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## CHANGING CHILDREN'S ENVIRONMENTAL ATTITUDES BY CHANGING THE FAMILIAR STORIES? RESULTS OF AN EXPERIMENT

### Abstract

This paper presents the results of an experiment regarding a pre-test and post-test study of environmental attitudes in children before and after reading a particular collection of eco-stories.

The main aim of this research was to empirically establish whether reading literature with an explicit eco-pedagogical dimension would improve children's environmental attitudes. Four eco-stories were read to children over a 3-4-week period in a school environment. The experiment was performed with 5<sup>th</sup> and 6<sup>th</sup> graders (mostly 11-year-old children), in two eco-schools and two regular schools in wider Split area. It was presumed that results would differ due to differing levels of previous eco-education. Children read stories from the collection *Fairy-Tales for a Better Tomorrow* (2010) in which popular children's literary and media texts are reworked in an environmentally aware fashion. To obtain the answers to the posed questions, a mix of instruments was used: quantitative pre- and post-reading questionnaires, open-ended comprehension questions in story response sheets, as well as autonomous creation of children's own stories. Eco-school students were found to have more positive environmental attitudes overall, but no difference of attitudes was shown before vs. after reading the eco-stories across both groups of schools. Results of this study are compared to a recent study with opposing results (Ebersbach and Brandenburger 2020), whereas some suggestive trends emerging from the present study are discussed. Most notably, we have arrived at the trend suggesting a correlation of children's previous environmental education and personal experience to the way they read and respond to eco-stories.

Key words: children's literature, empirical ecocriticism, environmental attitudes, environmental education, environmental values

## 1. Introduction: eco-literature in the Croatian context

Studies in empirical ecocriticism have taken the aim of probing the assumptions often held by humanities, especially literary studies scholars, and the wider public regarding the effects reading literature may have. One such assumption, also present in ecocriticism, is that literature can have an impact on our beliefs, values, and, ultimately, behaviours (Glotfelty 1996: xix; Małecki 2018: 55). Children's literature (unlike literature for adults) is more easily seen, used, and circulated as a means of educational transferral of values (Dobrin and Kidd 2004, Presthus Heggen et al. 2019), both in the classroom and in free time. Stories are considered an "appropriate tool in children's environmental education" (Altun 2018 in Ebersbach and Brandenburger 2020: 2) and, more generally, "intervention studies that aim at changing the ecological attitudes and behaviour of children and adolescents are still rare and often include poor methodologies" (Altun 2018 in Ebersbach and Brandenburger 2020: 3).

The aim of this research was to empirically evaluate children's responses to reading stories with an explicit eco-pedagogical dimension, i.e. that of raising *environmental awareness*. Environmental awareness and its implicit set of values may, of course, be acquired and strengthened in reading literature not written primarily with that aim in mind (cf. Małecki et al. 2018: 62). All texts and reading process are, in the social constructionist view, seen as always productive, whether moving towards or away from a specific cultural understanding, value, etc. Empirical ecocriticism, however, seeks precision and clarity in researching whether particular types of texts can have an effect on environmental attitudes and behaviours (in specific contexts and for specific publics). In the present study, we chose stories from a children's literature collection which directly aims to educate readers on the present ecological crises, namely climate change, while presenting possible ways of dealing with them.

The collection we used as a stimulus, titled *Fairy-Tales for a Better Tomorrow*, comprises seven short stories and verse narratives published in Croatia in 2011. Their primary audience is children, but the book advertises as "for children and adults" (back cover), acknowledging that the latter too might benefit from the narratives' provocations. The over-arching characteristic of this collection is that the stories take up plots and characters familiar from (Croatian and world) children's literature and culture and re-contextualize them in an ecologically changed/-ing story-world. The editors' motto states: "just as our environment is changing and the need to understand why this is happening arises, so have these familiar stories changed, and we need to re-encounter them again," echoing diverse calls for creating new stories to read and to live by (e.g. Gaard 2008, Stibbe 2015). Rather than proposing a single idea on how to arrive at the desired new story/society, the collection presents diverse ecological problems and possible solutions, each story authored by another writer. The editors also express hope that the stories will contribute to the development of an ecological mind-set resulting in environmentally aware behaviour.

In the Croatian literary context, few children's works explicitly deal with ecological topics, a notable exception being H. Hitrec's humorous SF novel *Eko eko* (1979), which centres on an (eco)friendly alien crashing on Earth during a fight with polluting aliens. Though children's literature featuring nature and animal tropes and

loci easily *invites* an ecocritical reading (as does all literature, in a way), Croatian ecocriticism as a theoretical movement is still in its early stages of development. On the other hand, ecofeminism, environmental history, social and political ecology, and animal studies have gained a bit more traction in Croatian academia in the past decade. Specifically, ecocritical explorations of literature and culture are in Croatian academia performed largely by scholars of Anglophone literatures, yet in the Croatian academic field the appearance of ecocritical research and publications grows slowly but perceptibly. Notable works include explorations namely in ecofeminism (Đurđević and Marjanić 2020, Geiger 2006).<sup>1</sup>

Lastly, the usage of the term *fairy-tale* in the collection's title requires some clarification. The fairy-tale genre is prominently experimented on in the late 20<sup>th</sup> and early 21<sup>st</sup> century literature, when activist adaptations of fairy-tales emerge (Hameršak and Zima 2015: 244). The adaptations problematize the templates themselves or their hegemonic uses in popular culture. This collection's stories could to varying degrees be placed in such *template adaptation* category. However, the term *fairy-tale* is in this collection used loosely, as the stories – or the templates they are based on – do not fall under the fairy-tale category in the strict sense. For example, narratives in the collection derive from fables, folk fairy-tales, and literary fantasy narratives alike. The term *fairy-tale* could thus be readily replaced by the term *story*; the two terms are mutually interchangeable in Croatian children's literature and scholarship (Hameršak and Zima 2015: 244). Thus, in this context, *fairy-tale* is to be taken as a story in which anything is possible.

