2016-10-14

Studying Children's Intrapersonal Emotion Regulation Strategies from the Process Model of Emotion Regulation

Lopez-Perez, B

http://hdl.handle.net/10026.1/8224

10.1080/00221325.2016.1230085
The Journal of Genetic Psychology
Informa UK Limited

Running head: EMOTION REGULATION IN CHILDHOOD

Studying Children's Intrapersonal Emotion Regulation Strategies from the Process Model of Emotion Regulation

Belén López-Pérez, Michaela Gummerum, Ellie L. Wilson, & Giulia Dellaria

University of Plymouth

Correspondence concerning this article should be addressed to Belén López-Pérez, School of Psychology, Cognition Institute, University of Plymouth, Drake Circus, Plymouth, PL4 8AA, UK. Electronic mail may be sent to belen.lopez-perez@plymouth.ac.uk

Accepted: 14/10/2016

Embargo period: No current embargo required, author can archive post-print (final draft post-refereeing)

This is the peer-reviewed version of the following article: López-Pérez, B., Gummerum, M., Wilson, E., & Dellaria, G. (2016). Studying Children's Intrapersonal Emotion Regulation Strategies from the Process Model of Emotion Regulation. The Journal of Genetic Psychology, Advanced Online Publication. Doi:10.1080/00221325.2016.1230085, which has been published by Taylor & Francis. This article may not exactly replicate the final version published. It is not the copy of record.

Abstract

The present research relied on the Process Model of Emotion Regulation (PMER, Gross, 2007) to investigate children's abilities to regulate their emotions and to assess how distinct emotion regulation strategies are used by children of different ages. In Study 1, one-hundred and eighty parents of children aged between 3- and 8- years old reported about a situation where their child had been able to change what s/he was feeling. In Study 2 one-hundred and twenty-six 3- to 8-year-old children answered two questions about how they regulate their own emotions. Results from both studies showed age differences in children's reported emotion regulation abilities and the strategies they used. As expected, strategies such as 'situation selection', 'situation modification', and 'cognitive change' were used more frequently by 5-6 and 7-8-year-olds, whereas 'attention deployment' was mainly used by 3-4-year-olds. No age differences were found for 'response modulation'. The present research contributes to the existing body of literature on emotion regulation by adding more information about the developmental patterns for each specific emotion regulation strategy.

Keywords: emotion regulation; childhood; regulation strategies.

Studying Children's Intrapersonal Emotion Regulation Strategies from the Process Model of Emotion Regulation

People make conscious and unconscious efforts to change their own positive and negative emotions, and the way these emotions are expressed (Gross, 2007). These processes have been labelled *emotion regulation* (ER, onwards). ER has received great attention (Gross, 2015), as the use of maladaptive ER strategies has been shown to be a strong predictor of poor academic performance (e.g., Blair, 2002), low social adjustment (e.g., Eisenberg & Fabes, 2006), psychological disorders (e.g., Southam-Gerow & Kendall, 2002), and ineffective interpersonal functioning (e.g., Richards & Gross, 2000).

The Process Model of Emotion Regulation

As noted by Gross (2007), one of the main issues when studying ER is to find a way to organize the possible limitless number of ER strategies. To that aim, research with adults has mainly been conducted under the paradigm of the *Process Model of Emotion Regulation* (PMER; for a review see Gross, 2015). The PMER model relies on the Modal Model of Emotion which considers that the emotion generation process occurs in a particular sequence, and different ER strategies can be categorised on the basis of their temporal location along the emotion generative process (see Figure 1). At the broadest level, actions are classified as *antecedent-focused* (i.e., strategies that are employed before an emotional response has become fully activated) or *response-focused*, (i.e., those adopted after an emotional response has already been generated).

Antecedent-focused strategies involve *situation selection* (i.e., taking actions that make it more or less likely that one will end up in a situation, that will give rise to desirable or undesirable emotions), *situation modification* (i.e., efforts to directly modify the situation to alter its emotional impact), *attentional deployment* (i.e., redirecting one's attention within a

given situation in order to influence one's emotions through concentration or distraction), and *cognitive change* (i.e., modifying how one appraises the situation in order to alter its emotional significance, either by changing how one thinks about the situation or about one's capacity to manage the demands it poses). Finally, response-focused strategies include *modulation of response* (i.e., regulation of emotion-expressive behavior). Thus, by knowing which ER strategy has been activated it is possible to identify what component of the emotional experience has been targeted. However, antecedent-focused strategies may be used as well once the emotion has been partly activated (Gross, 2015). Hence, an individual may be feeling sad and start crying to downregulate his or her physiological response (response modulation) but may also try to think about some positive features of the situation (reappraisal).

The PMER has been useful not only for classifying different ER strategies but also for allowing comparisons between findings from different fields (Gross, 2015). For instance, while early literature on ER pointed to gender differences in emotionality (e.g., Labouvie-Vief et al., 2003), recent research using the PMER has revealed no gender differences when it comes to the use of ER strategies (McRae, Oschner, Mauss, Gabrieli, & Gross, 2008). The PMER model has also been extremely useful for understanding ER findings from clinical populations, such as children and adolescents with high-functioning autism (e.g., Samson, Hardan, Podell, Phillips, & Gross, 2015). Whereas early research focused on the study of a limited number of ER strategies in individuals with autism (e.g., Jahromi, Meek, & Ober-Reynolds, 2012), recent studies relying on the PMER model allowed for a better and wider understanding of ER by analysing different strategies at the same time (Samson, Huber, & Gross, 2012).

Emotion regulation in childhood

Most research on the development of ER has shown that children pass from other-reliant strategies to increasingly active and autonomous ER strategies (Grolnick, McMenamy & Kurowski, 2006). Autonomous ER therefore constitutes an important milestone that (typically developing) children tend to reach during the preschool years (Kopp, 1989). However, research on autonomous ER in children has been conducted using different research methods (e.g., observation, physiological measures, self- and parent-report) and relied on different post-hoc classifications of strategies, which makes it difficult to compare developmental differences in the use of specific ER strategies across studies.

Research on children's use of different ER strategies was initiated by Harris (1989) and Eisenberg and collaborators (e.g., Eisenberg, Fabes, Guthrie, & Reiser, 2000). Harris investigated whether children were able to change not only the expression but also the experience of emotions. Harris (1989) showed that from 3 years of age children use distraction to down-regulate negative affect and that ER became more complex (e.g., passing from playing with a toy to undertaking thought suppression) with age. Eisenberg and colleagues investigated ER in terms of *effortful control*, the ability to inhibit a dominant response through the use of attentional strategies (e.g., distraction) and the modulation of responses (e.g., emotional suppression). Although effortful control has been predictive of children's emotional responses to emotional stimuli (e.g., Eisenberg, Smith, Sadovsky, & Spinrad, 2004), this research has only investigated the strategies of attention deployment and response modulation according to the PMER model, while overlooking other strategies, such as situation selection and reappraisal.

