

EMOTION REGULATION AND ACADEMIC PERFORMANCE: A SYSTEMATIC REVIEW OF EMPIRICAL RELATIONSHIPS

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ABSTRACT. It has been suggested that emotion regulation (ER) is a predictive factor of academic performance. However, empirical studies are scarce and relatively little is known about the specific relationships between academic performance indicators and ER strategies and skills. The goal of this study is to identify the state of the art in terms of the relationship between emotion regulation (ER) and academic performance. A systematic review of the literature was conducted through Google Scholar, ERIC and PsyArticles by combining the terms emotion regulation and emotion self-regulation with: abilities, competency, achievement, success, performance, academic learning, school, literacy, classroom, education, reading, math. Seventeen articles were selected and, following an analysis, these were divided into two groups. The first group included articles that evaluated ER strategies. In this group, experimental designs and behavioral indicators as measures of ER predominated. The second group included studies that evaluated ER skills. In this group, cross-sectional studies and self-reporting or third-party reporting measures to evaluate ER predominated. Recommendations for future research are indicated.

Keywords: Emotion; scholastic learning, literature review.

REGULACIÓN EMOCIONAL Y DESEMPEÑO ACADÉMICO: REVISIÓN SISTEMÁTICA DE SUS RELACIONES EMPÍRICAS

RESUMEN. Se ha propuesto que la regulación de la emoción (RE) constituye un factor con capacidad predictiva sobre el desempeño académico. Sin embargo, los estudios empíricos son escasos y aún se conoce relativamente poco sobre la relación específica de las estrategias y habilidades de RE con diferentes indicadores del desempeño académico. El objetivo de este trabajo fue identificar el estado del arte de la relación de la regulación emocional (RE) con el desempeño académico. Se realizó una búsqueda sistemática de artículos en las bases Google Scholar, ERIC y PsyArticles combinando los términos regulación de la emoción y autorregulación de la emoción con: habilidades, competencia, logro, éxito, desempeño, aprendizaje (académico), escolar/escuela, alfabetización, aula/aúlico, educación, lectura, matemáticas. Se seleccionaron 17 artículos. El análisis permitió conformar dos grupos. En el primer grupo, fueron considerados los artículos que evaluaron estrategias de RE. Entre estos estudios predominaron los diseños experimentales y los indicadores comportamentales como medidas de RE. En el segundo grupo, fueron considerados los estudios que evaluaron habilidades de RE. En este grupo, predominaron los estudios con diseños transversales y medidas de autoinforme o de informes de terceros para evaluar RE. Se concluye señalando recomendaciones para futuros trabajos.

Palabras clave: Emoción; aprendizaje escolar, revisión de literature.

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REGULAÇÃO EMOCIONAL E DESEMPENHO ACADÊMICO: UMA REVISÃO SISTEMÁTICA DE RELAÇÕES EMPÍRICAS

RESUMO. Foi proposto que a regulação da emoção (ER) é um fator com uma capacidade preditiva de desempenho acadêmico. No entanto, estudos empíricos são escassos e ainda relativamente pouco se sabe sobre a relação específica das estratégias e habilidades RE com diferentes indicadores de desempenho acadêmico. O objetivo deste estudo foi identificar o estado da arte sobre a relação entre regulação emocional e desempenho acadêmico. Uma pesquisa sistemática de artigos empíricos foi realizada nas bases de dados Google Scholar, ERIC e PsycArticles combinando os termos regulação de emoção ou auto-regulação emocional com: (acadêmico) habilidades, competência, realização, sucesso, desempenho, aprendizagem, escola, alfabetização, sala de aula, educação, leitura, matemática. Foram selecionados 17 itens. Análise possível formar dois grupos. No primeiro grupo, foram considerados os artigos que avaliaram estratégias de RE. Nestes estudos predominaram projetos experimentais e indicadores comportamentais como medidas de RE. No segundo grupo, foram considerados estudos que avaliam habilidades RE. Neste grupo predominaram estudos com projetos transversais e medidas de auto-relato ou de relatórios de terceiros para avaliar RE. Concluiu-se apontando algumas recomendações para trabalhos futuros.

