational adjective described themselves (e.g., whether they find mathematics interesting; experimental condition). Results revealed a significant effect (i.e., decrease) of participants' reaction time for recalling affective memories in the experimental condition indicating that memories had been used in the preceding task. The effect was robust across facing known and unknown learning content. Overall, results from this experiment support the assumption that individuals use affective memories in the process of generating expectancy and value regardless of an explicit recall task.

SYMP 2: Antecedents and consequences of teacher motivation   E08 | F-to-F

Chair: Rebecca Lazarides   **Discussant:** Markku Niemivirta

Abstract: Researchers have revealed that teacher motivation matters for learning and instruction. However, it is still unclear how teachers' motivations are interrelated with instructional behaviors, student academic and teacher professional outcomes. This symposium brings together four studies from international groups (Israel, Germany and Austria) that investigate the role of teacher motivations for teaching (Studies 1 & 4) and for teachers (Study 2 & 3) in different institutional contexts (teacher education, schools; higher education), referring to different motivational theories (achievement goal, expectancy-value, social-cognitive theories).

Paper 1 reveals that Israeli teachers' relational goals mediate the effect of teachers' value on social-emotional support (Study 1), that principal support relates to social support via relational goals (Study 2), and that principal support and relational goals predict student-reported support (Study 3).

Paper 2 shows that German higher education teachers' subjective well-being at the semester start predicts increases in task-and learning-approach goals, and decreases in appearance- and work-avoidance goals. Appearance-approach goals at the semester start predict increases in subjective well-being.

Paper 3 identifies four latent profiles of Austrian teacher students' career motivations which differ in regard to teacher students' self-efficacy. Younger students tend to be overrepresented in the social profile.

Paper 4 identifies three instructional pathways - a behavioral, an instructional, and a socio-emotional path - through which German secondary teachers' self-efficacy and interests are longitudinally related to students' interest (1.5 yrs) when focusing on theoretically aligned student-reported teaching behaviors.

Our expert discussant from Finland will draw out recommendations for further research, policy and practice.

1. Personal and contextual influences on teachers' relational goals and support for students
Ruth Butler, Limor Shibaz

Abstract: Teachers' relational goals to create caring relationships with students predict their socio-emotional support (SS) for students. No studies have considered what influences beneficial relational goals, however. In three studies in Israel we predicted that personal prosocial values and a supportive working environment promote relational goals, and both promote SS via relational goals. In Study 1 (N = 338 teachers) we assessed values and relational goals at the beginning of the school year (Time 1) and SS six months later (T2). In Study 2, 374 teachers in 40 schools rated perceived school principal support and relational goals (T1) and SS (T2). In Study 3, 73 teachers rated principal support and relational goals (T1); students in one class per teacher (N = 1,700) rated the teacher's SS at T2. Results from linear regressions (Study 1) and HLM (Studies 2 and 3) confirmed that values and principal support predicted relational goals and predicted SS via relational goals. Principal support predicted relational goals at both individual and school levels. Results confirm the benefits of strivings to connect and provide novel evidence of coherent paths from personal values and experienced support through relational goals to support for students.

2. Temporal relationships of achievement goals and subjective well-being in higher education teachers
Raven Rinas, Lisa Kiltz, Markus Dresel, Martin Daumiller

Abstract: Research indicates that higher education teachers struggle with compromised subjective well-being stemming from the challenging academic environments they work in. From a motivational perspective, several cross-sectional studies have found teachers' achievement goals to be meaningfully intertwined with aspects of their subjective well-being. However, more research is needed to clarify findings and understand temporal relations of these goal/well-being interrelations. In our study, we aimed to address this research gap by assessing 493 higher education teachers' achievement goals and multifaceted subjective well-being, operationalized as positive affect, negative affect, job satisfaction, and life satisfaction across one semester (four months). Latent change score modelling revealed that higher levels of subjective well-being at the semester start predicted subsequent increases in task-and learning-approach goals, as well as subsequent decreases in appearance- and work-avoidance goals. Higher levels of appearance-approach goals at the semester start also predicted subsequent increases in subjective well-being. Taken together, the present findings help to disentangle temporal relations of these critical psychological variables and highlight that especially subjective well-being matters for teachers' goal setting processes, as opposed to the other way around.

3. Self-efficacy beliefs among preservice teachers: Also a matter of career motivation and age?
Anna M. Eder, Michaela Katstaller, Burkhard Gniewosz, Andreas Bach, Franz Hofmann

Abstract: Many studies on the teaching profession point to the impact of various motivational dimensions on successful teacher-professionalization. This study focuses on the impact of the motivation of choosing teaching as a career and the age of teacher students on teacher-specific self-efficacy beliefs. Based on a sample of 306 Austrian teacher students, four profiles of motivations could be identified by latent profile analysis. The results of the study indicate that socially and idealistically motivated students report higher values in teacher-specific self-efficacy beliefs than students in the undecided or balanced motivational profile. Regarding age, only a trend could be shown: younger students would be rather characterized by a social profile than by a motivationally balanced profile. However, the different profiles and the subsequent differences in teacher-specific self-efficacy beliefs indicate more or less favorable starting points in the teacher students' professionalization very early in the process. Therefore, it is important to provide differentiated learning opportunities at the beginning of the teacher training to address the differential need of the teacher students.

4. Tracing the signal: Teachers' motivational beliefs, student-reported teaching and student interest
Rebecca Lazarides, Ulrich Schiefele, Katharina Hettinger, Marthe Claire Frommelt

Abstract: Theoretical models suggest that teachers' motivational beliefs relate to student academic outcomes through teaching behaviors, and that teacher motivation and teaching behaviors are reciprocally interrelated. However, these relations have merely been empirically tested in longitudinal work. We extend research by (i) examining whether teachers' motivational beliefs (multiple facets of teacher self-efficacy and interest) longitudinally relate to student interest through student-reported teaching behaviors (cognitive activation, emotional support, classroom management, relevance support), and by (ii) testing reciprocal relations between teachers' motivational beliefs and student-reported teaching behaviors. Participants were 50 mathematics teachers (66.0% female) and their n = 959 students (48.7% girls; Mage: 14.20, SD = 0.62). Results of longitudinal latent-manifest multilevel models revealed different indirect teaching pathways: A 'behavioral pathway' from teacher self-efficacy for classroom management (Time 1) to student interest (Time 3) through student-perceived classroom management (Time 2); a 'socio-motivational pathway' from self-efficacy for engagement (Time 1) to student interest (Time 3) through emotional support (Time 2), and an 'instructional pathway' from self-efficacy for classroom management (Time 1) to student interest (Time 3) through cognitive activation (Time 2). Self-efficacy for engagement and teacher educational interest (Time 1) affected student-reported relevance support (Time 2). We did not find reciprocal effects from teaching to teachers' motivational beliefs. Our findings propose that when planning classroom instruction and interest enhancement in schools, different dimensions of teachers' motivational beliefs need to be considered as relevant for high-quality teaching

SYMP 3: Gender, ethnic/migration background and their intersection in students' motivational beliefs   114 I Hybrid

Chair: Elisa Oppermann   **Discussant**: Hanna Gaspard

Abstract: Empirical research documents inter-individual differences in students' motivational beliefs related to students' gender, ethnic/cultural, migration and socio-economic backgrounds. Little is known, however, about the interplay of these social categories with regard to students' motivational beliefs. The symposium addresses this paucity in current research by bringing together studies from four different countries that examine gender, ethnicity/race, migration background and socio-economic status, and their intersections, across different age groups (range 8-16 years).Paper 1 (Germany) investigates the development of elementary students' interest in mathematics and language arts and how developmental changes are interrelated with the intersection of gender and migration background.Paper 2 (US) investigates ethnic/racial differences in high school students' math competence-related beliefs and the extent to which these differences replicate among girls and boys across four U.S. datasets.Paper 3 (Australia) examines the immigrant paradox for secondary school students' mathematics self-concept by considering the role of SES-of-origin-country in explaining differences between immigrant and native students.Paper 4 (Austria) investigates whether potential differences in secondary school students' motivational-affective, cognitive and socio-emotional learning characteristics between students with and without migration backgrounds can be explained by a cultural pluralism climate (ages 10-16 years).The contribution of our symposium is to extend current knowledge about the role of different social categories and their intersections in explaining inter-individual differences in students' motivational beliefs across different age groups. The four papers are discussed with regard to their theoretical and practical implications by an expert in the field from Australia.

1. The intersection of gender and migration background in the development of student interest
Elisa Oppermann, Rebecca Lazarides

Abstract: The development of student interest in mathematics and language arts is heterogenous. For example, whereas some students experience a decline in their interest as they progress through school, the interest of others remains stable across time (Gaspard et al., 2019). One potential explanation for such different trajectories are gender- and cultural-specific socialization processes. However, little is known about the intersections of gender with other social categories. The present study examines the development of student interest in mathematics and language arts and the role of gender, migration background and their intersections for changes in interests. The sample included 2.316 students (48% female; Mean age = 9.3 years; 76.4% born in Germany) assessed at three measurement times in elementary school. Linear growth models (LGM) revealed initial subject interest differences between boys and girls as well as between students with and without a migration background. Interaction effects of gender and migration background were found for language arts on both the intercept and slope, but not for mathematics. Results underline the importance of considering the intersection of gender and migration background when aiming to understand students' subject-specific interest development.

2. Math competence-related beliefs: A replication of ethnic/racial differences within gender groups
Charlott Rubach, Jacque Eccles, Sandra Simpkins, Christine Starr, Yannan Gao, Glona Lee, Nayssan Safavian

Abstract: Does STEM motivation differ by students' ethnicity/race, and do these differences replicate among male and female adolescents? This study investigated differences in math competence-related beliefs across European Americans, Latino Americans, African Americans, Asian Americans and the extent to which these ethnic/racial differences replicate among male and female high school students across four U.S. datasets collected from the early 1990s to 2010s. We employed a total sample of 22,493 students in 9th to 12th grade (49% male). We identified similar ethnic/racial differences in math competence-related beliefs across datasets. Specifically, Asian American students reported higher math competence-related beliefs than European American, African American, and Latino American students in 9th and 10th grade across datasets. However, the comparison between European American students and African American students varied. By focusing on ethnic/racial differences among each gender group, the same pattern was found: The finding that Asian Americans have more positive competence beliefs than all other races/ethnicities in 9th and 12th grade replicated across datasets and gender. Latino Americans reported higher math competency-related beliefs than European Americans only among females in 12th grade across datasets. Findings will be discussed in relation to cultural values and socialization processes.

3. The immigrant paradox and math self-concept in Australia: An SES-of-origin-country hypothesis
Geetanjali Basarkod, Herbert W Marsh, Philip D. Parker, Theresa Dicke, Jiesi Guo

Abstract: The immigrant paradox is the phenomenon where recent immigrants have better outcomes than individuals from native-born families. Limited past research has shown the paradox to exist for math self-concept. However, neither its exact nature nor a theoretical explanation for its existence have been reported. In this study, we bridge these gaps by using Australian cohort data from the Programme for International Student Assessment (PISA) 2003 (N = 12,551) and 2012 (N = 14,481), and a series of weighted random-intercept multilevel models. We first establish that immigrant students do indeed have higher math self-concepts than native students, controlling for gender and absolute parental socioeconomic status (SES). We then provide an SES-of-origin-country hypothesis as a contextual explanation for the immigrant paradox for math self-concept. Specifically, we show that the difference between immigrant and native students' math self-concepts substantially reduces when accounting for parents' SES relative to their country-of-origin. In addition, we show that both these results replicate when examining educational expectations—a construct widely studied in the immigrant paradox literature (sometimes labelled the expectation-achievement gap). Our findings suggest that the paradox for math self-concept and educational expectations may partly result from immigrant parents' socioeconomic advantage in their home countries.

4. Differential effects of cultural pluralism climate on students with and without migration background
Joy Muth, Sophie Oczlon, Marko Lüftenegger

Abstract: In school, adolescents are faced with the task to develop healthy socio-emotional, motivational, and competence-related personality aspects. Especially for students with migration backgrounds, this development might be specifically sensitive to social contexts like a cultural pluralism climate (CPC). A positive CPC refers to an atmosphere in which differences between cultural groups are valued by providing opportunities to learn about and respect different cultures of students.This study investigated whether potential differences in self-esteem, cultural identity, well-being, academic self-concept, and scholastic achievement between students with and without migration backgrounds can be explained by a CPC. The sample consisted of 1649 students from 87 Austrian secondary school classes, of which 700 had a migrant background of first or second generation. CPC was measured with the two scales multicultural interest shown by teachers and learning about intercultural relations (Schachner et al., 2016).Results from SEM revealed no differences between first- and second-generation students in all the outcome variables. Students with migration background showed lower levels of cultural identity, scholastic achievement, academic self-concept, self-esteem, and well-being. Learning about intercultural relations positively predicted self-esteem, well-being, self-concept, and cultural identity for all students. Multicultural interest shown by teachers predicted students' well-being. Multigroup SEM, however, showed no differential effects of both CPC scales on outcomes for both students with or without migration background.

Wednesday 11:00-12:30	Session Block I – Papers

PAPER 1: Perfectionism and well-being   **216 I Online**

Chair: Antti Pulkka

1. Perfectionism, academic well-being, and temperament: Parallel processes and predictive effects
Anna Rawlings, Anna Tapola, Heta Tuominen, Markku Niemivirta

Abstract: We examined among adolescent students parallel developmental processes of perfectionistic strivings and concerns, and academic well-being (school value, emotional exhaustion). Temperament (reward and punishment sensitivity) was included as an individual-difference factor contributing to perfectionistic tendencies, academic well-being, and their interconnections. Participants (N = 393) rated their perfectionistic tendencies and academic well-being in the autumn of the 8th and 9th grades, with temperamental sensitivities, GPA, and gender considered as predictor variables in series of latent change score modeling (LCS).Findings showed school value to decrease and emotional exhaustion to increase. Connections were observed between the respective levels and changes in perfectionistic strivings and school value, and perfectionistic concerns and emotional exhaustion, suggesting parallel processes between adaptive and maladaptive aspects of perfectionism and well-being. Regarding predictions from temperament, novelty-seeking was positively linked with strivings and school value, and negatively with exhaustion. Conversely, interindividual reward sensitivity was positively connected with concerns and exhaustion, and negatively with school value. An inspection of means showed exhaustion and concerns to remain high among those with higher initial punishment sensitivity, while those with lower initial level reported steeper increase. These dynamics also applied to the effects of interindividual reward sensitivity on changes in strivings and exhaustion. Girls reported steeper increase in both perfectionistic strivings and emotional exhaustion. Findings provide new information on developmental connections between perfectionism and well-being, and the role of temperament in these linkages. Further longitudinal studies with more diverse samples are needed to examine these developmental relationships, and to deepen understanding of their educational significance.

2. Students' perfectionistic profiles: Stability, change, and connections with well-being
Anna Kuusi, Heta Tuominen, Anna Widlund, Johan Korhonen, Markku Niemivirta, Petri Ihantola

Abstract: Recent evidence indicates an increase in perfectionism and school burnout among adolescents. Perfectionism is characterized by a combination of two individual tendencies: perfectionistic strivings and concerns. Cross-sectional group-based studies have informed us that meaningful perfectionistic profiles can be identified and that they differ in relation to general well-being. However, studies examining perfectionistic profiles among adolescents, their temporal stability, and how they link with academic well-being (i.e., school engagement and burnout) are scarce.The aim of this study was to investigate Finnish adolescents' (N = 450) perfectionistic profiles, profile stability during the ninth grade (from fall to spring), and how those profiles relate to academic and more general well-being and academic achievement. Cross-sectional latent profile analyses (LPA) and a two-wave latent transition analysis (LTA) were conducted.Four distinct profiles with different emphasis on strivings and concerns were identified: concerned (T1: 34%/ T2: 32%), ambitious (25%/25%), perfectionists (22%/21%), and non-perfectionists (19%/22%). There was substantial stability in profiles: being assigned to the same group yielded the highest transition probabilities (.71–.80). Likely transitions were from concerned to non-perfectionists or perfectionists, and from perfectionists to concerned or ambitious. Perfectionists and ambitious students were the most engaged in their studies. Perfectionists and concerned expressed the most burnout, depressive symptoms, and anxiety. Ambitious students had the highest grades, followed by perfectionists. The findings add to our understanding of the role perfectionistic strivings and concerns play in students' well-being and achievement, and thus provide some insight on how to address such challenges in schools.

3. Students' pride, hopelessness and anxiety after school transition: multilevel growth curve modelling
Simon Meyer, Juliane Schlesier, Michaela Gläser-Zikuda

Abstract: Regarding the transition from elementary to secondary school, recent studies have predominantly addressed regional, social and ethnic-cultural disparities, whereas affective factors such as achievement emotions, especially hopelessness and pride, at the beginning of secondary school are less researched. Emotions are closely related to cognitive, behavioural, motivational and physiological processes and they are therefore important for learning and achievement. Thus, the purpose of the present longitudinal study is to analyze the development of students' pride, anxiety and hopelessness after transition to secondary school. The study was carried out from the beginning of 5th grade to the beginning of 6th grade (three measure time points) and included N = 584 students (84.9% female) with an average age of M = 10.19 (SD = .45).

Results of multilevel growth curve models show that the effect of time for pride (β = −0.07 (−0.10, −0.47), $t(1167)$ = −3.94, $p < .001$), hopelessness (β = 0.14 (0.10, 0.17), $t(1167)$ = 7.68, $p < .001$) and anxiety (β = 0.09 (0.07, 0.13), $t(1167)$ = 6.17, $p < .001$) is highly significant. These results indicate an unfavorable development of the measured achievement emotions, which may lead to negative effects on e.g. students' performance.

Results and limitations of the study will be presented and discussed in the lecture. Furthermore, educational implications to promote an increase of students' pride and to prevent a decrease of hopelessness and anxiety in the context of transition will be discussed.

4. Perfectionistic profiles: Associations with error-related beliefs and responses
Antti Pulkka, Heta Tuominen, Anna Tapola, Markku Niemivirta, Maria Tulis

Abstract: In this study, we examined the associations between secondary school students' perfectionistic profiles (i.e., the patterns of perfectionistic strivings for high standards and concerns over one's accomplishments) and important preconditions of learning from errors and affective responses (i.e., adaptive error-related beliefs and responses, fear of failure, and academic withdrawal).

Based on a sample of 356 Norwegian 8th grade students, three profiles were identified: perfectionist (high strivings and concerns; 36.8%), ambitious (relatively high strivings, low concerns; 23.9 %), and non-perfectionist (relatively low strivings, moderate concerns; 39.3 %). The groups differed in their beliefs about errors as learning opportunities, adaptive (metacognitive) learning activities following errors, fear of failure, and academic withdrawal. Ambitious and perfectionists had highest scores on learning from errors and adaptivity of error reactions when compared to the non-perfectionists. Perfectionists scored highest on fear of failure followed by the non-perfectionists, and regarding academic withdrawal, the perfectionists and non-perfectionists scored equally high and differed significantly from the ambitious.

Thus, it seems that strong perfectionistic strivings may be related to recognizing errors as a source of learning, but with an affective cost when coupled with concerns.

5. The role of Future orientation on academic performance and wellbeing in Peruvian university students
Dora Herrera, Erika Jassuly Chalen Donayre, Benjamin Lira Luttges

Abstract: In this study we examine the effect of future orientation (in two life domains: work/career and family/marriage) on academic performance and well-being in 746 Peruvian University students (70% female). Participants' mean age was 21.51 years (SD = 2.26). Parents' level of instruction was mostly at the university level. Psychometric characteristics of the future orientation measure did not comply to the hierarchical model of future orientation, given that second order factor models did not converge. Confirmatory factor analysis using weighted least squares mean and variance corrected for the seven first level factors was satisfactory (CFI=.96/.99, TLI=.96/.99, RMSEA=.072/.094, SRMR= .069/.065 for Career/Family models respectively). Alphas ranged from .73 to .96. Wellbeing was operationalized as life satisfaction on one sub-sample (n=311) and flourishing in a separated sub-sample (n=435); both were measured through psychometrically optimal scales and related to several future orientation variables. Most notable among them were career expectancy (rs=.53), exploration (rs=.42) and commitment (rs=.46/.52). Flourishing was also related to career internal control (r=.52) and career hopes (r=.45). Relations with the family domain were weaker, yet significant. Grades were lowly associated with career-expectancy and internal control (rs=.09) and negatively with career fears (r = −.11) and internal control in family domain (r = −.09). According to these findings we conclude that, in order to enhance university students' wellbeing and academic performance; expectance (optimism), internal control, hopes, fears, exploration and commitment could be considered under the work/career domain.

PAPER 2: Assessing and promoting teacher`s self-efficacy   213 | Online

Chair: Doris Holzberger

1. Novice teachers' motivation, needs, efficacy, and job satisfaction: a person-centred approach
Katrien De Cocker, Silke Hellebaut, Leen Haerens

Abstract: Motivation to teach is related to different beneficial teacher and student outcomes. Given the high drop-out among novice teachers, further research on their motivation is warranted. However, most studies rely on variable-centred approaches, while different forms of motivation may co-occur simultaneously. Therefore, this study aimed (1) to determine novice teachers' motivational profiles using a person-centred approach based on autonomous and controlled motivation, and (2) to examine how these profiles differ in need-based experiences, job satisfaction, and teacher efficacy. Seventy-two novice teachers participated in this cross-sectional study in which motivation to teach, basic psychological need satisfaction and frustration, teacher efficacy, and job satisfaction were assessed through validated questionnaires. Based on cluster analyses, four motivational profiles were identified, with respectively high-low (Profile 1: 29.6%), high-average (Profile 2: 28.2%), low-low (Profile 3: 26.8%), and low-high (Profile 4: 15.5%) autonomous and controlled motivation. Using MANOVA test, the relatively controlled group (Profile 4) showed the worst pattern of antecedents and outcomes with significantly lower need satisfaction, teaching efficacy and job satisfaction compared to the relatively autonomous (Profile 1) and relatively highly motivated (Profile 2) group. This relatively controlled group (Profile 4) also displayed higher need frustration compared to the relatively autonomous group (Profile 1). Findings confirm the importance of the quality of motivation among novice teachers. Hence, when developing induction programs for novice teachers, their type of motivation should be taken into account in order to enhance work-related well-being.

2. A class-specific perspective on teacher self-efficacy and its relation with teaching quality
Désirée Thommen, Anna-Katharina Praetorius, Fani Lauermann, Urs W. Grob, Robert Klassen

Abstract: Based on Bandura's social cognitive theory, researchers often assume teacher self-efficacy (TSE) is likely to have a positive effect on teaching quality. However, the available empirical evidence is mixed. This study extends previous research on TSE and teaching quality by examining whether the use of a class-specific assessment of TSE may strengthen its associations with student-rated teaching quality. The analyses were based on the English sample of the TALIS Video Study. Mathematics teachers (N = 86) rated their self-efficacy beliefs using class-/task-specific TSE items and generalized task-specific TSE items. Their students (N = 1930) rated the quality of teaching in their math class. Multilevel regression analyses revealed comparatively stronger associations between student-rated teaching quality and class-/task-specific TSE than generalized task-specific TSE. However, our results do not yield conclusive information on the added value of the class-specific perspective on TSE. We discuss possible reasons for these results.

3. Promoting teacher self-Efficacy. A meta-analysis on intervention studies
Doris Holzberger, Janina Täschner

Abstract: A substantial amount of research has emphasized the importance of teacher self-efficacy for a successful and healthy teaching career (e. g., Aloe et al., 2014; Zee & Koomen, 2016). However, it is less clear, how teacher self-efficacy can be effectively promoted. Existing research syntheses especially call for deeper investigation of the role the sources of self-efficacy, as described by Bandura (1997), play in the context of teacher self-efficacy promotion (Klassen et al., 2011; Morris et al., 2017). The present meta-analysis aims to answer two main research questions: (1) Can interventions in teacher education and teacher training promote teachers' self-efficacy? (2) How do the four sources of self-efficacy (mastery experience, vicarious experience, social persuasion, physiological reactions) affect the intervention effects? The study analyzes quantitative intervention studies and further analyses whether intervention effects depend on study quality indicator or the career state of teachers. It will contribute knowledge to the theoretical foundations of teacher self-efficacy research as well as to practical implementations in teacher education.

4. The development of student teachers' teacher self-efficacy before and during the COVID-19 pandemic
Wendy Symes, Rebecca Lazarides

Abstract: Mastery experiences are important for the development of self-efficacy, including teacher self-efficacy (TSE, Tschannen-Moran & Hoy, 2001). The current study explored whether student teachers who missed out on such experiences due to the COVID-19 pandemic differed in the extent to which their TSE developed across a semester. We examined data of 201 student teachers from one university in Germany using latent growth curve models to compare the development of TSE in students taught before or during the first COVID lockdown in Germany. Results suggested that student teachers taught during the COVID lockdown showed less of an improvement (and in some cases, a decline) in their TSE, than students who had been taught in the preceding two semesters. These findings are important as they suggest that there may be a cohort of student teachers entering the teaching profession with lower teacher self-efficacy than is typical. Universities and schools may wish to provide additional mastery experiences to compensate for the missed opportunities during the COVID-19 pandemic.

5. Measures of teacher self-efficacy: An overview on covered domains and psychometric qualities
Janina Täschner, Anna Hartl, Doris Holzberger

Abstract: Teacher self-efficacy is a prominent construct in motivational research (Klassen et al., 2011; Zee & Koomen, 2016). Despite repeated calls for conceptually grounded measures of teacher self-efficacy (Chesnut & Burley, 2015; Klassen et al., 2011), existing scales differ significantly in content and form although they consistently rely on Albert Bandura's theory (1997). While the scale from Tschannen-Moran & Hoy (2001), for example, measures three content-related domains of teacher self-efficacy (classroom management, student engagement and instructional strategies), the scale from Gibson & Dembo (1984) covers only two domains (personal and general teaching efficacy). Another scale from Bosse & Spörer (2014) measures content-related domains in the specific context of inclusive teaching. In our overview we explore the following research questions:

- What measurement instruments of teacher self-efficacy exist?
- Which domains of teacher self-efficacy do they measure?
- How good are the psychometric qualities of the measures?

A systematic literature search in four electronic databases (e.g., ERIC) and four common test repositories (e.g. GESIS) revealed 552 hits that are currently coded with regard to inclusion criteria (e.g., validated and peer-reviewed measure, accessible in fulltext) and the research questions.

Our study significantly extends previous reviews by Tschannen-Moran and colleagues (1998; 2001) and O'Neill and Stephenson (2011). It is the first review to systematically compare measures of teacher self-efficacy using criteria relevant for practice and theory. The goal is to sharpen researchers' and teacher educators' perspectives on the potential focuses of various self-efficacy questionnaires.

PAPER 3: Role of parents – educators   105 | Online

Chair: Miriam Compagnoni

1. Moderation of parent psychological functions on their practices & their children's school readiness
Lihi Sarfaty, Adar Ben-Eliyahu

Abstract: As parent-child interactions have a direct effect on their children's development and of their school readiness, the aim of this study was to unpack the role of parent's psychological functions play in the association between parenting practices and their children's self-regulated learning (SRL) and pre-academic knowledge as framing children's school readiness. Building on prior research suggesting parent's psychological functions, such as their metaprocesses and motivation toward learning, relate to the support they provide to their children, we hypothesize that these psychological functions may play a role in the association between parenting practices and their children's school readiness. The current study queried 109 children at the end of their kindergarten year and their mothers regarding parent practices, SRL (i.e., reappraisal suppression, attention, and planning), met-aprocesses (i.e., metacognitive, metaemotion, and metabehavior), and motivation (i.e., mastery and performance goal orientation). Moderation analyses with the parent functioning (e.g., goal orientation) as the moderator, the parent practice (e.g., positive parenting) as the independent variable, and child's school readiness indicators (e.g., SRL) as the dependent variable were examined. Findings showed four parent's psychological functions to be significant, indicating that parent's emotion (reappraisal) SRL, metaemotion and their goal orientations moderated the association between their practices and several aspects of their children SRL. Theoretical and practical implications are presented.

2. Student achievement goals and parental involvement: A person-centered longitudinal approach
Konstantina Falanga, Eleftheria Gonida, Dimitrios Stamovlasis

Abstract: Student motivation has been significantly associated with parental involvement in children's education. However, limited longitudinal research has been conducted to date on the relationships between parental homework involvement and children's motivational and academic functioning. The study aimed at investigating longitudinal associations between parental beliefs and types of involvement in math homework (autonomy support, control, interference) and student motivational processes (achievement goals and efficacy beliefs) and academic performance via a person-centered approach. In grades 5th and 6th, 296 students completed twice a year self-reports measuring achievement goal orientations (mastery, performance-approach, performance-avoidance) and math self-efficacy, and solved mathematical tasks. Their mothers completed questionnaires on their involvement in math homework and their beliefs for their child's efficacy in math. Latent class analysis indicated four profiles based on children's goal orientations and efficacy beliefs Regarding longitudinal relationships, the following significant results were found: (i) the 'High Mastery' profile was negatively predicted by parental control in all four time points; (ii) the 'Low Mastery and Self-efficacy' profile was positively predicted by interference and negatively by parents' efficacy for the child in two and three time points, respectively; (iii) the 'All High' profile was positively predicted by parental control in three time points; (iv) math performance was positively associated with the 'Mastery' profile, and (v) a relatively stable goal and efficacy profile was found. Findings are discussed in light of current theory and evidence on parents' contribution in children's motivational and academic outcomes, and implications for practice will be pointed out.

3. Supporting early childhood educators' skills in co-regulation of emotions: an intervention study
Kristiina Mänty, Susanna Kinnunen, Outi Rinta-Homi, Marika Koivuniemi, Hanna Järvenoja

Abstract: Years of research has connected the qualities of interactions in early childhood education (ECE) to children's learning of emotion regulation skills. However, there is little research exploring educators' skills in co-regulation of emotions and how these skills can be improved by research-based learning programs. Therefore, this study explores how ECE educators develop co-regulation skills during learning intervention. 165 educators from Finnish early education units participated in the study, from which 42 educators belong to a control group. 123 educators (intervention group) participated in the 32-week long, research based, work-integrated collaborative learning intervention for ECE educators. The learning intervention was developed by considering research and

related practices in terms of the aspects of effective co-regulation of emotions in naturally occurring socio-emotional interactions in early childhood education. The interventions' effects on educators' self-efficacy and skills in being aware of, accepting, supporting, and monitoring children's emotion regulation were explored by Crèche Educator Emotional Style Questionnaire (CEESQ) and video-stimulated questionnaire (VSQ). The results indicate that during the intervention, educators' self-efficacy in supporting children's emotion regulation skills and their skills in knowledge-based reasoning of co-regulation of emotions and children's need for support increased. This study stresses the importance of focusing on ECE educators' theoretical knowledge and pedagogical skills to provide optimal support for children's learning of emotion regulation skills.

4. Is it okay to be a couch potato? The transmission of willpower theories from parents to children
Miriam Compagnoni, Vanda Capon-Sieber, Veronika Job

Abstract: Are parents' views of their willpower as a limited or a non-limited resource transmitted to their children? Given that social learning is thought to occur through a child's perceptions of their parents' beliefs and actions, we suggest that a child's perception of the vitality of their parent may facilitate the transmission of willpower theories between generations. Following previous studies on antecedents of willpower theories, a parent's autonomy-supportive behavior could serve as a mediator in this relationship. Data on willpower theories, perceived vitality, and autonomy-support were collected from 193 primary school child-parent dyads using self-assessment questionnaires (M Child = 11 years, SD = 0.99; M Parent = 44 years, SD = 5.12). Results show a positive relationship between parent and child willpower theories (r = .176, p = .023), based mainly on mother-daughter transmission processes. Parent-child transmission is partially mediated by the children's perception of the vitality of their parents during leisure time on weekdays, but not at the weekends. Further, results indicate that perceived autonomy support might also play a role in the transmission. Because willpower theories are important predictors of successful self-regulation, the results are discussed in terms of their practical and theoretical implications.

5. Imaging the future: Exploration of the Effect of Future Thinking on Self-Regulated Learning
Jenefer Husman, Ross Anderson, Ed Madison, Matthew Kim

Abstract: This presentation will review the literature focused on three traditions of research into future thinking: Future Time Perspective, Future Possible Selves, and Episodic Future Thinking. We argue that, taken together, these three bodies of research provide valuable insight into student self-regulated learning. Although few researchers have explored the importance of future thinking for self-regulated learning, the influence of thinking about the future on our present decision-making, health behaviors, learning strategy use, and well-being has been demonstrated in numerous psychological studies. The effect of thinking about the future is frequently located within self-regulation: when people think about their futures, they are more likely to self-regulate (e.g., (Daniel, Stanton, & Epstein, 2013; Lee, Husman, Green, & Brem, 2016). However, research on the effects of future thinking is spread across several domains. Researchers from developmental, social, cognitive, and educational psychology have examined human's ability to think about their futures. Cross-disciplinary research concerning mental representations of past-present-future is rare, however, and, there are no established set of terms across disciplines exist to describe these dimensions.

Self-regulation is the thread that binds research on future thinking. This presentation will argue that findings that link theories of future thinking can inform research on self-regulated learning. The intersection of future thinking and self-regulated learning can also inform interventions designed to improve student performance. The presentation also discusses a program designed to support students' academic self-regulation through imagining the future through digital story telling.

PAPER 4: The dynamics and effects of stress and resilience in teachers   **214 | Online**

Chair: Gyde Wartenberg

1. The everyday measurement of everyday resilience: Assessing teachers' buoyancy
Thijmen Van Alphen, Joost Jansen in de Wal, Jaap Schuitema, Thea Peetsma

Abstract: Daily measures can provide additional insight into motivational constructs that are relevant for education. A construct that seems particularly important to study on a daily basis is teacher buoyancy. This is because teachers experience high amounts of stress, daily hassles contribute to these stress experiences, and teacher buoyancy is conceptualized as teachers' ability to deal with these daily hassles. However, to date, buoyancy has been measured on a daily basis. Therefore, this study evaluated the dimensionality, reliability, and convergent validity of a daily work buoyancy scale (DWBS). The results provide support for the anticipated factor structure, reliability, and convergent validity of the DWBS, both for measuring state-like within-teacher variation and trait-like between teacher differences in buoyancy. Implications of finding daily variation in teachers' buoyancy for the conceptualization of the construct are discussed.

2. Burnout, motivation, and (de-)motivating teaching style in different phases of the teaching career
Silke Hellebaut, Katrien De Cocker, Ruben Vanderlinde

Abstract: Many teachers report to experience difficulties in feelings of burnout (Abos et al., 2018), in their motivation to teach (Deci & Ryan, 1985), and the way they interact with their students (Roth et al., 2007). To mentor and support teachers it is crucial to understand whether such problems are more likely to occur in specific phases of their career. A focus is generally placed on differences between novice and more experienced teachers, with studies revealing that burnout is higher among novice teachers (e.g. Goddard & Goddard, 2006) and that autonomous motivation is higher among experienced teachers (Roness and Smith, 2009). Yet, the phases beyond the novice phase received far less attention. Day et al., (2007), concluded that burnout and a lack of motivation may be more prevalent in the intermediate phase between 8 and 15 years of experiences. The present study aim is to examine whether differences can be noted in teachers' burnout, motivation and (de-)motivating style according to six professional life phases. In a sample of 913 teachers, we found that teachers burnout started to increase when teachers had more than 8 years of experience and was the highest when they had 16-30 years of experience. Teachers' controlled motivation was the highest in the latest phase of their career when they had 24-31+ years of experience. For teachers' motivating style, teachers with 0-3 years of experience were less structuring than those with 8 or more years of experience and less controlling than those with 24-31+ years of experience.

3. The daily dynamics of teacher anxiety and their investment in professional learning activities
Thijmen Van Alphen, Joost Jansen in de Wal, Jaap Schuitema, Thea Peetsma

Abstract: In order to keep pace with the frequently changing aspects of their jobs, teachers need to invest time and effort into their own professional learning. This, however, is challenging given the already (emotionally) demanding work pressures of the teaching profession. Therefore, this study investigated how the emotion of teachers, specifically anxiety as an indicator of work-related stress, affects the much needed investment of time and effort in professional learning activities. In addition, because anxiety may be a fast-changing emotional experience, cross-sectional methods may not suffice. Indeed, the results support the notion that the relationships of anxiety and investment in professional learning differ when investigated from a cross-sectional (between-person focused) and longitudinal (within-person focused) perspective. The cross-sectional approach shows that anxiety of teachers negatively predicts their investment in professional learning, whereas no such relationship is found with daily data, collected over a three week period.

4. The relationship between teachers' burnout and teacher effectiveness: A meta-analysis
Gyde Wartenberg, Karen Aldrup, Simon Grund, Uta Klusmann

Abstract: This meta-analysis examines the relationship between teachers' burnout and teacher effectiveness. The consequences of teachers' burnout received increased attention in recent years. Established theoretical models propose that burnout impairs teacher-student interactions and students educational outcomes (Jennings & Greenberg, 2009; Maslach & Leiter, 1999). At the same time, burnout, as a chronic stress reaction, likely influences organizational aspects, such as turnover intentions and absenteeism. The aim of this systematic review is to provide a comprehensive synthesis of consequences of teacher burnout for organizational aspects regarding absenteeism and intention to quit, for the quality of teacher-student interactions, namely emotional support, classroom management and instructional support, and for students' educational outcomes, such as motivation and achieve-

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ment. A comprehensive literature search in PsychINFO, Web of Science, and Open Grey yielded a total of 1441 records, of which 80 were included in the present study. Meta-analyses using random-effects models demonstrated medium negative associations between teacher burnout and their teaching quality, student motivation, and achievement, while turnover intentions and absenteeism were positively related to burnout. Meta-regressions showed that the negative associations between teacher burnout, the quality of teacher-student interactions, and student motivation were stronger when teachers reported on the outcomes. Based on the meta-analytic summary of different consequences of teacher burnout, we aim to identify areas where empirical findings are lacking, set an agenda for future research, and discuss implications for the importance of intervention programs.

5. Sustaining use of metacognitive strategies: Professional learning and grounded actionable knowledge
Simon Leonard, Florece Gabriel, Martin Westwell

Abstract: This paper reports on the five-year long Empowering Local Learnings (ELL) teacher professional learning project. ELL supported teachers to incorporate metacognitive strategies to improve the use of executive function (EF) when engaging in mathematics. A range of pedagogical strategies to develop EF, the group of basic cognitive processes including attention control, working memory and cognitive flexibility that are foundational to effective self-regulated learning (SRL) are now well established. ELL sought to improve the scalable and sustainable implementation of these strategies by addressing issues identified in previous research including the need to work with both teacher technical knowledge and teacher professional belief. This dual knowledge work appears essential to translating the science of learning to educational practice. However collaborative applied research projects appear to have had limited success in achieving sustainable change beyond the project. This case study offers a different approach to the knowledge work of translation through the conscious development of grounded actionable knowledge. This approach positions EF as an epistemic objector a legitimate focus for guided and active practitioner inquiry. The impacts of the project included a dramatic improvement in student performance in standardised test results in mathematics as well as substantial changes in learning culture including the widespread adoption of metacognitive strategies.

Wednesday 13:30-14:30	Keynote Session 1	E11	F-to-F with stream

Chair: Reinhard Pekrun

KEYNOTE 1 | **Maarten Vansteenkiste, University Gent, Belgium**

Nourishing learners' and teachers' engagement and growth?
The critical role of basic psychological needs and need-supportive socialization

Abstract: At the heart of Self-Determination Theory is the claim that all people have basic psychological needs for autonomy, competence, and relatedness, the satisfaction of which is beneficial for learners' psychological growth and the frustration of which increases risk for ill-being and maladjustment. In the present presentation, the key criteria to characterize basic needs are addressed, together with supportive diary, longitudinal, and experimental research in diverse age groups, some of which was collected as part of a large-scale population study across the pandemic (www.motivationbarometer.com). Although basic needs are presumed to play a universal critical role across different developmental phases and challenges, there is room for contextual variation in the support of basic needs by key socialization figures (i.e., teachers, parents). Indeed, there is not a one-size-fits-all approach to support learners' psychological needs. Recent work grounded in a circumplex-based approach on need-supportive and need-thwarting contextual conditions, thereby providing a deeper insight in the dynamic interplay between autonomy support (relative to control) and structure (relative to chaos), shows that different (but not all) roads can lead to Rome. Accordingly, the provision of adequate need support becomes a matter of calibration and of tailoring support to individual differences between students and situational demands. Finally, apart from contextual support of basic needs, individuals can also get their basic needs met through need crafting. This promising line of correlational and intervention research on need crafting testifies to the pro-active and growth-oriented nature of the human organism.

Wednesday 14:40-16:10	Session Block II – Symposia

SYMP 1: Innovative student-directed learning approaches — E04 I F-to-F

Chair: Sabine Schweder, Diana Raufelder   **Discussant**: Lisa Bardach

Abstract: While teacher-directed instruction has dominated teaching in schools in the Western world for decades, in recent years there has been an increasing turn to student-directed forms of learning. There are many different student-directed learning formats, such as inquiry-based learning, learning with competency grids, or digital approaches. This raises the questions of what benefits in terms of motivation and achievement result from student-directed learning formats, whether student-directed learning formats (should) replace teacher-directed instruction altogether, or whether even brief interventions of student-directed learning can have positive effects on otherwise teacher-directed instruction. This symposium aims to provide initial answers to these questions. The first presentation (Schweder & Raufelder) reports the effects of two one-week self-directed learning intervals on the development of interest and self-efficacy of adolescent students from Germany, whereas the students have teacher-directed instruction the rest of the school year. The second presentation (Chevalère et al.) addresses the effect of an adaptive Intelligent Tutoring System [ITS] that aims to support German adolescent students' self-directed learning by enabling them to work autonomously at their own pace on tasks in the content area climate change using concept maps in a quasi-experimental design. The third presentation (Uus) focused on significant individual prerequisites based on differences in cognitive skills among adolescents from Estonia. The fourth presentation (Beckers) investigated whether Dutch VET students' self-directed learning skills and motivation could be positively affected by using an electronic portfolio with a self-coaching protocol.

1. Students' interest and self-efficacy and the impact of changing learning environments
Sabine Schweder, Diana Raufelder

Abstract: Interest and self-efficacy are two key components of motivation and learning, both of which decrease during adolescence. The situated expectancy-value theory (SEVT), recently formulated by Eccles and Wigfield (2020), provides a detailed perspective on critical components of learning situations and the ways in which competence beliefs (e.g., self-efficacy) and value perceptions (e.g., interest) work together to impact students' achievement. This four-wave study includes data from 754 German secondary school students (M Age = 13.56; SD = 1.2; 49.4% girls). The study analysis employed two latent change models and a latent neighbor change model with covariates (sex, age, grades) to examine the development of and interconnections between interest and self-efficacy. The schools included in the sample suspended regular instruction in favor of two self-directed learning phases during the school year. During the self-directed learning phases, learning was driven by the students' preferences for subject matter rather than curricular learning objectives. The findings indicate that students' interest and self-efficacy increased not only during self-directed learning phases but also over the course of the school year. In sum, the results suggest that alternating learning environments benefits the interplay between interest and self-activity.

2. Self-directed learning with emotional adaptive intelligent tutoring systems
Anja Henke, Rebecca Lazarides, Johann Chevalère, Hae Seon Yun, Verena Hafner, Niels Pinkwart

Abstract: This quasi-experimental study examined the effect of an adaptive Intelligent Tutoring System [ITS] that aims to support students' self-directed learning by enabling them to work autonomously at their own pace on tasks in the content area climate change using concept maps. We examined whether a version of the ITS that adapts artificial teaching support to students' on-task cognitive characteristics (CA condition) differs from a version of the ITS that adapts artificial teaching support to both on-task cognitive and affective characteristics (performance and achievement emotions: EA condition) in terms of students' performance gains and achievement emotions. In our experimental study we used data from German students (N =104) in grades 7 to 10 (M age = 15.3, SD = 2.13, 51.5% girls, 76.3% native German speakers). Participants were randomly assigned either to the cognitive-adaptive condition (n = 49) or to the emotion-and-cognitive-adaptive condition (n = 55). Results of piecewise growth curve models showed that students' enjoyment levels decreased during the first session in both

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groups, and reached a plateau during session two. Boredom levels remained stable across time and conditions. The expected time x condition x final performance interaction effect on boredom was significant during the first session. In the EA condition, boredom decreased among high achievers and increased among low achievers while time effects were stable for all students in the CA condition. For enjoyment, the time x condition x final performance interaction effect was non-significant.

3. Cognitive skills in school students' self-directed learning efficacy
Õnne Uus

Abstract: Besides a beneficial goal of self-directed learning (SDL) as the major educational aim of the 21st century to construct evidence-based concepts for complex problems, this approach has also revealed some challenging aspects. (1) Raising a cognitive demand to a learner: to keep in mind multiple info-items. While human cognitive capacity is able to process concurrently only a small number of elements to relate them together and memorize. (2) Requiring advanced cognitive capabilities to be employed by the learners themselves through (a) domain factual knowledge; (b) procedural information how-to. Whereas school-age students–passing prolonged maturity of their cognitive skills–have less prior knowledge, they often lack to make sense sufficiently quickly processing the multi-component learning material sequentially. We have found significant (individual prerequisites based on) differences among adolescents–the age that due to the normal developmental peculiarities of puberty additionally impacts the SDL results. Despite the need for specific metacognitive skills to be enhanced in young students to foster their efficient acquisition of both procedural and declarative knowledge, those skills are not yet strategically taught. We call for further work and discussions on how to optimize today's school students' cognitive load in complex learning keeping learners motivated with adequately challenging, yet attractive age-appropriate demands. In order to prepare them for independent problem solving and to make proper decisions in the multi-information environment. While also to stay mentally healthy, and continue with lifelong learning that gives them an advantage for quick reorientation in the rapidly changing circumstances of contemporary life around us.

