Journal of Environmental Psychology 32 (2012) 225–233

Contents lists available at SciVerse ScienceDirect

Journal of Environmental Psychology

journal homepage: www.elsevier.com/locate/jep

How do children cope with global climate change? Coping strategies, engagement, and well-being

Maria Ojala [a,b,*]

[a] Department of Education, Box 2136, Uppsala University, 750 02 Uppsala, Sweden
[b] Youth & Society, Örebro University, Örebro, Sweden

ARTICLE INFO

Article history:
Available online 8 March 2012

Keywords:
Climate change skepticism
Problem-focused coping
Meaning-focused coping
Optimism
Negative affect
Pro-environmental behavior

ABSTRACT

The aim of this questionnaire study was to explore how Swedish 12-year-olds (n = 293) cope with climate change, and how different coping strategies relate to environmental engagement and well-being. Three coping strategies were identified: problem-focused coping, de-emphasizing the seriousness of climate change, and meaning-focused coping. Problem-focused and meaning-focused coping had positive associations with measures of environmental engagement, while de-emphasizing the threat had negative associations with engagement. Problem-focused coping was positively related to general negative affect, which was explained by the tendency for highly problem-focused children to worry more about climate change. In contrast, the more meaning-focused coping the children used the less they experienced negative affect, and the more they experienced life satisfaction, general positive affect, purpose, and optimism. Finally, moderation analyses revealed that for children high on problem-focused coping; meaning-focused coping, purpose, and optimism worked as buffers against negative affect. The importance of positive emotions for constructive coping is discussed.

1. Introduction

Climate change is one of the most serious threats that humanity is facing today. Since this problem is intertwined with the global pattern of production and consumption there is a need to include the public in efforts toward a sustainable society, and it is perhaps especially important to reach the young generation since they are the future leaders of society. Researchers argue that late childhood and early adolescence are vital when it comes to developing an interest in global environmental problems (Blanchet-Cohen, 2008; Chawla & Flanders Cushing, 2007). Children in this age-group have acquired the capacity for abstract thinking, which allows them to make use of hypotheses and think beyond the concrete and direct situation (Evenshaug & Hallen, 2001), and many have also started to show an interest in the larger world and in global issues (Holden, 2007).

Unfortunately, studies indicate that learning about global problems can trigger profound feelings of anxiety, helplessness, and hopelessness (Eckersley, 1999; Hicks & Bord, 2001; Holden, 2007; Searle & Gow, 2010; Taber & Taylor, 2009; Tucci, Mitchell, & Goddard, 2007). Psychologists have started to recognize climate change as a stressor, and to argue that how people cope with this threat could be important for both engagement and psychological well-being (Homburg & Stolberg, 2006; Homburg, Stolberg, & Wagner, 2007; Reser & Swim, 2011; Stokols, Misra, Runnerstrom, & Hipp, 2009; Swim et al., 2009, 2011). This could be particularly true for children, since they may find it more difficult than adults to deal with the negative emotions that this threat arouses (Fritze, Blashki, Burke, & Wiseman, 2008). There are, however, few studies focusing on how children cope with climate change. The main aims of this study were, therefore, to explore how a group of Swedish 12-year-olds cope with global climate change and to examine how different coping strategies relate to well-being (life satisfaction, negative affect, positive affect) and environmental engagement (environmental efficacy, pro-environmental behavior), as well as optimism concerning climate change and a sense of purpose in life.

In the remainder of the introduction section, first, the concept of coping is defined. Second, studies focusing on how young people cope with societal risks in general are presented, before touching upon the few studies focusing on climate change and coping. Thereafter, the importance of meaning-focused coping will be elaborated upon. Finally, the more specific aims and hypotheses of the study are presented.

* Department of Education, Box 2136, Uppsala University, 750 02 Uppsala, Sweden. Tel.: +46 0 18 4712422.
E-mail address: maria.ojala@edu.uu.se.

0272-4944/$ – see front matter © 2012 Elsevier Ltd. All rights reserved.
doi:10.1016/j.jenvp.2012.02.004

1.1. Coping

According to Lazarus and Folkman (1984), coping concerns humans trying to handle different kinds of psychological stress and threats. Coping is "cognitive and/or behavioral efforts to manage specific external and/or internal demands" (Lazarus & Folkman, 1984, p. 141). This definition implies conscious efforts as opposed to automatic or unconscious behavior, and focuses on efforts rather than the actual outcome of the coping process. The word manage indicates that, for instance, avoiding or accepting the stressful condition, not only mastering the situation, are examples of coping.

The focus in the coping literature is usually on demands or threats at a micro-level, for example, interpersonal problems. However, coping could also be concerned with how one deals with societal threats in order to avoid adverse states such as social alienation and powerlessness (Lazarus & Folkman, 1984). An individual's way of coping with societal threats could have an impact not only on his/her psychological well-being, but also on his/her social engagement (see Van Zomeren, Spears, & Leach, 2010).

The most well-known coping theory was developed by Lazarus and Folkman (1984) and it distinguishes between two main ways of coping; (1) emotion-focused strategies, where the goal is to get rid of negative emotions evoked by a stressor, through for instance avoidance, distancing, and denial-like strategies; and (2) problem-focused strategies, where one concentrates on ways to solve the problem, such as searching for information about what one can do. When it comes to problems at a micro-level, a common finding is that problem-focused coping has a positive influence on mental well-being (Clarke, 2006; Lazarus & Folkman, 1984), while emotion-focused strategies are detrimental to well-being, at least in the long run (for a review see Frydenberg, 2008, pp. 24–25). However, research has shown that whether a coping strategy is constructive or not is context dependent, and that even denial can be beneficial if used for a short time period, for instance, after the sudden death of a loved one (for a review see Lazarus, 1999).

Although many of the main aspects of coping are similar in different age-groups, there are some differences between how adults and early adolescents cope with stress and threats. For example, what is perceived as a stressor could differ between different age-groups. In a review of studies about adolescents and coping, Frydenberg (2008, pp. 2–3) identified three main concerns for this age-group; achievements and future plans such as how one performs in school, interpersonal relations with peers and parents, and societal problems such as environmental risks. Furthermore, children and adolescents do not have as much control over their own behavior as adults; for instance, they are constrained by their parents, and therefore there is a tendency to use problem-focused coping less often than adults do (Ryan-Wenger, 1992). Thus, as pointed out above, coping is dependant to a certain extent on factors such as age and context, but also on the characteristics of the stressor, which will be elaborated on below.