Palavras-chave: Emoções; aprendizagem escolar; revisão de literatura.

Introduction

Academic performance (AP) can be defined as the degree to which individuals achieve specific goals established by their educational context or as the demonstrated level of knowledge in a specific subject or area (Steinmayr, Meibner, Weidinger, & Wirthwein, 2015). Socio-cultural, family and individual factors that contribute to successful performance have been examined (e.g. Hattie, 2009). Among emotional factors, aggression, test anxiety and math anxiety stand out (Hattie, 2009). However, other emotional factors that are not associated with aggression or a specific anxiety may also present themselves. One such factor is emotion regulation (ER) (Howse, Calkins, Anatopoulos, Keane, & Shelton, 2003; Graziano et al., 2007).

ER includes those processes that allow individuals to monitor, evaluate and change the nature and trajectory of their emotions in order to achieve objectives and respond to environmental demands in an appropriate manner (Gross, 2014). Some theoretical models focus on the role of ER strategies (actions aimed at achieving objectives), while others underscore the role of ER skills (the ability to successfully undertake a certain activity) (Tull & Aldao, 2015). Strategies that have been studied in connection with academic performance include cognitive reappraisal (changing the appraisal of a situation in order to alter its emotional impact, Gross, 2014), rumination (directing attention to one's own feelings, Gross, 2014), expressive suppression (the inhibition of an emotion's expressive trajectory, Gross, 2014), distraction (the focusing of attention away from a situation, Gross, 2014) and emotion management (changing the way of thinking about one's own ability to handle the emotional demands of a situation, Xu, Fan, & Du, 2015).

The ER skills that have been most studied in connection with AP are: emotion recognition (adequately assigning semantic categories to emotional experiences, Berking & Whitley, 2014), distress tolerance (persisting in an activity to achieve an objective despite an unpleasant emotional state, Lejuez, Kahler & Brown, 2003) and emotion reaction modification (changing the quality, intensity and/or duration of an emotional response in a desired direction with the help of strategies and other skills, Berking & Whitley, 2014). Delayed gratification or temptation management skills (resisting a present temptation to obtain a greater long-term reward, Galla et al., 2014) also play an indirect role in emotion regulation; for example, they require self-control strategies to resist a temptation.

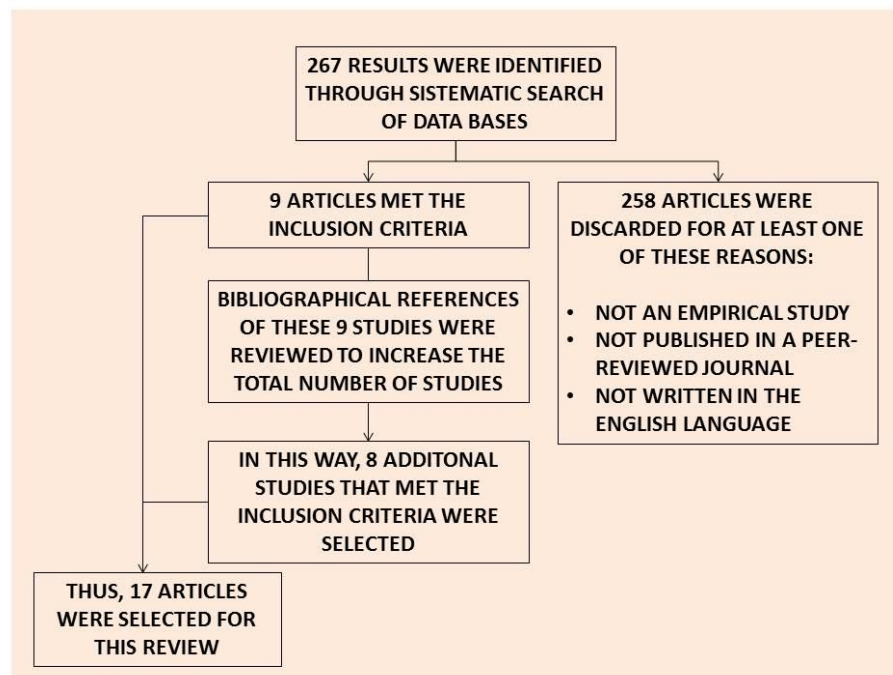
In educational settings, individuals receive information that they are to learn. Emotions can re-direct or divert higher-order cognitive processes (e.g., working memory, attention, planning, etc.) toward content that is unrelated to the academic content. If the educational information is not paid attention to and processed, it cannot be remembered and learned; therefore, ER strategies and skills can facilitate attentional focusing and the processing of new information, thus favoring AP (Graziano et al., 2007). The study of the relationship between ER and AP processes represents a complementary contribution to knowledge of the emotional factors linked to it. The goal of this study is to identify the state of the art with respect to the relationship between ER and AP in order to establish the points of agreement and disagreement in the research and the theoretical questions that future studies should address. To achieve this goal, a theoretical review of the literature on the relationship between these two variables was conducted.