## 2. Research: general theoretical background and aims

Cognitive literary studies have suggested that “reading fiction makes the brain simulate cognitive and affective responses to the actual world, and therefore [...] can improve our understanding of the actual world” (Nikolajeva 2014: 8). As recent studies suggest (Schneider-Mayerson 2018), however, the relationship between reading a literary text, and changing beliefs or behaviours due to having read that text is far from straightforward. Since stories in *Fairy-Tales for a Better Tomorrow* collection have an outspoken eco-pedagogical agenda, we aimed to investigate whether reading these stories would have an impact on children's environmental attitudes. For the purpose of this study, four narratives were selected based on their widely familiar stories and characters (Little Red Riding Hood, Alice in Wonderland, Peter Pan, and the hedgehog from the eponymous story famous in ex-Yugoslav countries). We presumed that the deviations from the original stories' templates would make the ecological (eco-pedagogical) dimension of the adaptations particularly salient. In other words, we presumed that the ecological motifs would stand out for children in their reception of the stories.<sup>2</sup> Due to this salience of ecological motifs, we also

<sup>1</sup> Some explanations of lack of focus on environmental issues in Croatian contemporary media can be found in Vuletić and Buljubašić (2021). In Croatian literary studies, more emphasis has, in the past two decades, been put on feminist, post-socialist and transition issues, national and supranational identity, etc.

<sup>2</sup> This assumption was correct as, in story response sheets, children were able to easily describe the differences between the given experimental story and its original template. The concept of *foregrounding* or 'salience' was used by the Russian formalist school and early structuralism in literary studies.

assumed, these stories might have an effect on children's environmental attitudes in a positive manner (cf. Małecki et al. 2018: 61). This was not corroborated in the study, though some trends eliciting further research did emerge.

Second, this study sought to determine whether there would be differences in results between regular schools and eco-schools.<sup>3</sup> In any narrative, the implied reader, as a textual construction, enables a range of potential subject positions, while the meaning of the text also depends on the reader's disposition, familiarity with story conventions and experiential knowledge (Hunt 2005: 59). Our comparison of results from regular and eco-schools relied on the premise that the experiential knowledge of the two groups will differ (eco-school children having had more environmental education through elective classes and other school activities)<sup>4</sup> while their level of familiarity with literary conventions will be the same, since all students are in the same class level. Our results showed that eco-school children indeed had stronger pro-environmental attitudes overall.

### *3. Description of eco-stories used in this research*

The prose stories follow the hero-villain-victim narrative (Hameršak and Zima 2015) where the villain is in the end transformed into an ally. In these narratives, the hero(ine) acts individually, saving the villain's victims who are both people and anthropomorphised animals.

"Tea with Little Red Riding Hood" (by Antica Bračanov) follows the folk fairy-tale template in terms of the main characters (the girl, wolf, and hunter) and the frame of a girl visiting her grandmother's house. Wandering into the woods, the Little Red Riding Hood enjoys an idyllic setting, until the wolf enters the scene: highly anthropomorphised, he drives a deafening "smoke-making machine" – a red sports car, cockily offering the girl a lift. When she refuses, he "smokes his way out," offended. This reckless wolf is unaware of the consequences of his behaviour at first, but he experiences them first-hand when his car gets stranded on a chunk of melted mountain top ice. Flabbergasted, he accepts the girl's invitation for tea at her grandma's house. There, engaging him in a pedagogically exemplary heuristic dialogue, the heroine educates him on CO<sub>2</sub> and global warming. The repentant wolf then gladly accepts the hunter's gift: a *green* bicycle. So, through education, the antagonist is rehabilitated into an ally and a champion of an eco-conscious lifestyle. In "Alice in the Land of Global Warming" (by Željka Majić), Alice visits a Wonderland plighted by raging floods, hurricanes, droughts, and diseases. The Oraculum reveals the unfolding climate breakdown and biodiversity loss, while the Mad Hatter moves his tea parties from one roof to another as they are being inundated with floods. These are caused by the Red Queen's "excessive exploitation" of the natural resources such as woods, minerals, and oil. Alice saved the Wonderland by first beating the Queen in a match with the help from croquet animals. The Queen then listens to Alice's arguments: "What you're doing affects the Wonderland. (...) The

<sup>3</sup> Croatian eco-schools are part of the global eco-school initiative. More info on aims and programmes is available at <https://www.ecoschools.global/> (accessed October 2024).

<sup>4</sup> Shelley [et al.] (2012) show that school culture and positive leadership (role models), along with school facilities and governance synergistically support conservation and environmental education.

changes affect everyone and if you don't stop what you've been doing, after a while all living things in Wonderland will go extinct." The Queen promises Alice to change her *habits*, i.e., to recycle and curb her uses of resources. Once again, insight gained through education leads to adoption of an ecological mind-set, i.e. to an espousal of lukewarm stewardship ethics.

The verse narratives present the merits of collective rather than individual positioning in ecological actions. Giving more agency to animal characters, they represent a more biocentric orientation (see below) in painting how humans (should) relate to *nature-culture* (Plumwood 1993). The verse narratives also make greater use of humorous wordplay and jokes.

"The Hedgehog and the Nature of Commotions" (by Siniša Bahun) rewrites a famous Yugoslav-era children's fable *The Hedgehog's House* (Branko Ćopić, 1949), following in its decasyllable verse with couplet rhymes. The eco-narrative borrows the characters (hedgehog, fox, bear, wolf, and boar), and the key motif of loving one's home, transmuting it into caring for the environment as a shared home. The hedgehog is now a clean-up ranger who encounters animals who've lost their homes due to human-caused fires, floods, and clear-cutting. The 3<sup>rd</sup> person narrator lends direct speech to animals who profess their anger and sadness about the losses, resulting in strong narrative empathy in these parts of the text (cf. Weik von Mossner 2017). The hedgehog directly advises children to love *the grass, water, earth and air since the planet is everyone's home*, extending an invitation to start *a new day* with a clear conscience.

