Adaptive Emotion Regulation, Academic Performance, and Internalising Problems in Flemish Children with Special Educational Needs: A Pilot Study

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School readiness of children with special educational needs (SEN) is still understudied. The present study examined how the presumed bidirectional relationship between impaired academic performance (AP) and internalising problems (IP) could be favourably influenced. In this regard, it was assumed that children's adaptive emotion regulation plays a crucial role, as it was shown to be independently related to improved AP and fewer IP. However, to gain stronger evidence for this assumption, it should be further clarified whether adaptive emotion regulation, AP and IP are also jointly associated and, if so, how this is reflected in children with SEN. To explore these issues, two different models were tested in a cross-sectional pilot including 61 Flemish elementary school children with SEN (39 boys and 22 girls, mean age = 10.0 years old). Teachers reported on adaptive emotion regulation, AP and IP. The results indicated that AP partially mediated the relationship between adaptive emotion regulation and IP (model 1), while IP fully mediated the relationship between adaptive emotion regulation and AP (model 2). Practical implications, strengths, and limitations were discussed.

Keywords: School readiness, Special educational needs, Adaptive emotion regulation, Academic performance, Internalising problems

Introduction

***Promoting School Readiness in Flemish Children with Special Educational
Needs (SEN)***

School readiness, defined by UNICEF as children's successful transition into the school
system, implicates specific competencies (e.g. social-emotional and cognitive skills),
and is reflected in both psychosocial and academic outcomes (Britto, 2012). Enhancing
school readiness is particularly beneficial for young children (i.e. elementary school
age) with special educational needs (SEN), as these children have 'learning difficulties
or disabilities that make it harder for them to learn or access education than most
children of the same age. These children may need extra or different help from that
given to other children of the same age' (Westwood, 2007, p. 1).

In Flemish school education (Flemish Ministry of Education, 2017), the largest
group of children with SEN consists of children with learning problems and/or a mild
intellectual disability, because the group is at specific risk for developing associated
psychosocial problems (Dekker, Koot, van der Ende, Verhulst, 2002; Morgan, Farkas,
Tufis, & Sperling, 2008). McIntosh, Ty, and Miller (2014) recommend urgent priority
for these internalising problems, as they are assumed to affect academic performances
but often remain unaddressed. Academic performance (AP) has been defined as
children's achievement, as well as their concrete on-task behaviours (Dupaul, Rapport,
& Perriello, 1991), while internalising problems (IP) refer to 'problems related to
anxiety, fear, shyness, low self-esteem, sadness, and depression' (Ollendick & King,
1994, p. 918).

Taking into account the above recommendations, the present study aimed to
explore how the relationship between impaired academic performance and internalising
problems could be favourably influenced in children with SEN. In this regard, adaptive

emotion regulation was assumed to be a crucial mechanism, as it was found to be independently related to improved academic outcomes and fewer internalising problems (Aldao, Nolen-Hoeksema, & Schweizer, 2010; Bauminger & Kimhi-Kind, 2008; Graziano, Reavis, Keane, & Calkins, 2007; MccLure, Halpern, Wolper, & Donahue, 2009). However, regardless of these findings, this assumption needs to be further substantiated, as it currently remains unclear whether adaptive emotion regulation, academic performance, and internalising problems are also jointly associated and, if so, how these associations are expressed in children with SEN. To address this gap in knowledge, a pilot study was conducted.

Bidirectional Relationship between Academic Performance and Internalising Problems

In previous research, it has been assumed that AP and IP are bidirectionally related, which resulted in two research lines. Firstly, both cross-sectional and longitudinal studies investigated whether IP precede AP (see e.g. Riglin, Petrides, Frederickson, & Rice, 2014), which is the *adjustment erosion hypothesis* (Moilanen, Shaw, & Maxwell, 2010). According to this hypothesis, higher levels of IP mainly affect students' academic productivity, which is reflected in lower levels of motivation (e.g. striving for rewards), cognitive difficulties (e.g. impaired working memory capacity), and biological complications (e.g. loss of energy) (Weidman, Augustine, Murayama, & Elliot, 2015). Secondly, mainly longitudinal studies investigated whether low AP precedes IP (see e.g. Moilanen et al., 2010), which is *the academic incompetence hypothesis*. This hypothesis implies that children with low AP receive negative feedback from their parents and teachers, which subsequently triggers negative primary emotions such as anger, anxiety, and sadness (Cicchetti, Ackerman, & Izard 1995) leading to IP.