1.2. Coping with societal problems

Even if problem-focused strategies are often adaptive ways of coping with stress at a micro-level, when stressors are uncontrollable or very severe problem-focused coping could actually create more distress (Clarke, 2006). Since societal problems are relatively uncontrollable, some researchers have speculated that this could cause problem-focused coping in this area to be associated with low well-being (Hallis & Slone, 1999). Empirical studies have, however, shown mixed results. When it comes to how young people cope with societal risks such as nuclear war and terrorism, problem-focused coping is sometimes related to feelings of efficacy, engagement, and high well-being (Boehnke, Macpherson, Meador, & Petri, 1989; Silver, Holman, McIntosh, Poulin, & Gil-Rivas, 2002), and sometimes to low well-being and stress (Hallis & Slone, 1999; Heyman, Brennan, & Colarossi, 2010). These mixed results indicate that there are factors that moderate the association between problem-focused coping in relation to societal problems, on the one hand, and well-being, on the other.

Concerning climate change and coping, there is some research performed on adults. In a study by Homburg et al. (2007), problem-solving strategies were positively related to both stress and measures of pro-environmental behavior, while an emotion-focused strategy in the form of denial of guilt was negatively associated with stress and pro-environmental behavior. Furthermore, an experimental study by Van Zomeren et al. (2010) showed that problem-focused coping in relation to the climate threat, in this case equated with group efficacy, led to environmental action intentions.[1] Other studies, although they do not base their arguments on the coping literature, have shown that often various emotion-focused strategies, such as denial or externalization of responsibility, are used to handle climate change psychologically (Lorenzoni, Nicholson-Cole, & Whitmarsh, 2007; Stoll-Kleeman, O'Riordan, & Jaeger, 2001). Although not investigated directly, these strategies are perceived as being detrimental for environmental engagement.

If problem-focused coping is in some instances related to stress and low psychological well-being – which could be especially true for children, since they have less control over their behavior than adults – and if emotion-focused strategies such as distancing and denial may be negatively related to environmental engagement, are there any other ways in which children can cope with the climate threat? In the next section theories about the importance of meaning-focused coping and positive emotions are presented.

1.3. Meaning-focused coping and positive emotions

There are some important aspects missing in the studies mentioned above. Research has shown that emotion-related coping is not only about getting rid of negative feelings, through for instance distancing or by de-emphasizing the seriousness of the problem, but also concerns strategies to evoke positive feelings that can work as buffers hindering negative emotions from turning into low well-being (Folkman, 2008). This way of regulating emotions is called meaning-focused coping. When using meaning-focused strategies, people draw on their beliefs, values, and existential goals to sustain well-being. This form of coping includes strategies such as positive reappraisal, which is about acknowledging the stressor but still being able to reverse one's perspective. Other meaning-focused strategies are finding benefits in a difficult situation, revisions of goals, and spiritual beliefs (Folkman, 2008). These strategies seem to activate positive emotions that can help people face the difficult situation and deal with the stressor constructively. Meaning-focused coping is especially important when the stressor cannot be removed and solved at once (or at all) but still demands active involvement, such as when one has to care for a terminally ill partner (Folkman, 2008; Folkman & Moskowitz, 2000).

Ojala (2007a,b) has argued that there are actually some similarities here with global environmental problems. Even if a person is very active, climate change cannot be solved at once, only in a distant future. Furthermore, the person cannot solve the problem alone; this can only happen at a collective and global level.

[1] It is important to note that this study had a somewhat different conceptualization of problem-focused coping from most studies, in that the focus was on group efficacy rather than individual strategies to find out what one can do about the problem oneself.

However, at an aggregated level all people are contributing to climate change through their lifestyles, and it is therefore important to be active concerning this issue even though no result can be seen directly. Thus, some form of meaning-focused coping, where people do not deny the climate problem but are able to activate positive emotions that can help them to bear the worry associated with the awareness of this threat, could be beneficial for both engagement and well-being.

Meaning-focused coping could perhaps be one important factor that moderates the relation between problem-focused coping and different facets of psychological well-being. That is, it is possible that, for instance, the ability to reverse one's perspective, and see not only threats but also opportunities, could buffer the excessive worry that problem-focused coping may otherwise evoke. In addition, optimism concerning climate change and a general sense of purpose could perhaps also shield highly problem-focused children from low well-being. Optimism, defined as positive outcome expectancies, has been found to be closely related to positive emotions in stressful situations (see Carver & Scheier, 1999). Having identified a purpose/meaning in life has been found to be important for well-being among young people, including early adolescents (Bronk, Hill, Lapsley, Talib, & Finch, 2009), and seems to buffer a high degree of environmental worry from turning into low well-being (Ojala, 2005).

In order to explore more in detail how young people in different age-groups cope with global environmental problems, three qualitative studies were performed (Ojala, 2007a, 2007b, 2008, submitted for publication). One of the strategies identified was named *positive reappraisal/cognitive restructuring* since the young people, after describing their worries about the environmental problems, thought about them in a different way so as to also activate hope. An example was to put the problems into a historical context, where they thought that the awareness of the problem had increased during recent years. Another source of hope was *trust in different societal actors*, covering, for instance, trust in scientists and technological solutions and trust in environmental organizations. These strategies could be seen as meaning-focused coping. *Trust in one's own ability to influence* the environmental problems in a positive direction, a strategy similar to problem-focused coping, was also present. In addition, in one of these studies (Ojala, submitted for publication) different kinds of emotion-focused strategies to de-emphasize the climate threat were identified, both more active strategies, for example thinking that the problem is exaggerated, and more passive strategies, for example claiming that one couldn't be bothered to care about climate change. Thus, the three main coping strategies identified in the coping literature – problem-focused coping, emotion-focused coping, and meaning-focused coping – also seem to be important when it comes to coping with global environmental problems.