"Together Against Climate Change" (by Ivo Balenović) borrows characters from Croatian children's literature and world literary classics, as well as from animated movies and comic books. The reader encounters Disney princesses, Mickey Mouse, Peter Pan, Mowgli, and standard fable and fairy tale characters such as hungry bears, inquisitive rabbits, wise owls, etc. Already on the first page various environmental issues are enumerated, including oil drilling, poisonous chemicals, global warming, and bees' endangerment. As the starting point, a hole in the ozone layer is the problem characters come together to solve. First a congress takes place where everyone chimes in with advice, and then, in a secret mission the ozone hole is stitched up. The tiniest creatures do the key work: spiders weave a net in the hole and sea algae place oxygen in its threads. The overall lesson is in cooperation and biocentrism, ("the O<sub>2</sub> protects all of us on this planet, just as mother protects her child"). The implied readership is both children ("photosynthesis – that event with a weird name") and adult readers, as some of the references, e.g., to David Bowie or Kirby Rip will not be familiar to children readers.

Summing up, the verse narratives portray collective efforts and a less anthropocentric perspective for tackling environmental issues. Conversely, in prose narratives, an individualized heroine takes centre stage protecting the environment, and the stories are more anthropocentrically oriented. The verse narratives could thus be said to represent a more *biocentric* orientation, by which we understand seeing nature (animals, river, woods, etc.) as having its own intrinsic value independent of humans. The prose narratives, through the actions of the heroine (Little Red Riding Hood, Alice) represent the stewardship orientation, by which we mean taking up

responsibility for maintaining the natural equilibrium. The villains (the wolf, the queen), on the other hand, represent the *utilitarian* view of nature as a reservoir of resources to be exploited for human consumption.

#### 4. Methodology

##### 4.1. Sample and procedure

A total of 80 children in 5<sup>th</sup> and 6<sup>th</sup> grades (mostly 11-year-olds) enrolled into 2 regular schools (Visoka elementary; Blatine – Škrape elementary) and 2 eco-schools (Gripe elementary; Žrnovnica elementary) participated in this study. At each school, one class numbering approximately 20 students was selected for the experiment (with the exception of Žrnovnica school where due to other activities, children from two different classes were assembled). The study was conducted in 3-4 meetings during regular school hours in each school. First, the participants completed an initial questionnaire addressing their attitudes towards environmental issues. Next, they listened to and read the stories. The experimenter read the stories out loud, while students were given separate copies to keep track and also kept the copies while filling out the story response sheets. After reading each story, children individually answered a set of questions probing their understanding and experience of the story. After the four stories were read, the children again took the initial questionnaire. Taking this post-reading questionnaire was 3-4 weeks removed from taking it on the first visit. The post-reading questionnaire also comprised additional questions aimed at the comparison of the four read stories (likes and dislikes). In the final step, children were asked to write their own short eco-story.

At the first visit, students in all 4 schools were told they would be reading stories dealing with nature and the environment. They were told that the study is performed for the benefit of the book publisher to collect information on the likeability and popularity of their stories. During the first visit, children took the pre-reading questionnaire and read one story; during the second visit they read two stories; and during the third visit they read the final story, took the post-reading questionnaire, and wrote their own eco-stories. This last step either lasted longer than the previous two or was split into two visits. It also happened that some students were not present for all steps of the procedure, which is why the number of results varies for specific questions.

A 5<sup>th</sup> grade class at another elementary school (Stobreč elementary) served as a control group. These students received the same pre-reading/post-reading questionnaire, but they were presented with 4 different stories which did not have a straightforward ecological dimension. They read 2 fairy-tale like short stories by a Croatian author Sunčana Škrinjarić and 2 folk Japanese stories. While these stories took place in nature or had animal characters, they did not include explicit ecological messages and environmental themes, per se. The control group students were also told they are reading stories for the book publisher's study in popularity of their publications, but eco-issues were not mentioned at all. The control group students were not asked to write their own eco-stories, as this part of the methodology was secondary to the study's major aims.

The 5<sup>th</sup> and 6<sup>th</sup> graders were selected as age-appropriate groups for reading the selected stories due to their narrative complexity level. As Ebersbach and Brandenburger note (2020: 2), a recent longitudinal study (Otto, Evans, Moon, and Kaiser, 2019) shows that environmental behaviours start to consolidate during middle school, while environmental attitudes are still variable at that age.<sup>5</sup> Our experimental groups (and the control group) largely consisted of 11-year-olds, with some 12-year-olds.

In each school, a class of students was selected for the study in agreement with the class' head teacher and school director. In eco-schools, pupils participated in the study in the library room with the librarian and the experimenter present, while in regular schools and in the control group school the study was conducted in the classroom. In one case (Blatine – Škrape elementary) the school pedagogue was present with the experimenter, while in the other (Visoka elementary) and in the control group school (Stobreč elementary) the head teacher was present with the experimenter. Visits to all five schools were conducted during March and April 2019. The design and procedure of this study was pre-approved by the ethics committee of the Faculty of Humanities and Social Sciences in Split. Following this approval, before the children participated in the study, their parents received and signed the approval form informing them about the study design and the general aim ("probing what effect the stories might have on children's environmental attitudes").