Promoting Successful School Transition: Emotion Regulation Strategies

In previous research, one skill that was assumed to individually precede and influence both AP and IP, is emotion regulation (Aldao et al., 2010; Graziano et al., 2007), which has been defined as 'processes by which individuals influence which emotions they have, when they have them, and how they experience and express these emotions' (Gross, 1998, p. 224). When confronted with stressful life-events, such as challenging school demands, children experience both positive and negative emotions. To manage these emotions, children use adaptive and/or maladaptive emotion regulation strategies, based on their positive or negative influence on children's emotions, cognitions, and behaviours (Aldao et al., 2010; Graziano et al., 2007). The present study mainly focuses on adaptive emotion regulation, as firstly, Aldao et al., 2010 showed that adaptive emotion regulation protects children from developing psychopathology, such as internalising problems. Secondly, adaptive emotion regulation has also been associated with improved academic performance (see e.g. Graziano et al., 2007; Juntorn, Sriphetcharawut, & Munketvit, 2017). Since adaptive emotion regulation seems to be trainable, studies in children with IP were important for designing interventions.

Adaptive Emotion Regulation in the Bidirectional Associations between
Academic Performance and Internalising Problems

Considering the alternative hypotheses on the associations between AP and IP, it remains unclear in which model and how adaptive emotion regulation fits well. First, concerning the academic incompetence hypothesis, one study evaluated the impact of emotion regulation on the assumed AP-IP association but failed to show that AP mediates the association between adaptive emotion regulation and IP (Wills, Simons, Sussman, & Knight, 2016). Remarkably, also no relationship was observed between adaptive emotion regulation and IP, which is surprising as this was firmly established in

other research on this topic (see e.g. Eisenberg, Spinrad, & Eggum, 2010). However, as this study was conducted in a general school population consisting of young adolescents between 11 and 14 years of age, it is difficult to generalize these findings to children with SEN.

Furthermore, when considering emotion regulation, IP, and AP simultaneously and taking into account the adjustment erosion hypothesis, we were unable to find any studies that examined whether low adaptive emotion regulation strategies precede higher levels of IP, which in turn leads to lower levels of AP.

The Current Study

Based on the above literature review, it can be concluded that there is a gap in knowledge regarding the joint associations between emotion regulation, AP and IP. Therefore, a pilot study was conducted with the main objective to explore how these associations are reflected in elementary school children with SEN using two mediation models. Firstly, it is aimed to tentatively explore whether AP mediates the relation between adaptive emotion regulation and IP in children with SEN, thereby taking into account the academic incompetence hypothesis (Model 1; see Figure 1). Three hypotheses were tested. It was expected that (a) emotion regulation is negatively related to IP and positively to AP, (b) AP is negatively related to IP, and (c) AP mediates the relation between adaptive emotion regulation and IP.

Secondly, it is intended to examine if IP are a mediator in the relationship between adaptive emotion regulation strategies and AP (Model 2; see Figure 2), thereby taking into account the adjustment erosion hypothesis. Again, three hypotheses were tested. It was expected that (a) adaptive emotion regulation is positively associated with AP and negatively with IP, (b) IP are negatively related to AP, and (c) IP mediate the relation between adaptive emotion regulation and AP.

