Push and pull factors determine adolescents' participation in natural observation

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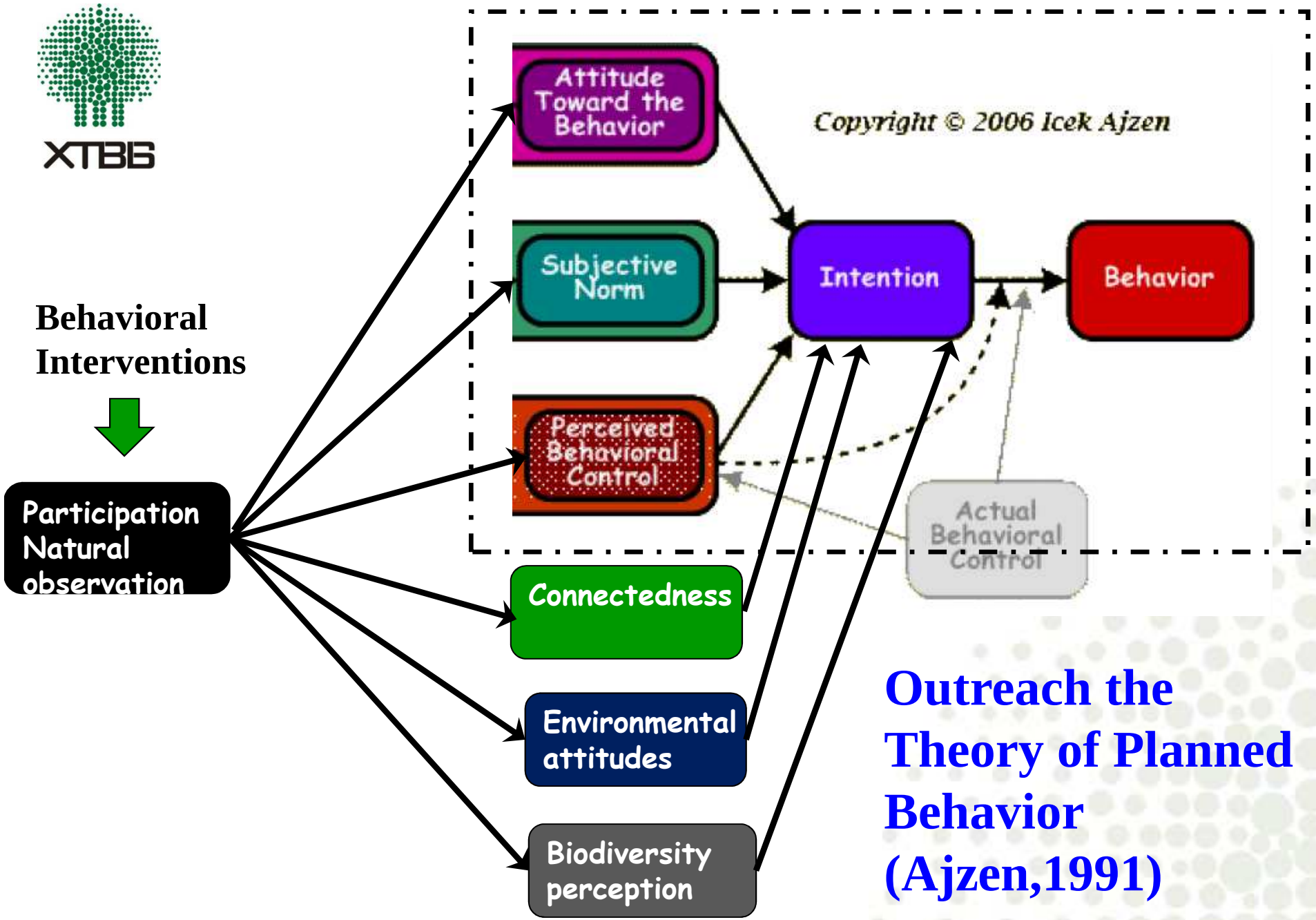


Outreach the Theory of Planned Behavior (Ajzen,1991)

Educational practices


Summer camp


Climate change


Bird fair

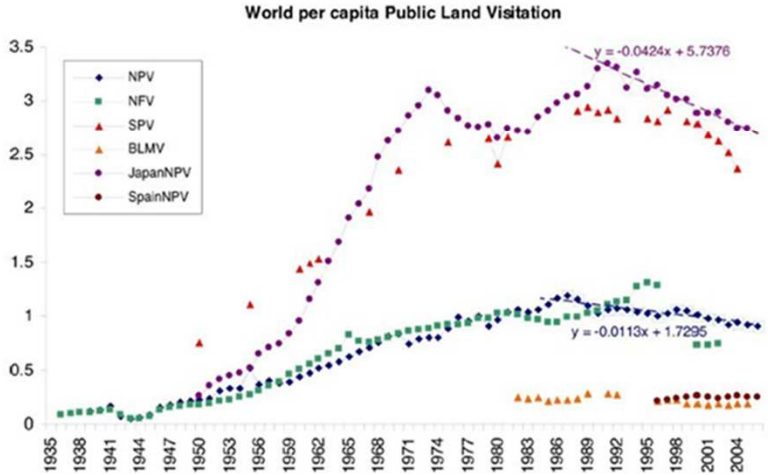

Night viewing

A large number of study has documented that outdoor activities, such as zoo visit, summer camp, wildlife viewing play an important role in enhancing learning outcomes and fostering conservation action (Collado et al., 2013; Pearson et al., 2013; Zeppel, 2008).