1.4. Aims and hypotheses

In the present study, the coping strategies identified in the qualitative studies mentioned above were measured quantitatively in a group of 12-year-olds. The first aim was to investigate whether these could be seen as separate and valid dimensions in a scale measuring coping with climate change among children in late childhood/early adolescence. The focus was on problem-focused coping, meaning-focused coping (positive reappraisal and trust in different societal actors), and emotion-focused coping (de-emphasizing the seriousness of climate change, to not care about climate change). The second aim was to explore the relations between these sub-scales and different measures of psychological well-being (life satisfaction, negative affect, and positive affect), on the one hand, and environmental engagement, on the other (environmental efficacy and pro-environmental behavior). The relations to optimism concerning climate change and a sense of purpose were also investigated. Thereafter, a set of hypotheses were formulated:

(1) A first hypothesis was that problem-focused coping could be negatively related to well-being, since searching for information about what one can do concerning climate change probably increases worry about this threat, at least among children.
(2) A second hypothesis was that for children using a high degree of problem-focused coping, meaning-focused coping ought to function as a buffer against low well-being. That is, for children using a high degree of meaning-focused coping the negative relation between problem-focused coping and well-being ought to be weaker than among children using meaning-focused coping to a lower degree.
(3) A third hypothesis was that for children using a high degree of problem-focused coping, optimism concerning climate change, ought to function as a buffer against low well-being. That is, for children feeling a high degree of optimism the negative relation between problem-focused coping and well-being ought to be weaker than among children feeling less optimistic.
(4) A fourth hypothesis was that for children using a high degree of problem-focused coping, a sense of purpose in life, ought to function as a buffer against low well-being. That is, for children having found a purpose in life the negative relation between problem-focused coping and well-being ought to be weaker than among children not having found a sense of purpose in life.

2. Method

2.1. Procedure and participants

The study took place during autumn/winter 2009 among children living in five municipalities in central Sweden. Active consent was collected from both parents and children. Before the study started, several measures, for instance pilot studies, were taken to ensure that the children would understand the questions in the questionnaire.[2] The study was performed during regular school hours in the classroom and children were ensured anonymity. Teachers were not present, and the questionnaire was administered by trained neutral test leaders.

A total of 402 parents were contacted and asked if they would allow their child to take part in the study. Of these, 85% gave their active consent. In addition, 40 children were not present in the classroom due to vacation or because they were sick, and four children elected not to participate in the study. Thus, 299 children answered the questionnaire, which gives a response rate of 74%. Six of these children were excluded from the analysis because they had not answered the questionnaire in a serious manner, or had not understood the questions, and the subsequent data

[2] A secondary-school teacher read through and gave comments on a first draft of the questionnaire. A smaller pilot group of children talked through the questionnaire with an assistant and made comments. A pilot class answered the questionnaire and made comments on, for instance, items that were hard to understand. At least two trained assistants distributed the questionnaire in the classrooms, and encouraged the pupils to ask questions if they had a hard time understanding a question. In addition, those young people who had reading difficulties (as indicated by the teacher) answered the questionnaire in a separate room where the questions and answer alternatives were read out loud by one of the assistants.

analyses were based on 293 respondents. The sample consisted of 48% girls and 51% boys,[3] and the mean age was 12 years (s.d. = .28).

2.2. Measures[4]

Environmental efficacy was measured with four items. Two captured individual self-efficacy: "I think that I myself can contribute to the improvement of the climate change situation", and "I know there are a number of things that I myself can do in order to improve the climate change problem". Two captured collective efficacy: "I believe that together we can do something about the climate threat", and "I am confident in that we together can solve the climate change problem". The children were asked to indicate how well the items applied to them. Each item was followed by a 5-point scale ranging from "does not apply at all" to "applies very well". Studies with adults have shown that self-efficacy and collective efficacy (group efficacy) in relation to environmental issues seem to be two separate concepts (Homburg & Stolberg, 2006; Van Zomeren et al., 2010). Therefore, a principal component analysis was performed on the four items. However, they did not separate into two factors. Instead, they fell out in one factor, and one scale with good internal reliability (Cronbach's alpha = .86), was created.

Pro-environmental behavior was measured with twelve items capturing both behavior in everyday life (e.g. how often one is: "helping one's parents to recycle", "cycling to school instead of being driven by car") and communicating the need to do something about the environment to other people (e.g. how often one is: "asking one's parents to buy organic food", "trying to influence one's friends or/and peers to care more for the environment"). Each item was assessed on a 5-point scale (almost never, seldom, sometimes, often, almost always). Cronbach's alpha was .88.

Life satisfaction was measured by a Swedish translation of a scale aimed at assessing children's thoughts about their own life (Huebner, 1991). The scale contained seven items (e.g. "I have a good life", "I wish I had a different kind of life"), each answered on a 6-point scale from "does not apply at all" to "applies very well". The Cronbach's alpha was .89.

General negative affect was measured with seven items about anxious and depressive feelings felt during the last week, taken from the Child Depression Scale (Radloff, 1977). Two typical items are: "I have worried about things I don't usually worry about" and "I have felt down and unhappy". *General positive affect* was measured with three items from Radloff's scale. A typical item is: "During the last week I have felt happy". Each item was assessed on a 4-point scale from "not at all" to "often". A principal component analysis with Varimax as the rotation method was conducted on the items to investigate if they can be perceived as two separate scales measuring general negative affect, on the one hand, and general positive affect, on the other. A two-factor structure was suggested by Kaiser's Eigenvalue criterion. This factor solution accounted for 58% of the total variance and the factor loadings were also satisfactory (±.50 or greater) (see Table 1). The alpha reliability for negative affect was .83 and .76 for the scale measuring positive affect.

Optimism concerning climate change was captured by three items: "I feel hopeful that we will fix the climate change problem in the future", "I think we will solve the climate problem in the future", and "I believe the future looks bright when it comes to climate change". The children were asked to indicate how well the items applied to them on a 5-point scale ranging from "does not apply at all" to "applies very well". Cronbach's alpha was .80.

Table 1
The two-factor solution of the affect scale with rotated factor loadings.

Principal component analysis (PCA)		
Factor labels and sub-scales	General negative affect	General positive affect
Felt worried	.67	
Not felt happy	.63	
Down and unhappy	.71	
Felt like I wanted to cry	.79	
Felt sad	.79	
Felt like others don't like me	.60	
Felt scared	.63	
I have laughed		.82
Felt happy		.86
I have had a good time		.73
Percent of variance explained	43	15

Note. Principal component analysis was used as the extraction method, with varimax rotation.

Purpose in life was measured by four items taken from the Revised Youth Purpose Survey (Bundick et al., 2006).[5] These items measure whether one has found a purpose in life (1 item), how important this purpose is for one's self (2 items), and the depth of one's engagement; that is, if one is engaged in any organization that supports one's purpose (1 item). The children were asked to indicate how well the items applied to them on a 6-point scale ranging from "does not apply at all" to "applies very well". Cronbach's alpha was .72.

