Emotion regulation and well-being in primary classrooms situated in low-socioeconomic communities

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Abstract

Background

Although emotion is central to most models of children's well-being, few studies have looked at how well-being is related to the ways in which children regulate their emotions.

Aims

The aim of this study was to examine the associations among children's emotion regulation strategy choice and their emotional expression, behaviour, and well-being. The study also investigated whether contextual factors influenced the emotion regulation strategies children chose to use.

Sample

Participants (N = 33) were selected from four Year 5/6 composite classrooms situated in low socioeconomic urban communities in New Zealand

Method

Questionnaires were used to measure children's well-being and teacher-reported emotional and behavioural problems. Emotional expression and emotion regulation strategies were measured through video-recorded observations in the classroom. 1184 instances of emotion regulation strategy use were coded using a framework based on Gross' process model of emotion regulation.

Results

The findings highlight the complexity of the relations among emotion regulation, emotion expression, and well-being. Some strategies, such as *Cognitive Reappraisal,* were effective at up-regulating negative emotion in the short term, yet not strongly associated with well-being.

Others, such as *Situation Modification: Physical* were positively associated with well-being, yet not with an immediate change in a child's emotional experience. The findings also suggest children flexibly use different strategies in relation to different contextual demands.

Conclusion

These findings may be used to guide future intervention efforts which target emotion regulation strategy use as well as those which focus on teachers' support of children during emotionally challenging situations.

Background

Children living in socioeconomically disadvantaged communities face a wide range of stressors that are qualitatively and quantitatively different from those experienced by children from more privileged homes (Buckner, Mezzacappa, & Beardslee, 2009). The link between poverty and elevated rates of emotional and behavioural problems has been well documented (Bradley & Corwyn, 2002; Shaw & Shelleby, 2014; Yoshikawa, Aber, & Beardslee, 2012). One of the most widely examined and influential explanations for this relationship is that poverty leads to increased levels of stress in the child's environment, which in turn has a negative impact on their social, emotional, and cognitive development (Shaw & Shelleby, 2014). These stressors may be at the community level, such as exposure to violence (Fowler, Tompsett, Braciszewski, Jacques-Tiura, & Baltes, 2009); in the home, such as harsh and inconsistent discipline (Margolin & Gordis, 2004); or at school, such as academically challenging tasks, test taking, and interpersonal conflict (Berger et al., 2017; Pekrun, Goetz, Titz, & Perry, 2002).

Having the capacity to effectively regulate the negative emotion associated with these challenging events is likely to protect children against longer-term problems of mental health and well-being. Emotion regulation is the term used to describe the processes involved in modifying the experience and expression of emotion (Gross, 1998b). Koole (2009) describes emotion regulation as "one of the most far-ranging and influential processes at the interface of cognition and emotion" (p. 4). Indeed, the inability to regulate one's emotions has been linked to the majority of mental disorders in the *Diagnostic and Statistical Manual for Mental Disorders* (Berking & Whitley, 2014).

Models of Emotion Regulation

A number of different frameworks have been developed to conceptualise the ways in which individuals regulate their emotions. Koole's (2009) model posits that emotion regulation serves multiple functions, including the satisfaction of hedonic needs (need-oriented), facilitation of specific goals and tasks (goal-oriented), and optimisation of personality functioning (person-oriented)" (p.15). Each of these functions may target the individual's attention, knowledge, or bodily expression of emotion. In terms of how this model relates to well-being, Koole (2009) argues that need-oriented functions are important for short-term changes in well-being, while person-oriented functions are more likely to lead to longer-term changes in well-being. Parkinson and Totterdell (1999) use the term *affect regulation* and focus on only the conscious and deliberate aspects of emotion regulation. They devised a comprehensive classificatory system of regulatory strategies which, at its highest level, groups all strategies into either a cognitive or behavioural category. Larsen (2000) uses the term *mood regulation* and identifies several distinctions between mood and emotion. Most of these distinctions describe differences of degree rather than kind, for example, moods are typically longer in duration and less intense than emotions. Larsen also links regulatory behaviours with well-being, arguing that there are two routes to improving well-being: increasing pleasant affect or decreasing unpleasant affect, both of which can be achieved through effective emotion regulation.

The most widely cited framework to date is Gross' process model (Gross, 1998a; 2015). Gross defines emotion regulation as "all of the conscious and non-conscious strategies we use to increase, maintain, or decrease one or more components of an emotional response" (2001, p. 215). He places five different families of emotion regulation strategies on a temporal dimension (see Figure 1).

INSERT FIGURE 1 ABOUT HERE

The horizontal line in Figure 1 represents the temporal dimension of the emotion generation process, where a psychologically relevant situation presents itself, is attended to, appraised by the individual, and followed by an emotional response. The arrow below the time sequence depicts the recursive aspect of emotion, in which the emotional response changes the original situation. The five labels and vertical arrows at the top of the figure represent the five families of emotion regulation processes and the point in time at which they intervene in the emotion generation process (Gross, 2014). Processes 1 to 4 are described as being antecedent focused, as they occur before the emotion response tendencies are fully activated, and Process 5 is described as response focused, as it occurs once the emotions have already been generated.

These different strategies are likely to lead to different consequences. For example, an antecedent-focused strategy, such as cognitive reappraisal (which falls under the umbrella term cognitive change), occurs early in the emotion generation process and therefore has the potential to alter the entire trajectory of the process. Additionally, the model assumes this strategy will alter both the experience and expression of emotion. Conversely, suppression (which falls within the response modulation family of strategies) occurs late in the process and targets only the expression of emotion and not the experience.

In terms of longer-term consequences, Gross and John (2003) have argued that the daily use of more adaptive antecedent-focused strategies, which alter both the experience and expression of emotion, will have cumulative benefits for well-being. Conversely, frequent use of maladaptive response focused strategies, such as suppression, which only alter the expression of emotion, will lead to cumulative costs.