Method

Participants

One Flemish elementary school, taking part in a larger intervention study (Weymeis, Braet, & Van Leeuwen, 2017), and providing special education for children between 6 and 12 years of age with SEN ('Type Basic Offer', which was defined as education for children with SEN, for whom the common curriculum is not feasible in regular education, unless adjustments; Flemish Ministry of Education, 2017), was included in the current cross-sectional pilot study. The sample size was not predetermined as it was an opportunity sample. A full description of the sample is provided in Table 1. All children between 8 and 12 years of age, as well as their teachers and parents, were invited to participate. Children, parents, and teachers who did not give their explicit consent to participate were removed from the study. Eventually, out of 136 children, a total of 79 teachers, children and their parents agreed to participate. One outlier was excluded from the study ($n = 1$; $z - score > 3.0$). Furthermore, as Little's MCAR test showed that the data was not missing at random, χ^2 (9, $N = 79$) = 24.10, $p = <.05$, participants with too much missing data were excluded from the study using listwise deletion ($n = 17$) (Little, 1988). As a result, the final sample consisted of 61 children (39 boys and 22 girls, mean age = 10.0 years old), who were all of Caucasian ethnicity. At the time of data collection, children's average time of placement was 2.68 years. To be able to accurately identify children with learning problems (i.e. IQ score > 70) and/or a mild intellectual disability (i.e. IQ score $\geq$ 55 and $\leq$ 70) (American Psychiatric Association, 2013), children's full scale intelligence scores (mean = 77.08, *SD* = 11.88) were derived from one of three different intelligence tests, which were conducted by the participating school: the Snijders-Oomen Non-Verbal Intelligence test – R (22.60%) (SON-R; Laros & Tellegen, 1991), the Wechsler Intelligence Scale for Children – III

(40.30%) (WISC-III; Kort et al., 2002) and the Wechsler Preschool and Primary Scale of Intelligence – R (35.50%) (WPPSI-R; Vander Steene & Bos, 1997). These tests were equally standardized (mean = 100.0, SD = 15.0) and, moreover, were found to be strongly interrelated (Tellegen, Winkel, Wijnberg-Williams, & Laros, 1998). As such, it was reasonable to assume that children's intelligence scores can be reliably compared with each other. When comparing the study-subsample with the total school sample, we found that gender, χ^2(1, N = 140) = .05, p = .82, and socio-economic status (SES), χ^2 (3, N = 140) = 1.98, p = .58, were not differently distributed. Furthermore, also no significant effect was found regarding age, t(60) = -1.32, p = .19 and IQ scores, t(60) = 1.02, p = .31.

[TABLE 1 near here]

Procedure

The current study was approved by the ethical committee of Ghent University (Ghent University, 2014). Teachers, children, and their parents received a letter including the aim of the study, an invitation to participate, as well as information regarding the confidentiality of data processing. After permission was given, teachers were assigned randomly generated passwords, which provided access to an online survey tool. In this tool, teachers were consequently requested to complete three questionnaires, which are further described below. To avoid the results being affected by ongoing school interventions, all questionnaires were completed at baseline (i.e. at the beginning of the school year).

Measures

Emotion Regulation Strategies

To measure children's use of emotion regulation strategies, the *Fragebogen zur Erhebung der Emotionsregulation bei Kindern and Jugendlichen* was used (FEEL-KJ; Grob & Smolenski, 2005; Dutch version by Braet, Cracco, & Theuwis, 2013). The FEEL-KJ is a 90-item self-, parent- and - teacher report questionnaire for measuring a broad range of emotion regulation strategies in children and adolescents between 8 and 18 years of age. More specifically, the FEEL-KJ assesses 15 emotion regulation strategies in children's response to anxiety, sadness, and anger. Adaptive emotion regulation strategies consist of cognitive problem-solving, problem-solving, acceptance, forgetting, distraction, revaluation, and evoking positive mood. Each strategy is measured by rating two items for each of the three emotions, whereby answers are given on a 5-point Likert scale (1 = almost never; 2 = rarely; 3 = occasionally; 4 = often; 5 = almost always). Regarding psychometric qualities, the FEEL-KJ is well-validated and reliable (Cracco, Van Durme, & Braet, 2015). As the current study aims to include a broad range of adaptive emotion regulation strategies, a global composite score of teacher-rated adaptive emotion regulation was used (42 items; $\alpha = .97$).