Method

A systematic search of the Google Scholar, ERIC and PsyArticles databases was conducted for research that analyzed the relationship between ER and AP. The search took place on September 6, 2016 and used terms in English appearing in the titles of articles. The search used the Boolean operator OR to combine the terms “emotion regulation” or “emotion self-regulation” with each one of the following terms using the Boolean operator AND: academic abilities, academic competency, academic achievement, academic success, academic performance, academic learning, school, literacy, classroom, education, educational, reading, math.

This initial search generated 267 results (see Figure 1). The inclusion criteria applied to these results were: (a) empirical studies that analyze the relationship between ER and AP; (b) published in peer-reviewed scientific journals; (c) written in English; and (d) published since 2000.

Figure 1. Literature review selection procedures



A total of nine articles meet the inclusion criteria. To increase this number, the bibliographical references of these studies were examined for additional research that met the objectives of this study. In this manner, the final number of articles examined in this study grew to 17.

The following comparison criteria were established: (a) ER process evaluated: strategies and/or skills; (b) AP area evaluated: reading, math and/or general academic competencies (the latter could be cognitive or behavioral; the former referred to, for example, the recall of educational information (such as recall that is cued, general or detailed, etc.) and specific subject-area knowledge. Behavioral comparison criteria refer to, for example, following instructions, finishing tasks, etc.); (c) research design used: ex post facto or correlational and/or experimental; (d) age of sample evaluated: kindergarten children, primary school children, secondary school adolescents and/or university/post-graduate adults; and (e) ER and AP measures used: self-/third-party reporting and/or behavioral indicators.

Of the selected studies, six did not explicitly specify the ER processes they evaluated. To determine these processes, the characteristics of the measurement instruments used were examined. Three of these studies (i.e. Graziano et al., 2007; Howse et al., 2003; Trentacosta & Izard, 2007) used the Emotion Regulation Checklist (Shields & Chichetti, 1997). This instrument has two scales: Negativity and Emotion Regulation. The latter does not specify which aspects of ER are being evaluated; nonetheless, many of its items reveal various ER skills, such as emotion recognition ("Can you tell when you feel sad, angry or afraid?"), distress or frustration tolerance ("Are easily frustrated"; "Can recover from episodes of unease or distress") and delayed gratification ("Is able to delay gratification").

Another study (i.e. Gumora & Arsenio, 2002) used the Task Orientation Scale of the Revised Dimensions of Temperament Scale (DOTS-R; Windle & Lerner, 1986). An analysis of its items shows that they reveal distress or frustration tolerance (e.g. "When I start something, I can stick with it", "I am not easily distracted"). Yet another study (i.e. Bakracevic-Vukman & Licardo, 2010) used Taksic's (2001) Emotion Regulation Questionnaire. The questionnaire could not be reviewed because it is written in the Bosnian language. According to the study's authors (i.e. Bakracevic-Vukman & Ricardo, 2010) this questionnaire is based on the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT) (Mayer, Salovey, Caruso & Sitarenios, 2003). Therefore, the MSCEIT was examined and was found to inquire about emotion recognition and emotion reaction modification skills. Finally, the last of these six studies (i.e. Kwon, Hanrahan & Kupzyk, 2016) used the Rydell, Berlin and Bohlin (2003) Emotion Regulation Scale. This scale measures the intensity of an emotional response and the regulation of emotion. In terms of the latter subscale, the items refer to the ability to calm oneself when experiencing various emotions (e.g. "When my child becomes angry, he/she has difficulty calming down", "When my child is afraid or worried, he/she has difficulty calming down", etc.) and can therefore be regarded as a measure of emotion reaction modification skill.