Indeed, studies of adult well-being have shown that individuals who frequently use reappraisal emotion regulation strategies have higher self-esteem, feel more satisfied with life, and show fewer symptoms of depression, whereas frequent suppressors are typically less satisfied with life, have lower self-esteem, and are less optimistic (Gross & John, 2003; Schäfer, Naumann, Holmes, Tuschen-Caffier, & Samson, 2017). Although numerous studies have examined the effectiveness of cognitive reappraisal and suppression strategies, (Gresham & Gullone, 2012; Gross & John, 2003; Gullone & Taffe, 2012; Perrone-McGovern, Simon-Dack, Beduna, Williams, & Esche, 2015; Troy, Shallcross, & Mauss, 2013); relatively few studies have looked at the effectiveness of the other families of emotion regulation strategies.

Similarly, little attention has been paid to the conditions under which different emotion regulation strategies are effective. One exception is Troy et al's (2013) study which examined whether emotion regulation strategy effectiveness was dependent upon the type of stressful event that elicited the negative emotion. They found that cognitive reappraisal was associated with lower levels of depression in situations in which adults were dealing with uncontrollable stress and higher levels of depression when individuals had a degree of control over the stressful situation. This finding highlights the need for emotion regulation to be examined within a particular situation or context.

Children's Emotion Regulation

Much of the child-focused emotion regulation research examines extrinsic, behavioural aspects of emotion regulation during the early developmental stages. Far fewer studies have focused on emotion regulation in middle childhood (Gullone & Taffe, 2012). The limited evidence available suggests that children of this age rely less on support seeking and more on cognitive and behavioural problem solving strategies (Denham, Salisch, Olthof, Kochanoff, & Caverly, 2002).

Past studies have shown school-age children's emotion regulation to be inversely related to a variety of externalizing problems (Belsky, Pasco Fearon, & Bell, 2007; Eisenberg, Spinrad, & Eggum, 2010; Gardner, Dishion, & Connell, 2007; Lengua, 2003). Findings also indicate that self-regulatory processes may predict the presence or absence of later externalizing problems. For example, Belsky et al. (2007) found that better attention regulation at 4½, 6, and 9 years predicted fewer externalizing problems at 6, 8, and 10 years. There have been comparatively few empirical studies that have included a focus on the relations among children's emotion regulation and *positive* indicators of mental health.

Measuring Children's Emotion Regulation

In a recent article reviewing the past 35 years of emotion regulation assessment in children, Adrian, Zeman, and Veits (2011) noted that although observational methods are often seen as the 'gold standard' in developmental research, the majority of studies examining middle childhood and adolescence used offline assessment methods, such as survey. In fact, of the 77 studies of school-aged children included in the review, not one used observational methods in a naturalistic educational setting.

When compared to laboratory studies, naturalistic studies are more likely to capture a child's propensity to regulate their emotions when faced with a naturally occurring challenging situation, rather than measuring emotion regulation under optimal conditions, when the individual is trying their hardest (Duckworth & Yeager, 2015). The absence of contextual factors in a laboratory setting is also likely to lead to differences in how a child chooses to regulate their emotions. For instance, if a child wants to redirect their attention away from a negative stimulus in the classroom, they are likely to have a number of alternative options to focus on. However, in the laboratory it is unlikely there will be other children or learning materials available to turn to during times of emotional stress.

Furthermore, laboratory based studies do not capture the social nature of emotion regulation and the complex processes that unfold dynamically within the classroom (Jang, Kim, & Reeve, 2012). Gross, Richards, and John (2006) found that 98% of emotion regulation episodes involved the presence of other people and only 2% of episodes took place when the participants were alone. This further highlights the need to examine emotion regulation within a particular social context. Despite the aforementioned benefits of carrying out naturalistic observation studies, and the evidence indicating the importance of the classroom context (Berger et al., 2017; Hernández et al., 2017; McClelland et al., 2017), relatively few studies have examined children's emotion regulation using observational methods in the classroom.

The Present Study

The aim of the present study was to address the aforementioned gaps in the literature by examining the extent to which emotion regulation strategies were associated with healthier patterns of emotional expression, behaviour, and well-being. On the basis of the process model (Gross, 1998a; 2015), we predicted that antecedent strategies, such as cognitive reappraisal, would be more effective at down-regulating negative emotion than response-focused strategies, such as suppression. We also predicted that due to the cumulative costs or benefits of using these strategies daily, children who frequently used antecedent strategies would have higher levels of well-being and experience fewer emotional and behavioural problems in the classroom than those children who frequently used response-focused strategies. Finally, due to the social nature of emotion regulation, we hypothesised that strategy use would be heavily influenced by the social context in which the emotion was being regulated. To capture emotion regulation strategy use within an authentic social context, the study was carried out in naturalistic educational settings. Video-recorded observations of children experiencing emotionally challenging situations in primary classrooms were analysed to obtain rich, descriptive, and

contextually sensitive data on the ways in which children expressed and regulated their emotions.

Methods

Participants

Participants (N = 33, 19 female, M_{age} 10.1 years, SD = 0.5) were selected from four Year 5/6 composite classrooms situated in low socioeconomic urban communities in New Zealand. The Ministry of Education calculates a socioeconomic decile for every school, based on national census data. Decile 10 schools draw their students from high socioeconomic communities and Decile 1 schools from low socioeconomic areas. These classrooms were a subsample of a larger study involving 508 children in 31 classrooms across eight Decile 1 primary schools (Author, 2016). The four classrooms in the present study were selected based on the children's responses on the well-being questionnaires. The classroom with the highest mean well-being score was chosen, as was the classroom with the lowest mean well-being score. Two additional classrooms were selected with mean well-being scores closer to the overall mean of the larger sample.

Information sheets and consent forms were sent to all parents/caregivers of the children in the selected classrooms. Child friendly information sheets and consent forms were also given to those children who had parental permission to participate in the study. The information was read to the children and they had the opportunity to ask questions, decline to participate, or withdraw from the study at any time. All children who agreed to participate were told that they may not be selected for the study. As with the classroom selection, children were chosen based on their questionnaire responses — children with well-being scores below the first quartile or above the third quartile were prioritised for selection.