Extinction with experiences and video-philia

Is love of nature in the US becoming love of electronic media? 16-year downtrend in national park visits explained by watching movies, playing video games, internet use, and oil prices

Oliver R.W. Pergams[a,*], Patricia A. Zaradic[b]



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Biodiversity conservation and the extinction of experience

James R. Miller

Figure I. Volunteers restoring wetland vegetation along the Middle Fork of the North Branch of the Chicago River. Reproduced with permission from Will Fletcher.

Photo from Amphibian and Reptile Herbarium Chengdu

Reduced direct contact lead to lack of

Appeals to common people engaging with

Louv poses this question: If this gap between children and nature continues to widen, where will future conservationists come from?

American Journal of Primatology

Museum of Natural Science

Target local school children in Xishangbanna, southwest China

1) Urbanization and expansion of rubber plantation, moving away from livelihoods based on rice cultivation (Li et al., 2008).

2) Local schoolchildren rarely participate in watching birds or visiting local tropical botanical gardens.(Onsite investigation)

3) Traditionally hunt birds and eat wild animals (Sreekar et al., 2014; Zhang et al., 2008)

Natural Observation Clubs

Opportunities for local students to foster connectedness to nature and conservation benefits

Photograph , observation seed germination, insects specimens and bird watching

Methods

Step 1

Questionnaires survey (N=1024)

Step 2

Introduction of Natural Observation Club

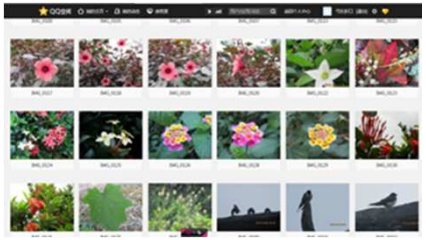
and self participation (N=340)

Step 3

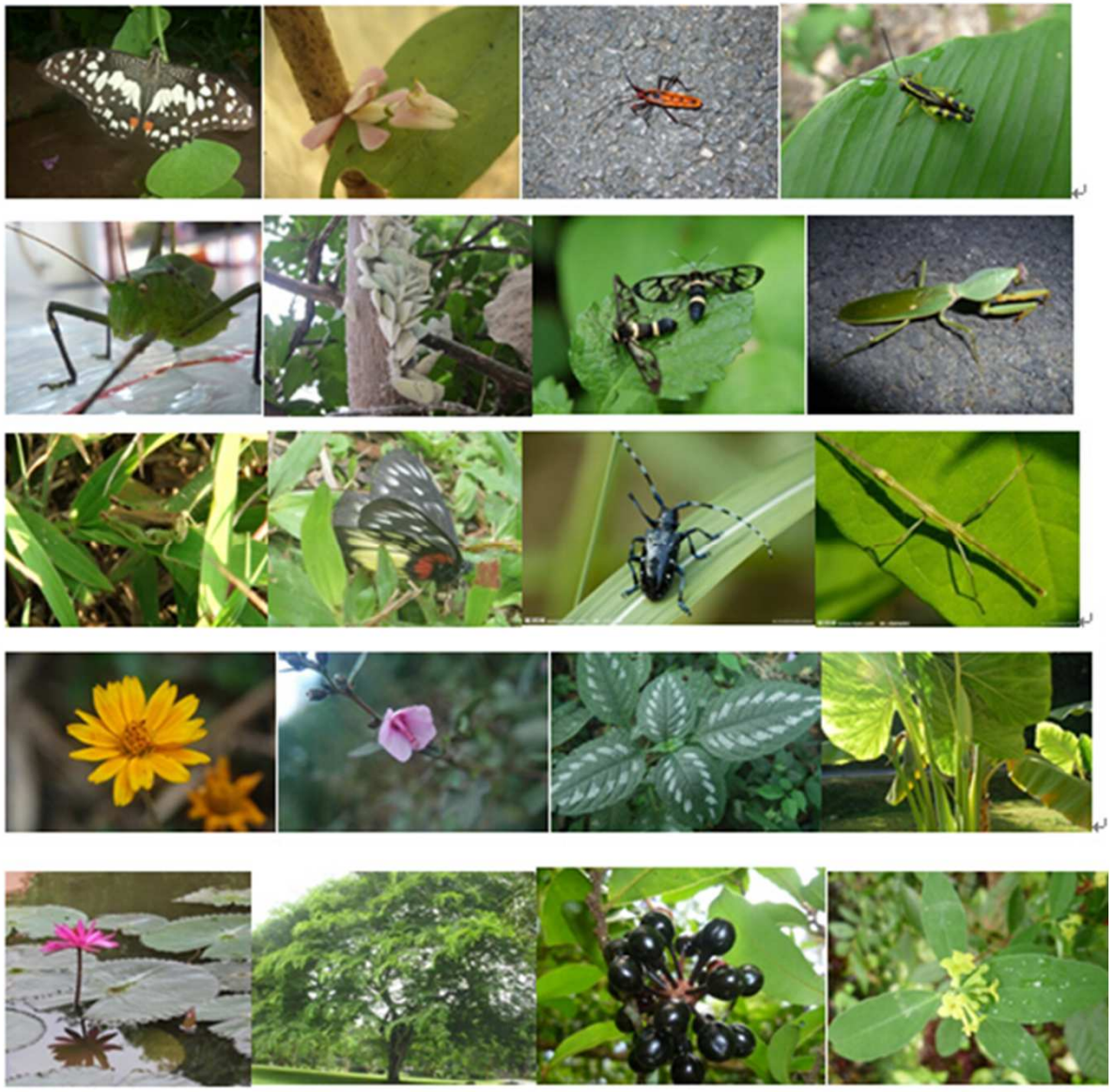
Present toolkits and followed interview (N=204)