Lastly, of all the studies selected, only three analyzed the impact of the cognitive reappraisal of anxiety and temptation on AP (i.e. Jamieson, Mendes, Blackstock & Schmader, 2010; Johns, Inzlicht, & Schmader, 2008; Leroy, Grégoire, Magen, Gross, & Mikolajczak, 2012). These subtypes of cognitive reappraisal were considered as emotional management strategies since they imply changing the way of thinking about one's own ability to manage emotional demands (Xu et al., 2015).

Results

The comparison of studies based on the established criteria showed that the most evaluated ER strategy was cognitive reappraisal (seven studies), followed by emotional management (five studies), rumination (two studies), suppression of emotional expression (two studies) and finally cognitive distraction (one study). With respect to skills, the most evaluated ER skill was distress or frustration

tolerance (five studies), followed by emotion recognition (three studies), emotion reaction modification (three studies) and finally delayed gratification (two studies).

In terms of academic subject areas, the majority of studies analyzed the relationship between ER and reading and/or math performance (13 studies), and in four of these studies, behavioral general academic competencies (e.g., finishing tasks, following instructions, etc.) were analyzed in addition to reading and math. In the four remaining studies, the authors focused exclusively on cognitive general academic competencies: recalling educational information (three studies) and specific subject-area knowledge (one study).

With respect to research design, 11 studies were correlational and six experimental. With regard to the age of the samples, four studies evaluated samples of kindergarten children (one of them in combination with primary school children), four evaluated samples of primary school children, five evaluated samples of secondary school adolescents (one in combination with university adults), and six evaluated samples of university adults.

Lastly, to evaluate ER, self- or third-party reporting measures were used in ten studies and behavioral indicators were used in the remaining eight studies (one study used both types of measures in a combined manner). With respect to AP areas, three studies used self- or third-party reporting measures combined with behavioral indicators, while the rest used behavioral indicators exclusively.

In order to more easily compare the nature and results of the various studies, they were divided in two groups based on the ER process they evaluated (see Table 1). The two groups were: the strategy group (STG) and the skills group (SKG).

Table 1. Classification of studies by analysis criteria

Study	ER Process		Area of AP			Design		Sample				ER Measure		AP Measure	
	Strat.	Skill	Read.	Math.	Gnrl.	Corr.	Exp.	Child. Kindergarten	Child. Primary	Adoles. Secondary	Adult Univ.	Self-Rprt.	Behav. Indic.	Self-Rprt.	Behav. Indic.
Ben-Zeev, Fein, & Inzlicht (2005)	X			X			X				X		X		X
Rice, Levine, & Pizarro (2007)	X				X		X	X					X		X
Johns, Inzlicht, & Schmader (2008)	X			X			X				X		X		X
Jamieson et al. (2010)	X		X	X			X				X		X		X
Leroy et al. (2012)	X				X		X				X		X		X
Davis & Levine (2013)	X				X		X	X					X		X
Hafizah & Hafiz (2015)	x				X		x				X		x		X
Xu, Fan & Du (2015)	x			X	X		x			X			x		X

Xu, Fan & Du (2016)	x			X	X	x			X	x			X
Gumora & Arsenio (2002)		X	X	X	X	X			X	X		X	X
Hill & Craft (2003)		X	X	X	X	X		X		X		X	X
Graziano et al. (2007)		X	X	X	X	X		X		X		X	X
Trentacosta & Izard (2007)		X	X	X	X	X		X	X	X			X
Bakracevic-Vukman & Licardo (2010)		X	X	X	X	X			X	X		X	X
Kwon, Narran & Kupzyk (2016)		X	X	X	X	X			X	X			X
Howse et al. (2003)		X	X	X	X	X		X		X	X		X
Ivcevic & Brackett (2014)		X	X	X	X	X			X	X	X		X

Key: Strat.= Strategies, Skill= Skills, Math= Mathematics, Gnrl.= General Academic Competencies, Corr.= Correlational, Exp.= Experimental, Kinder= Kindergarten, Prmry= Primary School, Adoles. Secndry= Adolescents Secondary School, Adult Univ.= Adults University, Self-Rprt= Self-/Third party- reports. Cells shaded dark grey= Strategy Group (STG). X= STG studies with primary school children. Cells shaded light grey= Skills Group (SKG). X= SKG studies with behavioral measures. x= STG subgroup.