4. Easy does it. Accommodating the need for autonomy and need for support in self-regulated learning
Jorrick Beckers

Abstract: Self-regulation comprises an important set of skills that typically do not come naturally. Self-regulation skills can be fostered by using an electronic portfolio. However, complementary coaching is needed, which is time and energy consuming. Replacing a part of complementary coaching with a self-coaching protocol may help reduce workload, while retaining positive effects. The current paper describes the outcomes of two similar, but separate, studies that aimed to research whether students' self-directed learning skills and motivation could be positively affected by using an electronic portfolio with a self-coaching protocol. Both studies varied on some aspects, most notably on the amount of autonomy students received while working with the portfolio. Study one reported positive effects on SDL skills as well as motivation, but there were not that many opportunities to engage in SDL. Students' autonomy was decreased somewhat to ensure more opportunities for students to engage in SDL in study two. This was successful, however, there were also negative effects on students' motivation and SDL skills. It can be concluded that the level of offered autonomy and support needs be adjusted carefully to meet students' needs. Future research should provide guidelines on how to best accommodate students' changing needs for autonomy and support as they progress through their education.

SYMP 2: Advances in emotion regulation research: A self-determination theory perspective
E08 I F–to–F

Chair: Moti Benita **Discussant**: Guy Roth

Abstract: The ability to regulate emotions is crucial to individuals' healthy adjustment (Aldao et al., 2016). A growing body of research has recently utilized self-determination theory (SDT; Ryan & Deci, 2017) to study emotion regulation (Roth et al., 2019). SDT offers a unique perspective on emotion regulation highlighting autonomy experiences in emotion regulation (Benita, 2020). At this symposium, recent research will be presented on the role of autonomy in healthy emotion regulation.

SDT's emotion regulation model explored autonomy primarily through the concept of integrative emotion regulation (IER). It is contrasted with suppressive emotion regulation (SER) and dysregulation, considered non-autonomous. Three papers will demonstrate the effects of these styles on healthy and unhealthy psychological functioning. Paper 1 shows IER predicts Israeli elementary students' prosocial behavior and empathy, whereas dysregulation predicts bullying. This paper also shows teacher emotional and relatedness support predict IER, whereas lack of emotional support predicts dysregulation. Paper 2 shows IER contributes to adolescents' long-term adjustment during and following a COVID-19 lockdown in Israel, whereas SER and dysregulation undermine it. Paper 3 shows Peruvians' autonomous reasons to follow COVID-19 restrictions mediate the relation of IER to ill-being, whereas controlled reasons-controlled reasons mediate the positive of dysregulation to ill-being. In this study, SER predicted ill-being. Finally, Paper 4 presents a novel approach to study autonomy in emotion regulation that focuses on the concept of emotion crafting. This study demonstrates the discriminant and predictive validity of emotion crafting in a representative sample of Norwegian adults.

1. Teachers' characteristics and students' emotion regulation, empathy, and pro-social behavior
Guy Roth, Yaniv Kanat Maymon

Abstract: Although empathy is an emotional skill, little research examines the relations between emotion regulation, empathy, and pro-social behavior in the schooling context. Research on teachers and teaching and their relations to the socialization of emotion regulation among their students is similarly limited. Research anchored in self-determination theory (SDT; Ryan & Deci, 2017) describes three general types of emotion regulation: integrative emotion regulation (IER), which focuses on emotions as carrying information that is brought to awareness, controlled emotion regulation, which focuses on diminishing emotions, and amotivated emotion regulation, in which emotions are dysregulated.

Recent research supports the hypothesis that IER may be extended to taking an interest in the adversities of others (empathy). The present research comprised two studies exploring teachers' perceptions and practices as predictors of students' IER, empathy, and pro-social behavior. Study 1 (N = 241) involved sixth and seventh graders' self-reports. The results supported the hypothesis that IER may mediate relations between students' perceptions of teachers' relatedness support and students' empathy. Study 2 was longitudinal. Following Gottman et al. (1997), it involved teachers' reports (N = 32) of their perceptions of the legitimacy of the experience and expression of negative emotions, as well as students' reports (N = 606). HLM analyses revealed teachers' perceptions of legitimacy predicted students' IER, and this, in turn, predicted students' empathy. Teachers' perceptions of negative emotions as something to avoid predicted students' dysregulation, and this, in turn, predicted students' personal distress and bullying behaviors. The theoretical and practical implications will be discussed.

2. Emotion regulation styles and adolescent adjustment during and after a COVID-19 lockdown in Israel
Moti Benita, Maya Benish-Weisman, Nitsan Scharf

Abstract: Following the outbreak of COVID-19, countries around the world imposed lockdowns that adversely impacted youth. This study investigated the effects of adolescents' habitual emotion regulation styles on their psychological adjustment during and following the October 2020 lockdown in Israel. We relied on self-determination theory's approach to emotion regulation, differentiating between the styles of integrative emotion regulation (IER), suppressive emotion regulation (SER), and dysregulation. 113 mother-adolescent pairs completed questionnaires on the adolescents' emotion regulation styles, aggressive and prosocial behaviors, and depressive symptoms in a 3-wave study. The first wave was conducted during the lockdown, followed by two more waves three months apart. We used multilevel linear growth models to analyze the data. The results show that adolescents' IER positively predicted their reports of prosocial behavior during the lockdown, but this behavior decreased in the following months. IER also negatively predicted adolescents' and mothers' reports of depressive symptoms during the lockdown. Dysregulation positively predicted adolescents' and mothers' reports of aggression and depressive symptoms during the lockdown, and negatively predicted adolescents' reports of prosocial behavior. The adolescents then reported decreased depressive symptoms in the months following the lockdown. SER positively predicted adolescents' reports of depressive symptoms during the lockdown, but negatively predicted mothers' reports of aggressive behavior. In addition, SER predicted increased maternal reports of aggressive behavior and decreased maternal reports of prosocial behavior in the months following the lockdown. The results suggest IER facilitated psychological adjustment during and after the lockdown, while SER and dysregulation undermined it, albeit through different plausible mechanisms.

3. Emotion crafting: Individuals as agents of their positive emotional experiences
Jolene van der Kaap-Deeder, Lars Wichstrøm, Maarten Vansteenkiste, Lennia Matos, Silje Steinsbekk

Abstract: Although the literature on emotion regulation is vast and insightful, less is known about positive emotion regulation and especially how individuals proactively can contribute to their own positive emotional experiences. Herein we coin the term emotion crafting, indicating the degree to which individuals are aware of positive emotion-inducing contexts and proactively act upon this awareness to increase their positive emotions. We aimed to develop a self-report measure of emotion crafting (i.e., the Emotion Crafting Scale; ECS) and to examine its discriminant and unique predictive validity. Data were collected among a representative sample of 326 participants (Mage = 42.90 years, SD = 14.76; range 18-70), of which 49.7% was female. Results yielded evidence for a 2-factor structure (i.e., awareness and action component) and showed the subscales to be highly reliable. With respect to the discriminant validity of the ECS, emotion crafting was only moderately related to other measures of adaptive emotion regulation (i.e., adaptive cognitive emotion regulation, cognitive reappraisal, and integrative emotion regulation). Subsequent structural equation modeling showed that the action (but not awareness) component related positively to life satisfaction, vitality, and eudaimonic well-being and negatively to internalizing symptoms via increased positive affect, even after controlling for other measures of emotion regulation. These promising findings show not only the reliability and validity of the ECS, but also indicate the importance of examining proactive positive emotion regulation in the prediction of individuals' mental health.

4. Emotion regulation and autonomous vs. controlled motivation predict ill-being during the pandemic
Lennia Matos, Moti Benita, Rafael Gargurevich

Abstract: When COVID-19 appeared, countries-imposed measures to prevent the dissemination of the illness. However, these measures included many restrictions (e.g. social distancing) that led people to feel stressed, anxious, and depressed (Vermotte et al., 2021). In this study we explain why these restrictions hindered the individual by studying the role of emotion regulation styles as an antecedent of ill-being symptoms during the first wave of COVID-19, using a self-determination theory approach (SDT; Ryan & Deci, 2017). Recently, Waterschoot et al., (2022), showed that integrative emotion regulation negatively predicted ill-being during the pandemic, whereas suppression and dysregulation were positive predictors. We further propose that motivation (external, introjected, identified) might explain the relations between emotion regulation styles and ill-being given that identified regulation was a positive predictor of adherence to governmental measurements during the pandemic while external regulation was a negative predictor (Morbée et al., 2021).

In this cross-sectional study, 311 participants (M age=31.17, SD=12.88), filled-out a questionnaire assessing: emotion regulation styles, motivation for adherence to governmental measures, depression, anxiety, and stress, during the first quarter of the pandemic (last quarter of 2020). We analyzed the data with structural equation modeling using Mplus 8.4 (Muthén & Muthén, 2017). Our results showed that integrative emotion regulation negatively predicted all three ill-being measures through identified regulation. Dysregulation positively predicted all three ill-being measures through external regulation. Suppression directly predicted all three ill-being measures and introjected regulation. This study helps in identifying individual differences on mental health, by identifying ill-being profiles during the pandemic.

SYMP 3:	Parental involvement and children's learning outcomes: Different aspects, modes, and trajectories	114 I Hybrid

Chair:	Eleftheria Gonida	**Discussant**:	Idit Katz

Abstract: Although the significance of parents' contribution to children's school outcomes has been acknowledged, more research is needed in order to uncover the multiple dimensions of the role of parents and their associations to children's cognitive, motivational and emotional patterns of learning. The symposium brings together researchers from different countries attempting to delineate different aspects of parental contribution ranging from a macro-level such as parental conditional support to a micro-level such as parental involvement in homework. The presentations also include a range of student school outcomes, apply different research designs and advanced analytical methods and involve students of different age. The first study (Canada) using a six-year longitudinal design with elementary school students examined different trajectories of parental conditional support and their effects on students' motivation, self-regulation, test anxiety and dropout risk. The second study (Portugal) focuses on perceived parental involvement at home (support, communication) and the mediating role of cognitive ability and academic self-concept in the relationships between parental involvement and academic achievement. The third study (Estonia) examines latent profiles of parental homework support, adolescents' math skills, and persistence as well as profile changes across Grade 6 and 9. The fourth study (Greece) using a two years longitudinal design focuses on parental control during homework and the role of parent negative emotions and perceptions of the child efficacy via a non-linear approach. The symposium discussant (Israel) will synthesize the evidence of the four studies and point out implications for theory and practice as well as directions for future research.

1. Parental involvement in schooling, cognitive abilities, academic self-concept and achievement
Francisco Peixoto, Gina C. Lemos, Leandro S. Almeida, Lourdes Mata, Isaura Pedro

Abstract: The main goal of this paper is to analyze the relationships between sociodemographic variables, parental involvement at home, cognitive ability, academic self-concept (ASC) and academic achievement. Participants were 1917 students attending 5th to 9th grade from 22 different schools in Portugal. Students age ranged from 10 to 18 years old (M=12.9; SD=1.26) and 51.6% are female. Data was collected using questionnaires that tap Perceived Parental Involvement at Home (Support, Communication) and ASC. Cognitive Abilities were assessed through a battery with 9 sub-tests assessing Verbal, Numeric and Spatial abilities. A hierarchical analysis using structural equation modelling was carried out considering four blocks of variables (sociodemographic variables, cognitive abilities, ASC and perceived parental involvement dimensions) to predict academic achievement. Results showed that each model added more explained variance to academic achievement and the final model explains 68% of academic achievement. Results also showed differential effects of the various aspects of parental involvement at home (Communication and Support) and emphasized the mediated role of ASC and cognitive abilities in the relationships between parental involvement and academic achievement.

2. Latent profiles of parental homework help: Changes in middle school and adolescents' motivation
Eve Kikas, Gintautas Silinskas, Kaja Mädamürk

Abstract: The study aimed to examine latent profiles of parental homework support, adolescents' math skills, and persistence in completing homework, profile changes across Grade 6 and 9, and differences according to adolescents' motivation in Grade 6. The participants were 655 mother–adolescent dyads. Adolescents' math skills, perceptions of parental help, and mother-reported task persistence were assessed in both grades; adolescents' math-related interest, self-efficacy, mastery- and performance-goal orientations in Grade 6. One adaptive profile plus four (Grade 6) and five (Grade 9) non-adaptive profiles that differed according to adolescents' interest, self-efficacy, and goal orientations were found. Adolescents evaluated their parents as supporting autonomy – one group showed low autonomy support, while others differed primarily according to controlling help, skills, and persistence. Parents provided autonomy-support more readily when their child's math skills were strong and learning behavior was effortful. These adolescents also reported higher interest, self-efficacy, and mastery-goal orientation. In contrast, students who perceived parental control to be high, reported higher performance-goal orientation. These findings help to conceptualize parental homework help as a multidimensional construct that is related to adolecsents' skills and motivation.

3. Parent control in homework: The role of parent negative emotions and perceptions of child efficacy
Eleftheria Gonida, Dimitrios Stamovlasis, Konstantina Falanga

Abstract: This longitudinal study aimed to investigate the dynamics of parental involvement in children's homework within the Complex Dynamical System framework. Specifically, the focus of the presentation is on parental control during homework and the role of parents' negative emotions and perceptions of child's academic efficacy. Data from parents (N=296) of elementary school children were collected at four time points (beginning and end of the fifth and sixth grade) measuring their involvement in homework, emotions during homework and their perceptions of their child's academic efficacy. Cusp catastrophe models were implemented in order to detect potential nonlinear effects. Since the present state of a dynamical system is a function of its previous states, the examined variables at time t were used as predictors of parental Control at time t+1. A series of cusp catastrophe models demonstrated that negative emotions act as bifurcation variable and parental control becomes unstable oscillating between the two modes of behavior, high control and low control introducing nonlinearity in the system. Analogous models revealed the bifurcation role of parents' perceived child efficacy. The findings indicate the crucial role of the two above variables as bifurcation factors, indicating that, as time passes, controlling parents may become even more controlling, possibly interfering, when they experience high negative emotions during homework and develop negative perceptions about their child's academic efficacy. This new interpretation of the empirical data will be discussed in light of current theory and evidence about parental involvement in students' homework.

4. Trajectories of perceived parental conditional support and psychological adjustment
Therese Bouffard, Audrey Marquis-Trudeau, Carole Vezeau, Pascal Pansu

Abstract: Studies have showed that perceived parental conditional support was associated with impaired emotional adjustment and negative school outcomes (Côté & Bouffard, 2014; Itzhaki, Itzhaky & Yablon, 2018; Raufelder, Hoferichter, Ringeisen, Regner, & Jacke, 2015; Roth, Assor, Niemiec, Ryan, & Deci, 2009). However, the lack of longitudinal research exploring changes in conditional parental support makes it difficult to know whether such temporary or more sustained support is linked differently to academic outcomes. The main goal of this 6-year longitudinal study was to examine whether students' school outcomes at the last year differ according to their belonging to profiles of perceived conditional support identified over the preceding 5-year period. The 754 participants (370 boys) were at Grade 5 at the outset of the study. School outcomes refers to students' motivation, self-regulation, test anxiety and ideations about dropping out. Models were estimated in Mplus v.8.3 via latent class growth analysis (LCGA) and were carried out using the maximum likelihood with robust standard errors estimator (MLR) and full information maximum likelihood (FIML) to accommodate missing data. Gender was unrelated to belonging to the latent trajectory classes. Estimates for distinct trajectories in the academic outcomes revealed that students from the low conditional groups reported significantly better scores on all school outcomes but test anxiety, compared to those in the declining and the inclining conditional groups who were generally similar. The discussion will focus on the deleterious role of sustained perception of parental conditional support for the students' academic future and actualization of their full potential.

SYMP 4: Interest development during higher education: What changes and how?   E11 I online

Chair: Kathleen M. Quinlan   **Discussant**:   Ann Renninger

Abstract: Interest research emphasises the malleability of interest, with potential for it to develop from situational interest to well-developed interest through interactions with other people, objects (e.g., text, activities), or events (Hidi & Renninger, 2006; Renninger & Hidi, 2016). Although higher education (HE) students rely on appraisals of their interest to make important decisions about their careers and futures, little research has addressed how students' interests develop during HE. A student's interest can shape decisions about choice of program (i.e. major), further study, and career. Thus, the ways in which interest develops, particularly during HE, not only has instructional and curricular design implications, but could have far-reaching impact on workforce preparedness and productivity in a dynamically developing world. Most HE students have independence and self-direction about how and what they study. Compared to students in primary and secondary education, HE exposes students to new subjects, new specialities within a given subject, new disciplinary practices, and new extra-curricular opportunities, all of which allow students to broaden, deepen, or re-shape their interests. What path they take may depend their beliefs, as well as the opportunities and constraints of their own HE environment. In this symposium, we consider the nature of changes in students' interest during HE, explain factors that affect those changes, and explore their possible consequences. Presenters will draw on findings from longitudinal, intervention, and mixed methods studies. They will consider how their findings advance understanding of the development of interest in HE and its implications for theory, research and practice.

1. A growth theory of interest intervention boosts math and science interest among arts undergraduates
Paul O'Keefe, E.J. Horberg, Carol Dweck, Gregory Walton

Abstract: American-style college education presents unique opportunities for students to explore diverse disciplines and develop a breadth of interests–but if students view interests as relatively fixed, they may not explore new disciplines that can broaden and enrich their education. Could a brief intervention that portrays interests as developable boost interest, and even grades, in mandatory math and science coursework in an enduring way among students who begin college not identifying as a "math or science person"? In a randomized controlled field-experiment, first-year undergraduates (N=580) in the school of arts and social sciences of a large university completed a brief growth-theory-of-interest (vs. study-skills control) module before matriculating. Among those who entered college less identified with math and science, the intervention increased interest and final grades in two mandatory first-year math/science courses. Our results suggest that a growth theory promotes the development of new interests, which is crucial for successfully navigating a diverse college curriculum. By representing interests having the potential to grow, colleges can encourage the development of interdisciplinary scholars. Such messages would be most usefully relayed to students at critical junctures in their educational trajectory, before they make important decisions about their future.

2. Developing interest as a self-regulation strategy: The role of implicit beliefs
Carol Sansone, Yun Tang, Jasmine Norman

Abstract: Maintaining motivation is often a challenge for college students. The Self-Regulation of Motivation (SRM) model embeds the interest experience within the self-regulation process (Sansone & Thoman, 2005), proposing that students may choose to engage in strategies that will help to create interest under certain circumstances. Thoman, et al. (2020) further proposed that individuals might differ in beliefs that interest can be regulated, which may help to understand when interest regulation likely occurs. We used data collected as part of the Online Evaluation Project 2020 to examine whether students' implicit beliefs about interest regulation predicted use of interest development strategies when they found it difficult to sustain motivation during the COVID19 pandemic. Results (n=163) indicated that the more that students believed interest can be enhanced or created as reported at the beginning of the semester, the more likely they were to report using interest development strategies during the first third of the course, especially when they found sustaining motivation to be difficult. Greater use of these strategies predicted greater interest and greater likelihood of taking additional courses at the end of the semester. Tests of moderated mediation showed that implicit beliefs indirectly affected motivation outcomes via interest development strategy use especially when sustaining motivation was difficult. These results suggest that students can strategically work to develop interest as a response to motivational challenges, but this response depends on their beliefs about the nature of interest.

3. How and why do students' career interests change during higher education?
Kathleen M. Quinlan, James Corbin

Abstract: With increasing emphasis on employability after higher education (HE), there is an urgent need to understand how HE influences students' career interests. Much of the vocational psychological interest literature has assumed that career interest is stable from adolescence through adulthood. Newer conceptions of interest, drawn from developmental-educational perspectives, instead emphasise the mutability of interest and the ways in which the environment can support its development. This study makes a novel contribution by extending a developmental-educational theory of interest to illuminate how students' career interests develop during university and what influences those career interests.

We surveyed the 2019 bachelor's graduating class (n=663) at a mid-ranked UK university offering both applied and pure programmes. Graduates indicated whether their career interests had changed during university, described their career interests 'when they started university' and what they were 'now', and explained what had affected their career interest during university.

Most (61%) reported that their career interests had changed. Consistent with interest theory, the most common type of change was refinement within a Standard Industrial Classification (45%), followed by shifts to a different SIC (29%), becoming more decided (18%), or rejecting a plan, leaving them unsure (7%). The most common influences on career interests were the curriculum (46%), placements (14%), work experiences (7%), co-curricular activities (6%) and lecturers (5%). We conclude that career practitioners and academics need to consider the central role of disciplinary curricula in career learning and continue to emphasise opportunities for work experiences in and outside the curriculum.

4. Leveraging prosocial value in introductory chemistry to promote STEM interest and persistence
Judith Harackiewicz, Michael Asher

Abstract: Higher education students, especially first-generation students (for whom neither parent has a college degree) desire courses and careers that emphasize prosocial values. However, despite their relevance for public health, the planet, and the human condition, STEM courses often emphasize technical knowledge at the expense of real-world applications. We developed a prosocial utility-value intervention (UVI) in which students were asked to reflect on the prosocial value of science course content, piloting two versions (prosocial only and prosocial and personal values combined) in an introductory biology course (N=282). Then we tested a version that combines personal and prosocial values (the prosocial-combined UVI developed in Study 1), using a randomized controlled trial in an introductory chemistry course (N = 2,679) to examine effects on students' interest, performance and persistence. Results suggest that the prosocial UVI may be particularly effective in promoting interest, performance and longer-term persistence in STEM for first-generation college students. Process analyses revealed that interest in chemistry mediated the effects of the prosocial-combined UVI on performance.

Wednesday 14:40-16:10	Session Block II – Papers

PAPER 1: Expectancies, values and costs — 214 I Online

Chair: Daria Katharina Benden

1. Testing the GI/ E model with expectancy, value and cost beliefs amongst secondary students in Rwanda
Dominik Bulla, Lars-Erik Malmberg, Steve Strand

Abstract: Generalized I/ E models of motivational-belief formation postulate that prior academic achievement predicts motivational outcomes such as expectancy or value beliefs within and across school domains. Respective relations are assumed to be positive within domains. To the extent that school domains are considered to be rather different, relations between domains are expected to be negative. Otherwise, they may be positive. In this study, we applied the GI/ E model to explain expectancy, perceived utility, and cost beliefs that Rwandan lower-secondary students reported across Chemistry, English, Kinyarwanda, and Math. To measure beliefs, we developed respective scales bottom up. In our analysis, we applied amongst others multiple-group structural equation modelling to test the GI/ E model of belief formation and to compare respective relations between boarding schools, Rwanda traditional school system, and basic-education schools, a school type scaled up across the country to provide universal access to education. We found that the GI/ E model explained motivational beliefs amongst boarding-school students well. Especially expectancy and cost beliefs were predicted positively within domains and negatively across far domains. Amongst basic-education schools, the GI/ E model was less suitable. Utility was generally not predicted by achievement. Expectancy beliefs were only predicted by achievement within matching domains. Only cost beliefs were driven by within-domain and cross-domain effects. Theoretical and practical implications of this research are discussed as well.

2. Theoretical and empirical basis for a three-dimensional scale capturing expectancy-related beliefs
Kerstin Kisielski, Susanne Narciss

Abstract: Aims. Capturing the current state of students' motivation requires instruments that allow measuring the complex interplay of individual factors and instructional conditions. Based on expectancy-value theory (EVT; Eccles, et al. 1983; Heckhausen, 1977; Pekrun, 2006) such instruments should include scales for measuring expectancy-related, value-related, and cost-related beliefs. While recently new multidimensional instruments with respect to the value component were developed and empirically validated (e.g., Gaspard, et al., 2015), comprehensive measures of expectancy-related beliefs are scarce. However, the large body of research on expectancy-related beliefs suggests that the expectancy component is worth being further differentiated into multiple facets. As the dimensionality of expectancy-related beliefs has rarely been tested, this study focuses on differentiating multiple expectancy components.

Method. This study examines the factor structure of a three-dimensional task-specific expectancy scale including 3 subscales addressing competence (7 items), control (7 items), and strategy beliefs (5 items). Maximum-likelihood confirmatory factor analyses were used to analyse data collected from 277 university students.

Results. The model fit indices support the assumption, that competence (α = .71), control (α = .80), and strategy beliefs (α = .78) are independent but related expectancy beliefs.

Significance of the study. A multidimensional measure of expectancy-related beliefs in competence, control, and strategy beliefs will make key contributions to the prediction of motivation in instructional contexts beyond the effects of variables, such as values and costs.

3. A state-trait analysis of students' expectancy-value beliefs about math versus specific math tasks
Daria Katharina Benden, Fani Lauermann

Abstract: Students' expectancy and task values are key predictors of their academic achievement and persistence in math-intensive domains such as science, technology, engineering, and mathematics (STEM). Eccles' situated expectancy-value theory posits that students' situation-specific expectancy and task value beliefs are formed by situational processes, individual characteristics, and person by situation interactions. To date, little is known about the extent to which such situation-specific motivational beliefs are mainly driven by general, domain-specific

attitudes (e.g., towards STEM) or by the situation-specific content of a given task or domain. Using data from students who participated in a statewide math test for postsecondary students in STEM at the beginning of their studies (N = 3035), we examined trait and state proportions of students' situation-specific expectancy-value beliefs across four time points during the approximately hour-long math test. Multitrait-multistate models showed that a substantial amount of variance was accounted for by trait factors (i.e., content-independent consistency in students' beliefs about math). Students' expectancy had the greatest amount of state variability, whereas utility value showed very little state variability. Situational carryover effects emerged suggesting that students' situational experiences of expectancy and task values further contribute to interindividual, trait-like differences in their motivational beliefs.

4. Reciprocal relations, stability and gender differences in the development of STEM career aspirations
Tobias Debatin, Albert Ziegler, Heidrun Stoeger

Abstract: Expectancy-value theory is important in explaining gender differences in educational and career aspirations and choices in STEM (science, technology, engineering, and mathematics). However, little is known how career aspirations, expectancies and values in STEM affect each other over time and if there are gender differences in these relations. Using the traditional as well as the random-intercept cross-lagged panel model (RICLPM) we investigated (a) reciprocal relations between career aspirations, expectancies (operationalized via self-concept) and values in STEM over the course of one year and (b) if there are stable time-invariant components (i.e. trait-like individual differences) in these variables. Additionally, we evaluated gender differences regarding the reciprocal relations and the stable components. Participants were 694 students who were surveyed at three time points from the middle of grade 9 to the middle of grade 10. In the traditional model we found that the development of career aspirations was positively influenced by self-concepts and values, the development of self-concepts was positively influenced by career aspirations and to a lesser degree by values, and the development of values was positively influenced by self-concepts but not by career aspirations. There were no gender differences in these relations. In the RICLPM, we found stable components in all three constructs and only some of the effects of the traditional model were confirmed. Additionally, there were gender differences in the stable components of STEM aspirations and STEM self-concepts. Implications for theory and interventions are discussed.

5. Predictors of students' subjective task values and expectancies for success at middle school
Utku Caybas, Yesim C. Aydin, Nur Akkus Cakir

Abstract: Situated Expectancy-Value Theory is widely used in studies examining student motivation, but this theory needs to be tested in different cultures as well. Because the theory and their relationships to other constructs could differ in different cultural contexts (Tonks et al., 2018). Therefore, this study examines the predictors of middle school students' expectancies for success and subjective task values in a different cultural context. In this direction, the relationship between students' perceived teacher affective support, previous achievement, the number of interaction partners, and motivational variables was examined. Students' number of interaction partners was added model because the role of peers in students' motivational variables is still understudied in the SEVT framework (Eccles & Wigfield, 2020). A total of 702 middle school students from Turkey participated in the study. While the research findings demonstrated that students' subjective task values and expectancies for success have a positive relationship between the previous achievement and perceived affective teacher support, there is no relationship between the number of interaction partners and motivational variables. This finding suggests that the quality of the peer interactions rather than quantity may predict students' motivation.

PAPER 2: Student wellbeing, alienation

213 | Online

Chair: Julia Morinaj

1. Fostering student wellbeing in higher education: a systematic review of the literature
Hanke Korpershoek, Marjolein Deunk

Abstract: The increasing pressure and need to achieve in higher education has negative effects on student wellbeing. This study aims to identify what higher education institutes, study programs, and teaching teacher(teams) can do to foster and stimulate student wellbeing. The following research questions are formulated: What are effective and/or promising approaches for higher education institutes and study programs to foster and stimulate student wellbeing? When are generic approaches required and when are differential approaches needed for specific student groups? A systematic review study was conducted (Deunk & Korpershoek, 2021), including 52 papers that relate (policy) measures, interventions or actions to student wellbeing. Basic inclusion criteria were: published in peer-reviewed journals, written in English or Dutch, published in 2000 or later. Databases: Web of Science, ERIC, and PsychInfo. The studies are categorized into three promising approaches to stimulate students' academic and social integration and consequently their wellbeing: (a) approaches focusing on didactics and study program organization, (b) relational approaches, (c) person-focused approaches. Special attention to students from minority groups, first year students, and international students is needed to foster their wellbeing, for example, by paying extra attention to positive teacher-student interactions and actively stimulating their sense of belonging to their peer group, the study program, and the higher education institution.

2. Longitudinal association between school alienation and students' academic achievement
Julia Morinaj, Tina Hascher

Abstract: The phenomenon of school alienation has recently attracted significant interest in educational research (e.g., Authors, 2018), partly due to its harmful effects on the quality of students' educational outcomes. Addressing the question of how school alienation is related to academic success is important for both theoretical and practical reasons, given that students' performance has always been a top priority for schools. In our longitudinal study, we examined the nature and magnitude of the association between school alienation domains–alienation from learning, from teachers, and from classmates–and students' academic achievement among Swiss secondary school students (N = 403) of grade 7 to grade 9. The findings revealed that alienation from learning and from teachers were reciprocally related to students' academic achievement, while earlier alienation from classmates predicted later achievement. These results emphasize the importance of both academic and social aspects of school in promoting students' academic outcomes as well as of academic success in reducing alienation levels.

3. Do today's schools fit all?Profiling motivation, cognition & wellbeing among Norwegian ninth graders
Christian Brandmo, Gunnar Bjørnebekk, Riikka Mononen, Rolf V. Olsen, Kristin Slungård

Abstract: This study presents the results of a national survey of 2012 ninth graders in Norway. The variables include the need for cognition, motivation for deep and surface approaches to learning, metacognitive knowledge, whether school is meaningful, and wellbeing in the form of positive and negative affect. The study reveals several exciting results, such as gender differences and regional variations. The latent profile analyses reveal three distinct groups, one of which is characterized by low motivation, a surface approach to learning, and low levels of wellbeing. The results are discussed in relation to an ambitious new curriculum that emphasizes 21st-century skills.

4. Reciprocal effects of mathematics performance, school engagement, and burnout during adolescence
Anna Widlund, Heta Tuominen, Johan Korhonen

Abstract: Some declines have been detected in students' school-related well-being occurring during the adolescent years, but still, relatively little is known about the causal relationship between students' school-related well-being (i.e., school engagement and burnout) and their academic performance. Therefore, the aim of this study was to complement previous research by examining longitudinal relations between adolescents' (N = 1131) mathematics performance (test scores), school engagement, and burnout (exhaustion, cynicism, and inadequacy) during the course of lower secondary education (Grades 7–9). A random intercept cross-lagged panel model was used to investigate both short-term (within 7th and 9th grade) and long-term (from 7th to 9th grade) relations between

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performance, engagement, and burnout. The findings revealed that mathematics performance had a reciprocal relationship with both engagement (within 9th grade) and exhaustion (from 7th to 9th grade), as higher performance increased students' engagement, and lowered their exhaustion and cynicism, whereas both engagement and exhaustion predicted higher performance. Negative relations were also found from inadequacy (from 7th to 9th grade) and cynicism (within 9th grade) on students' mathematics performance. Furthermore, school burnout predicted engagement both positively (from exhaustion) and negatively (from cynicism and inadequacy) within and between the school years, whereas engagement only predicted cynicism and inadequacy negatively within 7th grade. Overall, these findings suggest that the overall relation between students' mathematics performance, engagement, and burnout is rather reciprocal, but also, that the relations seem to become more prominent over time, demonstrating the importance of supporting both learning and well-being in school.

5. Profiles of perceived instructional quality and their relevance for students' school alienation
Katharina Fuchs, Ramona Obermeier, Michaela Gläser-Zikuda

Abstract: School dropout is the result of a stepwise process of increasing disconnection (alienation) from school. Motivation and achievement emotions of students are crucial components of school alienation and substantially associated with aspects of instructional quality. In order to support students' learning process and to prevent school alienation, it is vital to improve instructional quality. Thus, the current study addresses the research questions (1) Which profiles of instructional quality do exist in schools with high dropout rates and (2) How alienated are students in these different profiles? Using data of N = 1000 students (50.4 % female, average age: M = 12.97, SD = 1.45) from 10 middle and comprehensive schools (class levels 5 to 9) in one German federal state, a person-centered approach is applied. Latent profile analyses reveal three distinct profiles of students (positive: N = 70, moderate: N = 895, negative: N = 35) differing in their perception of instructional quality. The students in the profiles show different levels of school alienation. Students with a more positive perception of instructional quality report significant higher motivation and more positive achievement emotions. Additionally, students in the first profile have a significant higher achievement in mathematics. Hence, the findings highlight the significance of different dimensions of instructional quality for students' school alienation.

PAPER 3: Development of goal orientation, role of peers, teachers, classroom   105 I Online

Chair: Junlin Yu

1. Mastery, performance, outcome, work-avoidance goals: Longitudinal trajectories and consequences
Junlin Yu, Pia Kreijkes, Katariina Salmela-Aro

Abstract: Despite calls to broaden the goals studied, research continues to focus primarily on mastery and performance goals. This four-year study examined the development of outcome and work-avoidance goals across the middle school transition alongside mastery and performance goals. In doing so, it identified the trajectories and consequences of outcome and work-avoidance goals, as well as revisited the debate concerning the relations of mastery and performance goals with achievement. A cohort of 1072 Finnish students were assessed at four time points from the end of elementary school through middle school (Grades 6-9, ages 13-16). Latent growth models revealed that students' mastery, outcome, and performance-avoidance goals declined, but work-avoidance goals increased over time. Contrary to mastery and performance-avoidance goals, outcome and work-avoidance goals displayed stability across the school transition but showed more pronounced changes towards the end of middle school. Furthermore, changes in outcome and work-avoidance goals were closely tied to the development of academic achievement, life satisfaction, and burnout. Change in performance-approach goals, however, was unrelated to changes in student outcomes. Pre-transition growth mindset and perceived competence did not mitigate the decline of student motivation, but teacher emotional support stalled the increase in work avoidance. Based on the findings, we suggest that researchers incorporate other goals that are commonplace in authentic achievement contexts and are consequential for student learning and well-being.

2. Goals of close friends versus the entire class: Relationships with individual achievement goals
Alla Hemi, Nir Madjar, Yisrael Rich

Abstract: This study explored relationships between individual achievement goals of high-school students (N = 472; 52% girls; M age = 15.71), their perceptions of peer goals, and actual achievement goals as reported by Achievement goals predict important outcomes for students such as well-being and academic achievement. Earlier work indicates that interactions with peers, both close friends and all classmates, play an important role in academic motivation and achievement. However, there is limited research examining how peers shape each other's achievement goals. Some previous studies used adolescents' perceptions of peers' achievement goals, while others used peers reports of their own goals. We examined both perceived and actual reports to compare their effects. hypothesized that whole-class goals and close-friends goals, as well as individual-level perceived peer goals, would be related to students' achievement goals. HLM analyses indicated that classmates' goals were positively correlated with all individual achievement goals. Individual students' mastery approach goals were positively correlated with close-friends' achievement goals and this association was stronger than with classmates' goals. Additionally, perceived peer goals explained more variance in achievement goals than did classmates' or close-friends' actual reports. Results indicate both perceived and actual reports of peer goals are informative of individual achievement goals and target somewhat different processes related to peer group influence. Simultaneous examination of achievement goals of all classmates as well as those of particular student groups in the class may facilitate educators' efforts to design motivational interventions aimed at promoting mastery among specific groups of students in the classroom.

3. Performance-approach goals: The operationalization makes the difference
Linda Wirthwein, Ricarda Steinmayr

Abstract: The operationalization of performance-approach goals (PAGs) was found to be an important moderator of the associations between different PAGs and several educational outcomes. The aim of the current studies was to analyze the dimensional structure of PAGs by applying confirmatory structural equation models and to investigate the relevance of multidimensional PAGs for several educational outcomes (i.e. grades, motivational variables, school well-being). Therefore, we conducted two studies with school students (N1 = 425; N2 = 310). In Study 1 we mainly focused on the associations between PAGs and school grades. In study 2, we additionally assessed several motivational variables (academic self-concept, school values), as well as test anxiety and school well-being. All variables were assessed for school in general, mathematics, and German (mother tongue). The results of con-

firmatory factor analyses replicated and extended the finding on the different facets of PAGs. Besides a normative component (the aim is to perform better than others) and an appearance component (the aim is to demonstrate competence), we additionally examined proving PAGs (the aim is to demonstrate one's ability towards significant others). Contrary to earlier findings, both normative and appearance PAGs were positively correlated with school grades, whereas the proving component showed smaller associations. Moreover, differential associations with self-concept, school values, and school well-being emerged regarding the different facets of PAGs. The results are discussed with regard to the operationalization of PAGs.

4. Effects of perceived peer and teacher goals on adolescents' achievement goals
Alla Hemi, Nir Madjar, Yisrael Rich

Abstract: Background: Research on adolescents' achievement goal orientations and perceived goal structures focuses mostly on perceptions of teachers' goals, rather than peers' goals. Yet, peer-group influence becomes prominent during adolescence. Therefore, longitudinal research on perceptions of both teacher and peer goals can refine our understanding of factors that predict changes in achievement goals over time.

The primary hypothesis was that both perceived peer and teacher goals would predict students' achievement goals over time. Specifically, we expected that perceived teacher goals would predict student mastery achievement goals measured six months later while perceived peer goals would predict performance achievement goals after six months.

Method: High-school students (N=358; 56% female; mean age= 15.27) completed two self-report questionnaires assessing their achievement goals (hereafter "AGQ") and perceived peer and teacher goals (adapted from PALS, Midgley at al., 2000). Questionnaires were administered twice six months apart in the same school-year.

Results: Cross-lagged analyses using Structural Equation Modeling indicated that teachers' mastery-goals predicted increased students' mastery goals and teachers' performance-goals predicted decreased students' mastery goals, while peers' mastery-goals predicted decreased students' performance goals and peers' performance-goals predicted increased students' performance goals.

Conclusions: The meaning of students' perceptions of others' goals depends on whether teachers or peers are being assessed. Perceived peer goals predict performance goals, while perceived teacher goals predict mastery goals. Simultaneous examination of both perceived teacher and peer goals can enhance understanding of motivation among adolescents.

5. The role of classroom & peers in students' achievement goal orientations over lower secondary school
Elina E. Ketonen, Ninja Hienonen, Sirkku Kupiainen, Risto Hotulainen

Abstract: Students rarely endorse only one type of motivation in classroom and seldom in isolation from their classmates. The present study adds to earlier person-oriented research by investigating differences in students' achievement goal orientation (AGO) profiles and their development using a simultaneous consideration of classroom patterns with longitudinal multilevel methods. The sample of almost 10,000 lower secondary school students, representing over 600 classrooms, were surveyed on their AGOs on 7th and 9th grade. Multilevel latent profile analyses (MLPAs) revealed three parallel student-level and two class-level profiles on both grades based on students' AGOs. On student-level, following profiles were identified: success-oriented (7th grade: 60%, 9th grade: 42%), students with multiple goals (7th grade: 34%, 9th grade: 53%), and avoidance-oriented (7th grade: 6%, 9th grade: 5%). Multilevel latent transition analysis (MLTA) indicated that stability of student profiles (64%) was more typical than change, maladaptive transitions (e.g., from success-oriented to multiple goals) occurring more often than adaptive ones (e.g., from avoidance-oriented to multiple goals). Maladaptive transitions were related to and stable and adaptive transitions to higher GPA in the end of 9th grade (after controlling for the effects of covariates). Further, we identified two classroom types (class-level profiles): success-oriented (15%) and mixed goal orientation classrooms (85%) with varied relative proportions of different student-level profiles and patterns of likely transitions. Students seemed to benefit from belonging in a positively valued learning group during lower secondary school in terms of maintained/increasing motivation. The findings highlight the role of peers in students' achievement goal adoption.

PAPER 4: Promoting teachers' knowledge and use of motivational and self-regulated learning strategies

216 I Online

Chair: Lars Jenßen

1. ESP teachers' use of motivational strategies: A classroom-oriented view
Bochra Kouraichi

Abstract: Although research on L2 motivation is prolific, studies with a focus on teachers' use of motivational strategies (MS) are quite limited. The present study explores ESP university teachers' use of MS and whether their students see them motivating. Both teachers (N=14) and students (N=127) at an Estonian university were asked to fill out a questionnaire that follows Keller's (2010) ARCS model. Moreover, 20 class observations were conducted for in-person and online classes using Guilloteaux and Dörnyei's (2008) MOLT scheme. Both quantitative and qualitative methods were used to analyze the data. SPSS was used to carry out t-tests and ANOVA tests. Students' answers were compared with their teachers' and were indeed similar in terms of MS categories. Class observations were first analyzed qualitatively following the MOLT scheme. Then, z-scores were used to compare teachers' questionnaire answers to their observation results. The findings showed the differences between teachers' self-use of MS from their actual classroom behavior.

2. Three good things – An intervention to reduce preservice teachers' shame in mathematics
Lars Jenßen, Katja Eilerts

Abstract: Unpleasant emotions such as shame can reduce individual performance and harm the self. This is especially important for pre-service primary teachers, as they are expected to have sound professional knowledge in mathematics and teach mathematics in schools later on. So far, no systematic intervention exists that could be applied during teacher education to reduce shame. This study presents a brief intervention based on techniques of positive education. Through an experimental design with n = 121 pre-service primary teachers from Germany, it was shown that the intervention was effective in reducing shame in mathematics. Discussion includes benefits, limitations, and further applications of the intervention.

3. Learning conceptions, regulation and processing strategies: paths towards deep professional learning
Anna Ciraso, Carla Quesada-Pallarès, J. Reinaldo Martínez-Fernández, Jordi García-Orriols, Yansi Aurora Delgado Orrillo, Tânia Celeste Matos Nunes

Abstract: Learning patterns are dynamical combinations of learning conceptions, learning orientations, regulation- and processing strategies. The key processes for deep learning are related to the meaning-directed pattern: with constructivist conceptions of learning with personal interest, self-regulation and deep processing strategies in place. The majority of research in the field focused on higher education students; little is about teachers who are involved in in-service training programs. Our research question was: How can we explain deep processing among teachers, from learning conceptions and regulation strategies?

Participants were 241 teachers involved in in-service learning post-graduate programs. With data from the ILP60, path analyses were performed including learning conceptions, regulation and processing strategies. Results showed that the two typical paths (meaning-directed learning pattern towards deep processing and reproduction-directed pattern towards stepwise processing) are not independent: both paths can be originated from the same conceptions; moreover, stepwise processing holds an explicative effect towards self-regulation. Furthermore, an interesting combination of learning conceptions appeared.

4. Primary school teachers' content and pedagogical content knowledge about self-regulated learning
Lies Backers, Hilde Van Keer

Abstract: Teachers play a key role in supporting students with self-regulated learning (SRL). Yet previous research shows that teachers, like students, struggle with SRL. This study focuses on an underexposed topic within the research field of SRL, namely studying teachers' content and pedagogical content knowledge about SRL. Prior studies have revealed that there are significant differences in teacher knowledge, and with this study, we explore exactly where those gaps are located. 68 primary school teachers were interviewed and completed self-report questionnaires. By using a semi-structured interview protocol and a recently developed test with four scenarios,

more insight is gained in both types of knowledge. A coding scheme and 32 pair comparisons will be used to analyze the collected data. The analysis is ongoing and the presentation will discuss the analyses in detail as well as the implications for teaching practice and further SRL research.

5. Strategy instruction in collaboration between a researcher and a teacher: The process and the effect
Nao Uchida, Yu Mizuno

Abstract: Strategy instruction is significant to develop self-regulated learning skills. However, learners hardly use learned strategies spontaneously in other situations after the instruction. Thus, it is necessary to clarify how to promote spontaneous use of effective strategy. In this study, a researcher and a teacher collaborated to implement strategy instruction, and we investigated the effects and the process of it in a public high school in Japan.33 Japanese high school students participated in this practice. The researcher provided explicit lectures on strategies, and after that, the teacher supported strategy use in regular classrooms. We surveyed the students' strategy use three times during the intervention and interviewed 5 participants based on their change in strategy use. The latent-growth model was conducted to analyze the change in strategy use and revealed that the students' use of the association strategy continuously increased over ten months. The interview data indicated that the participants who adopted the instructed strategies recognized their own learning and its limitations and perceived the relative usefulness of the new strategies. The results showed the effectiveness of this form of strategy instruction and the possibility that learners' awareness of their own learning and its limitations might promote their spontaneous strategy use. Further studies are necessary to verify the effect of the instruction and cognitive process to adopt new strategies.

Wednesday 16:30-18:00	Session Block III - Symposia

SYMP 1: **Emotion regulation in achievement contexts: How can we promote adaptive achievement emotions?**	**E04 I Online**

Chairs: Elisabeth Vogl, Ulrike Nett **Discussant**: Stephanie Lichtenfeld

Abstract: Although the impact of emotions on students' achievement and well-being is now well-established, research on achievement emotion regulation [AER] is a more recent development. Empirical evidence on this topic is still scarce and inconsistent. This symposium will address empirical evidence regarding several aspects of AER in the context of Harley and colleagues' (2019) integrated model. Their integrated model has adapted Gross's (2015) emotion regulation process model to diverse achievement contexts by integrating Pekrun's (2018) control-value theory of achievement emotions. The adaptive application of AER strategies in different contexts is critical for students' academic success and academic development. The papers presented in the symposium will provide empirical evidence in support of different facets of AER.