Subsequent studies with children have proposed different classifications of ER strategies (Cole, Dennis, Smith-Simon, & Cohen, 2009; Davis, Levine, Lench, & Quas, 2010; Gilliom, Shaw, Beck, Schonberg, & Lukon, 2002; Harris, 1989; Sala, Pons, & Molina, 2014; Supplee, Skuban, Shaw, & Prout, 2009; see Table 1) which do not target all the components

mentioned in the PMER. For instance, only two of the most recent classifications considered the use of cognitive strategies in children (Davis et al., 2010; Sala et al., 2014). None of these studies considered the component of situation selection, which involves approaching or avoiding a stimulus or a situation to feel a particular way. Although children's approach and avoidance behaviours have been considered as a component of self-regulation (i.e., the ability to inhibit or initiate a response if needed; Dennis, 2006), it has not been considered as a possible ER strategy.

When grouping the findings of different studies according to the PMER (Table 1) we can draw some conclusions concerning the use of ER strategies in childhood. The strategy *situation selection* has been completely overlooked by previous studies. This strategy requires an understanding of the likely features of a situation and its possible outcomes (Gross, 2007). Thus, in order to use the strategy of situation selection an individual needs to have emotional knowledge and be able to undertake affective forecasting (e.g., Denham, Zoller, & Couchoud, 1994). Previous research has suggested that these skills develop with age, showing a significant improvement from the age of 5 to 6 years (e.g., Bassett, Denham, Wyatt, & Warren-Khot, 2012).

Situation modulation captures a wide range of behaviours aimed at modifying the emotional impact of a situation (e.g., when a child asks for help to solve a frustrating puzzle). *Situation modification* has been mainly studied in children as social support seeking, which is used equally in 3-4 and 5-6-year-olds (Sala et al., 2014). However, situation modification might entail other processes such as problem-solving, which so far has only been targeted in Cole et al's (2009) study. They found that 4-year-olds reported this strategy more frequently compared to 3-year-olds. Although social support has been reported equally in different age groups (Sala et al., 2014), we argue that situation modification in ER may be used more often by older children, as it involves being able to separate emotions and goals and the ability to

anticipate possible consequences. These abilities increase with age, with children showing similar levels to those adults at the age of 7 (Amsterlaw, Lagattuta, & Meltzoff, 2009). Furthermore, *situation modification* has been linked to problem-focused coping (Gross, 2007), which is mainly used by older children and adolescents (from 8 years onwards) rather than younger children (e.g., Band & Weisz, 1988).

The strategy *attention deployment* has been investigated by many developmental studies on ER (Table 1). Research has shown that it is one of the first ER processes to appear in very early childhood (Mischel & Ayuduk, 2004). Infants and young children use it to divert their attention from aversive events, and it does not entail very complex socio-cognitive skills (e.g., Stifter & Moyer, 1991). Although research does suggest that attention deployment is still employed in later childhood, adolescence and even in adulthood (Gross, 2006; Harris, 1989), the use of this strategy may decrease with age as individuals may rely more on other strategies such us situation selection, modification, or cognitive change (Diener & Mangelsdorf, 1999; Zimmer-Gembech & Skinner, 2011).

Only two developmental studies have approached the strategy of *cognitive change* (Table 1), finding that it was mainly used by 6-year-old compared to younger children (e.g., Sala et al., 2011). Authors have argued that an increased use of this strategy with age relates to the development of cognitive skills. For instance, in Sala et al.'s (2009) study children who used more cognitive change ER strategies showed better linguistic skills. Furthermore, there are studies which have linked cognitive change to working memory and response inhibition (e.g., Bunge & Wright, 2007; Lewis & Stieben, 2004), which improve over the course of childhood and adolescence, particularly from the age of 8 years.

Finally, *response modulation* has been studied from a developmental perspective as emotional inhibition or suppression. As noted by Gross (2007), this strategy includes

different types of behaviours to target physiological responses that increase or decrease emotion-expressive behaviour. Concerning evidence from developmental studies, results have been mixed as some of them have found emotional suppression to be used less with increasing age (e.g., Gullone, Hughes, Neville, King, & Tonge, 2010), whereas others have suggested the opposite (Eisenberg et al., 2000). Thus, further research is necessary to clarify potential age differences in childhood for this regulation strategy.

In sum, while there is research on the use of different ER strategies from adolescence to late adulthood as well as clinical populations in childhood and adolescence consistent with the PMER (e.g., McRae et al., 2012; Samson et al., 2015), our review of the literature indicated that there is a gap in our knowledge on developmental differences on children's use of specific ER strategies. Overall, the literature reviewed suggest that (1) situation selection needs to be studied in order to determine whether there are age and gender differences for this strategy in childhood; (2) situation modification needs to be studied including behaviors besides social support; and (3) further research is needed to disambiguate existing findings with regards to response modulation in childhood, considering not only emotional inhibition but also emotion expression. Using the PMER framework may allow researchers to explore these lacunas and compare findings across different fields of psychology and to better understand which components of the emotional process children target first when regulating their own emotions.

The Present Research

The present research intended to study age differences in children's use of different ER strategies following the PMER. Based on the literature reviewed above (see also Table 1), we expected that (1) situation selection, situation modification and cognitive change would be used more by older than younger children; (2) that attention deployment would be either

equally used by all age groups (Sala et al., 2009) or used more by younger than older children (see Zimmer-Gembech & Skinner, 2011); (3) given the mixed evidence regarding response modulation we decided to explore developmental differences for this strategy. Finally, we decided to investigate possible gender differences exploratively as previous research has found mixed results. Whereas initial research based on the use of self-reported measures found gender differences with female participants reporting more suppression/response modulation (e.g., Eschenbeck, Kohlmann & Lohaus, 2007; Garnefski, Teerds, Kraaij, Legerstee, Van Den Kommen, 2004), other studies based on the use of other methods, such as the fMRI, did not (e.g., McRae et al., 2008).

Study 1

Study 1 relied on parent reports to obtain information about children's emotion regulation skills and strategies. Although this method may arguably be biased, as recalling situations could be potentially difficult for parents (Levine, Stein, & Liwag, 1999), parental reports seem to be a valid technique for assessing children under the age of seven years (Bilancia & Rescorla, 2010).

Method

Participants

One-hundred and eighty parents accepted to participate in this study and reported on their 3- to 8-year-old children's ER. Specifically, sixty parents reported about children aged between 3 and 4 years old (*M* = 46.03 months; *SD* = 7.20 months); sixty parents reported about children aged between 5 and 6 years old (*M* = 71.05 months; *SD* = 6.48 months); and sixty parents reported about children between 7 and 8 years old (*M* = 94.48 months; *SD* = 6.94 months). Within each age group 30 parents reported about a male child and 30 about a female child. In 99% of cases the mother was the informant. Parents were recruited from middle-class communities in southern England through a participant register at the authors'

institution. We used a stratified random sampling procedure to ensure even numbers for age and gender. Ninety-eight percent of the sample was White-British, with the remaining participants either having an Eastern European or South Asian background.

