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Do I feel sadness, fear or both? Comparing self-reported alexithymia and emotional task-performance in children with many or few somatic complaints

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Children with many somatic complaints seem to report problems with emotion identification and communication ('alexithymia'). The aim of this study was to verify whether children with somatic complaints do indeed show signs of alexithymia. We compared 35 children (M age = 10.99, SD = 13 months) with many somatic complaints with 34 children (M age = 11.03, SD = 12 months) reporting few complaints on the basis of a self-report alexithymia scale and tasks that require the skill to identify and communicate emotions: an emotional attention task, a structured interview about own emotions, and a mixed-emotion task. Children were also asked about the intensity of the reported emotions. Compared to children with few complaints, children with many complaints seemed to have higher self-reports of alexithymia. However, these results were explained by difficulty in communicating negative internal states and experiencing indefinable internal states, rather than difficulty in identifying emotions. In addition, children with many complaints reported higher intensities of fear and sadness. The children did not differ in their attention to emotions or causes of emotions. Children with many somatic complaints more often described previous emotional experiences and showed better abilities in identifying multiple emotions. Children with many somatic complaints thus show more negative emotional processing, but the alexithymia-hypothesis was unsupported.

Keywords: health; emotion; child; alexithymia; affect

Introduction

The idea that recognising and expressing feelings can be healthy is widespread. There are even many self-help and support groups for adults and children based on the idea that sharing your emotions with others helps in reducing negative feelings. Moreover, being able to recognise own emotions is thought of as a precondition for adequate emotion analysis in subsequent emotion regulation (Rieffe, Meerum Terwogt, Jellesma, 2008). Not being able to verbalise emotions is seen to have unbeneficial outcomes, including psychosomatic problems. Indeed, Sifneos (1972, 1973) first described 'alexithymia' as problems with identifying and describing emotions after observing these characteristics in

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patients with somatisation problems. To date, a literature search shows that alexithymia is of interest for many researchers who study the field of somatic complaints. In this study, we aim to further investigate the association between somatic complaints and alexithymic features in children.

A commonly cited assumption in the literature is that adults and children with alexithymia develop health complaints through (unrecognised) emotional arousal and the accompanying physiological reactions (Taylor, Bagby, & Parker, 1997). Not being able to recognise and express emotions would intensify and prolong these physiological reactions, causing an increased likelihood of experiencing somatic complaints. Most studies on alexithymia have been conducted in adult populations. A review of these studies indicates that self-reports of alexithymia are indeed positively related to reports of somatic symptoms (De Gucht & Heiser, 2003). More recent studies also confirm this relationship between self-reported alexithymia and somatic complaints in childhood (Burba et al., 2006, Jellesma, Rieffe, Meerum Terwogt, & Kneepkens, 2006; Meade, Lumley, & Casey, 2001; Rieffe, Oosterveld & Meerum Terwogt, 2006). The outcomes of these studies seem to imply that children with alexithymic characteristics might be more susceptible for developing somatic complaints.

Sifneos (1972, 1973) based his initial ideas about alexithymia on clinical observations, but most empirical studies in this area use self-report questionnaires to measure the construct. A potential problem is that self-reports give information about an individual's subjective perception, but fail to provide information about one's actual abilities. The associations between self-perceived emotional abilities, including alexithymia and emotional abilities observed through other kinds of tasks are weak in adulthood (Brackett, Rivers, Shifman, Lerner, & Salvoy, 2006; Lumley, Gustavson, Partridge, & Labouvie-Vief, 2005). There is no reason to expect more accurate self-perceptions in childhood. The link between somatic complaints and alexithymia should therefore, also be studied by means that differ from self-reported indices of alexithymia.

In a previous study, Rieffe, Meerum Terwogt, and Bosch (2004) presented 8–12 year old children with 16 emotion-evoking vignettes and asked children how they would feel, and how strongly. Rieffe and colleagues not only showed that children with many somatic complaints were equally able to identify emotions as children with few or no somatic complaints, but also that children with many somatic complaints reported more negative emotions. Children with many somatic complaints reported stronger intensities and frequencies for anxiety and a similar trend was present for fear, whereas, the children with few complaints reported higher frequencies and intensities for anger. These findings seem to undermine the alexithymia hypothesis, that problems with identifying and describing emotions cause somatic complaints to arise, and seem to suggest that self-reports on alexithymia may differ from children's capacities. However, two alternative explanations might challenge this conclusion.

