MASTERARBEIT | MASTER'S THESIS

Titel | Title

The Impact of Emotion Regulation Strategies on Internalizing and Externalizing Difficulties in Primary School Children

verfasst von | submitted by

Emily Antonia Scheer BSc

angestrebter akademischer Grad | in partial fulfilment of the requirements for the degree of

Master of Science (MSc)

Wien | Vienna, 2025

Studienkennzahl lt. Studienblatt | Degree programme code as it appears on the student record sheet:	UA 066 840
Studienrichtung lt. Studienblatt | Degree programme as it appears on the student record sheet:	Masterstudium Psychologie
Betreut von | Supervisor:	Univ.-Prof. Giorgia Silani Privatdoz. PhD

Table of Contents

Introduction

Around the world, many young people suffer from mental health (MH) issues. According to the World Health Organization (2024), every seventh person (14%) between the ages of 10 and 19 experiences a mental disorder, the majority of whom remain without treatment or sufficient support (WHO, 2024). Furthermore, a meta-analysis and systematic review by Silva and colleagues (2020) revealed a global prevalence of common mental disorders (i.e., depressive and anxiety disorders) in the same age group to be between 25% and 31%, meaning every fourth person between the ages of 10 and 19 suffers from an anxiety and/or depressive disorder. Additionally, Baranne and Falissard (2018) analyzed which diseases were the leading causes of disability-adjusted life years (DALYs) between the ages of 5 and 14 years using data from the global burden of disease study of 2015. DALYs sum up the years lost because of early death and the years living with limited health due to the disease or disorder of a person. They found that mental disorders were one of the top five main causes of DALYs in that age group globally. Even more concerning, in the United States, mental disorders are the second most common cause, and in Western Europe, the leading cause of DALYs in adolescence (Baranne & Falissard, 2018).

In Austria, the situation is even more severe. Philipp and colleagues (2014) found that in their sample of 405 students between the ages of 10 and 18, the prevalence of psychological problems was 18.9%. Moreover, Wagner and colleagues (2017) conducted a similar study on 3651 adolescents, which revealed a prevalence of mental disorders of 23.9%. Thus, approximately one in four to five adolescents in Austria appears to experience at least one mental disorder (Philipp et al., 2014; Wagner et al., 2017).

At the same time, many children and adolescents with mental health difficulties remain untreated (Canals et al., 2019; Ghafari et al., 2022; Kessler et al., 2007; Ravens-sieberer et al., 2015; Supke et al., 2021; Wagner et al., 2017). In fact, a meta-analysis and systematic review by Ghafari and colleagues (2022) revealed that globally the need for mental health care in adolescence remains unmet in about 54% of the time. Similar to global estimates, Wagner and colleagues (2017) discovered in their Austrian sample that 52.5% of adolescents with lifetime psychiatric disorders had not sought mental health care. Thus, more than half of adolescents do not receive adequate support when facing mental health problems (Ghafari et al., 2022; Wagner et al., 2017). Furthermore, Kessler and colleagues (2007) found that even when people are diagnosed in childhood or adolescence, they typically only receive treatment several years later.

This may have devastating consequences. Mental health issues can lead to social exclusion and (cyber-)bullying, difficulties at school, low self-esteem, physical health problems, discrimination, and other problems for adolescents (Juhl et al., 2023; Li et al., 2022; WHO, 2024). Affected individuals also experience a lower quality of life compared to their peers without mental health conditions (Philipp et al., 2014). Furthermore, these children are particularly at risk for self-harming behaviors and suicidality (Richardson et al., 2024). This is especially relevant, since globally about 16% of all adolescents between the ages of 11 and 18 take part in non-suicidal self-injury (Farkas et al., 2023). In a sample consisting of 1339 German, Austrian, and Swiss students with a mean age of 14, nearly every fifth person (18.8%) reported having participated in self-harming activities in the last 6 months (Plener et al., 2013). Moreover, suicide is among the leading causes of death for individuals aged 15 to 19 in Western Europe and globally 4% to 13% of all adolescents between the ages of 12 and 15 conducted more than one suicide attempt (Naghavi et al., 2017; Smith et al., 2021). In the year 2022, suicide was the second most common cause of death of adolescents aged 15 till 19 in Austria (Bundesministerium für Soziales, Gesundheit, Pflege und Konsumentenschutz, 2023).

Furthermore, the high prevalence of mental disorders in this age group are especially concerning, since most often mental disorders with an onset in adolescence remain stable in later years of people's lives (Lallukka et al., 2019). In most follow-up studies, more than half of children or adolescents with one or more mental disorder(s) persist in having mental health problems in later years of life (Canals et al., 2019; Colman et al., 2007; Essau et al., 2002; Ford et al., 2017; Göbel et al., 2022; Ravens-sieberer et al., 2015; Supke et al., 2021; Wozniak et al., 2011). For example, Colman and colleagues (2007) conducted a longitudinal study with over 3,000 British adolescents spanning 40 years and found that 70% of all participants with internalizing problems at both assessment points in adolescence also had mental disorders in their thirties, forties, and fifties. A systematic review by Mulraney and colleagues (2021) revealed that mental health difficulties at any point in early or late childhood are associated with high risks of mental disorders in all phases of adulthood, but especially young adulthood. This association was strongest when the onset of the mental disorder was at age 14 or younger. Furthermore, they discovered that symptoms of mental disorders showed an even stronger connection to adult mental health issues compared to diagnosed disorders in childhood (Mulraney et al., 2021). Thus, children with mental health issues are especially vulnerable even if they do not meet all criteria for a mental disorder. Additionally, mental disorders in childhood and/or adolescence are correlated with poor social, educational, work and physical functioning in young adulthood (e.g., poor relationships with parents, peers, and romantic partners) (Burke

et al., 2014; Winsper et al., 2015; Wozniak et al., 2011). Therefore, identifying and treating mental health issues in childhood or adolescence could prevent chronicity and recurrence while also improving overall well-being, not only during adolescence but throughout all of adulthood (Göbel et al., 2022; Herpertz-dahlmann et al., 2015; Supke et al., 2021; Winsper et al., 2015).

Especially late childhood and early adolescence appear to be optimal periods for intervention. Some of the most prevalent mental disorders, like anxiety or impulse-control disorders, first present themselves around the age of 11, while half of all lifetime cases of mental disorders will have manifested by the age of 14 or earlier (Kessler et al., 2005; Mulraney et al., 2021). In Austria, a particularly challenging event in the early years of adolescence is the transition from primary to secondary school, which is reported to have negative effects on self-esteem and anxiety levels (Evans et al., 2018). Even though childhood and early adolescence is a period of vulnerability, it also represents a great opportunity for early life interventions (Clark et al., 2020). Specifically, the end of primary school constitutes a good time to learn new skills and gain knowledge about mental health. At that time children have improved cognitive competencies (e.g., cognitive control, cognitive inhibition, attention abilities, word processing; Aydmune et al., 2022; Bub et al., 2006; Carretti et al., 2022; Hein & Kauschke, 2020). A study by Longobardi and colleagues (2019) with 240 Italian primary school children discovered that by fourth grade (i.e., age range 8.9 and 10.5 years) children had developed significantly improved receptive language skills, empathy, and Theory of Mind abilities. Moreover, children seem to have developed better social skills, emotion regulation, and self-awareness by the end of primary school (Tarasova, 2016; Vierhaus et al., 2016). Therefore, this time period composes a great opportunity for learning new skills to enhance wellbeing and manage mental health issues. Strategies are needed to prevent and reduce MH issues in this age group.

Theories and Frameworks of Emotion Regulation

One factor that is often reported to be a predictor of psychological problems and, therefore, a key target for intervention is the use of emotion regulation styles (Mumtaz et al., 2017). Emotion regulation (ER) refers to "the processes by which people modify the intensity and/or duration of their emotions in response to contextual demands" (Aldao et al., 2016, p. 928). Thus, for the sake of achieving goals, emotions are influenced (enhanced or inhibited) by using different strategies (e.g., suppression, avoidance, cognitive reappraisal, etc.; Thompson, 1994). For example, a person might try to inhibit the feeling of anger because it is culturally unacceptable to express this emotion publicly by avoiding the stimuli that cause this emotion

(i.e., situation selection). Depending on the situation or an individual's implicit or explicit preferences, they could also try to re-evaluate their perception of the situation to reduce the uncomfortable feeling (i.e., cognitive reappraisal). Frameworks and theories on ER highlight important features of regulatory processes, summarized in the following section.

Thompson (2011) argues that emotion regulation can occur both extrinsically and intrinsically, meaning that ER is not only a form of self-management, but emotion can also be regulated through external influences, for example through cultural expectations (e.g., cultural norms or rules of the social group) or the interventions of others (e.g., parents, peers). The latter is especially important in early childhood in form of caregiver responsiveness (Thompson, 2011). Moreover, emotions can be both up-regulated (e.g., trying to prolong positive affect) and down-regulated (e.g., trying to reduce negative affect; Gross, 2015; Thompson, 1994). With some exceptions, most people try to enhance their positive and inhibit their negative emotional arousal (Gross, 2015). Furthermore, regulatory processes affect both the discrete emotion itself, as well as its temporal features (e.g., intensity, duration, persistence over time, emotion range or lability; Aldao et al., 2016; Gross, 2015; Thompson, 1994). Thus, ER does not necessarily inhibit or enhance a specific emotion but may also decrease or increase its intensity or shorten or lengthen its persistence. Finally, many conceptualizations of ER highlight its goal orientation (Gross, 2015; Martínez-Priego et al., 2024; Sabatier et al., 2017; Thompson, 1994). The use of specific emotion regulation strategies is, therefore, driven by individuals' conscious or subconscious goals for the particular situation regarding satisfactory short- and/or long-term outcomes (Gross, 2015; Thompson, 1994, 2011). Because people differ in their goals, someone might not fully understand the emotion regulation behavior of others. Specifically, children might be (wrongfully) classified as being emotionally dysregulated because of an adult's misconception of their desired outcome for the particular situation (Thompson, 2011).

As mentioned above, ER can be categorized into different strategies people use to regulate their emotional experiences (Martínez-Priego et al., 2024). The most popular ER model, the process model of emotion regulation by Gross (2015), includes the five strategies situation selection (i.e., influencing to which situation one is exposed to), situation modification (i.e., changing aspects of the situation), attentional deployment (i.e., influencing what aspects are noticed), cognitive change (i.e., changing how it is represented cognitively), and response modulation (i.e., influencing emotion-related behavior). Just like the process model, most models of ER consider strategies that can be classified into three dimensions: cognitive control strategies (e.g., cognitive reappraisal, rumination, distraction), behavioral strategies (e.g.,

seeking social support, problem solving, aggressive action), and motivational-coping strategies (e.g., goal setting, impulse control, emotion-focused coping; Martínez-Priego et al., 2024). Cognitive ER strategies try to influence cognitive processes like attention and thoughts. In contrast, behavioral strategies encompass visible actions to modify emotions, while, motivational-coping strategies include goal-oriented and voluntary acts that occur internally and therefore, are not visible to other people (Martínez-Priego et al., 2024).

Additionally, some ER strategies are generally seen as more adaptive (e.g., problem solving, distraction, humor enhancement, accepting, cognitive reappraisal, etc.), while others are considered as maladaptive strategies (e.g., giving up, aggressive actions, withdrawal, etc.) (Goldschmidt et al., 2006; Martínez-Priego et al., 2024). Generally speaking, adaptive strategies induce better long-term outcomes compared to maladaptive strategies. In childhood and adolescence, adaptive ER is linked to lower symptoms of psychopathology, higher wellbeing and positive affect, while maladaptive ER is associated with higher symptom severity and negative affect (Cai et al., 2021; Compas et al., 2017; Heleniak et al., 2016; Karnilowicz et al., 2022; Martínez-Priego et al., 2024; Rueth & Lohaus, 2022). However, some people argue, that categorizing strategies into adaptive and maladaptive ones, does not capture the complexity of short- and long-term outcomes of a person, since every strategy serves a goal-oriented purpose in particular circumstances (Thompson, 2011). Therefore, strategies that might lead to poor long-term outcomes can serve a protective purpose in a specific situation. For example, children at risk might be exposed to high stress or dangerous situations, and because of this immediate danger, they might not be capable of considering long-term goals. Therefore, the only available ER strategies may be those typically considered maladaptive, but in this particular situation serve the purpose of protecting the child from further harm (Thompson, 2011). Thus, even though the term adaptive and maladaptive strategies are used in this thesis when speaking about strategies leading to better or worse long-term outcomes, it should be kept in mind that maladaptive strategies can serve as crucial coping mechanisms depending on the situation.