The first paper introduces a newly developed instrument designed to measure AER based on Harley et al.'s (2019) integrated model. The subsequent second paper investigates the development of AER during elementary school in a longitudinal study (grade 3 to 6) and identifies students at risk for maladaptive emotion regulation. The third paper presents inaugural research on the effectiveness of a control-value intervention to promote adaptive achievement emotions based on the integrated model. The fourth paper introduces a creative new approach designed to regulate students' achievement emotions with music, hence providing empirical evidence supporting external AER and strategic intervention protocols.

An internationally recognized expert on students' emotions and emotion regulation will discuss the single papers on the background of a comprehensive theoretical and empirical framework. Concluding, the audience will be invited to an interactive discussion.

1. Dealing with achievement-related feeling: The regulation of achievement emotions questionnaire
Kristina Stockinger, Reinhard Pekrun, Anne Schreyer, Viktoria Kithzmann, Elisabeth Vogl

Abstract: Studies like the 2015 rendition of the Programme for International Student Assessment (PISA; OECD, 2017) document disquieting trends in students' emotional development: On average, 66% of students reported frequently worrying about poor grades. At the same time, research has shown that students' emotions can profoundly impact their learning and well-being, and little is known about how students attempt to regulate their emotions, likely because adequate assessment tools are largely lacking. To address this gap, we developed a set of self-report scales for measuring students' strategies for regulating positive and negative emotions related to achievement (Regulation of Achievement Emotions Questionnaire; RAEQ). In this study, we report on the development and an initial validation of the RAEQ. The instrument was administered to N = 350 German university students, along with several additional measures pertaining to proposed antecedents and outcomes of achievement emotion regulation. Our findings suggest that the RAEQ presents a reliable instrument and that its scales yield meaningful relations with students' emotions, psychological health, and achievement. In line with theoretical expectations and prior research on general emotion regulation, appraisal-oriented regulation strategies were most strongly related to students' achievement emotions and well-being. Competence-oriented regulation (i.e., modification of study behaviors) also showed substantial relations with students' achievement emotions. Overall, our study speaks to the importance of considering achievement emotion regulation in designing interventions to promote student well-being. Implications for scale refinement, future research, and educational practice will be discussed.

2. The development and role of emotion regulation in elementary students' mathematics problem solving
Kelsey Losenno, Krista Muis, Brendan Munzar, Courtney Denton Hurlbut

Abstract: Students emotions can impact their learning processes and outcomes. As such, emotion regulation (ER) is a necessary skill for learners to develop. However, little is known about how different ER strategies develop over time and which learner characteristics predict developmental trajectories. To address this gap, we investigated how cognitive reappraisal and expressive suppression develop over time, identified profiles of students whose

development may be at risk, and examined how these distinct ER strategies related to elementary-aged students' mathematics problem solving outcomes over time. In total, 235 grade 3 to 6 students (104 girls) from one elementary school participated over two years. Data regarding students' mathematics grades, mathematics problem solving outcomes, and ER strategy use was collected twice each year. Students' ER strategies were measured immediately prior to solving mathematics problems. Results suggest that students who used reappraisal early continued to do so over time. For some students, a decrease in mathematics outcomes resulted in an increased use of suppression strategies. Conversely, increases in mathematics outcomes resulted in the use of less suppression strategies. Students at risk in their development of ER and mathematics outcomes were predominantly young boys, as they consistently used more suppression and had lower problem-solving outcomes. Findings contribute to our understanding of how ER develops and which characteristics place students at risk. The unique relations to mathematics problem solving achievement has implications for researchers and educators to implement ER interventions at a global level within schools.

3. Control-value intervention to promote adaptive achievement emotions in fifth grade students
Elisabeth Vogl, Kristina Stockinger, Reinhard Pekrun

Abstract: The onset of mental disorders is shifting towards a younger age (Marcus et al., 2012), which endangers children and adolescents and highlights the urgent need for effective prevention programs. In school, transition periods (e.g., from primary to secondary education) have been identified as particularly critical phases in which adaptive achievement emotions decline and maladaptive achievement emotions increase, a finding that is particularly well documented for mathematics. These patterns have important consequences for students' achievement and well-being. In response to the need for prevention programs promoting children's well-being, we developed an intervention to promote adaptive and prevent maladaptive achievement emotions in mathematics by fostering adaptive control and value appraisals based on Harley and colleagues' (2019) integrated model of achievement emotion regulation. We evaluated the control-value intervention using a pretest-posttest control group design with 208 fifth-grade students sampled from nine classrooms. Five classrooms (118 students) were randomly assigned to the control-value intervention group participating in four training sessions. Four classrooms (90 students) were randomly assigned to the control group participating in eight math lessons. The evaluation results indicate a positive development of enjoyment, boredom, and shame for participants in the intervention. However, the results also suggest that more sensitive assessment methods are needed to adequately evaluate the effects produced by the intervention. Implications for program refinement, future research, and educational practice will be discussed.

4. The regulation of learner emotions through the introduction of music at varying tempo
Matthew Moreno, Earl Woodruff

Abstract: Literature has established the integral role of emotional response as part of the learner's experience (Pekrun & Perry, 2014) in order to optimize performance (Cunningham, Dunfield, & Stillman, 2013), and attentional response (Kärner & Kögler, 2016). At the same time, music has been known to have strong effects to modulate emotional response in cognitively demanding tasks. This study examines the psycho-emotional and psychophysiological effects that variations in the tempo of background music have on learners who are completing reading comprehension tasks. The present study examined how learning performance is modulated through expressed emotions, electrodermal responses, and how our understanding of the relationship between the emotional and cognitive experiences effect emotion regulation in learning tasks. Results from seventy-four (N= 74) participants indicated that the tempo of background music that participants were exposed to while competing their reading comprehension task, did have a significant effect on predicting their performance outcome, emotional expressions, as well as psychophysiological responses. Results indicated that participant were more likely to have lower performance scores accompanied with the likelihood of greater expressions of fear, joy and contempt, along with greater skin conductance responses when listening to fast tempo music (150bpm). These results can suggest that a combined regulatory mechanism may be at play that helps indicated the combined effect that music may have on cognitive performance, attention allocation, and emotion regulation.

SYMP 2: Teacher emotions, emotion regulation and student motivation	E08 I F-to-F

Chair: Katharina Hilger   **Discussant:**   Dave Putwain

Abstract: Teachers experience a wide range of emotions during their day-to-day teaching, which they can influence by adopting emotion regulation strategies. So far, research on teacher emotion regulation and teacher emotions has rather focused on individual abilities and has largely disregarded contextual factors influencing the teacher emotion regulation process and teacher's emotional experiences. This symposium will start addressing questions about the contextual factors influencing teacher emotions and emotion regulation by focusing on interpersonal context effects such as supportive environments, the influence of colleagues, and the teacher-student relationship. The discussion will focus on factors affecting teacher emotions and emotion regulation and on the ways teacher emotion regulation abilities could be improved in order to foster student motivation, positive affect, and learning as well as reciprocal circles among teacher emotion regulation, student outcomes and motivating teaching styles.

1. When to regulate and how – social context effects in teachers' emotion regulation
Katharina Hilger, Melanie Keller, Anne Christiane Frenzel, Susanne Scheibe

Abstract: People regulate their emotions in response to changing environmental demands. Thus, with varying contexts, they may also employ different emotion regulation strategies. So far, educational research tended to focus on individual differences in emotion regulation and has largely disregarded context factors such as the teacher-class relationship quality. The goal of the present paper is therefore to investigate the extent to which social contextual factors impact teachers' emotion regulation. In two studies, we assessed teachers' use of expressive suppression and cognitive reappraisal across different classrooms at the within-person level, testing for the effect of teacher-class relationship quality. Across the two studies, emotion regulation varied significantly across classrooms and within teachers. Even when controlling for class characteristics and teacher emotions, results of Study 1 showed that relationship quality with a specific group of students is negatively related to expressive suppression, but unrelated to cognitive reappraisal. In Study 2, however, no effect of relationship quality on emotion regulation was found. These findings highlight the potential of relationship quality to instigate less maladaptive emotion regulation and hence better mental health.

2. Emotions of student teachers triggered by social interactions in the team practicum
Gerda Hagenauer, Jennifer Waber, Tina Hascher, Lea de Zordo

Abstract: Emotions are significant not only in the teaching profession, but in the training of student teachers as well, and particularly during their first practical experiences in the school practicum. While studies have repeatedly shown that pupils and their behavior are relevant for the emotional experiences of student teachers, little is known about the emotions of student teachers that are triggered by the social interactions with their mentor teacher and their fellow student teacher, which is the focus of the present research. Based on self-determination theory, we assume that student teachers feel positive emotions if they feel appreciated, competent and autonomous in a particular interaction situation, while negative emotions are likely to occur if these needs are not or only partly fulfilled. In order to explore this relationship, semi-structured qualitative interviews with 27 Swiss student teachers were conducted. The interviews were transcribed verbatim and analyzed by structuring content analysis. In line with the expectations, the results show that student teachers experienced more positive activating (like joy or happiness) and positive deactivating (such as feeling at ease) emotions in social interaction situations in which their basic psychological needs were met by the mentor teacher or the team partner. In social interaction situations, in which the fulfillment of the basic psychological needs was threatened, student teachers experienced more negative activating (such as anger or frustration) and negative deactivating (such as insecurity) emotions. Theoretical implications will be discussed and practical implications for the design of internships in teacher education will be derived.

3. Emotion regulation and need satisfaction shape a motivating teaching style
Idit Katz, Angelica Moè

Abstract: Teachers whose basic psychological needs for competence, autonomy and relatedness are satisfied tend to use a motivating teaching style characterized by the provision of autonomy and structure, whereas teachers whose needs are frustrated tend to use controlling or chaotic styles which are considered de-motivating. Given the

importance of a supportive and motivating teaching style, it is crucial to better understand how it can be fostered and maintained. Since emotion regulation has been shown to affect both teachers' and students' well-being, this research tested the hypothesis that emotion regulation shapes the association between teachers' need satisfaction or frustration and the adoption of (de)motivating styles. Two hundred and ninety teachers filled in questionnaires to assess need satisfaction and frustration, the emotion regulation strategies of reappraisal and suppression, and their teaching styles. The results confirmed the mediating role of reappraisal and the moderation of emotional suppression. Teachers' need satisfaction was linked with reappraisal, which in turn was related to the autonomy supportive and structuring motivating styles. High emotional suppression related with the adoption of a controlling style independently of need frustration levels. Only low levels of emotional suppression and need frustration lessened the adoption of a controlling style.

4. Teachers' emotion regulation in the team-taught classroom: a qualitative analysis
Franziska Muehlbacher, Gerda Hagenauer, Melanie M. Keller

Abstract: As part of their professional competence, teachers need to adaptively regulate their emotions in the classroom. Until now, we know little about teachers' emotion regulation during collaborative teaching practices, such as team teaching. Team teaching describes that (at least) two teachers share responsibility for the teaching process. Within this setting, we assume that teachers experience emotions triggered by the team partner, which need to be regulated. Theoretically, we apply Gross' (1998) process model of emotion regulation and Järevonja and Järvelä's (2009) research on co- and shared emotion regulation. The aim of this study was to investigate team teachers' emotion regulation strategies, caused by the partner teacher during lessons. Moreover, we examined in how far co- and shared emotion regulation processes between both team partners occurred. To this end, we conducted 30 semi-structured online interviews with Austrian team teachers from lower secondary schools. The interviews were transcribed verbatim and analysed using structuring qualitative content analysis. Team teachers described to apply a variety of regulation strategies, such as attentional deployment and reappraisal, to prevent negative emotions. They tended to authentically express positive emotions, such as joy and gratitude, whereas they reported to regularly suppress negative emotions such as anger or boredom. Still, many teachers alleviated tensions with their team partner after the lesson through conversation. Co- and shared regulation strategies included situation modification, suppression, and (shared) humour. Theoretical and practical implications, including the role of emotion regulation for high-quality team teaching collaboration, will be discussed.

SYMP 3:	How network methods are innovating the research on multi-facetted motivation constructs	114 I Hybrid

Chair: Julia Moeller   **Discussant**: Laura Bringmann

Abstract: Network analyses are revolutionizing how we think about and measure multi-facetted psychological constructs. On one hand, network methods are innovating theories and theory development, on the other hand, they offer new methods to measure constructs and test theoretical assumptions in empirical studies. This symposium translates the insights gained in ongoing debates about the usefulness of network methods into the research on multi-facetted motivation constructs.

The first presentation (Dietrich et al.) shows how network models and the discussions ongoing in the network-interested research community open new perspectives to our understanding of short- and long-term motivational development, employing network perspectives to integrate dynamical systems ideas into the research on the Situated Expectancy-Value theory. The second presentation (Lee et al.) demonstrates how network methods can be used to formulate evidence-based hypotheses about relations among situated expectancy-value experiences, based on the analysis of empirically observed covariance patterns in previous studies. This presentation closes the gap between empirical findings and follow-up studies, uses network methods to explain where good hypotheses can come from, and thus contributes to solving the currently much-discussed theory crisis. The third presentation (Kulakow et al.) demonstrates how network models can improve the measurement of multifaceted constructs (engagement; burnout), and why these contributions go beyond frequently used latent factor models. The fourth presentation (Moeller et al.) discusses how network methods can improve the measurement of the multi-facetted construct of passion, and how network methods help us better understand ambivalent motivation and mixed emotions. All presentations present both data and general methodological arguments.

1. When new methods drive new theory development: Networks and the situated expectancy-value theory
Julia Dietrich, Julia Moeller, Asko Tolvanen, Jaana Viljaranta, Baerbel Kracke

Abstract: This presentation discusses the implications of the research on network methods for the conceptualization and modeling of long- and short-term development, state-trait relationships, and heterogeneity in regard to achievement motivation defined in terms of the situated expectancy-value theory (Eccles & Wigfield, 2020).

The influential expectancy-value theory describes motivational antecedents of task choice in achievement contexts, but only recently there has been an emphasis on the situated nature of expectancy-value experiences. This has raised new questions, including how situated motivational states relate -and develop into- stable motivational dispositions, how different -or similar- people are with regard to their within-person variability of situated experiences. We have found that many concepts and methods needed to study these questions have been employed in the research on dynamic systems theories and the research on network analyses, which are often combined in previous studies. There are, for instance, the articles showing how network models can be used to examine moment-to-moment stability, or to examine state-to-trait relationships.

This presentation summarizes the network methods that will link the situated expectancy-value theory to recent discussions and innovations in the network community, as one example how the research on multi-facetted motivation constructs can benefit from network approaches.

The conceptual contribution of this study will be illustrated using empirical data from an experience sampling method study with 155 participants who provided situated expectancy-value reports over 10 weeks during one university lecture. Data were analyzed with a multilevel cross-lagged structural equation model to examine moment-to-moment associations among expectancies and values.

2. Where do good hypotheses come from?: Creating formalized evidence-based hypotheses with networks
Hye Rin Lee, Jacquelynne S. Eccles, Julia Moeller, Allan Wigfield, Daniela Alvarez, Katariina Salmela-Aro, Hanna Gaspard, Nayssan Safavian, Sandra Simpkins, Xin Tang, Drew H. Bailey, Ji Seung Yang

Abstract: Since the replicability crisis, much effort has been invested into improving the process of theory testing, but recent debates about the theory crisis has pointed out that more attention should be paid to the process of formulating and formalizing theories themselves. This presentation discusses a novel approach of formulating and formalizing hypotheses not only by deriving them from theory but also by informing them of previous empirical findings, to close the gap between the end of one study and the beginning of the next. This presentation shows how network analyses of co-variance patterns among motivation constructs can be used to formulate hypotheses about causal relations among these constructs. These hypotheses can then be tested in further studies. We used data from three studies on the (situated) expectancy-value theory, with sample 1 consisting of 1,540 U.S. students; sample 2 of 1,867 German academic track students and sample 3 of 103 German academic track students). All included comparable measures of expectancies and values from self-report surveys. We examined the inter-correlation patterns among the between expectancy of success, intrinsic value, utility value, attainment value, and prior achievement with regularized partial correlation networks. Then after comparing correlations and partial correlations and estimating the psychological network, we created directed acyclic graphs using the Inferred-Causation Algorithm to formulate hypotheses about potential underlying causal structures among these motivational components. We expect this approach to systematize how we use prior evidence to inform new hypotheses and contribute to better formalized hypotheses to be tested in further research.

3. Which Insights Do Network Models Offer to Motivational Research?
Stefan Kulakow, Julia Moeller, Frances Hoferichter

Abstract: Multifaceted constructs such as schoolwork engagement and school burnout are commonly used in motivational research. However, current developments in psychological research indicate that traditional statistical handling of these variables may be prone to error and may lead researchers to wrong conclusions. In particular, critique draws on two points: First, conventional between-person methods, such as structural equation modeling, may overlook diverging patterns of individuals from the point estimates of correlations. Hence, within-person methods are needed to identify such individuals. Second, another point of critique concerns measurement properties of such multifaceted constructs. Often the underlying assumptions of a latent variable are not tenable for multifaceted constructs. Consequently, it has been proposed that psychometric network models may be better suited to adequately model constructs such as school engagement and burnout (Lange et al., 2020). The present study addresses these concerns and aims to extend current research with regards school engagement and school burnout. Based on a data set of 733 adolescent students (Mage = 13.97, SD = 0.41, 52% girls), a psychometric network model, a residual network model, and a co-endorsement network model were conducted to analyze potential shortcomings of the conventional latent variable framework. All models were contrasted concerning different conclusions. Our results highlight the importance of contrasting different methodological approaches and questions whether reflective measurement models are suitable when studying multifaceted constructs.

4. How network models help us understand ambivalent motivation: The example of passion
Julia Moeller

Abstract: Passion is a multi-facetted motivation construct studied extensively for two decades. This presentation discusses four ways in which network methods are expected to drive paradigmatic changes in the research on passion, and why these innovations are needed to align the passion research with recent methodological debates.

First, the presentation discusses why the specific facets of the multi-facetted passion construct deserve more attention and require other measurement models than the commonly used latent factor models. It summarizes theoretical and empirical reasons suggesting that psychometric network models may be more appropriate measurement models (see Figure 1 for a comparison). Second, the presentation addresses a recently proposed theoretical model integrating state and trait aspects of passion (Figure 2) and discusses how certain network models help integrating these state- and trait aspects theoretically and empirically. Third, the presentation shows why the ambivalent joint experience of harmonious and obsessive passion by the same person is easily overlooked by the frequently used latent factor models and illustrates how co-endorsement networks can reveal this ambivalent intra-individual co-occurrence of harmonious and obsessive passion. Fourth, the presentation addresses the need to connect the passion research to the debate about within- versus between-person analyses and shows the various ways in which network models can uniquely help us understand within- and between-person patterns and variation. These arguments will be illustrated using cross-sectional self-report survey data (N = 471 university students) and experience sampling method data and different network analyses based on partial correlations and co-endorsements.

Wednesday 16:30-18:00	Session Block III – Papers

PAPER 1: Role of motivation and/or emotion in STEM education	**214 I Online**

Chair: Rachel Sparks

1. Effect of metacognition, emotions, and identity on students' reasoning orientation
Rachel Sparks, Jenny Dauer

Abstract: Scientific literacy requires that students critically evaluate and synthesize scientific knowledge in everyday contexts such as making decisions about socioscientific issues. Evidence evaluation is subject to cognitive biases including motivated reasoning, in which individuals' reasoning may have accuracy orientations to reach an accurate conclusion or directional orientations to reach a desired conclusion. We examined how components of self-regulated learning (e.g., metacognition, emotion, epistemology) and learner characteristics (e.g., stakeholder identity, open-mindedness) affect students' reasoning orientation within a postsecondary science literacy course. Our findings demonstrate that motivated reasoning is predicted by metacognitive components of self-regulated learning, as well as specific emotions elicited in response to a socioscientific issue. Recognizing and attending to learners' metacognitive skills and emotions may foster accuracy-oriented reasoning in socioscientific contexts.

2. Enhancing the motivation and career aspirations in STEM among adolescent students: a cautionary tale
Tim Urdan

Abstract: In this paper we examine the effects of a program designed to increase the knowledge, interest, and aspirations of middle school students about computer programming (CP). The purpose of this intervention project was to provide middle-school students (grades 6 through 8, ages 10-14) with opportunities to learn more about computer science and to gain experience practicing with programming tools. To date, we have collected survey data from a sample of over 400 middle school students over 10 waves (2 years) to track changes in their attitudes about computer science. These students have participated in dozens of web-based modules designed to increase their understanding of computer programming and to gain experience with basic computer programming activities within game-like settings. We found modest increases in students' understanding of CP, their interest in CP and aspirations to work in CP during the second year. But we also found anomalies in the data that raised questions about how and why students responded to the program as they did. For example, interviews with teachers revealed that some felt left out of the intervention process, and therefore did little to support it, thereby affecting their students' attitudes about the project. In this paper, we consider some of the challenges motivation researchers face as they try to enhance motivation in classrooms and offer suggestions for understanding factors that may limit the efficacy of motivation interventions.

3. Third graders' emotions in mathematics – different raters, different perspectives
Riikka Mononen, Anna Tapola

Abstract: Studies examining young students' mathematics emotions from different raters' perspectives (i.e., students, parents, and teachers), are still quite rare, and therefore we know little how consistent the evaluations are across different raters. In this study, we investigated third graders' experienced mathematics emotions (i.e., enjoyment, boredom, and anxiety) from the viewpoints of students and their teachers and parents, and the correspondence between these evaluations, while controlling for mathematics performance, gender, and mother's educational level. Participants were 123 Norwegian third graders, their parents, and teachers. Students completed a mathematics emotions questionnaire (AEQ-ES) and three mathematics performance tests. Parents and teachers rated their child or student with a question for each emotion. Students reported enjoying their mathematics learning, experiencing some boredom, and relatively low levels of anxiety. Hierarchical regression analyses showed that only the parent-rated emotions were significantly associated with student-rated emotions. Further, girls enjoyed mathematics more than boys, while boys experienced more boredom. Higher mother's educational level and students' better addition skills were associated with lower level of student-rated anxiety. These findings implicate that parents' evaluations of their child's emotions in mathematics coincide to some degree. Further, they highlight that the differences between the raters' perspectives should be acknowledged. This calls for longitudinal studies to further explore the relations and discussion on measurement validity.

4. Anxiety, motivation and academic performance in French elementary school pupils by gender
Diane Sicre, Florence Bara, Nathalie Huet

Abstract: Anxiety is known to impact students' academic performance from early grades (Grills-Taquechel, Fletcher, Vaughn, Denton, & Taylor, 2013) to many years later (Shakir, 2014).

Our purpose is to examine if the relationships between anxiety, motivational variables (self-efficacy, academic interest), and academic performance according to gender previously found in other populations (e.g., older and from other countries), would be similar to those found in French elementary pupils.

In accordance to the literature, we found, regarding girls: negative relationship between anxiety and self-efficacy or academic interest, correlations between anxiety and performance in mathematics and in reading comprehension. For boys: anxiety was negatively related to self-efficacy, but there was no relationship with academic interest or performance. Girls demonstrated higher anxiety than boys.

Practical implications and perspectives of this work are discussed.

5. Which epistemic emotions predict engagement in learning physics?
Barbara Balaž, Nina Pavlin-Bernardic

Abstract: Emotions are ubiquitous in academic context and an inseparable part of learning process. Academic emotions vary in their object focus, valence, and activation. Based on the object focus, one group of academic emotions are epistemic emotions, which are specifically focused on the process of generating knowledge. The control-value theory of achievement emotions proposes different effects of epistemic emotions on motivation, based on their valence and activation. Therefore, the aim of this study was to investigate the relationship between epistemic emotions and motivation for learning physics. We conducted two studies. Study 1 was qualitative (N = 31), while Study 2 was cross-sectional quantitative study (N = 545), both conducted with 8th grade students from elementary schools in Zagreb, Croatia. Qualitative analysis showed that curiosity and enjoyment (as positive activating emotions), surprise (as a neutral activating emotion) and confusion (as a negative activating emotion) motivate students for learning physics. In contrast, frustration and confusion as negative activating emotions and boredom as a negative deactivating emotion do not motivate them for learning physics. The path analysis conducted with data from Study 2 showed similar results. That is, curiosity positively predicted engagement in learning physics, while confusion, anxiety, frustration, and boredom predicted lower engagement. The similarities and differences between qualitative and quantitative data gave insight in the directions for further research and were discussed in line with theoretical assumptions.

PAPER 2: Motivation research based on Self-Determination Theory
213 | Online

Chair: Ralph Meulenbroeks

1. A differentiated look at introjected regulation within Self-Determination Theory
Sonja Bieg, Florian H. Müller, Almut E. Thomas

Abstract: The focus of the present study is introjected regulation within Self-Determination Theory which describes behavioral reasons to promote ego involvement with a focus on approval from the self and others. Previous studies have shown that a distinction between approach and avoidance within introjected regulation show differentiated correlations to identified regulation, well-being and negative affect. The aim of this study is to investigate four factors of introjection representing the approach/avoidance component and the approval of self and others. We were looking for associations with well-being and anxiety.

We conducted our study with a sample from universities from Germany and Austria, N = 409 students (84% female) with a mean age of M = 24.3 (SD = 5.96). Results of confirmatory factor analyses show that a differentiation of introjected regulation into an approach and avoidance component with a focus on approval of others or self fits the data better than a model with one-Factor for introjection (χ^2 =331.62; df = 131; p < .000; CFI = .935; TLI = .915; RMSEA = .062, SRMR = .046). Furthermore, a bifactorial model fits the data well (χ^2 =59.65; df = 23; p < .000; CFI = .976; TLI = .954; RMSEA = .063, SRMR = .034) and confirms the theoretical postulations. The introjected approach regulation is positively related with well-being whereas the introjected avoidance regulations (focus on self and others) are negatively related with well-being and positively with anxiety.

A differentiation of introjected regulation helps to evaluate the quality of motivation more reliable.

2. Fostering secondary students' intrinsic motivation for a physics practical by inquiry-based learning
Ralph Meulenbroeks

Abstract: An inquiry-based learning approach (IBL) to a physics practical on ionizing radiation is studied in terms of its effects on students' intrinsic motivation towards performing this type of practical. In a semi-experimental set up, upper secondary school students (N=255) are divided into three groups. Two groups performed an IBL version of the practical in question and are guided through the phases of the inquiry process by a dedicated worksheet. In addition, these two groups of students are supported in the use of the equipment by either an instructional video (group 1, N=90) or a printed quick start guide (group 2, N=75). Students performing the practical on the basis of a more classical instruction sheet containing a step-by-step description of the entire process are used as a control group (N=90). Five subscales of the intrinsic motivation inventory are used as a pre- and posttest for all three groups. Results show significant gains in the Interest/Enjoyment as well as Effort/Importance subscales favoring IBL, both group 1 and 2. In the case of support by the instructional video (group 1), all five subscales show a significant increase as compared to the control group. The results point to the advantages of using an IBL approach for practicals, provided that appropriate scaffolding is used in terms of equipment operation and research process.

3. Need supportive supervision boosts junior doctors' work enjoyment & psychological need satisfaction
Wieke van der Goot, Nico Van Yperen, Debbie Jaarsma, Robbert Duvivier

Abstract: Postgraduate training of junior doctors mainly takes place at clinical workplaces. There, consultants play an important role in supervising junior doctors to ensure patient safety and to support and guide junior doctors' development. Drawing from self-determination theory, we hypothesised that consultants' supervision styles are likely to affect junior doctors differently in terms of psychological need satisfaction, psychological need frustration, and work enjoyment. To examine the effects of different supervision styles, we conducted an experimental scenario study among junior doctors (N = 150). We presented written scenarios to reflect authentic clinical situations that junior doctors may encounter in practice. We used a 2 x 2 between-subjects design to manipulate supervision styles within these scenarios, with need supportive (high vs low) and directive (high vs low) supervision styles. We performed a 2 x 2 MANOVA and a follow-up parallel mediation analysis to test our hypotheses. The results indicated a strong positive effect of need supportive supervision on work enjoyment, mediated through autonomy satisfaction and competence satisfaction. We found little empirical evidence for differential effects of directive supervision on psychological need satisfaction, psychological need frustration, and work enjoyment. This study adds a theoretical and experimental perspective to the differential effects of supervision in clinical workplaces. Supervisors that listen and empathise with junior doctors' questions and doubts regarding patient care, support psychological need satisfaction and stimulate work enjoyment.

4. Observing teachers' (de)motivating styles: how does it relate to students' outcomes?
Nele Van Doren, Katrien De Cocker, Nele Flamant, Ruben Vanderlinde, Leen Haerens

Abstract: Self-Determination Theory-based studies showed the importance of developing teachers' motivating style (i.e. being autonomy-supportive and providing structure) while minimizing their demotivating style (i.e. being controlling and chaotic). However, most research relied on self-reported measures. This study extends previous research by relying on observations. The study sample consisted of 65 PE-teachers (M age = 40,15 (11,50) years) and 904 students (M age = 13,23 (1.18) years). One PE lesson of each teacher was video- and audiotaped. At the end of each lesson, students completed questionnaires on their motivation and need-based experiences. Experts used a newly-developed observation tool to rate teachers' (de)motivating style. Reliability (intrarater-, interrater-reliability, and internal consistency) and (internal) validity of the tool were assessed. Multilevel analyses were performed to examine the relations between teachers' observed (de-)motivating style and students' outcomes. The observation tool showed good reliability and validity, with teachers' (de)motivating style being depicted in a circular model. Teachers' autonomy-supportive and structuring styles were significantly and positively related to students' autonomous motivation and negatively to amotivation. Teachers' controlling style showed a trend towards a significant negative relation with controlled motivation. Teachers' chaotic style was significantly and negatively related to students' autonomous motivation and positively to amotivation. Teachers' autonomy-supportive style was also significantly and positively related to students' need support and negatively to students' need frustration. Thus, we managed to create an observation tool that allows to assess PE teachers (de)motivating style in a comprehensive manner. The observed behaviors were correlated in a meaningful way with students' outcomes.

5. Pilot-testing a video annotation tool for optimizing physical education teachers' motivating style
Arne Bouten, Nele Van Doren, Katrien De Cocker, Leen Haerens

Abstract: Introduction: In 2016, 81% of adolescents aged 11-17 were insufficiently physically active. Insufficient physical activity–in turn–has been related to negative health outcomes such as chronic diseases and mental health issues in adolescents. Physical education (PE) teachers and–more specifically–their (de)motivating teaching style can stimulate students to increase their physical activity. We have developed an online video annotation tool to improve PE teachers' motivating style, based on Self-Determination Theory.

Methods: The online tool measures and presents PE teachers' current motivating style. Afterwards, teachers annotate a video of one of their classes and write a short action plan for improving their motivating style. We have pilot-tested the tool in pre-service PE teachers, who completed appreciation questionnaires (n = 53; 66% men; M age = 20.64 ± 1.98 years) and focus group interviews (n = 36; 67% men; M age = 20.69 ± 2.08 years).

Results: The appreciation questionnaires showed that pre-service teachers found the video annotation the most innovative (mean score on a 5-point Likert scale: 3,90 ± 1,02) and useful step (3,94 ± 0,75). In turn, pre-service teachers' rating of usefulness had the strongest positive correlation with their intention to change their motivating style (r = 0.6; p < 0.01). These findings were corroborated through framework analysis (a form of thematic analysis) of the focus groups data.

Conclusion: This study provides initial support for the acceptability of a video annotation tool to optimize PE teachers' motivating style. Changes to optimize the tool are proposed.

PAPER 3: Motivation and self-regulated learning interventions   105 I Online

Chair: Margus Pedaste

1. Increasing the motivation for learning-journal-writing as a self-regulated learning training
Nina Udvardi-Lakos, Tino Endres, Alexander Renkl, Inga Glogger-Frey

Abstract: University students need to be able to self-regulate their learning to succeed in their studies. Long-term self-regulated learning interventions such as the Freiburg Self-Regulated-Journal-Writing Approach can help students to reach that goal. However, there might be a decrease in students' motivation over the course of training, potentially causing attrition. To avoid this decrease, we combined a learning journal-based, self-regulated learning training with a learning environment teaching conditional knowledge about learning strategies, a peer-feedback system to support students' self-efficacy, and an optional motivational intervention for students reporting low levels of motivation. The expectancy and the value as well as cost components of motivation were assessed over the course of ten weeks. Students (N = 103) showed an increase in the expectancy components and a decrease in the cost components of motivation. The additional motivational intervention led to an increase in the value associated with learning journals for students reporting low levels of motivation. Our study suggests that this expanded self-regulated learning training can help participants maintain their motivation throughout a semester.

2. Supporting self-regulated learning in distance learning contexts at the higher education level
Natalia Edisherashvili, Katrin Saks, Margus Pedaste, Äli Leijen

Abstract: Distance learning has assumed a scale that transformed the paradigm of learning altogether, especially at the higher education level, where learners, if capable of regulating their learning process, can well benefit from the experience. Thus, self-regulated learning skills and support to develop those have assumed critical importance for learner success in online environments. The presentation covers the results of the systematic literature review conducted in an attempt to fill the gap in understanding what has been done in recent years to support SRL – each of its areas (cognitive, metacognitive, motivational, and emotional) at each of its phases (preparation, performance, appraisal) in various distance learning environments at the higher education level. It attempts to explore in detail the design and characteristics of the identified SRL support mechanisms, and how they help with enhancing the learning experience and developing the SRL competence.The repertoire of systemized and categorized SRL interventions reported as a result of the study will inform the educators and online course designers about the proven SRL support methods that can be applied while designing cognitively, metacognitively, motivationally, and emotionally accommodating online learning environments. Additionally, the present study will assist the researchers to identify the areas where to draw further attention while exploring SRL.

3. Supporting learners' online self-regulated learning through targeted interventions: Experiment
Margus Pedaste, Leo Aleksander Siiman, Natalia Edisherashvili, Äli Leijen, Katrin Saks, Külli Kallas

Abstract: COVID-19 pandemic has taught the education sector that making distance learning available is not the same as making it work. In adult education, where remote learning is increasingly gaining relevance, and becoming widely open and self-paced in nature, one of the key competencies needed on learners' part to succeed is the ability to self-regulate cognitive, metacognitive, motivational, and emotional aspects of their learning.

In our joint research and development project of a university and private company developing a platform for online learning, we developed a set of reusable tools to collect evidence and support self-regulated learning (SRL) in online settings. In this presentation, we introduce the learning environments, developed tools and findings from experiments with the environment.

4. Fostering multiple document comprehension: Motivational influences on the use of self-study material
Theresa Zink, C. Hahnel, U. Kroehne, T. Deribo, N. Mahlow, C. Artelt, F. Goldhammer, J. Naumann, Cornelia Schoor

Abstract: Multiple document comprehension (MDC) is an essential skill for university students, making it beneficial to improve it. We assume that the value assigned to MDC is important to foster MDC since it can be a predictor for behavioral choices, such as working with self-study material. Using self-study material is typical for university learning, but it requires the motivation to improve a skill such as MDC. We define motivation to improve MDC in terms of expectancy, value, and cost to improve MDC. We expect that it is a driving force for working with self-study material on MDC, while it might also depend on the perceived value of MDC. Therefore, this study examined whether the perceived value of MDC predicts the motivation to improve MDC, which is also expected to predict the use of self-study material. A total of 325 students of different majors participated in an MDC assessment and received the opportunity to train their MDC skill with self-study material. Self-study material use was measured by total time and the number of page transitions. The results revealed that the perceived value of MDC partially predicts motivation to improve MDC. Mediation analysis showed no significant effect of the motivation to improve MDC on the relation between the perceived value of MDC and the use of the self-study material. However, the log data indicated that the self-study material had not been processed as intensively as expected.

5. A bibliometric analysis of self-regulated learning from 1986-2021
Toshiyuki Hasumi

Abstract: The past decades saw an abundance of research interest in self-regulated learning (SRL). Where studies have revealed its significant impact on students' achievement, the recent school closures and shift to online learning in light of the pandemic further elevates the importance of SRL. The need for scholars to become cognizant of this concept, whether from a research or pedagogical perspective, serve as the rationale for the current study. Using bibliometric methods to analyze the state-of-the-art in the field of SRL research, this preliminary study examined 2,055 articles and reviews from the Web of Science database during the period between 1986 and 2021. Performance analysis revealed the scientific production during this period and the most relevant literatures in the field. Scientific mapping using bibliographic coupling revealed nine main research themes, including: (1) Metacognition; (2) Cognitive processes; (3) Motivation; (4) Self-efficacy; (5) Emotions; (6) Assessment; (7) Monitoring; (8) Online learning; and (9) Training. The results of this study serve as a comprehensive overview of SRL research by mapping the academic landscape and identifying the most important literatures, both of which provide an introductory reference on which future research endeavors can be guided.

PAPER 4: Measuring motivation, emotion, and SRL — 216 I Online

Chair: Iva Stuchlikova

1. Measuring achievement motivation by a two facet design – pictures, statements or both
Iva Stuchlikova

Abstract: Prior approaches to measuring motive constructs have applied both pictured situations and verbal statements/items as construct indicators. However, when internal consistency, reliability, and structural relations have been estimated, pictures and verbal statements have not been simultaneously and distinctly included in the estimation procedure. Inserting both pictured situations and verbal statements to represent both construct-relevant variance and error of measurement, a less biased estimation of motive constructs could be expected.

The present study applied the short version of the multi-motive grid (MMG-S) created by Sokolowski, Schmalt, Langens, and Puca (2000) to assess the multi-faceted structure of this inventory. The MMG-S was administered to 660 students aged 14 and 15 years to assess achievement motives. The findings replicated the three-factor model of Schmalt (2005), consisting of two Fear of failure factors and one Hope of success factor. The present study, however, obtained support for a four-factor model consisting of Schmalt's three factors and one additional new Hope of success factor. The four-factor model that was obtained supported the distinction, made by Schmalt, between passive and active factors, which, in the present model, supported both passive and active factors for both Hope of success and Fear of failure motives.

2. Psychometric properties of the questionnaire for medical students learning in the practice setting
Evelyn Steinberg, Stephan Marsch, Takuya Yanagida, Ulrike Auer, Lukas Schwarz, Petra Bührle, Christopher Pfeiffer, Laura Dörrenbächer-Ulrich

Abstract: Medical students often struggle in transitioning from learning in the academic setting to learning in the practical clinical setting. Instruments for analyzing learning in the transition phase, including not only cognitive and motivational aspects but also emotional and contextual aspects, are needed. Our aim was to develop a self-report-questionnaire including a single-item-form, which can be used for investigating undergraduates' learning in the practical clinical setting and for intensive longitudinal studies. In developing the questionnaire, we followed Gehlbach and Brinkworth's (2011) seven steps. In this presentation, we focus on the final step of pilot-testing where we analysed unidimensionality, reliability, relation to nomological network and information reproduction.

In pilot-testing the questionnaire included sub-scales for cognition/metacognition, motivation, emotion, and context as well as sub-scales for monitoring and controlling of the mentioned areas. Statistical analyses were based on data from n = 214 students from two veterinary medical universities.

Analysis suggested that all sub-scales were unidimensional and possessed satisfactory level of reliability (ω=.66-.92), correlations were low to medium with established sub-scales for the academic setting and high with sub-scales for the practical clinical setting. Single items possessed satisfactory level of reliability (λ2=.63-.83), information reproduction ranged from r=.40- to r=.72, and the correlational pattern with established sub-scales were similar to the sub-scale-form.

The distinctive features of the short form are its comprehensive view on learning and its satisfactory psychometric quality despite the brevity of sub-scales. The single-item-form lacks in information reproduction but can be appropriate for longitudinal studies with a more global perspective.

3. Validating a task-specific self-regulated learning questionnaire for primary education
Rutmer Ebbes, Helma Koomen, Jaap Schuitema, Brenda Jansen, Marjolein Zee

Abstract: Possibilities for assessing children's self-regulated learning (SRL) in primary schools are limited and prone to several methodological issues. The current paper describes the development and validation of the Cognition and Emotion regulation (CEMOR) questionnaire, a task-specific questionnaire for upper primary school students that measures SRL during a math task. Using a multistep procedure, 22 items were developed, divided over five scales (Planning, Monitoring, Cognitive Control, Emotion/Motivation Control, and Reflecting). Children from upper primary school (N = 547) completed the CEMOR. CFAs indicated that the five proposed scales have an adequate to good model fit and acceptable to good composite reliability. To further test validity, the five SRL scales were correlated with math ability, experienced emotions, and level of motivation during the math task. The majority of correlations was significant and in the expected direction. The CEMOR questionnaire shows promise as a new SRL instrument for primary education.

4. Development and validation of a short multidimensional scale measuring emotional competence
Sebastian Gerbeth, Elena Stamouli, Regina Mulder

Abstract: When seeking to understand interactions with other people from an emotional perspective previous research has documented that the competence to deal with emotional situations is complex and multidimensional. Individuals often react differently when emotions are experienced. In this context, emotional competence comprises a set of competences, including the perception of one's own or others' emotions and the expression, the regulation and handling of emotions. The aim of our project was to develop and validate a short version of the Multidimensional Emotional Competence Questionnaire (MECQ). Originally, the MECQ consisted of 109 items, which assess emotional competence based on different dimensions (12 subscales). Due to the length of the questionnaire, its usage in combination with other measurement instruments is time consuming which hinders application and valid data acquirement. Considering content and statistical criteria, we reduced the original questionnaire to a 32-items short version (Authors, 2021). To investigate validity and retest-reliability, we conducted two additional studies with a total of 541 students. Using exploratory structural equation modelling (ESEM), construct validity was established. Furthermore, measurement invariance analysis was applied for convergent validity comparing the long with the short version. For convergent, concurrent and discriminant validity we compared the MECQ-s with several measurement instruments including self-efficacy and the Big Five. The benefit of the MECQ-s is its multidimensional and short conception compared to other existing self-report tools measuring emotional competence. Researchers and practitioners can use the new instrument to measure, map and evaluate emotional competence of students and employees.

5. Development and validation of a Clothing Motivation Scale in the context of China
Yingyan Li

Abstract: Recent years have witnessed a boom of fashion bloggers sharing information about clothing and cosmetics on diverse social media platforms. Constant exposure to such digital information impacts heavily on Chinese youths' aesthetics, fashion-related motivation, and behaviors. Compared to a substantial body of research on youths' academic motivation, studies investigating youths' motivation for fashion-related issues are scarce, particularly in the context of the digitalized world. To address this issue, the present study sought to develop a valid and reliable scale, measuring Chinese youths' motivation for clothing collocation and exploring its relationship with the exposure to fashion bloggings and the subsequent clothing behaviors. Based on Deci and Ryan's self-determination theory, an 8-item multidimensional scale, including the subscales of amotivation, controlled, and autonomous motivation, was validated using survey data collected from 1997 Chinese youths (Mage = 18.68, SD = 1.99). In general, preliminary evidence was found to prove the validity and reliability of the scale. Results show that youths' OCT skills as partial mediators between clothing motivation and intentions, and amotivation is negatively related to all OCT types, whereas autonomous and controlled motivation is positively associated with OCT to different levels of clothing intentions. This study is a starting point for further research on youths' cognitive functioning in digitalized age.

PAPER 5: Motivational, emotional, and metacognitive perspectives on reading   **E11 I Online**

Chair: Enrica Donolato

1. Emotional aspects and reading motivation in children with dyslexia: A dimensional framework
Enrica Donolato, Enrico Toffalini, Cesare Cornoldi, Irene C. Mammarella

Abstract: This study examined whether emotional aspects and reading motivation in children with dyslexia could be inferred from the characteristics of the typically-developing population or whether other factors related to children's diagnosis, family and schooling may introduce violations in the predictions based on the typical population. We tested this hypothesis by implementing two studies and taking a dimensional framework in which dyslexia represents the lower end of the distribution of reading ability.

In Study 1a, typically-developing children attending school in grades 4 to 8 (N = 191) were examined on the associations between their reading ability, anxiety, self-concept, reading motivation and reading strategy use. In Study 1b, on children with dyslexia (N = 34), the same variables were analyzed and predicted using a simulation procedure that considered typically-developing population parameters.

Study 1a revealed negative association between reading decoding and physiological anxiety, and a positive association between reading decoding and reading enjoyment, interest in reading, reading competitiveness, and reading strategy use.

Study 1b showed that dyslexic children largely mirrored the predicted patterns in the variables of interest, with the notable exception of reading self-concept. These findings seemed to suggest that children's diagnosis of dyslexia had made them more acutely aware of their reading difficulties.

Taken together, our findings show that being diagnosed with dyslexia can affect how children judge their reading ability, so they should not only receive support for their reading impairment, but also be helped to preserve a positive image of themselves as readers.

2. Determinants of latent profiles of cognitive and metacognitive reading strategies in young adults
Monica Onofrei, Ilka Wolter

Abstract: Cognitive and metacognitive reading strategies as aspects of more general self-regulation strategies are consciously used strategies to monitor, control, and regulate ones' own reading process. Previous studies have examined self-regulation strategies by person-centered analysis approaches and confirmed four different profiles with either small or high extent of strategy use as well as inconsistent profiles with either relatively higher cognitive or metacognitive strategy use for students at school or university (e.g., Artelt et al. 2001). This study uses the person-centered approach to analyze latent profiles of reading strategies of young adults and how potential profiles of strategy use are correlated to reading competence, reading motivation, and frequency of reading. Based on a sample of 1,218 participants of a pilot study of the German National Educational Panel Study (NEPS; Blossfeld & Roßbach, 2019), a latent profile analysis has shown a three-profile-solution with either high, medium, or low average expressions of cognitive and metacognitive reading strategies. Contrary to our hypothesis we therefore could not replicate the patterns of latent profiles from previous studies. The subsequent logistic regression, however, has shown that persons with high reading motivation were more likely in the profile of high or low reading strategy use. As expected, women were more likely to be found in the profile of high reading strategies. The discussion will focus on cognitive and metacognitive strategies of adults with more heterogeneous conditions of using reading strategies in their daily life.

