



How to increase connection to nature? A quasi-experimental test of two environmental education projects.

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Environmental education



- One of the goals of environmental education is to foster **pro-environmental behaviors** among learners (UNESCO, 1977; Hungerford & Volk, 1990).
 - « behaviors that omit to harm the environment or to harm it in the least extent possible, or that benefit the environment » (Steg & Vlek, 2009).
- What processes/contents should we target in order to foster (futur) pro-environmental behaviors?
- How can we reach those targets?

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Nature connectedness as a relevant target ?

- **Connection to nature...**
 - the importance of nature in people's self-concept, and their emotional, cognitive and affective attachment to nature (Frantz & Mayer, 2014; Schultz, 2002).
- **...is consistently associated with pro-environmental behaviors**
 - Meta-analyses :
 - $r = .37$ (Mackay & Schmitt, 2019);
 - $r = .42$ (Whitburn et al., 2020)
 - strength of the association depends on the scale used.
- **... and is supposed to predict those behaviors.**



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Contact with nature as a relevant lever?

- **Contact with nature ...**
 - Frequency of contact or time spent in nature (walking, playing, etc.)
- **... is associated with pro-environmental behaviors** (Martin et al., 2020).
 - Retrospective childhood contact with nature is associated with pro-environmental behaviors in adulthood (Wells & Lekies, 2006).
 - Not only “wild” nature but also parks and outdoor activities (Hatty et al., 2022).
- **... and also with nature connectedness** (Lumber et al. 2017)
- **Contact with nature as a way to foster nature connectedness ?**

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BUT ...



- Most available studies are cross-sectional or retrospective (Lundholm, 2019).
 - The results of the few interventions studies are not always consistent.
- The role of contact with nature in the development of nature connectedness remains debated (DeVille et al., 2021).
- Lack of studies showing that an increase in connection to nature has a positive effect on pro-environmental behaviors (Mackay & Schmitt, 2019).

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Research questions

- 1) Do environmental education projects promoting **Contact with nature** increase **Nature connectedness** ?
- 2) Do environmental education projects promoting **Contact with nature** increase **Pro-environmental behaviors** ?
- 3) Does **Nature connectedness** mediate the effect of the environmental education projects on **Pro-environmental behaviors** ?

↗ **Contact with nature** -> ↗ **Nature connectedness** -> ↗ **Pro-environmental behaviors**?

➤ 2 studies

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Study 1

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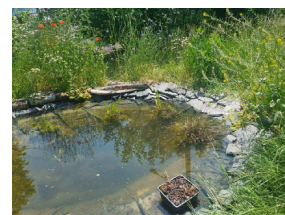
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Greening the playground

- Schools applied for the project and received funding and support (coaching including 4 on-site sessions).
- Involvement of pupils and teachers in redesigning their school playground to make it more “green and natural” (planting bushes and trees, creating a pond, building an insect hotel, etc.).
- Increasing children’s contact with nature was an explicit goal.



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Procedure & Sample



- Quasi-experimental design
- 874 participants :
 - **Greening group = 590 students**
 - **Control group = 284 students**
- Self-reported paper and pencil questionnaires
- T1 October 2022 – T2 May 2023 (same school year)
- Grade 4, 5, 6 (Belgium) : **8 to 13 years old (M age = 10)**
- Gender : girls 46,3%, boys 50,5%, others 3,2%

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Measures



- **Contact with nature:** 10 items (frequency), $\alpha_{T1} = .75$, $\alpha_{T2} = 0.77$
 - *e.g. Play with mud, pebbles, sand, bits of wood, ...*
- **Connexion to nature** (CNI, Chen & Monroe, 2012)
 - **enjoyment of nature:** 7 items (agreement), $\alpha_{T1} = .80$, $\alpha_{T2} = 0.81$
 - *e.g. I like to hear different sounds in nature.*
 - **empathy for creatures:** 4 items (agreement), $\alpha_{T1} = .72$, $\alpha_{T2} = 0.79$
 - *e.g. I like to see wild animals living in a clean environment.*
- **Pro-environmental behaviors:** 13 items (frequency), $\alpha_{T1} = .80$, $\alpha_{T2} = 0.81$
 - Adapted to fit with children realities (Davreux & Galand, 2024)
 - *e.g. I'm careful not to waste food – I encourage my friends to behave more respectfully towards nature – I look after animals and insects*

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Results

- Repeated measures ANOVA (controlling for age, gender, and SES)
- Students in schools where greening is taking place reported a marginally significant increase in **Contact with nature** ($F(862, 1) = 3,72$; $p = .06$; $\eta^2 = .004$)
- Students in schools where greening is NOT taking place reported a slight decrease in **Empathy for creatures** ($F(862, 1) = 4,42$; $p = .04$; $\eta^2 = .005$)
- No effect on **Enjoyment of nature** or **Pro-environmental behaviors** ($p > .10$).