Academic performance

Students' AP was measured with the Academic Performance Rating Scale (APRS; Dupaul et al., 1991). The APRS is a 19-item teacher questionnaire that assesses children's academic success, academic productivity, and impulse control. The academic success subscale consists of items that are related to children's academic achievement (e.g. quality of reading, quality of speaking, etc.), whereas the academic productivity subscale consists of items related to children's learning behaviours (e.g. time to

complete work, follows group instructions, etc.). Furthermore, the impulsivity subscale includes items that refer to children's difficulties to work in a precise manner (e.g. begins work carelessly, careless work completion, etc.). Regarding psychometric qualities, the APRS is a valid and reliable instrument for measuring AP (Dupaul et al., 1991). As the current study is especially focused on promoting positive academic outcomes, only academic success (9 items; $\alpha = .74$) and academic productivity (7 items; $\alpha = .86$) were included.

Internalising and Externalising problems

The Teacher Report Form (TRF; Achenbach & Rescorla, 2001; Dutch version by Verhulst, Van der Ende, & Koot, 1997), is a 113-item teacher-report questionnaire for measuring teachers' perceptions of 6- to 18-year-old children's adaptive and maladaptive functioning. Items on the TRF comprise eight subscales, clustered in two broad dimensions, Internalising (Anxious/Depressed, Withdrawn/Depressed, Somatic Complaints) and Externalising (Rule-Breaking Behaviour, Aggressive Behaviour) scales, and a Total Problems scale. Regarding psychometric qualities, the TRF is well-validated and reliable (Achenbach, Dumenci, & Rescorla, 2003). In the current study, children's scores for IP were included as the outcome variable (33 items; $\alpha = .87$), whereas externalising problems were included as control variable (33 items; $\alpha = .94$).

Data Analytic Plan

In order to meet the assumption of normality, scores on IP were log-transformed due to positive skewness in the sample distribution, $D(61) = 0.21$, $p < .05$. Next, descriptive statistics and correlations were calculated (see Table 1). To test the hypothesised mediation models 1 and 2, the SPSS PROCESS macro command (Template 4) was used, which was developed by Preacher and Hayes (2008). The SPSS PROCESS macro

command involves a nonparametric procedure, which is based on a bias-corrected bootstrap method with 5000 resamples to estimate the 95% confidence intervals (CI) for the indirect path. It was shown that the bootstrap CI is less susceptible to outliers in small samples compared to other tests (Creedon & Hayes, 2015). Furthermore, the bootstrapping procedure also seems advantageous over other approaches, as it does not require distributional assumptions and, moreover, takes into account correlations between mediators and control variables. Given these advantages, only pure mediation effects are reported, which are not influenced by other mediators or control variables (Preacher & Hayes, 2008). In the current study, a .05 criterion for rejection was used.

Results

Preliminary Analyses

Descriptive statistics and Pearson correlations are presented in Table 2. As expected, the results showed significant correlations between adaptive emotion regulation and IP, adaptive emotion regulation and AP, and AP and IP. Regarding AP, however, significant correlations were only found for academic productivity. Academic success was consequently excluded as a possible mediating variable in Model 1 and as a possible outcome variable in Model 2. However, as the academic success and productivity scales are typically highly correlated, academic success was included as a control variable in the analyses (see e.g. Graziano et al., 2007). Furthermore, in both models, we controlled for gender, as it is known from the literature that girls typically experience more IP compared to boys (Crijnen, Achenbach, & Verhulst, 1997). Also children's externalising problems were controlled for, as they commonly interfere with children's IP (Masten et al., 2005).

[TABLE 2 near here]

Academic Productivity Mediating the Relation between Adaptive Emotion Regulation and Internalising Problems

Regarding Model 1 (see Figure 1), the results confirmed the first (i.e. *c*-path; β = -.01, $t(56)$ = -2.93, p < .01), second (i.e. *a*-path; β = .05, $t(56)$ = 2.09, p < .05), and third hypothesis (i.e. *b*-path; β = -.03, $t(55)$ = -2.52, p < .05). Furthermore, the indirect effect (i.e. *ab* – path) was estimated between -.004 and -.0003. As the 95% confidence interval did not include zero, the results indicated a significant mediation effect. The direct effect remained significant, which suggested partial mediation. Also the final model was significant, $F(4, 56)$ = 8.09, p <.001, r^2 =.01, explaining 61% of the variance in IP (R^2 = .61, ΔR^2 = .37).