Measures

Life satisfaction. Huebner's (1991) Students' Life Satisfaction Scale was used as one measure of well-being (e.g., my life is going well). Responses were rated on a 4-point scale from 1 (never) to 4 (almost always). This scale correlates predictably with criterion measures and has been shown to have internal consistency coefficients ranging from .70 to the low .90s. Test-retest coefficients for two- and four-week time periods also fall mostly in the .70 — .90 range, providing further support for the reliability of the scales (Long, Huebner, Wedell, & Hills, 2012).

Eudaimonic well-being. Well-being was also measured using the eudaimonic subscale of the Good Childhood Index (e.g., I feel that I do things that are useful in my daily life). Responses were similarly rated on a 4-point scale from 1 (never) to 4 (almost always). These items attempt to capture factors such as meaning and purpose in life — aspects of well-being which some scholars argue are lacking in measures of life-satisfaction (Rees et al., 2013). Although this scale has not been widely used in other studies, cognitive testing was carried out on all questions of the index, and suitability for use of the items as a scale was conducted using factor analysis and reliability analysis (including a test-retest survey). The Good Childhood Index (2013) has also been tested and refined with over 60,000 children.

Emotional and behavioural difficulties. The teacher-report Australian version of the Strengths and Difficulties Questionnaire (SDQ–T; Goodman, 2001) was administered to obtain a measure of emotional and behavioural difficulties. The SDQ–T is a 25-item questionnaire focusing on the emotions, behaviours, and relationships of 3-16 year olds. It asks teachers to indicate on a 3-point response scale how far each attribute applies to the target child. It generates scores for

emotional symptoms, conduct problems, hyperactivity-inattention, peer problems, and prosocial behaviour. This instrument has been found to correlate well with lengthier child and adolescent well-being and behaviour measures. The validation studies demonstrated satisfactory levels of reliability: internal consistency a = .73, retest stability after 4 to 6 months r = .62 (Goodman, 2001).

Procedure

In the first phase of the study, the four teachers of the selected classrooms were asked to complete the Strengths and Difficulties Questionnaire–Teacher (SDQ–T; Goodman, 2001) questionnaire for each of the target children. Well-being questionnaires were also administered to all participating children.

For the second phase of the study, a video camera was used in the classroom to capture the target children during naturally occurring emotionally challenging situations. Participants were given a small Bluetooth microphone to clip on to their clothes so their speech could be captured during the observations. A Sony CX410 high-definition video camera was positioned at the edge of the classroom and the zoom lens facility was used to capture target students. Once the child was in focus, the researcher moved away from the camera to minimise attention. This ensured the researcher and the equipment did not interfere with the classroom activities and also allowed detailed video data to be collected on the target child's speech, vocal characteristics, facial displays, and whole body displays. Six 10-minute observations were recorded for each child. Group work or 'adult free' situations were prioritised for recording, as a pilot study indicated these were the times when emotionally challenging events were more likely to occur.

Analysis of video data

The *Observer XT 11.5* software program (Noldus Information Technology, 2013) was used to code emotion expression, emotion regulation strategies, and the proximal antecedents that led to the emotionally challenging situations. To segregate the three types of behaviour, the coding scheme comprised three concurrent measurement approaches. Both the emotion regulation strategies and the antecedents were coded as point events — an event without measurable or relevant duration; while emotion expression was coded as a mutually exclusive, exhaustive state event. State events have a distinct beginning and end, in which the duration is recorded.

The emotion expression coding scheme was based on Gilliom, Shaw, Beck, Schonberg, and Lukon's (2002) *Child Affect Coding System*. This system uses behavioural indicators (verbal and non-verbal) to rate different levels of intensity of positive and negative emotional expression. For the present study, the intensity levels were collapsed as there were few instances of high intensity emotion. This also improved the coding reliability. An additional *Neutral* code was added to the framework to describe instances in which the child did not appear to be expressing positive or negative emotion. The final coding scheme is presented in Table 1.

INSERT TABLE 1 ABOUT HERE

The proximal antecedents that led to the negative emotion being expressed were also coded. This was achieved by making a list of initial codes relating to the antecedents that occurred before each instance of negative emotion, then grouping the codes broadly by themes. As with the emotion coding framework, this was based on both verbal and non-verbal indicators and was developed over several iterations. The final antecedent coding scheme is presented in Table 2.

INSERT TABLE 2 ABOUT HERE

Finally, the emotion regulation strategies were coded. This coding scheme was based on Gross' (1998a; 2015) process model of emotion regulation. The temporal dimension of the process model was not considered in the framework, as a number of strategies appeared both before and after the emotion generation process was under way. For instance, the children would frequently use Attentional Deployment: Distraction following the expression of negative emotion, in a manner that was arguably more reactive than preventative. As the videos had already been coded for emotion expression, only segments in which negative emotion was expressed were analysed for the presence of emotion regulation strategies. As with the previous two coding schemes, both verbal and non-verbal indicators were used and the scheme was refined using an iterative process. Firstly, Situation Selection was removed from the framework as there were no instances in which this strategy was observed. This may be partly due to the children not having sufficient autonomy in the classroom to carry out actions that would be coded as Situation Selection, such as moving to a different room. Secondly, Situation Modification was split into three categories. Prior to the development of this framework (Author, 2016), Situation Modification had only been described as modifying the physical environment. However, the children in the sample were observed attempting to modify situations socially (Situation Modification: Social) and using cognitive problem-solving strategies to modify frustrating situations related to academic tasks (Situation Modification: Cognitive). Thirdly, the Attentional Deployment code was split into subcategories. In addition to instances where children attempted to distract themselves from the situation that led to the expression of negative emotion (Attentional Deployment: Distraction), there were also times when the children appeared to be deliberately focusing on features of the situation (Attentional Deployment: Concentration). Concentration is a sub-category of attentional deployment which

has previously appeared in the literature (Webb, Miles, & Sheeran, 2012). The final emotion regulation coding scheme is presented in Table 3.