Strategy Group Results (STG)

This group was comprised of the nine studies from the total number of selected studies that evaluated ER strategies. The majority of these studies used an experimental design and behavioral indicators such as ER measures (six studies). A subgroup of studies within this group (three) used correlational designs and reporting measures.

With respect to the other comparison criteria, it was observed that samples of university adults predominated (four studies) and only a minority of studies analyzed primary school children (two studies). The correlational studies analyzed secondary school adolescents (two studies) and university adults (one study).

Variations in academic areas were observed. Five studies analyzed performance in mathematics, one of which also analyzed performance in reading and two incorporated behavioral general academic competencies. The four remaining studies analyzed the impact of strategies on cognitive general academic competencies: three of them on the recall of educational material and one on knowledge in the subject of Psychology. All of the studies in this group used behavioral indicators to evaluate AP.

Lastly, in terms of the relationships found between ER and AP, results varied depending on the academic area being evaluated. For example, the implementation of cognitive reappraisal improved performance in math tasks (Been-Zeev, Fein, & Inzlicht, 2005; Jamieson et al., 2010; Johns et al.,

2008), the recall of educational information in adults (Leroy et al., 2012) as well as primary school children (Davis & Levine, 2013), and its self-reported frequency of use was positively correlated with the tendency to complete tasks in the academic subject area (Xu et al., 2015, 2016). However, its implementation did not improve performance in reading tasks (Jamieson et al., 2010), and positive correlations were not observed with its self-reported frequency of use in performance on standardized math tests (Xu et al., 2015, 2016) and on tests of knowledge in a specific subject area (Hafizah & Hafiz, 2015).

With respect to the emotional management strategy, Johns et al. (2008), Jamieson et al. (2010) and Leroy et al. (2012) found that instructing participants to implement this strategy had a positive effect on performance in math tasks (Jamieson et al., 2010; Johns et al., 2008) and in the recall of educational material (Leroy et al., 2012). Using a self-reporting questionnaire, Xu et al. (2015, 2016) observed positive correlations between standardized math test results and emotional management.

In terms of the rumination strategy, only two studies analyzed the effect of its implementation on the recall of educational material in primary school children (Davis & Levine, 2013; Rice, Levine, & Pizarro, 2007). Both studies found that the group of children that implemented this strategy did not show a significant difference in the amount of recalled information compared to the control groups. With regard to the suppression of emotional expression, Johns et al. (2008) demonstrated that the group that implemented this strategy did not perform any better in resolving math problems than did the control group. In other words, the implementation of this strategy did not have a differential impact versus using no strategy. Additionally, Hafizah and Hafiz (2015) found that the suppression of emotional expression correlated positively with grade point average in Psychology majors.

Lastly, distraction was analyzed in one single study. Rice et al. (2007) demonstrated that the implementation of this strategy by primary school children improved the recall of educational material in comparison to the control group and to a group that implemented rumination.

Skills Group Results (SKG)

This group includes the eight studies that evaluated ER skills. Unlike the studies in the STG group, the majority of these studies used correlational designs and self- or third-party reporting ER measures (seven, with one adding behavioral measures; only one study in this group used behavioral ER indicators exclusively).

With respect to the ages of the evaluated samples, this group showed greater variability than the STG group; two of these studies even evaluated two types of samples combined. Researchers analyzed kindergarten children (four studies), primary school children (two studies), secondary school adolescents (three studies) and university adults (one study). In terms of the academic area evaluated, this group had less variability than the STG group; these studies evaluated reading and math, and two of them added evaluations of behavioral academic competencies. Like the STG group, all these studies used behavioral indicators to evaluate AP and three added self- and third-party reporting measures.