First, an obvious objection to the use of the vignettes could be that children were prompted to name emotions in the task by Rieffe et al. (2004), because they were asked 'How would you feel?'. Possibly, the question that Rieffe et al. asked during the task is a question that children with alexithymic characteristics would not themselves ask spontaneously. It has been suggested that alexithymia causes decreased attention for emotions, but research using an experimental stroop task in adults revealed unclear results (Lundh & Simonsson-Sarnecki, 2002). Concrete attention tasks representing situations similar to those in children's every day life have not yet been used in research into alexithymia in children. Spontaneous attention for emotion experiences could therefore

be a crucial problem for children reporting alexithymic characteristics and somatic complaints.

Second, empirical evidence that children and adults with high self-reported alexithymia are able to identify their affective state, is overwhelming. Numerous studies show positive relationships between alexithymia and symptoms of internalising problems, such as anxiety and depression in adults and children (Berthoz, Consoli, Perez-Diaz, & Jouvent, 1999; Grabe, Spitzer, Freyberger, 2004; Honkalampi, Hintikka, Tanskanen, Lehtonen, & Viinamaki, 2000; Rieffe et al., 2006). However, feeling 'bad' about an argument with a classmate is less reflective of the emotional experience than feeling angry because he took your pencil away, scared because you think he might break it, and perhaps feeling sad because the pencil was a birthday present you very much liked and now cannot use. Possibly, the ability to differentiate between different emotion states, rather than the ability to globally identify how one feels, might be a problem in people reporting alexithymic characteristics, due to a problem in locating the various emotion antecedents. Given that several studies (Rieffe et al., 2004, 2006; 2008) have found that children with more somatic complaints score higher than their peers with few somatic complaints on all negative mood states (anger, sadness and fear), it may be that children with many somatic complaints fail to identify multiple emotions, but do acknowledge a general negative affective state.

The aim of the current study was two-fold. First, we aimed to examine both alternative explanations for the findings reported in the previously described study by Rieffe et al. (2004). In order to achieve this, a group of children, who reported many somatic complaints were compared with a group of children who reported no or few somatic complaints on several emotion indices. We assessed children's ability to spontaneously attend to emotions in possible emotion-evoking situations; their ability to identify their own emotions and related emotion antecedents; and their ability to identify multiple emotions simultaneously. If problems with (i) spontaneous emotion identification, or (ii) emotion differentiation and identification of emotion antecedents are related to somatic complaints, children with many somatic complaints could be expected to show deficits in at least one of these three tasks. More specifically: they would have less spontaneous attention for emotional situations, identify fewer emotion antecedents and differentiate fewer emotions simultaneously.

Second, we wanted to compare children's observed ability to identify, differentiate and communicate their emotions with their self-reports about these abilities. Therefore, the scale 'Differentiating Emotions' was also administered, consisting of items that reflect the ability to differentiate emotions but also the ability to identify emotion antecedents, and the scale 'Verbal Sharing', which contains items that reflect the ability to communicate emotions. Both scales were derived from the Emotion Awareness Questionnaire, a questionnaire based on the well-known TAS-20, adjusted for children (Rieffe et al., 2006). Gender was taken into account in the analyses, but no hypotheses were formulated regarding the influence of gender on the relationship between alexithymia and somatic complaints.

Method

Procedure and participants

Four primary schools participated in this study. Parents were given information letters that included an informed consent, to be returned to the child's teacher. The participation rate was 96%. In the classroom, 381 children filled out the Somatic Complaint List, on basis of which two groups were selected for an individual session of ~45 min. The children

scoring in the lowest 10% and the children scoring in the highest 10% were selected, excluding children, who scored exactly on the 10th or 90th percentile. The group of children with few somatic complaints were 21 boys and 13 girls aged 8.84 to 13.11, $M = 11.03$, $SD = 1.03$. The group of children with many somatic complaints were 12 boys and 23 girls aged 9.15 to 12.83, $M = 10.99$, $SD = 1.04$. In order to minimise any cross-over effects from the different measurements, children filled out the self-report alexithymia measure one week prior to performing the emotion tasks, immediately after completing the Somatic Complaint List. The emotion tasks were presented in the following order: spontaneous attention for emotions, identification of own emotions, and identification of emotions in mixed emotion situations. After all, tasks measuring children's (mixed) emotion identification would interfere with *spontaneous* attention for emotions when they would be presented first. Moreover, hearing stories about possible emotion eliciting situations could trigger children's memories of own emotional experiences. Therefore, the mixed emotion task could not be presented prior to the structured interview about children's own emotional experiences.