[FIGURE 1 near here]

Internalising Problems Mediating the Relation between Adaptive Emotion Regulation and Academic Productivity

Regarding Model 2 (see Figure 2), the assumption was tested that IP mediate the association between adaptive emotion regulation and academic productivity. The results provided support for the first (*c*-path; β = .05, $t(56)$ = 2.09, p < .05), second (*a*-path; β = -.01, $t(56)$ = -2.93, p < .01) and third hypothesis (*b*-path; β = -3.82, $t(55)$ = -2.52, p < .05). Finally, estimations showed that the indirect effect (i.e. *ab* – path) had a value between .01 and .06. As the 95% confidence interval did not include zero, the results indicated a significant mediation effect. The direct effect was no longer significant, which suggested complete mediation. The final model was significant, $F(4, 56)$ = 42.36, p < .001, r^2 = .05, explaining 87% of the variance in academic productivity (R^2 = .87, ΔR^2 = .75).

[FIGURE 2 near here]

Discussion

The current pilot study on school readiness aimed to tentatively explore whether and how adaptive emotion regulation, in children with SEN, influenced AP and IP, taking into account the underlying assumption that AP and IP are bidirectionally related (Moilanen et al., 2010). In this regard, one previous study used a non-representative sample (i.e. adolescents without SEN) and failed to show that adaptive emotion regulation precedes the relation between AP and IP (Wills et al., 2016). Conversely, until now, it has remained unclear whether adaptive emotion regulation precedes the relation between IP and AP. To address the above gaps in knowledge, both mediational models, as well as the associated hypotheses, were tested in children with SEN. From the results, and somewhat in line with the academic incompetence hypothesis, it was concluded that the relation between adaptive emotion regulation and IP is partially mediated by children's academic performance (cf. Model 1). Moreover, and slightly in line with the academic erosion hypothesis, it was concluded that the relation between adaptive emotion regulation an academic performance seemed to be entirely mediated by children's IP (cf. Model 2).

Unfortunately, the above analyses do not allow for causal inferences due to the cross-sectional nature of the data. Furthermore, other important limitations prevented us from generalizing any results to a larger population (see also Parker, 1990), such as non-random sampling, the use of a small sample, teacher subjectivity, teacher bias related to difficulties with identifying internalising problems, mono-informant bias, and shared method variance (De Los Reyes & Kazdin, 2005; McIntosh et al., 2014; Meissel, Meyer, Yao, & Rubie-Davies, 2017). As a result, it is too early to draw any practical conclusions for schools and teachers at this stage of research. Therefore, this study should be replicated in the future by using a longitudinal design and by including a

larger sample, different informants, and other data sources such as interviews, observations and test results.

Despite the above limitations, reliable measures were used and, moreover, the study was performed in a real-life setting, thereby guaranteeing richer data and ecological validity (Schmuckler, 2001). Also, as teachers are the primary sources of children's behaviour ratings within the school environment, they are expected to accurately assess children's emotion regulation strategies within an academic context (Evans, Fite, Hendrickson, Rubens, & Mages, 2015). Overall, the current pilot study provided relevant data that fuel our theoretical understanding of school readiness and offer interesting implications for designing interventions.

The present preliminary findings encourage future research on this topic, which hopefully results in more robust findings and useful indications for teachers and schools to accurately support children with SEN in the classroom.

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Table 1. Sample Table for Describing Participants

Participants	
Gender:	
male	$n = 39$ (63.90%)
female	$n = 22$ (36.10%)
total	$n = 61$
Age:	
mean	10.0
range	4.0 (8.0 – 12.0)
Race/Ethnicity:	
Caucasian	$n = 61$
SES:	
upper class	$n = 1$ (1.60%)
upper-middle class	$n = 14$ (23.0%)
middle class	$n = 35$ (57.40%)
lower-middle class	$n = 11$ (18.0%)
Level of Placement:	
Average time in Special Ed. Placement	2.68
Level of Placement	Type Basic Offer
Intelligence*:	
IQ score ≤ 70	$n = 16$ (26.20%)
IQ score > 70	$n = 45$ (73.80%)
mean	77.08
range	55.0 (55.0 – 110.0)
Overall Academic Achievement**:	

mean	22.13
SD	4.11
range	20.0 (12.0 – 32.0)
Geographical location:	Urban

Note. * = Names of tests used: SON-R, WISC-III and WPPSI-R; ** = Name of test

used: APRS (Academic Success scale).

