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Why be afraid of the night? - Pedagogical methods for developing positive attitudes towards natural darkness in order to reduce light pollution

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Abstract

Human existence has always been accompanied by our fear of the dark. Based on the theory of runaway selection (Fisher, 1930), it can be concluded that the innate feeling of fear associated with darkness can also be related to increased levels of light pollution of modern era. Although it is not possible and would also be undesirable to eliminate this fear, there is a pedagogical opportunity to develop positive attitudes towards the night, which may also lead to a reduction in light pollution in the future. The aim of the study is to present the psychological peculiarities of fear of natural darkness (e.g., Li et al., 2015; Morris and Kratochwill, 1998; Mooney et al., 1985) and to provide pedagogical opportunities to reduce it. Alternative types of education presented by the study based on scientific literature include astronomy education, games and tasks in the dark, night camp programs, education with virtual reality. Within each type, different educational options were presented (e.g., star counting, play therapy methods in the dark, night trips, test of courage). In addition, the results of interviews carried out with instructors related to the above mentioned pedagogical methods are also presented, as well as a detailed collection of links to help access several educational materials. The study provides a novel approach to tackling the problem of light pollution, for which it provides abundant and effective educational materials.

Keywords: fear of darkness, night, light pollution, pedagogy, education

1. Introduction

Human existence has always been accompanied by our fear of the dark. Numerous experiments and observations testify that the lack of light triggers fears and escape stimuli not only in young children, but in many cases also in adults (Bereczkei, 2003). These existing fears can be further strengthened by negative environmental influences, and can take the form of irrational emotions, phobias and panic. According to Bereczkei (2003), in the course of evolution, strong selection pressure was directed at behavioral algorithms inclining humans to avoid natural hazards. Our fear of the dark has thus contributed to the survival of our species by strengthening our genetic fitness as we have stayed away from various „invisible" sources of danger. At the same time, the evolutionary hardwired fears also appear in connection with other phenomena, such as fears of heights or fears of certain creatures. Wilson (1984) refers to the latter as

biophobia which most of the times means negative attitudes towards animals that are dangerous to humans (e.g., snakes, spiders). Clearly, staying away from dangerous creatures as well as avoiding high or dark places can increase our chances of survival. According to Bereczkei (2013), however, we did not develop innate phobias against the dangers of the modern age such as firearms or electricity. In these cases, in the absence of genetically hardwired feelings of fear, we use sociocultural solutions to avoid dangers (e.g., education, legal regulations, discourses). Much of the modern environmental damage that threatens people have an anthropogenic origin, we have to adapt socioculturally to problems that we have caused ourselves. Paradoxically, there are also cases where the emergence of an environmental problem may be due to the evolutionarily hardwired fear that is originally intended to help our species survive. Nowadays, these phenomena are also defined as runaway selection (Fisherian selection; Fisher, 1930). According to Csányi and Miklósi (2010), it means that the limitation which maintain the optimal parameters of a biological character, in this case a form of behavior, disappear in a relatively short time. Our genetically hardwired fear of the dark, which previously served the purpose of our survival, may be embodied in environmentally damaging behaviors due to current developments in civilization that threaten both nature and our own health. A significant part of our planet is flooded with light, mainly because of a feeling of discomfort associated with natural darkness. Among the several negatives associated with nocturnal animals, it is important to mention the difficulty of orientation, nutrition, self-defense, territorial behavior and reproduction. In the long run, upsetting the human biorhythm can also have detrimental health consequences, such as sleep disturbances, an increased chance of developing cancer, high stress levels, and blood pressure problems (for details, see Csonka, 2020). Based on Csányi and Miklósi (2010), it can be seen that the transformation of this character in a biological/evolutionary way is an extremely long-term process, thus only sociocultural solutions can help, i.e. the relevant group or society has to generate the necessary constraints itself.