Measurements

On all tasks that included a question about intensity of emotions, we used a visual rating scale from 1 to 5.

Self-reported somatic complaints

The Somatic Complaint List was used (Jellesma, Rieffe, Meerum Terwogt, 2007) as an index of self-reported somatic complaints. This list consists of 11 somatic symptoms that are rated by children on a 5-point scale from 1 = (*almost*) *never* to 5 = *quite often* (each verbally anchored). The internal consistency as previously reported in earlier studies using the Somatic Complaint List is good, as is the internal consistency we found in the current study, $\alpha = 0.85$.

Spontaneous attention for emotions

To measure children's spontaneous attention for emotions, we used three picture cards: one depicting an angry man looking at a boy with a ball in his hand, standing before a shattered window; one depicting a boy with a sad face watching a group of children walking away from him towards a soccer field with a ball; and one depicting a girl on a diving board looking scared. The children were given the instruction: 'Tell me something about this picture.' Their answer was rated according to whether they referred to an emotion, and if so, whether they also included the cause of this emotion in their story. The cards were presented in randomised order.

Identification of own emotions

In order to measure the extent to which children acknowledge their own emotional experiences, children were asked the following questions regarding the four basic emotions (Rieffe, Meerum Terwogt, & Kotronopoulou, 2007)

'...[name child], do you feel...[emotion] sometimes?' (question 1)

'Can you tell me about the last time you felt...[emotion]?' (question 2)

'I would also like to know how...[emotion] you felt.'

Can you show me on this scale how...[emotion] you felt?' (question 3)

A 5-point scale was introduced to children in order for them to respond to question 3:

'Look, if you felt *very very* happy, you point to the highest bar in this scale. And if you felt just *a tiny little bit* happy, you point to the lowest bar. You could also feel *quite* happy, and that might be somewhere in the middle. So, just try to think which one fits best how you felt.'

The first emotion asked about was happiness, the negative emotions (sadness, anger, fear) were asked about in a randomised order.

Emotion identification in mixed emotion situations

For the assessment of children's emotion differentiation abilities, we used six stories about situations with the potential of evoking multiple emotions (Meerum Terwogt, Koops, Oosterhof, & Olthof, 1986). An example story is presented in the Appendix. The stories were accompanied by a simple picture (Appendix). They were presented in a randomised order. We added two positive stories, one in the middle and one in the end, in order to make the task more pleasant for the children. After each task, the children were asked whether they would feel happy, angry, sad, and/or afraid (randomised order), and if so, why they would feel this way and with what intensity using the visual analogue scale.

Self-reported alexithymia

Two subscales of the Emotion Awareness Questionnaire (Rieffe et al., 2007) were used to assess children's self-reports of alexithymia. The subscale Differentiating emotions measures experienced emotion identification ability, in particular emotion differentiation, and consists of 7 items. An example item is: 'I am often confused or puzzled about what I am feeling' (reverse coded). The second subscale we used: Verbal sharing of emotions measures experienced ability in the communication of emotions and consists of 6 items. An example item is: 'I can easily explain to a friend how I feel inside'. Lower scores on both scales are indicators of self-reported alexithymia. The previously reported internal consistencies of the scales were satisfactory, similar to the results in the current study ($\alpha = 0.68$ and 0.72 , respectively).

Statistical analyses

For the simultaneous comparison of the two groups on multiple dependent variables, Hotelling's Trace test was used, followed up by independent *t*-tests. However, some dependent variables were not normally distributed. In that case we used the non-parametric Mann-Whitney *U*-test. The Chi-square test was used to compare frequencies of children in each group who described previous emotion-evoking events. We controlled for gender effects, but we did not find any gender interactions. Therefore, it was more parsimonious to report the results for the total groups of children with few or many somatic complaints.

Results

Spontaneous attention for emotions

We first compared how often children with many somatic complaints and children with few somatic complaints spontaneously mentioned the emotions depicted in the picture

Table 1. Means on the emotional abilities and emotion intensities for children with few and children with many somatic complaints.