INSERT TABLE 3 ABOUT HERE

Inter-observer reliability checks were carried out with a trained independent observer. Training in the use of the coding framework involved extensive discussion and practice using the video recordings. Following the training period, the researcher who devised the coding framework and the trained observer independently coded the same sections of video recordings. This involved coding 20 different observation recordings, including 305 point events (antecedents and emotion regulation strategies) and over 200 minutes of state events (emotion expression). Cohen's kappa and inter-observer agreement were calculated for emotion expression (κ = .76, 90.2% agreement), proximal antecedents (κ = .71, 80.3% agreement), and emotion regulation (κ = .70, 75.8% agreement), indicating an acceptable level of reliability (Bakeman & Gottman, 1997).

Results

Descriptive Statistics

Descriptive statistics for the emotion expression and emotion regulation video data are presented in Table 4. The mean, standard deviation, minimum, and maximum scores for emotion expression are presented in minutes. For the emotion regulation variables, the numbers represent the frequency of strategy use.

INSERT TABLE 4 ABOUT HERE

These data indicate that for a large proportion of the observations, the children were coded as expressing neutral emotion. They were also found to spend over twice as much time expressing

positive emotion as negative emotion. With respect to emotion regulation, there was a large amount of variation in the mean frequencies of strategy use, with *Situation Modification: Social* being considerably more frequent than the other strategies. The standard deviation also varied noticeably among the different strategies.

Emotion Regulation and Teacher-Reported Emotional and Behavioural Problems

To determine whether certain strategies were associated with healthier patterns of behaviour, a correlational analysis was carried out examining the associations between the strategy frequency data and teacher-reported emotional and behavioural problems in the classroom. Four of the five Strengths and Difficulties Questionnaire (SDQ-T) subscales were included in the analysis (the peer problems scale was excluded due to its low internal consistency).

INSERT TABLE 5 ABOUT HERE

Table 5 shows that the only emotion regulation strategy with statistically significant associations with the sub-scales of the SDQ-T was *Situation Modification: Cognitive*. There was a negative correlation between this strategy and teacher-reported hyperactivity, $r_s(33) = -.36$, $p = .04$, and a positive correlation between *Situation Modification: Cognitive* and the prosocial scale of the SDQ-T (the only positive indicator of mental health on the scale), $r_s(33) = .37$, $p = .04$.

Emotion Regulation and Well-being

A correlational analysis was also carried out to assess the strength of the associations between emotion regulation strategy use and well-being. Both life satisfaction and eudaimonic measures of well-being were included in the analysis. As shown in Table 6, the only strategy that was significantly correlated with the indicators of well-being was *Situation Modification: Physical*,

which had positive correlations with both life satisfaction, $r_s(33) = .49$, $p = .005$, and eudaimonic well-being, $r_s(33) = .45$, $p = .012$.

INSERT TABLE 6 ABOUT HERE

Emotion Regulation and Emotional Expression

To examine how effective the different emotion regulation strategies were in diminishing negative emotion, a lag sequential analysis was carried out. This analysis identified what happened to the children's emotional expression immediately following the use of an emotion regulation strategy. This produced a frequency count of positive changes in emotion that occurred in the 3-second window following the seven different emotion regulation strategies. This included instances when emotion expression shifted from negative emotion to neutral and from neutral to positive emotion. Figure 2 shows the percentage of positive change for the different emotion regulation strategies.

INSERT FIGURE 2 ABOUT HERE

A binomial logistic regression was then conducted to ascertain the likelihood of each emotion regulation strategy being followed by a positive change in emotion (the outcome variables were 'positive change' and 'no positive change'). This analysis allowed us to determine how effective the individual strategies were in down-regulating negative emotion — those strategies which were more likely to lead to a positive change in emotion are likely to be the most adaptive. The data were inspected for outliers (standardized residuals greater than ±2.5) and extreme cases were removed from the analysis to ensure individual responses were not having an undue influence over the parameter estimates. This involved removing 10 cases from the overall sample of 1184 instances of emotion regulation strategy use.

To control for the fact that the participants were contributing multiple instances of data, a child variable was entered as a covariate in the first step of the model. The model with only the child variable was statistically significant, $\chi^2(32) = 105.116$, $p < .001$, and explained 11.4% (Nagelkerke R^2) of the variance in emotion change, correctly classifying 62% of cases. Adding the strategy variable doubled the explanatory power of the model, $\chi^2(38) = 209.760$, $p < .001$, accounting for 21.8% (Nagelkerke R^2) of the variance in emotion change, correctly classifying 67% of cases.

INSERT TABLE 7 ABOUT HERE

To examine differences in strategy use, the only response-focused strategy, *Suppression*, was selected as the reference category in which to contrast the other strategies against. The analysis (see Table 7) indicates that when the children used *Cognitive Reappraisal* (instead of *Suppression)*, this was 7.67 times more likely to result in a positive change in emotions. When *Attentional Deployment: Distraction* was used, it was 4.03 times more likely to result in a positive emotion change, and *Situation Modification: Cognitive* was more than twice as likely (2.25) to lead to a positive change in emotion than *Suppression*. The analysis also indicated that *Attentional Deployment: Concentration* was significantly less likely to lead to a positive change in emotion when compared with *Suppression* (.33 with a negative *B* value).

Emotion Regulation and Contextual Factors

To examine the influence of contextual factors on children's emotion regulation strategy choice, each emotion regulation strategy was linked to a proximal antecedent during the video coding. The frequencies of the different emotion regulation strategies within the key antecedent categories were then summed across all children in the sample.

INSERT TABLE 8 ABOUT HERE

Table 8 shows that the large majority of emotionally challenging situations were preceded by an interaction with a peer (804 events). The antecedent category with the second highest frequency of emotionally challenging events was *Task* (244 events), and the category with the lowest frequency of emotionally challenging events was *Teacher* with 58 events.