It is important to note that as children and adolescents grow up, personal goals and, consequently, emotion regulation itself become increasingly complex and strongly influenced by social and cultural norms and values (Fombouchet et al., 2023; Thompson, 2011). In early childhood, meta-emotional skills are not fully developed and children fail to consider long-term goals when monitoring and regulating emotions (Thompson, 2011). Furthermore, babies and toddlers primarily depend on extrinsic emotion regulation through their caregiver. Between the ages of 7 and 9, children realize that people differ in their point of views, as well as in their

emotional responses to different situations, and that they sometimes withhold their emotions. Thus, children at this age are capable to hide their feelings, express different emotions than they are actually experiencing, and use emotion regulation strategies intentionally. At ages 9 and 10 ER is significantly influenced by social norms and expectations (i.e., children understand that the expression of specific emotions is well received, while others are not; Sabatier et al., 2017). Furthermore, children now primarily use internal compared to external ER strategies and regulate their emotions without the intervention of caregivers or other adults (Fombouchet et al., 2023; Sabatier et al., 2017). In the following years till adulthood, adolescents experience a refinement and expansion of ER strategies and increasingly consider how they are perceived by other people, their own long-term goals, as well as the position and feelings of others (e.g., empathetic concern; Fombouchet et al., 2023; Sabatier et al., 2017). Nevertheless, this time is also associated with the consolidation of gender differences in ER. By age 15, boys use a reduced range of ER strategies, are less sensitive, and show less empathic concern for other's emotions. They are also more likely to inhibit and withhold feelings of fear and sadness (Sabatier et al., 2017). Furthermore, adolescence is associated with an increase in the use of maladaptive and a decrease in the use of adaptive ER strategies (Fombouchet et al., 2023). Therefore, even though a higher range of emotion regulation strategies are used at the end of childhood, adolescence is also associated with increasingly harmful exertion of ER, particularly in boys. Targeting adolescents' emotion regulation skills in primary school, before gender differences become firmly established, could be a potential strategy for preventing the development of mental health problems.

To further examine the use of emotion regulation strategies at the end of childhood and hopefully contribute to the growing body of research on mental health disorders in young adolescence, this thesis addresses the following research question: How are different emotion regulation strategies connected to mental health difficulties in primary school children?

The Relationship Between Emotion Regulation and Mental Health Difficulties

Focusing on childhood and adolescence, emotion regulation has been found to be connected to many aspects related to mental health issues. For example, maladaptive ER strategies were positively correlated with both anxious and avoidant attachment behaviors, as well as depressive symptoms in 12- to 14-year-old Belgian adolescents (Brenning et al., 2012). Additionally, in a sample of American children between the ages of 7 and 13, participants who used fewer positive and more negative emotion regulation styles, as reported by their parents, were more likely to display conduct problems at school (e.g., aggressive actions, rule-breaking

behavior, and peer problems; Kim & Page, 2013). Furthermore, a study with 183 American children at risk for self-harming behavior found that decreasing use of ER strategies was associated with an increased report of taking part in (non-suicidal) self-injury 12 months later (Poon et al., 2023). ER was also found to be related to sleep problems, peer victimization, problematic gaming and internet addiction (Cooley et al., 2022; Liang et al., 2021; Riley et al., 2019; Schettler et al., 2024; Yang, 2024).

In addition, there seems to be a strong connection between emotion regulation and various mental disorders in childhood and adolescence (Essau et al., 2017). For example, multiple studies found a connection between maladaptive emotion regulation (e.g., rumination) and eating disorder behaviors (e.g., bulimic symptoms), in adulthood and adolescence (Murayama et al., 2021; Trompeter et al., 2021; Van Durme et al., 2018). Additionally, in a sample of 9- to 15-year-old Japanese students the increased use of the adaptive strategy of cognitive problem solving was associated with lower bulimic symptoms, but only in girls. However, the adaptive strategy of distraction was positively associated with some symptoms of eating disorders in the same sample (Murayama et al., 2021). Therefore, compared to maladaptive strategies, adaptive strategies might not be as clearly associated with some mental health issues. Furthermore, emotion regulation strategies are connected to both depression and anxiety in childhood and adolescence (LaMontagne et al., 2023; Liang et al., 2021; Suveg & Zeman, 2004). For example, Suveg and Zeman (2004) found that 8- to 12-year-old children with diagnosed anxiety disorders had more emotion regulation difficulties compared to ‘healthy’ counterparts and were less confident in their ability to regulate high-intensity emotions. Regarding depression, in a sample of Chinese adolescents between the age of 12 and 18, cognitive reappraisal (i.e., adaptive strategy) was negatively, and expressive suppression (i.e., maladaptive strategy) was positively associated with depression and anxiety (Liang et al., 2021). Moreover, LaMontagne and colleagues (2023) found that emotion regulation difficulties were connected to increased depressive symptoms in US American middle- and high school students between the ages of 10 and 19. They also discovered that emotion regulation difficulties mediated the effect of family conflict on depressive symptoms, indicating that a decrease in maladaptive ER could buffer the negative effect of family problems on depression (LaMontagne et al., 2023). Similarly, Wang and colleagues (2025) found that ER was able to moderate the negative influence of maternal depression on mental health difficulties in Chinese children in primary school. Another study discovered, that emotion regulation affected the relationship between positive and negative family factors (e.g., attachment style, family conflict, parent psychopathology) and children’s mental health

difficulties (Lin et al., 2024). Therefore, more adaptive and less maladaptive ER strategies might protect children from the negative effects of risk factors and thus strengthen their resilience.

Interestingly, some research examined the connection between different types of mental disorders and emotion regulation strategies. Specifically, there seems to be a difference in the use of ER strategies between individuals with internalizing and those with externalizing problems. Internalizing problems are primarily inward-directed, meaning they are often not visible to others (e.g., social isolation, withdrawal, anxiety, depression). In contrast, externalizing problems are often directed towards the outside, where the person reacts (often negatively) to their environment (e.g., disordered behaviors, aggression and poor anger management, delinquency, hyperactivity; Garnefski et al., 2005; Georgiou et al., 2021). In childhood and adolescence, the most common internalizing mental disorders are anxiety disorders while the most common externalizing disorders are impulse-control disorders (Kessler et al., 2005). Generally speaking, girls are known to have more internalizing problems (e.g., eating disorders, anxiety disorders), while boys experience more externalizing problems (e.g., ADHD, conduct problems; Masfety et al., 2021). Some studies have found that people with internalizing problems might use more cognitive ER strategies (e.g., rumination, self-devaluation, cognitive problem solving), while people with externalizing problems use more behavioral ER strategies (e.g., distraction, aggressive action, social support; Garnefski et al., 2005; te Brinke et al., 2021). For example, Garnefski and colleagues (2005) conducted a study with Dutch adolescents between the ages of 12 and 18, finding that individuals with internalizing problems scored significantly higher on the ER strategies of self-blame, rumination, and positive reappraisal compared to the control and externalizing problems group. Moreover, a similar study by te Brinke and colleagues (2021) classified emotion regulation strategies into four groups (i.e., cognitive maladaptive, behavioral maladaptive, cognitive adaptive, and behavioral adaptive) and found that in Dutch adolescents between the ages of 12 and 19, the internalizing problems group scored significantly higher on cognitive maladaptive and cognitive adaptive ER strategies. Furthermore, when compared to children with internalizing problems, a 'healthy' control group, and children with both internalizing and externalizing problems, the individuals with only externalizing problems used a behavioral emotion regulation style (te Brinke et al., 2021). Since both studies are based on adolescents from the Netherlands between the ages of 12 and 19, more research is needed to examine these observations across different age groups and in children from different countries. Therefore, this study aims to determine if similar results can be obtained in primary school children from

Austria. Gaining detailed knowledge of the effect of specific emotion regulation strategies on mental health difficulties could support the development of intervention and specifically prevention programs in primary schools, a time in which most major mental disorders have typically not yet emerged.

Therefore, three hypotheses have been formulated. First, it is expected that children with more mental health difficulties in general use fewer adaptive and more maladaptive ER strategies compared to children with fewer mental health difficulties. Second, it is expected that children who have more internalizing problems score higher on cognitive ER strategies compared to children with fewer internalizing problems. Third, it is expected that children with more externalizing problems score higher on behavioral ER strategies compared to children with fewer externalizing problems.

Methods

Project COMET for Kids

This study was part of the COMET for Kids project at the Faculty of Clinical and Health Psychology of the University of Vienna led by the principal investigators Prof. Dr. Giorgia Silani, Prof. Dr. Barbara Schober, and Prof. Dr. Kerstin Zechner. The aim of the project is to improve mental health literacy (MHL) in primary school children to prevent future mental health issues. MHL refers to knowledge about mental health that aims to promote the recognition of mental disorders and facilitate people's ability to access information on mental health in general, and mental health issues in particular (i.e., risk, causes, availability of treatment, and professional help) (Bale et al., 2020). Children take part in mental health literacy workshops on a weekly basis throughout an academic school year (i.e., October 2024 till June 2025). Data for this thesis were collected during the pre-intervention test in September and October 2024.

Participants

Participants were 194 children between the ages of 8 and 11 years (M_{age} = 9.27, SD = 0.52), 46.74% of whom were girls and 53.26% boys. They were recruited from schools in Vienna and Lower Austria. Several schools were contacted and asked if they were interested in participating in the COMET project. Finally, schools were selected to differ in location and, therefore, in the socioeconomic background of the children. Moreover, children differed in their cultural backgrounds with 108 children (55.67%) speaking either no German or more than one language at home. In total, twelve classes across four different schools participated in the

study. One so called “integration class” was included in the study, which contains students who need more individual support because of (learning) disabilities or developmental disorders.

Children and their parents provided informed consent in order to participate in the study. Therefore, not all children in each class decided to take part in the study. Furthermore, of the 194 children who participated, 10 children were excluded from the analysis because they did not attend school on either day one or day two of the data collection process.

Instruments

Emotion Regulation Strategies

Emotion regulation strategies were assessed with the German version of the FEEL-KJ questionnaire (Goldschmidt et al., 2006). The FEEL-KJ is a 90 item self-report questionnaire measuring 15 emotion regulation strategies in response to three different emotions (i.e., anger, anxiety, and sadness). It was originally designed for children, as well as adolescents between the ages of 10 and 19 years; however, it has already been applied and validated for children as young as 8 (Cracco et al., 2015). Items are rated on a five-point Likert scale (i.e., from almost never to almost always; Goldschmidt et al., 2006). To give an example, an item regarding the emotion regulation strategy of social support in response to the emotion of sadness would be: “when I am sad, I tell someone how I am feeling”.

Since, children in the sample were required to answer multiple questionnaires a day as part of the COMET project’s pretest, not all emotion regulation strategies in response to all emotions were measured. The decision on which items were to be used was made by the research team based on relevance for the Workshop objectives. The final version consisted of 28 items from the original FEEL-KJ questionnaire, measuring 7 different emotion regulation strategies (i.e., social support, distraction, acceptance, humor enhancement, aggressive action, withdrawal, and cognitive problem solving) in response to the two emotions of anger and sadness.

Furthermore, the different emotion regulation strategies of the FEEL-KJ can be divided into maladaptive and adaptive strategies. Aggressive action and withdrawal constitute the maladaptive strategies of the shortened version used in the study, while adaptive strategies are represented by distraction, acceptance, humor enhancement, and cognitive problem solving. Social support is the only strategy that cannot be distinctly classified as either adaptive or maladaptive (Goldschmidt et al., 2006). Moreover, te Brinke and colleagues (2021) additionally divided some emotion regulation strategies of the FEEL-KJ into cognitive and behavioral strategies, which was supported by confirmatory factor analysis. Regarding the

strategies tested in this sample, distraction, aggressive action, and withdrawal were classified as behavioral strategies, while cognitive problem solving, humor enhancement, and acceptance can be classified as cognitive strategies (te Brinke et al., 2021). Since social support was not included in the study by te Brinke and colleagues (2021), it was classified as a behavioral strategy in this thesis due to its characteristics and conceptual alignment with other strategies in this category. Therefore, the cognitive strategies measured in this sample consisted only of adaptive strategies. Due to the dependence on the main project no maladaptive cognitive strategy was assessed in this study.

Mental Health Difficulties

Children's mental health difficulties were measured using the German self-report version of the Strengths and Difficulties Questionnaire (SDQ-Deu-S; Lohbeck et al., 2015). The SDQ is a widely used screening tool to assess mental health problems, as well as potential strengths of children between the ages of 2 and 17 years. It is available as a self-report questionnaire, as well as an external assessment filled out by parents or teachers. The SDQ consists of 25 items which can be classified into 5 subgroups (i.e., emotional problems, peer problems, conduct problems, hyperactivity, and prosocial behavior; Lohbeck et al., 2015). An example of an item of the subscale conduct problems would be: "I am often accused of lying and cheating". The items of the original version of the SDQ are rated on a three-point Likert scale (i.e., not true, somewhat true, certainly true). However, to ensure consistency across all questionnaires and reduce complexity for the children in this sample, the SDQ responses were expanded to a five-point Likert scale (i.e., ranging from not true to certainly true).