In terms of the relationship of ER skills with AP, the results are somewhat uniform. All the studies showed positive correlations between ER skills and AP. Distress and frustration tolerance, emotion recognition, emotion reaction modification and delayed gratification were positively correlated with reading and math performance in samples of varying ages. Additionally, distress tolerance, emotion recognition and delayed gratification were positively correlated with behavioral general academic competencies in kindergarten children (two studies, i.e. Graziano et al., 2007; Hill & Craft, 2003).

Discussion

The goal of this study was to identify the state of the art in terms of the empirical relationship between ER and AP. Based on an analysis, previous studies were divided into two large groups according to the ER process evaluated (STG and SKG), and it was observed that within each group the use of certain research designs and ER measures predominated. The STG group included nine studies that analyzed ER strategies; in this group, experimental design and behavioral measures predominated. The SKG group included eight studies that analyzed ER skills; the majority of them used a correlational design and reporting measures.

With respect to the STG group, the strategies that were evaluated were strategies that have demonstrated consistent correlations with mental health variables in the clinical setting (e.g., Gross, 2014). In the academic setting, however, the results are disparate. For example, in the case of cognitive reappraisal, its implementation improved performance in math tasks (Been-Zeev et al., 2005; Jamieson et al., 2010; Johns et al., 2008) and in the memorization of educational content (Davis & Levine, 2013; Leroy et al., 2012), but not in reading tasks (Jamieson et al., 2010). Additionally, the self-reported frequency of use correlated with the tendency to complete math tasks but not standardized math tests (Xu et al., 2015, 2016) nor in tests on knowledge in a specific subject area such as Psychology (Hafizah & Hafiz, 2015).

It is possible that this disparity is correlated with the type of design used in the study. Studies that observed a positive correlation between cognitive reappraisal and AP implemented experimental designs in which the use of cognitive reappraisal was manipulated in a controlled experimental setting via direct instruction. In correlational studies, cognitive reappraisal was estimated through a self-reporting measure and no correlation with performance objectives was observed. It is possible that the self-perception of frequency of use differs from the real frequency of use.

Further, although performance in reading comprehension was not affected by the implementation of this strategy in the studies reviewed here, it might still benefit from its implementation. Chauncey-Strain and D'Mello (2011) analyzed the role of cognitive reappraisal in reading comprehension. This study is not included in this review because it did not meet the inclusion criterion of publication in a peer-reviewed journal. Nonetheless, it is worth mentioning since its results show that the implementation of cognitive reappraisal by law school students improved reading comprehension versus a control group. Therefore, with respect to cognitive reappraisal, new studies are needed to examine its impact on AP by analyzing the metacognitive processes related to this ER strategy that might be behind the detected discrepancies between the self-reported data and those related with the effective implementation of the strategy.

With respect to the emotion management strategy, the results show that its implementation was correlated with superior performance in math tests (Jamieson et al., 2010; Johns et al., 2008) and the recall of educational material (Leroy et al., 2012). Its self-reported frequency of use was correlated with performance in standardized math tests and the tendency to complete math tasks (Xu et al., 2015, 2016). It is possible that seeing oneself as capable of managing the emotional demands of a situation favors the disposition to persevere in demanding tasks since one may view them as a personal challenge which motivates one to commit to the task. The value of personal effort in academic success has been widely documented in the literature (e.g. Hattie, 2009). However, it still remains to be determined if this strategy is somehow correlated with or impacts performance in math in children and adolescents, as well as in reading comprehension in children and adolescents, as in adults.

With respect to rumination, the results indicate that its implementation has no effect on the amount of educational material recalled when compared to no strategy being implemented (Davis & Levine, 2013; Rice et al., 2007). This might suggest that those individuals that have a tendency to ruminate

over their negative emotional states may benefit from training in adaptive ER strategies (e.g. cognitive reappraisal, cognitive distraction) in an academic setting; this is a challenge for future studies to tackle.