## 4.2. Instruments

### 4.2.1. Pre-reading questionnaire

The initial questionnaire probed students' attitudes towards the environment as well as some environmental habits. It comprised two parts. The first part consisted of a total of 41 items on a 5-point scale (1 – do not agree at all; 5 – completely agree). Out of these items, 11 were adapted from items addressing children's affect and actual commitment to the environment from the Children's Environmental Attitude and Knowledge Scale (CHEAKS; Leeming, O'Dwyer and Bracken, 1995) and 3 were adapted from the Attitudes Toward Animal Welfare Scale (ATAW; Małeckiet al., 2016), chosen based on their cultural and developmental appropriateness. In addition to the CHEAKS and ATAW scale questions, we included 27 additional items designed specifically for this study, in accordance with issues tackled in the experimental stories and bearing in mind some of the often-discussed topics in ecocriticism. These topics, using ecocritical terminology, can be categorized as pertaining to (discourses of): utilitarianism, stewardship ethic, or biocentrism towards the environment; denial of climate and environmental crises; affects of worry, apathy, or hope; and techno-optimism, a stance that technological progress will bring forward and enable solutions to ecological and environmental crises (cf. Alexander 2014: 2). Several items focused on pro-environmental behaviour were also included. We hypothesized

<sup>5</sup> The study claims that "[e]nvironmental attitude and behavior form around the age of 7, increase until the age of 10, level off until the age of 14, and then decline again. Environmental behavior develops from childhood to early adolescence and starts consolidating from age 10 onwards, whereas environmental attitude remains in flux at least through early adulthood" (Otto, Evans, Moon, and Kaiser, 2019).

that if successful in changing students' environmental attitudes, the stories might have a similar effect in encouraging positive environmental behaviours. This study showed no such effect, but further observations are offered in the discussion. In the second part, students reported whether they had ever participated in ecological actions and, provided that they had, of what kind.

#### *4.2.2. Story response sheets*

After reading each story, children were asked a set of questions regarding the heard/read story. Following the general characterization of the children's fiction reading process (Benton 2005: 91), children were asked a set of questions probing their identification with a character; projection into the situation, and the distanced viewer position. Specifically, they received a set of open-ended questions in which they were asked to briefly identify the story's plot and compare it to the original template; name their favourite character and part of the story; imagine themselves as a character in the story (in a character's shoes or in their own); compare the issues presented in the story to real life; identify the moral of the story; and state whether they had learned something from the story and what that was.

In addition to these, several story-specific questions were formulated to further examine children's involvement with the stories. For example, after reading "The Hedgehog and the Nature of Commotion," the children were asked what the hedgehog learned from other animals; which animal they feel most sorry for; and, what they would say to it (probing their projection into situation).

#### *4.2.3. Post-reading questionnaire*

The questionnaire given to children after the reading intervention was the same as the pre-reading questionnaire, with some newly added elements. By repeating the items/questions from the pre-reading questionnaire, it was possible to track a difference in children's environmental attitudes and habits, or a lack of such change. Additionally, four open-ended questions regarding the read stories were included. These additional questions inquired about the most and least liked story; whether the stories were easy or difficult to comprehend and follow; and whether they learned anything relevant for their own lives.

#### *4.2.4. Final creative short story*

This instrument was included in the methodology based on the premise that the children's creative stories would reveal which environmental issues and ways of fixing them are most prominent in children's minds. We presumed that in the post-reading context, the experimental stories would influence their selection of themes and narrative techniques, i.e., that children would imitate the experimental stories in some of these respects. According to children's literature scholar C. Wilkie-Stibbs (2005: 177), *texts of imitation*, as the experimental eco-stories used in this study in themselves are, "have a metafictional dimension which causes readers to pay attention to their fabric, to the devices of artifice in literature and to the textuality, as well as the actuality, of the world to which they allude." In their own creative

stories, children imitated the experimental stories by directly borrowing from them (characters, motifs; 60%), or by imitating their meta-narrative template of the environmentally minded re-telling of another familiar story (40%).

#### 4.3. Data analysis

Data obtained in pre-reading and post-reading questionnaires, was analysed using chi-square ( $\chi^2$ ) tests that was used for testing differences between nominal data and analysis of variance (ANOVA) for testing differences between data on interval scales of measurement. A threshold of  $p < .05$  was considered statistically significant.

The results obtained in story response sheets were analysed in a similar manner, namely using chi-square ( $\chi^2$ ) tests given that all questions were coded on a nominal scale. Comparable to the pre-reading and post-reading questionnaires, a threshold of  $p < .05$  was considered statistically significant.

The results obtained in children's creative stories were coded through inductive analysis.

### 5. Results and discussion

#### 5.1. Pre- and post-reading questionnaires (main research aims)

Given a relatively small number of study participants, we were not able to conduct a factor analysis on the items we included in the questionnaire that would allow us to extract separate factors that represent different dimensions of the children's environmental attitudes. Therefore, we calculated each participant's score based on all items, which yielded us with a scale whose reliability amounted to a satisfactory  $\alpha = 0.83$ . Next, we compared the mean results on this scale for eco- and regular schools in the first and second administration of the questionnaire. The obtained results indicated a statistically significant main effect of school ( $F(1,152) = 4.75$ ,  $p = .03$ ,  $\eta_p^2 = .54$ ), such that children from eco-schools had more positive attitudes overall. The main effect of administration or their interaction were not statistically significant ( $F(1,152) = 1.96$ ,  $p = .16$ ,  $\eta_p^2 = .13$ ;  $F(1,152) = 2.88$ ,  $p = .14$ ,  $\eta_p^2 = .01$ , respectively). Thus, no difference of attitudes was shown before vs. after reading the eco-stories across both groups of schools, which means that our reading intervention was unsuccessful in improving children's environmental attitudes. Eco-school students were found to have more positive environmental attitudes than regular school children both before and after the intervention.

In addition to having better environmental attitudes overall, eco-school children, unsurprisingly, also reported participating in environmental activities more often. Specifically, they have participated in three times more cleaning activities with school than regular school children. Additionally, eco-school children participated in planting and recycling unlike the latter group which reported none such activities. In both groups *helping animals* as an activity (either at school or in everyday life) was practically nil.