3. Sources of reading self-efficacy: Differential patterns of experiences among primary school children
Pilvi Peura, Mikko Aro, Tuija Aro, Tuire Koponen, Helena Viholainen

Abstract: Beliefs about our capabilities, i.e., efficacy beliefs, are important predictors of our learning and achievement. These beliefs are theorized to be formed by interpreting information from four sources: mastery experiences, verbal persuasions, vicarious experiences, and physiological and emotional states (Bandura, 1997). The aim of this study was to extend previous work by examining heterogeneity in these source experiences in reading and among primary school children (N = 1327) with latent profile analyses. It was further studied whether children's grade level, gender, reading skills and reading self-efficacy relate to the varying source profiles. Five profiles indicating varying combinations of source experiences were established. Half of the children belonged to a profile with high positive experiences on all four sources and children in this profile had higher reading skills and higher reading self-efficacy than children in the other profiles. A small proportion of children experienced little sources of self-efficacy and these were children with lowest reading skills. Boys and older children were more likely to be in a profile with low experiences of social sources of self-efficacy support (e.g. positive feedback, vicarious models). Offering children possibilities to experience all four sources of self-efficacy in reading may be especially beneficial to their reading skills and their self-efficacy in reading. Practitioners should be sensitive to the variations in how children experience learning situations and interpret messages conveyed to them. Some children may need more targeted support, such as social sources of self-efficacy support or targeted efforts to reduce high negative arousal in reading situations.

4. Desire to read
Lisa van der Sande, Marjolein Dobber, Roel van Steensel

Abstract: Purpose. In the course of education, many students' reading motivation declines. We hypothesize that the Zin in Lezen approach (ZiL; in English: Desire to Read) may prevent beginning readers from losing reading motivation. In ZiL, reading and writing activities are integrated in meaningful literacy practices that children come across in the real world. ZiL integrates reading motivation, text comprehension, decoding skills, and vocabulary. To learn how to design and implement meaningful reading and writing activities, teachers follow a professionalization trajectory. In the current study, we investigate the effects of ZiL on reading motivation and reading development by comparing schools in which teachers follow a ZiL professionalization trajectory with schools in which teachers follow a professionalization trajectory focused on working with programmatic instruction (PI).

Method. 362 kindergarten, Grade 1, and Grade 2 students from 11 schools are participating (seven ZiL schools and four PI schools). Both professionalization trajectories consist of four meetings and in-between coaching on the job. At pre- and posttest, we measure students' reading motivation, text comprehension, decoding skills, and vocabulary.

Results. Data analysis pipelines are currently being developed with the posttest scheduled for March 2022. It is expected that teachers will implement more meaningful reading and writing activities after following the ZiL professionalization trajectory. We hypothesize that this will lead to an increase in students' reading motivation.

Conclusion. The study will provide insights into the early development of reading motivation and reading skills and has the potential to offer guidelines for fostering reading motivation in the classroom.

5. Color design of Chinese poetry animation makes up for the low empathy learners' appreciation
Yi Wang, Zhijin Zhou, Fred Paas

Abstract: Recent literatures have suggested that benefits can be derived from incorporating emotional design elements such as color, anthropomorphism into multimedia instructions. However, most relevant studies focus on natural sciences, leaving the humanities unexplored. The present study was implemented to investigate whether the color design would foster the aesthetic appreciation and learning of Chinese classic poetry, and the role of learners' empathy trait in this process. Students from a junior school (N=159) were assigned to one of four conditions in a 2 (Color Design: Colorful vs. Neutral Gray-Scaled) x 2 (Learners' Trait Empathy: High vs. Low) between-subject design according to their level of empathy. Results showed that learners' scores on retention in colorful design condition were higher than those of the gray-scaled condition. And learners with high empathy attained higher scores on retention, transfer and higher aesthetic appreciation than the ones with low empathy. Moreover, a significant interaction of the two factors on aesthetic appreciation was found, that is, learners with high empathy had higher aesthetic appreciation than the low empathy group when the learning material was achromatically designed, whereas the low empathy learners' aesthetic appreciation was comparable to learners with high empathy in the colorful condition. The results indicated that color design can foster learners' aesthetic appreciation, and individual differences should be taken into consideration in instructional design in the multimedia learning of poetry.

Wednesday 18:15–19:15	Keynote session 2	E11 | online with stream

Chair:	Fani Lauermann

KEYNOTE 2 | **Gale Sinatra, University of Southern California, USA**

There is no denying it: Motivation and emotion play key roles in public understanding of science

Abstract: Many individuals are perplexed by family members, friends, and co-workers who avoid vaccinations or believe climate change is a hoax. Science doubt, resistance, and denial are in the news daily, whether reporting on the fear of adverse effects from vaccines or erroneous beliefs that climate change is naturally caused. What's commonly misunderstood is that it is "other people" who have this problem, when in fact we are all susceptible to misinformation and resisting aspects of science. Democracies depend on educated citizens who can make informed decisions about scientific issues. The COVID-19 pandemic brought these issues into sharp relief. In Science Denial: Why It Happens and What to Do About It, Sinatra and co-author Barbara Hofer examine the motivational and emotional factors contributing to science doubt, resistance, and denial. This presentation will focus on the themes from the book including the role of psychological constructs such as cognitive biases, emotions, identity, epistemic cognition, and motivated reasoning in public (mis)understanding of science. Sinatra will overview significant motivational and emotional challenges to public understanding of science and provide research-based solutions to each challenge for individuals, educators, policy makers, science communicators.

Wednesday 20:00	Welcome Event – Guided City Tour

Program Overview Thursday, 25.08.2022

THURSDAY, 25 AUGUST 2022								
09:00	**Poster 1 |** E04 Motivation regulation – Feedback – Beliefs C: J Maike Trautner	**Poster 2 |** 105 Motivation – Emotion – Metacognition – Technology-enhanced self-regulated learning C: Steffen Moser	**Poster 3 |** 213 Teacher motivation – TPACK C: Linda Schürmann	**Poster 4 |** 214 Interest – Student engagement – regulation of learning and motivation C: Corwin Senko	**Poster 5 |** 216 Conditions and effects of interventions on student motivation and/or self-regulation C: Demian Scherer			
10:30	Coffee Break							
11:00	**SYMP 1 | E04** Individual and social resources relate to exhaustion and stress among school and university students C: Frances Hoferichter D: Diana Raufelder	**SYMP 2 | E08** Secondary school students' academic emotions C: Thea Peetsma, Tina Hascher D: Eleftheria Gonida	**SYMP 3 | 114** Social behavior in childhood: A self-determination theory perspective C: Sarah Steffgen D: Maarten Vansteenkiste	**Paper 1 |**213 Self-beliefs, instructional design and motivation C: Jelena Radisic	**Paper 2 |**214 Group regulation and affect in collaborative learning C: Hanna Jarvenoja	**Paper 3 |**105 Achievement motivation: Students' expectancies, values, academic success C: Tim Urdan	**Paper 4 |**E11 Academic emotions: antecedents, individual differences, and consequences C: Matthias Huber	**Paper 5 |**216 Motivation, beliefs, and teacher-student-interactions C: Inga ten Hagen
12:30	Lunch Break – Tusculum							
13:30	Keynote 3 I E11 Thomas Goschke – Technische Universität Dresden Volition and self-control: From executive functions to meta-control							
14:40	**SYMP 1 | E04** Advancing research on achievement emotions in primary and lower secondary school C: Daniela Raccanello D: Reinhard Pekrun	**SYMP 2 | E08** Smart students: How about their motivation for school? C: Lisette Hornstra D: Thea Peetsma	**SYMP 3 | 114** Integrating approaches to self-regulation in education: antecedents, processes and outcomes C: Franz Wortha, Peter Gerjets D: Philip Winne	**Paper 1 |**214 Teachers' motivation, goals, and well-being C: Xiangyuan Feng	**Paper 2 |**213 Theoretical developments and methodological issues in motivation research C: Luise von Keyserlingk	**Paper 3 |**216 Instructional design, social interaction, and motivation C: Kathryn Bartimote	**Paper 4 |**E11 Assessing and supporting student´s self-regulation C: Panayiota Metallidou	**Paper 5 |**105 Metacognition, affect, and decision making C: Sara Becker
16:10	Coffee Break							
16:30	Mid – Career – Keynotes I E11 Barbara Flunger – Utrecht University, The Netherlands Promoting student motivation: But how and for whom Heta Tuominen – University of Helsinki, Finland							
18:00	Balancing Doing Well with Feeling Well: Dynamics between Student Motivation and Well-being							
18:15	EARLI SIG-8 I E11 SIG8 – Business-Meeting							
20:00	Conference Dinner – French Pavilion – Alte Meister							

Program Thursday, 25.8.2022

Thursday 09:00–10:30	Session Block IV - Poster

POSTER 1: Motivation regulation – Feedback – Beliefs	E04 I Online

Chair: Maike Trautner

1. Effects of social and individual academic self-concepts on school engagement in adolescence
Diana Raufelder, Olga Steinberg, Rebecca Lazarides

Abstract: High levels of school engagement promote academic motivation and achievement and contribute to students' well-being. However, particularly after the transition to secondary school, the school engagement begins to decline. Both students' individual academic self–concept (i.e., a personal factor) and students' social academic self–concept (i.e., a social factor) may act as facilitators of behavioral and emotional school engagement. The current study utilizes latent change modeling to discover the role of individual and social academic self-concepts in the development of behavioral and emotional school engagement over 1.5 years of secondary school. The sample includes 1088 German adolescents (8thgrade, aged 12–15 (Mage = 13.70, SD = 0.53; 53.9% girls) at Time 1 and 845 participants (Mage = 14.86; SD = .57; 55% girls) from the initial sample at Time 2 (1.5 years later). The results stand in line with the existing research, evidencing the decline in emotional as well as behavioral school engagement on the span of 1.5 years. Moreover, they suggest that social, but not individual academic self-concept is associated with change in school engagement over time. Theoretical considerations and practical application of the findings will be discussed.

2. Biophysiological stress markers relate differently to grit and school engagement among adolescents
Diana Raufelder, Frances Hoferichter

Abstract: This study examines the relationship between adolescents' biophysiological stress (i.e., cortisol, alpha-amylase, oxidative stress) and the development of grit and school engagement over one school year. The major aim is to identify how objective stress impacts grit and three dimensions of school engagement. Based on the conservation of resources theory (COR), the study considers low- and high-track students and students' genders.The sample consists of secondary school students (N = 83; MAge = 13.71; SD = 0.67; 48% girls) from Germany. The students participated in a questionnaire and biophysiological study in the first semester (t1) of the school year and completed the same questionnaire at the end of the school year in the second semester (t2). A multigroup cross-lagged panel model was calculated to identify differences among lower- and higher-track students.Lower-track school students who exhibited high cortisol levels reported lower cognitive and emotional school engagement over the school year. In turn, higher-track school students with high oxidative stress levels reported lower grit and behavioral school engagement at t2.Examining the relationship between biophysiological stress markers and grit and school engagement of lower- and higher-track school students indicates that the educational context and its specific subculture shapes physiological stress reactions, which are related differently to grit and engagement dimensions.

3. Motivational idiosyncrasy and metacognitive feedback through design in the study of history
Helen Margaritou-Andrianessi

Abstract: Effective idiosyncratic learning is promoted by a fundamental recognition of the subject matter itself towards which the act of learning is directed, an apprehension of the "inner origin" of a framework of possibilities of reconstruction of the meaning of the events through action learning (Marquardt, 2018). A selection of domains of "idiosyncratic involvement" was analysed as a conceptualized learning process based in a dynamic mix of intellectual tools: the growth of self-regulation is a fight for recognition of the criteria of identification, explication and meta-analysis of interventions (Novak, 2010). Following specific definitions of idiosyncratic involvement in relation with "elaborated feedback" factors (Hattie & Timperley, 2007 ; Narciss, 2008), my study aimed to answer the main question: how can we determine a prior-learning hypothesis as possibilities and strategies of effective "idiosyncratic learning"? Hence we design performative modes (time-mixing and reasons-mixed with idiosyncrasies, motivations (Pintrich, 2003), experiences and emotions based on the same intellectual tools

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and different types of interventions) as categories metacognitive diversity strategy in history learning process. We expose methodically arguments about students' learning at different rates (36 students). There is a focus on performance consulting rather than an order taking-emphasis on idiosyncrasy-centered design in order to elaborate a framework of effective idiosyncratic experience-feedback.

4. Achievement and motivation: The role of receptivity to feedback and perceived feedback usefulness
Jan Luca Bahr, Thorben Jansen, Lars Höft, Nils-Jonathan Schaller

Abstract: Written argumentations are rarely provided with feedback that is conducive to learning. Even though feedback has been shown to promote learning on average, the effects are heterogeneous and in some cases even hinder learning. Thus, it is unclear what drives the effectiveness of feedback. Student characteristics, both, situational or of relatively stable nature, may help in explaining. Therefore, in this study we investigated links between students' receptivity to feedback and the perception of the usefulness of the feedback on students' motivation and achievement when revising written argumentations with feedback in an online learning environment. The sample survey is scheduled to start in March 2022. The sample will contain 1000 students (age 16 to 21) from secondary schools in Germany. Insights into the determinants of effective automated feedback may help researchers and educators alike in developing learning tools and interventions fostering argumentation skills and motivation to face global challenges.

5. The effects of internal feedback and self-compassion on the perception of negative feedback
Helena Laudel, Susanne Narciss

Abstract: Negative feedback, that is, information indicating a gap between the standards strived for and the current level of achievement, can be perceived as self-threatening and thereby hinder learning (Eskreis-Winkler & Fishbach, 2019). Self-compassion could support learners to overcome this threat of negative feedback: it involves maintaining a non-judgmental, understanding and caring attitude towards oneself in situations of failure or stress (Neff, 2003). We hypothesize that self-compassion supports adaptive feedback perception, and that this effect could be enhanced by combining it with the generation of internal feedback. Hence, this paper examines how brief interventions that elicit self-compassion or internal feedback, or a combination of both, affect the perception of negative feedback. A target sample size of N = 250 will be randomly assigned to these intervention conditions as well as to a control condition. Participants will have to respond to a set of eight difficult reasoning tasks and will receive negative feedback. The intervention is administered in advance to the external feedback. Feedback perception is measured with the feedback perception questionnaire (Author et al., 2021). Data collection will be finished in March 2022. We expect the interventions to support more conducive feedback perception compared to the control group, with the combined intervention to be most beneficial. Findings will be discussed with regard to their implications for further research as well as their insights on the practical relevance of self-compassion and internal feedback for supporting adaptive coping with negative feedback.

6. Elementary school students' mindsets, effort beliefs and math task difficulty preference
Ita Puusepp, Tanja Linnavalli, Elina Kuusisto, Sonja Laine, Kirsi Tirri

Abstract: The aim of this study was to explore how Finnish elementary school students' general intelligence mindset and math ability mindset as well as effort beliefs are associated with their learning-oriented behavior in the domain of mathematics. For this, data on students' (N = 140) mindsets, effort beliefs, and their preference for a challenging math task over an easy one were collected on three consecutive years from grade three to grade five. According to our results, preferring a challenging version of the math task was associated with higher growth mindset regarding general intelligence in grades four and five, but not in grade three. These effects of general intelligence mindset were overridden by math ability mindset, which had a unique effect on task preference at all grade levels, when general intelligence mindset was accounted for. Moreover, when exploring the relative contributions of mindsets and effort beliefs, we found effort beliefs to override the contributions of mindsets in grades four and five, while in grade three both effort beliefs and math ability mindset had a unique effect on task preference. These results refer to the potential benefits of explicit messages on the malleability of domain-specific abilities and the particular importance of discussions on the positive role of effort in elementary school.

POSTER 1: Motivation regulation – Feedback – Beliefs   *continued*

7. Conceptualising and reviewing instruments measuring mathematics motivation in primary education
Maarja Sõrmus, Äli Leijen. Jelena Radisic, Krista Uibu

Abstract: Although motivation is an increasingly relevant and researched topic, systematic overviews across different contexts, such as mathematics learning in primary education, are more scarce to find. In the context of learning, the existence of motivation is crucial to achieving long-term interest and focus, especially in mathematics, where new knowledge builds on existing ones. Research on the primary education of mathematics has shown that although students' interest in mathematics is high at entering school, their motivation starts to drop during the first grades and remains decreasing. The presentation covers the results of the systematic literature review conducted to identify different theoretical foundations in measuring motivation to learn mathematics and understanding how measures grounded in varied theoretical conceptualization may be used in the context of primary education. Based on exclusion criteria, three screenings of articles narrowed 766 articles into 39 articles that were included for further analysis. Current investigation attempts to provide a better overview of the existing measures, their theoretical background, and the extent to which they are suitable for studying primary school students.The systematic literature review results indicate that primary school students have been studied but most often viewed through measures capturing only one to two motivational components (e.g., intrinsic motivation), thus allowing for a much-reduced lense in examining students' mathematics motivation.

8. How are executive functions related to motivational self-regulation?
Maike Trautner, Malte Schwinger

Abstract: Self-regulation refers to a wide array of intrapersonal processes which aim at adapting physical and psychological states to a desired state (Nigg, 2017). Executive functions, "deliberate, top-down neurocognitive processes involved in the conscious, goal-directed control of thought, action, and emotion" (Zelazo & Carlson, 2012, p. 354) refer to basal forms of self-regulation. They play an important role in learning, achievement (e.g., Valcan et al., 2020) and more complex forms of self-regulation, such as self-regulated learning (e.g., Rutherford al., 2018). However, it has not yet been examined which role executive functions play for learners' self-regulation specifically of their own motivation to study as an important aspect of self-regulated learning, precondition for motivated learning and thus academic success (Schwinger & Stiensmeier-Pelster, 2012). The present research therefore seeks to investigate whether and how executive functions are related to the use and effectivity of motivation regulation in a sample of N = 130 university students. Students report their motivational regulation strategy use, several outcomes of its effectivity, and complete tests on four areas of executive functioning (working memory, inhibition, cognitive flexibility, and "hot" executive functioning). Preliminary results (n = 48) revealed no associations between basal executive functions and the use of complex self-regulatory strategies to enhance motivation for studying. Understanding how executive functions affect the regulation of one's motivation to study may provide important insights into causes of motivational regulation success and failure and possibilities for interventions, such as including trainings of executive functions into motivation regulation trainings or tailoring interventions learners' needs.

POSTER 2: Motivation – Emotion – Metacognition – Technology-enhanced SRL   **105 I Online**

Chair: Steffen Moser

1. A web application on earthquake-related emotional preparedness: The role of achievement emotions
Giada Vicentini, Daniela Raccanello, Elena Florit, Veronica Barnaba, Emmanuela Rocca, Erminia Dal Corso, Roberto Burro

Abstract: Natural disasters, such as earthquakes, could have traumatic consequences on children's psychological functioning. Few studies explored the efficacy of training aimed at improving children's emotional preparedness and resilience, useful to prevent the negative impact of future disasters. Thus, the "Emotional Prevention and Earthquakes in primary school" project had the aim to promote earthquake-related emotional competence, also using a web application developed ad-hoc, i.e., HEMOT® (Helmet for EMOTions). In this work, we explored the relations between achievement emotions (i.e., pride, relaxation, sadness, anxiety) and the digital performance obtained in the web application, also considering class and gender differences. We considered the control-value

theory as the theoretical framework. The participants were 64 second and fourth-graders from Northern Italy. The web application included nine levels focused on earthquakes, emotions, and emotion regulation strategies. We measured participants' digital self-concept, digital performance (operazionalized as digital text comprehension), application-related achievement emotions, and text comprehension. We ran linear and generalized linear models, and path analyses to analyse the data. First, we found that pride was higher for second compared to fourth-graders and that digital performance was higher for fourth compared to second-graders. Second, digital self-concept related positively with pride and relaxation; pride, relaxation, sadness, and text comprehension were linked to digital performance. On the whole, the obtained results confirmed the assumptions of the control-value theory within a digital context. This study represents a preliminary step to understand which factors are associated with children's digital learning about earthquake-related emotional preparedness.

2. Investigating predictors of students' certainty of assumptions about socioscientific issues
Jenny Dauer, Caitlin Kirby, Amanda Sorensen, Cody Smith

Abstract: Students who are stakeholders in an issue may be more likely to engage in motivated reasoning or have emotional and psychological barriers to engagement in learning activities, especially objective examination of evidence. In a post-secondary science literacy course, we examined students' certainty of assumptions about water conservation solutions impact on water conservation and farmer economics. We determined that stakeholder identity, actively open-minded thinking and metacognitive awareness were all statistically significant positive predictors of assumption certainty. Future work will explore how certainty of assumptions may play a role in students' ability to critically examine evidence and if learning tools based on self-regulated learning support students' ability to engage open-mindedly with evidence.

3. The interaction of conscientiousness and learning strategies during learning with MetaTutor
Franz Wortha, Elizabeth Cloude, Roger Azevedo

Abstract: The effective use of cognitive and metacognitive learning strategies is important for self- regulated learning (SRL) and enables students to achieve desired learning outcomes. Theories suggest that the deployment and use of such strategies also depends on personal dispositions. Furthermore, large-scale research has shown that personal disposition (i.e., conscientiousness) are key predictors of academic outcomes. However, research investigating conscientiousness and its relation to SRL processes is scarce and often limited to the use of self-report data to capture SRL processes, which poses major challenges in literature. We addressed this issue by investigating how conscientiousness relates to the quantity and quality of cognitive and metacognitive strategy use during learning with MetaTutor, an intelligent tutoring system. Regression analyses showed that can significantly predict the quantity and marginally predict the quality of metacognitive processes used during learning with MetaTutor. Moreover, the interaction of conscientiousness, cognitive and metacognitive strategy use predicted learning outcomes. As suggested by pervious large-scale research, these results showed that, personal dispositions (i.e., conscientiousness) are related to cognitive and metacognitive strategy use which in turn effects learning outcomes. Implications for the integration of large-scale personality research and process-oriented research of SRL are discussed.

4. Navigating rough waters? Understanding emotion regulation in online distance collaborative learning
Sabrine Hassane, Jorrick Beckers, Karel Kreijns

Abstract: Collaborative learning can be difficult for students due to the social nature of the learning context, which presents challenges. Emerging socio-emotional challenges could obstruct achieving psychological safety and productive collaboration, thereby pointing to their potential detrimental role. Online distance students differ in various characteristics from their counterparts in traditional higher education and may experience less social and affective reactions due to the computer mediated collaboration. In the current study, we combine a survey and focus groups to identify and investigate the major socio-emotional challenges, their associated emotions, and emotional regulation on both individual and group level. Moreover, we aim to gain more insight into the students' perceptions, views, and attitudes towards online distance collaborative learning. The results will allow us to design appropriate tools and guidance to support emotion regulation during distance online collaboration.

POSTER 2: Motivation – Emotion – Metacognition – Technology–enhanced SRL   *continued*

5. Studying student agency in digital interactions: an empirical approach
Maria Hvid Stenalt

Abstract: This paper presents an analysis of the potential of adopting an approach to student agency in digital contexts of higher education that pays attention to relational agency and the field of posthumanism. Specifically, the paper introduces the adapted gestalt framework, an empirical approach that draws on individual agency, relational agency, and posthumanism theories. With this outset, we provide a study of online peer feedback and examples from a Danish Higher Education to illustrate how the suggested approach may offer valuable insights into the student experience of digital education. Based on this, we highlight the benefits of this approach. Finally, the paper ends with a short reflection on the impacts of a student agency perspective on digital education.

6. Emotional reactions and metacognitive engagement in a blended learning program through CBM
Ana Remesal, Mireya Álvarez-Brinquis, Maria Carbo, Maryam Elkhayat, José Daniel Fierro, Merce Garcia-Mila, Tània Gri, Maria Josep Jarque, Gemma Pérez-Clemente, Esther Pérez-Sedano, Fàtima Vega

Abstract: This paper presents results on the implementation of a prior–self-evaluation system at Masters Degree. A complete cohort of master students (ca.500) participated in this study, as enrolled in a compulsory course of Developmental and Educational psychology at the Masters Degree for Secondary School Teacher Training. Students responded a specific quiz at the beginning of each of three topics which was designed following a specific CBM-strategy as an instrument for self-assessment with formative assessment purposes. The students welcomed the support system, as a scaffold for self-regulated learning. Two kinds of results are presented here: students' reported emotional reactions to the studying support system and metacognitive reflections as the course developed.

7. Development of learning strategies in primary school children: A latent change score modelling study
Ji Zhou, Yehui Wang, Tao Xin

Abstract: Metacognitive self-regulation involves the choice of cognitive strategies and relies on knowledge about these strategies. The development of these strategies were not isolated. The study explored the developmental changes of memorization, elaboration and control strategies and the change-on-change effects using latent change score models. Participants were 2789 students in primary schools, who were asked about their strategy use when they were in the fourth and sixth grades. Results showed that in average there was increasing use of memorization, elaboration and control strategies of primary school students from fourth to sixth grade, yet individual differences were observed; the change of control strategy was associated positively with changes of using cognitive strategies, whereas the change of memorization strategy was negatively associated with the change of elaboration strategy. The study adopted a new perspective of analysing the developmental changes of learning strategies and has implications for understanding the dynamic of strategy development as well as for training self-regulated learning.

8. The role of learning tasks to foster regulated learning processes in online learning communities
Steffen Moser, Maria Bannert

Abstract. The acquisition of media pedagogical competences requires modified learning processes in the field of education and training as well as in the context of social learning. It should be noted that institutions in the field of higher and further education have to provide social learning platforms and create frameworks for evidence-based learning environments. The present study explores the effect of different kinds of instructional input in a technology-mediated social learning environment to change adults' regulated learning processes. In order to do so, nine lecturers interacted with each other in a social learning platform and were guided with instructional support to initiate social interaction. The results of the explorative study suggest that fostering interaction and reaching a high level of participants' activity is not sufficient to initiate regulated learning activities, which are important to acquire complex skills and professional competencies. Moreover, to design a social learning platform, it is necessary to consider participants' personal and contextual factors as well as instructional guidance of participants' social exchange. Extending upon these findings, an experimental field study will be conducted to investigate the relationship of instructional support via authentic learning tasks, regulated learning activities and the acquisition of media-pedagogical competencies.

POSTER 3: Teacher motivation – TPACK   213 | Online

Chair: Linda Schürmann

1. Learning about motivation theory improves preservice teachers' autonomy–supportive motivating style
Linda Schürmann, Claudia Quaiser-Pohl

Abstract: Teachers' motivating style influences student motivation and, therefore, learning and achievement. Autonomy support can be learned, but integrating trainings into the university curriculum might be difficult. Based on self-determination theory, we aimed at investigating whether visiting a regular seminar dealing with motivation theory might lead to more autonomous motivating styles in preservice teachers to better prepare them for their preparatory service. N=89 preservice teachers (age M=22.93, SD=2.24, n=44 women) participated in the pre-post quasi-experimental study. The experimental group consisted of n=25 preservice teachers who participated in a motivation theory seminar. Participants indicated their motivating style before and after the seminar. We also gathered data on their motivation during the respective seminar and their prior and post knowledge as a manipulation check. Univariate analyses of variances revealed that participants in the experimental group did not differ in prior knowledge or motivation during the seminar from those in the control group, except for external motivation, which we included as a covariate. Repeated-measurement analyses of covariance displayed that only the experimental group developed a more autonomy-supportive and less controlling motivating style. Especially efficacy beliefs were an important influence of motivating style. As long as preservice teachers believe a method to be effective, they are willing to use it. This study shows that already learning about motivation helps to develop plans to adopt an autonomy-supportive teaching style, whose effectiveness should be in focus in teacher training.

2. Learner autonomy in English language learning: teachers' beliefs and practices
Merih Welay Welesilassie

Abstract: The language learning process is based on learners' own reflections on how they learn, and it engages learners by teaching them to assess their own learning processes. As a result, educational research and instructional practices have given more attention to learner autonomy, which allows learners to operate more successfully. The beliefs of teachers about learner autonomy have been extensively researched, but few investigations have examined classroom practices to foster learner autonomy (Madiha, 2018). Therefore, to effectively implement learner autonomy, investigating teachers' beliefs regarding learner autonomy is crucial, as their misconceptions about it either intentionally or unintentionally impede the actual classroom practices. The purpose of this study, therefore, was to investigate EFL teachers' beliefs toward learner autonomy and how these beliefs were reflected in their instructional practices. A convergent mixed methods research design (Creswell, 2012) was used to conduct the research. Data was collected using questionnaires, semi-structured interviews, and classroom observation checklists adapted from Borg and Al-Busaidi (2012). The study participants were 12 EFL teachers. The findings of this study indicated that teachers were highly positive about learner autonomy; however, they did not consider it to be feasible as much as they considered it to be desirable. Teachers mentioned psychological, social, and skill-related factors that made it hard for them to foster learner autonomy. A recommendation arising from the findings is that teachers and students should both be given training on how to implement it. as well as teachers should involve students in decision-making on the learning and teaching processes.

3. Teachers' emotions in homework practice and their antecedents
Christine Feiss, Gerda Hagenauer, Sandra Moroni

Abstract: Emotions are an important factor influencing teaching behaviour and teaching quality (Frenzel, 2014). Previous studies have primarily focused on teacher emotions in the classroom in general (e.g.Chen, 2019), rather than on a specific aspect of teaching such as homework practice. However, it can be assumed that homework practice also evokes a variety of emotions in teachers. Taking up this idea, this study examines teachers' perceived emotions in homework practice and their antecedents. In addition, it is explored what changes are necessary from the teachers' point of view to experience homework practice in a more emotionally positive way. The data are based on 23 semi-structured interviews with Swiss secondary school teachers. The interviews were analysed by structuring qualitative content analysis (Mayring, 2017) The results reveal that teachers experience a variety of positive and negative emotions related to the homework practice. The antecedents of teachers' emotions were manifold. They ranged from factors of students' parental home to factors concerning the behaviour of the teachers and that of the students. The two most important aspects that teachers would adjust regarding homework practice are the intensified collaboration within the teaching staff and the reduction of the amount of homework.

POSTER 3: Teacher motivation – TPACK   *continued*

4. Personal resources and teachers' psychological functioning: A job Demands- resources approach
Helena Granziera, Rebecca Collie, Andrew Martin

Abstract: Teaching can be a personally and professionally taxing occupation. On a daily basis, teachersare required to display positive emotions to do an effective job, manage conflicting organisational and pedagogical demands, and navigate complex relationships with students,staff and parents. Accordingly, teachers commonly report high levels of emotional exhaustion(Kunter et al., 2011). A significant body of literature has considered how job resources (i.e.,those physical, social, and emotional resources available to employees) may positively enhance teachers' psychological functioning (e.g., Skaalvik & Skaalvik, 2018). However,fewer studies have considered how teachers' personal resources may also promote positiveworkplace functioning, and if these resources enhance motivation, engagement, andwellbeing in different ways. The present study thus aimed to address this gap by drawing onJob Demands-Resources theory (Demerouti et al., 2001) to consider how personal resources(adaptability and self-efficacy) differentially influenced burnout, engagement, andoccupational outcomes. The sample consisted of 486 primary teachers from New SouthWales, Australia. Structural equation modeling revealed the unique role each personal resource played in determining teachers' psychological functioning; adaptability was directly and negatively related to emotional exhaustion, and directly and positively related to organisational commitment. Conversely, self-efficacy was directly and positively associated with behavioural engagement. Taken together, these results suggest that both of the resources under examination play an important, albeit different, role in influencing teachers' individual and occupational outcomes. These findings point to the importance of cultivating both capacities among pre-service and practising teachers as a means to enhance their individual psychological and broader school functioning.

5. Training studies for teachers to promote students' self-regulated learning – a systematic review
Sabrina Reith, Maria Bannert

Abstract: The Corona pandemic and the resulting homeschooling have shown even more now, how important the ability to regulate one's own learning is for students. In order to support students to become self-regulated learners, teachers need the competence to foster the development of students' self-regulated learning. Therefor our research takes a closer look into the promotion of self-regulated learning by a systematic research review of training studies that address teachers (in- and pre-service) and their ability to promote self-regulated learning in the classroom.

6. Competent use of digital media in school by fostering reflection competence of prospective teachers
Begüm Arvaneh, Maria Bannert

Abstract: The competent use of digital media by teachers is an increasing issue of the last decades and has gained even more importance due to the Coronavirus pandemic. In order to guarantee a competent use of digital media in classroom settings, prospective teachers have to learn how to use them successfully. Thereby, it is important to recognize, that there are many different factors which can influence the use of digital media in lessons, such as grade, competency level of students and technical equipment of schools. This means, that teachers always have to be very adaptive and reflected in order to provide an appropriate digital environment for their students. Therewith, teachers also need a high reflection competence to be able to improve their use of digital media in different situations.

7. Understanding pre-service teachers' motivation and engagement in the context of a reflective journal
Aloysius C. Anyichie

Abstract: Research has shown that interaction between the learner and learning context (e.g., task perception) shapes their engagement and motivation. Self-regulated learning (SRL) research identifies practices that support student engagement and motivation, but less research has considered using SRL practices to support pre-services teacher's motivation and engagement in Journal writing. This study investigated how pre-service teachers at a public university on the West Coast of Canada participated in a Journal Reflection Activity that integrated SRL-promoting practices (e.g., choice provision) with opportunities for pre-service teachers to make connections between the activity and their lives. Specifically, this study examined pre-service teachers' engagement and motivation during the Journal Reflection Activity. Data collected included task instructions, Journal Reflection Experience Forms and submitted Journal entries. The results demonstrated: (1) associations between pre-service teachers' motivation and engagement and contextual features of the Journal Activity; and (2) variations in levels of motivation and engagement based on specific contexts (e.g., difference journal entries). Implications for theory, practice, and research are discussed.

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8. Can we measure feeling understood? Development of the student perceptions of teacher empathy scale
Jeff Vomund, Angela D. Miller

Abstract: Empathy is a multidimensional construct that has been shown to be fundamental to successful human relationships as well as an important component in successful classrooms. Teacher-reported empathy has been connected to improved academic achievement as well as increases in students' critical thinking. However, little is known as to how students perceive their teachers' empathy. This study details the development and validation of the Student Perceptions of Teacher Empathy Scale (SPTES). Results indicate a three-factor solution comprised of students' perceptions of their teacher's organizational, instructional, and interpersonal empathy. Further, results suggest the importance of student-teacher interactions and teachers' cognitive empathy in determining students' perceptions of the construct.

POSTER 4: Interest – Student engagement – Regulation of learning and motivation   214 I Online

Chair: Corwin Senko

1. Predictors and outcomes of situational interest in biology
Niels Dohn

Abstract: The purpose of the present study is to investigate predictors of upper secondary students' interest in a citizen science program. The sample comprised 1,879 upper secondary students attending a citizen science programme provided by a natural history museum. Students responded to a questionnaire on situational interest. Based on structural equation modelling, the results show that the value of contributing to research was not as strong predictor of interest as one would have expected. Since students took part in the citizen science programs as part of their biology class, they are subject to curriculum demands and thus extrinsic goals (i.e.: "mandatory volunteerism"). In contrast, self-directed citizen science activities have internal goals. This raises the question of whether mandatory volunteerism actually leads to internalization of values and thus interest in environmental issues.

2. Situational interest creates overconfident judgments of learning
Corwin Senko

Abstract: Educators often use stories, humor, surprise, or other gambits to catch students' interest. Students themselves often rate "capturing my interest" an essential feature of effective teaching. Each group assumes those gambits facilitate learning. In fact, this form of interest – "situational interest" (SI) – does guide learners' attention, produce subjective feelings of processing ease (i.e., "fluency"), and increase engagement. Those benefits usually are transient, however, and they might occasionally be countered by certain risks that come with triggering SI. The present study examines one such potential risk: hampered metacognition. Specifically, it provides the first direct, causal test of how SI impacts judgments of learning (JOLs) and calibration accuracy, as well as the study choices anchored to those metacognitive judgments.

3. A scoping review on situational interest sources within learning tasks in formal education
Zhixing Guo, Luke Fryer

Abstract: Interest has long been recognized to have an array of benefits for learning (e.g., Harackiewicz, et al., 2016; Senko, et al., 2021). A wide range of empirical studies have explored various sources of situational interest (e.g., novelty, relevancy/utility value, social interaction) within learning activities. Studies have identified that the same sources, but in distinct contexts and with different participants, sometimes lead to different outcomes. However, to the author's knowledge, no review has been conducted to systematically summarize the situational interest sources identified by existing empirical studies based on four-phase model of interest development (Hidi & Renninger, 2006) or to synthesize the influence of these sources on learners' situational interest in educational settings. To address this gap and to further inform our understanding of how to trigger and maintain students' situational interest, this scoping review aimed to (1) identify and synthesize the situational interest sources examined by existing empirical studies; (2) summarize the influence of the six most frequently addressed situational interest sources (novelty, relevancy/utility value, social interaction, physical/hands-on activity, choice, complexity) on students' situational interest across different subjects and participants; (3) synthesize the conditions in which the six most frequently addressed situational interest sources (novelty, relevancy/utility value, social interaction, physical/hands-on activity, choice, complexity) exert positive or negative influence on learners' situational interest. Research gaps in this field and educational practices to effectively elicit students' situational interest in educational settings will be informed at the end of the review.

POSTER 4: Interest – Student engagement – Regulation of learning and motivation *continued*

4. Promoting engagement among gifted underachieving adolescents: A mixed method single case design
Sabine Sypré, Maarten Vansteenkiste, Karine Verschueren, Bart Soenens, Patrick Onghena

Abstract: In line with the distinction between a maladaptive competence beliefs and a decreasing value beliefs pathway towards underachievement (Snyder & Linnenbrink-Garcia, 2013), we examine the effectiveness of an intervention which targets one of both pathways. While a first module targets students' self-beliefs by fostering an incremental mindset (Blackwell, Trzesniewski, & Dweck, 2007) and reducing their fragile self-worth, self-handicapping, and helplessness, the second module aims to increase the students' valuation of their schoolwork (Siegle, et al., 2017) by influencing on their value beliefs and feelings of autonomy and authenticity.

5. Engagement in learning physics within the contextual model
Ema Petričević, Nina Pavlin-Bernardic

Abstract: Physics is subjects that students experience as interesting but difficult. Some research showed that decline in interest for physics is most pronounced between the ages of 12 and 13. Therefore it is important to research the motivation and engagement for learning physics at the beginning of formal education. The aim of this study was to research the role of motivational beliefs in the relation between the quality of teacher's motivational style and three aspects of engagement in learning physics (behavioural, cognitive and emotional) on a sample of elementary school pupils within the contextual model for student engagement (Lam et al., 2012). The participants were 595 (51% female) 7th-grade students from ten primary schools in Zagreb, Croatia. The questionnaires of teacher's motivational style, and student's motivational beliefs, and engagement for learning physics were applied. The results of structural equation modeling showed that interest in physics had a central mediating role in the relationship between the teacher's involvement and structure and emotional and behavioural engagement in learning physics. Teacher's autonomy support positively predicted the student's self-efficacy beliefs and the utility of physics. Self-efficacy beliefs positively predicted cognitive end emotional engagement in learning physics; interest in physics positively predicted behavioural and emotional engagement, attainment value (the importance of doing well on a given task) positively predicted behavioural and cognitive engagement while the utility of physics positively predicted cognitive engagement. The model explained 54% variance of behavioural engagement, 56% variance of cognitive engagement and 71% variance of emotional engagement in learning physics.

6. Learning profiles in adult secondary education: an individual learners' perspective
Bea Mertens, Vincent Donche, Sven De Maeyer

Abstract: Adult secondary education (ASE) provides a second chance for adult learners without a diploma secondary education in order to prepare them for a lifelong learning (LLL) trajectory. Persisting motivation (the will to learn), self-regulation skills and processing strategies (the skills to learn) seem to be crucial components for LLL and are under investigated in the context of ASE. The present study examined the extent to which these key components are developed in ASE learners and whether qualitatively different learning profiles can be distinguished by relating motivation, regulation and processing strategies learners use. 304 ASE-learners from five centers for adult education participated in this study. Learning profiles were mapped using cluster analysis, variance analyses and crosstabs. The insights from this study are theoretically new to this research context and provide an important knowledge base for educational practice. Understanding learning profiles, enables instruction to identify qualitative learning profiles and students at risk. Further, these insights enable instruction to better support and develop the will and skills to learn and thus to prepare ASE-learners for a qualitative LLL-trajectory.

7. The importance of enjoyment-based metamotivational strategies for learning
Emily Corwin-Renner

Abstract: Despite their natural curiosity, people are often faced with the task of learning something which they do not enjoy learning. I argue 1) that making learning activities more enjoyable is one of the most promising ways to promote student learning, 2) that interest and positive feedback are the two main sources of enjoyment of learning, and 3) that we need to identify the most promising strategies with which people can increase their own enjoyment of learning and teach them to students. These arguments are supported by empirical findings from the motivation literature. I further propose that there are three important types of strategies that people can use to increase their enjoyment of learning: 1) strategies for increasing positive feedback, 2) strategies for increasing one's interest, and 3) strategies that use one's knowledge about what one enjoys to restructure or reconceptualize the learning activity accordingly. I conclude that to increase student engagement, we should discover and teach effective strategies that students can use to make their learning activities more enjoyable

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8. The Role of motivation and SRL in sustainable learning in education
Gili Eschinasi-Hanovich, Adar Ben-Eliyahu

Abstract: Sustainable learning in education (SLE) is an educational philosophy of learning and teaching that considers that learning must continue despite different circumstances and crises such as the global pandemic, or everyday life changes such as the transition to college. The current work provides empirical evidence for the four components of SLE that have been identified in the literature. These four components of SLE are: renewing and relearning, independent and collaborative learning, active learning, and transferability. A different line of work suggests that achievement motivation and self-regulated learning (SRL) are important mechanisms for enhancing learning. It is likely that motivation and SRL are associated and perhaps enable SLE during challenging times, such as the transition to university during a pandemic. To this end, the current study uses semi-structured interviews with twenty undergraduate students to inquire about processes and strategies that they used that facilitated their transition to college. The two main research questions were: Can we identify SLE as important for maintaining learning during challenging transitions? and Do motivation and SRL appear as mechanisms for successful maintenance of learning despite challenging and changing circumstances? The results indicated that the four themes of SLE emerged as part of college readiness and do in fact contribute to students' sustainable learning during transitions. We also identified motivation and SRL as recurring themes that complement the four components of SLE. The study provides a novel approach to skill-building and has both theoretical and practical implications for the educational and the sustainability communities globally.

POSTER 5: Conditions and effects of interventions on student motivation and/or self-regulation   216 I Online

Chair: Demian Scherer

1. The role of academic goals in strategy use, motivation, and emotions: A mixed-design pilot study
Kamila Urban, Marek Urban

Abstract: Setting personally relevant learning goals is important to meet students' individual needs and interests. In self-regulated learning, learners have control over the decision of how much effort and resources they will invest in attaining their learning goals and what learning strategies they will use. This gives them a sense of empowerment that keeps them motivated and emotionally engaged. The present pilot study explored how individual academic goals are associated with self-reported use of cognitive and metacognitive strategies, learning motivation and learning-related emotions, and test anxiety. A total of 53 university students formulated their academic goals, which were classified according to achievement goal theory. Non-hierarchical cluster analysis identified three clusters of students: performance-approach oriented (40.8%), mastery and performance-approach oriented (46.9%), and performance-avoidance oriented (12.2%). Students with the combination of mastery and performance-approach orientation exhibited higher intrinsic motivation and experienced more positive emotions during learning compared to other groups. On the other hand, students with performance-avoidance orientation were less intrinsically motivated, reported lower self-efficacy, invested less effort in their learning, and exhibited less positive and more negative learning-related emotions and test anxiety. The results suggest that recognition of students' academic goals may be a beneficial tool for better understanding of students' SRL.

2. How are mastery goals and elaboration associated? A developmental view of self-directed learning
Sabine Schweder, Diana Raufelder

Abstract: Elaboration and mastery goal orientation are essential to an adaptive learning approach. The TARGET framework gives an orientation, while environmental class factors expand students' mastery goals. Self-directed learning gives students the option to become responsible for the main issues of their own learning. Due to the COVID-19 pandemic and the desire to boost lifelong learning skills, some German schools are trying to enrich instruction via self-directed learning intervals. During one school year, 754 students (MAge = 13.56; SD = 1.2; 49.4% girls) participated in a study that observed expanded instruction. This instruction occurred via self-directed learning intervals that focused on a favorite topic. The intervals were implemented in the same way, twice per academic year. To further deepen empirical research about reciprocal associations between mastery goal orientation and deeper processing, and to emphasize changing learning conditions, the data analysis included two latent change score models and a bidirectional latent change score neighbor model with the covariates age, grade, and sex. The results confirm an increase of both mastery goals and elaboration and provide insights about reciprocal

patterns. Elaboration and mastery goal orientation work together over time, although only elaboration revealed a long-term effect on mastery goal orientation. In contrast to elaboration, the initial values of mastery goals predicted change values for later learning occasions. The results give evidence that both variables profit when instruction is expanded by including options for self-directed learning about a favorite topic.