In terms of the suppression of emotional expression, it was found to consume working memory resources (Gross, 2014) and therefore it would be expected to disadvantage academic performance. Surprisingly, however, its implementation did not have differential effects on solving math problems compared to the non-implementation of any strategy, which indicates that its use is not correlated with performance in mathematics. Additionally, contrary to expectations, its frequency of use is positively correlated with grade point average among Psychology majors (Hafizah & Hafiz, 2015). The authors interpreted these results as probably meaning that the suppression of emotional expression helped the students focus on their work and kept them away from potentially distracting social situations. Another possible interpretation of both findings is that the effect of the suppression of emotional expression on academic performance varies according to the intensity of the emotions to be suppressed. In the case of emotions of low to moderate intensity, emotional suppression may allow for attentional focusing on relevant academic content, thus making improved academic performance possible. On the other hand, in situations with elevated emotional intensity, emotional suppression might consume attentional and working memory resources that negatively affect AP. To date, there have not been any studies that have tested this hypothesis. Further, correlations still remain to be established between suppression and performance in other academic areas, such as reading comprehension. Also, its differential effect with respect to other strategies remains to be tested.

Lastly, in primary school children cognitive distraction improved the memorization of educational material compared to a control group (Rice et al., 2007). Rice et al. (2007) suggests that children who had been instructed to distract themselves from emotional content could have done so by minimizing this content or focusing attention on the least emotional aspects of the situation, such as material of an educational nature. Cognitive distraction is a strategy that is considered to have little adaptive value when used frequently by an adult population, since it has been suggested that it could impede an effective confrontation (Watts, 2007); however, it has been found to be positively correlated with health variables in children (e.g. Garnefsky et al., 2007). It would be valuable therefore to further study the effects of the implementation of this strategy in populations of children and in academic areas that are central to scholastic success, such as knowledge in mathematics and reading comprehension (York, Gibson & Rankin, 2015).

In summary, the studies reviewed herein that analyzed the association of ER strategies with AP (i.e. STG) used mostly experimental designs and behavioral ER indicators. Additionally, they showed a preference for analyzing cognitive ER strategies, with the exception of the few that analyzed the suppression of emotional expression (i.e. behavioral). The effect of these strategies in the areas of reading and math is disparate and was only explored in adult participants (Ben-Zeev et al., 2005; Chauncey et al., 2011; Jamieson et al., 2010; Johns et al., 2008). This latter point is noteworthy given that in children and adolescents reading and math skills are in the process of being acquired and consolidated; the study of the effectiveness of these strategies with these populations could therefore aid in the design of interventions to improve AP.

With respect to SKG, the skill that has been evaluated the most is distress or frustration tolerance, followed by emotion recognition, emotion reaction modification and delayed gratification. All of these skills showed positive correlations with reading and math in samples of different age groups. Distress tolerance, emotion recognition and delayed gratification were also positively correlated with behavioral general academic competencies in kindergarten children (Graziano et al., 2007; Hill & Craft, 2003).

The correlation between distress tolerance and AP (Graziano et al., 2007; Howse et al., 2003; Trentacosta & Izard, 2007) is possibly due to the fact that the demands of processing new content, and of engaging in activities that are difficult, demanding and/or prolonged over time, require tolerating the anxiety, frustration and distress that these could generate (Graziano et al., 2007). Emotion recognition

has been correlated with high scores in reading, math and/or behavioral general academic competencies (e.g., Bakracevic-Vukman & Licardo, 2010; Graziano et al., 2007; Tentracosta & Izard, 2007). It is possible that this skill correlates with better AP because awareness of an emotional experience is the first step in its effective regulation, and this facilitates task execution. As stated by Gross (2014), the first factor that helps to effectively regulate an emotion is awareness of that emotion. Future studies could examine the influence of emotion recognition on the selection and implementation of ER strategies and on AP.

With respect to emotional reaction modification, the results show positive correlations with reading and math (Bakracevic-Vukman & Licardo, 2010, Ivcevic & Brackett, 2014, Kwon et al., 2016). The effectiveness of this skill, composed of other processes, depends on each individual's implementation, situation and context (Berking & Whitley, 2014). It is probable that if these skills are effective they can favor the focalization of attention and the processing of educational information (Graziano et al., 2007).