	Few somatic complaints <i>M (SD)</i>	<i>p</i> < 0.05	Many somatic complaints <i>M (SD)</i>
Self-reported alexithymia			
Differentiating emotions	1.51 (0.32)	>	1.00 (0.34)
Verbal sharing of emotions	0.99 (0.51)	=	0.77 (0.47)
Spontaneous emotion references			
Spontaneous referring to emotion	1.97 (0.76)	=	2.11 (0.80)
Spontaneous referring to emotion cause	1.76 (0.85)	=	2.03 (0.92)
Own emotions			
Descriptions of emotion evoking situations	2.82 (1.03)	<	3.51 (0.82)
	Median (range)		Median (range)
Multiple emotion references			
Positive and negative emotions	1.00 (3.00)	=	1.00 (3.00)
Multiple negative emotions	4.00 (6.00)	<	5.00 (6.00)
	<i>M (SD)</i>		<i>M (SD)</i>
Emotion intensity: in own experiences			
Happiness intensity	4.09 (1.19)	=	4.03 (0.95)
Anger intensity	1.91 (1.50)	=	2.22 (1.63)
Fear intensity	1.56 (1.69)	<	3.23 (1.72)
Sadness intensity	1.82 (1.71)	<	3.11 (1.55)
	Median (range)		Median (range)
Emotion intensity: in imagined scenario's ^a			
Mean intensity happiness	0.67 (1.50)	=	0.50 (2.00)
Mean intensity anger	1.67 (3.00)	=	1.50 (2.67)
Mean intensity fear	0.50 (2.00)	<	1.33 (3.83)
Mean intensity sadness	2.17 (3.00)	<	2.67 (4.17)

Note: ^aMixed emotion situations.

cards and how often they spontaneously referred to a cause for the emotion (0–3 times). A multivariate analysis of variance revealed that the groups did not differ in their spontaneous emotion analysis on this task, Hotelling's Trace = 0.03, $F(2,66) = 1.04$, partial $\eta^2 = 0.03$, $p = 0.36$ (Table 1).

Identification of own emotions

All children answered in the confirmative when asked whether they ever were happy. Only one child with few somatic complaints and two children with many somatic complaints denied that they were ever angry. However, 9 out of the 34 children with few somatic complaints compared to only 3 out of the 35 children with many somatic complaints said they were never afraid, $\chi^2(1, N = 69) = 3.85$, $p = 0.05$. There were also more children with few somatic complaints ($n = 8$) than children with many somatic complaints ($n = 2$) who denied ever being sad, $\chi^2(1, N = 69) = 4.42$, $p = 0.04$.

We then compared how often children with few or many somatic complaints could report on their last experience of the emotions. In comparison to children with few

complaints, children with many somatic complaints more often described their last emotion-evoking situations, $t(67) = -3.09$, $p < 0.01$, and this difference remained significant when correcting for the times when children had denied experiencing a certain emotion, $t(67) = -2.46$, $p = 0.02$. Some children referred to specific situations (e.g. 'I was angry yesterday because my sister had ruined our board game'), whereas others mentioned more general situations (e.g. 'I feel scared after watching a scary movie'). Given that general answers can be quite prototypical, not necessarily referring to actual remembered experiences, we controlled whether children with few somatic complaints more often referred to specific, concrete situations than children with many somatic complaints. This was not the case, $t(67) = -1.10$, $p = 0.28$. Children with many somatic complaints ($M = 0.87$, $SD = 0.17$) and children with few somatic complaints ($M = 0.82$, $SD = 0.22$) equally often recalled specific situations.

A multivariate analysis of variance comparing the groups (few vs. many somatic complaints) on the rated intensity of happiness, anger, fear and sadness revealed a significant group difference, Hotelling's Trace = 0.35, $F(4,64) = 5.64$, partial $\eta^2 = 0.26$, $p < 0.01$. Compared to children with few somatic complaints, children with many somatic complaints reported higher intensities for fear and sadness, $t(67) = -4.07$ and $t(67) = -3.28$, respectively, $p < 0.01$ (Table 1).