With the help of pedagogical methods, human fear of the dark can be reduced, and even interest and attraction can be induced. The aim of the present study is to provide pedagogical opportunities to reduce fear and raise attraction related to natural darkness, thereby facilitating future interventions to reduce light pollution. The first part of the study presents the results of psychological research on the topic, as well as relevant educational suggestions and experiences found in literature. In addition, based on the results of the interviews, the experiences of education professionals are also presented in terms of strengthening positive attitudes towards

natural darkness. Finally, a set of online platforms is introduced which offer pedagogical tools (such as program descriptions, worksheets) to reduce the fear of natural darkness (see: Appendix B).

2. Theoretical background

2.1. Psychological peculiarities of fears about darkness

According to Miles's (1895), the most common fears typically fall into two main categories, and in essence, the fear of pain or the unknown is at their core. In another interpretation, a third group can be distinguished in addition to the former two, which includes fears that appear reflexively as a result of various environmental effects. These include, for example, fears of snakes, spiders, thunder, heights, and, in fact, feelings of fear caused by visualizations in the darkness. Categorization of certain types of fears of darkness can also be found in scientific literature. A milestone in this regard is Li et al. (2015), who first differentiated between the fear of night and darkness in their studies, analyzing fear responses to stimuli separately in relations to day-night and darkness-light. Although we can come across a fair number of literature in this field, this basic conceptual demarcation cannot be found in previous research (Li et al., 2015). According to the study, responses associated with fear inducing stimuli increased significantly in the night environment compared to daylight, not simply in the dark. Based on this, we can assume that pedagogical work should focus not only on attitudes towards the lack of light, but on the development of positive attitudes towards the night in general (including the natural and built environment at night). Mooney et al. (1985) define three categories of night-related fears. Category 1 is "secure," which is actually the fear of death, separation from others, and abuse. The characteristic thoughts associated with these are „I will die!" (one characteristic type including this: „I will not wake up!"); „Someone will hurt me!"; „They will kidnap me!"; „There is a stranger in the room!"; „Burglars are coming!"; „Are the parents still at home?"; „Is everyone in the family okay?". Category 2 is the so-called „imaginal-luminous," which is, among other things, fear of imaginary creatures, ghosts, spooks, monsters, dangerous animals, space creatures, or nightmares themselves. Category 3 is "inherent characteristics", which can be triggered by, for example, shadows in the room, the hissing of the wind or other unknown sounds. According to the research of Morris and Kratochwill (1998), fear of darkness appears very early, typically at the age of 2-3 years, and are extremely common among the 4-6 age group. According to Ollendick (1979), 4-year-old children are most dominantly afraid of darkness. Cashman and McCann (1991) also pointed out that a third of the 5-8 age group is

afraid of the dark. Fear of darkness typically begins to decrease significantly after the age of 9 (Méndez, 1999), but for some children it persists until adulthood (Mikulas and Coffman, 1989). While fears of darkness make the daily activities of the parent and child significantly more difficult, we can speak about dark phobia (Graziano et al., 1979), the global average frequency of which is around 2% within the population. (Méndez et al., 1997).

Thus, the development of positive attitudes towards darkness is also preventive from an environmental and health point of view. As for the former, taking into account the long-term goals of sustainability, we promote the growth of a generation that is less demanding of the night environment flooded with artificial lights, as it is less of a discomfort for them. Regarding the latter, we can prevent the appearance of phobias related to darkness. It is important to note, however, that the decline in fear as we age does not in itself guarantee the development of sufficiently positive attitudes towards darkness. Furthermore, there is no guarantee that light pollution will be reduced, so we need pedagogical intervention to achieve this. The following are pedagogical practices found in scientific literature that can promote the development of positive attitudes towards natural darkness.

2.2. Pedagogical tools for developing positive attitudes towards natural darkness

The possibilities for developing attitudes towards natural darkness vary widely. Although traditional frontal teaching activities are important in imparting knowledge about a topic and can even shape attitudes, the current study presents alternative pedagogical methods capable of shaping emotional attitudes. This is because these methods are able to provide students with experiences that can even bring about lasting and long-term changes in attitudes. In this chapter, astronomy education, games and challenges in the dark, night camp programs and education with virtual reality are presented. This is followed by further educational opportunities presented by the results of a qualitative research.