Worry about climate change was measured by five items asking how much the children worried about negative consequences caused by climate change for themselves, their close ones, future generations, people living in economically deprived countries, and animals/nature. Each item was answered on a 6-point scale ranging from "not at all" to "very much". Cronbach's alpha was .89.

3. Results

3.1. The coping scale

The children were given the following instruction: "When one hears about societal problems such as climate change, one can feel worried or upset. Below is a list and for every item we would like you to indicate how well it applies to what you *do* or *think* when you are reminded of climate change. Choose the alternative that you feel best applies to you, and choose only one alternative per item." The response alternatives were: "not true at all", "not very true", "fairly true", "very true", and "completely true". The list contained statements taken from qualitative studies with different age-groups of young people (see Section 1.2) capturing different facets of trust in other actors, positive reappraisal, problem-focused coping, and strategies to de-emphasize the seriousness of climate change.

After initial principal component analyses and reliability analyses the items that are presented in Table 2 remained in the scale. This is the result of a Principal component analysis with Varimax rotation. Using Kaiser's eigenvalue criterion, the items fell out in three separate sub-scales with acceptable Cronbach's alphas; (1) Meaning-focused coping (positive reappraisal including trust) (α = .76), (2) De-emphasizing the seriousness of climate change

[3] Four children did not indicate sex.

[4] At all times, the arithmetic mean of the items in the scales for every person was used to create aggregated measures.

[5] The original scale was developed as part of "The Stanford Center on Adolescence Youth Purpose Project", partly financed by "The John Templeton Foundation and the Thrive Foundation for Youth."

Table 2
The three factor solution of the coping scale with rotated factor loadings.

	Principal component analysis (PCA)					
	Meaning-focused coping		De-emphasizing/don't care		Problem-focused coping	
	More and more people have started to take climate change seriously	.59	I think that the problem is exaggerated	.69	I think about what I myself can do	.68
	I have faith in humanity; we can fix all problems	.77	I don't care since I don't know much about climate change	.62	I search for information about what I as a child can do	.84
	I trust scientists to come up with a solution in the future	.69	Climate change is something positive because the summers will get warmer	.70	I talk with my family and friends about what one can do to help	.80
	I have faith in people engaged in environmental organizations	.70	I can't be bothered to care about climate change	.66		
	I trust the politicians	.58	Nothing serious will happen during my lifetime	.51		
	Even though it is a big problem, one has to have hope	.61	Climate change does not concern those of us living in Sweden	.62		
Percent of variance explained		25		19		9

Note. Principal component analysis was used as the extraction method, with varimax rotation.

($\alpha = .75$), and (3) problem-focused strategies ($\alpha = .76$). This factor solution accounted for 52.5% of the total variance and the factor loadings were satisfactory (±.50 or greater) (see Table 2). It is notable that positive reappraisal and trust fell into one factor, as did the "active" and "passive" emotion-focused strategies.

3.2. How do the different coping strategies relate to engagement and well-being?

Table 3 shows the results of Pearson's correlation analyses between the three coping strategies and measures of engagement and well-being. Problem-focused coping and meaning-focused coping were positively related to environmental efficacy, pro-environmental behavior, optimism concerning climate change, and a sense of purpose. In addition, problem-focused coping had a positive relation to general negative affect; that is, the more problem-focused coping the children used, the more likely it was that they also experienced more negative affect. However, there were no significant relations between problem-focused coping and the other two measures of well-being, life satisfaction and positive affect. Children who tended to use a high degree of meaning-focused coping were, on the other hand, less likely to experience negative affect and more likely to experience life satisfaction and general positive affect. In addition, de-emphasizing the seriousness of climate change was negatively related to environmental efficacy and pro-environmental behavior. However, the more the children used this coping strategy, the less likely they were to feel a high degree of depressive and anxious feelings (general negative affect).

Table 3
Pearson correlations between the three coping strategies and measures of environmental engagement and well-being.

	Meaning-focused coping	De-emphasizing/don't care	Problem-focused coping
Optimism concerning climate change	.61*** ($n = 287$)	−.04 ($n = 282$)	.18** ($n = 290$)
Environmental efficacy	.43*** ($n = 287$)	−.39*** ($n = 282$)	.51*** ($n = 290$)
Pro-environmental behavior	.29*** ($n = 288$)	−.38*** ($n = 283$)	.70*** ($n = 289$)
General negative affect	−.12*($n = 288$)	−.16** ($n = 283$)	.19*** ($n = 291$)
General positive affect	.13* ($n = 288$)	.06 ($n = 283$)	.03 ($n = 291$)
Life satisfaction	.22*** ($n = 288$)	.10 ($n = 283$)	−.01($n = 291$)
Purpose in life	.13* ($n = 286$)	−.05 ($n = 281$)	.31*** ($n = 289$)

Note. *$p \leq .05$; **$p \leq .01$; ***$p \leq .001$.

3.3. Is problem-focused coping associated with general negative affect because these strategies make children more worried about climate change?

Since problem-focused coping was only significantly related to one of the well-being measures, negative affect, only the hypothesis that problem-focused coping is positively related to general negative affect because these strategies make children more worried about climate change, was investigated. The first step was to correlate problem-focused coping with worry about climate change. A significant positive relation was identified, with $r = .48^{***}$ ($n = 292$; ***$p \leq .001$). Next, a partial correlation analysis was performed between problem-focused coping and general negative affect, with worry as a control variable. When controlling for worry, the relation between problem-focused coping and negative affect was no longer significant, with $r = .03$ ($n = 287$). Thus, the hypothesis was confirmed.

The next three sections cover the hypotheses that meaning-focused coping, optimism concerning climate change, and a sense of purpose can buffer highly problem-focused children from low psychological well-being. Since problem-focused coping was only significantly related to one of the well-being measures, negative affect, the focus is solely on this facet of well-being.

3.4. Does meaning-focused coping buffer against a high degree of general negative affect for children high on problem-focused coping?

First, a hierarchical multiple regression analysis was performed to assess the possible moderating effect of meaning-focused coping on the relationship between problem-focused coping and negative affect.[6] In a first step, problem-focused coping was found to be a unique significant positive predictor, $\beta = .25$, $p \leq .001$, of negative affect while meaning-focused coping was a significant negative predictor, $\beta = -.20$, $p \leq .001$. A significant interaction term between these two variables was also present, $\beta = -19$, $p \leq .001$; that is, in the second step in the model, the added variance explained by the interaction term was significant, $\Delta R^2 = .04$, $p \leq .001$.[7] The main effects also remained significant in the second step; problem-focused coping, $\beta = .27$, $p \leq .001$, and meaning-focused coping, $\beta = -.23$, $p \leq .001$.