Procedure

The study received ethical clearance from the university's ethics committee. Parents of children falling into the age range required for the study were contacted through a participant database at the authors' institution. Once parents had consented to take part in the study a link to an online survey was sent. The questionnaire contained: (1) two demographic questions whereby parents had to specify their child's age and gender, (2) one question about any developmental delays (children with developmental delays were excluded from the data analysis) and, (3) one open-ended question that asked parents to describe everyday life situations where their child had shown emotion regulation competence. Specifically, parents were asked about intrapersonal emotion regulation (i.e., *Please describe one situation where your child was able to change how s/he was feeling when feeling negative. If s/he is not able to do it please describe it as well*).

Coding

Parents' responses were coded into numerical values. The variable *regulation* was coded as 0 when parents described that the child could not regulate at all; 1 when parents described that the child could regulate with adult support or help; and finally, 2 when parents described that the child could regulate independently.

Using the definitions of the different strategies of the PMER (see above) each parent's response was coded in any of the following categories: *situation selection*, *situation modification*, *attentional deployment*, *cognitive change*, and *modulation of response*. Please see Appendix A for the definitions and examples of responses coded within each category.

Two independent raters with considerable experience in the PMER classification were trained before coding the actual responses. After the training, coders coded 60 responses, twenty from each age group, to establish inter-rater reliability for the coding system. Raters were blind to the research aims and did not have any information about the participant's age or gender. Inter-rater agreement was excellent, $\kappa = .89$.

Statistical Analyses

To investigate whether children show differences in their ER skills and strategies depending on their age and gender we computed a set of log-linear analyses (see Wickens, 1989). First, the automatic model search of the Statistical Package for the Social Sciences (SPSS 21.0) saturated hierarchical log-linear (hi-log-linear) procedure was run to find the most parsimonious final model. A final model having a value greater than $p = .05$ is considered to be fitting. The model fit (χ^2) of the hi-log-linear procedure is presented in the text. To estimate single parameters (*z* values), a log-linear model was computed.

Results and Discussion

Emotion regulation skills. Table 1 displays the frequency of emotion regulation skills by age and gender. Children of all age groups showed *no regulation* rather infrequently. Because the cell frequencies for *no regulation* were lower than 5 for the 5-6 and 7-8-year-olds, *no regulation* was excluded from the hi-log-linear and log-linear analyses. Consequently, the hi-log-linear and log-linear analyses included the variables Regulation [regulation with help (*r*), regulation on their own], Age group [3-4 years-old (*r*), 5-6 years-old and 7-8 years-old] and Gender [female (*r*), male] with *r* indicating the reference category of each factor for the *z* value. Table 2 displays the significant effects (partial chi-squares) and corresponding parameter estimations (*z* values) for the log-linear analyses. The hi-log-linear analyses produced the final model of Regulation × Age, $\chi^2 = 1.89$, $df = 6$, $p = .93$. Seven and

8-year-olds regulated more on their own, whereas 3-4 and 5-6 regulated more with help (Table 2).

Emotion regulation strategies. Only 28 parents out of 180 reported that their children used more than one strategy (two in all cases) to change their own feelings. All described strategies were included in the analyses. The following analyses do not include those children whose parents reported *no regulation*. If not otherwise indicated, we ran hi-log-linear and log-linear analyses for each strategy including the variables Strategy [not used (*r*), used], Age group [3-4 years-old (*r*), 5-6 years-old, 7-8 years-old] and Gender [female (*r*), male] with *r* indicating the reference category of each factor for the *z* value. Significant effects (partial chi-squares) and corresponding parameter estimations (*z* values) are reported in Table 3.

For *situation selection*, we ran the analyses for the two eldest groups only because the cell frequencies for the youngest group was lower than 5 (see Table 1). The hi-log-linear analyses produced the final model of Situation selection × Age, χ^2 = 1.81, *df* = 4, *p* = .77. Parents of 7- and 8-year-olds reported that their children used the situation selection strategy significantly more often than parents of 5- and 6-year-olds (Tables 2, 3)[1].

For *situation modification*, the hi-log-linear analyses produced the final model of Situation modification× Age, χ^2 = 3.28, *df* = 6, *p* = .77. The log-linear analysis (Table 3) showed non-significant differences between the 3-4 and 5-6 years old. However, children in these age groups were reported to use situation modification strategies significantly less often than the 7-8- year-olds (Table 2).

[1] When considering only the data of children who regulated on their own, only the significant effect of the category emerged for situation modification (χ^2 = 2.75 , *df* = 6, *p* = .84; Z = -6.75), attention deployment (χ^2 = 4.19, *df* = 6, *p* = .65; Z = -6.47), cognitive change (χ^2 = 4.07, *df* = 6, *p* = .65; Z = -3.60), and response modulation (χ^2 = 1.44, *df* = 6, *p* = .96; Z = -4.18).

Concerning *attention deployment*, the hi-log-linear analyses produced the final model of Attention deployment× Age, χ^2 = .51, *df* = 6, *p* = .99. The log-linear analysis showed that the 3-4 years old differed significantly from the other two groups. Thus, parents of 3-4-year-old children reported that their children used this strategy significantly more compared to the other two groups (Table 2).

Regarding *cognitive change*, the hi-log-linear analyses produced the final model of cognitive change× Age, χ^2 = 3.35, *df* = 6, *p* = .76. The log-linear analysis (Table 3) showed that all groups differed from each other. As expected, the use of this strategy was mainly reported to be used by older children (Table 2).

Finally, for *response modulation*, there was only a significant effect of the main category, χ^2 = 3.14, *df* = 10, *p* = .98. The log-linear analyses showed that there were no significant age or gender differences for this category (Table 2).

Overall results showed that older children were reported to regulate their emotions more independently. Regarding the use of specific strategies, younger children were reported to rely on attention deployment, whereas older children were reported to rely more on situation selection and modification, and cognitive change. Finally, results on response modulation showed no age differences. There were no significant gender differences.

Study 2

Study 1 presented some limitations. First, it relied exclusively on a single open-ended question, and we did not control whether the described episode was the most recent, or the most frequent. Furthermore, we did not test children directly which may limit the conclusions in regards to possible developmental differences. In order to overcome these limitations we conducted Study 2 where children reported what they would do to change how they are feeling in a general and in a concrete scenario. We expected that, as in Study 1, older children would report using more situation selection, situation modification and reappraisal and less

attention deployment compared to younger children. For response modulation we explored whether the obtained pattern in Study 1 with parents would be also obtained when using children as informants.

Method

Participants

One-hundred and twenty-six 3- to 8-year-old children participated in this study. Forty-two children aged between 3 and 4 years old (*M* = 44.21 months; *SD* = 6.10 months; 23 females); 42 children between 5 and 6 years old (*M* = 70.10 months; *SD* = 6.75 months; 21 females); and 42 children between 7 and 8 years old (*M* = 92.69 months; *SD* = 7.13 months; 24 females). Children had middle-class background and were recruited from three different schools in two large cities in Spain. All schools were public and located in middle-income neighbourhoods. We used a stratified random sampling procedure to ensure that there would be even numbers for age and gender. Ninety-seven percent of the sample was White, with the remaining participants either having an Eastern European or South American background. We also selected this age range as at the age of 3 children start making correct inferences on the situations that may lead to different emotions (e.g., Widen & Russell, 2003).We decided to put the upper age limit at 8 years as previous studies have shown that 7-8 year olds do not differ from older children in their performance in intrapersonal ER tasks (Simonds, Kieras, Rueda, & Rothbart, 2007).