3. How an intervention to improve notetaking quality can promote lecture understanding
Mengsi Liu, Yuri Uesaka

Abstract: Lecture notetaking is beneficial for learning at different educational levels. However, it has also been reported that lecture notetaking may not always help student learning, as its effect depends on how it is used. In this experiment, we will confirm the effect of lecture notetaking on classroom understanding first and examine how interventions to improve notetaking quality could promote understanding. There are two phases in the experiment. In the first phase, students (N = 102) will be asked to watch a video lecture as if it were a real class. The quality of their notes will be evaluated to see if it predicts their understanding of the lecture. During the second phase, only the experimental group will be instructed on taking good quality notes. The effect of the intervention will be examined by comparing the experimental and control groups' posttest scores. Mediation analyses will be performed to see if the effect of the intervention is influenced by monitoring accuracy and cognitive load. The results of this study could provide useful information about the conditions under which lecture notetaking is effective. The findings could also provide insights into how to effectively cultivate notetaking skills in educational settings.

4. Effect of the jigsaw classroom on student motivation and self-regulation: a longitudinal study
Mathilde Riant, Anne-Laure de Place, Pascal Bressoux, Pascal Pansu

Abstract: This study aims to assess whether jigsaw cooperative learning (Aronson & Patnoe, 2011) impacts the mathematics motivation and academic self-regulation trajectories of French secondary vocational students. Indeed, empirical evidence for the beneficial impact of the jigsaw classroom is inconsistent (Hänze & Berger, 2007; Moreno, 2009). Moreover, Deigleymar and Schalk (2015) suggested that jigsaw may negatively impact the schooling of students with a low academic level, but Hänze and Berger (2007) showed the opposite. In view of these contradictory results, this study also investigates the moderating effect of student academic level on the impact of jigsaw classroom on student motivation and self-regulation trajectories. 5226 students from 108 French vocational schools participated in the French national experiment during two years and were divided into three groups: jigsaw classroom (n = 1793), unstructured cooperation (n = 1768) and control (n = 1665). Student autonomous motivation and self-regulation were self-reported at three measurement times. The results show that on average, there were no difference appeared in the trajectories of autonomous motivation in mathematics and academic self-regulation between the three learning conditions. However, learning conditions impacted students' motivation and self-regulation differently according to their mathematics level. Specifically, trajectories of weak students on the jigsaw classroom and unstructured cooperation conditions decreased over time. In contrary, the trajectories for students in the control condition remained stable or slightly increased. These results suggest that cooperative methods, particularly the jigsaw classroom, are not beneficial to students and even less for weak students.

5. One for all? The predictive role of academic self-concept for multiple domains of academic success
Lena Sofie Kegel, Carola Grunschel

Abstract: The academic self-concept is a relevant predictor of academic success in higher education. However, there is a lack of studies on the interplay of academic self-concept and academic success based on the current multidimensional understanding of academic success. Given this multidimensionality, academic success can be located in multiple domains, such as academic achievement, study satisfaction, and student dropout (York et al., 2015). Within students, all these domains of academic success coexist. While academic self-concept is known to be predictive for academic achievement (Choi, 2005), study satisfaction (Kegel et al., 2021), and student dropout intention (Bäulke et al., 2021), it remains unclear whether academic self-concept predicts multiple academic success domains all at once. The first aim of our research is to identify intraindividual constellations of academic success domains (grade point average, study satisfaction, student dropout intention) at the end of the first and second year of studies. Our second aim is to investigate the relation between academic self-concept at the end of the first year of studies with the intraindividual constellations of academic success domains at the end of the first and second year of studies. Based on empirical findings (e.g., Bäulke et al., 2021), we hypothesize that academic self-concept will be highest for students with high academic achievement, high study satisfaction, and low student dropout intention. Statistical analyses are planned with data from the German National Educational Panel Study (Blossfeld et al., 2011) prior to the conference so that results will be discussed in the poster presentation.

6. Exploring the mentor's figure as a facilitator of new nurses' motivation to learn and their transfer
Elena Roig Ester, Carla Quesada-Pallarès

Abstract: During the first year in the professional world there are many factors that can influence learning transfer of new graduates. This paper aims to explore the relationship between the mentor and motivation to learn of new nurses as relevant factors that facilitate the application of the learning acquired during their degree. A questionnaire configured with 64 questions was administered to a total of 198 nurses, with less than one year of work experience. The results obtained show that there is a significant but small relationship between the mentor's figure, in relation to motivation to learn and learning transfer. The need to investigate the effectiveness of incorporating the figure of the mentor as a facilitating element in the application of training is considered relevant.

7. Helping students' academic writing performance, metacognition, and writing self-efficacy
Tiphaine Colliot, Dyanne Escorcia

Abstract: The purpose of the present study was to evaluate the effects of training writing for post-secondary students on their writing performance, metacognition, and writing self-efficacy. The principles of Self-regulated Strategy Development –SRSD– (Graham et al., 2005) were adapted to the learning context specificities where students had to produce written texts. Four main stages composed the training: acquiring knowledge about genre, learning strategies for planning and revising processes, practicing self-evaluation, and peer revising. The training took place during four sessions of one-hour and a half to two hours along two months. This study involved two classes composed of 17 (C1) and 16 (C2) students respectively. A one-group pretest-posttest design was conducted in each class. In addition, measures of metacognition and writing self-efficacy were collected before and after the training. Data analysis will consist, for each class, in pretest-post-test comparisons in order to assess the effects of training on metacognition and writing self-efficacy. Also, the quality of written texts produced before instruction, at the end of it, and after training will be compared to identify differences on writing performances.

8. Connections of concept-level learning with cognitive processing and regulation strategies
Erika Österholm, Tuike Iiskala, Minna-Kaarina Wuorela, Outi Kortekangas-Savolainen, Mari Murtonen

Abstract: Interprofessional education (IPE) offers knowledge and skills needed in working life for students in higher education. This mixed-method study examined how interprofessional learning environment affects university students´ content learning on concept-level. This was studied with the aid of mind maps. The impact on students´ cognitive processing strategies and metacognitive regulation strategies was studied with questionnaires. All the data was gathered as pre- and post-test design. Students (n=43) from six health and social care disciplines took part into a new interprofessional course. The results indicated significant development in students´ concept-level learning. Also, students' cognitive, critical processing strategy enhanced significantly. The more sophisticated mind maps were significantly connected with the cognitive, stepwise processing of learning. The somewhat short course did not have significant effect on students´ metacognitive regulation strategies. The next step is to study students´ metacognitive regulation processes during a collaborative assignment focusing especially on socially shared metacognitive regulation and try to identify the nature of collaborative learning processes. The main objective is to gain more understanding of learning in interprofessional groups.

9. Improving metacognitive monitoring with pictures
Demian Scherer, Stephan Dutke

Abstract: A well-established finding in multimedia research is the multimedia principle: People learn more deeply from text plus pictures than from text alone (Mayer, 2014; Schnotz, 2014). That is, instructional pictures can help to learn text content. However, it is also plausible that pictures provide learners with an overview of which content they know and which they do not know well. For example, a map of a country probably does not only provide geographic information about the country. A mental representation of a map may also help learners to identify which regions they know well and for which regions they have less knowledge. Because instructional pictures help to build a coherent pictorial model, learners can inspect this model to explore what they know better and about which content they know less. This idea was investigated in an online experiment. Participants learned about a fictitious country either from a text alone or from a text plus a picture showing a map of the country. To measure knowledge and transfer performance and to determine metacognitive measures we used confidence-weighted true-false items (Barenberg & Dutke, 2019). Learners who received the text with the picture of a map showed better knowledge and transfer performance as compared to the control group. Further, participants who learned with the text-picture combination showed better metacognitive learning outcomes for several metacognitive measures. Results support the idea that adequate pictorial models help learners to assess their comprehension of the learning content more adequately.

Thursday 11:00–12:30	Session Block V – Symposia

SYMP 1:	**Individual and social resources relate to exhaustion and stress among school and university students**	**E04 I F-to-F**

Chair: Frances Hoferichter   **Discussant:** Diana Raufelder

Abstract: Research on school and university students' self-reported and biophysiological stress and exhaustion has gained increasing attention as a response to rising mental health problems and impaired well-being among youth and adolescents (Schneiderman et al., 2005). To prevent school and university students from experiencing stress and feeling exhausted, this symposium aims to identify individual (motivation, emotional intelligence) and social (peer-feedback, social support) resources that act as antecedents, mediators or moderators and therefore promise to support students' healthy development. Thereby, the empirical studies apply sophisticated quantitative methods, including latent-profile analysis, multi-group analysis, path- and multiple regression models. The first presentation investigates the stability and change of Finish university students' motivational profiles and how these are related to exhaustion, depressive symptoms, and engagement. The subsequent study examines how the emotional intelligence of Spanish youth relates to their satisfaction with life, mediated by perceived stress. Focusing on social resources, the third study explores how peer-feedback relates to exhaustion and self-efficacy of German university students who follow a teaching career and participate in micro-teaching sessions. Another social resource is investigated by the fourth study, which examines parental and teacher support within the relationship of self-reported and objective stress in a sample of German school students. The symposium outlines how the research findings can be made fruitful in the educational context to support youth and adolescents across different countries and beyond.

1. The interplay between emotional intelligence, stress and life satisfaction among adolescents
Konstanze Schoeps, Immaculada Montoya-Castilla, Diana Raufelder

Abstract: Socio-emotional skills such as emotional intelligence are protective factors that promote adolescent mental health and well-being. Based on Mayer and Salovey's ability model of emotional intelligence, this study examined whether perceived stress mediate the interplay of emotional intelligence and life satisfaction for girls and boys during early and middle adolescence. Self-report data were used from 800 Spanish adolescents aged 12–16 years, collected in two waves (T1 = March; T2 = December). Results of multigroup structural equation modeling indicated no group differences between boys and girls in early adolescence (7th and 8th grade) and middle adolescence (9th and 10th grade), as stress mediated the relationship between emotional intelligence and life satisfaction for all groups. The latent mean comparison, however, indicated that girls not only perceive and understand emotions better than boys, but they also perceive higher amounts of stress at an older age. Results indicate the potential risk of perceived stress that might drop the protective effect of emotional intelligence on life satisfaction. These findings have implications for future research and educational practice considering combined prevention programs for adolescent's health and well-being.

2. University students' motivational profiles during the pandemic: Stability and links to well-being
Henriikka Juntunen, Heta Tuominen, Jaana Viljaranta, Riikka Hirvonen, Auli Toom, Markku Niemivirta

Abstract: Concerns regarding university students' motivation and well-being have been further accentuated due to the abruptions caused by COVID-19. Thus, it is vital to address the qualitative differences in students' motivation, development over time, and the relations to well-being. We investigated Finnish university students' (N = 405) motivational (expectancy-value-cost) profiles, their stability and change, and how they relate to well-being (i.e., engagement, exhaustion, and depressive symptoms) over six months during the pandemic. Using latent profile analysis, five distinct profiles were identified: disengaged (T1 5%, T2 6%), indifferent (T1 19%, T2 21%), moderately motivated (T1 25%, T2 24%), struggling ambitious (T1 22%, T2 20%), and positively ambitious (T1 28%, T2 28%). Configural frequency analysis indicated a considerable stability in profiles: about 60% of all students demonstrated a stable profile over time, and a majority of the profile changes were directed towards similar profiles. According to analyses of variance, the groups differed significantly in well-being and showed similar rela-

tions to well-being at both timepoints. Overall, the positively ambitious students displayed the most adaptive well-being and the disengaged the most maladaptive. Struggling ambitious students, characterised by high expectancies, values, and costs, showed rather high engagement, high exhaustion, and moderate depressive symptoms. Findings highlight the importance of costs as all groups high on costs demonstrated high exhaustion. The findings suggest that examining university students' multidimensional expectancy-value-cost motivation may be valuable for a better understanding of the motivational dynamics and in recognising the factors endangering and fostering student learning and well-being during the pandemic and beyond.

3. The role of peer feedback for student teachers' emotional exhaustion and self-efficacy
Isabell Hußner, Rebecca Lazarides

Abstract: This longitudinal study examined how the quality of peer-feedback affected student teachers' self-efficacy and exhaustion across the semester, and how student teachers' self-efficacy, and their emotional exhaustion were bidirectionally interrelated. We used longitudinal questionnaire data from German student teachers (N = 127) who participated in courses that included micro-teaching elements. Participants reported self-efficacy and exhaustion at the beginning and the end of the semester, and quality of peer-feedback at the middle of the semester after receiving feedback from fellow students on teaching concepts presented in the course. Results of longitudinal modeling showed that self-reported quality of peer-feedback at the middle of the semester significantly related to reduced emotional exhaustion at the end of the semester. Emotional exhaustion at the beginning of the semester, however, reduced perceived quality of peer feedback at the middle of the semester. Quality of peer-feedback at the middle of the semester positively predicted self-efficacy for classroom management at the end of the semester. Emotional exhaustion and dimensions of teacher self-efficacy were not significantly related to each other across or within time. Implications of these results for research on student teacher self-efficacy and emotional exhaustion are discussed.

4. Social support from parents and teachers buffers school students' subjective and objective stress
Frances Hoferichter, Miriam C. Hufenbach, Hans Jörgen Grabe

Abstract: Adolescence can be a challenging period for students, as they face multiple changes within themselves (e.g., biological, cognitive) and their environment (e.g., changing relationships with parents and teachers) along with increased school demands and academic expectations. Accordingly, secondary school students commonly experience increased levels of general psychological and school-related stress, which may result in school burnout. According to the Conservation of Resources Theory (Hobfoll, 1989) and the Buffering Hypothesis (Cohen & Wills, 1985) supportive social relationships may protect individuals from experiencing stress. So far, this theoretical framework has mainly been investigated with subjective stress measures. However, combining self-report data and biological stress markers to investigate the association between supportive social relationships and subjective and objective stress more deeply presents a promising approach for interventional programs. The current study is based on self-report data, alpha-amylase and cortisol levels of 79 German students (48% girls, Mage = 13.73, SD = .68) from secondary schools. Moderation analysis in R revealed that the relationship between students' perceived stress and alpha-amylase was mitigated by supportive relationships with parents and teachers. Furthermore, parental support buffered the relationship between students' feeling of inadequacy, as a dimension of school burnout, and alpha-amylase as well as psychosomatic symptoms and cortisol. The study hints to a differentiated function of parents and teachers with regards to students' subjective and objective stress.

SYMP 2:   Secondary school students' academic emotions   E08 I F-to-F

Chairs: Thea Peetsma, Tina Hascher   **Discussant**: Eleftheria Gonida

Abstract: According to the Stage-Environment-Fit Theory (Eccles et al., 1993), secondary education can be considered as a specifically vulnerable period in the development of students' academic emotions and it has been found that positive emotions such as enjoyment decrease and negative emotions such as boredom increase. It can be expected, however, that emotional development during secondary education is more complex as it is influenced by individual as well as contextual factors. Thus, it is important to identify emotionally relevant individual factors as well as contextual factors that impact on student academic emotions.The four papers of this symposium unite the aim to better understand academic emotions and their development during secondary education. Two cross-sectional and two longitudinal studies investigate adolescent student emotions related to learning and achiveement: (1) Study 1 from the Netherlands sheds light on the interplay between anxiety in three different learning situations and future time perspective on students' effort and persistence in the subject of mathematics; (2) Study 2 is based on data from England and Wales and investigates the impact of cancelled high stakes exams due to COVID-19 pandemic on students' relief, gratitude, disappointment and anger; (3) Study 3 follows German students after transition into secondary education and illustrated the change in mathematics enjoyment and boredom over one year. (4) Study 4 identifies three emotion profiles that are based on enjoyment, pride, anxiety, anger, and boredom in Mathematics and shows specific responses of these profiles to an intervention aiming at fostering positive emotions and motivation.

1.   Learning Under Stress: The Moderating Role of Future Time Perspective Objectives and Relevance
Lucija Andre, Saar Koene, Joost Jansen in de Wal, Jaap Schuitema, Thea Peetsma

Abstract: We investigated the relationship between students' perceived stress and investment in learning and tested the role of future time perspective (FTP) as a moderator. We expected that FTP would serve as a protective factor in the association between students' perceived stress and investment in learning. Perceived stress was gauged by assessing students' mathematics anxiety related to class, learning, and tests, and investment in learning was gauged by measuring investment in learning with respect to mathematics. To measure FTP, we focused on the FTP in school and professional career. A total of N = 349 secondary school students from the Netherlands participated in this study. Results revealed negative associations between students' investment in learning and their anxiety in class, during learning, and while taking tests. The moderating effects of FTP were also found to be significant. Contrary to our expectations, higher levels of FTP were associated with a stronger negative relationship between anxiety and investment in learning. Moreover, we found negative associations between FTP and anxiety and learning anxiety and a positive association between FTP and investment in learning. Overall, our results may suggest that FTP motivates students to learn, but students' anxiety weakens the motivating effect of FTP.

2.   COVID-19 meets control-value theory: Emotional reactions to canceled high-stakes examinations
Wendy Symes, Dave Putwain, Zhane Marsh-Henry, Reinhard Pekrun, Herbert Marsh

Abstract: Schools in England and Wales were closed in March 2020, and high-stakes examinations scheduled for summer 2020 were canceled as part of a package of measures to curb the spread of COVID-19. The emotional reaction of students to having these important examinations canceled is not known. Based on Control-Value Theory (Pekrun, 2006), we examined how four retrospective emotions about the canceled examinations (relief, gratitude, disappointment, and anger) were related to control-value appraisals. We included two forms of control appraisals (expectancy of success and causal attribution) and distinguished between positive (importance and usefulness) and negative (effort) dimensions of the perceived value of the canceled exams. A sample of 474 participants in their first year of upper secondary, or undergraduate, education completed self-report measures of appraisals and emotions. Applying a robust latent modelling approach, we found that relief and gratitude were related to the interactive combination of low expectancy and high value, and anger to the interactive combination of high expectancy and high value. Disappointment was related to expectancy only. These findings offer broad support for the propositions of CVT that emotions arise from control-value appraisals and show how the underpinning appraisals of achievement emotions can differ when the emotion referent is canceled examinations rather than success or failure.

3.   Students' enjoyment and boredom at the beginning of secondary school
Simon Meyer, Juliane Schlesinger, Michaela Gläser-Zikuda

Abstract: Emotions are closely related to cognitive, motivational, and social processes, and they are therefore important for learning and achievement. Especially in the context of school transition students are facing many new emotional experiences but research is rare. Thus, the purpose of this longitudinal study was to analyze the development of students' enjoyment and boredom at the beginning of secondary school. It was carried out a few weeks after transition to 5th grade to the beginning of 6th grade and included N = 584 students (84.9% female; average age of M = 10.19 (SD = .45)) from middle track schools (56.2%) and higher track schools (43.8%). Results of multilevel growth curve models show that the effect of time for enjoyment (β = −0.19 (−0.21, −0.16), t(1167) = −14.13, p < .001) and boredom (β = 0.18 (0.14, 0.22), t(1167) = 8.87, p < .001) is highly significant. These results indicate an unfavorable development of the measured achievement emotions, which may lead to negative effects on e.g. students' performance. Moreover, the analysis show significant differences with regard to gender and the type of school. Educational implications to enhance students' enjoyment and to prevent an increase of boredom in the context of transition will be discussed.

4.   Effects of an intervention on students' emotion profiles in mathematics in lower secondary education
Tanja Held, Tina Hascher

Abstract: In everyday school life, students experience a wide range of different emotions. Due to their relevance for learning processes, academic achievement, and well-being, research on emotions has increased. Given the heterogeneity of individuals, it is of particular importance to understand differences between learners by applying a person-centered approach. In this study, we identify subpopulations of students characterized by distinct constellations of different emotions in mathematics in lower secondary education (Grade 7 and 8). Moreover, we examine whether a particular intervention setting (students participated in workshops with the aim of promoting positive emotions and learning motivation) had an impact on the patterns of change in the specific emotion profiles compared to the control setting over two school years. Latent Profile Analysis (LPA) was used to assess the emotion profiles of 348 lower secondary school students regarding their enjoyment, pride, anxiety, anger, and boredom in mathematics. Subsequently, the transition probabilities between the profiles are estimated using Latent Transition Analysis (LTA). Results revealed three emotion profiles: a mixed emotion profile, a predominantly positive emotion profile, and an only positive emotion profile with a high level of stability across Grades 7 and 8. Furthermore, LTA revealed different effects of the intervention on different emotion profiles. The intervention seemed to be better tailored to students in the predominantly positive emotion profile than to students in the other profiles.

SYMP 3: Social behavior in childhood: A self–determination theory perspective   114 I Hybrid

| Chair: | Sarah T. Steffgen | Discussant: | Maarten Vansteenkiste |

Abstract: Researchers have long acknowledged the role of children's prosocial and aggressive behaviors in their future psychosocial adjustment (Crick, 1996). Accordingly, much research has investigated the antecedents of such behaviors (for reviews, see Malti & Dys, 2018; Rodkin, Espelage, & Hanish, 2015). In the past decade, many such efforts have been anchored in self-determination theory (SDT; Ryan & Deci, 2017). SDT offers a unique view of human functioning, as it is grounded in an organismic view of human nature. It highlights the experience of autonomy, or lack thereof, in facilitating and forestalling the natural growth tendencies of individuals. As such, it accounts for both the bright and dark sides of human nature, as evidenced in either aggression or prosociality.

This symposium will present recent advances in the study of antecedents of prosocial behavior and positive interpersonal interaction from the SDT perspective. Papers 1 and 2 will focus on parenting. Paper 1 will demonstrate the role of Israeli parental childbearing motivation in their toddlers' later behavior problems. Paper 2 will discuss the role of parental practices of autonomy support and conditional regard in predicting German adolescents' prosocial sibling behaviors. Paper 3 will present the results of an Israeli study of the role of emotion regulation styles in promoting autonomous and controlled prosocial behavior. Paper 4 will focus on positive teacher–student interaction by considering student and teacher emotions in the classroom. Overall, the findings suggest SDT is a promising avenue for the evolution of research on children's social behavior.

1. Prenatal childbearing motivations, parenthood, and child social adjustment: A longitudinal study
Reut Nachoum, Yaniv Kanat Maymon

Abstract: Behavior problems in early childhood are considered a key factor in social maladjustment and later difficulties in interpersonal relationships. Children with early externalizing and internalizing problems often struggle interacting with peers, parents, and teachers, and are at risk for subsequent delinquent behaviors. Considerable research has been devoted to parenting styles as predictors of behavior problems in early childhood. Harsh, controlling, and authoritarian parenting have been identified as key predictors, but less attention has been paid to antecedents of parenting styles. The present study takes a Self-Determination Theory (SDT) perspective, focusing on mothers' reasons for childbearing as one such antecedent. The rationale is that prenatal autonomous (sense of volition and self-fulfillment) and controlled (feeling pressured) childbearing motivations can shape later parental styles (autonomy supportive versus controlling) and, consequently, child social adjustment. Participants were 326 mothers who took part in a longitudinal study. Childbearing motivations were measured at pregnancy, and parental styles and child behavior problems at 20 months. Results showed that prenatal autonomous motivation to have children predicted an autonomy-supportive parenting style. Meanwhile, prenatal controlled motivation predicted a controlling parenting style, which, in turn, predicted child behavior problems (i.e., internalizing and externalizing problems). In sum, this study shows that prenatal childbearing motivations have long-term, meaningful effects on early parenting styles and child social adjustment. These findings may have theoretical and practical implication for discourse on motivations underlying the decision to have a child, and their effects on early parenting and child social adjustment.

2. Prosocial behavior between siblings: Parental conditional regard and autonomy support as antecedents
Sarah T. Steffgen, Nantje Otterpohl, Avi Assor, Malte Schwinger, Yaniv K. Maymon, Joachim Stiensmeier-Pelster, Bat El Gueta

Abstract: Prosocial behavior is regarded as a central prerequisite for social participation and building relationships. However, little is known how prosocial behavior develops within the family. Based on assumptions of self-determination theory, we investigated the roles of parental conditional regard (CR) and autonomy-supportive socialization practices (i.e., basic autonomy support, fostering inner valuing, and inherent value demonstration; AS) as possible antecedents of positive sibling relationships. We hypothesized that conditional regard would reduce prosocial behavior and foster antagonistic behavior between siblings, mediated by children's feeling that their parents prefer one sibling over the other (parental partiality). Autonomy support, in contrast, was assumed to show inverse effects. N = 247 children were asked to rate on conditional regard, autonomy-supportive practices,

parental partiality and prosocial/antagonistic behavior in their sibling relationship. We computed two latent SEM (Model 1: CR; Model 2: AS) in Mplus to investigate the relationship between parenting and prosocial/antagonistic behavior, including partiality as mediator. In both models, parenting directly predicted prosocial behavior and antagonistic behavior. In addition, autonomy-supportive parenting indirectly predicted antagonistic behavior via parental partiality in the expected direction. The results contradict the opinion that conditional regard is a benign strategy, whereas autonomy-supportive practices seem to be helpful to foster prosocial behavior and reduce conflict and competition between siblings.

3. Emotional integration and dysregulation differentially predict prosocial behavior and empathy
Moti Benita

Abstract: This research employed self-determination theory's taxonomy of emotion regulation styles, differentiating integrative emotion regulation (IER) from less adaptive emotion regulation styles, specifically dysregulation. We tested the hypothesis that IER is associated with sympathy and autonomously motivated prosocial behavior, while dysregulation is related to personal distress and controlled prosocial behavior. In Study 1, 235 adult participants (mean age = 32.48, 79% female) filled in questionnaires in which they reported on their emotion regulation styles and trait empathy (sympathy and personal distress). Then, they viewed a film featuring the testimony of an Eritrean refugee intended to elicit empathy. After viewing the film, participants rated their autonomous and controlled reasons for helping the individual. The results show that, controlling for participants' gender, IER was positively related to autonomous prosocial behavior and negatively to controlled prosocial behavior through sympathy. Dysregulation was related to controlled prosocial behavior through personal distress. In Study 2, Israeli sixth graders were tested using a diary study methodology, in which they responded to self-report measures on their sympathy, prosocial behavior, and motivation to perform prosocial behavior (autonomous vs. controlled) over nine days. The results showed their IER was positively associated with daily reports of sympathy, pro-social behavior, and autonomous prosocial behavior, while dysregulation was related with controlled prosocial behavior. These findings strengthen past findings suggesting IER is associated with adaptive outcomes, in particular with the psychosocial adjustment of children.

4. Relationships between need–supportive teaching and student and teacher emotions
Jingwen Jiang, Sarah Teresa Steffgen, Leen Haerens

Abstract: This study contributes to the understanding of positive interactions between teachers and students by examining the interactive mechanism of need support, student emotions, and teacher emotions, in order to figure out how students' and teachers' positive emotional functioning could be fostered. Guided by Self-Determination Theory, this study investigated relationships between need-supportive teaching (independent variable) and student and teacher emotions (dependent variables) in the classroom of English as a foreign language (EFL). The sample was 326 early adolescent students from 22 classrooms in Finland. Using multilevel modelling, this study found that early adolescent students' perceptions of their teachers' lack of need support were positively related to student-perceived teachers' negative emotional responses and inattention in class. In addition, students' positive emotions were positively related to student-perceived teachers' positive and negative activating emotions simultaneously. Students' positive emotions mediated positive relationships between perceived need support and perceived teachers' negative activating emotions. This study also found large variance in student emotions within classrooms and strong degrees of relationships between perceived need support and perceived teacher emotions between classrooms. This study provided important implications for teacher education concerning need support in relation to both student and teacher emotions within and between classrooms, including positive interactions between teachers and students in classroom learning environments.

Thursday 11:00-12:30	Session Block V – Papers

PAPER 1: Self-beliefs, instructional design and motivation	**213 I Online**

Chair: Jelena Radisic

1. Revising expectancy-value motivational scale in mathematics: Cross-country and grade comparison
Jelena Radisic, Francisco Peixoto, Kajsa Y. Hansen, Aleksander Baucal, Lourdes Mata, Ksenija Krstic, An-Laine, Maarja Sõrmus

Abstract: The study focuses on validating an extended model of the Expectancy-Value Motivational Scale (EVMS) in mathematics from a comparative perspective. Two thousand forty-five students in grades three to five from Norway, Finland, Serbia, Estonia, Sweden, and Portugal participated in the study. Current validation also extended the range of grades the EVMS was applied. Results indicate that all EVMS items yield sufficient variation in student responses. A five-dimension model (competence self-beliefs, intrinsic value, utility value, attainment value and cost) was confirmed. Invariance models indicated scalar invariance across countries and grades was also achieved. While the results on measurement invariance contribute deeper cross-country comparisons on understanding how students build their achievement expectancy and task values, current results also show that students as early as grade three can reliably answer items relative to different value aspects.

2. How do variables relate to K12-student's self-beliefs? A second-order meta-analysis
Jennifer Meyer, Thorben Jansen, Jens Möller

Abstract: Positive self-beliefs are known to be central to students' motivation and well-being. Importantly, research has considered variables that relate to self-beliefs, aiming to understand how we can transform self-in positive ways. However, the comparative strength of the relations of self-beliefs with different variables is unclear but relevant in finding the most effective way to foster positive self-beliefs. In this second-order meta-analysis, we systematize the body of meta-analytic research investigating how variables relate to self-beliefs. Theories on academic motivation include a multitude of constructs that describe self-beliefs. We refer to constructs describing students' self-concepts, self-efficacy, and self-esteem, including constructs from different theoretical frameworks to systematize work from different research traditions. We summarize research from 80 meta-analyses with 380 effect sizes based on a total of N=18,164,870 participants. To calculate mean effect sizes, we conducted a multi-level second-order meta-analysis and accounted for dependencies in the data using robust standard error estimation. Results showed large effect sizes of associations of self-beliefs with achievement and cognitive ability ($d=0.51$), and moderate associations with socioemotional variables ($d=0.39$) and interventions ($d=0.30$). We found slightly smaller associations for background ($d=0.23$) and teacher variables ($d=0.24$). The results implicate that instructional practices should focus on fostering achievement to transform self-beliefs in a positive way. Future meta-analyses should focus on explaining the heterogeneity in the field and particularly the impact of the different ways in which self-constructs are defined in various meta-analyses.

3. Timing of information matters: effects on cognition, motivation, and emotion in game-based learning
Yuanyuan Hu, Pieter Wouters, Marieke van der Schaaf, Liesbeth Kester

Abstract: Learning with games requires two types of information, namely domain-specific information, and game-specific information. Providing two types of information together may pose a heavy demand on learning. It is hypothesized that providing domain-specific information before gameplay and game-specific information during gameplay (i.e., just-in-time) benefits 1) cognition (i.e., test performance), 2) motivation (i.e., achievement goals), and 3) emotion (i.e., achievement emotions). In this study, 300 students participated in a 2 × 2 factorial experiment with two factors timing of domain-specific information and timing of game-specific information, either before or during gameplay. Results on achievement goals partially support the second hypothesis; the other hypotheses were not supported.

4. Fostering student motivation through tasks: The motivational potential of current textbook tasks
Anna Heinle, Anja Schiepe-Tiska, Frank Reinhold, Jörg-Henrik Heine, Doris Holzberger

Abstract: Fostering student motivation is an important educational goal. However, student motivation is rather heterogeneous, particularly in mathematics and physics. In research on motivation, the design of learning opportunities that promote motivation, such as the use of tasks, has received little attention to date. This study addresses this desideratum by examining the potential of textbook tasks to promote student motivation. Based on self-determination theory (SDT) and theory of interest, a low-inference coding scheme was developed and validated by applying the framework of item response theory (IRT) to assess the motivational potential of tasks. Current ninth grade mathematics and physics tasks from German textbooks (N=254 task units) were analyzed using the categories differentiated instruction, real-life context, autonomy support, competence support, and support for relatedness. Additionally, differences between mathematics and physics tasks were examined. Results indicate the coding scheme's high interrater reliabilities and empirical validity. For the motivational potential of tasks, motivational features occurred rarely in mathematics and physics tasks, with few subject-specific differences in favor of mathematics. The coding scheme can contribute to optimizing motivation-supportive instructional designs.

5. Can warning students of the consequences of examination failure promote engagement?
Dave Putwain

Abstract: In the context of high-stakes qualifications, teachers may warn students of the negative consequences of failure as a tactic designed to increase engagement and ultimately achievement. Previous studies have shown that these types of messages, namely fear appeals, are indirectly related to engagement and achievement in different ways depending on how they are evaluated by the student. When fear appeals are evaluated as a challenge, they are positively related to engagement and achievement. When evaluated as a threat, fear appeals are negatively related to engagement and achievement. In the present study, we offer a robust test of these relations in a multi-level model that controls for autoregressive and concurrent relations in the domain of mathematics. Self-reported data were collected from 1,530 participants, aged 14-16 years, at two time points over the final two years of secondary education. These data were linked to prior and subsequent achievement. Results showed that students who attended to fear appeals and evaluated them as a challenge showed higher subsequent engagement, and students who showed higher engagement showed higher achievement. Accordingly, it may be beneficial to identify those students likely to evaluate fear appeals as a threat and intervene in order to enhance the likelihood of a challenge evaluation (e.g., building confidence through strategy focused feedback and strengthening beliefs in the value of effort). Given the difficulties associated with teachers judging students' motivation and emotion as private experiences, methods to access student voice should be considered.

PAPER 2: Group regulation and affect in collaborative learning 214 I Online

Chair: Hanna Järvenoja

1. The role of pedagogical emotions in teacher collaborative learning
Dana Vedder-Weiss, Karin S. Shaulov

Abstract: Understanding teacher emotions is essential in understanding teaching and learning to teach. Yet, the role teacher emotions play in their professional learning has only recently started to draw attention as a focus of investigation. Adopting a sociological perspective, this study examines teacher 'Pedagogical Emotions', i.e., emotion teachers display with regards to their work. We aim to shed light on the role of teacher emotional displays in collaborative problems-of-practice-based learning and to disentangle the emotional rules that govern these displays. We thus examined in-school professional development (PD) discourse, characterizing the pedagogical emotions teachers narrate in the stories they tell each other during PD meetings and how the group responds to them. We analyzed data from a sample of 66 PD meetings from 33 Israeli teacher groups (in 17 elementary schools), a total of 64:45 hours of audio-recorded data. This corpus included 128 stories narrating pedagogical emotions, which we coded, applying discourse analysis, for five categories: the story's elicitation, number of narrated emotions in the story, their valence (positive or negative) and object, and the group response. We selected one focal event for linguistic ethnographic microanalysis. The findings demonstrate the potential of narrated pedagogical emotions as collaborative learning resources but also how emotional rules constrained the realization of this potential. We thus suggest theoretical frameworks for teacher learning should acknowledge pedagogical emotions as important objects for collaborative explorations. It should also consider the emotional rules that governs teacher PD discourse and, specifically, how they constrain exploration of negative emotions towards students.

2. How do individual contributions play a role in group level regulation during collaborative learning?
Sara Ahola, Jonna Malmberg, Hanna Järvenoja

Abstract: The aim of this study is to investigate collaborating group members' participation in group level regulation. Thus far, the fine-grained qualitative aspects of participation are often overlooked in research within collaborative learning contexts. The current study explores in detail the qualitative micro-level contributions group members make during group level regulation. The aim of this study is to investigate how these contributions play a role in co- and socially shared regulation processes during collaboration.
The study utilizes video recordings of small groups working collaboratively on physics-related tasks by analyzing individuals' utterance-based contributions to regulation activities. The results of a detailed qualitative video analysis reveal diverse types of contributions to group level regulation. In addition, the results indicate differences in co-regulation (CoRL) and socially shared regulation (SSRL) episodes in terms of individual contributions. The results of this study address the need for a more qualitative micro-level investigation of participation during group level regulation activity, as it emerges from collaborative interaction.

3. When collaborative group members don't engage in group level emotion regulation?
Hanna Järvenoja, Tiina Törmänen, Kristiina Mänty

Abstract: Emotions are an inherent part of collaborative learning, but prior research indicates that group level emotion regulation appears rarely during the collaboration. The aim of this study is to investigate in why groups do not always engage in emotion regulation even though the collaborative learning situation would benefit from it. The study combines video and physiological data to explore the conditions in which group level emotion regulation do and do not emerge when 12-year-old students perform a collaborative science task. The data analysis proceeded in four phases in which both data sets were first were processed in the 30s segments separately to determinate emotional valence and physiological activation in situations that could provoke emotion regulation. Valence and activation codings were then combined to define groups' emotional states and their relations with actualized emotion regulation in qualitatively different types of situations. The results revealed that emotionally negative and physiologically activating states are favorable for group level emotion regulation to emerge. In contrast, when the emotional state was mixed and de-activating, group level emotion regulation emerged less likely. When these mixed situations were investigated in more details, the results showed that lack of group level regulation was related particularly into situations that were triggered by social reasons, whereas task-related reasons were more likely regulated. The results imply that groups may need emotion regulation support particularly with socially-related challenges.

4. Students' socio-emotional interaction profiles and regulation of collaborative learning
Tiina Törmänen, Hanna Järvenoja, Mohammed Saqr, Jonna Malmberg, Sanna Järvelä

Abstract: Emotions in collaborative learning both originate from and are externalized in students' socio-emotional interactions, and individual group members evidently contribute to these interactions to varying degrees. Research indicates that socio-emotional interactions within a group are related with the occurrence of co- and socially shared regulation of learning, which poses a need to study individual contributions to these interactions via a person-centered approach. This study implements multimodal data (video and electrodermal activity) and sequence mining methods to explore how secondary school students' (n=54, 18 groups) participation in socio-emotional interactions evolved across a series of collaborative tasks. On this basis, it identifies subgroups of students with distinct longitudinal profiles. Furthermore, it investigates how students with different socio-emotional interaction profiles contributed to their groups' regulation of learning. Three profiles were identified: negative, neutral, and diverse. Each profile represents a particular socio-emotional interaction pattern with unique characteristics regarding the emotional valence of participation and physiological emotional activation. The profiles to students' contributions to group regulation of learning. Students with the diverse profile were more likely to contribute to regulation, whereas the neutral profile students were less likely to contribute. The results highlight the importance of person-centered methods to account for individual differences and participation dynamics in collaborative learning and consequently clarify how they relate to and influence group regulation of learning.

PAPER 3: Achievement motivation: Students expectancies, values and adacemic success 105 I Online

Chair: Tim Urdan

1. Adolescents' motivational beliefs about effective learning, use of strategies and academic success
Ita Puusepp, Kati Aus, Eliis Härma, Eve Kikas

Abstract: The aim of this study was to explore the direct and indirect effects of adolescents' motivational beliefs about effective learning on their academic success, which was operationalised as performance on a reading comprehension task, grades and academic exhaustion. In total, 1165 eight-grade students' beliefs, reading comprehension and use of reading comprehension strategies were assessed at the beginning of the school year. Half a year later 296 students from the sample reported their levels of academic exhaustion and grades from the previous academic semester. Students' motivational beliefs had indirect effects on their reading comprehension and grades: higher self-concept of ability and valuing of effective learning as well as lower perceived cost of mastering effective learning strategies were associated with better reading comprehension and grades via the use of deep-level reading comprehension strategies. The effects of motivational beliefs on academic exhaustion were direct: higher self-concept of ability and lower cost were associated with lower academic exhaustion, while value had no effect. These results highlight the relevance of students' motivational beliefs about effective learning in regard both their academic outcomes as well as academic exhaustion, referring to the potential benefits of addressing these beliefs about effective learning in addition to instruction on the use of deep-level strategies. Moreover, our results indicate the importance of tackling students' specific concerns about the time and effort that effective learning entails in addition to helping them value effective learning.

2. Student definitions of success: Comparing liked and disliked classes
Tim Urdan, Daniel Teramoto, Jada Lawson

Abstract: College students were surveyed and interviewed to learn about how they defined success in a class they liked and in a class they disliked. Using open-ended questions that allowed students to use their own words, we found that students' definitions of success were more varied and complex in classes they liked compared to disliked classes. For liked classes, definitions of success focused primarily on learning, understanding, and doing well, In contrast, for disliked classes students tended to define success in terms of grades and work-avoidance. The sources of these success definitions included family and cultural influences, actions of the teachers, and students' internal beliefs. In a few instances, students believed experiencing discrimination based on ethnicity or gender affected their definition of success in the classroom.

PAPER 3: Achievement motivation: Students expectancies, values and adacemic success *continued*

3. Lower secondary school students' cross-domain expectancy–value–cost profiles in math and Finnish
Kukka-Maaria Polso, Heta Tuominen, Petri Ihantola, Markku Niemivirta

Abstract: Expectancies and value beliefs are an important indicator of students' subject-specific motivation at school. Classification of students according to these motivational factors offers broad perspectives on their most typical patterns while also highlighting the relative emphasis of individual factors. However, although profiles related to single school subjects have provided valuable knowledge, they fail to capture the potential differentiation of motivation across domains. On the other hand, most studies observing two or several subjects jointly have focused solely on one factor or another, disregarding the relevance of other expectancy-value components.This study considered both aspects - multiple components (intrinsic value, utility value, opportunity cost, ability self-concept) and two domains - simultaneously by investigating, a) what kinds of cross-domain expectancy-value-cost profiles in math and native language can be identified among lower secondary school students, and b) how the profiles are associated with academic achievement.Data collection in autumn 2021 resulted in a nationally representative sample of Finnish lower secondary students (N = 6137). Seven profiles were identified in a latent class cluster analysis. Of all students, 11% belonged to a very positively motivated group, whereas almost 40% represented two least motivated groups. Four fifths of the students reported somewhat similar motivation towards both domains. A fifth of the students, in turn, demonstrated differentiated motivation towards math and Finnish.As in prior studies, girls were underrepresented in the math-motivated group. Some of the profiles differed in achievement: more positive motivation co-occurred with higher achievement. Importantly, cost was essential in differentiating some more and less favorable profiles.

4. Relation between support and students' national exam performance: The mediating role of motivation
Utku Caybas, Yesim C. Aydin, Seyda D. Tarim

Abstract: Due to the pandemic, schools around the world have switched to remote education. Within this transition, the way students interact with their peers and teachers has dramatically changed. Considering the impact of social isolation, this study examines the relationship between students' (N=231, 8th grade) perceived teacher, peer, and family support with students' motivation and performance of standardized national high school entrance exams during the pandemic. Structural equation modeling (SEM) showed that, while peer support only predicts the utility value, only perceived teacher affective support predicts both students' intrinsic and utility values. On the contrary, family support is not a significant predictor of students' subjective task values. While only intrinsic value from subjective task values predicts academic achievement through self-efficacy for self-regulated learning and competence-related beliefs, students' competence-related beliefs significantly predict performance. Regarding the indirect effects of perceived social support on academic achievement, only perceived teacher support was associated with academic achievement. The results highlighted that perceived teacher affective support predicts students' academic achievement through academic motivation during the pandemic.

PAPER 4: Academic emotions: antecedents, individual differences, and consequences   E11 I Online

Chair: Matthias Huber

1. Types of boredom and other learning activity emotions: a person–centred investigation
Dirk Tempelaar, Alexandra Niculescu

Abstract: Whether boredom is a unitary construct or if multiple types of boredom exist is a long-standing debate. Recent research has established the existence of boredom types based on frequency observations of boredom by experience sampling. This work tries to expand our understanding of boredom and replicate these previous findings by applying intensity observations of cross-sectional type for four discrete learning activity emotions: boredom, anxiety, hopelessness, and enjoyment. Latent class analysis based on activity emotion scores from 9863 first-year students of a business and economics program results in seven profiles. Five of these profiles allow a linear ordering from low to high control and value scores (the direct antecedents of emotions), low to high positive, and high to low negative emotions. Two profiles differ from this pattern: one 'high boredom' profile and one 'low boredom' profile. We next compare antecedent relationships of activity emotions at three different levels: inter-individual, inter-class or between classes, and intra-class or within classes. Some of these relationships are invariant for the choice of level of analysis, such as hopelessness. Other relationships, such as boredom, are highly variant: within-class relationships differ from inter-individual relationships. Indeed, our results confirm that boredom is not a unitary construct. The types of boredom found and their implications for educational practice are discussed and shared in this article.

2. High performing adolescents in Mathematics: Motivational profiles and links with academic emotions
Dimitrios Moustakas, Eleftheria Gonida, Dimitrios Stamovlasis

Abstract: High achievement in Mathematics is regularly attracting the interest of a number of educational researchers, who try, among others, to investigate the specific characteristics of students who excel in this field. Our research contributes to these efforts, aiming to identify the motivational and emotional profiles of high achievers. For the aims of the study, 141 high achieving ninth-graders from Greek high schools were identified and administered two questionnaires that measured (i) their motivation towards Mathematics, according to the Expectancy-Value theory and (ii) their emotions related to the class of Mathematics, within the Control-Value theoretical framework. With the use of a Latent Class Analysis approach, the study sample was found to be distributed in two discrete latent profiles. The first one included 57 students having high expectancy for success and value of Mathematics, and significantly low cost while engaging with it. In contrast, the 84 students within the second cluster were characterized by relatively decreased, however still high, expectancy and value but increased cost compared to the first group. Moreover, the students from the first group reported more intense emotions with positive valence like enjoyment and pride, and less intense negative emotions such as anxiety and shame. Boredom appeared to be more prevalent in the students of the second group. These results are discussed in parallel with the current theoretical developments in the fields of student motivation, academic emotions, and high academic achievement, while implications for educational practices regarding high achieving students are also considered.