Second, the interaction effect was plotted in order to clarify its nature. As shown in Fig. 1, the positive relation between problem-

[6] In all the regression analyses, the independent variables were transformed into z-scores to minimize problems of multicollinearity (Aiken & West, 1991).

[7] The final model was significant, $F(3, 284) = 11.27$; $p \leq .001$; $R^2 = .11$.

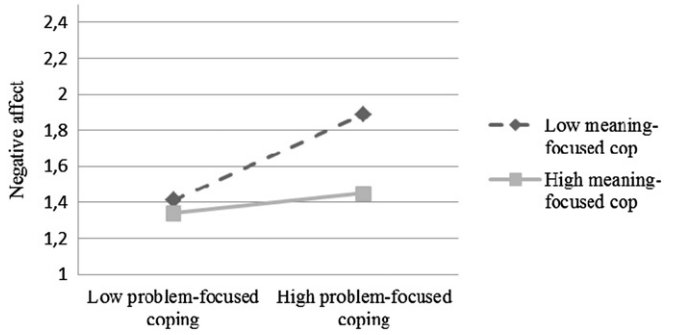

Fig. 1. The moderating role of meaning-focused coping on the relation between problem-focused coping and negative affect. Low values = −1 SD and high values = +1 SD.

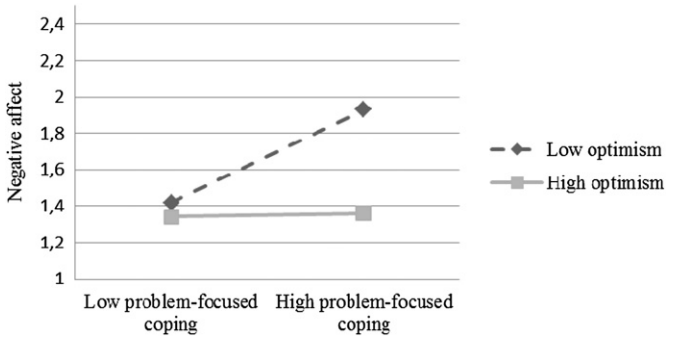

Fig. 2. The moderating role of optimism concerning climate change on the relation between problem-focused coping and negative affect. Low values = −1 SD and high values = +1 SD.

focused coping and negative affect was stronger for low meaning-focused coping than for high levels.[8] In addition, simple slope analysis (Aiken & West, 1991) showed that problem-focused coping significantly predicted negative affect for children low on meaning-focused coping, $\beta = .44$, $p \leq .001$, but not for children high on meaning-focused coping, $\beta = .10$, $p = .175$. Thus, using meaning-focused coping to deal with the climate threat seems to shield children who use a lot of problem-focused coping from a high degree of general negative affect.

3.5. Does optimism concerning climate change buffer against a high degree of general negative affect for children high on problem-focused coping?

The results of a hierarchical regression analysis showed that problem-focused coping was a unique significant positive predictor of negative affect, $\beta = .24$, $p \leq .001$, while optimism was a significant negative predictor, $\beta = -.25$, $p \leq .001$. Thereafter, the interaction term between these two variables were entered in a second step and was also found to be a significant predictor, $\beta = -.23$, $p \leq .001$, that is, it contributed significantly to the explained variance, $\Delta R^2 = .05$, $p \leq .001$.[9] In addition, the main effects remained significant; problem-focused coping, $\beta = .24$, $p \leq .001$, and optimism, $\beta = -.30$, $p \leq .001$.

A plot of the interaction term is shown in Fig. 2. The positive relation between problem-focused coping and negative affect was much stronger for low optimism than for high optimism, where the relation was virtually null. A simple slope analysis (Aiken & West, 1991) showed that problem-focused coping significantly predicted negative affect for children low on optimism concerning climate change, $\beta = .46$, $p \leq .001$, but not for children high on optimism, $\beta = .02$, $p = .835$. Hence, optimism seems to buffer highly problem-focused children from a high degree of negative affect.

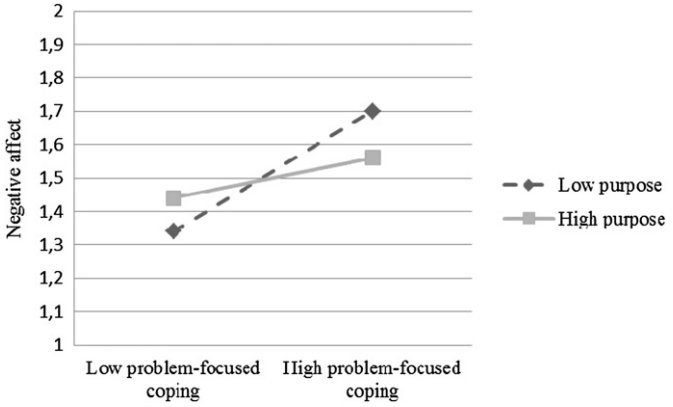

Fig. 3. The moderating role of a sense of purpose on the relation between problem-focused coping and negative affect. Low values = −1 SD and high values = +1 SD.

3.6. Does a sense of purpose buffer against a high degree of general negative affect for children high on problem-focused coping?

Again a hierarchical regression analysis was performed. In the first step, problem-focused coping was a unique significant positive predictor of negative affect, $\beta = .20$, $p \leq .001$, while purpose had no significant impact on negative affect, $\beta = -.02$, $p = .80$. However, in a second step there was a significant interaction effect between purpose and problem-focused coping, $\beta = -.12$, $p \leq .05$; $\Delta R^2 = .01$, $p \leq .05$.[10] Furthermore, the main effect for problem-focused coping remained significant in the second step, $\beta = .22$, $p \leq .001$.

In order to interpret this result, the interaction was plotted (see Fig. 3), showing a slightly more complicated picture. Among children who used a lot of problem-focused coping, those who experienced a high degree of purpose felt less negative affect than those who experienced a low degree of purpose, indicating that purpose works as a buffer against negative affect for these children. However, among children who scored low on problem-focused coping, a high degree of purpose was actually associated with a higher degree of negative affect than was a low degree of purpose. In addition, a simple slope analysis (Aiken & West, 1991) showed that problem-focused coping significantly predicted negative affect for children low on purpose, $\beta = .33$, $p \leq .001$, but for children high on purpose the relation was weaker and not significant, $\beta = .11$, $p = .139$. Hence, purpose seems to buffer highly problem-focused children from a high degree of negative affect.