Emotion identification in mixed emotion situations

We then calculated the number of times children identified happiness and at least one negative emotion and the number of times children identified more than one negative emotion in the mixed emotion situations. The median and range of the scores are presented in Table 1. Since the two variables violated the assumption of a normal distribution, Mann-Whitney U -tests were used for a comparison of the groups. The children only differed in the number of times multiple negative emotions were reported, $U = 405.50$, $p = 0.02$, $r = -0.28$. Children with many somatic complaints more often reported multiple negative emotions than children with few somatic complaints. Some children reported multiple emotions, but gave the same reasons for the different emotions. For instance, children responded that they would be sad and angry when punished for something they did not do. On the hand, it is possible that children indeed feel both emotions for the 'same' reason (whereas, sadness may be linked to receiving punishment, anger may be linked to the fact that the punishment is not seen as being justified). On the other hand, giving the same reason for different emotions can also reflect poor emotion differentiation. Therefore, we conducted an additional analysis, comparing the number of times children reported multiple emotions that each had a different explanation. This revealed similar results, $U = 413.50$, $p = 0.03$, $r = -0.27$, $Mnd = 4$ for children with many somatic complaints, and $Mdn = 2$ for children with few somatic complaints.

Finally, we compared the groups across the different stories on their mean emotion intensity, for happiness, anger, sadness and fear separately. The median and range of the scores are presented in Table 1. Because the assumption of normality was violated, we used Mann-Whitney U -tests for the group comparisons. Children with many somatic complaints reported higher intensities of fear and sadness compared to children with few somatic complaints, $U = 210.50$, $p < 0.01$, $r = -0.20$, and $U = 418$, $p = 0.03$, $r = -0.26$. No other significant differences were found.

Self-reports of Alexithymia

We finally analysed whether the previous findings with regard to the self-reports of children's alexithymia could be confirmed in the current study. A multivariate analysis of variance was used, with group (few vs. many somatic complaints) as the independent variable and emotion differentiation and verbal sharing of emotions as dependent variables. Indeed, we found differences between the groups, Hotelling's Trace = 0.62, $F(2,66) = 20.39$, partial $\eta^2 = 0.38$, $p < 0.01$. As was expected, children with many somatic complaints experienced more difficulty in differentiating emotions than their healthy peers, $t(67) = 6.42$, $p < 0.01$ (Table 1). Children with many somatic complaints also seemed to have more difficulty with the verbal sharing of emotions. However, this difference was only significant at a significance level of 0.10, $t(67) = 1.84$, $p = 0.07$, probably due to a smaller sample size in comparison to our previous study.

As children's self-reports of alexithymia and the emotional capacities they showed on each of the tasks seemed to contradict each other, we decided to analyse children's self-reports more thoroughly. Discriminant function analyses were used in order to determine which of the scale items contributed to the discrimination of children with many somatic complaints and children with few somatic complaints. A stepwise procedure was applied. When more than one item is found to discriminate between the groups, a latent variable is created as a linear combination of the discriminating items. This latent variable was more accurate in predicting group membership than each of the items alone. An item was entered in the linear combination at a significance level of 0.05 and deleted at a level of 0.10.

For the items of the differentiating emotions scale, a significant function was found, Wilks' $\lambda = 0.40$, $\chi^2(2, N = 69) = 60.44$, $p < 0.01$. A combination of two items was used for creating the latent variable. The association between the latent variable and all items of the scale are presented in Table 2. These results indicate that children with many somatic complaints experienced difficulty in understanding or placing their feelings, but this concerned *general internal states*. Items that assessed confusion about *specific emotions* did

Table 2. Correlations between items and the latent variables created with discriminant function analyses.

Item	Pooled within group correlation
Experience of undefined internal states	
I am often confused or puzzled about what I am feeling (<i>R</i>)	0.93 ^a
Sometimes I feel upset and have no idea why (<i>R</i>)	0.53 ^a
I never know exactly what kind of feeling I am having (<i>R</i>)	0.26
When I am upset, I don't know if I am sad, scared or angry (<i>R</i>)	0.18
It is difficult to know whether I feel sad, angry or something else (<i>R</i>)	0.15
Difficulty in talking about internal states	
I find it hard to talk to anyone about how I feel (<i>R</i>)	1.00 ^a
I find it difficult to explain to a friend how I feel (<i>R</i>)	0.60
When I am upset about something, I often keep it to myself (<i>R</i>)	0.25
I can easily explain to a friend how I feel inside	0.17
I always like to tell my friends how I am feeling	0.13
When I feel upset, I like to talk about it with a friend	0.08

Notes: (*R*) = reverse coded.