The percentages of strategy use within each antecedent were then calculated. Figure 3 shows some clear differences in the percentage of strategy use across the three antecedent categories. The strategy *Situation Modification: Physical* did not seem to vary much across the three categories. However, there was considerable variation with both *Situation Modification: Social* and *Situation Modification: Cognitive.* Almost two-thirds of all negative emotional responses involving peers were followed by the *Situation Modification: Social* strategy. That compares to half of the incidents involving the teacher, and just over a quarter of incidents (26%) related to a cognitive task. The *Situation Modification: Cognitive* strategy follows a reverse pattern with this strategy being most likely to occur during a task (38%), less likely following incidents involving the teacher (10%), and very rarely observed when peers were involved (1%).

INSERT FIGURE 3 ABOUT HERE

There was also variation in the use of attentional deployment strategies across antecedent categories. *Attentional Deployment: Distraction* was seen less frequently when the teacher was involved in the emotionally challenging situation. Conversely, *Attentional Deployment: Concentration* was most frequently observed during interactions involving the teacher. In terms of *Cognitive Reappraisal* strategy use, there did not seem to be much variation across the antecedent categories. Finally, *Suppression* was more likely to be seen during interactions involving the classroom teacher.

Discussion

Much of the emotion regulation research to date has had a strong focus on individual processes and has somewhat downplayed social and situational factors. In an attempt to offer a more nuanced and contextualised understanding of how these processes operate in children on a daily basis, the present study investigated children's emotion regulation strategy use in naturalistic educational settings. The study aimed to establish whether certain emotion regulation strategies were associated with healthier patterns of emotional expression, behaviour, and well-being — something which had not previously been investigated in younger populations. It also examined how contextual factors were associated with emotion regulation strategy choice.

In terms of strategy effectiveness, the results revealed some key differences in terms of how effective the individual strategies were in leading to a positive change in expressed emotion. As hypothesised, *Cognitive Reappraisal* was found to be significantly more effective than *Suppression* in this regard. These two strategies are arguably the most researched strategies in the emotion regulation literature, with *Cognitive Reappraisal* often being described as a healthy, adaptive strategy, and Suppression as maladaptive (Webb et al., 2012). The analysis also found that both *Attentional Deployment: Distraction* and *Situation Modification: Cognitive* were more effective in up-regulating emotion than *Suppression*. This is consistent with Gross' (1998a) claim that antecedent strategies tend to be more effective than response-focused strategies such as *Suppression*. *Attentional Deployment: Concentration* was the only strategy that was less likely to lead to a positive change in emotion than *Suppression*. While *Attentional Deployment: Concentration* has not previously been examined in a naturalistic study such as this, there have been several studies that have looked at strategies which similarly involve attending to the features of an emotionally challenging situation. Rumination, for example, shares many of the characteristics

of *Attentional Deployment: Concentration* and has been found to be maladaptive and linked with longer term problems of mental health (Aldao, Nolen-Hoeksema, & Schweizer, 2010; Webb et al., 2012).

The well-being analysis revealed that *Situation Modification: Physical* was the strategy most strongly associated with both life satisfaction and eudaimonic well-being. As much of the research examining emotion regulation strategy has exclusively focused on *Cognitive Reappraisal* and *Suppression*, there have been very few empirical studies which report on the effectiveness of *Situation Modification* (Jacobs & Gross, 2014). However, related research, in the field of coping strategies, has found that forward thinking problem solving strategies, similar to *Situation Modification*, are positively associated with healthy adjustment and negatively related to emotional and behavioural problems (Compas & Malcarne, 1988; Ebata & Moos, 1991; Glyshaw & Cohen, 1989; Kochenderfer-Ladd & Skinner, 2002).

The study also examined a new sub-type of situation modification, termed *Situation Modification: Cognitive.* This was the only strategy linked with teacher-reported emotional and behavioural problems. Although it has not been examined previously, similar problem solving behaviours have been linked to a range of healthy and adaptive outcomes in previous studies (Ebata & Moos, 1991; Glyshaw & Cohen, 1989). These findings suggest more research is needed to determine whether adding subcategories to the *Situation Modification* family of strategies is helpful in conceptualising how individuals regulate their emotions.

When viewed together, the aforementioned analyses demonstrate the complexity of the relationships among emotion regulation and positive and negative indicators of mental health and well-being. While there was some support for our hypothesis regarding the effectiveness of the antecedent strategies over suppression, the findings were not consistent. Some strategies,

such as *Cognitive Reappraisal,* seemed to be effective at up-regulating negative emotion in the short term, yet not strongly associated with well-being or behavioural problems in the classroom. Conversely, the data suggest that *Situation Modification: Physical* is positively associated with well-being, yet not with an immediate change in a child's emotional experience. One possible explanation for these differences is that the impact of some strategies may not be realised until they have been used regularly over a longer period of time. Further research is needed to better understand the short- and long-term impact of different regulatory strategies on children's emotional expression, behaviour, and well-being.

The analysis that focused on contextual factors found that the majority of situations in which children regulate their emotions are social situations. As predicted, within these social situations, strategy choice appeared to vary depending upon who is involved in the situation. One of the more interesting findings was that *Attentional Deployment: Distraction*, often described as an adaptive strategy (Wadlinger & Isaacowitz, 2011), was seen less frequently when the teacher was involved in the emotionally challenging situation. Conversely, *Attentional Deployment: Concentration*, typically described as a maladaptive strategy (Webb et al, 2012) was observed more often during interactions involving the teacher. Also, *Suppression*, another strategy described as maladaptive in much of the emotion regulation literature (e.g., Gross & John, 2003), was more likely to occur during interactions involving the classroom teacher. Due to the low frequency of some strategies within the antecedent categories, the analysis was unable to say more about these relationships. However, as the findings suggest that the presence of a teacher may increase the likelihood of a child using ineffective emotion regulation strategies, this is an important area to investigate further, and one which could potentially have important educational implications. Of particular interest would be the role

primary teachers or peers play in co-regulating children's emotions, something which Kurki, Järvenoja, Järvelä, and Mykkänen (2016) examined in day-care settings.