2.2.1. Astronomy Education

One of the possible way of reducing fears and negative feelings about the darkness of the night is to present the wonders of the night sky. The amazement, the aesthetic experience and the feeling of "I am but a speck of dust in this vast universe!" can reduce thoughts filled with fear. The "flow experience" in a night environment can reduce negative attitudes about darkness, which can be greatly aided by astronomy education. In doing so, we may encounter a number of teaching activities, such as specific science classroom lectures, meteorite studies in

museums, planetarium lectures, or sky observations. Astronomy education is used from the first grade onwards, e.g. learning about the time of day, the change of seasons, but deeper education about the universe and more complex sky observation, even with telescopes, are more common from upper elementary school. According to Percy (2001), the latter should be included in all astronomical courses. Among other things, you can give students star maps and teach them how to use it, or even help them make one for themselves. Another fun and thought-provoking, playful task into nature is counting stars, which is also a strong aesthetic experience and can reinforce the feeling of "I am but a speck of dust in this vast universe!" or require strong concentration, which can distract them from distressing thoughts. One possible way to do this is if you make a square 20 cm wide and 20 cm tall with the help of scissors, a ruler, a pencil, and a piece of paper. Then measure 2,5 cm from the edge all the way around and cut out the middle. Cut a piece of string 40 cm long. Next, go outside on a clear night when lots of stars are visible (Metaxa, 2019). „Tape the other end of the string to your shoulder and hold the frame up in front of you so that the string is tight. Look through the frame at the stars. This divides the sky up into 40 pieces. Hold the frame steady and count how many stars you see inside it. Do this 5 times in different parts of the sky, and take these five numbers, called samples". (Metaxa, 2019; p. 2-3.). Each time, write the number of stars, after that calculate the sum of the 5 measures. This will be the average number of stars you saw in the frame. If you multiply the average by 40, you will give the number of stars you can see from your very own backyard (Metaxa, 2019). However, experiencing similar treats in a classroom situation is also conceivable. Constellations can be drawn on shoe boxes, for example. If the box is punched in place of each star and a flashlight is placed in the box, the illuminated constellations will appear on the closed box in the dark classroom. You can draw your favorite constellations on the boxes, but you can also choose any constellations from the star map (Metaxa, 2019).

2.2.2. Play in the dark

Play therapies to eliminate dark phobia have been successful in many cases (see Kelley, 1976; Mikulas et al. 1985; Santacruz et al., 2006). Although these methods were designed to treat feelings of extreme anxiety, they may also be applicable in general to alleviate negative attitudes towards natural darkness. Mikulas' et al. (1985) biblio and game therapy package uses a variety of therapeutic tools to alleviate fears of natural darkness, which can be successfully applied to the 4-7 age group based on the studies performed (e.g. Mikulas et al., 1985; Mikulas and Coffman, 1989). The book used in parental readings tells the story of Michael Murphy, a

dark-feared child who turns to his Indian uncle for help. Uncle Lightfoot introduces Michael to various Indian games to teach him to enjoy the darkness. This includes animal sound recognition, playful relaxation exercises (for example: how to relax like a puppet). As Michael is able to stay in the dark longer and longer, he starts to feel as brave as the Indians, and that fills him with pride. He will have to face nightmares too, but he can also overcome these with the relaxation exercises he has learned. At the end of the visit, Michael receives a cloak and a necklace from his uncle and he is declared a warrior for overcoming his fears. Upon his return, our protagonist is extremely proud of his new abilities and begins to teach them to his fearful companions (Mikulas et al., 1985 quoted by Santacruz et al., 2006). At the end of most chapters, there are one or more games that help with attitude formation processes. Each game corresponds to a chapter. The games used in the book are, for instance the handkerchief game, the blindfolded child tries to find a toy in his room; the simple and the complete version of the puppet game, the child relaxes muscles (in the complete version they relax shoulder, stomach and toes too); the toy in the room game, the children go into their room to get a toy from a designated place; the animal friends game, in a dark room the children guess the animal sound that a parent makes from another room; the animals on the wall game, parents teach the child how to make hand shadows on the wall; the toy in the dark game, the child go into his or her dark bedroom to get a toy from an indeterminate place; the flip the switch game, when a parent yells "Go!", the child in the bedroom gets up from floor, turns off the light, and lies in bed waiting for his parent; the noise box game, begins in a totally dark home with the child lying in his bed, a parent shakes a cereal box every now and then and the child tries to find the parent by going through the dark house turning on light switches (Mikulas et al., 1985 quoted by Santacruz et al., 2006).