Procedure

Each child was tested individually after receiving parental consent. A research assistant, blind to the study hypotheses, administered the questions. She was provided with a script and a tape recorder to later transcribe children's responses to the questions. First, children were asked an open-ended question regarding what they usually *do to feel better* when they feel bad. This question may provide information about regulation strategies in

general. Then, each child was read a scenario that described the most mentioned situation by parents (48% of the cases) in Study 1 ("Imagine you cannot do something you really want to such as play with a toy, meet your best friend or go to a place you really like"). After that, the child was asked to rate *how she or he would feel* about that in a scale ranging from very bad, bad, so so, good to very good. Then, the child was asked to describe what she or he *would do to feel better*. This last question was mentioned at the end in order not to bias children's responses to the first question about their own emotional experience. The scenario may allow the testing of whether what children report they usually do is in line with what they say they would do in a concrete situation.

Coding

Children's responses were coded following the same procedure used in Study 1. Please see Appendix B for the examples of responses coded within each category.

Two independent raters, blind to the study aims and with high expertise in the PMER, coded 60 statements, twenty from each age group to establish inter-rater reliability for the coding system. Inter-rater agreement was excellent, $\kappa = .90$.

Results and Discussion

General emotion regulation strategies. Firstly, we analysed children's responses about what they usually do to regulate their own emotions when they feel bad. Only 13 out of 126 children mentioned more than one strategy. All categories identified were included in the analyses. If not otherwise indicated, we ran hi-log-linear and log-linear analyses for each strategy including the variables Strategy [not used (*r*), used], Age group [3-4 years-old (*r*), 5-6 years-old, 7-8 years-old] and Gender [female (*r*), male] with *r* indicating the reference category of each factor for the *z* value. Significant effects (partial chi-squares) and corresponding parameter estimations (*z* values) are reported in Table 5.

For *situation selection*, we ran the analyses for the two eldest groups only because the cell frequency for the youngest group was lower than 5 (Table 4). The hi-log-linear analyses produced the final model of Situation selection× Age, χ^2 = 4.46, *df* = 4, *p* = .62. Seven- and 8-year-old children used the situation selection strategy significantly more often than 5- and 6-year-olds (Tables 4, 5).

For *situation modification*, we ran the analyses for the two eldest groups only because the cell frequency for the youngest group was lower than 5 (Table 4). The hi-log-linear analyses produced the final model of Situation modification× Age, χ^2 = .79, *df* = 4, *p* = .94. The log-linear analysis (Table 5) showed significant differences between the 5-6 and 7-8 year olds. Thus, 7-8 year olds used situation modification strategies significantly more often than the 5-6 year olds (Table 4).

Concerning *attention deployment*, the hi-log-linear analyses produced the final model of Attention deployment× Age, χ^2 = 3.93, *df* = 6, *p* = .69. The log-linear analysis showed that the 3-4 year olds differed significantly from the eldest group. Thus, 3-4-year-old and 5-6 year-old children used this strategy significantly more (Table 4).

Regarding *cognitive change*, we ran the analyses for the two eldest groups only because the cell frequency for the youngest group was lower than 5 (Table 4). The hi-log-linear analyses produced the final model of cognitive change× Age, χ^2 = 5.13, *df* = 6, *p* = .53. The log-linear analysis showed that this strategy was used significantly more by the eldest age group (Table 5).

Finally, for *response modulation*, the hi-log-linear analyses did not produce a significant model for any interaction, only the main effect of category was significant, χ^2 = 5.55, *df* = 10, *p* = .85. The log-linear analyses showed that there were not age or gender differences (Table 5).

Emotion regulation strategies in a concrete scenario. Before analysing the concrete strategies we checked if there were age differences in the children's emotional experience regarding the described episode. Results showed that 3-4-year-olds (M = 1.02; SD =0.15), 5-6-year-olds (M = 1.10; SD =0.30) and 7-8 year-olds (M = 1.12; SD =0.32) reported feeling very bad in the described situation. There were no significant differences between the three age groups (F (2, 124) = 1.41, p =.37).

Concerning children's responses about their emotion regulation strategies in a concrete situation only 17 out of 126 reported more than one strategy. If not otherwise indicated, we ran hi-log-linear and log-linear analyses for each strategy including the variables Strategy [not used (r), used], Age group [3-4 year-olds (r), 5-6 year-olds, 7-8 year-olds] and Gender [female (r), male] with r indicating the reference category of each factor for the z value. Significant effects (partial chi-squares) and corresponding parameter estimations (z values) are reported in Table 5.

For *situation selection*, the hi-log-linear analyses produced the final model of Situation selection× Age, χ^2 = 9.92, df = 10, p = .45. Seven- and 8-year-old children used the situation selection strategy significantly more often than 3- and 4-year-olds (Tables 4, 5). Three and 4-year-olds did not differ from 5- and 6- year-olds.

For *situation modification*, the hi-log-linear analyses produced the final model of Situation modification× Age, χ^2 = 2.45, df = 6, p = .87. The log-linear analysis showed that the 3-4 year olds differed significantly from the eldest group. Thus, 3-4-year-old and 5-6 year-old children used this strategy significantly less than 7-8 year olds (Table 4).

Concerning *attention deployment*, the hi-log-linear analyses produced the final model of Attention deployment× Age, χ^2 = 4.28, df = 6, p = .64. The log-linear analysis showed that the 3-4 year-olds differed significantly from the eldest group. Thus, 3-4-year-olds and 5-6 year-olds used this strategy significantly more (Table 4).

Regarding *cognitive change*, we ran the analyses for the two eldest groups only because the cell frequency for the youngest group was lower than 5 (Table 3). The hi-log-linear analyses produced the final model of cognitive change× Age, $\chi^2 = 1.80$, $df = 4$, $p = .77$. The log-linear analysis (Table 5) showed that the two eldest groups differed from each other. As expected, this strategy was mainly used by the eldest group (Table 5).

For *response modulation*, the hi-log-linear analyses did not produce a significant model for any interaction, only the main effect of category was significant, $\chi^2 = 4.57$, $df = 10$, $p = .92$. The log-linear analyses showed no significant age or gender differences between the different groups (Table 5).

Results from this study showed that, as in Study 1, younger children mainly used attention deployment, whereas older children mainly used situation selection and modification, and cognitive change. Furthermore, as in Study 1 there were no gender differences in the use of the different strategies and no age differences in the strategy response modulation.