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Exploratory additional analyses

- Multiple regressions
- T1 Enjoyment of nature, but not Empathy for creatures, predicts T2 Pro-environmental behaviors ($\beta = .15$) above T1 Pro-environmental behaviors.
- Reciprocally, T1 Pro-environmental behaviors predict T2 Enjoyment of nature ($\beta = .09$) and Empathy for creatures ($\beta = .10$) above T1 Enjoyment of nature and Empathy for creatures.

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Study 2

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Outdoor schooling

- Classrooms applied for the project.
- 10 half-day activities all along the school year, concerted with and co-animated by an external facilitator and the main teacher.
- Active experiential learning (to observe, touch, collect, sort measure, draw, tell, ...) to reconnect children to the natural world and make links with school subjects.
- Increasing children's contact with nature was an explicit goal.



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Procedure & Sample



- Quasi-experimental design
- 339 participants :
 - **Outdoor group = 114 students**
 - **Control group = 225 students**
- Self-reported paper and pencil questionnaires
- T1 October 2023 – T2 May 2024 (same school year)
- Grade 4, 5, 6 (Belgium) : **8 to 12 years old (M age = 10,3)**
- Gender : girls 51%, boys 47%, others 2%

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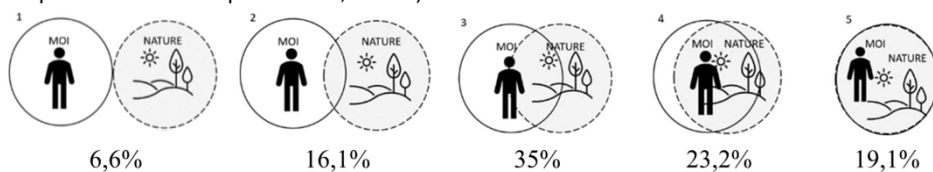
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Measures



- **Connexion to nature** : illustrated inclusion of nature in self scale (IINS adapted from Kleespies et al., 2021)



- **Pro-environmental behaviors**: 13 items, $\alpha_{T1} = .79$, $\alpha_{T2} = .76$
 - Same as study 1

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Results

- Repeated measures ANOVA (controlling for age, gender, and SES)
- No significant effect of outdoor schooling on the evolution of **Connection to nature** or **Pro-environmental behaviors** ($p > .10$)
- Connection to nature decreased slightly with time.

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Exploratory additional analyses

- Multiple regressions
- T1 Connection to nature predicts T2 Pro-environmental behaviors ($\beta = .12$) above T1 Pro-environmental behaviors
- Reciprocally, T1 Pro-environmental behaviors predicts T2 Connection to nature ($\beta = .20$) above T1 Connection to nature .

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Discussion

- Two place-based, participative, extended environmental education projects designed to increase contact with nature
- The results did not produce any convincing evidence of an effect on nature connectedness and pro-environmental behaviors among children.
 - Even if meta-analyses find a (low) positive mean effect of educational intervention on pro-environmental behaviors, there is a large heterogeneity of effects and many studies had null findings (Van De Wetering et al., 2022; Świątkowski et al., 2024).
- However, additional analyses suggest unexpected longitudinal reciprocal relationships between connection to nature and pro-environmental behaviors.

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Perspectives



- Reminder : Habits play a major role in behaviors (Linder et al., 2022).
- Contact with nature could be more important for health and well-being than for pro-environmental behaviors (Hartig et al., 2014).
- The characteristics of activities in nature could be more important than the frequency of contact (Rosa & Collado, 2019).
 - We plan to conduct analyses including teacher practices at classroom level
- Further longitudinal and intervention studies are needed to test the effects of contact with nature and connection to nature on pro-environmental behaviors, and reciprocal effects (Nielsen et al., 2021).
- In the meantime, maybe should we be more cautious in our practical recommendations (Brady et al., 2023).

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Thank you for your attention!

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Questions ?

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