The additional open-ended questions in the post-reading questionnaire probed whether children have learnt something from the read stories and what that

might be. Ten percent reported learning something new intellectually, while 65% said they *realized* (or *understood*) that they can do something of relevance for the environment. They expressed this generally as *saving* or *safeguarding* nature and the environment, while a few named specific actions such as *building animal shelters* or *riding a bike instead of being driven in a vehicle*. Therefore, 65% of students in the experimental group displayed an attitude of empowerment for environmental action after the reading intervention. In comparison, the control group students (N=19) quoted the morals of the individual stories (e.g. "lying is bad," "good trumps evil") as the general takeaways from the read stories. No environmental learnings or an increased perception of empowerment for environmental action were quoted. Though control group stories (fairy tales and folk tales) were set in natural surroundings and/or featured animal characters (and could thus be considered as having an ecological dimension), the control group students responded to their general didacticism and fairy-tale-like tone. Therefore, that the majority of students (65%) in the experimental group expressed an, admittedly vague, perception of their own empowerment after the reading intervention, suggests a positive trend that could be explored in future research.

Though tangential to our present purposes, two other observations merit mentioning. First, children on the whole gravitated towards the mild utilitarian and *anthropocentric stewardship* attitudes towards the environment. In both regular and eco-schools, and both prior to and after the reading intervention, students showed agreement with items expressing a mildly utilitarian attitude toward nature, while both those brazenly utilitarian and biocentric items received lower scores. Second, children showed agreement with the attitude that people have the right to use animals as they wish, and a personal willingness to help animals in need. From the animal rights perspective or the ecocritical perspective, it could be said that there is a tension between these two stances. In the dominant cultural paradigm, however, these beliefs coalesce into the belief that the animals in need are not the same as those people may freely use for their needs. These observations suggest that our participants display a mixture of attitudes along the scale of utilitarian-stewardship-(biocentric) orientation, which is expected in their age group (cf. Ebersbach and Brandenburger 2020: 5).

### 5.2. Story-response sheets (*observed trends*)

Responses to some of the questions reiterated for each story were identical. Students repeatedly quoted the ending as the favourite part of the story; they predominantly identified with the protagonists and on average 77% of students said that the problems depicted in the stories are the same as in the real world. Identifying the moral of the story, 77% of students wrote something along the general remark "we should safeguard the environment," while 14% quoted it was "helping each other." These results were equally distributed among regular and eco-schools.

In responding to "Tea with Little Red Riding Hood" and "The Hedgehog and the Nature of Commotion" we noted that children had accepted the ethical foundations of the stories and judged the characters and narrative situations according to them, at least in the immediate post-reading context. This comes forward in delineating

reasons why a specific character was their favourite. For example, children quoted liking Little Red Riding Hood the best because "she tries hard to save the Earth," or "because she taught the wolf to safeguard nature"; or liking the wolf "because he corrected his mistake," and "because he repents for polluting the woods." Here, 75% of the children quoted ecological reasons for liking these characters, rather than quoting other factors (25%), such as liking the wolf because he "drives a good car," or liking Little Red Riding Hood because "she managed well by herself in the woods." The fact that these characters (and the storyline) were well familiar to the students further adds to the relevance of children largely quoting ecological reasons for liking them, rather than the reasons pertaining to the original storyline (such as the above mentioned "she managed well by herself in the woods").

A comparable display of acceptance of the story's ethical foundations in the immediate post-reading context was noticed in the response to "The Hedgehog and the Nature of Commotion." The characters in this story are forest animals who have lost their homes due to humans' disruption of the environment. Although the hedgehog is the main character, only 56% of the students quoted him as their favourite character (for the other stories it was 77%), and, when asked which character they *cared for* the most, 63% of the children quoted the wolf (who lost his house and family) or the bear (who lost his habitat). They quoted empathetic reasons for their choice, e.g., feeling sorry for the animals or feeling angry at people causing them harm. Thus, children cared for, i.e., felt more empathetic towards the animals depicted as suffering the most. Also, in addition to quoting the general "helping the environment" as the moral of the story (50%), another 46% of the students quoted "helping animals." Less than 0.05% of children skipped answering this question, which reveals that they were highly engaged with this story. Overall, it can be concluded that in the immediate, short-term context after reading this story, the children exhibited a pronounced empathy towards the suffering animals, or, in other words, they accepted and followed with the story's main ethical foundation (empathy towards animals). Interestingly, 57% more regular school children than eco-school children expressed empathy towards the suffering animals. This point will be further discussed and contextualized in the conclusion.

Across the story-response results for "Alice in the Land of Global Warming" there were no significant differences between regular and eco schools, but for one exception, pointing towards a trend. In identifying how Alice helped the warming Wonderland, two categories of students' answers emerge: through dialogue (conversation/persuasion); and by defeating the queen in a match. Both answers are valid, but a conceptual difference can be noted in perceiving Alice's victory as primarily achieved via dialogue versus via winning in a match. In regular schools, 78% didn't perceive the dialogue as Alice's key means of tackling eco-issues; and in eco-schools just a half of that (37%) shared the same perception ( $\chi^2 = 8.41$ ,  $df=4$ ,  $p=0.08$ ). This suggests that eco-school children perceive communication as a means of environmental action to a greater degree than regular school children. Eco-school children also expressed talking to their parents about environmental issues and solutions to a far greater degree than regular school children ( $p < 0,01$ ).

After reading "Together Against Climate Change," 68% of the children wrote that (were

they a character in the story) they would try and help the characters' efforts, e.g., help fix the ozone hole, or help explain the importance of safeguarding the environment to others. Thus, in expressing their willingness to add to characters' efforts, 68% of the children demonstrated an attitude of empowerment for personal environmental action. An increased perception of their own ability to meaningfully participate in environmental efforts was subsequently quoted by 65% of children in the post-reading questionnaire.