4. Discussion

Researchers have started to argue that the way people cope psychologically with climate change is important both for mental well-being and for environmental engagement, and that this could be particularly true in younger age-groups. However, few empirical

[8] Throughout the article the value for high levels = +1 SD and the value for low levels = −1 SD.

[9] The final model was significant, $F(3, 284) = 16.58$; $p \leq .001$; $R^2 = .15$.

[10] The final model was significant, $F(3, 283) = 5.02$; $p \leq .01$; $R^2 = .05$.

studies have been performed on how young people cope with this threat. The present study was aimed at filling this gap in the literature. Three reliable coping strategies were identified; meaning-focused coping (positive reappraisal/trust), de-emphasizing the seriousness of climate change, and problem-focused coping. How these coping strategies relate to measures of psychological well-being and environmental engagement was explored.

4.1. Problem-focused coping and emotions-focused coping

In the study it was shown that to use a high degree of problem-focused coping (e.g. searching for information about what one as a child can do about climate change) seems to have both positive and negative consequences. If the goal is to encourage pro-environmental behavior and environmental efficacy, then it seems that a useful strategy would be to help children cope with climate change through problem-focused coping. This result is supported by a study conducted on adults (Homburg et al., 2007). However, in the present study, children who used problem-focused coping to a large extent also had a tendency to feel a high degree of general negative affect; that is, to experience anxious and depressive feelings in their everyday life. This is in accordance with researchers who argue that problem-focused coping concerning stressors that are relatively uncontrollable, such as societal problems, could be associated with lower mental well-being (Clarke, 2006; Heyman et al., 2010).

Even though the present study's design precludes any causal analyses, the result of the partial correlation analysis could be interpreted to mean that the use of problem-focused coping may trigger worry about climate change, which in turn makes children inclined to feel more negative affect in general. Children have even less control than adults over their own behavior concerning climate change; this could be why problem-focused strategies make them more worried, rather than helping them to experience a higher degree of control over the situation.

An alternative explanation is that children who experience a high degree of negative affect in general also experience more negative feelings when it comes to climate change, and that this worry motivates them to search for information about what they can do about the problem; that is, to use more problem-focused coping. This explanation is supported by studies showing that worry about nuclear war to a certain extent is a subtype of a general tendency to experience a high degree of negative affect (Hamilton, Keilin, Knox, & Naginey, 1989; Hollin, 1991). Further support comes from research showing that worry often focuses people's attention on the stressor followed by an intense search for possible solutions (for a review see Marcus, 2002).

That children who de-emphasize the seriousness of climate change as a way to cope, experience a lower degree of environmental efficacy and also do not behave as pro-environmentally as children who use these strategies to a lower degree is perhaps not a surprising result. However, this is still a novel empirical finding. A somewhat similar relation was identified in a study of how adolescents cope with the nuclear threat (Thearle & Weinreich-Haste, 1986). One can speculate whether it is these strategies to psychologically handle climate change that lead to a lower degree of felt efficacy, or if it is that children who believe that they and other laypeople cannot do anything concerning this issue – who perhaps even feel helpless in general concerning societal issues – develop these coping strategies as a response to these feelings of powerlessness. It is also interesting to note that this coping strategy has a negative relation to general negative affect, which indicates that it indeed is a way to regulate emotions, and not simply a "cold" cognitive view of climate change.

4.2. Meaning-focused coping, optimism, and purpose

Perhaps the most interesting results of this study are those concerning the use of meaning-focused coping, including strategies such as positive reappraisal and trust. In previous studies about coping with societal threats, the focus has mostly been on problem-focused coping, on the one hand, and emotion-focused strategies, on the other. However, studies about coping at a micro-level show that meaning-focused coping is aimed more at activating positive emotions than at getting rid of negative emotions (Folkman, 2008). In accordance with this, meaning-focused coping was the only strategy that had a significant relation, positive in this case, to general positive affect. Children using this coping strategy also experienced more optimism concerning climate change, and in this case the correlation was strong. Furthermore, the more meaning-focused coping the children used, the more they experienced life satisfaction, and the more they were inclined to behave pro-environmentally and to feel a high degree of environmental efficacy. Again, the data cannot show the direction of causality; however, an experimental study has shown that having trust in societal actors concerning climate change (group efficacy) leads to environmental action intentions (Van Zomeren et al., 2010). In addition, it could be an underlying optimistic personality or beneficial social circumstances that explain the use of this coping strategy (as well as well-being and environmental engagement).

More importantly, the meaning-focused strategies, trust and positive reappraisal, as well as optimism concerning climate change worked as buffers against a high degree of general negative affect among highly problem-focused children. These results are in accordance with studies about stressors at a micro-level that are hard to control but still demand that one is actively involved, showing the importance of meaning-focused coping and positive emotions for mental well-being (Folkman, 2008; Folkman & Moskowitz, 2000; Ojala, 2005).

Finally, a sense of purpose, which is a more identity-related concept, also seems to buffer highly problem-focused children from negative affect. This result is in accordance with a study showing that adolescents who worried a lot about global environmental problems were shielded from low subjective well-being by having found a sense of meaning (Ojala, 2005). However, a more surprising result is that for children who used problem-focused coping to a low degree, scoring high on the measure of purpose was actually related to stronger negative affect. This contradicts the notion that purpose in general has a positive relation to well-being (see for instance Bronk et al., 2009).[11] This result is perhaps spurious; however, embedded in the purpose measure are an interest in the larger world and also an engagement in organizations supporting one's purposes in life. For these children, it is perhaps normal to be problem-focused, that is, to search for information about what one can do when it comes to societal problems, and those who are not are youths that are more depressed or anxious.

4.3. Strengths and limitations

Despite the theoretically meaningful findings, some limitations of the current study should be mentioned. Due to the lack of scales measuring environmental engagement among children, many of the scales in this study were created by the author. Even though in many cases they were developed from qualitative pilot studies with young people, and the face validity therefore ought to be high, and although the internal consistencies of the scales were satisfactory,

[11] Purpose in life had no significant direct relation to general negative affect $r = .05$ ($n = 287$).

future studies are needed to further test the validity of the scales. For instance, how they relate to other similar measures ought to be investigated. This is particularly important when it comes to the coping scale. When it comes to, for example, the measures of optimism and self-efficacy, the scales used in the analyses reported in this article, only included questions worded for answers in one direction. Reversed questions were included in the questionnaire, but when factor analyses were performed on all items they did not fall into one consistent scale. This indicates that, for example, optimism and pessimism concerning climate change are not two endpoints on a scale, but rather two separate constructs, which is in accordance with theories about the independence of positive and negative affect (Cacioppo, Gardner, & Berntson, 1999). Nevertheless, in order to avoid response bias, future studies should use scales which include other, and better, reversed items.