General Discussion

The present research investigated age differences in the use of specific ER strategies, based on the PMER (Gross, 2007) through parent-report (Study 1) and children's self-report (Study 2). The results showed age differences in children's reported ability to regulate their own emotions and also in the specific strategies they used. In Study 1, parents reported that most children, including the youngest, were able to use ER strategies. Furthermore, we found that child's dependence on others to regulate their emotions decreases with age. These results correspond with previous research which suggested that children's ER moves from passive other-reliant strategies to increasingly active and autonomous strategies (Grolnick et al., 2006). In Study 2, all children described situations where they regulated their emotions on their own. We believe this is due to the wording of question as we asked children directly

what *they do* to feel better. Future research should consider including other more general questions (e.g., “what would you do in that situation?”) to find out whether the results obtained in Study 1 are replicated when asking children directly.

Concerning the specific strategies described in the PMER (Gross, 2007) the use of situation selection, situation modification, and cognitive change increased with age, as predicted. These strategies require an understanding of the likely emotional features and possible outcomes of an alternative situation (Gross, 2007). That is, the strategies situation selection, situation modification, and cognitive change rely on abilities, such as emotion understanding, emotion representation, and counterfactual reasoning, which increase with age (Beck, Robinson, Carroll, & Apperly, 2006; Denham et al., 1994).

Regarding situation selection, our results add new information because developmental patterns of this strategy have not been considered on previous research on children’s ER. This provides more information about approach and avoidance as forms of emotion regulation and not just as part of self-regulation as previously studied in the developmental literature (e.g., Dennis, 2006).

As hypothesized, the use of attention deployment decreased with age. This result is in line with previous research which found that pre-school children tend to use strategies such as distraction or avoidance, whereas children in middle-childhood start using more sophisticated strategies such us reappraisal (Zimmer-Gembech & Skinner, 2011). It is noteworthy that although the PMER model outlines situational strategies (i.e., situation selection and modification) at the beginning of the emotion generative process and attentional strategies (i.e., distraction vs. concentration) in the middle, it seems that the developmental pattern does not correspond with this.

Finally, we did not find age differences in the use of the response modulation strategy. Given that this strategy comprises different types of behaviour (suppression vs. expression of

the emotional experience) future research would need to consider subcategories to elucidate the possible developmental pattern of this strategy. Taken together our results appear to support the idea that certain antecedent-focused strategies (e.g., cognitive change) replace others (i.e., attention deployment) with increasing age (Zimmer-Gembech & Skinner, 2011).

Despite some controversy about the use of parent-report to study children's emotions or behaviours (Levine et al., 1999) we found very similar results in both studies (i.e., parent-report and children's report). Furthermore, when looking at Study 2, we found no differences between the results where children report about what they generally do to feel better and what they do in a concrete scenario. This result supports the existence of a coherent developmental pattern in the use of emotion regulation strategies.

We did not find any gender differences in the use of ER strategies, consistent with previous research (McRae et al., 2008). However, as we discussed before, there are conflicting results as other studies found such differences (e.g., Eschenbeck et al., 2007; Garnefski et al., 2004). Hence, more research should be conducted to determine whether there are gender differences in the use of the different strategies highlighted in the PMER model.

Overall, our results showed how children used a wide range of ER strategies relying on previous research using the PMER. With regards to the emotion generation process overall our results suggest that older children may use strategies that impact their emotional response at different stages of the emotion process, whereas younger children tend to regulate their emotional responses mainly at the attentional stage. We are not suggesting that children do not use certain strategies as they get older but that their repertoire becomes more complex targeting a wider spectrum of points in the emotion generative process to actually change their feelings (see Sala et al., 2009). Denham (1998) proposed that preschool children may

start using strategies that require more complex social and cognitive processes, but would use simpler strategies if complex ones did not work.

The finding that younger children differ from older ones (and potentially adults) with regards to the ER strategies they use may also have implications for the modal model of emotion and the PMER, as the sequence of the emotion-generative process and emotion regulation strategies described in these models may not apply to young children because attention strategies are used before than situational strategies. Although the PMER does not reflect the use of strategies depending on the frequency (but the stage at which the regulatory strategy impacts the emotional response), this model should consider that the pattern(?) of strategies may be different for the infancy and childhood periods. Children's emotion understanding as well as problem-solving skills may play an important role in the acquisition and use of strategies such as situation selection and modification and cognitive change and therefore their link should be studied further.

Limitations and future research

One important limitation of Study 1 is that in most cases (99%) the mother was the person who reported about the child. It would be necessary to study whether there are similarities or differences between parents when reporting about their child's emotion regulation. Previous studies have differentiated between emotion-coaching parents, that is, parents who see their children's negative emotions as opportunities for learning, and emotion-dismissing parents, that is, parents who see their children's negative emotions as emotional responses to be denied or neglected (Gottman, 2012). Thus, future research should test if there are differences in the children's use of strategies according to different approaches taken by parents to help children regulate their emotions. We would expect children with emotion-coaching parents to exhibit more complex ER strategies, such as situation selection, situation modification, or cognitive change.

Concerning Study 2 an important limitation is that we did not investigate further children's regulation skills, that is, whether children can regulate independently or not and how this affects the strategies they may use. As we acknowledged before, the type of questions used in that study induced children to report about independent emotion regulation.

One important limitation of both studies is that different strategies may be used depending on the type and intensity of emotion felt (Dixon-Gordon, Aldao, & De Los Reyes, 2015). For example, previous research with adults has shown that when feeling high-intense sadness adults used suppression/response modulation to a greater extent compared to???. Therefore, future research should control for this factor when analysing developmental differences in the use of different regulation strategies.

In spite of these limitations, our results open the door to two possible paths of research. The first could be aimed at testing the developmental changes in the use of specific ER strategies through longitudinal and cross-sectional studies which test the role of variables such as emotion understanding in children's ER. Along these lines, future research should also consider parents' antecedent-focused strategies, that is, why and when parents display different behaviours to make or avoid their child feeling a certain way (e.g., selecting what films the child can watch to avoid him/her feel frightened or distressed). Previous developmental research has focused exclusively in children's regulatory skills and it may be important to understand how parents' regulate children's emotion as this may play an important role in how children regulate their own emotions themselves. The second may be focused on the relationship of specific ER strategies and variables critical for adaptive ER, such as parents' good ER skills or safe attachment (e.g., Waters et al., 2010).

Implications

Most research on ER strategies in adults has been based on the PMER model and it has established that the differences between strategies are not only at a temporal level but

also impact possible outcomes (in terms of being either adaptive or maladaptive). When focusing on children and adolescents, previous research with typically developing children has not considered the PMER in their analysis of children's ER strategies as the only studies conducted under the PMER framework have investigated children and adolescents with high-functioning autism (Samson et al., 2015). We believe that using the PMER allows researchers to compare findings in typically and non-typically developing children, to study the developmental trajectories of the different strategies, to assess the relationship of each strategy with adaptive and maladaptive outcomes, and to identify cognitive, social, and contextual correlates in the use of different ER strategies.