Another successful treatment package with play elements is Emotive Performances (Méndez and Macià, 1986), which proved to be successful in the 3-8 age group (Méndez and Macià, 1986; Gonzales et al., 1996). The name of the game is Olympiad of Braves. The essence of the game is that the child increases her time spent in the dark gradually each time he replays it. A parent stands in the corridor opposite the bedroom door. Next, the parent cups his hands around his mouth and announces, imitating the sound of a stadium megaphone and says that the Olympiad of Braves is about to start. The first bravery trial is that the child has to beat the five-second record for lying on the bed. After instructing the child, one of the parents shuts the bedroom door and announces in a loud voice that the bravery test begins, while blowing a whistle and starting a stopwatch (Méndez and Macià, 1986 quoted by Santacruz et al., 2006).

It is important to cheer for the child and encourage him or her especially if he or she shows signs of fear in the dark and turn on the light if warranted. Reward is also an important element at the end of the task. For example, we can give tokens in exchange for their courage. A more valuable token (for example a gold token) is given when the child has been able to spend time in the dark without showing signs of fear. A less valuable token (e.g., a silver token) can be given if the child has been able to complete the task with help, such as lamp switching on (Méndez and Macià, 1986 quoted by Santacruz et al., 2006). Another important element of the game is the solemn Olympic ceremony, where you can even wave a flag and give medals of courage. It is also very motivating if tokens can be redeemed for different gifts. For example, if the kids chose Michael Jordan tokens can be redeemed for basketball cards. Of course, gold and silver tokens are not identical (for example 5 silver tokens are equivalent to one gold token). One of the most important messages of EP therapy is that fears about darkness must be reduced gradually and hierarchically. This applies to both the reduction in light intensity and the time spent in the dark. (How many lights are left on?; Whether the corridor light is on?; To what extent is the corridor door open?; How many minutes do we leave the child alone in the dark?) (Méndez and Macià, 1986 quoted by Santacruz et al., 2006)

2.2.3. Camp games

Camps also provide a golden opportunity to reduce fear of natural darkness with the help of positive experiences. These can include development tasks, games, competitions. Although there are mostly playful tasks in the camps, it is important to take into account age characteristics when organizing programs. In general, it is not possible to specify an ideal age for camp games, this should always be assessed by educators for the particular game and circumstances. Körömi (2017) identifies trials following the pattern of Invisible Exhibitions as a possible element of camp games where tasks must be completed in total darkness. He also mentions night obstacle races, where skill, sensory and logical tasks have to be solved in the camp area or in a well-known and safe outdoor location at night without using a flashlight. The nocturnal animal games described by Szakall (2012) are also able to enrich students with positive experiences. These games are based on the principle of a rotating stage, teams have to visit several stations. Each station has adults that make animal sounds, so they can be found by observing and following those sounds. The task is to collect the signatures of the „animals" found. „Animals" can be anywhere in the camp area, but it is important to discuss and designate the territorial boundaries of the game for safety. Night tours with the help of professional guides

can also be a significant source of experience (Körömi, 2017). One of their most exciting and memorable parts is when students have to walk through a short section alone in the dark forest at night. It is important to make students understand that a night hike can really be valuable in case we stay quiet watching the nests of the night, listening to the sound of nocturnal animals, the rustling of plants, and so on. According to Kövecsesné (2015), one of the most defining night experiences for children is the night tour with astronomy and the test of courage. Some students described what had made it so good for them: "Because I saw a lot of stars, my first shooting star and the illuminated Abbey of Pannonhalma." „The test of courage was the best, I was able to overcome my fears" (Kövecsesné, 2015; p. 58). In the author's view, if conducted in safe conditions, free and unconditional discovery in nature at night (free exploration in nature, see: Csonka and Varga, 2019, Csonka, 2020) can also help reduce fear of darkness.