Furthermore, the 5 subgroups can, additionally, be categorized into the three subscales internalizing problems (i.e., emotional problems and peer problems), externalizing problems (i.e., hyperactivity and conduct problems), and the prosocial behavioral scale (Goodman et al., 2010). This classification was supported by factor analyses and showed even better validity compared to the five-scale subgroups, particularly for low-risk groups. Therefore, when not screening for mental health disorders, as it is the case in this study, using the three-factor structure can be generally preferred (Goodman et al., 2010).

Gender

Gender was measured once as part of the other demographic questions. Without asking a specific question about their gender, children could tick two different boxes, stating "I am a girl" and "I am a boy".

Design

The two questionnaires relevant to this study were filled out on two separate days over a span of two weeks, in the students' classrooms over the course of one hour (i.e., between 8 a.m. and 12 p.m.). One member of the research team (i.e., postdoc or master's student) was present during the assessment and had standardized instructions on how to explain the questionnaires. Children were instructed to fill out the questionnaire as truthfully and spontaneously as possible, and they were reminded that there was no right or wrong answer. Instead, the goal was to find out more about their current situation and feelings. They were then asked if they had any remaining questions. Children who did not give informed consent were given something to draw and instructed to be quiet during the session. The questionnaire on the first day consisted of, first, a wellbeing scale not relevant to this study, followed by the FEEL-KJ with a focus on the emotion of sadness, and ended with demographic questions (e.g., gender, age). The questionnaires on the second day of data collection started with the FEEL-KJ with a focus on the emotion of anger, followed by a question about help-seeking behavior, and a mental health literacy scale not relevant to this study, and finished with the SDQ-Deu-S. Children were allowed to ask questions during the session.

Analysis

One hundred twenty-two values were missing at random (i.e., no consistent pattern was found) as part of the SDQ and FEEL-KJ. They were imputed with the median, which is considered to be one of the best methods to handle missing values in ordinal scaled data (Quintero & LeBoulluec, 2018). For the analysis, several variables were calculated using item responses from the children ("not true"/ "almost never" coded as 0 to "certainly true"/"almost always" coded as 4). First, the mean score of all SDQ items, apart from items of the subscale prosocial behavior, was calculated for every participant, to represent the variable general mental health difficulties. Second, the mean values of the subgroups emotional problems and peer problems were used as the internalizing problem scores. Third, the items for conduct problems and hyperactivity were averaged for every child to obtain the variable called externalizing problems. Regarding the emotion regulation strategies, the mean of all FEEL-KJ item scores was calculated to represent the amount of emotion regulation strategies a child uses. To add a variable for adaptive strategies, the mean value across all the subgroup items for humor enhancement, acceptance, cognitive problem solving, and distraction was calculated for every participant. The same was done with the items for withdrawal and aggressive actions to represent maladaptive strategies. The average of the subgroups humor enhancement,

cognitive problem solving, and acceptance were calculated for the variable cognitive strategies and the subgroups aggressive action, withdrawal, distraction and social support were averaged for the variable behavioral strategies. Finally, gender was represented by a dichotomous variable (i.e., girls coded 0, boys coded 1).

The data were analyzed using the "lme4" package in R (Bates et al., 2015; R Core Team, 2021). A multilevel modeling approach was used to account for the hierarchical structure of the data (i.e., participants nested in classes, classes nested in schools). Individual data points represented level 1, classes were placed on level 2, and schools constituted level 3 of the calculated models. Depending on the hypothesis, multiple models were carried out, which differed in the fixed and random effects included in the model. The models were compared using Akaike Information Criterion (*AIC*) and Bayesian Information Criterion (*BIC*) and the best fitting model was used to examine the effects of the predictor variables on the outcome (Akaike, 1998; Sakamoto et al., 1986; Schwarz, 1978). An alpha level of .05 was used to declare significance of the effect. Furthermore, single multilevel models with random intercepts only, and gender as a fixed effect were calculated in an exploratory analysis. Model fit outlier and predictor outlier were detected and handled according to recommendations by Aguinis and colleagues (2013). To determine no model fit outlier were present, random effects were standardized (i.e., z-scores) and plotted with dotplots and boxplots on every level (e.g., class, school). Z-scores above or below 3 were considered model fit outliers (Aguinis et al., 2013). Predictor outliers were detected calculating Cook's distance (Cook, 1977). Influential outliers were deleted and their influence on the direction and significance level on the effect were examined. Assumptions of multilevel modeling were checked for the model with the best fit. Residuals were plotted against fitted values and Shapiro-Wilk test was calculated to ensure normality, linearity and homoscedasticity (Shapiro & Wilk, 1965). Durbin-Watson test (*DW*) was performed in order to confirm independence of residuals and variance inflation factor (*VIF*) was calculated to check for multicollinearity (Durbin & Watson, 1950; Hair, 2006). Finally, the isSingular function of the lme4 package in R was used to reject singularity (Bates et al., 2015; R Core Team, 2021).

Results

Hypothesis 1

To determine whether children with more mental health difficulties use fewer adaptive and more maladaptive emotion regulation strategies compared to children with fewer mental health difficulties, as postulated in the first hypothesis, a series of linear mixed models were

conducted. The SDQ score mean was used as an outcome variable, while the mean of adaptive and maladaptive FEEL-KJ strategies was used as the two predictors representing fixed effects. School and class membership were included to account for random effects.

Five different models were examined successively. First, a null model with only the outcome and random intercepts for class and school was calculated, serving as a baseline for model comparison. Second, alongside the outcome and random intercepts, adaptive and maladaptive strategies were included as fixed effects. Third, in order to control for gender differences, gender was included as a third fixed effect into the model. In the last two models, first, a random slope for class was added, followed by a random slope for school.

Model comparison revealed that the third model, with inclusion of adaptive strategies, maladaptive strategies, and gender best fitted the data (AIC = 1395.65, BIC = 1418.15). The second model with only two fixed effects for maladaptive and adaptive strategies had the second best model fit (AIC = 1406.30, BIC = 1425.59), while the last two models with random slopes for class (AIC = 1408.85, BIC = 1444.22) and a random slope for school (AIC = 1419.52, BIC = 1470.95) displayed the worst fit, indicating that the slopes of class and school do not significantly vary from the mean slope of the sample. However, the model with the best fit shows a small class variance in the intercepts (s^2 = 2.76, SD = 1.66), indicating that children in the same class tend to have slightly more similar SDQ scores compared to children in different classes. No intercept variance was found on the school level (s^2 = 0, SD = 0).

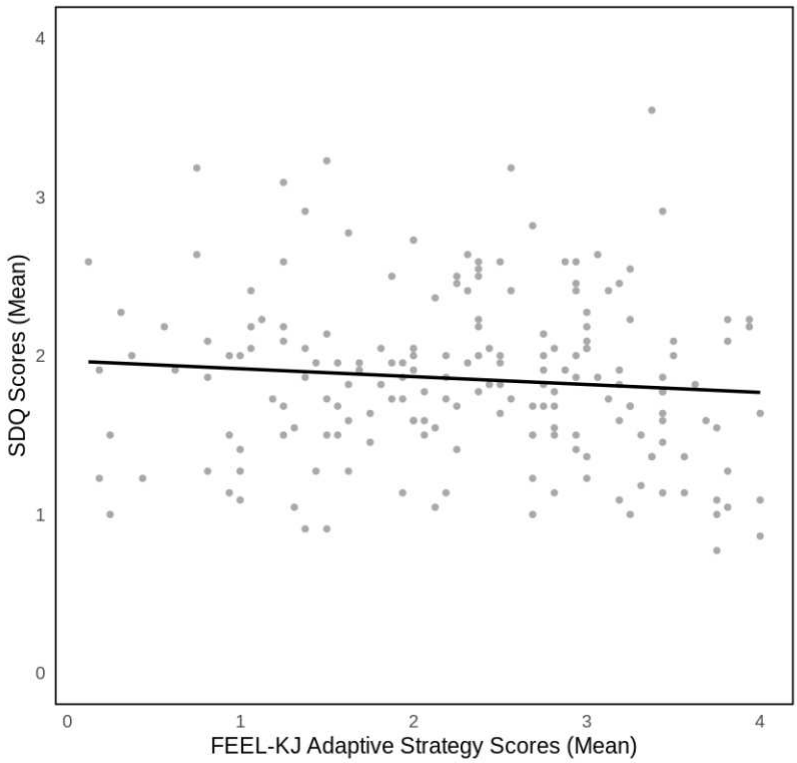
Across all models, the effect of adaptive strategies on SDQ scores was not significant. Focusing on the model with the best fit, adaptive strategies displayed a trend for a slight positive connection with SDQ scores though significance level was not reached (β = 0.07, SE = 0.06, t(179.36) = 1.33, p = .18). Therefore, adaptive strategies do not seem to have a considerable connection with mental health difficulties in this sample (see Figure 1).

In contrast, maladaptive strategy scores had a significant positive effect on SDQ scores in the model with the best fit (β = 0.63, SE = 0.11, t(178.75) = 5.53, p < .001), as well as across all other models of analysis. A one standard-deviation increase in maladaptive strategy scores was associated with a 0.63 increase in SDQ scores, indicating that children who reported using more maladaptive strategies also reported to have more mental health difficulties in this sample (see Figure 2).

Finally, the effect of gender on SDQ scores was also significant, with boys having significantly lower SDQ scores compared to girls (β = -4.88, SE = 1.53, t(177.58) = -3.19, p = .002). Therefore, boys reported to experience less mental health difficulties compared to girls. This explains why controlling for gender improved model fit.

Figure 1

Connection between Mental Health Difficulties and Adaptive Emotion Regulation Strategies



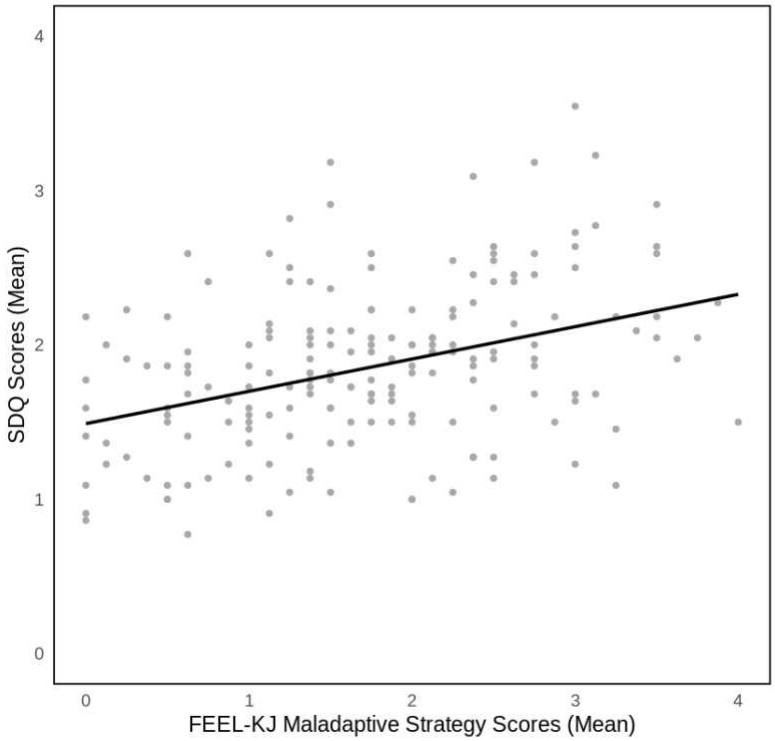
Note. The grey points represent participant's mean values of SDQ scores and FEEL-KJ adaptive strategy scores. The black line delineates the regression trend demonstrating the general relationship between the two variables.

Outliers were detected, and assumptions of multilevel modeling were tested using the third model (i.e., best fit). No model fit outliers were detected using standardized residuals (i.e., no z-scores above 3 or below -3) on each of the three levels (i.e., school, class and individual data points). However, by calculating Cook's distance 28 influential predictor outliers on level 1 were found and deleted to see if they influenced the significance level of the effects described above. The removal of the outliers did not change the direction or significance level of the effect of adaptive strategies (β = 0.12, SE = 0.06, t(121.28) = 1.89, p = .06) or the effect of maladaptive strategies on SDQ scores (β = 0.83, SE = 0.13, t(118.60) = 6.61, p < .001).