Still, the obvious strength of this study is that it is the first that focuses on the importance of meaning-focused coping and positive emotions for coping with climate change among children; and as such, the study is a valuable theoretical contribution to both environmental psychology and the coping literature. The study also has practical implications, both for parents searching for advice on how to talk with their children about climate change, and not least, for teachers involved in education for sustainable development.

4.4. Practical implications

This study reveals a dilemma: in this age-group, problem-focused coping may not be enough to avoid excessive negative affect from environmental worry, but it is still important to encourage problem-focused strategies because of their positive relations to environmental engagement. However, the study also identifies a solution to this dilemma. Teachers, for example, while focusing on problem-focused strategies, could also emphasize positive thinking, trust in different societal actors, and optimism concerning climate change, since these factors seem to shield children who use problem-focused coping from a high degree of negative affect but also have positive relations to pro-environmental behavior and environmental efficacy.

This does not mean that teachers should encourage naïve and uncritical trust and unrealistic optimism. However, research has shown that it is vital to avoid extreme cynicism and black-and-white thinking among pupils concerning, for example, politicians and scientists, since this often leads to feelings of helplessness (see Colby, Beaumont, Ehrlich, & Corngold, 2007, 153). It is important to help young people develop a nuanced appreciation of the complexity and dilemmas that different societal actors face. One possible strategy could be to organize meetings between young people and societal actors who have worked with the climate issue for a long time and who have faced and overcome challenges (see Colby et al., 2007, 154).

Concerning optimism, studies have shown that young people are to a large extent trapped in a discourse of threat and gloom when it comes to global problems (Eckersley, 1999; Reid, Payne, & Cutter-Mackenzie, 2010). Being caught up in the popular media's apocalyptic images is hardly beneficial for critical thinking about these issues. Here, teachers could encourage young people to search for alternative stories about the future, not only in scientific textbooks, but also in art and literature; these stories could be used as a basis for critical and creative discussions (see Reid et al., 2010). Trust and optimism need not be antithetical to critical thinking, but rather can help children to take in facts about climate change and discuss ethical issues in a constructive way (for related arguments see Folkman, 2008). In addition, when a person takes global environmental problems seriously and when hope is based on positive reappraisal and trust, this emotional cognitive concept has been found to relate positively to environmental engagement (Ojala, 2008, 2011). Thus, optimism/hope is not only a solace, but also seems to be a motivational force.

Teachers should also be aware of denial-like patterns of thinking, where the young de-emphasize the seriousness of climate change. It is important to encourage young people to put these thoughts into words, so that they can be discussed critically in the classroom (see Ojala, 2011). Otherwise, it will most probably be difficult to reach out to the young people who hold them with facts and ethical arguments.

4.5. Future studies

The study is to a large extent explorative in nature, and as such it evokes more questions than it answers. Future studies should for instance investigate whether the results identified are also present in other age-groups, or if they are age-specific to 12-year-olds. Furthermore, in order to know more about which comes first, coping strategies or well-being and engagement, experimental and longitudinal studies are needed.

In addition, research about coping has started to acknowledge that coping is not something that takes place in isolation, but also concerns how people interact and talk with others about threats and stress (Folkman, 2009). Thus, coping with climate change in a social context, for instance, how young people communicate with teachers, parents, and friends about emotions in relation to climate change, should be investigated in future studies.

Acknowledgments

This research was supported by research grants from the Swedish Research Council Formas and the Swedish Energy Agency. During the collection of the data and the writing of the article Maria Ojala was a post-doctoral researcher in psychology at Örebro University, affiliated with two research centers Youth & Society and Centre for Urban and Regional Studies. Many thanks to Professor Maria Tillfors for constructive comments on an earlier version of this paper.

References

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Newbury Park, CA: Sage Publications.

Blanchet-Cohen, N. (2008). Taking a stance: Child agency across the dimension of early adolescents' environmental involvement. *Environmental Education Research, 14*(3), 257–272.

Boehnke, K., Macpherson, M. J., Meador, M., & Petri, H. (1989). How West German adolescents experience the nuclear threat. *Political Psychology, 10*, 419–443.

Bronk, K. C., Hill, P., Lapsley, D., Talib, N., & Finch, H. (2009). Purpose, hope, and life-satisfaction in three age groups. *Journal of Positive Psychology, 4*(6), 500–510.

Bundick, M., Andrews, M., Jones, A., Mariano, J. M., Bronk, K. C., & Damon, W. (2006). *Revised youth purpose survey*. Stanford, CA: Unpublished instrument, Stanford Center on Adolescence.

Cacioppo, J. T., Gardner, W. L., & Berntson, G. G. (1999). The affect system has parallel and integrative processing components: Form follows function. *Journal of Personality and Social Psychology, 76*(5), 839–855.

Carver, C. S., & Scheier, M. F. (1999). Optimism. In C. R. Snyder (Ed.), *Coping: The psychology of what works* (pp. 182–204). New York: Oxford University Press.

Chawla, L., & Flanders Cushing, D. (2007). Education for strategic environmental behaviour. *Environmental Education Research, 4*, 437–452.

Clarke, A. T. (2006). Coping with interpersonal stress and psychosocial health among children and adolescents: A meta analysis. *Journal of Youth and Adolescence, 35*(1), 11–24.

Colby, A., Beaumont, E., Ehrlich, T., & Corngold, J. (2007). *Educating for democracy*. San Francisco: Jossey-Bass.

Eckersley, R. (1999). Dreams and expectations: Young people's expected and preferred futures and their significance for education. *Futures, 31*, 73–90.

Evenshaug, O., & Hallen, D. (2001). *Barn- och ungdomspsykologi*. [*Child, and youth psychology*]. Lund: Studentlitteratur.

Folkman, S. (2008). The case for positive emotions in the stress process. *Anxiety, Stress & Coping: An International Journal, 21*(1), 3–14.