It would also be interesting to examine which aspect of the emotion regulation process is most influenced by social contextual factors. Recent research investigating the neural underpinnings of emotion regulation offers interesting insights into the neural pathways of the construct. Kohn et al. (2014) propose a three-stage model for the regulation of emotion, consisting of 1) evaluation of the stimulus and emotional reaction, 2) detecting the need to regulate, and 3) execution of the regulation. One possible method of determining which of these areas was most influenced by classroom contextual factors would be to carry out a naturalistic study which included stimulated recall interviews. This would involve asking children to describe their thought processes while watching video data of themselves during emotionally challenging events.

Kohn et al.'s (2014) three-stage model may also explain the wide variation in emotion regulation ability observed among children. Experiencing difficulties at any stage of the pathway would likely result in poor emotion regulation. Although the children in the present study all lived in socioeconomically disadvantaged communities, there was considerable individual variation in both their expression and regulation of emotion. Some children repeatedly used the same emotion regulation strategy while others appeared to possess a rich repertoire of strategies. In a review of research examining socioeconomic status and child development, Bradley and Corwyn (2002) found that although there appears to be a link between socioeconomic status and children's emotional development, the findings are inconsistent. Garner and Spears (2000) go one step further by suggesting that in terms of emotion regulation, low- and middle-income children are more alike than different. While this may be correct, it is still very likely that there is considerable variation in the frequency with

which different children encounter emotionally challenging situations. The nature of these events, in terms of both intensity and duration is also likely to vary considerably.

Some limitations of the study need to be acknowledged. Firstly, due to the cross-sectional design of the study, the correlational analyses do not address directional effects. While, experimental studies with adult populations have demonstrated the causal effects of particular strategies on a range of dependent variables (see Gross and John, 2003), these effects also need to be examined with younger populations. Secondly, the correlational analyses were based on a small sample size meaning potentially important relationships may have been overlooked due to insufficient statistical power. Thirdly, the difficulties associated with using observational methods to examine emotion-laden constructs also need to be acknowledged. In some instances, the learners' intentions or goals had to be inferred, as they were internalized and not evident to the researcher. Video analysis assisted in improving the reliability of this process by allowing the opportunity for repeated observations and microanalysis. Additionally, the video-recorded observations facilitated the analysis of non-verbal behaviours such as gestures or facial expressions. Finally, although the naturalistic nature of the observational data led to a rich data set, it also meant that there was more variability in the videos in terms of the nature of the emotionally challenging events. This made it somewhat more difficult to make comparisons between children or groups as the circumstances in which they were filmed were often vastly different.

Despite the aforementioned limitations, the present study has added to our understanding of how certain contextual factors may influence strategy choice. It also presented an analysis of the relations between emotion regulation and children's well-being, something which has not been examined previously with this age group. Finally, the study used Gross' (1998a; 2015) process model to code naturalistic observations and proposed two additional emotion

regulation strategies to be included in the model. In terms of practical implications, it is anticipated that these findings can be used alongside existing evidence to guide future intervention efforts — those that target the acquisition and use of specific emotion regulation strategies as well as those which focus on teachers' support of children during emotionally challenging situations. It is hoped that the findings of the present study help to progress the field towards a more nuanced, contextualized understanding of the learning environments and emotion regulation processes that promote children's well-being — particularly for those children living in low socioeconomic neighbourhoods, who are more likely to encounter emotionally challenging situations on a daily basis.

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Figures

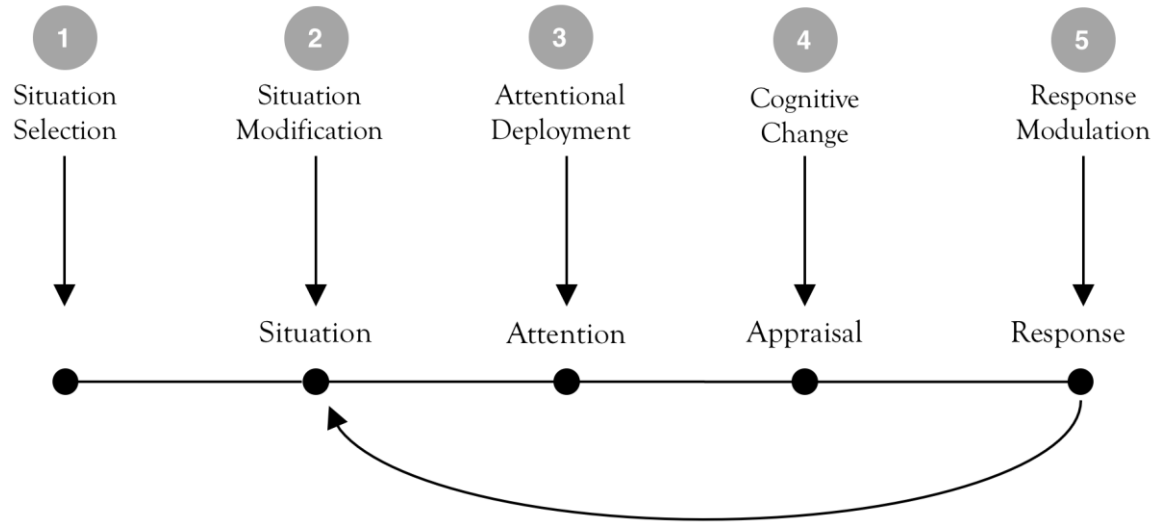

Figure 1: The process model of emotion regulation (Gross, 2014)