Furthermore, all assumptions of multilevel modeling were met. Looking at the distribution of residuals and carrying out the Shapiro-Wilk test revealed normality of the residuals (W = 0.99, p = .12). Linearity and homoscedasticity was ensured by plotting residuals against fitted values. Additionally, Durbin-Watson-Test was computed and revealed sufficient independence of the residuals (DW = 1.91). The isSingular function of the lme4 package in R

Figure 2

Connection between Mental Health Difficulties and Maladaptive Emotion Regulation Strategies



Note. The grey points represent participant's mean values of SDQ scores and FEEL-KJ maladaptive strategy scores. The black line delineates the regression trend demonstrating the general relationship between the two variables.

ensured no random effects covariance matrices were singular. Finally, a variance inflation factor was calculated and revealed an acceptable correlation between predictors (*VIF* = 1.26).

Hypothesis 2

In order to test the hypothesis, that children with more internalizing problems use significantly more cognitive strategies compared to children with fewer internalizing problems, the same five models as for hypothesis 1 were conducted with internalizing problems serving as the outcome variable and cognitive strategies as the predictor variable. First, a null model with only the outcome variable and random intercepts for school and class was calculated. Then, cognitive strategies were included, followed by the inclusion of gender as a fixed effect. Finally, random slopes for first, class, and second, school were allowed in the models.

The third model with fixed effects for cognitive strategies and gender revealed to have the best model fit (*AIC* = 1223.50, *BIC* = 1242.79), followed by the null model (*AIC* = 1234.45,

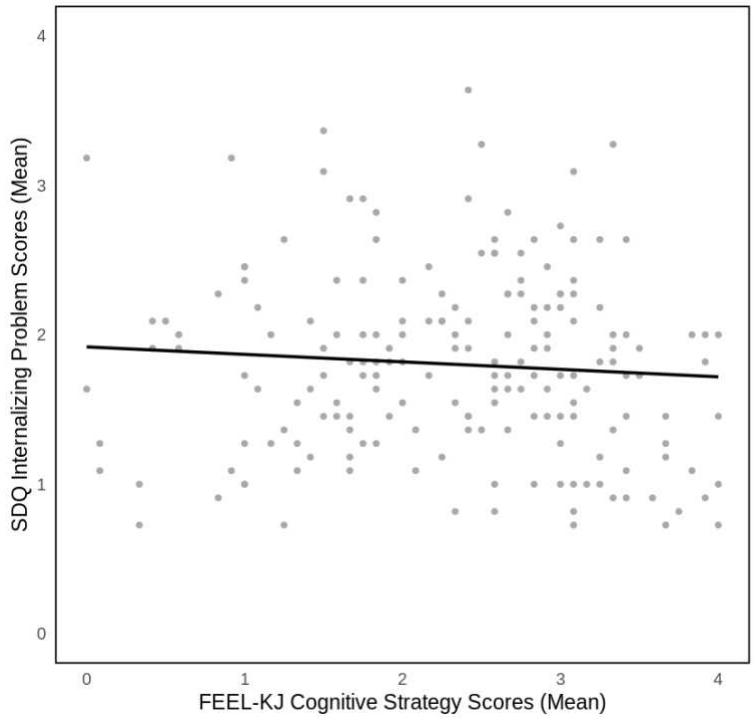
BIC = 1247.31). The models with random slopes for class (*AIC* = 1242.70, *BIC* = 1265.20) and school (*AIC* = 1246.91, *BIC* = 1275.85) displayed the worst fit, again indicating that they do not vary significantly from the average slopes across the sample.

Focusing on the model with the best fit, the variable for cognitive strategies was not a significant predictor of internalizing problems (β = -0.04, *SE* = 0.04, *t*(173.57) = -1.02, *p* = 0.31). Furthermore, the connection was negative, meaning that contrary to the hypothesis children with more internalizing problems used fewer cognitive strategies compared to children with fewer internalizing problems, though not significantly (see Figure 3).

However, the effect of gender on internalizing problems was significant, with girls scoring much higher on internalizing problems compared to boys (β = -3.99, *SE* = 0.96, *t*(179.27) = -4.14, *p* < .001). Thus, girls reported to experience more internalizing problems compared to boys in this sample. This explains why the model with gender as a fixed effect displayed the best fit, even though cognitive strategies were not a significant predictor for internalizing problems.

Figure 3

Connection between Internalizing Problems and Cognitive Emotion Regulation Strategies



Note. The grey points represent participant's mean values of SDQ internalizing problem scores and FEEL-KJ cognitive strategy scores. The black line delineates the regression trend demonstrating the general relationship between the two variables.

Focusing on the model with the best fit, no model fit outliers were found. However, 15 predictor outliers on level 1 were detected and removed to see if they had an effect on the connection between cognitive strategies and internalizing problems. Removing the outliers did not have an impact on the overall significance or direction of the effect (β = -0.05, SE = 0.05, $t(159) = -0.92$, $p = 0.36$). Furthermore, gender remained a significant predictor of internalizing problems (β = -0.35, SE = 0.08, $t(159) = -4.29$, $p < 0.001$).

The model with cognitive strategies and gender as fixed effects met all assumptions for multilevel modeling. The Shapiro-Wilk test revealed no problem with normality ($W = 0.99$, $p = 0.08$), and homoscedasticity and linearity were ensured plotting residuals against fitted values. Moreover, the independence of residuals was sufficient and no singularity issue was found ($DW = 2.07$). Finally, the predictor variables cognitive strategies and gender displayed close to no correlation ($VIF = 1.00$).

Hypothesis 3

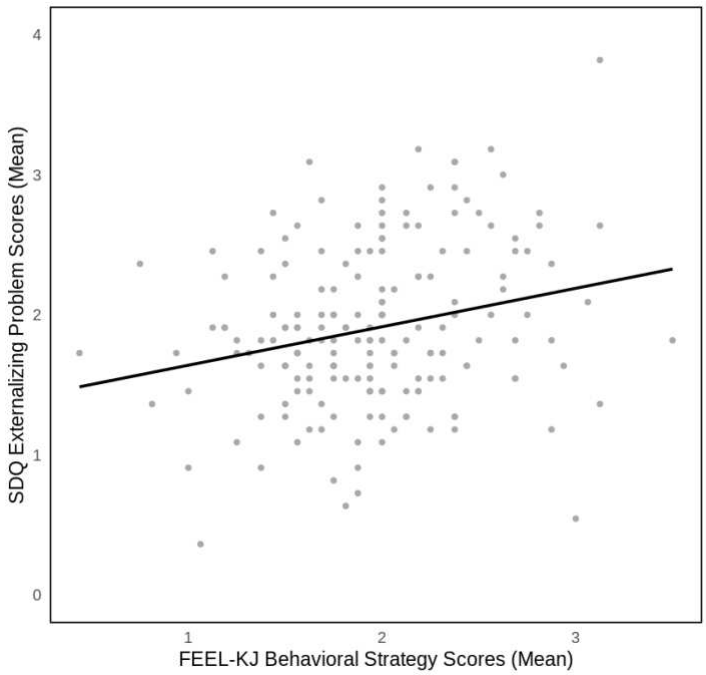
To test the hypothesis that children with more externalizing problems use more behavioral strategies compared to children with fewer externalizing problems, the same five models as for hypotheses 1 and 2 were calculated, with the mean of externalizing problem scores as the outcome and the mean of behavioral strategy scores as the predictor variable.

The models with both the fixed effect for behavioral strategies and the fixed effect for gender (AIC = 1197.56, BIC = 1216.85), as well as without gender (AIC = 1197.56, BIC = 1216.85), displayed the best model fit. The null model (AIC = 1204.99, BIC = 1217.85) and the model with a random slope for class (AIC = 1200.96, BIC = 1223.47) had similar model fits, while the model with both random slopes for class and school represented the data the worst (AIC = 1204.90, BIC = 1233.84), again indicating that slopes for school or class did not significantly vary from the average slopes of the whole sample.

Across all models, the effect of behavioral strategies on externalizing problems was significant and positive. Focusing on the model with gender and behavioral strategies as fixed effects, a one standard-deviation increase in behavioral strategy scores was associated with a 0.19 increase in externalizing problem scores ($\beta = 0.19$, $SE = 0.06$, $t(176.41) = 3.49$, $p < 0.001$). Therefore, participants with more externalizing problems reported using more behavioral strategies compared to those with fewer externalizing problems (see Figure 4).

Figure 4

Connection between Externalizing Problems and Behavioural Emotion Regulation Strategies



Note. The grey points represent participant's mean values of SDQ externalizing problem scores and FEEL-KJ behavioural strategy scores. The black line delineates the regression trend demonstrating the general relationship between the two variables.

In comparison, gender did not reveal to have a significant effect on externalizing problems, indicating that boys and girls did not differ considerably in the amount of externalizing problems they experience (β = -1.20, SE = 0.89, t(176.56) = -1.35, p = 0.18). The connection was negative, revealing that girls scored slightly higher on externalizing problems compared to boys.

When looking for outliers, no model fit outliers were found. However, 41 influential predictor outliers at level 1 were detected using Cook's distance. In order to see if they had an influence on the significance and direction of the fixed effects on the outcome, the outliers were removed from the sample. Behavioral strategies remained a significant predictor of externalizing problems (β = 0.29, SE = 0.06, t(134.86) = 4.54, p < 0.001), while gender remained to have no considerable influence (β = -0.07, SE = 0.06, t(134.46) = -1.15, p = 0.25).

Moreover, focusing on the model with both fixed effects for behavioral strategies and gender, all assumptions of multilevel modeling were fulfilled. Performing the Shapiro-Wilk test demonstrated no violation of normality (W = 1.00, p = 0.98). Furthermore, linearity and homoscedasticity were ensured by looking at the plot of residuals against fitted values. The

Durbin-Watson test revealed no issue with the dependence of residuals (DW = 1.95), and the model did not suffer from singularity or strong multicollinearity (VIF = 1.00).

Exploratory Analysis

Several exploratory analyses were conducted. As mentioned above, no FEEL-KJ maladaptive cognitive strategies were captured in this sample. Therefore, the reason for behavioral strategies influencing externalizing problems and cognitive strategies not influencing internalizing problems could be due to the fact that the former included maladaptive strategies, while the latter did not. In order to gain clarity about the reason for the effects, the connection between cognitive strategies, externalizing problems and mental health difficulties in general was explored. Furthermore, the effect of behavioral strategies on internalizing problems, as well as on mental health difficulties, was tested. Finally, the connection between every single emotion regulation strategy (i.e., acceptance, aggressive action, etc.) and types of psychological difficulties (i.e., internalizing problems) was examined, in order to gain insight into the specific behaviors that influence MH difficulties. Single multilevel models with the outcome variable, random intercept for class and school and fixed effects were calculated.

Cognitive strategies did not have a significant effect on SDQ scores in general (β = -0.09, SE = 0.07, t(179.39) = -1.14, p = 0.26), nor on externalizing problems specifically (β = -0.04, SE = 0.04, t(176.32) = -0.93, p = 0.35). In contrast, behavioral strategies significantly influenced both SDQ scores (β = 0.37, SE = 0.10, t(181.91) = 3.60, p < 0.001) and internalizing problem scores (β = 0.18, SE = 0.06, t(181.82) = 2.91, p = 0.004).

To determine whether the consistent effect of behavioral strategies on all types of mental health difficulties is due to the two maladaptive strategies in the behavioral strategy category (i.e., withdrawal, aggressive action), the effect of each single strategy on MH difficulties was tested. As demonstrated in Table 1, only three strategies had an effect on MH difficulties. The only cognitive and the only adaptive strategy that was found to have an impact on any type of psychological problem was cognitive problem solving. Cognitive problem solving did not have a significant effect on SDQ scores in general nor on externalizing problems (see Table 1); however, its influence on internalizing problem scores was significant (p = .048). The association was negative (β = -0.21, SE = 0.11), indicating that children who reported using fewer cognitive problem solving to regulate their emotions, also reported suffering from more internalizing problems compared to children who use more cognitive problem solving. By implication, a one standard deviation increase in cognitive problem

solving scores is associated with a 0.21 decrease in internalizing problem scores. The other two strategies that had an effect on mental health difficulties were withdrawal and aggressive action, which are both behavioral strategies, as well as the only two maladaptive strategies measured in this sample. Both strategies had a positive effect on SDQ scores in general, as well as on internalizing and externalizing problems (see Table 1). Therefore, children who reported using more aggressive action and/or withdrawal as an emotion regulation strategy, also reported having higher internalizing problems, externalizing problems and, thus, mental health difficulties in general. Withdrawal revealed to have a slightly stronger positive connection with internalizing problems compared to externalizing problems, while there is a stronger effect of aggressive action on externalizing problems, compared to internalizing problems (see Table 1).