Furthermore, our results highlight the importance of integrating knowledge from different domains in the study of ER in developmental psychology. Most research on ER in childhood has defined ER in terms of self-control, understanding that ER in children is the ability to inhibit a certain response (e.g., Eisenberg et al., 2004). However, as discussed above, ER is more than self-control as it includes not only a behavioural component but a cognitive one (Gross, 2007). Thus, considering theoretical frameworks developed in the field of emotion research can be extremely useful to broaden the scope of the research conducted on ER in childhood as it would allow researchers to test the replicability of the existing findings focused on the adaptive/maladaptive outcomes of different ER strategies in adults.

Besides these theoretical contributions, the current research has applied implications. Understanding the developmental patterns of concrete ER strategies may help in assessing possible developmental delays and prevent maladjustments due to problems in ER. For example, currently one indicator for the diagnosis of certain disorders, such as autism or attention deficit hyperactivity disorder, is low ER skills (Schipper & Petermann, 2013). However, this does not take into account which type of ER strategy is used in an atypical way. In fact, a recent study has shown how children and adolescents with Asperger mainly

use suppression (i.e., modulation of response) and rarely reappraisal in their intrapersonal ER (Samson et al., 2015). Thus, focusing on concrete emotion regulation strategies would be more efficient in terms of targeting specific needs not just in atypically but also typically developing children.

References

Amsterlaw, J., Lagattuta, K.H., Meltzoff, A.N. (2009). Young children's reasoning about the effects of emotional and physiological states on academic performance. *Child Development, 80*, 115–133.

Band, E., & Weisz, J. (1988). How to feel better when it feels bad: Children's perspectives on coping with everyday stress. *Developmental Psychology, 24*, 247-253.

Bassett, H. H., Denham, S. A., Wyatt, T., & Warren-Khot, H. K. (2012). Refining the Preschool Self-Regulation Assessment (PSRA) for use in preschool classrooms. *Infant and Child Development, 21*, 596–616.

Beck. S.R., Robinson, E.J., Carroll, D.J, & Apperly, I.A. (2006). Children's thinking about counterfactuals and future hypotheticals as possibilities. *Child Development, 77*, 413-426.

Bilancia, S. D. & Rescorla, L. (2010). Stability of Behavioural and Emotional problems over 6 years in children ages 4 to 6 or 6 to 7 at Time 1. *Journal of Emotion and Behavioural disorders, 18*, 149-161.

Blair, C. (2002). School readiness: Integrating cognition and emotion in a neurobiological conceptualization of children's functioning at school entry. *American Psychologist, 57*, 111-127.

Bunge, S.A., & Wright, S.B. (2007). Neurodevelopmental changes in working memory and cognitive control. *Current Opinion in Neurobiology, 17*, 243-250.

Cole, P.M., Dennis, T.A., Smith-Simon, K.E., & Cohen, L.H. (2009) Preschoolers' Emotion Regulation Strategy Understanding: Relations with Emotion Socialization and Child Self-regulation. *Social Development, 18*, 324–352.

Davis, E. L., Levine, L. J., Lench, H. C., & Quas, J. A. (2010). Metacognitive emotion regulation: children's awareness that changing thoughts and goals can alleviate negative emotions. *Emotion, 10,* 498-510.

Denham, S. (1998). *Emotional development in young children*. New York: Guilford Press.

Denham, S. A. Bassett, H. H., Mincic, M.M., Kalb, S. C., Way, E., Wyatt, T., & Segal, Y. (2012). Social-emotional learning profiles of preschoolers' early school success: A person-centered approach. *Learning and Individual Differences, 22,* 178–189.

Denham, S.A., Zoller, D., Couchoud, E.A. (1994). Socialization of preschoolers' emotion understanding. *Developmental Psychology, 30,* 928-936.

Dennis, T. (2006). Emotional self-regulation in preschoolers: The interplay of child approach reactivity, parenting, and control capacities. *Developmental Psychology, 42,* 84–97.

Diener, M.L., & Mangelsdorf, S.C. (1999). Behavioral strategies for emotion regulation in toddlers: Associations with maternal involvement and emotional expressions. *Infant Behavior and Development, 22,* 569-583.

Dixon-Gordon, K. L., Aldao, A., & De Los Reyes, A. (2014). Repertoires of emotion regulation: A person-centered approach to assessing emotion regulation strategies and links to psychopathology. *Cognition and Emotion, 29,* 1314– 1325

Eisenberg, N., & Fabes, R. (2006). Emotion regulation and children's socioemotional competence. In L. Balter & C. Tamis-LeMonda (Eds.), Child psychology: A handbook of contemporary issues (2nd ed., pp. 357–381). New York, NY: Psychology Press.

Eisenberg, N., Fabes. R. A., Guthrie. I. V., & Reiser. M. (2000). Dispositional emotionality and regulation. The role in predicting quality of social functioning. *Journal of Personality and Social Psychology, 78,* 136-157.

Eisenberg N, Smith CL, Sadovsky A, Spinrad TL. (2004). Effortful control: Relations with emotion regulation, adjustment, and socialization in childhood. In: Baumeister RF, editor. *Handbook of self-regulation: Research, theory, and applications*. Guilford Press; New York: pp. 259–282.

Eschenbeck, H., Kohlmann, C.W., Lohaus, A. (2007). Gender differences in coping strategies in children and adolescents. *Journal of Individual Differences, 28,* 18-26.

Garnefski, N., Teerds, J., Kraaij, V., Legerstee, J., & Van Den Kommer, T. (2004). Cognitive emotion regulation strategies and depressive symptoms, differences between males and females. *Personality and Individual Differences, 36,* 267–276.

Gilliom, M., Shaw, D. S., Beck, J. E., Schonberg, M. A., & Lukon, J. L. (2002). Anger regulation in disadvantaged preschool boys: Strategies, antecedents, and the development of self-control. *Developmental Psychology, 38*, 222–235.

Gottman, J. M. (2012). *The science of trust: Emotional attunement for couples*. Norton & Company: London.

Grolnick, W.S., McMenamy, J.M., & Kurowski, C.O. (2006). Emotional self-regulation in infancy and toddlerhood. In L. Balter & C.S. Tamis-LeMonda (Eds.), *Child psychology: A handbook of contemporary issues*, 2nd edn (pp. 3–25). New York: Psychology Press.

Gross, J.J. (2015). Emotion regulation: current status and future prospects. *Psychological Inquiry, 1*, 1-26.

Gross, J.J. (2007). *Handbook of emotion regulation*. New York: Guilford Press.

Gullone, E., Hughes, E. K., King, N. J., & Tonge, B. (2010). The normative development of emotion regulation strategy use in children and adolescents: a 2-year follow-up study. *Journal of Child Psychology and Psychiatry, 51*, 567–574.

Harris, P.L. (1989). The control of emotion. *Children and Emotion* (pp. 149-172). New York: Blackwell.

Jahromi, L. B., Meek, S. E., & Ober-Reynolds, S. (2012). Emotion regulation in the context of frustration in children with high functioning autism and their typical peers. *Journal of Child Psychology and Psychiatry, 53*, 1250–1258.

Kopp, C. (1989). Regulation of distress and negative emotions: A developmental view. *Developmental Psychology, 25*, 343–354.