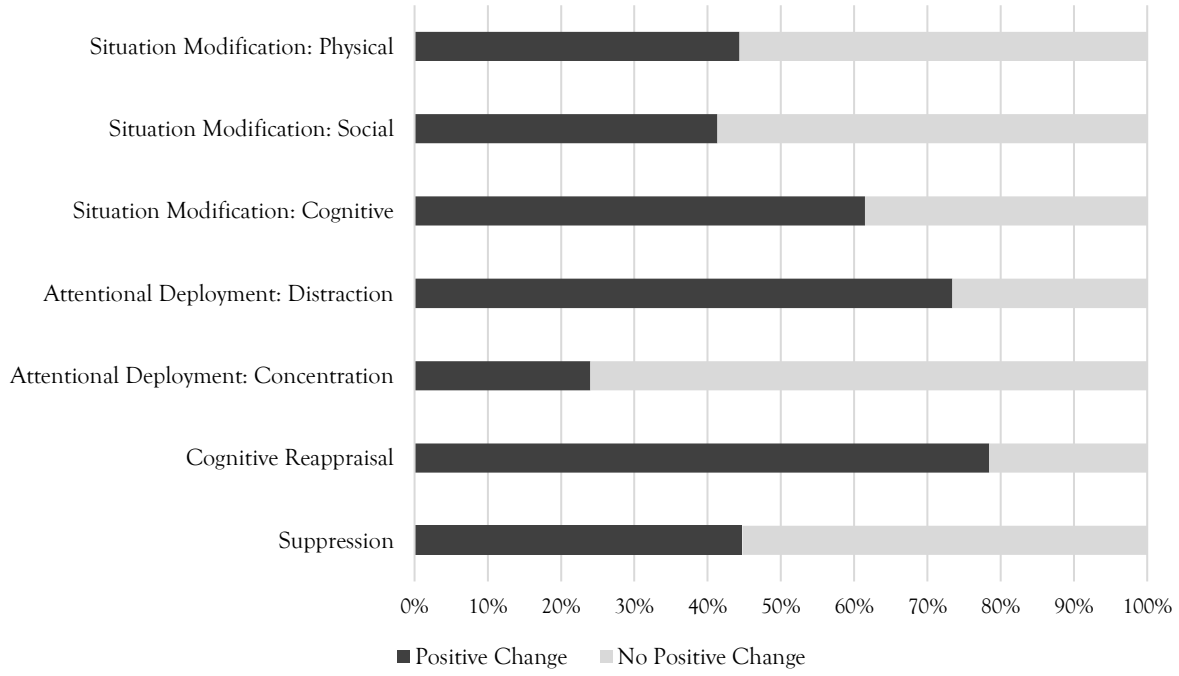

Figure 2. *Change in emotion expression (expressed as a percentage) following emotion regulation strategy.*

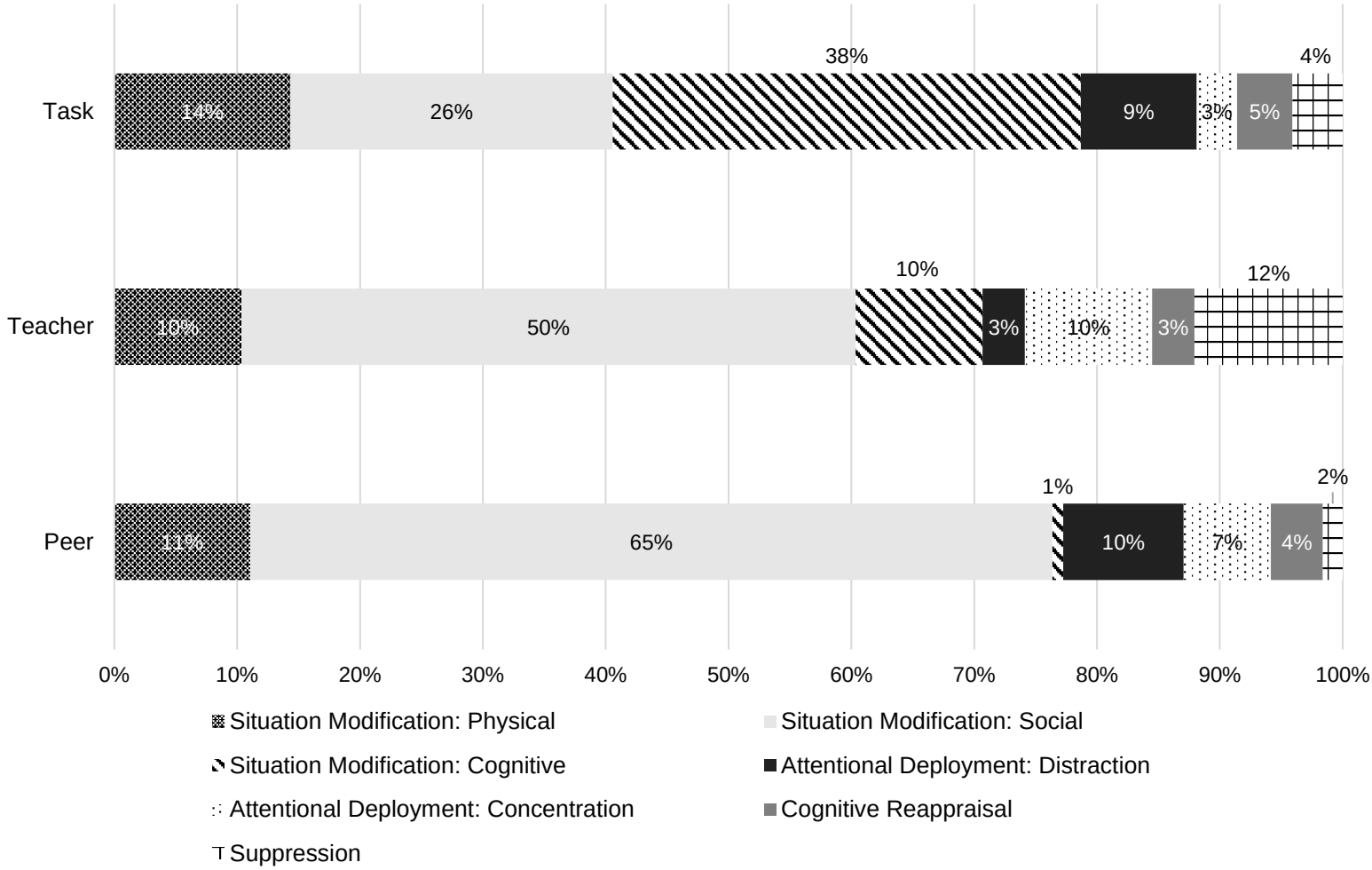

Figure 3. *Percentage of emotion regulation strategy by antecedent category*

Tables

Table 1. *Emotion expression coding scheme*

Coding	Description	Example
Positive emotion	External expression of satisfaction, happiness, or excitement. Indicators include: a smile, laughter, fist pump, exclamation, sharp intake of breath.	Child smiles after completing a difficult academic task.
Neutral	No clear sign of positive or negative emotion.	Child continues to work on task set by the teacher, showing no overt facial expressions
Negative emotion	Subtle to overt signs of negative emotion. Indicators include: eye rolling, groaning, impatient tone of voice, verbal complaints, facial expression or utterances conveying irritation or aggression.	Child groans after teacher tells them they have to redo an exercise.