Table 1

Multilevel Modelling Results of Single ER Categories

Effect	Estimate	*SE*	t	*p*
Effects on MH difficulties				
Social Support	-0.11	0.18	-0.62	.537
Distraction	-0.26	0.17	-1.54	.126
Acceptance	-0.12	0.19	-0.63	.532
Humor Enhancement	-0.07	0.18	-0.36	.722
Problem Solving	-0.34	0.18	-1.85	.067
Aggressive Action	0.82	0.18	4.49	< .001**
Withdrawal	0.79	0.17	4.58	< .001**
Effects on INT problems				
Social Support	0.00	0.11	0.03	.972
Distraction	-0.17	0.10	-1.72	.088
Acceptance	-0.03	0.11	-0.29	.77

Humor Enhancement	-0.05	0.11	-0.44	.659
Problem Solving	-0.21	0.11	1.99	.048*
Aggressive Action	0.30	0.11	2.48	.014*
Withdrawal	0.48	0.10	4.72	< .001**
Effects on EXT problems				
Social Support	-0.11	0.10	-1.15	.252
Distraction	-0.09	0.09	-0.90	.371
Acceptance	-0.09	0.10	-0.85	.396
Humor Enhancement	-0.02	0.10	-0.16	.871
Problem Solving	-0.13	0.10	-1.27	.204
Aggressive Action	0.55	0.10	5.65	< .001**
Withdrawal	0.31	0.10	3.20	.001**

Note. This table presents the effect (estimate, standard error, t-value, p-value) of each emotion regulation (ER) category on overall mental health (MH) difficulties, internalizing (INT) problems, and externalizing (EXT) problems, as calculated using linear mixed models. Significant effects are highlighted at $^{*}p < .05$. and $^{**}p < .01$.

Gender Differences

To gain insight into how girls and boys differ in the use of emotion regulation strategies, in the amount of mental health problems they experience, and in the connection between MH difficulties and ER strategies, multiple multilevel models were conducted.

First, to test the effect of gender on ER strategies and MH difficulties, models with ER strategies or MH difficulties as outcome variables, gender as a fixed effect, and random intercepts for class and school were conducted. Gender did not have a significant effect on FEEL-KJ scores in general, on maladaptive or adaptive strategies, or on cognitive or behavioral strategy use (see Table 2). Therefore, boys and girls did not differ considerably in the amount of category-specific emotion regulation strategies they used. In contrast, gender did have a significant effect on SDQ scores in general and on internalizing problems specifically. On

average, girls reported having significantly higher mental health difficulties (β = -0.24, *SE* = 0.07, $t(180) = -3.20$, $p = .002$), as well as significantly more internalizing problems (β = -0.36, *SE* = 0.09, $t(180) = -4.17$, $p < 0.001$) compared to boys. However, girls and boys did not differ significantly in the amount of externalizing problems they reported experiencing (β = -0.12, *SE* = 0.08, $t(178) = -1.39$, $p = 0.17$).

Second, to test the difference in the relationship between MH difficulties and ER strategies, gender was included as an interaction term in the models of hypotheses 1 to 3 with the outcome variable, the fixed effect for the predictor variable, and random intercepts for class and school. Regarding the first hypothesis that adaptive and maladaptive strategies are associated with SDQ scores, there was no significant interaction between adaptive strategies and gender ($\beta = 0.09$, *SE* = 0.083, $t(175) = 1.06$, $p = 0.292$), nor between maladaptive strategies and gender ($\beta = -0.01$, *SE* = 0.08, $t(178) = -0.16$, $p = 0.87$). Therefore, the relationship between mental health issues and the use of adaptive or maladaptive strategies did not differ considerably between boys and girls in this sample.

Table 2

The Effect of Gender on Categories of Emotion Regulation Strategies

Outcome	Estimate	*SE*	t	*p*
General ER	0.02	0.08	0.23	.818
Adaptive Strategies	0.11	0.14	0.80	.425
Maladaptive Strategies	-0.10	0.14	-0.69	.489
Cognitive Strategies	0.08	0.14	0.57	.568
Behavioral Strategies	-0.03	0.07	-0.40	.687

Note. This table presents the effect of gender (estimate, standard error, t-value, p-value) on overall emotion regulation strategies as well as different subgroups of strategies, calculated using linear mixed models. No significant effects were found.

Looking at the connection between cognitive strategies and internalizing problems (i.e., hypothesis 2), adding an interaction term for gender into the model changed the effect of cognitive strategies on internalizing problems to be significant (β = -0.15, SE = 0.07, t(179.3) = -2.16, p = 0.033), meaning that children with internalizing problems used fewer cognitive strategies compared to children with fewer internalizing problems, when the effect of gender on this relationship is taken into account. The interaction term approached statistical significance, suggesting that the relationship between cognitive strategies and internalizing problems may vary by gender (β = 0.18, SE = 0.09, t(173) = 1.95, p = .052). Specifically, the negative relationship between cognitive strategies and internalizing problems appeared weaker for boys compared to girls, indicating a potential moderation effect where the protective effect of cognitive strategies might be stronger for girls than for boys.

Regarding hypothesis 3 that children with more externalizing problems use more behavioral strategies, adding an interaction term for gender neither changed the significance level of the effect of behavioral strategies (β = 0.33, SE = 0.12, t(178.19) = 2.66, p = 0.008), nor did the interaction itself prove to be significant (β = -0.08, SE = 0.16, t(177.39) = -0.50, p = 0.617). Therefore, the relationship between behavioral strategies and externalizing problems did not differ significantly between boys and girls in this sample.

Discussion

This thesis aimed to investigate how different emotion regulation strategies are connected to mental health difficulties in primary school children. The sample consisted of 184 children in 4th grade of Austrian primary school, who filled out self-report questionnaires on their current mental health status and their use of emotion regulation strategies. It was hypothesized that, first, children with more mental health difficulties in general use fewer adaptive and more maladaptive emotion regulation strategies compared to children with fewer mental health difficulties. Second, children with more internalizing problems were hypothesized to use more cognitive strategies compared to children with fewer internalizing problems. The final hypothesis was that children with more externalizing problems use more behavioral strategies compared to children with fewer externalizing problems.

Hypothesis 1

Regarding hypothesis 1, no significant effect of adaptive strategies on mental health difficulties was found. Therefore, children with more mental health difficulties did not, as predicted, use fewer adaptive strategies in this sample. These results do not necessarily contradict prior research, since the effect of adaptive emotion regulation strategies on various

mental health difficulties seems to be less clear compared to the effect of maladaptive strategies. Some studies did find a negative connection, as hypothesized. For example, a decrease in adaptive strategy use was associated with an increase in mental health problems in children at risk for suicidal behavior, children with conduct problems, and those with depression (Kim & Page, 2013; LaMontagne et al., 2023; Poon et al., 2023). On the other hand, some studies did not find a consistent negative connection between MH difficulties and ER strategies. For example, the strategy of cognitive problem solving was found to be negatively associated with lower symptoms of bulimia, but only in girls, not in boys, and the strategy of distraction was positively associated but only with specific bulimic symptoms. Therefore, the significance and direction of the effect of adaptive strategies on MH difficulties might differ depending on the type of mental disorder or symptom, the specific adaptive strategies, and demographic characteristics of the sample (e.g., gender). This aligns with the discovery that when examining the individual strategies in the sample of this thesis, it was found that the only adaptive strategy, that had an effect on mental health, was cognitive problem solving. Specifically, cognitive problem solving had a significant negative association with internalizing problems only, meaning that children who used less cognitive problem solving when regulating their emotions had more internalizing problems. The remaining strategies – distraction, acceptance, and humor enhancement – did not have a connection to MH difficulties in this sample; however, they might still have effects on specific mental disorders or specific symptoms of disorders, not captured with the SDQ. Further research is needed to clarify whether adaptive emotion regulation strategies have an influence on any kind of mental health issues.

In contrast to adaptive strategies, maladaptive strategies had a significant positive association with mental health difficulties, as was hypothesized. Therefore, children who used more maladaptive strategies (i.e., withdrawal, aggressive action) to regulate their emotions also had more mental health difficulties. This discovery is consistent with the findings of similar studies. For example, maladaptive strategies were found to be positively associated with dysfunctional attachment styles, depression, anxiety, conduct problems, and disordered eating (Brenning et al., 2012; Kim & Page, 2013; Liang et al., 2021; Murayama et al., 2021; Trompeter et al., 2021; Van Durme et al., 2018). Therefore, when targeting mental health difficulties in late childhood and early adolescence, focusing on the reduction of maladaptive strategy use might be more efficient than fostering adaptive strategies to regulate emotions. This finding is very important since it can guide future intervention and prevention programs

for mental health issues to include training to suppress the application of maladaptive strategies.

Hypothesis 2

Regarding hypothesis 2, no significant effect of cognitive strategies on internalizing problems was found in this sample. Therefore, children who used more cognitive strategies did not have more internalizing problems, as was originally hypothesized. This does not necessarily contradict prior research, since only two studies examined this relationship with differing research questions and designs (Garnefski et al., 2005; te Brinke et al., 2021). First, Garnefski and colleagues (2005) found that children (aged 12 to 18) with internalizing problems used more of the cognitive strategies self-blame, rumination, and positive reappraisal compared to a 'healthy' control group. Furthermore, te Brinke and colleagues (2021) found that children with internalizing problems used more cognitive strategies compared to children with externalizing problems and children without any difficulties. However, the difference in the results could be due to the fact that both studies divided children into groups (e.g., children with only internalizing problems and children without any difficulties). Therefore, children with internalizing problems might still use significantly more cognitive strategies compared to children without any difficulties or those with externalizing problems. However, the two variables are not connected independently of group differences in this sample. Furthermore, the reason for the differences in the results could also be due to the specific strategies that were chosen to represent cognitive strategies. For example, Garnefski and colleagues (2005) used entirely different strategies from those used in this study. In addition to the cognitive strategies used in this study, te Brinke and colleagues (2021) included maladaptive cognitive strategies (e.g., rumination) in their measures, which displayed the strongest group differences. Since no maladaptive cognitive strategies were measured in this study, these might still have a strong effect on internalizing problem scores. Regarding adaptive cognitive strategies, the connection to internalizing problems might depend more on the specific strategies used. This is supported by the fact that one cognitive strategy (i.e., cognitive problem solving) was found to be connected only to internalizing problems. However, this connection was negative, meaning that children who used less cognitive problem solving to regulate their emotions had more internalizing problems. Therefore, there might still be a stronger connection between some cognitive adaptive strategies and internalizing problems; however, not consistently positive. Finally, a reason for the different results by te Brinke and colleagues (2021), Garnefski and colleagues (2005), and this study, could also be the demographics of the sample. In comparison

to both other studies, which included a sample of young to late adolescents (i.e., 12 to 19) children in this sample were a few years younger (i.e., 8 to 11). Furthermore, both studies consisted of samples of children from the Netherlands, while this thesis examined students from Austria. Therefore, it could be possible, that the connection between cognitive strategies and internalizing problems develops after primary school or is characteristic only of specific geographic regions or countries.

Another interesting finding contradicting hypothesis 2 was that, when including an interaction term for gender, cognitive strategies suddenly became a significant negative predictor of internalizing problems. It seems that specifically girls who have more internalizing problems use fewer cognitive strategies, while the connection is much weaker for boys. This is important to note, since girls are generally known to have more internalizing problems compared to boys, as was also found to be true in this sample (Masfety et al., 2021; Mumtaz et al., 2017). Prior research has found that girls tend to rely on maladaptive cognitive strategies (i.e., rumination, catastrophizing), while boys tend to rely on adaptive cognitive strategies (i.e., cognitive reappraisal, acceptance) (Mumtaz et al., 2017). An explanation could be that girls are often socialized to be more critical of themselves and tend to have low self-esteem, which may lead to less adaptive and more maladaptive cognitive strategy use. Boys, on the other hand, are socialized to be more confident in their abilities and skillset, which may lead to viewing themselves in a better light (Fiorilli et al., 2022). When regulating their emotions, they might be able to accept themselves and what they are feeling more easily (i.e., acceptance) and to frame situations in a way that serves their self-esteem and fosters positive emotions (i.e., cognitive reappraisal). One reason for girls experiencing (more) internalizing problems might be socialisation and societal expectations described above, which negatively affect the application of cognitive adaptive strategies. On the other hand, the reason for boys experiencing internalizing problems might not mainly be driven by socialisation, but other factors (i.e., parents mental health problems, maltreatment, etc.), that might not significantly influence cognitive adaptive strategies, the way socialisation does in girls. Hence, boys with internalizing problems do not use fewer cognitive adaptive strategies. Future studies should investigate this connection further and explore gender differences in the association between specific emotion regulation strategies and various symptoms of psychological disorders. Meanwhile, these findings highlight the importance of strengthening the use of adaptive cognitive strategies specifically in girls as an effective way to reduce their mental health difficulties.