Labouvie-Vief, G., Lumley, M. A., Jain, E., & Heinze, H. (2003). Age and gender differences in cardiac reactivity and subjective emotion responses to emotional autobiographical memories. Emotion, 3, 115–126.

Levine, L. J., Stein, N. L. & Liwag, M. D. (1999). Remember children's emotions. Sources of concordant and dis-concordant accounts between parents and children. *Developmental Psychology, 25*, 790-801.

Lewis, M.D., & Stieben, J. (2004). Emotion regulation in the brain: Conceptual issues and directions for developmental research. *Child Development, 75*, 371–376.

McRae, K., Ochsner, K. N., Mauss, I. B., Gabrieli, J. J. D., & Gross, J. J. (2008). Gender differences in emotion regulation: An fMRI study of cognitive reappraisal. *Group Processes & Intergroup Relations, 11*, 143–162.

Mischel, W., & Ayduk, O. (2004). Willpower in a cognitive-affective processing system: The dynamics of delay of gratification. In K.D. Vohs & R.F. Baumeister (Eds.), *Handbook of self-regulation: Research, theory, and applications* (pp. 99–129). New York: Guilford Press.

Richards, J. M., & Gross, J. J. (2000). Emotion regulation and memory: the cognitive costs of keeping one's cool. *Personality Processes and Individual Differences, 79*, 410-424.

Sala, M. N., Pons, F., & Molina, P. (2014). Emotion regulation strategies in preschool children. *British Journal of Developmental Psychology, 32*, 440-453.

Samson, A. C., Hardan, A. Y., Podell, R. W., Phillips, J. M., & Gross, J. J. (2015). Emotion regulation in children and adolescents with Autism Spectrum Disorder. *Autism Research, 8*, 9–18.

Samson, A. C., Huber, O., & Gross, J. J. (2012). Emotion regulation in Asperger's Syndrome and high functioning autism. *Emotion, 12*, 659–665.

Simonds, J., Kieras, J. E., Rueda, M. R., & Rothbart, M. K. (2007). Effortful control, executive attention, and emotional regulation in 7–10-year-old children. *Cognitive Development, 22*, 474–488.

Schipper, M., & Petermann, F. (2013). Relating empathy and emotion regulation: Do deficits in empathy trigger emotion dysregulation? *Social Neuroscience, 8*, 101-107.

Southam-Gerow, M. A., & Kendall, P. C. (2002). Emotion regulation and understanding: Implications for child psychopathology and therapy. *Clinical Psychology Review, 22*, 189–222.

Stifter, C.A., & Moyer, D. (1991). The regulation of positive affect: Gaze aversion activity during mother-infant interaction. *Infant Behavior and Development, 14*, 111–123.

Supplee, L. H., Skuban, E. M., Shaw, D. S., & Prout, J. (2009). Emotion regulation strategies and later externalizing behavior among European American and African American children. *Development and psychopathology, 21*, 393-415.

Waters, S. F., Virmani, E. A., Thompson, R. A., Meyer, S., Raikes, A., & Jochem, R. (2010). Emotion regulation and attachment: Unpacking two constructs and their association. *Journal of Psychopathology and Behavioral Assessment, 32*, 37–47

Wickens, T. P. (1989). *Multiway Contingency Tables Analysis for the Social Sciences*. Hillsdale, NJ: Lawrence Erlbaum.

Widen, S.C., & Russell, J.A. (2003). A closer look at preschoolers' freely produced labels for facial expression. *Developmental Psychology, 39*, 114–128.

Zimmer-Gembeck, M. J., & Skinner, E. A. (2011). The development of coping across childhood and adolescence: An integrative review and critique of research. *International Journal of Behavioral Development*, 35, 1-17.

Table 1

ER strategies previously identified in the literature and their correspondence with the PMER strategies

	PMER Gross (2007)	Harris (1989)	Eisenberg et al. (2000)	Gilliom et al. (2002)	Cole et al. (2009)	Supplee et al. (2011)	Sala et al. (2014)	Davis et al. (2010)
	Situation selection Situation modification			Physical comfort	Problem-focused	Emotion-focused active and Playful strategies	Social Support	Primary and Secondary social support / Goal restitution and forfeiture /Agent-focused strategies
Strategies	Attention deployment	Attention shift	Attention shift	Active distraction/ focus on delayed object	Self-focused internal	Emotion-focused active and passive	Attention deployment	
	Cognitive change						Cognitive reappraisal	Metacognitive strategies and Goal reinstatement
	Response modulation	Control of the expressive response	Behaviour and emotional inhibition	Self-soothing	Self-focused external		Behavioural strategies	
Age groups	Adults	12 months	3 to –year-	Longitudinal	3-4-year-olds	18 to 24	3-4 and 5-6-	5-6-year-olds

	to 6-year-olds	olds	from 18 months to 6 year-olds	months	year-olds

Table 2

Frequencies of Regulation Skills and Strategies per Age Group

	3-4 years-old	5-6 years-old	7-8 years-old	Male	Female
No regulation	5 (63%)	2 (25%)	1 (12%)	4 (50%)	4 (50%)
Regulation with help	30 (44%)	23 (33%)	16 (23%)	33 (48%)	36 (52%)
Regulation on their own	25 (24%)	35 (34%)	43 (42%)	52 (51%)	51 (49%)
Regulation with help and on their own					
Situation selection	2 (7%)	7 (26%)	18 (67%)	12 (44%)	15 (56%)
Situation modification	7 (20%)	10 (29%)	18 (51%)	15 (41%)	21 (59%)
Attention deployment	13 (58%)	8 (27%)	5 (15%)	16 (49%)	17 (51%)
Cognitive change	7 (15%)	16 (34%)	24 (51%)	27 (58%)	20 (43%)
Response modulation	19 (37%)	18 (35%)	14 (28%)	26 (51%)	25 (49%)
Regulation on their own					
Situation selection	2 (15%)	3 (23%)	8 (62%)	6 (46%)	7 (54%)
Situation modification	3 (21%)	5 (36%)	6 (43%)	6 (43%)	8 (57%)
Attention deployment	7 (44%)	5 (31%)	4 (25%)	9 (56%)	7 (44%)
Cognitive change	3 (12%)	9 (36%)	18 (52%)	14 (56%)	11 (44%)
Response modulation	12 (38%)	13 (41%)	7 (21%)	15 (47%)	17 (53%)

Table 3

Results of Log-Linear Analyses for Regulation and Regulation Strategies

Effects and interactions	*Df*	Partial χ^2	*p*	*z* value
Regulation × Age	2	9.19	.01	.44
				2.96
Regulation Strategies				
Situation selection × Age	1	6.29	.01	2.41
Situation modification × Age	2	6.66	.04	.73
				2.40
Attention deployment × Age	2	11.80	.003	-2.18
				-3.04
Cognitive change × Age	2	12.83	.002	1.97
				3.33
Response modulation	1	34.23	.001	

Note: Note that the number of *z* values corresponds to the degrees of freedom of the tested effects; *z* values with absolute values greater than 1.96 are significant ($p < .05$).