### 5.3. *Children's creative eco-stories*

After excluding the texts without an ecologically themed plot from the sample, a total of 60 texts remained to be analysed, 31 from eco-schools and 29 from regular schools. Sixty percent of the received stories incorporated motifs, plot sequences, and/or characters directly from the experimental stories, while the remaining 40% casted an already familiar character (or an original one, e.g., themselves as protagonists) in an eco-narrative. In other words, 60% of children imitated one of the heard stories, while 40% took up a familiar character<sup>6</sup> (e. g. Sponge Bob) or narrative (*The Little Mermaid*) and reworked it in an eco-narrative. No relevant difference was found in this aspect between regular and eco-schools.

The eco-action motifs employed by children overall included: clean-up actions (35% of the stories), tackling exhaust fumes (17%); helping animals, e.g., releasing them from captivity, or building shelters (15%); and recycling (13%). A notable trend was observed between regular and eco-schools in their selection of ecological motifs and settings. Motifs related to climate change (e.g., melting ice caps, global warming) were more present in regular schools, where they made up 41% of all stories. Cleaning up and stopping pollution motifs were highly present in eco-schools, where they made up 77% of all stories. As for the narratives' settings, in eco-schools 45% of the stories take place in the woods, 21% at the river, and 17% in the/at sea. None have an explicitly urban setting, and the remaining stories take place in an abstract setting. In regular schools, on the other hand, urban settings appear in 26% of the stories, the woods in 16%, and sea settings in 13% of the stories, while rivers do not appear (and the rest are abstract settings). It is worth noting that both regular schools and one eco-school are situated in urban parts of the city. Therefore, climate change motifs (including 3 separate mentions of Antarctica), urban and abstract settings were more often found in regular schools, whereas narrative projection of environmental degradation into the immediate, familiar environment (including 3 mentions of local toponyms) was more often found in eco-schools.

To sum up, even though children imitated the stimulus stories' narrative aspects, their selection of major motifs and settings seems to depend more on their pre-existing environmental education and personal experience. These factors include living and attending school in an urban/suburban setting; being enrolled in eco-/regular school; and (not) taking part in environmental activities. For example, in eco-schools

<sup>6</sup> A view into children's culture was provided through students' employment of motifs from literature and animated films, TV and other media. Sponge Bob, Ariella (a character from *The Little Mermaid*), Cinderella, Simba (character from *The Lion King*), Wonder-Woman, James Bond, and the Smurfs all appear as protagonists of the children's stories. From the global media culture, Donald Trump, Vladimir Putin, and the TV host Ellen DeGeneres also made appearances.

which participated in this study, students regularly participate in school-organized clean-up actions, and their elective classes include up-cycling trash. In these schools, correspondingly, children's stories depicted collective environmental actions such as cleaning up and recycling in 50% more cases than in regular schools. Then, few stories by eco-school children focused on climate change, while these motifs appeared largely in regular schools. Such characteristics of children's own eco-narratives allow to establish that children's previous level and content of environmental education, as well as their experience of (not) having taken part in organized eco-activities are indeed important factors in creating different contexts for reading and connecting to the read stories and the motifs therein. So, we might suggest that eco-school children read our stimulus stories (in the school environment, too), with their perception already set towards the familiar *eco-school* themes within the stories (while indeed the stimulus stories comprised various environmental themes), whereas regular school children were, in this context, unbiased, and thus perceptively more open to the stories' manifold themes, and to other influences. The need for diversification of (eco)school environmental education programs is discussed further below.

## 6. Concluding discussion

### 6.1. Theoretical and empirical ecocriticism and reading interventions

Our reading intervention used four eco-propaganda narratives read in school setting within a 3- to 4-week timeframe. No substantive differences were found in comparison of the pre- and post-reading questionnaire on children's environmental attitudes and behaviours, which shows that the reading intervention did not have an effect on these attitudes. Interpretations of the fact that the stories didn't produce the expected effect of strengthening children's environmental attitudes may move in several directions.<sup>7</sup>

Looking to ecocritical theory, which is generally wary of straightforward didacticism, might suggest that the stories were unsuccessful due to their narrative-stylistic factors, such as a too propagandistic or a flat weaving of environmental messages into the narrative text. Bergthaller's (2006) analysis of *The Lorax* exemplifies this wariness of didacticism and propaganda rhetoric in ecocritical studies. Bergthaller's argument is that *The Lorax* is a successful eco-narrative because it does not comprise a blunt mimesis of the real world, a common characteristic of (bad) eco-propaganda texts. Instead, he advocates for *narrative affinity*, i.e., an underlying structural/fabular similarity between the reader's own world and the story world.<sup>8</sup>

<sup>7</sup> Johnson and Manoli (2011) mention some concerns about the reliability of CHEAKS, CATES and NEP scales to successfully measure environmental attitudes in children, "including concerns that items often describe actions over which children typically have no control, items that are difficult for children to understand [...], leading to difficulties in maintaining children's interest" (2011: 86). As we have noticed children's boredom with having to take the questionnaire again during its second administration, and with filling it throughout, these remarks should be taken into consideration in future research.