Hypothesis 3

The findings of this study partially support the final hypothesis, stating that children with more externalizing problems use more behavioral strategies compared to children with fewer externalizing problems. Behavioral ER strategies were found to be significant predictors of externalizing problems in this sample. However, when examining the effects of the individual behavioral strategies separately, only the maladaptive strategies withdrawal and aggressive action displayed a significant connection to externalizing problems, while the behavioral adaptive strategies distraction and social support did not. Therefore, only behavioral maladaptive strategies seem to have an effect on externalizing problems, with children who use more maladaptive behavioral strategies reporting more externalizing problems compared to children who use fewer of these strategies. Similarly, te Brinke and colleagues (2021), who conducted the only other study that examined this connection in this age group, also found that children with externalizing problems scored significantly higher on behavioral maladaptive strategies compared to children with no mental health difficulties. Furthermore, te Brinke and colleagues (2021) also discovered that children with externalizing problems use more behavioral maladaptive strategies compared to children with internalizing problems. However, in this study, no difference in the strength of the effect of behavioral maladaptive ER on externalizing or internalizing problems was found, with both being significant. Therefore, children with more internalizing problems also use more maladaptive behavioral strategies compared to children with fewer internalizing problems. Since this study did not report on group differences, it could still be true that children categorized as having only externalizing problems use more behavioral maladaptive strategies compared to a group of children with only internalizing problems. To clarify this relationship, more research on group differences regarding the use of ER strategies is needed. It is likely that children with externalizing problems use many more behavioral than cognitive maladaptive strategies, since these are closely connected to symptoms of externalizing disorders (e.g., aggressive action and conduct problems). Further research should include cognitive maladaptive strategies in their samples to compare the two categories of maladaptive strategies in children with externalizing problems. Nevertheless, since the effect of behavioral adaptive strategies on externalizing problems was not significant, the statement by te Brinke and colleagues (2021) that children with externalizing problems use a behavioral ER style cannot be supported in this study.

Gender Differences

Significant differences in the amount of mental health difficulties children experience were found between girls and boys. Girls reported having considerably more mental health issues compared to boys. This is in line with previous research, since many studies have found mental health issues and disorders to be more common in girls (Silva et al., 2020). Furthermore, girls also reported experiencing more internalizing problems compared to boys in this sample. This is consistent with the results of other studies, which found that girls in this age group experience significantly more internalizing problems, while boys experience considerably more externalizing problems (Masfety et al., 2021). However, contrary to previous research, boys in this study did not suffer from more externalizing problems compared to girls. No significant difference in the amount of externalizing problems children experience was found between girls and boys. The reason for this finding is unclear, since most studies have reported significant gender differences when it comes to externalizing problems in primary school children (Kristofferson et al., 2015; Lau et al., 2021; Ogden et al., 2023). One possible explanation could be the fact, that most of the studies on externalizing problems in this age group depend on parents' or teachers' reports of the children's behavior. For example, Caqueo-Urízar and colleagues (2022) found that children tend to report having poorer mental health when compared to their parents' assessment of their children's MH difficulties. However, these differences are comparatively small in the report of externalizing problems. Nevertheless, since the study by Caqueo-Urízar and colleagues (2022) did not compare gender differences in self-reporting MH difficulties, it could still be possible that girls tend to describe having more externalizing problems compared to boys. To gain clarity on this assumption, future studies should analyze gender differences in the connection between self-reports and parents'/teachers' reports on primary school children's mental health status (Caqueo-Urízar et al., 2022).

Strengths and Limitations

One strength of this study is its focus on late childhood. When it comes to mental health difficulties in childhood many studies focus on teenagers aged 13 years and older, even though most mental disorders in adolescence will have manifested by the age of 14 or earlier (Kessler et al., 2005). Specifically, it can be argued that when considering the prevention of MH problems, targeting them at an earlier stage might be preferable. This study provides an indication of how to achieve this by targeting emotion regulation strategies. Furthermore, a notable feature of this study's design is the data collection through self-report. While many studies with a sample of primary school children use either parents' or teacher's assessments

of children's mental health difficulties and emotion regulation, some argue that self-reports are often similar and, in some aspects even better predictors of future outcomes (Bowie, 2010). Therefore, this thesis adds to the important research on children's self-rated mental health difficulties and emotion regulation strategies.

However, when interpreting the results of this study, several limitations must be considered. First, due to the objectives of the main project not all emotion regulation strategies from the FEEL-KJ were measured in this sample. Therefore, only two maladaptive strategies and no cognitive maladaptive strategies were assessed. Thus, results on maladaptive or cognitive strategies should be considered with caution since they might not adequately represent these categories. Furthermore, these strategies were measured in response to the two emotions: sadness and anger. It should be kept in mind that these results might differ when asking about other negative emotions (e.g., fear). Therefore, future studies should include a broader variety of emotion regulation strategies in response to different emotions, for example, by using multiple ER measurements. Finally, regarding the characteristics of the sample, only the effect of gender on ER strategies, mental health difficulties, and their connection was considered in the analysis. Other factors, such as socio-economic status, mental health diagnoses in the family, characteristics of the teacher or school, age, and so on might also impact these variables. Therefore, the results of this study may not be universally applicable. To ensure representation of a broader population, future studies should include more sample characteristics in their analysis, as well as test these hypotheses in different subgroups.

It can be concluded that when it comes to adaptive and cognitive strategies in this sample, their effect on mental health difficulties seems to be insignificant. Only cognitive problem solving has a negative effect on internalizing problems and could, therefore, be promoted to reduce internalizing problems in primary school children. Furthermore, the results of this study indicate that strengthening cognitive adaptive strategies could possibly reduce internalizing problems but only in girls, not in boys. However, because of the limited number of cognitive maladaptive strategies measured in this sample, further research is needed to discover which adaptive strategies have an effect on which mental health issues. Nevertheless, the application of maladaptive emotion regulation strategies specifically has a negative influence on primary school children's mental health and should, therefore, be targeted in interventions for this age group. This is especially important, since children at the end of primary school are vulnerable to the development of psychological difficulties that often last into (young) adulthood (Kessler et al., 2005).

References

Aguinis, H., Gottfredson, R. K., & Joo, H. (2013). Best-Practice Recommendations for Defining, Identifying, and Handling Outliers. *Organizational Research Methods*, *16*(2), 270–301. https://doi.org/10.1177/1094428112470848

Akaike, H. (1998). Information Theory and an Extension of the Maximum Likelihood Principle. In E. Parzen, K. Tanabe, & G. Kitagawa (Eds.), *Selected Papers of Hirotugu Akaike* (pp. 199–213). Springer. https://doi.org/10.1007/978-1-4612-1694-0_15

Aldao, A., Gee, D. G., Reyes, A. D. L., & Seager, I. (2016). Emotion regulation as a transdiagnostic factor in the development of internalizing and externalizing psychopathology: Current and future directions. *Development and Psychopathology*, *28*(4pt1), 927–946. https://doi.org/10.1017/S0954579416000638

Aydmune, Y., Introzzi, I., Vernucci, S., & Zamora, E. (2022). Development of inhibitory processes during the first years of primary schooling. *Psychology & Neuroscience*, *15*(1), 52–66. https://doi.org/10.1037/pne0000278

Bale, J., Grové, C., & Costello, S. (2020). Building a mental health literacy model and verbal scale for children: Results of a Delphi study. *Children and Youth Services Review*, *109*, 104667. https://doi.org/10.1016/j.childyouth.2019.104667

Baranne, M. L., & Falissard, B. (2018). Global burden of mental disorders among children aged 5–14 years. *Child and Adolescent Psychiatry and Mental Health*, *12*(1), Article 1. https://doi.org/10.1186/s13034-018-0225-4

Bates, D., Mächler, M., Bolker, B., & Walker, S. (2015). Fitting Linear Mixed-Effects Models Using lme4. *Journal of Statistical Software*, *67*, 1–48. https://doi.org/10.18637/jss.v067.i01

Brenning, K. M., Soenens, B., Braet, C., & Bosmans, G. (2012). Attachment and depressive symptoms in middle childhood and early adolescence: Testing the validity of the

emotion regulation model of attachment. *Personal Relationships*, *19*(3), 445–464. https://doi.org/10.1111/j.1475-6811.2011.01372.x

Bub, D. N., Masson, M. E. J., & Lalonde, C. E. (2006). Cognitive Control in Children: Stroop Interference and Suppression of Word Reading. *Psychological Science*, *17*(4), 351–357.

Bundesministerium für Soziales, Gesundheit, Pflege und Konsumentenschutz. (2023). *Suizid und Suizidprävention in Österreich*. Bundesministerium für Soziales, Gesundheit, Pflege und Konsumentenschutz.

Burke, J. D., Rowe, R., & Boylan, K. (2014). Functional outcomes of child and adolescent oppositional defiant disorder symptoms in young adult men. *Journal of Child Psychology and Psychiatry*, *55*(3), 264–272. https://doi.org/10.1111/jcpp.12150

Cai, R. Y., Hardan, A. Y., Phillips, J. M., Frazier, T. W., & Uljarević, M. (2021). Brief Report: Emotion Regulation Influences on Internalizing and Externalizing Symptoms Across the Normative-Clinical Continuum. *Frontiers in Psychiatry*, *12*. https://doi.org/10.3389/fpsyt.2021.693570

Canals, J., Voltas, N., Hernández-Martínez, C., Cosi, S., & Arija, V. (2019). Prevalence of DSM-5 anxiety disorders, comorbidity, and persistence of symptoms in Spanish early adolescents. *European Child & Adolescent Psychiatry*, *28*(1), 131–143. https://doi.org/10.1007/s00787-018-1207-z

Caqueo-Urízar, A., Urzúa, A., Villalonga-Olives, E., Atencio-Quevedo, D., Irarrázaval, M., Flores, J., & Ramírez, C. (2022). Children's Mental Health: Discrepancy between Child Self-Reporting and Parental Reporting. *Behavioral Sciences*, *12*(10), 401. https://doi.org/10.3390/bs12100401

Carretti, B., Giofrè, D., Toffalini, E., Cornoldi, C., Pastore, M., & Lanfranchi, S. (2022). Structure of working memory in children from 3 to 8 years old. *Developmental Psychology*, *58*(9), 1687–1701. https://doi.org/10.1037/dev0001385

Clark, H., Coll-Seck, A. M., Banerjee, A., Peterson, S., Dalglish, S. L., Ameratunga, S., Balabanova, D., Maharaj, K. B., Bhutta, Z. A., Borrazzo, J., Claeson, M., Doherty, T., El-Jardali, F., George, A. S., Gichaga, A., Gram, L., Hipgrave, D. B., Kwamie, A., Meng, Q., … Costello, A. (2020). A future for the world's children? A WHO–UNICEF– Lancet Commission. *The Lancet*, *395*(10224), 605–658. https://doi.org/10.1016/S0140-6736(19)32540-1

Colman, I., Wadsworth, M. E. J., Croudace, T. J., & Jones, P. B. (2007). Forty-Year Psychiatric Outcomes Following Assessment for Internalizing Disorder in Adolescence. *American Journal of Psychiatry*, *164*(1), 126–133. https://doi.org/10.1176/ajp.2007.164.1.126

Compas, B. E., Jaser, S. S., Bettis, A. H., Watson, K. H., Gruhn, M. A., Dunbar, J. P., Williams, E., & Thigpen, J. C. (2017). Coping, emotion regulation, and psychopathology in childhood and adolescence: A meta-analysis and narrative review: Psychological Bulletin. *Psychological Bulletin*, *143*(9), 939–991. https://doi.org/10.1037/bul0000110

Cook, R. D. (1977). Detection of Influential Observation in Linear Regression. *Technometrics*, *19*(1), 15–18. https://doi.org/10.1080/00401706.1977.10489493

Cooley, J. L., Blossom, J. B., Tampke, E. C., & Fite, P. J. (2022). Emotion Regulation Attenuates the Prospective Links from Peer Victimization to Internalizing Symptoms during Middle Childhood. *Journal of Clinical Child & Adolescent Psychology*, *51*(4), 495–504. https://doi.org/10.1080/15374416.2020.1731819

Cracco, E., Van Durme, K., & Braet, C. (2015). Validation of the FEEL-KJ: An Instrument to Measure Emotion Regulation Strategies in Children and Adolescents. *PLoS ONE*, *10*(9), e0137080. https://doi.org/10.1371/journal.pone.0137080