3. Affective, cognitive, motivational, and physiological components of achievement emotions
Dirk Tempelaar

Abstract: In empirical research on self-perceptions of achievement emotions, a prominent role is played by the AEQ instrument: Achievement Emotions Questionnaire. The AEQ thanks its unique position in part to the broad scope, covering nine achievement emotions in three educational contexts, distinguishing four emotion components. The flip side of this broad scope lies in the dimensionality of its outcomes, necessitating researchers to restrict the full scope. Selecting a reduced subset of emotions or restricting to only one educational setting are common restrictions, as is the aggregation over components of emotions. Empirical studies differentiating between affective, cognitive, motivational, and physiological components of emotion are scarce, if existing at all. Implicit in the aggregation over components is the assumption of unidimensionality: different components are empirically indistinguishable. This empirical contribution focuses on the tenability of this implicit assumption. Applying a large sample (N=13,299) of learning setting related AEQ responses for the four emotions Anxiety, Boredom, Hopelessness and Enjoyment, we investigate whether the emotion components are empirically distinguishable. Using a subset of observations (N=9738) where, beyond AEQ data, EES data are available, (Epistemic Emotion Scale), we investigate the relationship between epistemic emotions and achievement emotions, both at scale level and at the component level. We conclude that emotion components have their unique contribution that differentiates from other components and demonstrate different developments in time and different relations with epistemic emotions as antecedent. Consequently, we need to be careful in aggregating over components or shortening scales.

PAPER 4: Academic emotions: antecedents, individual differences, and consequences *continued*

4. **Test anxiety does not predict exam performance when knowledge is controlled for**
   Maria Theobald, Jasmin Breitwieser, Garvin Brod

Abstract: It is a common but rarely tested assumption that test-anxious students perform worse in exam situations than their knowledge would otherwise allow. To examine this assumption with high ecological validity, we analyzed extensive data from 309 medical students who prepared for a high-stakes exam using a digital learning platform. On the learning platform, students answered old exam questions that were similar to the final exam questions. Using log-files from the learning platform, we assessed students' level of knowledge throughout the exam preparation phase and their average performance in mock exams that were completed shortly before the final exam. The results showed that test anxiety did not predict exam performance over and above students' knowledge level as assessed in the mock exams or during the exam preparation phase. Leveraging additional ambulatory assessment data from the exam preparation phase, we found that high trait test anxiety predicted smaller gains in knowledge over the exam preparation phase. On a day-to-day level, lower knowledge levels predicted higher subsequent state anxiety levels, which suggests that awareness of one's own knowledge gaps triggers anxiety. Taken together, these findings are incompatible with the hypothesis that test anxiety interferes with the retrieval of previously learned knowledge during the exam.

5. **Emotions in educational trajectories. Formation, effects and interdependencies**
   Matthias Huber

Abstract: The present study investigates the relevance of emotions and emotional evaluations for educational trajectories and educational carrier choices with particular consideration of the subjective perspective of students at the transition point from school to university. The research design of the study is oriented towards the idea of the fully integrated mixed-methods design, taking into account different sources of data examined by qualitative and quantitative methods. The results not only delineate the significance of emotions for educational career choices and educational trajectories. Moreover, they signify those representations, mental images and ambitions that primarily guide students in their educational careers and identify the essential factors of influence for the constitution of those mental images in students' learning and life history. The results also indicate which emotions are the most significant in educational trajectories and which functions and models of action emotions accompany in educational careers.

PAPER 5: Motivation, beliefs, and teacher–student–interactions　　216 I Online

Chair:　Inga ten Hagen

1. **Motivation and perspective–specific versus common teacher–student ratings of instructional quality**
   Annika Koch, Fani Lauermann, Hanna Gaspard

Abstract: Teacher motivation can have a significant influence on the quality of teaching and thus determine students' academic outcome. However, findings concerning the associations between teacher motivation and teaching quality are mixed, and may vary depending on the perspective through which teaching quality is assessed (i.e., teacher vs. student ratings). In order to investigate possible perspective-specific differences in the dimensions of instructional quality, this study examined the relationship between teacher motivation (enthusiasm and self-efficacy) and common vs. perspective-specific factors of instructional quality. Instructional quality ratings from 72 math teachers and their 1,745 German ninth graders were analyzed using multi-level bi-factor models. Teacher motivating, teachers' experience, students' math achievement, and their socioeconomic status were included as covariates in these analyses.

Our results show that the greatest significant agreement measured by latent correlations and a common factor exist for the dimensions of "classroom management" and "instructional support". In contrast, a common factor failed to emerge for "instructional clarity" and "cognitive activation", which means that these dimensions are determined by two separate factors. Correlations between teacher motivation and the common and perspective-specific factors reveal patterns that, for "instructional support", suggest that this dimension is determined by perspective-specific teacher judgements. For "classroom management" there are correlations with the common, but not the perspective-specific factors. Our study highlights the importance of distinguishing between common and perspective-specific perspectives of instructional quality. Thus, the correlation with teacher motivation can provide information about perspective-specific differences in the dimensions of instructional quality.

2. **A latent–difference–score analysis of student– vs. teacher–rated student motivation across domains**
   Inga ten Hagen, Daria Katharina Benden, Fani Lauermann, Jacquelynne S. Eccles

Abstract: Students' learning engagement and academic choices are shaped by their relative placement of expectancies of success and subjective valuing of a specific domain in their individuals' hierarchy of domains. Teachers' beliefs and behaviors might influence students' intra-individual hierarchies of expectancies and values across different domains (e.g., Eccles & Wigfield, 2020). However, there is a lack of research simultaneously examining both intra-individual cross-domain differences in students' motivational beliefs and corresponding teacher ratings. Informed by Eccles and colleagues' expectancy-value theory and Möller and Marsh's dimensional comparison theory, we examined cross-domain intra-individual differences in elementary teachers' (N = 57) and their students' (N = 469) ratings of students' ability and subjective importance of math and reading.

Latent difference score analyses revealed that students perceived greater intra-individual differences in their own math versus reading ability than did their teachers. Analogous results emerged for students' and teachers' ratings of students' valuing (i.e., perceived importance) of math versus reading, suggesting differing dimensional comparison processes for students' self-judgments vs. their teachers' judgments. Cross-domain differences in teachers' and students' perceptions were positively associated for ratings of students' ability but not for ratings of students' perceived importance. Moreover, intra-individual differences varied substantially across students, in both students' and teachers' ratings. Students' gender and prior achievement in math and reading contributed to this variation. The study indicates the relevance of research on reciprocal influences of intra-individual differences in teachers' and students' perceptions of students' ability and motivation across domains and corresponding effects on teachers' instructional behavior and students' academic development.

PAPER 5: Motivation, beliefs, and teacher–student–interactions *continued*

3. Teachers' conditional regard, students' need satisfaction and agentic engagement
Rinat Cohen, Yaniv Kanat Maymon

Abstract: Teachers' conditional positive regard and conditional negative regard are common motivational techniques in the classroom. This study investigated their respective effects on adolescent students' agentic engagement, while considering students' basic psychological needs for autonomy and relatedness as potential mediators. Data collected from 30 teachers and 651 7th to 10th graders (52% female) were used to test a multilevel mediation model. The results indicated that teachers' conditional negative regard undermined students' agentic engagement by frustrating both of their autonomy and relatedness needs. Teachers' conditional positive regard thwarted students' sense of autonomy, which consequently undermined their agentic engagement. The findings are discussed in terms of conditional positive and negative regard as undesirable classroom motivational practices and the mechanisms through which they operate. The discussion also notes the importance of investigating contextual factors at the classroom level.

4. Teacher child relationship trajectories as predictors of sixth grade students' motivation
Ineke Van der Veen, Annemiek Veen

Abstract: In the present study, trajectories in the quality of teacher–student relationships in pre-school and primary school were related to academic motivation and achievement of sixth grade students.

High quality teacher-child relationships have been systematically found to contribute to children's school engagement and academic adjustment. Results may provide information for education and intervention efforts aimed at improving teacher-child relationship quality and with that, improving students' academic outcomes, especially of children at risk. Data from seven measurements on 2293 children of the national cohort study pre-COOL were used. Growth Mixture Modelling was performed in order to identify different groups of children based on developments in closeness, conflict and dependency. Results showed that for conflict two classes of children were found: a group of 8.7 percent of the children with increasing conflict and a majority group with decreasing conflict. In the group with the least favourable conflict trajectory boys and children with a low-educated mother were overrepresented. Children in this class have less favourable motivation for school and a less favourable language development.

5. Pre–service teachers' beliefs towards research evidence: results from an intervention study
Maximilian Knogler, Ricardo Böheim, Annika Diery, Tina Seidel, Judith Harackiewicz

Abstract: Following the movement toward evidence-based practice in education, teaching is regarded as a profession that requires teachers to act and argue based on research evidence. According to expectancy-value theory, a critical variable in promoting evidence-based practice among future teachers is the extent to which they consider research evidence useful for their teaching practice (i.e. utility-value). To further promote utility-value of research evidence among teacher students, the present study investigated the added value of a brief and easy-to-implement intervention that stimulates students to reflect on the utility-value of research evidence. The sample consisted of 3rd semester teacher students (n = 34) enrolled in a semester-long course on effective teaching who were randomly assigned to two conditions. In the first condition (typical course design), teacher educators used two typically applied strategies for promoting utility-value, i.e. direct communication of utility-value and application tasks, in which students can discover utility-value. In the second condition (enhanced course design), students were additionally stimulated to reflect on the utility-value in two written assignments. Their value perceptions were measured at the beginning and at the end of the semester. Although a mixed model MANOVA did not yield a statistically significant group-by-time interaction effect, follow-up t-tests revealed a substantial and significant increase in students value perceptions in the enhanced course design, but not in the typical course design. To further investigate the impact of the different course designs and to increase the statistical power of our analyses, we are currently collecting data from another cohort to increase sample size.

Thursday 13:30-14:30	Keynote session 3	E11 I F-to-F with stream

Chair: Susanne Narciss

KEYNOTE 3 | **Thomas Goschke, Technische Universität Dresden, Germany**

Volition and self-control: From executive functions to meta-control

Abstract: Human action rests on remarkable cognitive control capacities, including the ability to adapt behavior flexibly to changing contexts and to override impulsive or habitual responses in favor of long-term goals. Impairments of these control and self-regulation capacities have been related to harmful behaviors like insufficient academic effort, unhealthy eating habits and addictive behaviors. In the past decades, impressive progress has been made in elucidating the cognitive, computational, and neural mechanisms underlying volition and self-control. Questionable concepts that conceived of self-control as a limited resource or postulated a homunculus-like 'central executive' have been replaced by models specifying how volitional control emerges from interactions between distributed brain networks, how these networks are adapted to changing goals, and how they are modulated by emotion and motivation. I give an exemplary overview of this research with a focus on three key themes. First, based on a neurocognitive process model of self-control, I present evidence from a multilevel study that combines behavioral and neuroimaging tasks with ecological momentary assessments and showed that individual differences in real-life self-control failures are predicted by dysfunctional interactions between performance-monitoring, cognitive control, and valuation networks. Specifically, results indicate that self-control failures do not always reflect impaired control competencies, but insufficient mobilization of control due to deficient monitoring. Secondly, I will present new results that challenge the view that cognitive control is always experienced as costly, but suggest that people can learn to assign intrinsic value to cognitive effort. Finally, I discuss this research within a more general theoretical framework, according to which goal-directed action in changing environments confronts agents with fundamental "control dilemmas", which require a context-sensitive balancing of antagonistic adaptive constraints (cognitive stability vs. flexibility; goal persistence vs. disengagement; exploitation vs. exploration). Elucidating the meta-control processes underlying the adaptive regulation of such control dilemmas is a key challenge for the decade of cognitive control research.

Thursday 14:40–16:10	Session Block VI – Symposia

SYMP 1: Advancing research on achievement emotions in primary and lower secondary school	**E04 I F-to-F**

Chair: Daniela Raccanello   **Discussant**:   Reinhard Pekrun

Abstract: Within educational systems, attention to students' emotions and well-being is today a key objective along with traditional aims focused on learning. The relevance of emotions within the school has been mirrored by the increasing amount of research fostered by Pekrun's control-value theory (CVT) of achievement emotions (Pekrun & Linnenbrink-Garcia, 2014). Achievement emotions are those emotions that students feel in relation to learning activities or outcomes. Control and value appraisals are their proximal determinants, together with other distal antecedents. In turn, achievement emotions influence performance. However, not much research has been focused on young students, in particular examining longitudinal relations.

Considering the CVT as the theoretical framework, this symposium aims to advance research on achievement emotions in primary and secondary school, involving students from Italy, Portugal, Germany, and UK. The four studies used self-report methods, still the most efficacious ways to access students' internal world. They investigated a large variety of emotions, namely, enjoyment, pride, hope, relief, relaxation, anxiety, anger, shame, boredom, and hopelessness. Overall, they examined correlates of achievement emotions (i.e., well-being at school); distal (i.e., teacher and peer support) and proximal (i.e., competence and value) antecedents; and the interplay between emotions and performance (together with moderators such as academic buoyancy). Particular attention to longitudinal designs was paid.

Findings presented in this symposium are key resources to suggest directions for policy and practice. Promoting interventions on emotions is central for helping today's students to become tomorrow's adults able to adapt flexibly, collaboratively, and efficiently to a 'dynamically developing global world'.

1. Achievement emotions and well-being at school: Transitioning from primary to secondary school
Daniela Raccanello, Giada Vicentini, Kristina Stockinger, Roberto Burro

Abstract: Achievement emotions play a key role in students' well-being and learning. In line with the control-value theory, many studies support the relevance of achievement emotions for achievement. However, scarce attention has been devoted to school-related achievement emotions and well-being in the transition from primary to secondary school. We examined the psychometric properties of two brief scales assessing achievement emotions and well-being using Rasch modelling, possible grade-level and gender differences in emotions and well-being, and their relations with achievement. We sampled 432 fourth and seventh-graders. At T1 we assessed school-related achievement emotions (Achievement Emotions Adjective List–Brief version, AEAL-B, Raccanello et al., 2013) and well-being (School-Related Well-Being Scale, SWBS, Loderer et al., 2016). At T2 we gathered data on grades. First, our findings confirmed the goodness of two brief instruments to measure achievement emotions and well-being at school. Through Rasch modelling, we transformed the two scales in two instruments that respect the properties of the fundamental measurement. Second, grade-level differences emerged, with a general decrease of positive emotions and well-being that attests a maladaptive trend. Moreover, females reported lower anger, hopelessness, and boredom, and higher well-being. Third, a path analysis revealed that some school-related negative emotions, namely anger, hopelessness, and boredom, are detrimental for achievement, while well-being at school was positively associated to achievement. This study highlights the need for developing interventions to support students in the transition from primary to secondary school, which is such a pivotal time in their learning path.

2. Longitudinal effects of perceived classroom support on students' achievement emotions
Francisco Peixoto, Lara Forsblom, Lourdes Mata

Abstract: The current study examined cross-sectional and longitudinal relationships between perceived teacher and peer support, cognitive appraisals, and three achievement emotions (enjoyment, anger, and boredom) in math classrooms. The participants were 637 5th and 7th grade students from 12 public schools in Portugal who answered the same questionnaire over a two-year period. Relationships were analysed with structural equation modelling. The results showed that students' perceptions of teacher and peer support did not predict their perceived competence, whereas students' perceived teacher and peer support positively predicted their positive value ap-

praisals. Further analyses demonstrated that students' perceived competence positively predicted their enjoyment and negatively predicted their anger, whereas students' positive value appraisals negatively predicted their boredom. Moreover, the findings revealed direct effects of classroom support on emotions. Students' perceived teacher support negatively predicted their boredom, whereas their perceived peer support positively predicted their enjoyment and negatively predicted their boredom. The findings will be discussed regarding theoretical and practical implications.

3. Students' emotional trajectories in different educational contexts and relations with achievement
Stephanie Lichtenfeld, Reinhard Pekrun

Abstract: The present longitudinal study investigated changes in achievement emotions as well as linkages between achievement emotions and achievement in three different educational settings (being in class, during homework, when taking tests/exams) in primary school students. The study included annual assessments during which students answered an emotion questionnaire and a mathematics test towards the end of the school year from grades 2 to 4. Developmental changes were analysed using latent neighbour change models and cross-lagged models were run to investigate reciprocal relationships between achievement emotions and achievement. Latent neighbour change models for each emotion in the different settings showed that students' emotions become increasingly more maladaptive with enjoyment decreasing and boredom and test-related anxiety increasing over time. Interestingly, students' anxiety in class showed a slight decrease from year 2 to year 3 and remained stable thereafter. Cross-lagged models yielded that class- and learning-related anxiety and boredom show negative reciprocal effects whereas class- and learning-related enjoyment shows positive linkages with achievement over time. Concerning test-related emotions, achievement influenced subsequent test-emotions (with negative effects on subsequent anxiety and positive effects on subsequent enjoyment), but there was no effect from test-emotions to subsequent achievement. Maladaptive developmental trends as well as reciprocal linkages between students' emotions and their achievement outcomes highlight the need for further research in this age group. Implications for further research and practice will be discussed.

4. Emotions and achievement: Reciprocal relations and the moderating influence of academic buoyancy
Dave Putwain, Peter Wood, Reinhard Pekrun

Abstract: Control-value theory proposes that achievement emotions and achievement are reciprocally related. At present, however, there is little empirical evidence for these hypothesised relations. Academic buoyancy is a positive response to routine academic setbacks and pressures, and might, therefore, offer protection for achievement from negative emotions. In the present study we examined reciprocal relations between three achievement emotions (enjoyment, boredom, and anxiety) and test performance, and whether academic buoyancy moderated relations between achievement emotions and test performance. Data were collected from 1242 primary school students with a mean age of 9.3 Years of four waves. Achievement emotions were measured at T1 and T3 and test performance at T2 and T4. Academic buoyancy was measured at T3. A structural equation model showed reciprocal relations between emotions and test performance for anxiety but not enjoyment or boredom. Test performance predicted enjoyment and boredom, but not vice versa. Latent-interaction structural equation models showed buoyancy moderated relations between emotions and test performance for anxiety but not enjoyment or boredom. Academic buoyancy boosted test performance at low, not high buoyancy. Practitioners should consider using interventions to reduce anxiety and downstream effects on achievement. Boosting academic buoyancy is not likely to achieve this result as it will benefit low rather than highly anxious students.

SYMP 2:   Smart students: How about their motivation for school?   E08 | F-to-F

Chair: Lisette Hornstra   **Chair**:   Lisette Hornstra

Abstract: Many children with above-average cognitive abilities do not fully realize their potential in school (White et al., 2018). Motivation for school plays a pivotal role in students' engagement and achievement and has been suggested to be one of the main underlying causes of underachievement among high-ability students. To date, research findings concerning high-ability students' motivation for school are mixed. This symposium brings together four quantitative studies to give more insights into the relationship between cognitive ability and motivation, the motivational factors that contribute to underachievement among high-ability students, and the strategies used by teachers to foster high-ability students' motivation in school.

The first contribution sheds more light on how students' cognitive ability and achievement are related to students' attitudes toward school and other socio-emotional experiences in school among a large sample of third and fourth grade students. The second contribution has conceptualized motivation as a multidimensional construct and compared motivation of high-ability students to their mixed-ability classmates using a combination of variable-centered and person-centered techniques. The third contribution provides more insights into factors underlying underperformance among high-ability students using a longitudinal person-centered approach. Lastly, the fourth contribution of this symposium provides more insight into the motivational teaching strategies that teachers adopt for high-ability versus other students as well as the beliefs that explain differences in teaching strategies.

The discussant will reflect on the theoretical contributions and practical implications of the findings.

1.   Socio-emotional experiences of school: Relations with cognitive ability and academic achievement
Jessica Gnas, Elena Mack, Moritz Breit, Franzis Preckel, Julia Matthes

Abstract: Students' socio-emotional experiences of school significantly influence their development. In a sample of 1411 third and fourth grade students in 105 classrooms, we examined whether students' socio-emotional experiences varied with their cognitive ability (IQ) and academic achievement (Grade Point Average). Results of a structural equation model revealed that students with different levels of cognitive ability experienced school in a comparable way. Higher-achieving students reported more positive attitudes towards school, perceived their class climate more positively, felt more socially integrated and more accepted by their teachers than lower-achieving students did (β = .102 to .243). Furthermore, there was a significant interaction between students' cognitive ability and achievement for students' attitude towards school (β = .087) and their perceived class climate (β = .085) indicating that positive relations with academic achievement were stronger for high-ability students and weaker for lower-ability students. Effects were independent of students' gender.

2.   Academic motivation of high-ability students and their classmates in regular primary school classes
Lisette Hornstra, Anouke Bakx, Sven Mathijssen, Jaap Denissen

Abstract: Motivation for school plays a pivotal role in students' engagement in class and their achievement. This is also the case for children with above-average cognitive abilities. Motivation enables them to translate their abilities into achievement. Most prior studies on motivation of high-ability students focused only on intrinsic motivation. Self Determination Theory, however, defines motivation as a multifaceted construct consisting of intrinsic and multiple extrinsic types of motivation (identified, introjected, and externally regulated motivation), as well as amotivation which refers to a lack of motivation. To gain insight into the full scope of high-ability students' motivation, differences between high-ability students and their 'mixed-ability' classmates in all these motivational dimensions were examined with variable-centered and person-centered techniques. Moreover, age-related differences were examined by comparing students in different grades and comparing two waves of data across two school years. A sample of 1525 students (11.2% high-ability students) filled out questionnaires. Results indicated that high-ability students reported similar or more optimal levels of motivation (e.g., more intrinsic motivation) compared to their mixed-ability classmates. One notable finding, however, was that this motivational advantage was no longer present in Grade 6 where high-ability students tended to show lower levels of identified motivation and higher levels of external regulation and amotivation compared to their classmates. These findings suggest that high-ability students become at risk for developing unfavorable motivational patterns towards the end of primary school.

3.   Why do smart students underperform? Motivational underpinnings of gifted underachievement
Jeroen Lavrijsen, Alicia Ramos, Lisa Linnenbrink-Garcia, Bart Soenens, Maarten Vansteenkiste, Sabine Sypré, Michiel Boncquet, Karine Verschueren

Abstract: Using a longitudinal person-oriented approach, this study examined whether, as proposed by the Pathways to Underachievement Model (Snyder & Linnenbrink-Garcia, 2013), distinct developmental pathways of maladaptive motivation could be distinguished among high-ability students (IQ ≥120, N=403, Mage = 12.2 years, 60.5 percent males, 94% born in Belgium) throughout Grades 7 and 8. Latent class growth analysis provided evidence for three classes including an adaptive class and two maladaptive classes, one characterized by vulnerable self-beliefs and beliefs about intelligence, and one characterized by low and declining value beliefs. These classes largely corresponded to the pathways proposed in the Pathways to Underachievement Model. Class membership was then related to possible antecedents of maladaptive motivational beliefs (i.e., being labelled as gifted, person-centered parental feedback, high parental expectations). Moreover, class membership was found to predict outcomes at the end of Grade 8, with the maladaptive classes showing higher disengagement and underachievement. In the coming months, the adverse consequences of maladaptive motivational beliefs for the academic development of gifted students throughout secondary education will be further investigated using a new data wave in Grade 11, which is currently collected. In sum, these findings provide developmental insight in the multiple motivational pathways underlying disengagement and underachievement among high-ability students.

4.   Do teachers motivate gifted students differently? The role of effectiveness and other beliefs
Sabine Sypré, Maarten Vansteenkiste, Bart Soenens, Karine Verschuere, Joachim Waterschoot

Abstract: Several studies have shown that gifted students are less motivated to put effort in their schoolwork compared to typical students, which can lead to underachievement. Therefore, it is critical to find effective ways to motivate gifted students. Teachers may adapt their motivating teaching style as a function of the cognitive ability of children, leading them to use different teaching practices in interaction with gifted vs. typical children. Grounded in Self-Determination Theory, the present study examines if and to what extent this adaptation occurs and the factors that may explain the variability in teachers' use of (de)motivating styles in relation to different students. We examined the role of different types of beliefs, including teachers' beliefs regarding the effectiveness of a specific style as a function of the cognitive ability of the student, the malleability of intelligence, and misconceptions about giftedness more generally. Using a circumplex model of (de)motivational teaching styles (Aelterman et al., 2019), we examined the styles teachers use, and teachers' beliefs about the effectiveness of these styles on motivation of students, both among typical and gifted students.Teacher reports indicated that teachers provide gifted students with more autonomy support and less structure compared to typical students, with the perceived effectiveness of these teaching styles explaining this mean-level difference in adopting teaching style.The results will enable teachers of gifted students to gain a more accurate understanding of their own teaching practices so that they adopt a more motivating style that benefits their cognitively gifted and non-gifted students.

SYMP 3:	Integrating approaches to self-regulation in education: antecedents, processes and outcomes	114 I Hybrid

Chairs:	Franz Wortha, Peter Gerjets	**Discussant**:	Philip Winne

Abstract: This symposium integrates diverse theoretical concepts relevant for self-regulation in education in an overarching framework and presents empirical work that explores the benefits of such integration in several critical ways. First the symposium broadens and integrates antecedents of self-regulation, processes involved in it, and outcomes stemming from it. Second, the papers cover different learning outcomes from micro-level performance on learning tasks to grades in school, and so provide information about self-regulation's impact at different levels of outcome "granularity." The different studies examine grit, conscientiousness, interest, and motivation as antecedents, strategy use and hypermedia-navigation processes, and performance on laboratory tasks and students' grades as outcomes. Paper 1 introduces a systematic and integrative theoretical framework for self-regulation in education. Subsequent papers provide empirical examples for specific aspects of this framework by utilizing data from a large-scale German study of self-regulation. Paper 2 examines the predictive value of self-regulatory constructs from different parts of the model and tests how this generalizes across levels of outcome granularity using machine learning. Paper 3 assesses theoretically based relations of conscientiousness and interest to grit and achievement. Paper 4 looks at the roles of prior knowledge, grit, and visuospatial ability in students' performance in an art hypermedia learning task. Presenters use state of the art data analytic techniques including machine learning approaches and path analyses to examine these issues. Ultimately, the broad purpose of this symposium is to make a first step toward an integrative research program on self-regulation in education.

1. An integrative framework for self-regulation in educational contexts

Peter Gerjets, Franz Wortha, Benjamin Nagengast, Allan Wigfield, Roger Azevedo, Brent Roberts, Ulrich Trautwein

Abstract: In recent years, self-regulation (SR) has developed into one of the most important theoretical concepts in many fields of psychology and beyond. In educational contexts SR constitutes a central component of so-called 21st century skills, which are considered crucial for dealing with the challenges of the future. Research on SR in educational contexts is based on various theoretical constructs from different research traditions that have individually investigated different facets of self-regulation in education but remain largely disintegrated. These constructs range from investigation of the cognitive resources underlying regulatory behavior to the life-long development and effects of personality traits (e.g., conscientiousness). In this paper, we introduce an integrative framework that aims to incorporate the different types of research under the umbrella term of self-regulation in education. Specifically, based on an extensive literature review, we organized research into four different core types of theoretical constructs (activities, forces, resources, dispositions). Through this framework we aim to provide a systematic landscape of research on SR in education. This enables the integration of past and current research, the development of new fields of inquiry that focus on the interaction of multiple constructs, including the use of state of the art methodology to overcome obstacles such as varying levels of granularity, and ultimately aims to build the basis for a large-scale extensive research program on self-regulation in education.

2. Predicting learning outcomes in school and the laboratory: A machine learning approach

Franz Wortha, Tobias Appel, Maike Tibus, Birgit Brucker, Enkelejda Kasneci, Peter Gerjets

Abstract: Predicting learner's performance is a central goal of research in education. Theories and empirical evidence from different research traditions have identified vastly different sets of predictors. These variables range from cognitive abilities and resources (e.g., working memory capacity), over the use of learning strategies (e.g., metacognitive monitoring) to personal dispositions (e.g., conscientiousness). Integrating these findings is necessary to understand self-regulation in education in a larger context but remains a major challenge because both predictors and outcomes vary in their level of granularity. This study addressed this research gap by using machine learning to predict grades and learning outcomes with a set of predictors that represent research traditions related to self-regulation best. Furthermore, we used cross-validation to test if the obtained models generalize across levels of granularity. Results showed that sparse models using a small number of predictors can differentiate high and low learning outcomes well with cross-validated classification accuracy of 88.8% for grades and

92.5% for laboratory learning outcomes. Moreover, subsequent cross-validations on the other outcome have shown that the 'grade model' can predict laboratory outcomes (81.3%) and the 'laboratory outcome model' can predict grades (85.7%). Both models included predictors from different research traditions of self-regulation in education, including learning activities, personal disposition, driving forces, and resources. Moreover, they shared common predictors. This indicates that constructs from different research traditions are helpful for predict learning outcomes across levels of granularity, but the specific optimal predictors differ between outcomes.

3. Does conscientiousness compensate for low interest in a lab setting?

Anna Bareis, Marion Spengler, Sven Rieger, Maike Tibus, Tobias Appel, Peter Gerjets, Brent Roberts, Benjamin Nagengast, Ulrich Trautwein

Abstract: Conscientiousness and interest represent two different aspects of self-regulation. The Conscientiousness × Interest Compensation (CONIC) model (Trautwein, et al., 2019) proposes a compensatory effect of Conscientiousness and interest in predicting academic effort and academic achievement. This means that high Conscientiousness can partly compensate for a lack of interest in a domain and vice versa (Song, Gaspard, Nagengast, & Trautwein, 2019; Trautwein et al., 2019). However, whether interest and Conscientiousness also compensate each other in predicting effortful and self-regulated behavior in highly structured learning tasks is an open question. Therefore, N =317 university students participated in a laboratory study that involved completing in different digital learning environments five timed learning tasks on different topics. A set of regression analyses was conducted for every task. Achievement was regressed on conscientiousness, task-related interest, and the Conscientiousness Interest interaction term. The results support that the CONIC model also holds for learning behavior in controlled lab settings. They also point to limitations of the predictive validity of conscientiousness in highly structured learning tasks.

4. Predicting art learning performance using grit and multi-perspective hypermedia learning behaviors

Jeff Greene, Rebekah Freed, Matthew Bernacki, Franz Wortha, Robert Plumley, Rebekah Duke, Maike Tibus, Ann-Christine Ehlis, Peter Gerjets

Abstract: Researchers use trace data to explore relations between self-regulated learning (SRL) and performance. In this study, we explored how differences in prior knowledge, features of grit, and visuospatial ability predicted the kinds of SRL enacted during an art history learning task in a multi-perspective hypermedia learning environment (MHE), as well as how those behaviors in turn influenced different types of performance outcomes. German university students (n = 233) took grit and visuospatial ability assessments, completed an art knowledge pretest, studied a 20-piece art collection hosted within an MHE, and completed a posttest. During the learning task, participants could group artwork into categories, inspect pieces, answer study questions, and seek additional information. We hypothesized that performance would be strongest when there was alignment of SRL processing (e.g., focused on visual display v. verbal information about a work; precise detail v. elaborated explanation) and posttest question demand characteristics (e.g., requiring visual v. verbal information; recall v. transfer item). Path analyses revealed that overall, there were nuanced findings relating SRL behaviors during art learning to subsequent performance tasks demanding recall, transfer, and appraisal of images and text. Key SRL events included sorting, visual inspection, seeking information, and revisiting images; these events were differently predictive of performance when task demands differed. Seeking information about works related to recall. Revisiting images afterward predicted performance on transfer problems and on questions with visual and text-and-visual stems, as well as text and pictorial answers, signaling that such events may involve integration, consolidation, and abstraction processes.

Thursday 14:40–16:10	Session Block VI – Papers

PAPER 1: Teachers' motivation, goals, and well-being	**214 I Online**

Chair: Xiangyuan Feng

1. Linking teacher responsibility with preservice teachers' motivation for becoming teachers
Michaela Katstaller, Anna Maria Eder, Burkhard Gniewosz

Abstract: Preservice teachers' sense of responsibility can be regarded as being part of a teacher's identity that emphasizes the interplay of context, task, and person (Kaplan & Garner, 2018). According to Richardson and Watt (2018) teacher identity is a dynamic construct which reflects the degree to which a person is committed to the teaching career, considers her/himself as someone who corresponds to the roles expected of a teacher, and performs with social contributions toward an equitable society. Early precursors of teacher identity have rarely been investigated, yet. The present study builds upon existing research on teacher responsibility and investigates if the initial motivation for choosing a teaching career is predictive of teacher responsibility as one facet of teacher identity.

The Austrian sample consists of 271 participants, 64.7% are women and 35.3% men. With a latent transition approach in a cross-sectional study, the probabilities of occurrence for the three identified latent profiles of teacher responsibility are investigated based on the four latent profiles of career choice motivation. The findings highlight the relevance of examining personal responsibility in combination with career choice motivation because important differences may affect the development of teacher identity. The results suggest that the teacher education programs should support beginning preservice teachers, in particular the intrinsically motivated and the undecided, to reflect on their career choice motivation associated with their sense of responsibility, which might have implications for their professional well-being and prospective instructional practices.

2. Why do Cubans choose teaching? Exploring motivations and perceptions of trainee teachers in Cuba
Martina King

Abstract: In this Cuban study, the teaching motivations and career perceptions of trainee teachers across two universities in Havana and Camagüey were explored. Participants (N = 340) completed the Factors Influencing Teaching (FIT)-Choice scale which was extended and culturally adapted to the Cuban context. Social utility values, prior teaching and learning experiences, and subject interest were the main motivations for choosing teaching as a career. However, group differences were significant in the sample, for example, students who did not intend to enter the teaching profession demonstrated a less positive motivational profile. Based on the results, recruitment efforts and curriculum improvements of teacher education are recommended in order to overcome teacher shortage in Cuba.

3. Chinese teachers' intrinsic orientation for the profession: measurement and characteristics
Xiangyuan Feng, Ridwan Maulana, Michelle Helms-Lorenz

Abstract: Intrinsic orientations have long been acknowledged for their benefits on teacher well-being and performance. Different as they are in theoretical foundations, intrinsic orientations share a core element – the overall professional affection and experienced professional meaningfulness. To construct an operational framework of this core, a scale of Teacher's Intrinsic Orientation for the Profession (TIOP), as a compound teacher trait, was developed and validated in the Dutch context. The significance of TIOP on teacher well-being and teaching behavior was shown. However, little is known whether this construct and its predictive power apply to other contexts. This study aims to examine the validity of the TIOP instrument in the Chinese context. 179 Chinese secondary school teachers responded to revised scales of TIOP and self-efficacy. And 2982 of their students responded to My Teacher Questionnaire to evaluate students' perceived teaching quality. Results suggest the revised scale is valid and reliable in the Chinese context, which consists of five dimensions: affection for teaching activities and the subject, intrinsic value for self and others, and future-time goals. Correlation analysis results suggest that TIOP is a strong correlate of teacher well-being and student-perceived teaching quality. The present study adds to the knowledge base of teacher motivation and emotion.

4. Consequences of school boards' chaotic leadership style for teachers' well-being
Leen Haerens, Lennia Matos, Angel Abos, Moti Benita, Andrea Koc

Abstract: Using Self-Determination Theory (SDT) as a guiding framework, many authors have concluded that leaders' autonomy-support plays a key role in fostering job satisfaction and preventing burnout (Van den Broeck et al., 2016). At the same time, SDT suggests that negative indicators of mental health, such as burnout, will be more strongly predicted by leaders demotivating styles (Van den Broeck et al., 2016). However, surprisingly, these demotivating styles have been largely ignored in contemporary educational research. In a convenience sample of 205 teachers this cross-sectional study confirmed that particularly principals' chaotic style positively related to emotional exhaustion via need frustration, while an autonomy-supportive style related primarily to job satisfaction via need satisfaction. Latent profile analyses further revealed that the largest group of teachers (41%) perceived their principal as moderately high on both autonomy support and chaos. This group reported less optimal work related outcomes when compared to the group who perceived their principal as highly autonomy-supportive and lowly chaotic. An important challenge school boards endeavor when adopting an autonomy-supportive style is thus to avoid becoming chaotic. In conclusion, when school leaders are too awaiting, passive, unpredictable or unavailable, teachers are more likely to experience pressure and coercion, as well as feelings of incompetence and rejection. This makes them at higher risk for burnout. When school boards are trained to adopt a more autonomy-supportive style, it is imperative to raise awareness about the pitfalls of a chaotic style.

5. Group goals in teacher team meetings
Miriam Babichenko, Dana Vedder-Weis, Yariv Feniger, Rinat Cohen

Abstract: Studies show significant variance in the way teacher teams collaborate and interact. Relying on motivational theories, we suggest these differences might be closely related to the way teachers collectively define the goals of their team meetings. We used questionnaires (n=795) and in-depth interviews with teachers (n=20) to explore the phenomenon of group goals in teacher team meetings. Drawing on achievement goals theory, we mapped the various types of group goals teacher teams may collectively pursue, uncovered their unique characteristics and estimated their prevalence. Despite the basic fit of the achievement goal model to the context of group goals in teacher teams, we found differences in: (a) the types of goals pursued in that context; (b) in the meaning of goals and (c) in their prevalence. This study contributes to research on teacher teams' learning by proposing a motivational perspective, and to research on goal orientation by proposing a construct applicable for collaborative settings – group goals.

PAPER 2: Theoretical developments and methodological issues in motivation research   **213 | Online**

Chair: Luise von Keyserlingk

1. **Students' hopes for university and their engagement behaviours: an intermediate motivational theory?**
   Kathleen M. Quinlan, Natalie W Gentry

Abstract: The behavioural model underpinning national surveys of university students' engagement (e.g., NSSE, UKES) considers students' experiences but neglects their motivation. To remedy that, we surveyed undergraduates (N=236) about what they had wanted from their university experience (hopes) and their engagement behaviours and analysed the relationship between the two sets of variables. Students strongly endorsed five main hopes: explore subject, apply learning, grow as a person, explore subject, apply learning, interact with peers and interact with staff, suggesting that they value multiple hopes, but to varying degrees. As expected, hopes significantly predicted related engagement behaviours. Hopes to grow as a person and to explore subject significantly predicted behaviours related to growth and exploration. Apply learning significantly predicted proactive career research and work experience. Interact with peers was the strongest predictor of whether students reported interacting with peers. Likewise, interact with staff was the only significant predictor of interactions with staff.

2. **College students' motivation and goal-oriented behavior: Integrating two motivation theories**
   Luise von Keyserlingk, Charlott Rubach, Hye R. Lee, Renzhe Yu, Jacquelynne S. Eccles, Jutta Heckhausen

Abstract: In college, students often encounter situations in which they struggle with meeting their academic goals in difficult courses. We integrate the Situated Expectancy Value Theory and the Motivational Theory of Life-Span Development to investigate how motivational beliefs and experiences in a difficult course predict use of goal-engagement oriented control strategies, goal-adjustment oriented control strategies, and study behavior in preparation of final course exams. We used survey data and behavioral trace data collected in the fall 2019 quarter at a public university in the U.S. (N=231). Students who perceived their midterm exam as more difficult than expected, and students with higher course-specific subjective task values reported using more goal-engagement oriented and goal-adjustment oriented control strategies. Students with higher course-specific ability beliefs used more control strategies, when they experienced their midterm exam as more difficult than expected. Exploratory analyses showed small positive relations between motivational beliefs, goal-engagement oriented control strategies and the amount of study activities in preparation of final exams measured with behavioral trace data. Findings provide important insights on how motivational orientations and course experiences relate to adaptive and goal-oriented behavior in college courses.

3. **Towards an integrative framework for theories of motivation in education**
   Detlef Urhahne, Lisette Wijnia

Abstract: Several major theories have been established in research on motivation in education to explain and predict the direction, initiation, intensity, and persistence of learning behaviors. The most commonly cited theories focusing on academic motivation include expectancy-value theory, social cognitive theory, interest theory, self-determination theory, goal orientation theory, and attribution theory (Schunk et al., 2014). To gain a deeper understanding of the similarities and differences among these prominent theories, we present an integrative framework based on an action model (Heckhausen & Heckhausen, 2018). Associated recent meta-analyses demonstrate the empirical relationship between the motivation constructs of the six central theories and academic achievement. In this proposal, the integrative framework is presented and the value is illustrated through two examples from interest theory and attribution theory.

4. **Variables related to academic motivation in K-12 education. A systematic review of meta-analyses**
   Thorben Jansen, Jennifer Meyer, Allan Wigfield, Jens Möller

Abstract: Academic motivation is an essential predictor of school success in K-12 education. Accordingly, many meta-analyses have examined variables associated with academic motivation. However, a central question remains unanswered: What is the relative strength of relations of both student variables (achievement, socioemotional variables, background variables) and instructional variables (teacher variables, interventions, and technology) to academic motivation? To address this question, we provide a systematic review of meta-analyses on constructs focusing on the question "Do I want to do this activity and why?" We include 125 first-order meta-

analyses published before January 2021, with 487 first-order effect sizes investigating variables associated with academic motivation in K-12 education, and based on more than 8,839 primary studies and almost 25 million students. We computed second-order standardized mean difference (SMD) using two-level meta-analysis with robust variance estimation, considering moderators, including the methodological qualities and publication status of the meta-analyses. Results showed that overall student variables (SMD = 0.39) and instruction variables (SMD = 0.43) had medium and similar second-order effect sizes. Of the student variables, socioemotional variables (SMD = 0.52) and achievement (SMD = 0.46) were more important than background variables (SMD = 0.19). Of the instructional variables, teacher variables (SMD = 0.61) were more important than interventions (SMD = 0.36) and technology (SMD = 0.35). Overall, results provide the field with a clearer depiction of which student and instructional variables relate most closely to students' academic motivation and so have implications for designing interventions to foster students' academic motivation in school.

5. **The challenge of data granularity and time frame in motivational processes: a learning experiment**
   Thomas Martens, Moritz Niemann

Abstract: Motivational processes, especially in the framework of self-regulated learning were primarily investigated by questionnaire on a meso-level time frame. New data sources with different data granularities representing different time frames can be triangulated. A convincing theory should address these different time frames. Micro-level theories should be integrated into higher level models of self-regulated learning.

We investigated the occurrence of affective states during an introductory programming course (Python) with 95 subjects. Experience Sampling took place during the learning process every 270 seconds using 5 bipolar items on a continuous scale: tension, energy, interest, focus and pleasantness. Questionnaire measured different motivational aspects before and after the learning experiment. Subjects' faces were recorded on video during the learning process. Subjects reviewed their own learning process on video and were prompted to label their affective states every 15 seconds of the video.

With a growth curve model a 3-class-solution was selected for each of the 5 emotions from Experience Sampling. Class differences for interest and pleasantness had the greatest effects on the subsequent questionnaires. E.g. declining pleasantness leads to a significant decline in various motivational variables, like self-efficacy, intrinsic motivation, interest and a rise in anger and frustration. Visual inspection of the 12267 retrospective affect judgements shows that emotional states within a class could play a differential role. E.g. with growing disinterest uncertainty can deepen the disinterest and with growing pleasantness it can add to the pleasantness. These insights into the interplay of micro- and meso-level processes can be used for adaptive learning.

PAPER 3: Instructional design, social interaction, and motivation   216 | Online

Chair: Kathryn Bartimote

1. Triggers for interest in science in everyday family-life
Irit Vivante, Dana Vedder-Weiss

Abstract: Families play a major role in supporting their children's interest in science in everyday interaction. According to Hidi and Renninger's (2006) four-phase model of interest development, individual interest develops from situational interest which arises in response to a trigger: an environmental stimulus that draws the learner's attention. However, little is known about everyday family-life triggers: what kinds of stimuli trigger children's interest? When do these triggers accrue, where, and by whom? This study aims to characterize and categorize everyday family-life science interest triggers. Through a self-ethnography of one Israeli family, using fixed 24/7 cameras in the house, Go-Pro cameras, and mobile phone recordings, we collected video and audio recordings of science-related interactions across settings and time. Analyzing a maximum variance sample of these recorded interactions, we found three dimensions of everyday-science triggers: identifiable or un-identifiable; intentional or accidental; self-noticed or mediated. Overall, the findings suggest that in this family the children's situational interest was mostly elicited by self-noticed, identifiable, accidental triggers, despite the parents' repeated attempts to mediate trigger for their children's interest. This study offers a framework to describe and analyze everyday family life science-related interest triggers and advances our understanding of science interest development in informal everyday settings. The study also illustrates the benefit of a novel data collection approach for the study of interest and other affective constructs (motivation, emotion, identity) at the home.

2. Changes in mathematics self-concept, interest, and achievement in co- versus solo-taught classes
Hans Lehikoinen, Markku Niemivirta

Abstract: The aim of this study was to examine the development of mathematics motivation and achievement, and whether those developments are different in co- versus solo-taught classes. More specifically, we investigated i) how students' mathematics achievement, self-concept, and individual interest change over one year, ii) how those changes are connected with each other, and iii) whether they are predicted by the teaching condition (co- vs. solo taught classes). The participants were 70 sixth-grade students co-taught in mathematics by three co-teacher dyads, and 76 students taught by solo teachers. The data included three repeated measures of motivation as well as pre- and post-measures of low stakes mathematics test performances and teacher-rated mathematics achievement. A series of latent growth curve analysis revealed students' self-concept and interest to decline over time, and these changes to be strongly correlated. That is, when self-concept decreased, interest declined as well, and vice versa. Previous mathematics grade predicted the level of both self-concept and interest, and subsequent achievement. Co-teaching predicted later mathematics grade, but neither test performance nor changes in motivation. This suggests that the positive impact of co-teaching on students' mathematics achievement is not mediated by motivation. However, the effect on students' grades must also be interpreted with caution, as it may reflect some type of bias. Further research is clearly required.

3. Control of disruptive behavior at school : a meta-analysis of "differential reinforcement for all"
Irène Freyssinet, Pascal Pansu

Abstract: Disruptive behaviors are a source of concern in schools. They negatively impact academic success. One strategy to reduce the emergence of disruptive behaviors is ignoring them while reinforcing appropriate ones. Applying this strategy consistently to all the students in a class should be beneficial because it creates a new class norm. This presentation presents a meta-analysis of 14 studies that focus on the "differential reinforcement strategy for all". The results revealed a significant effect of this strategy. They also showed a large effect size heterogeneity across studies partly explained by the following moderators: the strategy used, the preventive learning, and the school year level. In conclusion, the "differential reinforcement strategy for all" seems to be one of the most effective ways to reduce disruption in ordinary classroom situations.