Table 2. Study Variables Pearson Correlations and Descriptive Statistics

Variable	1	2	3	4	5	*M*	*SD*	Min	Max
1. Adaptive emotion regulation						112.28	23.27	57.0	166.0
2. Academic success	.14					22.13	4.11	12.0	32.0
3. Academic productivity	.25*	.86**				40.21	7.55	20.0	57.0
4. Internalising problems	-.46**	.16	-.35**			6.18	6.32	0.0	27.0
5. Age	-.08	-.09	-.09	.18		10.0	1.37	8.0	12.0
6. IQ score	-.15	-.019	-.04	-.001	-.09	77.08	11.88	55.0	110.0

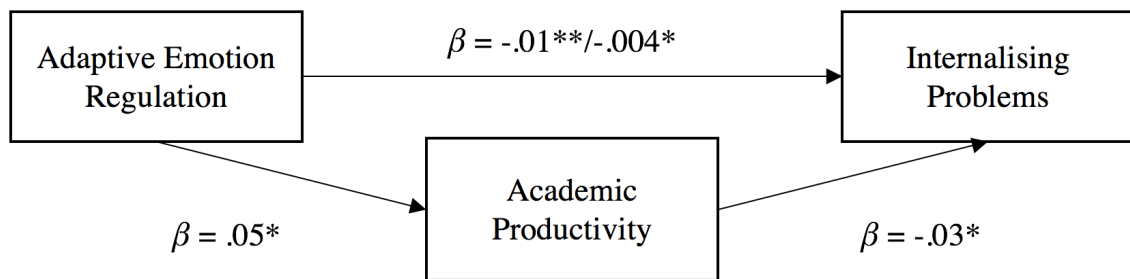*Note*. *p* < .05; **p* < .01. Min = Minimum; Max = Maximum.

Figure 1. Mediation Model 1

Figure 1. Academic productivity as a mediator between adaptive emotion regulation and internalising problems.

*Note. *p* < .05; **p* <.01.

Figure 2. Mediation Model 2

```
┌──────────────────┐      β = .05*/.03        ┌──────────────────┐
│ Adaptive Emotion │ ───────────────────────► │     Academic     │
│    Regulation    │                          │   Productivity   │
└──────────────────┘                          └──────────────────┘
         │                  ┌──────────────┐           ▲
         └────────────────► │ Internalising│ ──────────┘
      β = -.01**            │   Problems   │      β = -3.82*
                            └──────────────┘
```
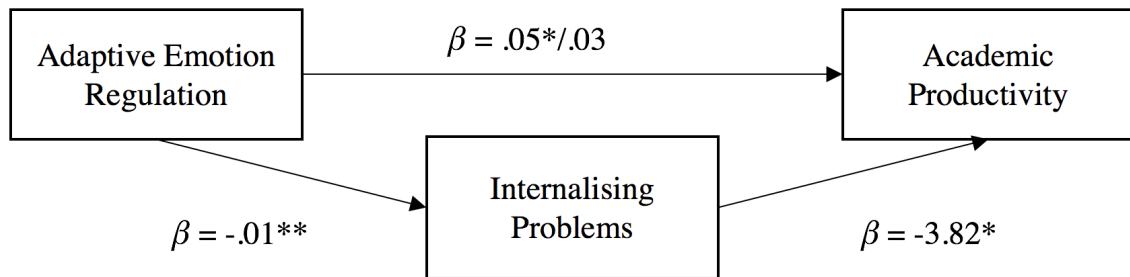
Figure 2. Internalising problems as a mediator between adaptive emotion regulation and

academic productivity.

*Note. *p < .05; **p < .01.*