Delayed gratification has been positively correlated with reading, mathematics and/or behavioral general academic competencies in kindergarten and primary school children (Graziano et al., 2007; Trentacosta & Izard, 2007). Studies that looked specifically at "academic delay of gratification" found that students who resist an immediate temptation in order to stay on task achieve better academic results (Galla et al., 2014). It would be valuable to analyze whether delayed gratification and academic delay of gratification make differential contributions to AP, and to use samples of different age groups.

The results of this group (i.e. SKG) should be regarded with caution, however. As Djambazova-Popordanoska (2016) states, many of the studies that analyze the relationship between ER and AP do not detail the specific aspects of ER that they are evaluating. Clarity with respect to the definition of the ER term is fundamental to a study's design, as it influences the selection of measurement instruments and, consequently, the conclusions derived from them.

For example, emotion reaction modification includes other processes in its implementation (Berking & Whitley, 2014) and these are not necessarily defined beforehand, which makes it a challenge to compare results across studies. In terms of measures, there are suitable and specific self-reporting and behavioral measures to evaluate skills in distress tolerance (e.g., Lejuez et al., 2003) and academic delay of gratification (e.g. Galla et al., 2014). Studies with greater specificity in the definition of the ER processes being evaluated would allow for greater precision in the selection of instruments, facilitate comparisons across studies, and thus make it possible to draw more definite conclusions as to the correlations between ER and AP.

In summary, studies that analyzed correlations between ER skills and AP (e.g. SKG) used mostly correlational designs and self- or third-party reporting measures. Additionally, they evaluated a set of ER skills that would benefit from greater conceptual and methodological precision. The correlations found are more or less uniform in the sense that all the skills showed positive correlations with reading and math. However, the recall of educational content is missing from the set of cognitive general academic competencies evaluated in these studies. Considering that this competency is implied in all academic areas, it would be enriching to undertake a study that contemplates this general competency in terms of ER skills.

Finally, in addition to the suggestions for future studies made thus far based on the two groups of studies that were defined herein, the following general recommendations for future research should be kept in mind. First, as Graziano et al. (2007) recommends, when evaluating AP it is of value to include standardized AP measures together with teacher evaluations. For one, standardized tests measure academic learning in the areas included in the curriculum; additionally, they provide a means of comparing children by age group, gender and socioeconomic level. However, these tests have a limited number of items per academic area as well as response formats that inhibit students' expression of knowledge (e.g., multiple choice). For this reason, it is recommended that these measures be complemented with teacher evaluations of student achievement. These provide information on

performance (e.g., comprehension of texts, problem solving, etc.) and behavior in class (e.g., attentional capacity, comprehension of new content, finishes tasks, follows instructions, etc.) that give a more comprehensive and representative vision of AP. However, since these instruments also have their limitations, such as response bias (e.g., children with good interpersonal skills tend to be evaluated as more intelligent by their teachers) it is recommended that they be accompanied by standardized measures (Graziano et al., 2007). Another recommendation is to develop procedures for direct behavioral observation of academic activities in situations that present various levels of stress.

Second, there are other variables that influence the relationship between ER and AP, such as intelligence and executive functions (Graziano et al., 2007), attentional capacity (Tentracosta & Izard, 2007), behavioral issues, type of student-teacher relationship (Graziano et al., 2007; Howse et al., 2003), personality traits (Ivcevic & Brackett, 2014) and socioeconomic level (Gumora & Arsenio, 2002; Hill & Craft, 2003). Keeping these other variables in mind and recognizing their influence will allow researchers to know the unique explanatory contribution of ER on AP.

Final considerations

Under certain circumstances, emotions can consume a good deal of an individual's cognitive resources; therefore, they could limit the attention and memory capacity needed to process educational material. Students capable of regulating their emotions would thus have a performance advantage over those who cannot (Davis & Levine, 2013). The studies reviewed herein show that, in general terms, ER strategies and skills are positively correlated with performance in reading and math tasks, as well as in tasks that demand general competencies, such as following instructions. Educational programs could benefit by transmitting to students a repertoire of ER strategies and skills to help them overcome emotionally demanding academic experiences (Ivcevic & Brackett, 2014). It is hoped that the results of this study might contribute to new research in the area of ER and AP, and that these future studies may aid in the design of ER interventions to improve AP.

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