Durbin, J., & Watson, G. S. (1950). Testing for Serial Correlation in Least Squares Regression: I. *Biometrika*, *37*(3/4), 409–428. https://doi.org/10.2307/2332391

Essau, C. A., Conradt, J., & Petermann, F. (2002). Course and outcome of anxiety disorders in adolescents. *Journal of Anxiety Disorders*, *16*(1), 67–81. https://doi.org/10.1016/S0887-6185(01)00091-3

Essau, C. A., LeBlanc, S. S., & Ollendick, T. H. (Eds.). (2017). *Emotion Regulation and Psychopathology in Children and Adolescents*. OUP. https://web-p-ebscohost-com.uaccess.univie.ac.at/ehost/detail/detail?vid=0&sid=d58fbefb-8a2a-410c-9a77-8c31b10a73d3%40redis&bdata=JkF1dGhUeXBlPWlwLHNoaWImc2l0ZT1laG9zdC1saXZl#AN=1528950&db=nlebk

Evans, D., Borriello, G. A., & Field, A. P. (2018). A Review of the Academic and Psychological Impact of the Transition to Secondary Education. *Frontiers in Psychology*, *9*. https://doi.org/10.3389/fpsyg.2018.01482

Farkas, B. F., Takacs, Z. K., Kollárovics, N., & Balázs, J. (2023). The prevalence of self-injury in adolescence: A systematic review and meta-analysis. *European Child & Adolescent Psychiatry*. https://doi.org/10.1007/s00787-023-02264-y

Fiorilli, C., Barni, D., Endendijk, J., & Retelsdorf, J. (2022). Gender differences and disparities in socialization contexts: How do they matter for healthy relationships, wellbeing, and achievement-related outcomes? *Frontiers in Psychology*, *13*, 1103425. https://doi.org/10.3389/fpsyg.2022.1103425

Fombouchet, Y., Pineau, S., Perchec, C., Lucenet, J., & Lannegrand, L. (2023). The development of emotion regulation in adolescence: What do we know and where to go next? *Social Development*, *32*(4), 1227–1242. https://doi.org/10.1111/sode.12684

Ford, T., Macdiarmid, F., Russell, A. E., Racey, D., & Goodman, R. (2017). The predictors of persistent DSM-IV disorders in 3-year follow-ups of the British Child and Adolescent Mental Health Surveys 1999 and 2004. *Psychological Medicine*, *47*(6), 1126–1137. https://doi.org/10.1017/S0033291716003214

Garnefski, N., Kraaij, V., & van Etten, M. (2005). Specificity of relations between adolescents' cognitive emotion regulation strategies and Internalizing and Externalizing psychopathology. *Journal of Adolescence*, *28*(5), 619–631. https://doi.org/10.1016/j.adolescence.2004.12.009

Georgiou, S. N., Charalambous, K., & Stavrinides, P. (2021). The mediating effects of adolescents' internalizing and externalizing problems on the relationship between emotion regulation, mindfulness and bullying/victimization at school. *School Psychology International*, *42*(6), 657–676. https://doi.org/10.1177/01430343211035420

Ghafari, M., Nadi, T., Bahadivand-Chegini, S., & Doosti-Irani, A. (2022). Global prevalence of unmet need for mental health care among adolescents: A systematic review and meta-analysis. *Archives of Psychiatric Nursing*, *36*, 1–6. https://doi.org/10.1016/j.apnu.2021.10.008

Göbel, K., Ortelbach, N., Cohrdes, C., Baumgarten, F., Meyrose, A.-K., Ravens-Sieberer, U., & Scheithauer, H. (2022). Co-occurrence, stability and manifestation of child and adolescent mental health problems: A latent transition analysis. *BMC Psychology*, *10*, 267. https://doi.org/10.1186/s40359-022-00969-4

Goldschmidt, S., Berth, H., Grob, A., & Smolenski, C. (2006). FEEL-KJ. Fragebogen zur Erhebung der Emotionsregulation bei Kindern und Jugendlichen. *Diagnostica*, *52*, 208–212. https://doi.org/10.1026/0012-1924.52.4.208

Goodman, A., Lamping, D. L., & Ploubidis, G. B. (2010). When to Use Broader Internalising and Externalising Subscales Instead of the Hypothesised Five Subscales on the Strengths and Difficulties Questionnaire (SDQ): Data from British Parents, Teachers and Children. *Journal of Abnormal Child Psychology*, *38*(8), 1179–1191. https://doi.org/10.1007/s10802-010-9434-x

Gross, J. J. (2015). The Extended Process Model of Emotion Regulation: Elaborations, Applications, and Future Directions. *Psychological Inquiry*, *26*(1), 130–137. https://doi.org/10.1080/1047840X.2015.989751

Hair, J. F. (2006). *Multivariate Data Analysis*. Pearson Prentice Hall.

Hein, K., & Kauschke, C. (2020). Word Form Processing in Primary School Children: A Psycholinguistic Perspective. *Journal of Speech, Language and Hearing Research (Online)*, *63*(11), 3685. https://doi.org/10.1044/2020_JSLHR-20-00067

Heleniak, C., Jenness, J. L., Vander Stoep, A., Mccauley, E., & Mclaughlin, K. A. (2016). Childhood Maltreatment Exposure and Disruptions in Emotion Regulation: A Transdiagnostic Pathway to Adolescent Internalizing and Externalizing Psychopathology. *Cognitive Therapy and Research*, *40*(3), 394–415. https://doi.org/10.1007/s10608-015-9735-z

Herpertz-dahlmann, B., Dempfle, A., Konrad, K., Klasen, F., & Ravens-sieberer, U. (2015). Eating disorder symptoms do not just disappear: The implications of adolescent eating-disordered behaviour for body weight and mental health in young adulthood. *European Child & Adolescent Psychiatry*, *24*(6), 675–684. https://doi.org/10.1007/s00787-014-0610-3

Juhl, V. M. R. M. D. G. J., Sajid, S., & Brandt, V. (2023). The relationship between peer victimisation, self-esteem, and internalizing symptoms in adolescents: A systematic review and meta-analysis. *PLoS One*, *18*(3), e0282224. https://doi.org/10.1371/journal.pone.0282224

Karnilowicz, H. R., Mauss, I., & Zhou, Q. (2022). Links Between Emotion Regulation Strategies and Internalizing and Externalizing Problems in Chinese American Adolescents. *Journal of Research on Adolescence*, *32*(4), 1626–1634. https://doi.org/10.1111/jora.12723

Kessler, R. C., Amminger, G. P., Aguilar-Gaxiola, S., Alonso Caballero, J., Lee, S., & Ustun, T. B. (2007). *Age of onset of mental disorders: A review of recent literature*. https://doi.org/10.1097/YCO.0b013e32816ebc8c

Kessler, R. C., Berglund, P., Demler, O., Jin, R., Merikangas, K. R., & Walters, E. E. (2005). Lifetime Prevalence and Age-of-Onset Distributions of DSM-IV Disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, *62*(6), 593–602. https://doi.org/10.1001/archpsyc.62.6.593

Kim, H., & Page, T. (2013). Emotional Bonds with Parents, Emotion Regulation, and School-Related Behavior Problems Among Elementary School Truants. *Journal of Child and Family Studies*, *22*(6), 869–878. https://doi.org/10.1007/s10826-012-9646-5

Kristofferson, J. H. G., Obel, C., & Smith, N. (2015). Gender differences in behavioral problems and school outcomes. *07.11.2014*, *115*, 75–93. https://doi.org/10.1016/j.jebo.2014.10.006

Lallukka, T., Mekuria, G. B., Nummi, T., Virtanen, P., Virtanen, M., & Hammarström, A. (2019). Co-occurrence of depressive, anxiety, and somatic symptoms: Trajectories from adolescence to midlife using group-based joint trajectory analysis. *BMC Psychiatry*, *19*(1), Article 1. https://doi.org/10.1186/s12888-019-2203-7

LaMontagne, L. G., Diehl, D. C., Doty, J. L., & Smith, S. (2023). The Mediation of Family Context and Youth Depressive Symptoms by Adolescent Emotion Regulation. *Youth & Society*, *55*(3), 552–580. https://doi.org/10.1177/0044118X211067266

Lau, T. W. I., Lim, C. G., Acharryya, S., Lim-Ashworth, N., Tan, Y. R., & Fung, S. S. D. (2021). Gender differences in externalizing and internalizing problems in Singaporean children and adolescents with attention-deficit/hyperactivity disorder. *Child and Adolescent Psychiatry and Mental Health*, *15*(1), Article 1. https://doi.org/10.1186/s13034-021-00356-8

Li, C., Wang, P., Martin-Moratinos, M., Bella-Fernández, M., & Blasco-Fontecilla, H. (2022). Traditional bullying and cyberbullying in the digital age and its associated mental health problems in children and adolescents: A meta-analysis. *European Child & Adolescent Psychiatry*. https://doi.org/10.1007/s00787-022-02128-x

Liang, L., Zhu, M., Dai, J., Li, M., & Zheng, Y. (2021). The Mediating Roles of Emotional Regulation on Negative Emotion and Internet Addiction Among Chinese Adolescents From a Development Perspective. *Frontiers in Psychiatry*, *12*. https://doi.org/10.3389/fpsyt.2021.608317

Lin, S. C., Kehoe, C., Pozzi, E., Liontos, D., & Whittle, S. (2024). Research Review: Child emotion regulation mediates the association between family factors and internalizing symptoms in children and adolescents – a meta-analysis. *Journal of Child Psychology and Psychiatry*, *65*(3), 260–274. https://doi.org/10.1111/jcpp.13894

Lohbeck, A., Schultheiß, J., Petermann, F., & Petermann, U. (2015). Die deutsche Selbstbeurteilungsversion des Strengths and Difficulties Questionnaire (SDQ-Deu-S). *Diagnostica*. https://econtent.hogrefe.com/doi/10.1026/0012-1924/a000153

Longobardi, E., Spataro, P., & Rossi-Arnaud, C. (2019). Direct and Indirect Associations of Empathy, Theory of Mind, and Language with Prosocial Behavior: Gender

Differences in Primary School Children. *The Journal of Genetic Psychology*, *180*(6), 266–279. https://doi.org/10.1080/00221325.2019.1653817

Martínez-Priego, C., García-Noblejas, B. P., & Roca, P. (2024). Strategies and goals in Emotion Regulation models: A systematic review. *Frontiers in Psychology*, *15*, 1425465. https://doi.org/10.3389/fpsyg.2024.1425465

Masfety, V. K., Woodward, M. J., Keyes, K., Bitfoi, A., Carta, M. G., Koç, C., Lesinskiene, S., Mihova, Z., Otten, R., & Husky, M. (2021). Gender, the gender gap, and their interaction; analysis of relationships with children's mental health problems. *Social Psychiatry and Psychiatric Epidemiology*, *56*(6), 1049–1057. https://doi.org/10.1007/s00127-020-01950-5

Mulraney, M., Coghill, D., Bishop, C., Mehmed, Y., Sciberras, E., Sawyer, M., Efron, D., & Hiscock, H. (2021). A systematic review of the persistence of childhood mental health problems into adulthood. *Neuroscience & Biobehavioral Reviews*, *129*, 182–205. https://doi.org/10.1016/j.neubiorev.2021.07.030

Mumtaz, S., Maqsood, A., & Rehman, G. (2017). Cognitive Emotion Regulation as Determinants of Internalizing and Externalizing Problems of Adolescents. *Journal of Behavioural Sciences*, *27*(2), 1–1.