<sup>8</sup> To elucidate the term 'narrative affinity' we're using here, following Bergthaller's argumentation why *The Lorax* is a successful eco-story, we bring two quotes: "What enables us to map the world of the text back onto the extra-textual world is not the similarity of its characters and objects to actual persons and objects, but the structural affinity of its plot to narratives of environmentalism" (Bergthaller

Such narrative affinities are gradually detected by the reader in well-written, layered stories. Following this line of argument, we might speculate that our stimulus stories were unsuccessful in improving children's environmental attitudes due to narrative-stylistic factors, i.e., a lack of narrative affinity between the story world and the readers' world. Eco-stories, to perform the wanted eco-pedagogical function, which is both cognitive and emotional, must be of a high literary quality. The way the familiar stories were changed, in narrative and stylistic terms, is relevant, but addressing these issues in detail would require a separate study. Such further research is generally welcome, both theoretically (what are the best techniques of changing the familiar stories for eco-pedagogical usage?)<sup>9</sup> and empirically, to test the assumptions. The idea that the presence of some literary characteristics (e.g., narratorial voice) increases the narrative's potential in improving readers' environmental attitudes is recently being tested in (empirical) ecocriticism and environmental humanities (cf. Adamson 2017; Bernaerts et al. 2014; Mañeckí et al. 2018).

An alternative direction in drawing inferences from the present study is provided by Ebersbach and Brandenburger's research (2020) in experimental child psychology. Their study provides "first evidence that a short written intervention in which children encounter the solution to a resource dilemma by positive role models enhances their own sustainable behaviour in a related resource dilemma" (Ebersbach and Brandenburger 2020: 9). This experiment placed 10-year-old children in a resource dilemma game, in which they had to choose between maximizing their personal profit versus sustaining the natural resource. After playing one round of the game, a short story was read out loud to them, after which they played another round. In the experimental group, the narrative presented positive role models behaving sustainably and resolving a similar resource dilemma to the one students faced in the game. In the control group, students were read an unrelated story on urban gardening. There was an astonishing positive effect in the experimental group, as the children played more sustainably after the intervention, unlike children in the control group. The story that accomplished this positive effect is, however, quite simplistic, un-literary, and straightforwardly didactic, all characteristics ecocriticism usually advises against. But it seems that these characteristics notwithstanding (or perhaps, even thanks to some of them?) the *narrative affinity* between the story world and children's immediate situation was successfully relayed. It might be concluded then, that to be successful, a narrative intervention for children requires not necessarily a text of strong aesthetic appeal (cf. Mañeckí 2018: 61), nor of a complex literary structure but one whose narrative schemata can be aptly transposable to the readers' life experience/context. In this case, the representation of positive role models was key.

Building on this further, we might speculate that the reading intervention will be more successful if it (a) represents an issue the readers perceive as important in

2006: 165); "The legitimacy of this story rests not on the 'facts' whose faithful representation Buell urges or on its stable reference to an extra-textual ecological reality, but on the way in which it calls up and reconfigures narrative patterns that are rooted in the cultural heritage of the community he addresses" (Bergthaller 2006: 168).

<sup>9</sup> We thank the anonymous reviewer for pinpointing two issues: firstly, maintaining the original meaning of the story (e.g. "The Little Red Riding Hood" being about seduction, which is somewhat maintained in the changed story); and secondly, regarding plausibility: the lesson about the CO<sup>2</sup> would be more convincing coming from the grandmother or hunter than from the main protagonist).

their *immediate* life situation or situation experientially perceived as *close*, such as that it heavily occupies their minds (cf. Schneider-Mayerson 2018 on readers of cli-fi novels); and (b) if it shows *positive role models* for acting in such situations. As for the speculated *immediateness*, it can be perceived as a challenging factor for the effectiveness of the eco-narratives, as well as for environmental education generally. The latter pertains to the human cognition of spatiotemporal scales in the Anthropocene and to the lived experiences of hyperobjects such as climate change and other environmental crises (Morton 2013). Stating this issue is far from suggesting that narratives cannot have such (ecological-ethical) force, as notable historical examples and recent studies show that pro-environmental and prosocial effect of literature is possible (Małecki et al. 2018). We are merely underlining the relationship of the effect of environmental stories to various temporal scales (what is an *immediate* context and how long does it span; can its span be culturally and cognitively changed – and how fast?). More longitudinal studies are thus also needed to address the possible cumulative nature of the effectiveness of eco-narratives on environmental attitudes and behaviour.

At present, differences between Ebersbach and Brandenburger's study and our own, however, may cast light on our differing results. Their study focused on environmental behaviour, and ours on attitudes; theirs measured the effect of one story immediately post-reading, and ours of multiple stories across several weeks of reading; theirs focused on one issue (resource dilemma) and ours on environmental attitudes generally. It is possible that reading interventions are more successful if they employ a 1:1 relationship between the measured environmental attitude/behaviour and the narrative issue represented in the story. Ebersbach and Brandenburger study employed such a 1:1 relationship because it measured environmental behaviour in a resource dilemma while presenting a narrative which (solely) represents (role models) dealing with a resource dilemma. Future studies could use a parallel '1 environmental issue – 1 narrative theme' story model to test this assumption. The usual empirical research methodologies in studies on adults' environmental behaviour follow the 1:1 model, e.g., testing whether providing cues to recycle affects recycling behaviour (see Ebersbach and Brandenburger 2020, for further examples). Empirical ecocriticism might benefit from following such a model especially in its early stages. In that regard, future empirical ecocriticism studies could also test whether reading stories representing diverse environmental topics in a shorter time frame disperses children's attention, thus leading away from the desired environmental education goal.