It is also important to mention one of the typical programs of Waldorf schools in Europe, namely the Michaelmas celebration in every September, which bears many similarities to the Festival of Courage at the Waldorf (Primary) School in Nairobi. The essence of these events is that teachers come up with challenges for their students that are suitable for helping them overcome their anxieties and fears (Hoffman, 2016). The event is typically held outside the school building in natural areas, often in caves, during the autumn solstice. Understanding the natural alternation of light and darkness can also help allay fears of the dark. Students understood that darkness is also a natural state, without which there is no light would exist, and it is their natural alternation that this balance is becomes upset by light pollution.

2.2.4. Virtual realities

Nowadays, we can also come across dark phobia treatment methods that use virtual reality. As an example, it is worth mentioning the VR tool developed by Psious, which was created specifically to treat fears related to darkness and can be adapted to EP therapy (see Servera et al., 2020). VR treatment is presented as a game for the users. The child sees the inside of a computer-generated house with a help of VR glasses. The goal of the game is to explore the different rooms of the house and spend as much time as possible in them because the more rooms you explore and the longer you stay in them, the more points you accumulate. Each of the rooms has a predetermined light level graduated from lowest to highest. Moreover, the light intensity in the rooms can be reduced by a sliding bar, depending on the therapeutic needs. With the help of this VR system, the child will be able to spend more time in different rooms with lower brightness of light. The final step in the game is when the child has to go to his/her virtual

bedroom, lie down on his/her bed, and remain at least two minutes in total darkness. Servera's et al. (2020) research findings on a small number of samples are encouraging in reducing fear of darkness with VR in the 8-12 age group.

In order to supplement the analysis of the scientific literature, experts in environmental education were also interviewed on this topic. The results of the interviews are presented below.

3. Qualitative research interviews

3.1. Research methodology

Four environmental education specialists were interviewed in the form of telephone or written interviews. The interviewees primarily experts in astronomy education, light pollution education and conservation education and all familiar with the process of shaping attitudes towards natural darkness. Although none of them had it as their primary teaching activity, they could report forms of education that may be able to reduce fear of darkness. The qualitative research was of an exploratory nature, in which, similarly to the case studies, the aim was to capture as many different thoughts on the topic as possible, providing a baseline for future research. There are very few educators with experience in the subject, but the respondents were able to provide a number of useful information, so the method can be considered adequate. The interviewees were selected from organizations dealing with light pollution education, astronomy education or other natural and environmental education tasks. There were only a small number of ideal interviewees within each organization. In the interviews, they were asked about their views on the usefulness of educational activities related to natural darkness, as well as on the educational activities conducted by their organization related to light pollution, and about other applied pedagogical methods which can help reduce fear of natural darkness (see Appendix A for a full range of interview questions). In future research, it would also be important to ask directly what the ideal ages are for each method.

3.2. Results of the research and discussion

3.2.1. The importance of learning about natural darkness

All four respondents agreed that learning about natural darkness is an important and necessary educational activity. However, due to differences in individual professional interests, the need for this was explained differently. On the one hand, students will learn to appreciate this side

of nature, if they do not look at it with anxiety but with good feelings, their motivation to protect it will also become stronger. So getting to know the night also has a nature conservation effect, and in the meantime, students' knowledge can also expand, for example, on astronomical and biological topics. On the other hand, it also has an environmental protection outcome, students can assess the severity of the problem of light pollution, its human and non-human effects, and thus they can be motivated to take action against it. Another important aspect is that the sight of a starry night sky switches our brain to another mode, leading to an experience that is both relaxing and inspiring. It can inspire philosophical or scientific ideas, but it can also inspire the development of technology, as astronomical developments can often be applied to other areas as well. In addition, experiencing the night sky has a cultural and community dimension. Our traditions, beliefs, and sagas often stem from this ancient and common past experience (just think of the legends woven around the constellations or the common name of the deities and planets). Thus, experiencing the night and the stories associated with it also support preserving tradition and strengthening identity. The interviews also highlighted the psychological outcome of experiencing darkness in a supervised way. This can help, for example, reduce the anxiety associated with feelings of separation (Mooney's et al., 1985 secure category), as conceptual play allows the children to control the extent of separation on their own, which over time can lead to increased feelings of security in situations that evoke similar feelings.