Table 4

Frequencies of Regulation Strategies for the General Question and the Concrete Scenario per Age Group

		3-4 years-old	5-6 years-old	7-8 years-old	Male	Female
General Question	Situation selection	2 (7%)	10 (32%)	19 (61%)	14 (45%)	17 (55%)
	Situation modification	3 (14%)	7 (26%)	16 (60%)	13 (50%)	13 (50%)
	Attention deployment	21 (49%)	15 (35%)	7 (16%)	23 (54%)	29 (46%)
	Cognitive change	0 (0%)	7 (33%)	14 (67%)	13 (62%)	8 (38%)
	Response modulation	9 (39%)	8 (35%)	6 (26%)	11 (48%)	12 (52%)
Concrete Scenario	Situation selection	5 (18%)	9 (32%)	14 (50%)	16 (57%)	12 (42%)
	Situation modification	6 (21%)	7 (24%)	16 (55%)	16 (55%)	13 (44%)
	Attention deployment	22 (54%)	14 (34%)	5 (12%)	16 (39%)	25 (61%)
	Cognitive change	1 (5%)	5 (25%)	14 (70%)	9 (45%)	11 (55%)
	Response modulation	10 (40%)	7 (28%)	8 (32%)	12 (48%)	13 (52%)

Table 5

Results of Log-Linear Analyses for Regulation Strategies for the General Question and the Concrete Scenario

Effects and interactions	*Df*	Partial χ^2	*p*	*z* value
General Question				
Situation selection × Age	1	4.46	.04	2.02
Situation modification × Age	1	5.09	.02	2.16
Attention deployment × Age	2	11.35	.003	-1.31
				-3.12
Cognitive change × Age	1	4.03	.05	1.97
Response modulation	1	54.92	.001	
Concrete Scenario				
Situation selection × Age	2	5.45	.05	1.11
				2.29
Situation modification × Age	2	7.63	.02	.33
				2.46
Attention deployment × Age	2	16.04	.001	-1.68
				-3.26
Cognitive change × Age	1	6.02	.01	2.25
Response modulation	1	49.13	.001	

Note: Note that the number of *z* values corresponds to the degrees of freedom of the tested effects; *z* values with absolute values greater than 1.96 are significant ($p < .05$).

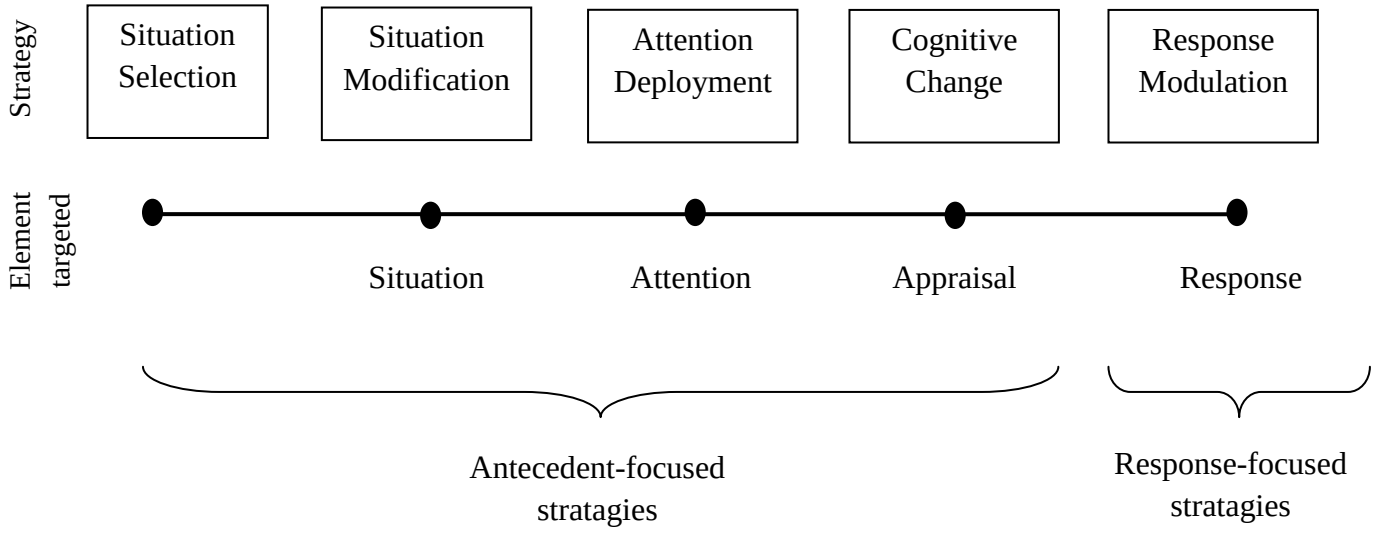

Figure 1. Illustration of the Process Model of Emotion Regulation (Gross, 2002)

Appendix A

Definitions used for Coding and Example of Responses Coded in each Category

Name of the Strategy	Definition and Examples provided to the Coders	Example of responses categorized in each strategy
(1) Situation selection	It involves any action that a person may take to make sure s/he will end up in a desired or undesired situation (e.g., choosing to go or not to a party)	- "When he knows he's going to get angry he goes to a chair on the landing next to the bookcase".
(2) Situation modification	It implies any action to change how one feels in a certain situation (e.g., talking to a friend in the party or staying alone in a corner)	- "After arguing with her sister she decided to apologize about what happened".
(3) Attention deployment	It consists on either focusing or diverting the attention from a situation to change how one feels (e.g., focusing on the music of the party)	-"She got very upset […] but found her baby dolls and distracted herself down by playing with them".
(4) Cognitive change	It implies to change the way one thinks about a situation, giving a more positive meaning to the situation (e.g, thinking the party is a good opportunity to meet new people)	-"He was very upset that an event at school was cancelled but he talked it through logically […] he became much more positive and hopeful about it through discussion"
(5) Response modulation	It involves either expressing or not showing how one feels (e.g., crying vs. hiding that one is feeling nervous about going to the party)	"When he feels in a silly/naughty mood he takes a deep breath and blows out slowly to calm down".

Appendix B

Example of Responses Coded in each Category for the General Question and the Concrete Scenario

Type of Question	Name of the Strategy	Example of responses categorized in each strategy
General	Situation selection	"When I feel bad I go to my bedroom to calm down"
	Situation modification	"When I feel bad I sometimes talk to my mum about it"
	Attention deployment	"When I feel bad I play with my toys or watch a film"
	Cognitive change	"When I feel bad I think what happened it is not that bad"
	Response modulation	"When I feel bad I cry"
Concrete Scenario	Situation selection	"I would lock myself in my bedroom to calm down (…) and would not eat the food unless it's the one I wanted"
	Situation modification	"If this would happen to me I would ask mummy for a hug to feel better"
	Attention deployment	"I would make bracelets or play with my dolls to feel happy again"
	Cognitive change	"I would think there are lots of nice things to do"
	Response modulation	"I would scream and cry (…) at least this would make me feel little bit better"