4. Exploring the fidelity of motivation constructs within a large, diverse university student sample
Kathryn Bartimote, Lorraine Smith, Helen Watt

Abstract: In this study, seven motivation constructs originating in a variety of research traditions have been explored via a factor analysis of 2,480 survey responses from university students completing 22 courses in a range of disciplines and year levels. The structure of many published scales could not be confirmed here, however two reliable scales (individual interest and self-efficacy) emerged from the seven explored. The individual interest scale comprised items from various scales published in the higher education, educational psychology, and science education literatures. A structural equation model was used to investigate the relationship between gender, interest, self-efficacy and achievement. Self-efficacy directly predicted achievement however interest did not, with male students having lower attainment in general. Interest is shown to be a possible antecedent to self-efficacy. Female students had higher interest levels and somewhat lower self-efficacy. Interest emerges from this study as an important and potentially unifying construct across research traditions.

5. Effective pedagogies by affective mathematics teaching
Mei-Shiu Chiu

Abstract: The aim of this study is to identify effective pedagogies by affect-focused or affective mathematics teaching. The Mathematics Grounding Activities (MGAs) designed and implemented by Taiwan scholars could serve this purpose, given the MGAs' primary aim for enhancing students' affective competence in mathematics (Wang et al., 2021). Qualitative and quantitative mixed methods were used to analyse the 42 MGA videos. In qualitative analysis, the key moments (as teaching context) of the MGAs were coded and identified for their potential pedagogical effectiveness or learning opportunities to promote students' affective and cognitive competencies (as student issues). The analysis finds that the MGAs' lesson structure included four phases: entry, entertainment, enlightenment, and enrichment, each with distinct affective and cognitive pedagogies. For the quantitative analysis, counting and averaging the occurrence of the effective pedagogies finds that the MGAs used 46.8% of the identified affective pedagogies and 65.5% of the cognitive pedagogies (54.3% of all the pedagogies). The qualitative results contribute to the knowledge of a 4-phase lesson structure, each with relatively affect- and cognition-focused pedagogies, for addressing students' affective issues in mathematics classrooms. The quantitative results suggest that affect-focused pedagogies (like those used in the MGAs) are likely to enhance students' affective competence, without at the expense of the cognitive competence in mathematics learning.

PAPER 4: Assessing and supporting student´s self-regulation   **E11 I Online**

Chair: Panayiota Metallidou

1. How can we better support self-regulation skills in the early years classroom to promote learning?
Michelle Downes, Amy McGrane

Abstract: The identification of poor self-regulation skills at the early stages of formal learning can help improve academic attainment and the learning experience of children who struggle to keep up with peers on everyday classroom tasks. Ecological measures of self-regulation, or multi-step behavioural tasks that mimic everyday developmentally-appropriate tasks, are lacking in educational settings and it is unclear whether performance on these measures in the early days of formal education could be useful for supporting children who may later struggle academically. The current research explored whether early performance on the Preschool Executive Task Assessment (PETA) could predict later executive functioning and literacy skills. Performance on the PETA task was linked to later literacy and executive functions. The implications of using practical tools such as the PETA in the classroom setting at the start of formal education are discussed.

2. Are metacognition interventions in school-aged children effective? Evidence from a meta-analysis
Janina Eberhart, Donna Bryce, Franziska Schäfer

Abstract: Metacognition is a cognitive skill highly important in school. Children who show high levels of metacognition set themselves goals, monitor their progress, and adapt their behaviour as needed when completing a task. Children show individual differences in these skills and some need support in developing them. Given the great benefits of these skills, research aims to understand if interventions could promote children's metacognitive skills and what type of interventions have the biggest impact. In a new meta-analysis, which updates and extends the one by Dignath and colleagues (2008), we aim to establish the effectiveness of metacognition interventions targeted at typically developing primary school children (up to 12 years of age). Studies identified via scientific databases (PsycINFO and ERIC) and a call for unpublished data underwent an initial selection process resulting in 187 potentially relevant papers; a final sample of approximately 65 papers reporting interventions that either primarily or partly trained metacognitive skills entered the meta-analysis. In this presentation we will share our findings from this meta-analysis, in which we also aim to explore the impact of the focus of the intervention, aspects related to instruction, and account for different outcome categories. The implications for pedagogical practice will be discussed.

3. Developing assessments with school teachers for students' metacognitive awareness of deeper learning
Yuri Uesaka, K. Hirosawa, T. Sakaguchi, Y. Mizuno, E. Ota, S.i Shiba, M. Tomita, M. Chono, Y. Sugiyama

Abstract: Promoting deeper learning and cultivating the metacognitive learning beliefs behind it are important topics in 21st century education and in the self-regulated learning research area. However, students tend not to learn deeply and often have poor metacognitive beliefs about learning (e.g., just valuing rote memorization and neglecting the process of solving). One of the reasons for students' shallow level learning behaviors and beliefs is that traditional forms of assessment have mainly focused on just solving problems and not evaluating explicitly the extent of students engagement with deeper learning. As a result, even if teachers emphasize the values of deeper learning, students themselves cannot judge properly whether they understand the material deeply or not. Hence students do not acquire metacognitive awareness of deeper learning and tend to resort to shallow learning. This paper describes a case study that addresses this problem at one high school in Japan. It proposes a new style of assessment directly evaluating the achievement of deeper learning among students. The assessment construction was a collaboration between researchers and school-teachers, and can therefore be considered a good example of a mutually beneficial research practice partnership (RPP). In the school, as a result of the change of assessment and the instruction used in class to match the new assessment, performance improvement in students' problem solving capabilities was found (compared to the previous year's students without the intervention). Students' metacognitive awareness about the value of deeper learning and change of learning behaviors toward deeper learning were also confirmed.

4. Children's behavioral and metacognitive strategies for regulating negative emotions
Panayiota Metallidou, Eleftheria Lamprianidu

Abstract: The present study aimed at exploring elementary school children's awareness that the use of metacognitive regulation strategies (e.g., changing thoughts or goals) can alleviate negative emotions. Further, it is examined children's flexibility in choosing between behavioral and metacognitive strategies according to the discrete emotion that needs to be regulated and to whether the emotional situation is under one's control or not. One hundred and sixty one Greek elementary children of both genders (n = 80 boys) from first (n = 81) and sixth grades from various public elementary schools in northern Greece were examined individually. They were asked to report emotion regulation strategies to alleviate sadness, anger and fear: (a) in past autobiographical events and (b) in hypothetical events that trigger these negative emotions and are under the story protagonist's control or not. The results showed that children in middle childhood, even the younger ones, have a well-developed repertoire of metacognitive strategies for regulating their negative emotions. Further, they have a well-developed metacognitive conditional knowledge base of when to use behavioral or metacognitive strategies, depending on the emotion and the contextual factors in the emotional situation. Finally, as they are getting older they show a more sophisticated understanding of the need to deliberately change one's thoughts and/or goals as more effective strategies than to act behaviorally for regulating discrete negative emotions, like sadness, which are more "affected" than other emotions by thinking processes, irrespective of the context. Implications for school-based interventions to foster emotion regulation skills are discussed.

5. Regulating emotions in the early years classroom to improve the quality of teaching and learning
Erika Galea

Abstract: Children's mental health has become an international and societal priority; the prevalence of mental health difficulties has exceedingly increased for various reasons. The research study focuses on the implementation of emotion regulation (ER) strategies through co-regulation within the early years that will help support the children with varied emotions. The use of learning strategies alongside ER can support self-regulation of both positive and negative emotional episodes and equip pupils with effective strategies in order to cope with the pressures of everyday life. The principal objective of the study was to trial and test the effectiveness of an intervention to support the promotion of ER strategies by teachers. These ER strategies would promote better effective learning leading to improved academic performance and safeguard against mental/adjustment problems later on in life. The results of the current study indicated that relative to control participants, the intervention participants showed the adoption of antecedent-focused ER strategies with their pupils following the teacher training workshop. Cognitive scaffolding of the strategies through co-regulation for the intervention group was apparent leading to peer regulation and/or self-regulation. As a result of this, a positive impact was noted in the students' behaviour and on the classroom environment. The findings are discussed in light of related research suggesting that the growth and enhancement of children's ER are ingrained into the children's early social interactions within their family and school setting, interacting with processes of neurobiological maturation. ER is considered a crucial developmental milestone necessary over the lifespan, especially during early childhood.

PAPER 5: Metacognition, affect, and decision making   105 Online

Chair: Sara Becker

1. Observations of metacognitive tendencies of high and low foreign language anxiety learners
Rebecca Paterson, Emmanuel Manalo

Abstract: In the increasingly globalised environments we now operate, speaking in a foreign language (FL) is both necessary yet nerve-racking for many. Speaking in a FL is under the control of a learner's metacognition, and research in other domains (e.g., mathematics anxiety) have revealed metacognition's role in the possible onset and/or maintenance of negative affect. The link between foreign language anxiety (FLA) and metacognition, however, is currently unclear. To understand this link further, the authors combined the use of novel scenarios in a questionnaire to identify differences in metacognitive thoughts and behaviours between high (HA) and low anxiety (LA) participants. HA participants were found to attend to less relevant information, use fewer effective strategies and regard themselves more negatively especially in relation to their language, whereas LA participants mentioned more strategic choices, were focused more on the hypothetical task given, and appeared to see themselves as more relaxed in English language settings. While LA participants also evidenced some negative attitudes, these were less focused on denying their English abilities.

2. Individual differences in giving up tendencies
Marvin Law, Lazar Stankov, Sabina Kleitman, Valerie Thompson

Abstract: Metacognition and reasoning are among key factors to good decision making (e.g., de Bruin, Parker & Fischhoff, 2007; Kleitman & Stankov, 2007). Based on the meta-reasoning model (Ackerman & Thompson, 2017), these two factors are inherently linked: individuals use metacognitive monitoring and control processes to monitor and regulate reasoning. These processes allow people to evaluate their feelings of certainty and uncertainty involved in test-taking activities and decision processes, e.g., committing to a response, or opting-out of responding.

Recently, a line of research has investigated individual differences in feelings of giving up, i.e., those that lead to opt-out decisions, and compared them to known constructs from the meta-reasoning framework and decision-making nomological network. There were four aims across two studies and three samples (Study 1, N = 176; Study 2, N = 177 and N = 197): 1) to establish whether individuals give up systematically across different tasks, 2) to examine how individual differences in giving up tendencies relate to other cognitive, metacognitive and decision-making variables, 3) to examine the effect of task characteristics on giving up tendencies and 4) to examine the predictive validity of these tendencies on life outcomes such as academic performance and decision outcomes.

The results indicated that frequency of giving up appear to be systematic across tasks, loading onto a Giving Up Factor which is distinct from trait Confidence and Cognitive Ability. Furthermore, there appear to be both internal (i.e., individual differences) and external (i.e., task characteristics) variables which affect giving up tendencies (frequency and duration).

3. Explaining recall bias of students' emotional experiences in adolescence
Philipp Schmidt, David Jendryczko, Carmen Zurbriggen, Fridtjof Nussbeck

Abstract: Adolescence is characterized by multiple changes in physiological, social, and cognitive processes, which are associated with high intraindividual variability of emotional experiences. Previous findings suggest that this intraindividual variability is reflected in a recall bias of adolescents' emotions. However, the corresponding findings are inconclusive. While in one study, adolescent students (14–17 years) generally overestimated their positive and negative emotions in retrospective assessments (i.e., intensity bias), other findings indicated a negative recall bias (i.e., blue view) for 15-year-old adolescents. Studies on predictors of recall bias in adulthood indicate that personality traits, especially neuroticism and extraversion, as well as specific internalizing disorders affect recall bias of emotion reports.

Thus, the present study aimed to examine whether personality factors and internalizing behavior could predict a recall bias in adolescent students' emotional experiences. To this end, we compared in situ reported emotional experiences with retrospectively assessed emotional experiences of 118 eighth- and ninth-grade students (M age = 15.15, SDage = 0.89). Students repeatedly reported their momentary emotional experiences during one school week and once in retrospective at the end of the school week. In addition, students assessed their personality, and

teachers evaluated the students' behavior. In order to test our hypotheses, we applied a latent difference model within a two-level structural equation modelling framework with latent variables. Results indicate a positive recall bias predicted by extraversion. Neuroticism, in turn, predicts retrospective effects for only negative emotional experience. Internalizing behavior does not predict retrospection effects for positive or negative emotional experiences.

4. Diagnostic processes under stress: eye-tracking in combination with physiological data
Sara Becker, Tobias Dörfler

Abstract: Stress pervades everyday teachers' life and can influence cognitive processes underlying diagnostic judgement. Because up to now, little is known about the diagnostic processes under stress, the present study was one of the first using the methodological of eye tracking in combination with think aloud protocols and physiological data to examine the influence of stress on teachers' cognitive processes. For this purpose, an experimental study was conducted with 64 prospective teachers. Based on the analysis of cortisol concentrations and of the eye movements, results showed that stress can affect cognitive processes underlying teachers' judgement. The results indicate that stress reduces reflective processing and increases intuitive processing in particular. The results offer implications for previous research of teachers' diagnostic competencies as well as of teachers' stress and also offer implications for practice.

5. The epistemic emotion confusion may serve as a cue for accurate mental effort estimates
Moritz Niemann, Diana Pistoll, Thomas Martens

Abstract: An important part of Self-regulated learning (SRL) is monitoring ones' experiences during a learning task, as well as making accurate summative self-reflective judgments after a learning task. Accurate judgments allow a learner to evaluate if learning was successful and whether they will be able to apply their knowledge in an upcoming assessment. It is plausible that learners recall their experiences during a learning task and use these as cues for their summative judgments. In this study, we investigated the relationship between the epistemic emotion Confusion, summative Mental Effort estimate, and Performance. We found that Confusion has a positive effect on Performance, and that this effect is fully mediated via Mental Effort. We conclude that experiencing Confusion leads learners to estimate their Mental Effort to be higher, and this judgment is correct insofar as people with higher Mental Effort also showed higher Performance. In conclusion, we found that Confusion during a learning task serves as a valid cue to accurately estimate ones Mental Effort. These results highlight the role of epistemic emotions during the learning process. In contrast to irrelevant emotions, which have been shown to incorrectly inflate other self-reflective estimates like judgments of learning, epistemic emotions may be an important source of information for accurate self-reflection.

Thursday 16:30–18:00	Keynotes Mid-Career Awardees	E11 I F–to–F with stream

Chair: Hanke Korpershoek

MID-CAREER-KEYNOTE 1 | **Barbara Flunger, Universiteit Utrecht, The Netherlands**

Promoting student motivation: But how and for whom?

Abstract: Students' motivational problems can have substantial societal costs: From poor performance to drop-out (ranging from 20–46% in European countries). Therefore, it is essential to study how motivation can be improved. A body of research has confirmed that teachers' autonomy support can boost students' academic outcomes. Yet, if teachers use autonomy support in their classrooms, will all of their students become more motivated and engaged? In order to reveal differences between students, our research considers distinct educational and psychological factors that facilitate motivation, learning behavior and academic achievement of heterogenous groups of students. Our findings showed that students with distinct levels of motivation and engagement can benefit from motivational support. The few differential effects we revealed highlighted that relatively high initial motivation can function as a motivational resource and increase the benefits of autonomy support. Yet, our findings also suggest that students may observe differences in how teachers provide autonomy support within their classroom. When teachers adjust their autonomy support to individual students, students can perceive inequalities in the amount of support they receive compared to the overall class and specific classmates. Differences in teachers' autonomy support in the classroom may not per se trigger negative outcomes in students: We found that students' perception that other students received more support than they did is associated with students' extrinsic motivation. Thus, teachers should be mindful to evenly distribute individual autonomy support within their classroom. Students might thrive most if they perceive their teachers to be autonomy-supportive in distinct situations, when teachers interact with the entire classroom and with individual students.

MID-CAREER-KEYNOTE 2 | **Heta Tuominen, University of Helsinki, Finland**

Balancing doing well with feeling well: Dynamics between student motivation and well-being

Abstract: Recent evidence indicates that there is a worrying increase in academic pressure and burnout among students and that perfectionism has increased among youth. Therefore, a need to study young people's motivation, perfectionistic tendencies, and well-being appears pressing. Despite the increasing prevalence of study-related burnout, significant individual differences in these developments take place. A possible key to the patterning of these differences lies not only in the level of goals the students seek to attain, but also in the type of goals striven for. Achievement goal orientations and perfectionism are two instrumental frameworks for understanding how students set goals, how they meet their imposed demands, and how they interpret achievement situations. In a series of studies, we have explored students' simultaneously salient multiple goals and demonstrated that they contribute to student well-being. For example, when a student aims to excel and outperform others, this sort of performance mode might result in not only academic success but also vulnerability for experiencing pressure, psychological cost, and exhaustion. Furthermore, we have examined students' perfectionistic profiles and how they predict well-being. Especially students with profiles characterized by high concerns (concerned and perfectionists) are at risk of study-related burnout. Our findings have also indicated that university students' perfectionistic profiles are linked with their stress experiences, coping, and recovery during the COVID-19 pandemic. Particularly a combination of high strivings and concerns seems to threaten university students' well-being. The findings add to our understanding of how both, the level and quality of goals, contribute to well-being.

Thursday 18:10–19:10	**EARLI SIG-8 Business-Meeting**	**E11 I F–to–F hybrid**

Thursday 20:00	Conference Dinner – French Pavilion – Alte Meister

Program Overview Friday, 26.8.2022

Joint Day of EARLI SIG Motivation and Emotion with EARLI SIG Metacognition and Self-Regulated Learning

FRIDAY, 26 AUGUST 2022			
09:00	Keynote 4 I E11 Patricia A. Alexander, University of Maryland, USA Skill, will, and thrill: The complex interplay of cognition, metacognition, motivation, and emotion in learning and development		
10:00	Coffee Break		
10:30	**Invited Symposium 1 | E04 P** Do teachers' motivations, emotions, and self-regulation matter for students' educational outcomes? C: Fani Lauermann, Ruth Butler, Bracha Kramarski D: Ruth Butler, Anastasia Efklides	**Invited Symposium 2 | E08 P** Development of motivation and metacognition C: Eleftheria Gonida, Claudia Roebers D: Deborah Stipek	**Invited Symposium 3 | 114 H** Self-evaluations of learning and competences C: Manuela Paechter, Marion Händel D: Philip Winne, Penelope Watson
12:30	Lunch Break – Tusculum		
13:30	**Invited Symposium 4 | E04 P** Meta-motivation and meta-reasoning C: Yves Karlen D: Patricia A. Alexander	**Invited Symposium 5 | 114 H** Emotional and metacognitive processes during technology-based learning C: Roger Azevedo, Michelle Taub, Reinhard Pekrun, Kristina Stockinger D: Susanne Lajoie, Inge Molenaar	
15:30	Coffee Break		
16:00	Oxford Style Debate I E11 How to best investigate the interplay of motivation, emotion and metacognition in learning and instruction? Debaters: • Tim Urdan, University of Michigan, USA • Kirsti Lonka, University of Helsinki, Finland • Phil Winne, University of Vancouver, Canada • Thomas Goschke, Technische Universität Dresden, Germany • Peter Reimann, University of Sydney, Australia Moderators: Fani Lauermann, Hanna Gaspard, Charlotte Dignath		
18:00	Conference Closing – Farewell I E11 • Farewell – Conference President: Susanne Narciss • Farewell – SIG8 Coordinators: Hanna Järvenoja, Hanna Gaspard		
19:00	Wrap-up Joint Day – Carolaschlösschen – Großer Garten		

Friday 09:00-10:00	Keynote Session 4	E11 | F-to-F with stream

Chair: Yves Karlen

KEYNOTE 4 | Patricia A. Alexander, University of Maryland, USA

Skill, will, and thrill: The complex interplay of cognition, metacognition, motivation, and emotion in learning and development

Abstract: It is a truism to proclaim that learning is an immensely complex process and that the path to becoming a competent learner in any field can be perilous and uncertain. Still, for more than 40 years, I have made it my mission to investigate the nature of academic learning and to map out a path toward increasing competence. In this presentation, I will chronicle some of that exploration and several course adjustments that occurred due to shifting theoretical and methodological currents in educational and psychological science, as well as to personal theoretical and methodological re-orientations. Those re-orientations involved mounting evidence that the attainment of competence cannot be attributed solely to cognition (skill), metacognition (will), motivation or emotion (thrill). Rather, it is the continual interplay of these components within learning environments and societal contexts that either fosters students' academic development or frustrates it. With this path to competence mapped out, I will offer guidance on embedding skill, will, and thrill in learning environments to promote students' academic development.

Friday 10:30-12:30	Invited Interactive Symposia – I

SYMP 1: Do teachers' motivations, emotions, and self-regulation matter for students' educational outcomes?   **E04 I F-to-F**

Chairs: Fani Lauermann, Ruth Butler, Bracha Kramarski   **Discussants**: Ruth Butler, Anastasia Efklides

Abstract: Teachers' motivations, emotions, and self-regulation in professional settings can have profound implications for their professional decision-making, work engagement, and wellbeing. However, links between teachers' affective-motivational and self-regulatory characteristics with their students' educational outcomes remain elusive. Two key pathways of influence have been proposed: First, teachers' affective-motivational and self-regulatory characteristics might lead teachers to engage in high-quality instructional practices that are likely to benefit students. Second, teachers' motivations, emotions, and self-regulation might affect students via the mere contagion of positive affect (e.g., shared enthusiasm in the classroom) or role model effects. Unfortunately, comparatively few studies to date have systematically examined these pathways, and the available evidence is mixed, with some studies showing positive links with students' educational outcomes, whereas others showing null or even negative associations (e.g., Lauermann, 2015; Lawson, et al., 2019; Zee & Koomen, 2016).

To clarify these puzzling results, this invited symposium features the work of leading experts in the fields of teacher motivation, emotions, and self-regulation research, who focus on the interplay between teachers' psychological characteristics, teaching practices, and students' educational outcomes. The contributions draw on diverse theoretical perspectives (e.g., achievement-goal theory, expectancy-value theory, and self-regulated learning) and use complementary methodological designs (e.g., systematic reviews, longitudinal research, multi-level analyses, classroom observations, and interventions). An explicit goal of this symposium is to not only contribute to a better understanding of the interplay between teacher and student characteristics but also provide a platform for the exchange of ideas across the fields of teacher motivation, emotion, and self-regulation research.

SYMP 1: Do teachers' motivations, emotions, and self-regulation matter for students' educational outcomes?   *continued*

1. Teachers' perceived teaching competence and student-reported classroom processes and outcomes
Fani Lauermann, Inga ten Hagen

Abstract: Teachers' teaching-related competence beliefs such as perceived teaching ability and self-efficacy have been linked to their occupational wellbeing and external evaluations of instructional quality. However, researchers have struggled to establish a reliable empirical link between teachers' competence beliefs and students' academic outcomes. To clarify these puzzling results, we review different conceptualizations of teachers' competence beliefs and their hypothesized effects on students, and we focus in particular on student-reported classroom processes and outcomes in authentic K-12 classrooms. Our review revealed considerable ambiguity concerning the conceptualization and assessment of teachers' competence beliefs in empirical research. Furthermore, there is a paucity of empirical evidence testing central assumptions about the associations between different types of beliefs about teaching competence, mediating processes such as instructional quality, and student outcomes in authentic K-12 settings. We identify and discuss important gaps in existing research that we believe warrant attention and outline directions for future research.

2. Teacher motivation and student outcomes: The search for the signal continued
Lisa Bardach, Robert Klassen

Abstract: Whereas links between teacher motivation and teacher-related outcomes such as teachers' well-being and commitment to the profession are well-documented, prior research on associations between teacher motivation and student outcomes has been less consistent. This presentation focuses on teacher motivation (self-determination theory, achievement goal theory, implicit theories). First, we present the results from two reviews on research on self-determination theory and achievement goal theory and the results from a meta-analysis on teachers' implicit theories to examine whether, when, how, and why teachers' motivation may influence—or at least relate to—which student outcomes. The processes by which teacher motivation is associated with student outcomes, such as via specific instructional strategies, are also considered. Second, we discuss the question why research on teacher motivation often fails to find consistent effects on student outcomes: Where in the complex chain of events from teacher motivation to student outcomes does the signal get lost? We also take research on the reverse ordering of effects, reciprocal effects, and the dynamic interplay between teacher motivation and student outcome variables into account.

Based on our own and other scholars' work on teacher motivation, we highlight challenges and promising directions for future research on teacher motivation continuing to search for the signal.

3. Interrelations between teacher and student motivation over time: An expectancy-value perspective
Hanna Gaspard, Cora Parrisius, Fani Lauermann

Abstract: This paper examines the association between teacher and student motivation from an expectancy-value perspective and focuses on the transmission of value in the classroom. Longitudinal data from 1,744 ninth-grade students and their 70 math teachers were used in two studies.

Study 1 examined the effects of teachers' valuing of teaching math on their students' valuing of math and whether such effects are mediated through teachers' instructional practices. Results suggested that teachers' teaching enthusiasm predicted students' values through both student-perceived enthusiastic behaviors during instruction as well as relevance-related instructional practices. Teachers' subject-related values (i.e., math enthusiasm and utility value) also predicted students' utility value, but this transmission could not be explained by the instructional practices under investigation.

In Study 2, we adopted a situated perspective and investigated lesson-specific variation in teacher and student motivation in order to capture joint motivational fluctuation and a shared perception of class-level motivational climate. We used state measures of both teacher- and student-rated motivations, namely teacher enthusiasm, teacher-rated student engagement, student engagement, and student-perceived teacher enthusiasm, which were assessed at the end of five consecutive math lessons. Multi-state-multi-trait analyses revealed substantial "trait-like" consistency in all four motivational measures across the five lessons, with student-perceived teacher enthusiasm showing the highest consistency over time. Furthermore, a substantial degree of lesson-specific shared variance among the four motivational measures indicated that there are systematic "state-like" fluctuations in the motivational climate, which suggests that teachers' and students' motivations have a shared cause that is situation-specific or results from person-by-context interactions.

4. Teachers as agents in promoting students' SRL and performance: The "triple SRL-SRT processes" model
Bracha Kramarski, Orna Heaysman

Abstract: An essential part of the teacher's role in the twenty-first century is supporting students' self-regulated learning (SRL), relating to cognitive, metacognitive, and motivational actions towards their learning goals as independent learners. However, teachers face multiple challenges in attaining self-regulation in learning (SRL) and teaching (SRT), resulting from a lack of knowledge, motivation, and practices in the SRL-SRT roles. To cope with these challenges, the "Triple SRL-SRT Processes" conceptual framework and a unique practical model for professional development are proposed. The framework refers to three types of self-regulation processes: (1) teachers' self-regulation of their learning; (2) teachers' self-regulation of their teaching; (3) teachers' activation of students' SRL as agents for teaching SRL.

To help teachers internalize this framework, we designed a unique "AIDE" program oriented to Authentic, Interactive, and Dynamic Experiences, based on simulations with real actors and video analysis embedded in teachers' professional development for integrating SRL-SRT theory and in-class practices. The effectiveness of the triple framework was assessed in a quasi-experimental intervention study, which compared (pre/post) a teachers' experimental (AIDE) group (n=38) to a control group (n=38). Authentic measures showed positive effects on teachers' triple SRL-SRT knowledge and skills, beliefs in autonomous learning, and in-class practices (explicitness level and duration). The SRL and achievement of students in grades 3-5 (n=313) improved following their teachers' participation in the program. HLM analysis revealed that teachers' SRL-SRT practices are related to students' achievement. The conceptual contributions and practical implications to teacher training and professional development will be discussed.

5. Teachers' metacognition about supporting self-regulated learning in their classrooms
Nancy Perry, Nikki Yee, Silvia Mazabel, Ben Dantzer, Xinke Wan, Marissa Hall

Abstract: Participatory approaches to research and professional learning are needed to support teachers' efforts to promote self-regulated learning (SRL) in classrooms. These approaches are distinct from top-down "training" models as they place teachers at the center of change efforts, enabling them to adapt innovations to suit their students' needs and support one another. In this presentation, we describe how we support teachers' SRL (i.e., metacognition, motivation, and strategic action) in "teacher learning teams" and the subsequent opportunities they create for students to develop and engage in SRL. Data are from 13 teachers participating in a longitudinal study of children developing SRL from Kindergarten through Grade 6 (ages 5-12) and include reflections templates (completed during learning team meetings), classroom observations (in the form of running records), and debrief interviews. We identify four patterns of metacognitive reflection and action, each resulting in different patterns of support for SRL. We use case descriptions to elaborate cluster findings and draw inferences about how to help teachers develop SRL-promoting practices.

6. Investigating teacher competence to foster self-regulated learning
Charlotte Dignath, Yves Karlen

Abstract: There is a need to expand and advance our understanding of how and which teacher characteristics affect teachers' self-regulated learning (SRL) practice in the classroom. By bridging research –across the fields of SRL and teachers' domain-general professional competence, this presentation features the results from three studies that investigate how teacher characteristics (i.e., instructional beliefs, knowledge, and motivation related to SRL) are associated with teachers' SRL-practice and their students' learning outcomes.

In Study 1, we investigated potential determinants of teachers' SRL-practice, namely teachers' knowledge, beliefs, and self-efficacy. In Study 2, we explored different profiles of teachers' competence to promote SRL in their classroom, and analysed the predictive effects of these SRL-competence profiles on teachers' SRL-practice, as well as corresponding effects on students' SRL. In Study 3, we tested the effects of a short-term teacher training about SRL on the development of teachers' SRL-competence, as well as a potential moderating effect of teachers' SRL-competence profiles on the hypothesized training effect.

The results of the three studies show that examining teachers' knowledge, beliefs, and self-efficacy for SRL simultaneously explains variation in their SRL-practice. Notably, the results across all three studies stress the importance of teachers' self-efficacy to foster SRL. Implications for future research in the field of teachers' SRL-practice are discussed.

SYMP 2: Development of motivation and metacognition   E08 I F-to-F

Chairs: Eleftheria Gonida, Claudia Roebers   **Discussant**: Deborah Stipek

Abstract: In theoretical models of self-regulated learning, motivation and metacognition are conceptualized side-by-side, with both concepts being considered as interrelated components of self-regulated learning. However, research on the development of each construct has followed distinct theoretical and methodological lines ignoring their interrelations. The aim of this interdisciplinary symposium is to bring closer related yet distinct theory and evidence in the fields of metacognitive and motivational development and provide an integrated overview towards a better understanding of how motivation and metacognition develop and associate to each other over time. Both leading and promising young researchers will present state-of-the-art research attempting either to shed light on the link between motivation and metacognition across the life span or to present new research questions addressed with innovative methods that have the potential to guide future directions in bridging motivation and metacognition research. Specifically, evidence on the development of 'knowing about knowing', self-monitoring, implicit vs explicit metacognition and metacognitive strategy use will be approached autonomously but also in relation to the development of self-efficacy, future time perspective, perceived competence and interest over time. One expert in both fields will attempt to connect the above constructs by identifying their dynamic interplay in the course of development and why bringing closer these two lines of theory and research will substantially contribute to our better understanding of the development of the self-regulated learner as well as of the strategic and motivated human mind.

1. Knowing minds: Early perspective taking predicts later metacognitive insight
Daniela Kloo, Beate Sodian, Markus Paulus

Abstract: In general, there is consensus that at around 3 years of age children acknowledge their own ignorance, when they are totally ignorant about, for example, the content of a box. However, recent metacognitive research using a partial knowledge task indicates that a firm understanding of "knowing about knowing" develops surprisingly late, at around 6 years (Kloo, Rohwer, & Perner, 2017; Rohwer, Kloo, & Perner, 2012). In this partial knowledge task, children are presented with a set of possible objects ahead of hiding one of the objects in a box. Interestingly, children claim to "know" up to around 6 years of age. To reveal the mechanisms subserving the development of this meta-knowing, the partial knowledge task was used in a longitudinal study with 67 children (33 girls) as an outcome measure at 5;9 (years;months). In addition, children's theory of mind understanding was assessed with first- and second-order false belief tests at 4;2, 5;0, and 5;9. At 2;6 years Level 1 perspective taking and executive abilities (Fruit Stroop) were evaluated. We found that metacognition at 5;9 was correlated with earlier Level 1 perspective taking and second-order false belief understanding – even when verbal intelligence and executive abilities were partialled out. In general, these results fit with the argument that meta-knowing is rooted in early theory of mind. And this highlights the importance of perspective taking for the development of an understanding of one's own mind.

2. Self-efficacy and self-monitoring in elementary school: Do these judgments overlap?
Mariette van Loon, Claudia Roebers

Abstract: Judging the likelihood of task success is common in research on metacognition (self-monitoring judgments) as well as in research on motivation (self-efficacy judgments). Although self-efficacy and self-monitoring seem quite similar and seem both predictive of performance measures, these judgments have mostly been investigated in isolation. This study aimed to investigate the overlap between self-efficacy and self-monitoring, and the extent to which these judgments uniquely predict performance. In elementary school, subjective judgments may become more strongly related to performance over the course of development. To investigate developmental effects, fourth (n = 97) and sixth (n = 106) graders were compared. They studied concepts with definitions and were tested for understanding. Before starting, they completed a self-efficacy questionnaire, addressing to what extent they thought they would be able to learn the concepts. After completing test questions, children self-monitored performance by judging the correctness of each response. Self-efficacy was related to self-monitoring for fourth (r = .37) and sixth (r = .42) graders. Hierarchical regression analyses investigated whether self-efficacy and self-monitoring uniquely predicted performance. In a first analysis, self-efficacy was entered in step 1, and self-monitoring in step 2. Self-efficacy predicted performance for sixth, but not for fourth graders. After controlling for self-efficacy, self-monitoring significantly predicted performance for both age groups. A second analysis showed that after controlling for self-monitoring, self-efficacy did not further predict performance. That is, although self-efficacy and self-monitoring overlap, self-monitoring seems to have unique, independent effects on performance for both fourth and sixth graders.

3. Behavioral regulation versus explicit reports: Implicit metacognition in a lifespan perspective
Marie Geurten

Abstract: Humans have the ability to estimate the success of their cognitive processes, a capacity that is known as metacognition. Generally, researchers assume that metacognitive regulation is achieved through deliberate inferences in which various pieces of information are consulted and weighed before making decisions. These explicit metacognitive skills emerge at a relatively late stage of child development (Fritz, et al., 2010) and are quite easily impaired in pathological aging (Cosentino, 2014). However, recent findings suggest that, despite an inability to explicitly estimate their own cognitive functioning, young children and patients with a neurodegenerative disease might demonstrate some implicit recognition of difficulties. Evidence showing that a behavioral dissociation between explicit and implicit measures of metacognition can be found in young children, AD patients, and healthy older controls will be presented (Geurten & Bastin, 2019; Geurten, et al., 2019). Data suggesting that implicit metacognition may be more resistant than explicit metacognition to the effect of pathological aging will be discussed.

4. Developments in adolescents' self-regulated learning after their transition to secondary school
Thea Peetsma, Ineke van der Veen, Jaap Schuitema

Abstract: This study focuses on developments in self-regulated learning (SRL) of young adolescents after their transition to secondary school. Models for SRL generally describe learners as active participants in a cyclical learning process. Pintrich' model (2004) brought together cognitive, motivational/affect, behavioural and contextual areas, differentiating four phases of regulation, starting with forethought, via monitoring and control, ending in reflection. In this study we investigated the relationship in the developments of motivational (future time perspective, self-efficacy), behavioral (effort regulation) and cognitive components (metacognitive strategy use) of SRL, expecting positive relations. We used two groups of students in the Netherlands: 735 students in a three wave study during their first year of the lowest academic level of secondary education (age 12-13) and 701 students in a five wave study during their first and second year of secondary schools (age 12-14). Self-report questionnaires were used to measure self-efficacy, future time perspective on school and professional career, effort regulation and the use of metacognitive strategies. Multivariate latent growth analyses were used to examine developments over school years and the relationship between developments of different SRL-components. Furthermore, using latent class growth curve analysis, it was explored whether groups of students with more positive effort regulation developments, also showed more positive developments in metacognitive strategy use, time perspectives on school and professional career and self-efficacy. Although students' effort regulation and future time perspective on school and professional career declined after the transition to secondary school, this did not count for their self-efficacy and use of metacognitive strategies.

5. Developmental interplay between interest and competence perceptions during task engagement
Markku Niemivirta

Abstract: "Do I want/like this" and "can I do it" are two key questions reflecting motivation in educational settings. In empirical research, they are often conceptualized as interests or values and perceived competencies or expectancies. Although studies have shown them to independently predict learning and performance, surprisingly little research has focused on whether and how they interact over time and jointly contribute to performance, even despite the intuitively clear connection: we tend to like to do what we are good at, and we tend to become better at things that we like more. This presentation gives an overview of findings from studies investigating the mutual relationships between interest and competence perceptions and how they are connected to task performance and achievement, both situationally and longitudinally. It will further address the role perceptions of difficulty play in this, and how these dynamics might depend on some more general individual differences.

6. Future directions in research on motivation and metacognition
Tim Urdan

Abstract: Since the 1970's, much of the research on motivation has focused on social-cognitive constructs including attributions, goals, expectancies, and values. The cognitive nature of these constructs has created a natural bridge between motivation and metacognition, where awareness of one's beliefs and cognitive strategy use is often the key to enhancing motivation. For example, making students aware of their explanations for their own successes and failures can be used to help students develop new attributions that are more adaptive for academic motivation and success (e.g., Dweck, 2005). Recent developments in technology and neuroscience, however, have begun to shift the focus away from cognitive components of motivation to non-conscious processes. In this presentation, we will discuss the dynamic interplay between cognitive and non-cognitive processes and how they contribute to the association between motivation and meta-cognition. We will also consider the potential impact of an increasing focus on cultural and situational factors on our understanding of human motivation and the connection between motivation and metacognition.

SYMP 3: Self-evaluations of learning and competences   114 I Hybrid

Chairs: Manuela Paechter, Marion Händel   **Discussants**: Penelope Watson, Philip Winne

Abstract: Self-evaluations are considered in research on self-regulated learning and metacognition (monitoring strategies or judgments) as well as in motivational research. The current symposium encompasses eight contributions from both fields of research and focuses on different theoretical and methodological perspectives in diverse settings and age groups.

Four studies focus on metacognitive strategies or judgment accuracy. First, an individual-differences approach explored the (in)accuracy of confidence judgments (Kleitman et al.). Second, a longitudinal study modelled the influence of metacognitive strategies on mathematics grades in higher education (Ringeisen). Use of predictive cues for judgment accuracy and their relation to regulation was studied in elementary students (van de Pol). Finally, an integrated approach studied the structure and relationship of monitoring strategies and monitoring judgments (Händel & Dresel).

Four further contributions illuminated predictors and consequences of self-concept. Two looked closer into the impact of self-concept and motivation-related variables (goal orientations or emotions) on psychophysiological responses to stress-related tasks (Steinlechner et al.; Hackl-Wimmer et al.). Another contribution (Ertl) investigated, in a sample of the National Educational Panel study, how outcome expectations can be predicted by prior outcome expectations and motivation. The last contribution focused on the impact of gender stereotypes and motivation on the self-concept of women in STEM (Luttenberger).

Thereby, the symposium encompasses a broad range of important research questions on the causes of more or less accurate self-evaluations, their impact on learning and behavior, as well as promising training procedures. The contributions are discussed by experts of metacognition (Winne) and motivation (Watson).

1. The impact of intrinsic and extrinsic motivation on students' expectations for study outcomes
Bernhard Ertl

Abstract: This contribution focuses on differences between several fields of study in the way how students' self-evaluations of learning and future academic success – their outcome expectations – can be explained by motivational variables and prior outcome expectations. The contribution builds on expectancy-value models postulating that individuals balance their efforts for achievement with the expectancy for success. It, furthermore, assumes that the relationships between motivational variables and outcome expectations may differ for male and female students and that they may differ in various fields of study.

The contribution analyses the relationships between outcome expectations and motivational variables in a sample of 5387 students of the National Educational Panel Study (NEPS) for six different fields of study. The specific research question investigates to which degree students' outcome expectations can be predicted by prior outcome expectations, intrinsic and different aspects of extrinsic motivation and whether gender- and subject-specific models for the relationships between the variables will emerge.

Results of the study show that the models indeed differ for gender and the different study fields, which is indicated by explained variances ranging from 3% to 24.6%. Expectably, students' outcome expectation was a significant predictor for all students in all study fields. Students' performance-oriented extrinsic motivation was a second predictor for all students in STEM and economics as well as for female students in language or education. The results indicate that motivational patterns differ in the context of study fields and gender.

2. Gender stereotypes might backfire – impact on the self-concept of female students in STEM subjects
Silke Luttenberger, Smirna Malkoc

Abstract: One might assume that women in STEM studies (Science, Technology, Engineering and Mathematics) with a low proportion of females have already successfully overcome barriers in school and at university, are less prone to stereotypic views and influences, and have a more positive self-concept concerning their academic abilities and their competence in STEM. The present quantitative study analyzes to which degree individual stereotypes, family factors, and school-related factors may influence female students' academic STEM self-concept in a sample of 296 women from different German universities, all from STEM studies with equal or less than 30 % female students (e.g., physics, engineering).

The results of a latent regression model point at the relevance of gender stereotypes and family-related factors, which were negatively related to the students' academic STEM self-concept. Stereotypes about women's interests,

abilities and need for conformance contributed negatively to the academic self-concept. Among those, stereotypes regarding women's abilities in STEM subjects had the strongest (negative) contribution. In contrast, school-related motivational aspects, like favorite subjects at school, were positively related to the STEM self-concept. The results show that even in this highly selective group of female STEM students stereotypes still may corrupt the academic self-concept.

In general, the results stress the need for indirect support for the development of positive self-evaluations in an academic field, e.g. by providing opportunities for children to have positive learning experiences or contact with role models. Even female students with high performance in STEM need support in the development of supportive self-evaluations.

3. When feedback contradicts self-concept – impacts on psychophysiological recovery
Marina T. W. Eglmaier, Manuela Paechter, Sigrid Hackl-Wimmer, Ilona Papousek, Helmut Karl Lackner

Abstract: Academic self-concept as self-evaluation of one's academic skills is related to emotions in an academic situations, motivation as well as achievements and can even be important for physiological responses. This study with a false-feedback paradigm examined how performance feedback concerning the academic self-concept may influence physiological recovery. In detail, participants' recovery of heart rates (HR) after receiving positive or negative feedback on their performance in a mental arithmetic task – that could be either consistent or inconsistent with their individual self-concept – was examined.

Seventy-four participants (37 women; age 19 to 33) evaluated their mental arithmetic skills as well as their actual emotional state (e.g., joy). After completing mental arithmetic tasks, they received (randomly allocated) positive or negative feedback which either confirmed or was in contrast with their self-concept. The statistical analyses show that participants with a more positive self-concept approached the task with higher levels of joy than participants with a more negative self-concept. Variance analyses yielded a significant interaction between self-concept x feedback and poorer HR-recovery when participants with a more positive self-concept received negative feedback. Thus, psychophysiological recovery may be delayed through rumination, or extended by cognitive representation of information beyond its actual presence. In academic situations like an exam such rumination could pose a barrier for approaching important tasks.

Approaching the situation with more joy could not prevent poorer recovery. Altogether, the results emphasize the acquisition of a realistic self-concept and the proper interpretation and appraisal of feedback as they are necessary for successful handling of academic situations.

4. Self-concept and goal orientations moderate how pre-service teachers cope with classroom noise
Petra Steinlechner, Sigrid Hackl-Wimmer, Ilona Papousek, Helmut Karl Lackner, Manuela Paechter

Abstract: Teachers, especially in primary education, regard high noise levels as one of the main stressors in the classroom. Measurements in classrooms typically found levels between 60dB (level of human speech) and 85dB (threshold to being harmful).

The study investigated how two noise levels affected pre-service teachers' cardiac stress responses and to which degree personal characteristics moderate them. 116 pre-service teachers (100 women) with teaching experience filled in questionnaires on their professional self-concept and goal orientations. Within an interval of four weeks they took part in two experimental sessions in the laboratory in which they were exposed to classroom videos with a moderate (60dB) and high (75dB) noise level.

The results point at interaction effects between noise level and gender, noise level and self-concept, and noise level and goal-orientations. In the female sample, a higher professional self-concept was related to better coping and better cardiac recovery while higher levels of performance avoidance were related to prolonged recovery in the noisy condition. Male pre-service teachers with a high learning-goal-orientation showed better recovery in the noisy condition.

Even a short exposition to the video of a noisy classroom had an influence on pre-service teachers' cardiac responses. As such the results show the impact of adverse teaching conditions. They, however, also point at the padding effects of personal attitudes and assessments with regard to one's profession. The present study also speaks for the inclusion of psychophysiological methods which allow the investigation of internal processes that are not accessible by self-reports or behavior observations.

5. Metacognition and math performance in higher education
Tobias Ringeisen

Abstract: Research on the role of metacognitive regulation for mathematics performance at university is sparse, especially if the two key strategies of planning and monitoring are considered simultaneously. In response, the current study employed a longitudinal design to investigate the associations between these variables with a sample of 206 students university in the context of a two-semester math course. Planning and monitoring were assessed with the respective subscales of the LIST (German: Inventar zur Erfassung von Lernstrategien im Studium; Boerner et al., 2005) at the beginning of the first semester (t1) and the end of the second semester (t2). After confirming strong measurement invariance for both metacognitive strategies, longitudinal panel models were computed. Achievement in the math course exam, which took place two weeks after completion of the second semester (t3) showed positive associations with planning at t1, yet negative relations at t2. Greater monitoring at t2 also predicted a better exam performance. Compared to monitoring, the use of planning was more stable from t1 to t2. Both strategies were unrelated over time. At the beginning of a math course, it seems helpful to engage in planning to schedule one's learning efforts over the course of two semesters, while executing and monitoring the learning progress appears to be particularly crucial for adequate preparation shortly before the exam.