Murayama, Y., Ito, H., Hamada, M., Takayanagi, N., Myogan, M., Suzuki, K., & Tsujii, M. (2021). Examining simultaneous associations of four emotion regulation strategies with abnormal eating behaviors/attitudes in early adolescents. *Eating Behaviors*, *40*, 101449. https://doi.org/10.1016/j.eatbeh.2020.101449

Naghavi, M., Abajobir, A. A., Abbafati, C., Abbas, K. M., Abd-Allah, F., Abera, S. F., Aboyans, V., Adetokunboh, O., Afshin, A., Agrawal, A., Ahmadi, A., Ahmed, M. B., Aichour, A. N., Aichour, M. T. E., Aichour, I., Aiyar, S., Alahdab, F., Al-Aly, Z., Alam, K., … Murray, C. J. L. (2017). Global, regional, and national age-sex specific

mortality for 264 causes of death, 1980-2016: A systematic analysis for the Global Burden of Disease Study 2016. *The Lancet*, *390*(10100), 1151–1210. https://doi.org/10.1016/S0140-6736(17)32152-9

Ogden, T., Olseth, A., Sørlie, M.-A., & Hukkelberg, S. (2023). Teacher's Assessment of Gender Differences in School Performance, Social Skills, and Externalizing Behavior From Fourth Through Seventh Grade. *Journal of Education*, *203*(1), 211–221. https://doi.org/10.1177/00220574211025071

Philipp, J., Zeiler, M., Waldherr, K., Nitsch, M., Dür, W., Karwautz, A., & Wagner, G. (2014). The Mental Health in Austrian Teenagers (MHAT)-Study: Preliminary results from a pilot study. *Neuropsychiatrie*, *28*(4), 198–207. https://doi.org/10.1007/s40211-014-0131-9

Plener, P. L., Fischer, C. J., In-Albon, T., Rollett, B., Nixon, M. K., Groschwitz, R. C., & Schmid, M. (2013). Adolescent non-suicidal self-injury (NSSI) in German-speaking countries: Comparing prevalence rates from three community samples. *Social Psychiatry and Psychiatric Epidemiology*, *48*(9), 1439–1445. https://doi.org/10.1007/s00127-012-0645-z

Poon, J. A., López, R., Marie-Shea, L., & Liu, R. T. (2023). Longitudinal Relations Between Childhood Maltreatment, Emotion Regulation Difficulties, and Suicidal Ideation and Non-Suicidal Self-Injury: An 18-Month Investigation of Psychiatrically Hospitalized Adolescents. *Research on Child and Adolescent Psychopathology*, *51*(9), 1315–1326. https://doi.org/10.1007/s10802-023-01067-8

Quintero, M., & LeBoulluec, A. (2018). Missing Data Imputation for Ordinal Data. *International Journal of Computer Applications*, *181*(5), 10–16. https://doi.org/10.5120/ijca2018917522

R Core Team. (2021). *R: A Language and Environment for Statistical Computing*. R Foundation for Statistical Computing. https://www.R-project.org/

Ravens-sieberer, U., Otto, C., Kriston, L., Rothenberger, A., Döpfner, M., Herpertz-dahlmann, B., Barkmann, C., Schön, G., Hölling, H., Schulte-markwort, M., & Klasen, F. (2015). The longitudinal BELLA study: Design, methods and first results on the course of mental health problems. *European Child & Adolescent Psychiatry*, *24*(6), 651–663. https://doi.org/10.1007/s00787-014-0638-4

Richardson, R., Connell, T., Foster, M., Blamires, J., Keshoor, S., Moir, C., & Zeng, I. S. (2024). Risk and Protective Factors of Self-harm and Suicidality in Adolescents: An Umbrella Review with Meta-Analysis. *Journal of Youth and Adolescence*, *53*(6), 1301–1322. https://doi.org/10.1007/s10964-024-01969-w

Riley, T. N., Sullivan, T. N., Hinton, T. S., & Kliewer, W. (2019). Longitudinal relations between emotional awareness and expression, emotion regulation, and peer victimization among urban adolescents. *Journal of Adolescence*, *72*(1), 42–51. https://doi.org/10.1016/j.adolescence.2019.02.005

Rueth, J.-E., & Lohaus, A. (2022). Process-Oriented Measurement of Emotion Regulation: General and Specific Associations With Psychosocial Adjustment and Well-Being in (Pre-)Adolescence. *Frontiers in Psychiatry*, *13*. https://doi.org/10.3389/fpsyt.2022.904389

Sabatier, C., Restrepo, D., Moreno Torres, M., Hoyos De Los Ríos, O., & Palacio Sañudo, J. (2017). Emotion Regulation in Children and Adolescents: Concepts, processes and influences. *Psicologia Desde El Caribe*, *34*.

Sakamoto, Y., Ishiguro, M., & Kitagawa, G. (1986). *Akaike Information Criterion Statistics*. Springer Netherlands.

Schettler, L. M., Thomasius, R., & Paschke, K. (2024). Emotional dysregulation predicts problematic gaming in children and youths: A cross-sectional and longitudinal approach. *European Child & Adolescent Psychiatry*, *33*(2), 605–616. https://doi.org/10.1007/s00787-023-02184-x

Schwarz, G. (1978). Estimating the Dimension of a Model. *The Annals of Statistics*, *6*(2), 461–464. https://doi.org/10.1214/aos/1176344136

Shapiro, S. S., & Wilk, M. B. (1965). An Analysis of Variance Test for Normality (Complete Samples). *Biometrika*, *52*(3/4), 591–611. https://doi.org/10.2307/2333709

Silva, S. A., Silva, S. U., Ronca, D. B., Gonçalves, V. S. S., Dutra, E. S., & Carvalho, K. M. B. (2020). Common mental disorders prevalence in adolescents: A systematic review and meta-analyses. *PLoS One*, *15*(4), e0232007. https://doi.org/10.1371/journal.pone.0232007

Smith, L., Shin, J. I., Carmichael, C., Oh, H., Jacob, L., López Sánchez, G. F., Tully, M. A., Barnett, Y., Butler, L., McDermott, D. T., & Koyanagi, A. (2021). Prevalence and correlates of multiple suicide attempts among adolescents aged 12–15 years from 61 countries in Africa, Asia, and the Americas. *Journal of Psychiatric Research*, *144*, 45–53. https://doi.org/10.1016/j.jpsychires.2021.09.047

Supke, M., Ferling, C., Hahlweg, K., & Schulz, W. (2021). Persistence and course of mental health problems from childhood into adolescence: Results of a 10-year longitudinal study. *BMC Psychology*, *9*(1), 38. https://doi.org/10.1186/s40359-021-00535-4

Suveg, C., & Zeman, J. (2004). Emotion Regulation in Children With Anxiety Disorders. *Journal of Clinical Child & Adolescent Psychology*, *33*(4), 750–759. https://doi.org/10.1207/s15374424jccp3304_10

Tarasova, K. S. (2016). Development of Socio-emotional Competence in Primary School Children. *Procedia - Social and Behavioral Sciences*, *233*, 128–132. https://doi.org/10.1016/j.sbspro.2016.10.166

te Brinke, L. W., Menting, A. T. A., Schuiringa, H. D., Zeman, J., & Deković, M. (2021). The structure of emotion regulation strategies in adolescence: Differential links to internalizing and externalizing problems. *Social Development*, *30*(2), 536–553. https://doi.org/10.1111/sode.12496

Thompson, R. A. (1994). Emotion Regulation: A Theme in Search of Definition. *Monographs of the Society for Research in Child Development*, *59*(2/3), 25–52. https://doi.org/10.2307/1166137

Thompson, R. A. (2011). Emotion and Emotion Regulation: Two Sides of the Developing Coin. *Emotion Review*, *3*(1), 53–61. https://doi.org/10.1177/1754073910380969

Trompeter, N., Bussey, K., Forbes, M. K., & Mitchison, D. (2021). Emotion Dysregulation within the CBT-E Model of Eating Disorders: A Narrative Review. *Cognitive Therapy and Research*, *45*(6), 1021–1036. https://doi.org/10.1007/s10608-021-10225-5

Van Durme, K., Goossens, L., Bosmans, G., & Braet, C. (2018). The Role of Attachment and Maladaptive Emotion Regulation Strategies in the Development of Bulimic Symptoms in Adolescents. *Journal of Abnormal Child Psychology*, *46*(4), 881–893. https://doi.org/10.1007/s10802-017-0334-1

Vierhaus, M., Lohaus, A., & Wild, E. (2016). The development of achievement emotions and coping/emotion regulation from primary to secondary school. *Learning and Instruction*, *42*, 12–21. https://doi.org/10.1016/j.learninstruc.2015.11.002

Wagner, G., Zeiler, M., Waldherr, K., Philipp, J., Truttmann, S., Dür, W., Treasure, J. L., & Karwautz, A. F. K. (2017). Mental health problems in Austrian adolescents: A

nationwide, two-stage epidemiological study applying DSM-5 criteria. *European Child & Adolescent Psychiatry*, *26*(12), 1483–1499. https://doi.org/10.1007/s00787-017-0999-6

Wang, S., Liu, X., Liu, Y., Li, X., Chen, X., & Gao, Y. (2025). Maternal Depressive Symptoms and Children's Behavioral Problems: The Moderating Roles of Emotion Regulation and Teacher-Student Relationship Quality. *The Journal of Genetic Psychology*, *186*(2), 114–129. https://doi.org/10.1080/00221325.2024.2400362

WHO. (2024). *Mental health of adolescents*. World Health Organization. https://www.who.int/news-room/fact-sheets/detail/adolescent-mental-health

Winsper, C., Marwaha, S., Lereya, S. T., Thompson, A., Eyden, J., & Singh, S. P. (2015). Clinical and psychosocial outcomes of borderline personality disorder in childhood and adolescence: A systematic review. *Psychological Medicine*, *45*(11), 2237–2251. https://doi.org/10.1017/S0033291715000318

Wozniak, J., Petty, C. R., Schreck, M., Moses, A., Faraone, S. V., & Biederman, J. (2011). High level of persistence of pediatric bipolar-I disorder from childhood onto adolescent years: A four year prospective longitudinal follow-up study. *Journal of Psychiatric Research*, *45*(10), 1273–1282. https://doi.org/10.1016/j.jpsychires.2010.10.006

Yang, J. (2024). Childhood maltreatment, emotion regulation difficulties/externalizing problems, and sleep problems in adolescents: Direct and indirect associations among developmental trajectories. *Sleep Medicine*, *115*, 114–121. https://doi.org/10.1016/j.sleep.2024.01.026

List of Figures

List of Tables

List of Abbreviations

Appendix

English Abstract

This thesis aimed to investigate how different emotion regulation strategies relate to mental health difficulties in primary school children. The sample consisted of 184 Austrian 4th grade students (M_{age} = 9.27, SD = 0.52), who completed self-report questionnaires on their current mental health status and their use of emotion regulation strategies. Mental health difficulties were categorized into internalizing and externalizing difficulties, while emotion regulation strategies were classified as maladaptive or adaptive, as well as behavioral or cognitive. A series of linear mixed models were conducted. Children with more mental health difficulties reported using more behavioral maladaptive emotion regulation strategies, whereas adaptive and cognitive strategies did not show a significant effect on mental health difficulties overall. However, when the interaction term for gender was included, cognitive adaptive strategies were negatively associated with internalizing problems, particularly in girls. Additionally, all children with more internalizing problems reported significantly less use of cognitive problem solving to regulate their emotions. Regarding gender differences, girls reported experiencing more mental health difficulties in general and internalizing problems in particular compared to boys. However, no significant gender differences were found in the number of externalizing problems reported. These findings emphasize the importance of reducing the use of maladaptive emotion regulation strategies in this age group while promoting cognitive problem solving in all children with internalizing problems, and fostering adaptive cognitive strategies specifically in girls with internalizing problems.

German Abstract

Diese Arbeit untersuchte den Zusammenhang zwischen verschiedenen Emotionsregulationsstrategien und psychischen Problemen bei Grundschulkindern. Die Stichprobe bestand aus 184 österreichischen Viertklässler*innen (M_{Alter} = 9,27, SD = 0,52), die Selbstberichtsfragebögen zu ihrem aktuellen psychischen Gesundheitszustand und ihrer Nutzung von Emotionsregulationsstrategien ausfüllten. Psychische Schwierigkeiten wurden in internalisierende und externalisierende Probleme unterteilt, während Emotionsregulationsstrategien als maladaptiv oder adaptiv sowie als behavioral oder kognitiv kategorisiert wurden. Eine Reihe linearer gemischter Modelle wurde berechnet. Kinder mit stärkeren psychischen Schwierigkeiten berichteten über eine häufigere Nutzung maladaptiver behavioraler Emotionsregulationsstrategien, während adaptive und kognitive Strategien insgesamt keinen signifikanten Einfluss auf psychische Schwierigkeiten hatten. Nachdem die Wechselwirkung mit dem Geschlecht einbezogen wurde, zeigte sich jedoch, dass kognitive adaptive Strategien negativ mit internalisierenden Problemen assoziiert waren – insbesondere bei Mädchen. Zudem nutzten alle Kinder mit stärker ausgeprägten internalisierenden Problemen signifikant seltener kognitive Problemlösestrategien zur Emotionsregulation. Hinsichtlich der Geschlechtsunterschiede berichteten Mädchen insgesamt mehr psychische Schwierigkeiten, insbesondere mehr internalisierende Probleme, als Jungen. In der Anzahl der externalisierenden Probleme zeigten sich hingegen keine geschlechtsspezifischen Unterschiede. Diese Ergebnisse unterstreichen die Bedeutung der Reduzierung maladaptiver Emotionsregulationsstrategien in dieser Altersgruppe sowie die Förderung kognitiver Problemlösestrategien bei allen Kindern mit internalisierenden Problemen. Zudem sollten adaptive kognitive Strategien gezielt bei Mädchen mit internalisierenden Problemen gestärkt werden.