Table 2. *Antecedent coding scheme*

Coding	Description	Example
Peer	Peer interaction leads to an increase in the target child's negative emotion	Peer scribbling on target child's workbook.
Task	Academic task leads to an increase in the target child's negative emotion.	A difficult maths problem frustrates a child.
Teacher behaviour	Teacher behaviour increases the target child's negative emotion.	The teacher tells the class to stop working on an activity before the target child has completed it.

Table 3. *Emotion regulation coding scheme*

Coding	Description	Example
Situation modification: Physical	Child modifies (or attempts to modify) the emotionally challenging situation by changing the physical environment.	Moving feet away when another child is trying to kick them under the table.
Situation modification: Social	Child modifies (or attempts to modify) the emotionally challenging situation by social means.	Child changes the joint understanding of a situation by explaining their own view to a peer, e.g., "He didn't mean that!"
Situation modification: Cognitive	Child modifies (or attempts to modify) the emotionally challenging situation through addressing a cognitive problem solving task.	Child is frustrated with a maths problem but continues to focus on the problem until it is solved.
AD: Self-distraction	Child moves their attention away from the situation.	Child deliberately turns attention to set task and away from the peer teasing her.
AD: Concentration	Child focuses on the emotional features of the situation or antecedent.	Child continues to argue that a previous incident was unfair during a board game.
Cognitive Reappraisal	Child controls how they cognitively interpret a situation, or re-evaluates the situation they are in, in order to give it new meaning or significance.	Child is initially annoyed at a peer for bumping into them but smiles once they see it was unintentional.
Suppression	The initial emotion response is concealed by attempting to hide the physical, observable expression of emotion.	A child quickly hides their annoyance with peer when teacher approaches.

Note: AD = Attentional Deployment;

Table 4. *Emotion expression and emotion regulation for the video subsample (60 minutes of video observation) .*

	Mean *N*=33	*SD* *N*=33	Min. *N*=33	Max. *N*=33
Emotion expression (duration in minutes)				
Positive	7.3	3.5	1.0	15.5
Neutral	43.9	4.7	33.0	53.2
Negative	3.1	1.5	0.6	7.2
Emotion regulation strategy (frequency)				
Situation modification total	26.6	11.4	7.0	52.0
Situation modification: Physical	4.3	2.9	0.0	11.0
Situation modification: Social	19.7	11.0	4.0	47.0
Situation modification: Cognitive	3.3	2.6	0.0	11.0
Attentional deployment total	7.0	4.9	1.0	18.0
Attentional deployment: Concentration	2.3	2.5	0.0	10.0
Attentional deployment: Distraction	4.2	2.8	0.0	11.0
Cognitive reappraisal	1.4	1.4	0.0	5.0
Suppression	1.2	1.3	0.0	5.0

Table 5. *Inter-correlations among teacher-reported emotional and behavioural problems (SDQ-T) and observed emotion regulation strategies*

Observed Strategy	SDQ Scale			
	Emotional Problems	Conduct Problems	Hyper-activity	Prosocial
Situation Modification: Physical	.05	.06	-.13	-.07
Situation Modification: Social	.14	-.01	-.20	.01
Situation Modification: Cognitive	-.27	-.25	**-.36***	**.37***
Attentional Deployment: Distraction	-.07	-.06	-.05	.02
Attentional Deployment: Concentration	.24	-.04	-.13	.03
Cognitive Reappraisal	-.02	-.19	-.04	-.02
Situation Modification: Physical	-.17	-.06	-.15	.21

Note: * $p < 0.05$ (2-tailed)

Table 6. *Inter-correlations among well-being indicators and observed emotion regulation strategies*

Observed Strategy	Well-being Indicator	
	Life Satisfaction	Eudaimonic Well-being
Situation Modification: Physical	.49**	.45*
Situation Modification: Social	.23	.27
Situation Modification: Cognitive	.26	-.13
Attentional Deployment: Distraction	.35	.04
Attentional Deployment: Concentration	.15	.15
Cognitive Reappraisal	-.04	-.25
Situation Modification: Physical	.06	-.11

Note: * $p < 0.05$ (2-tailed), ** $p < 0.01$

Table 7. Logistic regression predicting positive change in emotion based on strategy selection (controlling for child).

	B	*SE*	Wald	*df*	*p*	Odds Ratio	95% CI for Odds Ratio	
							Lower	Upper
Situation Modification: Physical	-.050	.397	.016	1	.90	.95	.44	2.07
Situation Modification: Social	-.164	.366	.202	1	.65	.85	.41	1.74
Situation Modification: Cognitive	.812	.415	3.835	1	.05	2.25	1.00	5.08
Attentional Deployment: Distraction	1.393	.419	11.048	1	.00	4.03	1.77	9.16
Attentional Deployment: Concentration	-1.100	.470	5.471	1	.02	.33	.13	.84
Cognitive Reappraisal	2.037	.536	14.474	1	.00	7.67	2.69	21.91

Table 8. *Frequency of emotion regulation strategies occurring within each antecedent category.*

	Antecedent		
Observed Strategy	Task	Teacher	Peer
Situation Modification: Physical	35	6	89
Situation Modification: Social	64	9	525
Situation Modification: Cognitive	93	6	7
Attentional Deployment: Distraction	23	2	79
Attentional Deployment: Concentration	8	6	57
Cognitive Reappraisal	11	2	34
Suppression	10	7	13
Total	244	58	804