## 6.2. Environmental education and reading interventions

We have arrived at the trend of suggesting a correlation of children's previous environmental education and personal experience to the way they read and respond to eco-stories. As discussed, this correlation<sup>10</sup> comes forward pronouncedly in the selection of motifs and settings in children's creative stories. Children in eco-schools,

<sup>10</sup> Though causation between them cannot be firmly established at this point, it has been "reported that young people's view of the environment changed according to their personal experiences related to environmental issues" (Cullinford 1996 in Bas et al. 2011: 127).

who participate in more clean-up activities, portrayed more of those activities in their stories, while climate change (discourse available through media) was more represented in regular schools. Regular school children also showed more empathy towards suffering animals than eco-school children. Thus, our observations suggest that the scope, focus, and practical activities of a school's environmental education might influence the way children read and understand eco-stories, sometimes in surprising ways.<sup>11</sup> In other words, (eco)school education which overly emphasizes clean-up actions and recycling as the key environmental activities might be unwittingly downplaying other relevant environmental issues such as climate change and biodiversity loss – and vice versa. As all these are welcome lessons, children might benefit from (eco)school's curricula introducing various topics on (caring for) the interconnectedness of plant, animal, and human life into practical and theoretical lessons. Furthermore, Bas et al. (2011) suggest that successful environmental education consists of going beyond teaching basic ecological concepts to incorporate cultural, social, and technological aspects, as well as emphasizing local features. Eco-literature is capable of narratively representing all these aspects at different scales (and synthesizing them to different degrees, as required per the educational level), so that regular exposure to children's environmental literature as pertinent eco-pedagogical content might be beneficial in all (eco)schools (cf. Małecki et al. 2018).

Secondly, 65% of children in the experimental group expressed that from the stimuli stories they learned that they *can do* something for the environment. This positive perception is an encouraging finding but was largely expressed in vague terms and was not followed by a measurable positive change in the questionnaire. Such willingness to personally do something for the environment with simultaneous inability to clearly define what that might look like (in terms of lifestyle, energy use, etc.), was recognized in several studies on effectiveness of environmental education in Turkey (cf. Bas et al. 2011: 127–129). Similar studies are needed in Croatia, and other national contexts, to find out how to best place eco-narratives within (environmental) education in schools.

Finally, that children successfully reiterated motifs and narrative techniques in their creative stories from the experimental stories read in this experiment, suggests that the *imitation stories* technique is appealing to them. Using this technique seems as an eco-pedagogical strategy worth further exploration, as other texts in the mediascape are making it more popular and present, e.g., memes and graphic artists' work.<sup>12</sup>

Eco-narratives are, of course, only one possible tool in the ecological education toolbox, both for regular and eco-schools. If we specifically look at takeaways for (eco)school curricula, our results point towards the need for an interconnected approach of intellectual learning (e.g. about the recycling process, climate change, carbon footprint), the hands-on approach (e.g. clean-up activities, recycling – such as implemented in eco-schools), and eco-pedagogical values (e.g. stewardship towards

<sup>11</sup> The authors are thankful to M. Schneider-Mayerson and W. Małecki for their insightful thoughts and comments on an early draft of this paper.

<sup>12</sup> One example is the work of artist Bautiste Drausin; see [https://www.francetvinfo.fr/culture/bd/video-sous-sa-plume-blanche-neige-winnie-l-ourson-et-la-petite-sirene-deviennent-des-victimes-climatiques\\_3000171.html](https://www.francetvinfo.fr/culture/bd/video-sous-sa-plume-blanche-neige-winnie-l-ourson-et-la-petite-sirene-deviennent-des-victimes-climatiques_3000171.html) (10. 2024.)

animas, non-wastage of resources) being disseminated throughout the school curriculum. Ecological narratives might add to, widen, or strengthen the positive ecological attitudes, and contribute to developing the feeling of self-empowerment for positive ecological change, as 65% of the children in our experimental group expressed. However, such development needs to happen within a school context where the necessary information and 'how to' are also delivered, in accordance with the children's understanding and maturity. This calls for an integrated pedagogical approach being developed and implemented, where policy makers, social and environmental scientists work alongside teachers, (eco-story) writers, and artists.

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## PROMJENE STAVOVA O OKOLIŠU KOD DJECE PROMJENOM SADRŽAJA POZNATIH PRIČA? REZULTATI JEDNOG EKSPERIMENTA

### Sažetak

Ovaj rad prezentira rezultate eksperimenta iz područja empirijske ekokritike u kojem se uspoređuju stavovi prema okolišu kod djece prije i poslije čitanja jedne zbirke ekopriča. Glavni cilj ovoga istraživanja bio je empirijski utvrditi hoće li (i u kojoj mjeri) čitanje književnih tekstova s eksplicitnom ekopedagoškom dimenzijom pozitivno utjecati na stavove o okolišu kod djece. Djeca su čitala četiri ekopriče tijekom 3 – 4 tjedna tijekom školske nastave. Eksperiment se proveo s učenicima petih i šestih razreda osnovne škole (većinom jedanaestogodišnjacima) u dvama regularnim školama i dvama ekoškolama na širem području grada Splita. Pretpostavka istraživanja bila je da će se rezultati čitanja ekopriča razlikovati po kriteriju prethodnoga ekološkog obrazovanja. Djeca su čitala priče iz zbirke *Bajke za bolje sutra* (2010) u kojima su popularni tekstovi književne tradicije i popularne medijske kulture „nanovo” ispričani s ekološkom tematikom. Kako bismo dobili odgovore na postavljena pitanja, korišteno je nekoliko instrumenata: kvantitativni upitnik dan prije i poslije čitanja, listići s otvorenim pitanjima o razumijevanju priča dan nakon čitanja svake priče te kreativno pisanje pri kojem su djeca napisala vlastitu ekopriču. Rezultati su pokazali da su učenici iz ekoškola imali generalno pozitivnije stavove prema okolišu, no nije primijećena razlika u stavovima prije i poslije čitanja odabranih ekopriča u objema grupama škola. U radu se dobiveni rezultati uspoređuju s recentnom studijom slične metodologije koja je pokazala suprotne rezultate (Ebersbach and Brandenburger 2020), a također se raspravlja o trendovima na koje naš eksperiment upućuje. Najvažniji među tim trendovima jest onaj koji sugerira korelaciju između prethodnoga obrazovanja za očuvanje okoliša i osobnoga iskustva djece s načinom na koji čitaju i razumijevaju ekopriče.

Ključne riječi: dječja književnost, empirijska ekokritika, ekološko obrazovanje, ekološki stavovi, ekološke vrijednosti