^aVariable used as latent trait predictor.

not contribute to discrimination of children with many or few somatic complaints. We labelled this latent variable 'experience of undefined internal states'. With the created latent variable, classification of both groups was quite accurate: 88.2% for the children with few somatic complaints and 88.6% for the children with many somatic complaints.

For the items of the verbal sharing or emotions scale, we found a significant function as well, Wilks' $\lambda = 0.84$, $\chi^2(1, N = 69) = 11.30$, $p < 0.01$, consisting of only 1 item. Table 2 shows how this latent variable (which in this case was identical to the item) is related to the other items. Based on these results, we can conclude that group differences found on this scale can be attributed to experienced difficulty in talking about internal states by children with many somatic complaints; there is no clear motivational problem to verbally share emotions. Specific feelings or emotions were not referred to in this item. Therefore, 'difficulty in talking about internal states' seems a suitable way of describing the variable. Of the children with few somatic complaints 82.4% could be correctly classified based on this item. Almost all children with few somatic complaints found it easy to talk about internal feelings. Yet, only 54.3% of the children with many somatic complaints was correctly classified. This indicates that those children who experienced difficulty with talking about internal states, reported many somatic complaints. Yet, there were also many children who reported many somatic complaints, but did not experience difficulty in talking about their internal states with others.

Discussion

The subject of this study was the assumption that alexithymia – an inability to recognise or verbalise one's emotions – is related to increased somatic complaints. This assumption was tested by comparing a group of children with many somatic complaints *vs.* a group of children with few somatic complaints on different emotion indices. The frequently noted alexithymic characteristics based on self-reports (Burba et al., 2006; Jellesma et al., 2006; Meade et al., 2001; Rieffe et al., 2006) seemed to be replicated in this study. However, children's answers on the different emotion tasks and a more in-depth analysis of children's self-reports gave more nuanced insights into the exact problems and difficulties of children with many somatic complaints with respect to their emotional functioning.

When we examined children's capacities to refer to emotions spontaneously, to differentiate between various emotions, and to identify their own emotions in relation to emotion-eliciting events, it appeared that, compared to children with few somatic complaints, children who had reported many somatic complaints identified more simultaneous emotions within the negative domain and more often acknowledged feeling sad and scared. Children with many somatic complaints also reported higher intensities of sadness and fear with respect to their own experiences, as well as those of protagonists. No other differences between the two groups appeared with respect to their capacities. These results indicate that children with many somatic complaints have no *deficiencies* in their ability to identify emotions and verbally share them, but their emotional responses are *different* compared to those of children with few somatic complaints. Moreover, further analyses of children's self-reports showed that children with many somatic complaints more often experienced undefined internal states than children with few complaints. Thus, identifying specific emotions or differentiating between them does not seem to be a problem for these children. Rather, children with many somatic complaints report they experience general negative internal feelings which they are unable to further define or place in context. Finally, within the group of children with many somatic complaints, there were more

children, who experienced difficulties in talking about internal states compared to the group of children with complaints. It may be that the experience of ill-defined internal states contributes to perceived difficulties in talking about these feelings.

Two questions arise from these findings. First, in the introduction we stated that children's emotional processing is related to somatic complaints via psychophysiological arousal. If the originally described alexithymic characteristics do not lead to difficulties in dealing with emotional states and related physiological changes, how can this be otherwise explained? In order to answer this question, we have to consider the process through which emotions are experienced and regulated. The first two steps involve having attention for emotional aspects and emotion appraisal (Gross & Thompson, 2007). Attention and appraisal in the sense of emotion identification ability were not associated with somatic complaints in the current study. However, the appraisal of emotions by children with many somatic complaints was different from their peers. They more frequently reported sadness and fear and also had higher intensity ratings for these two emotions. This was in line with the previous study by Rieffe et al. (2004), who found that higher emotion intensities indicated stronger physiological reactions. Moreover, sadness and fear are emotions typically associated with feelings of lower control, and are evoked by situations that are perceived as difficult to change (Kalat & Shiota, 2007). Children with many somatic complaints indeed more often confirm that they perceive situations in life as less controllable (Jellesma et al., 2006). The third step of emotion processing, applying emotion regulation strategies, could therefore be expected to be less effective in children with many somatic complaints. After all, if you feel you are in a situation you cannot control, you may be less likely to successfully cope. Indeed, children who experience chronic somatic complaints are less confident of their ability to change or adapt to stress (Rieffe, Meerum Terwogt, Jellesma, 2007; Walker, Craig, Garber, & Lewis Claar, 2007). Future studies can clarify whether the actual use of coping strategies in children with many somatic complaints is indeed different to that of other children. And even if it proves to be the case that there is a difference in the use of coping strategies, future studies must also investigate whether these differences remain when the children are prompted to use certain coping strategies. After all, if this is not the case, it might be concluded that children with many somatic complaints, guided by their own negative perceptions, are inclined to avoid using adaptive coping mechanisms. Finally, the assumed physiological changes associated with emotional experiences could be addressed in future studies. One limitation of this study was that no physiological measures were included.