6. Elementary students' cue–utilization, monitoring accuracy, and regulation decisions
Janneke van de Pol

Abstract: Students' ability to self-regulate their own learning is crucial for school performance. Yet, monitoring accuracy is generally low, assumedly due to use of cues that are not predictive of the judged outcome. However, students' actual cue-utilization is hardly ever measured, especially of young children. We aimed to investigate students' cue-utilization and the relation between actual cue-utilization and monitoring accuracy. In addition, we explored the relation between monitoring and regulation. Eighty-seven students (M(age)=10.53, SD=1.56) completed three sudokus (3x3/6x6/9x9 roster), predicted their test score, indicated which cue(s) they used (on a cue-list), what level they wanted to practice (no actual practice took place), and took a test (9x9).

Students misjudged their performance with 17.74% (SD=14.54%). The more they used the predictive cue 'how difficult I find the (9x9) sudoku', the more accurate their judgments were. However, this cue was only used by about 50% of the students and much more by students with high monitoring accuracy. Students with low monitoring accuracy used their interest in sudokus and test anxiety much more than students with high monitoring accuracy. There was only a moderate relation between students' monitoring and regulation judgments (.42). Regulation judgments were in line with students' practice scores for only half of the students; over 30% chose a that was too difficult.

Interventions, also for young learners, should aim at focusing students' attention on predictive cues and taking their attention away from non-predictive cues. In addition, using a cue-list may be a promising and efficient way to measure students' cue-utilization.

7. The structure and relationship of monitoring strategies and judgment accuracy
Marion Händel, Markus Dresel

Abstract: Metacognitive monitoring plays a central role in influential models focusing on metacognitive monitoring strategies (models of self-regulated learning) or metacognitive judgments and their accuracy (models of metacognition). For example, a learner tries to explain the learning content to a peer in order to test herself (monitoring strategy) or she estimates a certain number of tasks as having solved correctly in a sample exam (metacognitive judgment). Metacognitive monitoring is relevant for learning processes and learning success because it can reveal knowledge gaps or difficulties in understanding that require regulation of learning. However, although monitoring strategies and metacognitive judgments each serve metacognitive monitoring, they have almost only been considered separately. To combine these two research perspectives, an integrative model is proposed. Two cross-sectional studies were conducted to test the multi-factorial structure of metacognitive monitoring and its specific correlates (Study 1: general monitoring at the beginning of the semester, N = 396 students, 78.5% female; Study 2: situation-specific monitoring in a mid-term sample knowledge test, N = 225 students, 76.9% female). Across both studies, confirmatory factor analyses indicated that judgment accuracy and monitoring strategies (quantity and quality) display empirically distinct and only slightly related factors. Furthermore, monitoring strategies and judgment accuracy were found to having specific relations with metacognitive knowledge and motivational variables (especially the value component). Based on this structure of metacognitive monitoring, a next step for future research is to examine the consequences of monitoring strategies and judgments during the learning process as as to derive optimal (integrated) support measures.

Friday 13:30–15:30	Invited Interactive Symposia – II

SYMP 4: Meta–motivation and meta–reasoning   E04 I F-to-F

Chair:	Yves Karlen	**Discussant**:	Patricia A. Alexander

Abstract: What students know and believe about characteristics of their motivation and cognition plays an important role in successful learning, acquiring new competencies, and coping with setbacks and failure. In recent years, research on meta-motivational, meta-cognitive, and meta-self-regulatory beliefs and knowledge expanded in various directions. On the one hand, research on implicit theories expanded towards neglected topics such as the malleability of motivation and self-regulated learning (SRL) and the assessment of implicit theories. On the other hand, various interventions were developed to improve students' self-monitoring and metacognitive judgments. The present talks illustrate some of these recent empirical and theoretical developments. They highlight the importance of meta-reasoning in educational contexts and point toward future directions in assessing and shaping students' and teachers' meta-motivation and meta-reasoning. Trautner and Schwinger propose that implicit theories of motivation affect self-efficacy and the use of motivation strategies. Karlen and colleagues present evidence examining the role of teachers' self-beliefs about SRL abilities for their motivation to foster SRL in the classroom. Sik and Job present a mouse-tracking propositional evaluation task to assess theories of intelligence on the implicit level. Enders and colleagues tested the effect of comprehension-based as compared to performance-based cues on students' metacognitive accuracy. Finally, Michalsky and Bakrish present evidence on the positive impact of an intervention prompting metacognitive self-questioning to increase the accuracy of judgments of learning. This symposium brings together diverse but complementary perspectives on the important topic of meta-motivation and meta-reasoning, suggesting new approaches to promote student and teacher motivation and learning-related self-regulation.

1. How are implicit theories about the malleability of motivation related to motivation regulation?
Maike Trautner, Malte Schwinger

Abstract: Implicit theories about the malleability of a variety of personal attributes are linked to successful self-regulation in several domains (e.g., abilities, Burnette et al., 2013; emotions, Tamir et al., 2007). We extend these findings to the domain of motivation in the context of self-regulated learning by examining whether and how implicit theories about motivation to study affect motivational self-regulation. It was expected that the stronger students believed motivation to be malleable (incremental theory) as opposed to fixed, the more frequently they would implement motivation regulation strategies and thus be more successful at motivation regulation. Two cross-sectional surveys with university students (N1 = 376, N2 = 365) revealed an overall tendency to believe that both intrinsic and extrinsic aspects of motivation to study are malleable. Subsequent path analyses showed that incremental theories about motivation were only partly directly related to a more frequent motivation regulation strategy use. However, stronger incremental theories about motivation were associated with higher self-efficacy beliefs for motivation regulation (β = .17/.32, ps < .01), which were in turn related to a more frequent use of motivation regulation strategy use (β = .38/.43, ps < .01) and effort expenditure (β = .57/.42, ps < .01). Neither implicit theories about ability, dispositional interests, nor emotions showed similar relations, indicating the value of domain-specific considerations of the impact of implicit theories and individual dispositions on the motivation regulation process. Implicit theories about motivation and self-efficacy for motivation regulation may therefore represent target in trainings of motivation regulation and self-regulated learning.

2. Are teachers' self–beliefs related to their expectations and values about self–regulated learning?
Yves Karlen, Johannes Jud, Carmen Hirt, Silke Hertel

Abstract: In the context of teachers' professional competences, their beliefs and motivation play essential roles in teaching self-regulated learning (Karlen et al., 2020). Two core self-beliefs are a person's implicit theories about the nature of abilities as relatively fixed (fixed mindset) or malleable (growth mindset) and their self-theories about the level of their abilities, so-called self-concept (Bong & Skaalvik, 2003; Dweck & Leggett, 1988). Little is known about how teachers' self-beliefs about self-regulated learning (SRL) abilities influence their motivation to promote SRL. In a cross-sectional study with N= 280 in-service teachers, we examined whether teachers' implicit theories about SRL and their self-concept about SRL are related to their expectations and values on promoting SRL. A structural equation model revealed that besides previous experiences in fostering SRL (covariate), growth mindsets positively corre-

late with utility value and interest and negatively with opportunity costs. Teachers' self-concept was not related to any expectancies and value variables. Regrading teachers' self-reported promotion of SRL teachers' self-concept and interest were positively correlated. Finally, an indirect effect of growth mindsets via interest on SRL promotion was found. Our results suggest that it might be beneficial for future studies to include teachers' self-beliefs about SRL to understand better their motivation for promoting SRL.

3. Indirect assessment of implicit theories of intelligence: A mouse-tracking measure predicts learning
Kata Sik, Veronika Job

Abstract: Research on implicit theories of intelligence has shown that individuals endorsing a growth mindset – the belief that intelligence is improvable, rather than fixed – tend to react more constructively to setbacks and challenges. In turn, this more constructive reaction has been linked to more positive overall learning outcomes. Implicit theories are typically assessed with a self-reported scale, which might pose some problems. For instance, in recent years, governments, organizations and teachers have shown increasing interest in adopting and teaching a growth mindset, making the reporting of a growth mindset desirable. Therefore, it might be beneficial to complement the typically used self-reported scale of growth mindset with an indirect measure that is less sensitive to self-presentation. In a pre-registered study (N=184), we used the mouse-tracking Propositional Evaluation Paradigm, to capture implicit theories of intelligence. After completing the indirect measure, participants experienced a setback after working on difficult IQ tasks. Subsequently, they could view possible solutions to those items, before proceeding to the main IQ assessment. The time spent on viewing those solutions and the number of items viewed served as proxies for persistent learning behavior. We found that the indirect growth mindset score predicted learning behavior in addition (and to a higher extent) to the explicit measure. Our results suggest that complementing future studies with indirect assessments of implicit theories of intelligence may be beneficial to better understand their effects. Keywords:implicit theories of intelligence; indirect measures; learning; setback

4. How can we optimize monitoring during complex learning?
Tino Endres, Julia Waldeyer, Martine Baars, Julian Roelle, Alexander Renkl

Abstract: In self-regulated learning, students typically overestimate their current learning state. This is especially true when the learning contents are complex and comprehension is required. In this study, we analyzed whether a comprehension-based (vs. performance-based) cue increases learners' metacognitive accuracy, in particular, when this cue is presented early during learning. We conducted a 2x2 experiment (n=135 university students). The factors were (a) comprehension-based vs. performance-based cue and (b) early vs. late cue instruction: cue was presented before first problem solving attempts or after (late instruction). Against our expectations, we found only that a performance-oriented cue led to better absolute accuracy and that early instruction led to better accuracy in the case of complex procedural tasks. Our finding were not in line with a recent meta-analysis. Obviously, in our context, the focus on performance (instead of comprehension) was a better basis for metacognitive judgments.

5. Contribution of metacognitive questions to accuracy of judgment of learning in a digital environment
Tova Michalsky, Hila Bakrish

Abstract: Primary school pupil have difficulty making accurate judgments of learning (JOL) in a digital environment. In two studies, we examined the contribution of metacognitive self-questioning to JOL accuracy in the course of reading literacy (Study 1) and mathematical literacy (Study 2) digital learning programs. Both studies comprised a six-session intervention. In each session fifth-grade students studied a short text (Study 1, N=65) or story containing mathematical components (Study 2, N = 72), then judged their comprehension by predicting their performance before completing a test. For the experimental groups, metacognitive questioning was incorporated into the study materials. In both studies the experimental groups improved over the six sessions in both performance and calibration (i.e., reducing the gap between judgment and performance). The findings highlight the contribution of metacognitive support to improved performance and judgment accuracy, and strengthen the case for incorporating metacognitive practices when teaching literacy in a digital environment.

SYMP 5: Emotional and metacognitive processes during technology-based learning   **114 I Hybrid**

Chairs: Roger Azevedo, Reinhard Pekrun   **Discussants**: Susanne Lajoie, Inge Molenaar

Abstract: There is increasing evidence that emotional and metacognitive processes play a key role in learning. Research has demonstrated that technology-based learning is effective for fostering emotional and metacognitive processes, which students typically struggle to deploy during learning. There are many approaches to examining these processes using different types of multimodal data. These data can be used to investigate human-machine interactions as well as human-human interactions during learning across contexts. This can include multimedia and game-based learning environments, independent and social learning, and secondary school as well as college students. The goal of this symposium is to discuss challenges in measuring the complex interplay between emotional and metacognitive processes during learning across these different contexts and populations.

The symposium includes four contributions that discuss progress and challenges in current research in the field. The first presentation focuses on the methodological, analytical, and pedagogical challenges associated with using multimodal multichannel data to investigate learning with advanced learning technologies across domains and contexts. The second presentation addresses challenges in investigating socially-shared regulated learning using multimodal data during science learning in secondary school. The third presentation describes an integrated framework for assessing cognitive and affective processes during technology-based learning. The fourth presentation presents a study investigating the role of emotions when engaging in metacognitive monitoring activities during game-based learning in college students. Drs. Susanne Lajoie and Inge Molenaar, experts in the areas of emotion, metacognition and learning technologies, will critically analyze the work presented in this interactive symposium.

1. Challenges and issues in research on emotions and metacognition with advanced learning technologies
Roger Azevedo

Abstract: Emotions and metacognition play a critical role in monitoring and regulating learning, reasoning, and problem-solving across tasks and domains while using advanced learning technologies (ALTs; serious games, virtual reality). Empirical evidence indicates that emotions and metacognition are dynamically interrelated; yet, understanding their individual and combined roles have been a significant challenge when using multimodal data (e.g., facial expressions of emotions, screen recordings, and concurrent think-alouds) to measure, model, understand, and predict learning, reasoning, and problem-solving across tasks and domains with ALTs. In this presentation, I will highlight the strengths and weaknesses of recent empirical research using multimodal data to trace emotions and metacognition with various ALTs across tasks and domains. After describing a general methodological approach in collecting multimodal trace data of emotions and metacognition (e.g., eye tracking, facial expressions of emotion), I will focus on the challenges involved in using multimodal data to understand how these processes interact during learning with various ALTs. Specifically, I will present and discuss the methodological, analytical, and pedagogical challenges associated with measuring, understanding, and inferring emotions and metacognitive processes using examples of data from several studies with students of all ages as they learned, solved problems, and reasoned about science and biomedical topics with a range of ALTs.

2. Exploring the relation of emotion, motivation, and cognition in learning from digital media
Jan L. Plass

Abstract: How do emotion, motivation, and cognition relate to one another in the context of technology-based learning? Recent research has investigated an emotional design effect, which describes how features of the visual design of the learning material have been linked to emotions experienced by the learner that affected learning outcomes. This effect has led to the development of ICALM, the Integrated Cognitive-Affective Model of Learning with Media, as an extension of Mayer's Cognitive Theory of Multimedia Learning. The mechanisms of this effect have not been fully understood, however. Reviewing research from affective neuroscience and emotional design, we will discuss three approaches describing of how emotion may affect cognition and learning. One approach is that emotion increases motivation, a second, that emotion affects encoding, storage, and retrieval of information, and a third, that emotion broadens or narrows cognitive resources. We will conclude by discussing a research agenda to investigate the relative merits of these approaches.

SYMP 5: Emotional and metacognitive processes during technology–based learning *continued*

3. **Emotions and metacognitive monitoring during game–based learning in students with exceptionali-ties**
   Michelle Taub, Allison Banzon, LaVonda Walker

Abstract: Research demonstrates game-based learning is an effective means of fostering student learning, self-regulation, positive emotions, motivation, and engagement, perhaps due to providing them with agency during gameplay. Studies show providing some (high or low levels), as opposed to no agency, results in higher self-reported emotions and motivation, as well as greater leaning outcomes. It is unclear, however, how agency impacts these processes among students with exceptionalities during game-based learning. If a student has a deficit to their cognitive processing, perhaps too much agency can result in cognitive overload. The goal of this study was to examine if level of agency (high, low, none) impacts overall learning outcome, self-reported emotions, and metacognitive monitoring processes among students with different types of exceptionalities (e.g., ADHD, learning disabilities) during game-based learning with CRYSTAL ISLAND, a game that fosters SRL, microbiology learning, and scientific reasoning. Preliminary results reveal no significant differences in proportional learning gain or emotions between conditions. However, students in the partial agency condition spent significantly longer durations engaging in knowledge acquisition than students in the full agency condition. Results demonstrate potential benefits for all levels of agency for students with exceptionalities during game-based learning, contrary to previous findings that some level of agency was beneficial for game-based learning. This may be indicative that students' cognitive, metacognitive, and affective processes differ between students with and without exceptionalities, with implications for designing game-based learning environments that adapt to different learning needs.

4. **Advancement in socially shared regulation in learning and emerging challenges in research**
   Sanna Järvelä

Abstract: Contemporary perspectives view self-regulated learning as a cyclical complex metacognitive and social process that involves adapting cognition and metacognition, motivation, emotion, and behavior. Regulation is neither a static phenomenon nor a state of the learner, but rather a series of contingencies over time. We have been working for theoretical advancement of regulated learning in social learning contexts, namely socially shared regulation (SSRL) and implemented multimodal methods to identify when, how and what makes regulation in collaborative learning functional. Our progress in research has revealed epistemological and analytical challenges dealing with a) what single multimodal data channels and combination of these data channels tells about different constructs related to SSRL; b) group level analysis of regulation constructs; c) identifying regulation in collaborative learning manifested in interaction with different constructs (cognition, motivation, emotion). In this presentation we review the major achievement made in understanding SSRL. Grounding on our recent big multimodal data set in secondary school collaborative science lessons, we elaborate and demonstrate the conceptual and analytical challenges identified and our efforts to solve them. We raise the discussion that joint effort is needed in between research teams in the field of motivation and metacognition in order to solve these challenges and progress the research field.

Friday 16:00–18:20	Oxford Style Debate – Conference Closing – Farewell	E11 I F–to–F hybrid

Oxford Style Debate — 16:00–18:00

How to best investigate the interplay among motivation, emotion and metacognition in learning and instruction?

Experts:
Thomas Goschke, Technische Universität Dresden, Germany
Kirsti Lonka, University of Helsinki, Finland
Peter Reimann, University of Sydney, Australia
Tim Urdan, Santa Clara University, USA
Phil Winne, Simon Fraser University, Canada

Moderators: Fani Lauermann, Hanna Gaspard & Charlotte Dignath

Investigating the interplay of motivation, emotion, and metacognition in learning and instruction is a very challenging research issue. Researchers use various methods, designs, and data to address this issue.

The five debaters have longstanding experiences with a variety of research approaches including, large scale survey studies, experimental studies conducted in controlled lab-contexts, experience-sampling studies in authentic instructional contexts, technology-enhanced learning and study environments. In the debate they will bring in their expertise in several rounds of short statements in order to argue a pre-assigned position in a pointed manner. They have been asked to put aside their sensible, balanced views of the world and instead take a rabid stance in favor of the position they have been assigned to.

The audience is invited to challenge the debaters by contributing their thoughts and questions, and to voice their opinions with regard to the positions that are argued. Make sure to bring your mobile devices (e.g., smart-phone; tablets, laptops) to contribute your questions and thoughts.

Conference Closing – Farewell — 18:05–18:20

- **Farewell – Conference President:** Susanne Narciss
- **Farewell – SIG8 Coordinators:** Hanna Järvenoja, Hanna Gaspard

Friday from 19:00	Wrap-up Joint Day – Carolaschlösschen Großer Garten

Summer School Teachers and Participants

Teachers

- Roger Azevedo   (University of Central Florida, USA)
- Ruth Butler   (Hebrew University of Jerusalem, Israel)
- Eleftheria Gonida   (Aristotle University of Thessaloniki, Greece)
- Marko Lüftenegger   (University of Vienna, Austria)
- Markku Niemivirta   (University of Eastern Finland & University of Helsinki, Finland)
- Deborah Stipek   (Stanford University, USA)

Doctoral Students

- Sara Ahola   (University of Oulu, Finland)
- Thijmen Van Alphen   (University of Amsterdam, The Netherlands)
- Sophie Braumann   (University of Utrecht, The Netherlands)
- Emily Corwin-Renner   (Universiät Tübingen, Germany)
- Evropi Efthymiadou   (University of Thessaloniki, Greece)
- Meg Farrell   (TU München, Germany)
- Franzsika Frohberg   (Universität Leipzig, Germany)
- Inga ten Hagen   (TU Dortmund, Germany)
- Alla Hemi   (Bar-Illan University, Israel)
- Johannes Jud   (University of Basel, Switzerland)
- Henriikka Junturen   (University of Helsinki, Finland)
- Emmi Kaila   (Aalto University, Helsinki, Finland)
- Kerstin Kisielski   (TU Dresden, Germany)
- Annika Luisa Koch   (TU Dortmund, Germany)
- Ulku Kozluca   (Exeter University, UK)
- Clara Kuhn   (Universität Salzburg, Austria)
- Helena Laudel   (TU Dresden, Germany)
- Kelsey Losenno   (McGill University, Canada)
- Laura Menschaart   (Erasmus University Rotterdam, The Netherlands)
- Lihi Sarfaty   (University of Haifa, Israel)
- Katja Saxer   (University of Bern, Schweiz)
- Meropi Simou   (University of Thessaloniki, Greece)
- Shubina Tatiana   (University of Oulu, Finland)
- Christiana Varda   (Cyprus University of Technology, Cyprus)

Social Events

The following sections will provide the core information to the social events. For more details and registration please visit the conference homepage:

https://sig8meetssig16-dresden.de/social-events/

Welcome Event – Guided City Tour

When: Wednesday August 24th, 2022 at 8 pm (20:00)

Where: Meeting point Theaterplatz at the King Johann Monument

How to   Tramline 9   Wasaplatz to Theaterplatz or
get there: Tramline 11   Dresden Strehlener Platz to Theaterplatz

If you have not registered yet, please contact us as soon as possible info@SIG8meetsSIG16-Dresden.de

Conference Dinner

When: Thursday August 25th, 2022 after the SIG8 Business Meeting (starting around 20:00)

Where: French Pavilion of Restaurant Alte Meister, Theaterplatz Dresden

How to   Tramline 11   Dresden Strehlener Platz to Theaterplatz
get there: Tramline 9   Wasaplatz to Theaterplatz

I If you have not registered yet, please contact us as soon as possible info@SIG8meetsSIG16-Dresden.de

Conference Wrap-Up

When: Friday August 26th, 2022

Where: Carolaschlösschen (Großer Garten)

How to   Ten minutes walk from the Conference Venue from August-Bebel-Straße via
get there: Gustav-Adolf-Straße and Oskar-Straße

If you have not registered yet, please contact us as soon as possible info@SIG8meetsSIG16-Dresden.de

For all social events there is a limited number of spaces and they will be filled according to first in first serve principle.

Useful information

Dresden

Dresden is one of the most beautiful German cities. There are many places to visit including the historic city center (Altstadt) with the Frauenkirche (Church of our Lady), the Dresden Castle (hosting several museums), the Semper Opera, the famous baroque garden Zwinger, or the Neustadt on the other side of the river Elbe with its reconstructed baroque quarters and in its outer part, a very lively cultural district with for example the Kunsthof Passage (Art Courtyard Passage, Alaunstrasse 70).

Dresden is filled with cultural treasures. It would go beyond the space here to list all museums, sights and cultural events that are worth to be visited in Dresden. The website of Dresden Tourism offers an excellent inside to all attractions https://www.dresden.de/en/tourism/tourism.php   Note that for some museums you need to book specific time slots in advance (e.g., the Historic Green Vault, the restored treasury of Baroque King August the Strong – https://gruenes-gewoelbe.skd.museum/en/).

Getting around in Dresden

The city centre is compact and partly pedestrianized, which makes walking an enjoyable way to discover Dresden. Another comfortable way of getting around throughout Dresden is by public local transport (trams and busses). For information on timetables and network maps please visit the website of Dresdner Verkehrsbetriebe (https://www.dvb.de/de-de/). Note there is a special offer – the 9-Euro-Ticket that can be used in regional trains and in all German public transportation networks.

How to get the Conference Venue

The conference will be held at the TU Dresden building August-Bebel-Str.20, 01219 Dresden, Germany. You can get there easily from Dresden airport, the central station and also by public transportation or by car (note that there are only a few parking spots in August-Bebel-Straße, use rather Weberplatz or Reichenbachstraße). Buses and trams run every 10 to 15 minutes during the day.

- Arriving at the airport:
  Take a taxi or the suburban train S2 to City or directly to Strehlen train station „Haltepunkt Strehlen" (a 5 minutes' walk from the Conference Venue)

- From the central station:
  Exit east for taxis or the bus route 66 to Dresden Weberplatz (just a few steps from the Venue)

- Departing from the conference venue:
  tramline 11 is stopping at Strehlener Platz – it takes you to the main station and the Theaterplatz
  tramlines 9 is stopping at Wasaplatz – it takes you also to the main station and the Theaterplatz
  bus routes 63, 68, 61 and 85 arrive at „Haltepunkt Strehlen" or „Wasaplatz"

Taxis can be called via phone +49 351 211 211 – ordered via app or https://www.taxi-dresden.de/taxi-bestellen/

für iOS   für Android

The Conference Venue

The keynotes and all other plenary sessions will take place in the big Lecture Hall E11 of the Ground-Floor. The in-person symposia sessions will take place at the Ground-Floor as well (Lecture Halls E08; and E04). The hybrid symposia will take place in the Seminarroom 114 at the First Floor.   The further rooms for joining online-sessions are located either on the First or Second Floor. They are equipped with a presentation laptop and a video projector to guarantee that all presenters who are in Dresden can present their contribution at the venue. For further details on how to find the rooms see https://navigator.tu-dresden.de/etplan/abs/00.

Conference registration

The conference registration desk is located in the building at August-Bebel-Str.20, 01219 Dresden (ground floor). It is open daily during the conference hours. Further, conference assistants and members of the conference organisation committee are glad to help you.

Cloakroom and Lost Property

A cloakroom is available near the conference registration desk. Our cloakroom will be staffed during the conference. However, neither EARLI nor the local organizers accept any liability for the loss of or damage to any items left in the cloakroom. Of course, we'll do our best to keep everything safe.

In case you lose something during the conference, please contact the conference registration desk.

Lunch & Coffee/Tea

Lunch will be served in the Tusculum, just a few steps from the venue.
Coffee, tea and snacks will be served in the ground floor foyer. Water bottles can be refilled at any tap. Dresden's drinking water is of high quality.

Internet Access

The TU Dresden is part of the Eduroam program. Eduroam is the worldwide roaming access service developed for the research and education community. Select the eduroam Wi-Fi network and log in using your home-university account. If this solution does not work for you there will be the possibility to use a guest network through the university. Please inform the registration office if you need one. They will provide you with the user name and password.

Emergency

In case of a non-life threatening emergency, ask a conference assistant to contact the first aid personnel. In case of a life threatening medical emergency, dial the number 112. In case of fire, call number 112. If the police are needed, call the number 110. These numbers can be dialled from any European mobile phone.

Medical Service

You can find a small dispensary at the conference registration desk. Several pharmacies are located nearby (e.g. at the main station, Wasaplatz, and the city centre).

List of Participants

	A			
Sara	Ahola	University of Oulu	Finland	In-Person
Patricia A.	Alexander	University of Maryland	United States	In-Person
Lucija	Andre	University of Amsterdam	The Netherlands	In-Person
Aloysius C.	Anyichie	Brandon University	Canada	Online
Begüm	Arvaneh	Technical University of Munich (TUM)	Germany	Online
Kati	Aus	Tallinn University	Estonia	In-Person
Roger	Azevedo	University of Central Florida	United States	In-Person
	B			
Miriam	Babichenko	Ben-Gurion University of the Negev	Israel	Online
Lies	Backers	Ghent University	Belgium	Online
Jan Luca	Bahr	Leibniz Institute for Science and Mathematics Education (IPN)	Germany	In-Person
Barbara	Balaž	Catholic University of Croatia	Croatia	Online
Lisa	Bardach	University of Tübingen	Germany	In-Person
Anna	Bareis	University of Tübingen	Germany	In-Person
Kathryn	Bartimote	The University of Sydney	Australia	In-Person
Geetanjali	Basarkod	Australian Catholic University	Australia	Online
Sara	Becker	Pädagogische Hochschule Freiburg	Germany	In-Person
Jorrick	Beckers	Open University of the Netherlands	The Netherlands	In-Person
Daria K.	Benden	TU Dortmund	Germany	In-Person
Moti	Benita	Ben-Gurion University of the Negev	Israel	In-Person
Sonja	Bieg	Pädagogische Hochschule Weingarten	Germany	In-Person
Marion	Blumenstein	University of Auckland	New Zealand	In-Person
Therese	Bouffard	Université du Québec à Montréal	Canada	Online
Arne	Bouten	Ghent University	Belgium	In-Person
Christian	Brandmo	University of Oslo	Norway	In-Person
Laura	Bringmann	University of Groningen	The Netherlands	Online
Dominik	Bulla	Oxford University	UK	In-Person
Ruth	Butler	Hebrew University of Jerusalem	Israel	In-Person

	C			
Utku	Caybas	University of Kentucky	United States	Online
Deniz	Çetin	Norwegian University of Science and Technology (NTNU)	Norway	In-Person
Erika Jassuly	Chalen Donayre	Pontificia Universidad Católica del Perú	Peru	In-Person
Mei-Shiu	Chiu	National Chengchi University	Taiwan	In-Person
Anna	Ciraso	Universitat Autònoma de Barcelona	Italy	Online
Rinat	Cohen	Ben-Gurion University of the Negev	Israel	In-Person
Tiphaine	Colliot	Université de Poitiers	France	Online
Miriam	Compagnoni	University of Zurich	Switzerland	In-Person
Emily	Corwin-Renner	Hector Research Institute of Education Sciences and Psychology	United States	In-Person
	D			
Jenny	Dauer	University of Nebraska-Lincoln	United States	In-Person
Katrien	De Cocker	Ghent University	Belgium	In-Person
Tobias	Debatin	University of Regensburg	Germany	Online
Julia	Dietrich	Friedrich-Schiller-University Jena	Germany	In-Person
Charlotte	Dignath	DIPF Leibniz Institute for Education Research Frankfurt	Germany	In-Person
Niels	Dohn	Aarhus University	Denmark	In-Person
Enrica	Donolato	University of Oslo	Norway	Online
Michelle	Downes	University College Dublin	Ireland	Online
	E			
Rutmer	Ebbes	University of Amsterdam	The Netherlands	In-Person
Janina	Eberhart	University of Tübingen	Germany	Online
Anna M.	Eder	Salzburg University of Education	Austria	In-Person
Natalia	Edisherashvili	University of Tartu	Estonia	In-Person
Anastasia	Efklides	Aristotle University of Thessaloniki	Greece	In-Person
Marina T. W.	Eglmaier	University of Graz	Austria	In-Person
Tino	Endres	University of Freiburg	Germany	In-Person
Bernhard	Ertl	Bundeswehr University Munich	Germany	In-Person
Gili	Eschinasi-Hanovich	University of Haifa	Israel	Online

	F			
Konstantina	Falanga	Aristotle University of Thessaloniki	Greece	Online
Meg	Farrell	Technical University of Munich (TUM)	United States	In-Person
Christine	Feiss	Paris Lodron University Salzburg	Austria	In-Person
Xiangyuan	Feng	University of Groningen	The Netherlands	In-Person
Barbara	Flunger	Utrecht University	The Netherlands	In-Person
Irène	Freyssinet	Université Grenoble Alpes (LaRAC)	France	In-Person
Katharina	Fuchs	Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU)	Germany	Online
	G			
Erika	Galea	University College London	UK	In-Person
Robert	Gaschler	FernUniversität in Hagen	Germany	Online
Hanna	Gaspard	TU Dortmund University	Germany	In-Person
Sebastian	Gerbeth	University Regensburg	Germany	In-Person
Marie	Geurten	University of Liège	Belgium	Online
Jessica	Gnas	University of Trier	Germany	In-Person
Eleftheria	Gonida	Aristotle University of Thessaloniki	Greece	In-Person
Julia	Gorges	Philipps-Universität Marburg	Germany	In-Person
Thomas	Goschke	TU Dresden	Germany	In-Person
Jeff	Greene	University of North Carolina	United States	Online
Zhixing	Guo	The University of Hong Kong	China	Online
	H			
Eleanor	Hadfield	Liverpool John Moores University	UK	Online
Leen	Haerens	Ghent University	Belgium	Online
Gerda	Hagenauer	Paris Lodron University Salzburg	Austria	In-Person
Marion	Händel	University of Augsburg	Germany	Online
Judith	Harackiewicz	University of Wisconsin-Madison	United States	Online
Lieke	Hartenberg- de Vries	Open University of the Netherlands	The Netherlands	Online
Tina	Hascher	University of Bern	Switzerland	In-Person
Sabrine	Hassane	Open University of the Netherlands	The Netherlands	In-Person
Toshiyuki	Hasumi	Ming Chuan University	Japan	Online
Orna	Heaysman	Bar-Ilan University	Israel	In-Person
Anna	Heinle	Technical University of Munich (TUM)	Germany	Online

Tanja	Held	University of Bern	Switzerland	In-Person
Silke	Hellebaut	Ghent University	Belgium	In-Person
Alla	Hemi	Bar-Ilan University	Israel	Online
Anja	Henke	University of Potsdam	Germany	In-Person
Dora	Herrera	Pontificia Universidad Católica del Perú	Peru	In-Person
Katharina	Hilger	Leibniz Institute for Science and Mathematics Education (IPN)	Germany	In-Person
Frances	Hoferichter	University of Greifswald	Germany	In-Person
Doris	Holzberger	Technical University of Munich (TUM)	Germany	In-Person
Lisette	Hornstra	Utrecht University	The Netherlands	In-Person
Yuanyuan	Hu	Utrecht University	The Netherlands	In-Person
Matthias	Huber	University College for Teacher Education Carinthia	Austria	In-Person
Nathalie	Huet	University of Toulouse 2	France	In-Person
Jenefer	Husman	University of Oregon	United States	In-Person
Tahrim	Hussain	Liverpool John Moores University	United Kingdom	In-Person
Isabell	Hußner	University of Potsdam	Germany	In-Person
J				
Thorben	Jansen	Leibniz Institute for Science and Mathematics Education (IPN)	Germany	In-Person
Sanna	Järvelä	University of Oulu	Finland	Online
Hanna	Jarvenoja	University of Oulu	Finland	In-Person
Lars	Jenßen	Humboldt-Universität zu Berlin	Germany	In-Person
Jingwen	Jiang	University of Turku	Finland	Online
Veronika	Job	University of Vienna	Austria	In-Person
Johannes	Jud	University of Applied Sciences and Arts North-western Switzerland FHNW	Switzerland	In-Person
Henriikka	Juntunen	University of Helsinki	Finland	In-Person
K				
Yves	Karlen	University of Applied Sciences and Arts North-western Switzerland FHNW	Switzerland	In-Person
Yasuhisa	Kato	Tokyo Online University	Japan	Online
Michaela	Katstaller	Paris Lodron University Salzburg	Austria	In-Person
Idit	Katz	Ben-Gurion University of the Negev	Israel	In-Person
Lena Sofie	Kegel	Westfälische Wilhelms-Universität Münster	Germany	In-Person

Elina E.	Ketonen	University of Helsinki	Finland	Online
Eve	Kikas	Tallinn University	Estonia	In-Person
Martina	King	University of Passau	Austria	In-Person
Kerstin	Kisielski	TU Dresden	Germany	In-Person
Daniela	Kloo	Ludwig-Maximilians-Universität (LMU)	Germany	In-Person
Maximilian	Knogler	Technical University of Munich (TUM)	Germany	Online
Annika	Koch	TU Dortmund University	Germany	In-Person
Hanke	Korpershoek	University of Groningen	The Netherlands	In-Person
Bochra	Kouraichi	University of Szeged	Hungary	In-Person
Bracha	Kramarski	Bar-Ilan University	Israel	In-Person
Clara	Kuhn	Paris Lodron University Salzburg	Austria	In-Person
Stefan	Kulakow	University Greifswald	Germany	In-Person
Anna	Kuusi	University of Helsinki	Finland	In-Person
L				
Helena	Laudel	TU Dresden	Germany	In-Person
Fani	Lauermann	TU Dortmund	Germany	In-Person
Jeroen	Lavrijsen	KU Leuven	Belgium	In-Person
Marvin	Law	The University of Sydney	Australia	Online
Rebecca	Lazarides	University of Potsdam	Germany	In-Person
Hye Rin	Lee	University of California Irvine	United States	Online
Hans	Lehikoinen	University of Eastern Finland	Finland	In-Person
Äli	Leijen	University of Tartu	Estonia	In-Person
Simon	Leonard	University of South Australia	Australia	Online
Yingyan	Li	Chengdu Institute Sichuan International Studies	China	Online
Stephanie	Lichtenfeld	Universität Hamburg	Germany	In-Person
Lucas	Liebenow	Leibniz Institute for Science and Mathematics Education (IPN)	Germany	Online
Cornelia	Lindenau	University College Freiburg	Germany	In-Person
Mengsi	Liu	The University of Tokyo	Japan	Online
Kirsti	Lonka	University of Helsinki	Finland	In-Person
Kelsey	Losenno	McGill University	Canada	In-Person
Marko	Lüftenegger	University of Vienna	Austria	In-Person
Silke	Luttenberger	University College of Teacher Education Styria	Austria	In-Person

	M			
Smirna	Malkoc	University College of Teacher Education Styria	Austria	In-Person
Kristiina	Mänty	University of Oulu	Finland	In-Person
Helen	Margaritou-Andrianessi	University of Athens	Greece	In-Person
Thomas	Martens	Medical School Hamburg	Germany	In-Person
Lucia	Mason	University of Padua	Italy	Online
Lennia	Matos	Pontificia Universidad Católica del Perú	Peru	In-Person
Bea	Mertens	University of Antwerp	Belgium	In-Person
Panayiota	Metallidou	Aristotle University of Thessaloniki	Greece	In-Person
Ralph	Meulenbroeks	Utrecht University	The Netherlands	In-Person
Jennifer	Meyer	Leibniz Institute for Science and Mathematics Education (IPN)	Germany	In-Person
Simon	Meyer	University of Erlangen-Nuremberg	Germany	In-Person
Tova	Michalsky	Bar-Ilan University	Israel	In-Person
Julia	Moeller	Universität Leipzig	Germany	In-Person
Riikka	Mononen	University of Oulu	Finland	In-Person
Matthew	Moreno	University of Toronto	Canada	Online
Julia	Morinaj	University of Bern	Switzerland	In-Person
Steffen	Moser	Technical University of Munich (TUM)	Germany	Online
Dimitrios	Moustakas	University of Macedonia	Greece	Online
Franziska	Muehlbacher	Paris Lodron University Salzburg	Austria	In-Person
Clara Marie	Mumme	Goethe-Universität Frankfurt	Germany	Online
Joy	Muth	University of Vienna	Austria	In-Person
	N			
Reut	Nachoum	Bar-Ilan University	Israel	In-Person
Ulrike	Nett	Augsburg University	Germany	In-Person
Moritz	Niemann	MSH Medical School Hamburg	Germany	Online
Markku	Niemivirta	University of Eastern Finland	Finland	In-Person
	O			
Paul	O'Keefe	Yale-NUS College	United States	Online
Monica	Onofrei	Leibniz Institute for Educational Trajectories	Germany	Online
Elisa	Oppermann	University of Bamberg	Germany	In-Person
Erika	Österholm	University of Turku	Finland	Online

	P			
Manuela	Paechter	University of Graz	Austria	In-Person
Rebecca	Paterson	Kyoto University	Japan	Online
Margus	Pedaste	University of Tartu	Estonia	In-Person
Thea	Peetsma	University of Amsterdam	The Netherlands	In-Person
Francisco	Peixoto	ISPA – Instituto Universitário	Portugal	In-Person
Reinhard	Pekrun	Ludwig-Maximilians-Universität (LMU)	Germany	In-Person
Nancy	Perry	University of British Columbia	Canada	In-Person
Ema	Petri?evi?	University of Zagreb	Croatia	Online
Pilvi	Peura	University of Jyväskylä	Finland	Online
Jan L.	Plass	New York University	United States	In-Person
Kukka-Maaria	Polso	University of Helsinki	Finland	In-Person
Antti	Pulkka	National Defence University	Finland	In-Person
Dave	Putwain	Liverpool John Moores University	United Kingdom	In-Person
Ita	Puusepp	University of Helsinki	Finland	In-Person
	Q			
Kathleen M.	Quinlan	University of Kent	United States	In-Person
Daniela	Raccanello	University of Verona	Italy	In-Person
Jelena	Radisic	University of Oslo	Norway	In-Person
Diana	Raufelder	University Greifswald	Germany	Online
Anna	Rawlings	University of Helsinki	Finland	In-Person
Peter	Reimann	University of Sydney	Australia	In-Person
Sabrina	Reith	Technical University of Munich (TUM)	Germany	Online
Ana	Remesal	Universitat de Barcelona	Spain	Online
K. Ann	Renninger	Swarthmore College	United States	Online
Mathilde	Riant	Université Grenoble Alpes	France	In-Person
Raven	Rinas	Augsburg University	Germany	In-Person
Tobias	Ringeisen	Berlin School of Economics and Law	Germany	Online
Claudia	Roebers	University of Bern	Switzerland	In-Person
Elena	Roig Ester	Autonomous University of Barcelona	Spain	Online
Erik	Roosken	Open University of the Netherlands	The Netherlands	Online
Guy	Roth	Ben-Gurion University of the Negev	Israel	In-Person
Charlott	Rubach	University of California, Irvine	Germany	In-Person

S

Katrin	Saks	University of Tartu	Estonia	In-Person
Linda	Salihu	University of Prishtina	Kosovo	Online
Carol	Sansone	University of Utah	United States	In-Person
Lihi	Sarfaty	University of Haifa	Israel	Online
Katja	Saxer	University of Bern	Switzerland	In-Person
Demian	Scherer	Westfälische Wilhelms-Universität Münster	Germany	Online
Juliane	Schlesier	University of Oldenburg	Germany	In-Person
Philipp	Schmidt	University of Bielefeld	Germany	In-Person
Jakob	Schnell	University of Bern	Switzerland	Online
Konstanze	Schoeps	Universitat de València	Spain	In-Person
Linda	Schürmann	University of Koblenz-Landau	Germany	In-Person
Sabine	Schweder	University Greifswald	Germany	In-Person
Bettina	Schwenger	The University of Auckland	New Zealand	Online
Corwin	Senko	SUNY New Paltz	United States	Online
Diane	Sicre	University of Toulouse 2	France	In-Person
Kata	Sik	University of Vienna	Austria	In-Person
Gale	Sinatra	University of Southern California	United States	Online
Kristin	Slungård	University of Oslo	Norway	In-Person
Maarja	Sõrmus	University of Tartu	Estonia	In-Person
Rachel	Sparks	University of Nebraska-Lincoln	United States	In-Person
Sarah Teresa	Steffgen	Justus-Liebig-University Giessen	Germany	In-Person
Evelyn	Steinberg	University of Veterinary Medicine Vienna	Austria	In-Person
Petra	Steinlechner	Private University College of Teacher Education - Augustinum	Austria	In-Person
Maria Hvid	Stenalt	Copenhagen University	Denmark	Online
Deborah	Stipek	Stanford University	United States	In-Person
Kristina	Stockinger	University of Augsburg	Germany	Online
Iva	Stuchlikova	University of South Bohemia Ceske Budejovice	Czech Republic	In-Person
Wendy	Symes	University of Potsdam	Germany	In-Person
Sabine	Sypré	Ghent University	Belgium	In-Person

T

Janina	Täschner	Technical University of Munich (TUM)	Germany	In-Person
Michelle	Taub	University of Central Florida	United States	Online
Dirk	Tempelaar	Maastricht University	The Netherlands	Online
Inga	ten Hagen	TU Dortmund University	Germany	In-Person
Maria	Theobald	DIPF | Leibniz Institute for Research and Information in Education	Germany	Online
Désirée	Thommen	University of Zurich	Switzerland	Online
Tiina	Törmänen	University of Oulu	Finland	Online
Maike	Trautner	Westfälische Wilhelms-Universität Münster	Germany	In-Person
Heta	Tuominen	University of Helsinki	Finland	In-Person

U

Nao	Uchida	The University of Tokyo	Japan	Online
Nina	Udvardi-Lakos	University of Freiburg	Germany	In-Person
Yuri	Uesaka	The University of Tokyo	Japan	Online
Kamila	Urban	Slovak Academy of Sciences	Slovakia	In-Person
Tim	Urdan	Santa Clara University	United States	In-Person
Detlef	Urhahne	University of Passau	Germany	In-Person
Õnne	Uus	Tallinn University	Estonia	In-Person

V

Thijmen	Van Alphen	University of Amsterdam	The Netherlands	In-Person
Janneke	van de Pol	Utrecht University	The Netherlands	Online
Wieke	van der Goot	University of Groningen	The Netherlands	In-Person
Jolene	Van der Kaap-Deeder	Norwegian University of Science and Technology (NTNU)	Norway	In-Person
Lisa	van der Sande	Vrije Universiteit Amsterdam	The Netherlands	Online
Ineke	van der Veen	University of Amsterdam	The Netherlands	Online
Nele	Van Doren	Ghent University	Belgium	In-Person
Mariette	van Loon	University of Bern	Switzerland	
Maarten	Vansteenkiste	Ghent University	Belgium	In-Person
Christiana	Varda	Cyprus University of Technology	Cyprus	In-Person
Dana	Vedder-Weiss	Ben-Gurion University of the Negev	Israel	In-Person
Giada	Vicentini	University of Verona	Italy	In-Person

Jaana	Viljaranta	University of Eastern Finland	Finland	Online
Irit	Vivante	Ben-Gurion University of the Negev	Israel	In-Person
Elisabeth	Vogl	Ludwig-Maximilians-Universität (LMU)	Germany	In-Person
Jeff	Vomund	George Mason University	United States	Online
Luise	von Keyserlingk	TU Dortmund	Germany	In-Person
W				
Yi	Wang	Erasmus University Rotterdam	The Netherlands	Online
Gyde	Wartenberg	Leibniz Institute for Science and Mathematics Education (IPN)	Germany	Online
Penelope	Watson	University of Auckland	New Zealand	Online
Merih Welay	Welesilassie	University of Szeged	Hungary	Online
Anna	Widlund	Åbo Akademi University	Finland	Online
Lisette	Wijnia	Open University of the Netherlands	The Netherlands	In-Person
Philip	Winne	Simon Fraser University	Canada	In-Person
Linda	Wirthwein	TU Dortmund	Germany	Online
Franz	Wortha	University Greifswald	Germany	In-Person
Y				
Junlin	Yu	University of Helsinki	Finland	In-Person
Z				
Ji	Zhou	Leibniz Institute for Educational Trajectories	Germany	Online
Theresa	Zink	Leibniz Institute for Educational Trajectories	Germany	Online