It can be deduced from the interview results that the complete elimination of our fear of the dark is neither desirable nor possible, which is supported by Bereczkei (2003) and Wilson (1984) too. It is undesirable, as the lack of light still often puts us at increased risk today (accidents, vulnerability to people of bad will). Our genetically diurnal nature is evolutionary beneficial as it helps to avoid emergencies (see Chapter 1).

3.2.2. Pedagogical tools related to reducing light pollution and fear of the dark

The educational activities mentioned in connection with the topic of light pollution in the interviews are in many cases also suitable for reducing the resentment associated with natural darkness. There was an interviewee working for a nature conservation organization who mentioned that educational activities related to light pollution can also be find in the framework of the Bird-friendly Kindergarten/School Program. In the case of preschoolers, it is not recommended to talk directly about light pollution, the concept is too abstract to understand ("How can light pollute?!"), but at the same time they can be sensitized to love the animals of the night and the dark. This is a particularly difficult task because many preschoolers start

crying even when their eyes are blindfolded because of not being able to see. This can be offset by supporting those who have their eyes closed with positive experiences, such as being able to get in the middle of a circle so that attention is focused on them in a safe environment. Often, forest-school courage tasks or star-observation tours for older children are also linked to the topic of light pollution, as these take place close to nature where the level of light pollution is much lower than in cities. In some educational centers it is also possible to observe the night sky with telescopes (eg: Zselic Park of Stars, Hortobágy Starry Sky Park), including the observation of the craters of the Moon and the rings of Saturn. Planetary education can also be effective in introducing the lights of natural night.

The interviewees listed a number of pedagogical activities they have undertaken that, in their view, serve to reduce fears of natural night darkness. Based on the interviews, educators should be careful not to show signs of fear while using each method, which increases the chance of a pedagogical success. In the following, the methods collected through the interviews are presented.

Mention was made of the transfer of knowledge, so let us explain why it is important to experience darkness, to tell of the alternation of days and nights, the length of days and nights in different seasons (even with the help of a globe) and to study the stars, the moon. It was also said that it is important to strengthen children's sense of security in the dark if we have to leave dim light sources in the room (for example: corridor light filtering through a slit open door, energy-saving light bulbs, phosphorescent toy figures). Silent noises from outside and a short cuddle before going to bed can also enhance the sense of security. An evening routine can also reduce feelings of fear, help with a relaxed bedtime. If the child is afraid of a particular fictitious or non-fictitious being, in the context of a fairy tale, we can endow these creatures with ridiculous qualities (like in the case of the mummy of Harry Potter movies) such as shy, smelly, fears the water, reducing anxiety caused by them. We can also come up with “methods” that drive away the power of evil such as laughter, blowing magic perfume, kissing. In addition to the above, outdoor pedagogical methods to reduce fears were also mentioned by the interviewees. Among others, properly prepared cave environmental education can be used in this area for a more mature age group. Based on an interviewee, this educational element is recommended from the age of 10. During the preparation we have to tell about the caves, the total darkness, we have to create a safe atmosphere. Under these circumstances, intimidation for fun (both between student and student and between student and teacher) is strictly

prohibited. Based on an interviewee, in the total darkness of the cave, one can also observe how our brains and senses respond to changed conditions. For example, one observation is that if we look at our partner at the moment of turning off the flashlights, the glowing silhouette of his face remains there in pitch darkness. Pupils can also play sensory games in connection with cave environmental education. One option for this is the bat game. Everyone stands in a circle, we select the bats and the butterflies and we put them in the middle of the circle, the bats' eyes are blindfolded. Bats need to find the butterflies by making sounds while the butterflies repeat the sounds (echoes). If the bats get too close to the human wall, it will repeat their sounds too. The game is a beautiful representation of the ability to orient yourself with sounds, while combining the experience of darkness with plays at the same time. However, other games have been mentioned that illustrate the experience of not being able to see, such as stealth games (who can steal quietly?) and hearing tests (who hears sounds and from where?). In addition, several interviewees mentioned programs that are implemented in a night environment and can alleviate fear of darkness. Mention was made of night study trails and forest walks, which are often combined with education to reduce fear of nocturnal animals or teach that experiencing lack of light not necessarily go hand in hand with a sense of loss. In addition, deer roaring trips and birdwatching trips at night were expounded, which may include observing changes in natural light. Astronomical observations with telescopes were also mentioned frequently especially by the staffs of star parks. As a creative solution, a night-long obstacle course was also expounded where students could orient themselves in the dark with the help of reflective stickers on the trees. Some educational programs have also created „dark rooms", where total loss of eyesight can be experienced, relying only on our touch or hearing (for example: some programs of the House of Forests Visitor Center in Kaposvár, Invisible Exhibition and Hungarian Association of the Blind and Visually Impaired).