The second question is what causes children with many somatic complaints to experience undefined negative internal states. Since the results of this study show that this experience is unlikely to be the results of confusion about emotions, these self-reports are most likely associated with negative moods. Whereas emotions are temporary experiences that arise in response to specific events (Beedie, Terry, & Lane, 2005; Kalat & Shiota, 2007), it has been suggested that moods are affective states without a specific cause (Frijda, 1994). Moods can be thought of as residual affective states that are influenced by a conglomerate of experiences and emotions over time. The sources of negative moods are therefore hard to define and it is not always possible for people to understand why they are in a negative mood (Beedie, Terry & Lane, 2005). Based on the previously mentioned poor emotion regulation of children with many somatic complaints, strong associations between negative moods and somatic complaints in childhood can be expected, and indeed have been reported in previous studies (Campo et al., 2004; Diepenmaat, van der Wal, de Vet, & Hirasing, 2006; Jellesma et al., 2006; Muris & Meesters, 2004). Thus, it is highly likely that the children reporting somatic complaints experience more emotional distress compared to

their peers who report few somatic complaints (Campo et al.; Diepenmaat et al.; Jellesma et al.; Muris & Meesters). The reports of children with many somatic complaints indicating that they often experience indefinable negative internal states are therefore probably a reflection of more frequent negative mood experiences compared to their peers. In future research, this explanation should be further investigated. As group classification (many vs. few somatic complaints) based on the experience of undefined negative internal states was exceptionally accurate in the current study, understanding the exact meaning of these self-reports is highly relevant. We hope that this study will be a stimulation for further research aimed at replicating and extending our findings. As our results are based on various measures in a single sample, new studies could strengthen and validate our conclusions. Moreover, a limitation of this study was that we did not have any information about the children's medical records. As a consequence, it was not known whether children had a known medical or psychological illness and this might have caused a bias in our results. Future studies can address this restriction of the current research.

In conclusion, the results of this study fail to support the alexithymia hypothesis in children. Whereas, children with many somatic complaints have sufficient emotion identification capacities, they show signs of an emotion processing and emotion regulation style that increases the likelihood of intense and long-term negative affect. Therefore, not alexithymia, but (perceived) incompetence in dealing with negative situations and regulating own emotions are likely to increase children's vulnerability to somatic complaints.

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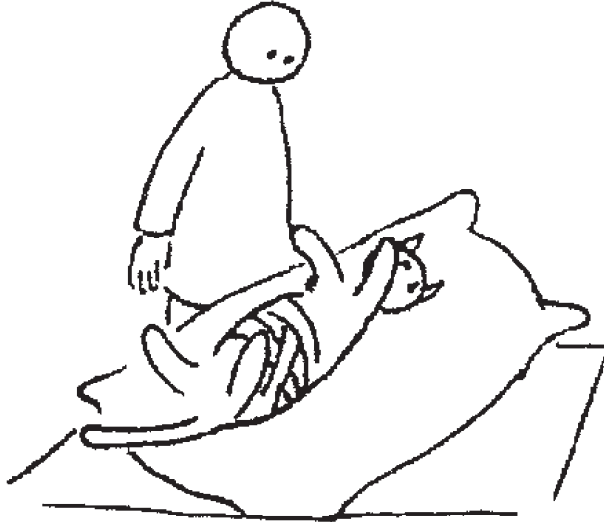
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Appendix: An example of a vignette (mixed emotion task)

Imagine you have a cat and you love her very much. You play a lot with her and she always sleeps in your room. However, the last few days she has been ill, it looks like there is something wrong with her belly. You bring her to the vet. 'Yes', says the vet, 'I have to operate on the cat, but soon, after the operation, she will no longer have pain'.



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