Folkman, S. (2009). Commentary on the special section "Theory-based approaches to stress and coping": Questions, answers, issues, and next steps in stress and coping research. *European Psychologist, 14*, 72–77.
Folkman, S., & Moskowitz, J. T. (2000). Positive affect and the other side of coping. *American Psychologist, 55*(6), 647–654.
Fritze, J. G., Blashki, G. A., Burke, S., & Wiseman, J. (2008). Hope, despair and transformation: Climate change and the promotion of metal health and well-being. *International Journal of Mental Health Systems, 7*(2), 2–13.
Frydenberg, E. (2008). *Adolescent coping. Advances in theory, research, and practice*. New York: Routledge.
Hallis, D., & Slone, M. (1999). Coping strategies and locus of control as mediating variables in the relation between exposure to political life events and psychological adjustment in Israeli children. *International Journal of Stress Management, 6*, 105–123.
Hamilton, S. B., Keilin, W. G., Knox, T. A., & Naginey, J. L. (1989). When thoughts turn toward nuclear war: Stress responses, coping strategies, and the importance of trait anxiety in moderating effects on "Mental health". *Journal of Applied Social Psychology, 19*(2), 111–139.
Heyman, J. C., Brennan, M., & Colarossi, L. (2010). Event-exposure stress, coping, and psychological distress among New York students at six months after 9/11. *Anxiety, Stress, & Coping, 23*(2), 153–163.
Hicks, D., & Bord, A. (2001). Learning about global issues: Why most educators only make things worse. *Environmental Education Research, 7*(4), 413–425.
Holden, C. (2007). Young people's concerns. In D. Hicks, & C. Holden (Eds.), *Teaching the global dimension: Key principles and effective practice* (pp. 31–42). New York: Routledge.
Hollin, C. R. (1991). Concern about the threat of nuclear war: Just another worry? *Anxiety Research, 4*(1), 51–60.
Homburg, A., & Stolberg, A. (2006). Explaining pro-environmental behavior with a cognitive theory of stress. *Journal of Environmental Psychology, 26*, 1–14.
Homburg, A., Stolberg, A., & Wagner, U. (2007). Coping with global environmental problems development and first validation of scales. *Environment and Behavior, 39*, 754–778.
Huebner, E. S. (1991). Further validation of the Students' Life Satisfaction Scale: The independence of satisfaction and affect ratings. *Journal of Psychoeducational Assessment, 9*, 363–368.
Lazarus, R. S. (1999). *Stress and emotions: A new synthesis*. New York: Springer Publishing Company.
Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer Publishing Company.
Lorenzoni, I., Nicholson-Cole, S., & Whitmarsh, L. (2007). Barriers to engaging with climate change among the UK public and their policy implications. *Global Environmental Change, 17*, 445–459.
Marcus, G. E. (2002). *The sentimental citizen. Emotion in democratic politics*. University Park, PA: The Pennsylvania State University Press.
Ojala, M. (2005). Adolescents' worries about environmental risks: Subjective well-being, values, and existential dimensions. *Journal of Youth Studies, 8*(3), 331–347.
Ojala, M. (2007a). Confronting macrosocial worries. Worry about environmental problems and proactive coping among a group of young volunteers. *Futures, 39*(6), 729–745.
Ojala, M. (2007b). *Hope and worry: Exploring young people's values, emotions, and behavior regarding global environmental problems*. Örebro Studies in Psychology 11. Örebro University. Doctoral dissertation.
Ojala, M. (2008). Recycling and ambivalence: Quantitative and qualitative analyses of household recycling among young adults. *Environment and Behavior, 40*(6), 777–797.
Ojala, M. (2011). Hope and climate change: The importance of hope for environmental engagement among young people. *Environmental Education Research*. doi:10.1080/13504622.2011.637157, On line first.
Ojala, M. *Regulating worry, promoting hope: How children, adolescents, and young adults cope with climate change*, submitted for publication.
Radloff, L. S. (1977). The CES-D scale. A self-report depression scale of research in the general population. *Applied Psychological Measurement, 1*, 385–401.
Reid, A., Payne, P. G., & Cutter-Mackenzie, A. (2010). Openings for researching environment and place in children's literature: ecologies, potentials, realities and challenges. *Environmental Education Research, 16*, 429–461.
Reser, J. P., & Swim, J. K. (2011). Adapting to and coping with the threat and impacts of climate change. *American Psychologist, 66*(4), 277–289.
Ryan-Wenger, N. M. (1992). A taxonomy of children's coping strategies. *American Journal of Orthopsychiatry, 62*(2), 259–263.
Searle, K., & Gow, K. (2010). Do concern about climate change lead to distress? *International Journal of Climate Change Strategies and Management, 2*(4), 362–378.
Silver, R. C., Holman, E. A., McIntosh, D. N., Poulin, M., & Gil-Rivas, V. (2002). Nationwide longitudinal study of psychological responses to September 11. *Journal of the American Medical Association, 288*(10), 1235–1244.
Stokols, D., Misra, S., Runnerstrom, M. G., & Hipp, A. J. (2009). Psychology in an age of ecological crisis. From personal angst to collective action. *American Psychologist, 64*(3), 181–193.
Stoll-Kleeman, S., O'Riordan, T., & Jaeger, C. C. (2001). The psychology of denial concerning climate change mitigation measures: Evidence from Swiss focus groups. *Global Environmental Change, 11*, 107–117.
Swim, J. K., Clayton, S., Doherty, T. J., Gifford, R., Howard, G., Reser, J. P., et al. (2009). *Psychology and global climate change: Addressing a multi-faceted phenomenon and set of challenges*. Report from the American Psychological Association (APA).
Swim, J. K., Stern, P. C., Doherty, T. J., Clayton, S., Reser, J. P., Weber, E. U., et al. (2011). Psychology's contributions to understanding and addressing global climate change. *American Psychologist, 66*(4), 241–250.
Taber, F., & Taylor, N. (2009). Climate of concern – A search for effective strategies for teaching children about global warming. *International Journal of Environmental & Science Education, 4*(2), 97–116.
Thearle, L., & Weinreich-Haste, H. (1986). Ways of coping; adolescents' response to nuclear threat. *International Journal of Mental Health Systems, 15*, 126–142.
Tucci, J., Mitchell, J., & Goddard, C. (2007). *Children's fears, hopes and heroes. Modern childhood in Australia*. Monash University: National Research Centre for the Prevention of Child Abuse.
Van Zomeren, M., Spears, R., & Leach, C. W. (2010). Experimental evidence for a dual pathway model analysis of coping with the climate crises. *Journal of Environmental Psychology, 30*(4), 339–346.