4. Conclusion

Reducing the harmful effects of light pollution goes hand in hand with the increase of natural darkness. Until we are prepared for this spiritually and intellectually, no real breakthrough in reducing light pollution can be expected. A number of forward-looking examples of shaping attitudes towards darkness are presented in this study, which not only is of significance environmentally, psychologically or culturally, but also regarding nature conservation, relaxation, inspiration and the community. Based on the literature and interviews, it is also important to emphasize that when using these methods, we must always strive for gradation

and consideration of age characteristics, as well as do not show signs of fear. The methods are: astronomy education, biblio and game therapies, camp games, virtual realities, sensory development games, night trips, cave trips, courage challenges, night obstacle courses, education programs, introduction of night routine. These elements are complemented by the collection of educational links in Appendix B. Nonetheless, the main purpose of these programs is to treat the phobia of darkness, to get to know the senses, to get to know the living world, to pass on astronomical knowledge, to present caves, but not to mitigate the effects of light pollution globally. Presumably, this may be part of the reason why these elements of education have not spread sufficiently, as their environmental significance has not been recognized. In the future, it would be important to place more emphasis on the introduction of the theoretical background of reducing light pollution through reducing fear of darkness, the implementation of related practical psychopedagogical tools and on mapping the fear-reducing effects of these tools in order to preserve our own health and our environment.

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About Author

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Appendix A

Research interview questions:

1. Please name the organization you work for.

2. Please briefly describe your work responsibilities at the organization.

3. Do you think it is important for students to know more about natural darkness, and if so, why?

4. Please describe what educational tasks the organization performs on the topic of light pollution.

5. Do you engage in educational activities specifically aimed at the importance of experiencing the night and darkness? If so, what are these activities?

6. Do you engage in educational activities that can reduce students' fears about natural darkness? If so, what are these activities?

7. Do you have any teaching materials available related to this topic?

8. Can you mention other pedagogical practices that focus on the importance of experiencing night and darkness, or are designed to reduce fear of natural darkness?

9. Could you mention other organizations and persons performing similar pedagogical work (with contact details)? Do you know of any other teaching materials available on the subject?

Appendix B

Online educational materials:

Listed below are website references that implicitly include educational programs and tasks to reduce fears of natural darkness.

International Dark-Sky Association

https://www.darksky.org/

https://www.darksky.org/our-work/grassroots-advocacy/resources/educators/

https://www.darksky.org/our-work/grassroots-advocacy/resources/public-outreach-materials/#brochures

National Optical Astronomy Observatory

https://www.noao.edu/education/iyl-focus/

https://www.noao.edu/education/

http://www.ctio.noao.edu/noao/content/Education-Public-Outreach

https://www.noao.edu/education/qltkit.php

https://www.noao.edu/education/teachers.php

Einstein Schools Programme:

https://www.einsteinschools.org/

Teen Astronomy Café Program:

http://www.teenastronomycafe.org/

Globe at Night Program:

https://www.noao.edu/education/gan.php

Globe at Night Program/Dark Skies Rangers Program

https://www.globeatnight.org/dsr/

https://www.globeatnight.org/

Teaching with telescopes

http://teachingwithtelescopes.org/

Astronomical Society of the Pacific

https://astrosociety.org/education-outreach/informal-eduators/overview.html

Namib Desert Environmental Education Trust

https://nadeet.org/