Step 4

Upload observation record and communication



I. Plants and Animals Photography



II. Bird watching records

description / bird name	Head characterist
Oriental Magpie Robin	black
Red-whiskered Bulbul	Head with a bu of black feathe
Japanese White-eye	
Asian Barred Owlet	
White-rumped Munia	
Blue-throated Barbet	
Common kingfisher	
Long-tailed Shrike	
Common Tailorbird	

白腰文鸟 (White-rumped Munia)

白喉红臀鹎 (Sooty-headed Bulbul)

Total 30 most common birds

红耳鹎 (Red-whiskered Bubul)

白喉冠鹎 (Puff-throated Bulbul)

III.Insects specimen making

IV.Seed growth

Observation seed growth

Sow three kinds of seeds (Mimosa, strawberries, corn poppy) in three flowerpots.

(Seed sowing process under the help of family is allowed)

Observe and take a note the process of seed growth every day.

Growth traits (including germination, leaf, blossom, results) at the same time record number of seed germination, germination of height, leaf number, flower size shape and color, fruit size and color, etc.

Growth status / No. day	Mimosa	Strawberry	Corn poppy
First day			
Second day			
Third day			
Fourth day			
Fifth day			
Sixth day			
Seventh day			
Eighth day			
Ninth day			
Tenth day			
Eleventh day			
Twelve day			

Our Question

1) **Therefore, in the present study, we will explore which determinants could lead to schoolchildren's willingness to participation in natural observation.**

2) The impact of natural observation on adolescents' love for nature, perception of biodiversity and conservation outcomes

Constructs measurement

- Questionnaires survey
- Internet interview
- Colleting observation records

Section I: Basic personal information

Name: Class: QQ:

School name: School location： Age: _____

urban ☐ rural ☐

Gender： male ☐ female ☐ Family size：

_____

- Do you have a pet at home（e.g. dog, cat, rabbit, bird） yes ☐ no ☐

Is one of your parents a biological teacher yes ☐ no ☐

Do you own a camera yes ☐ no ☐

Do you own a binocular yes ☐ no ☐

Please estimate for that how long it takes walking from your home to the nearest woods? _____

Section II: Connectedness to nature

Appendix 2. Environmental attitude inventory (EAI).

Scale 01. *Enjoyment of nature*

01. I am NOT the kind of person who loves spending time in wild, untamed wilderness areas. (R)
02. I really like going on trips into the countryside, for example to forests or fields.*,†
03. I find it very boring being out in wilderness areas. (R)*
04. Sometimes when I am unhappy, I find comfort in nature.
05. Being out in nature is a great stress reducer for me.*
06. I would rather spend my weekend in the city than in wilderness areas. (R)
07. I enjoy spending time in natural settings just for the sake of being out in nature.
08. I have a sense of well-being in the silence of nature.*
09. I find it more interesting in a shopping mall than out in the forest looking at trees and birds. (R)*
10. I think spending time in nature is boring. (R)*,†

Section III: Previous nature experiences

4 items focused on the extent of past outdoor activities related with plants and animals. For example, “When I am free, I used to go to see plants and animals in the wild.” (Harvey1989; Cheng and Monroe’s (2012))

Section IV: Enjoyment of plants and animals (Cheng and Monroe, 2010)

Rotated Factor Matrix[a]		
	Factor	
	Animals	Plants
1. I like to go to watch birds in the woods.	.711	
2. I like to observe insects (e.g. ants, beetle, and butterflies) in the wild.	.623	
22. I am the kind of people who likes to watch birds in the wild.	.571	
3. I like to hear different bird sounds in nature.	.568	
23. It is a pleasure to observe insect's behavior such as butterflies and ants.	.489	.
7. When I am free, I would like to see plants in the woods	.	.355
4. It is funny to see various plants in the wild.	.	.366
21. I watered and take care of my plants in the past.		.586
5. I like to plant flowers at home.		.520

Extraction Method: Principal Axis Factoring.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

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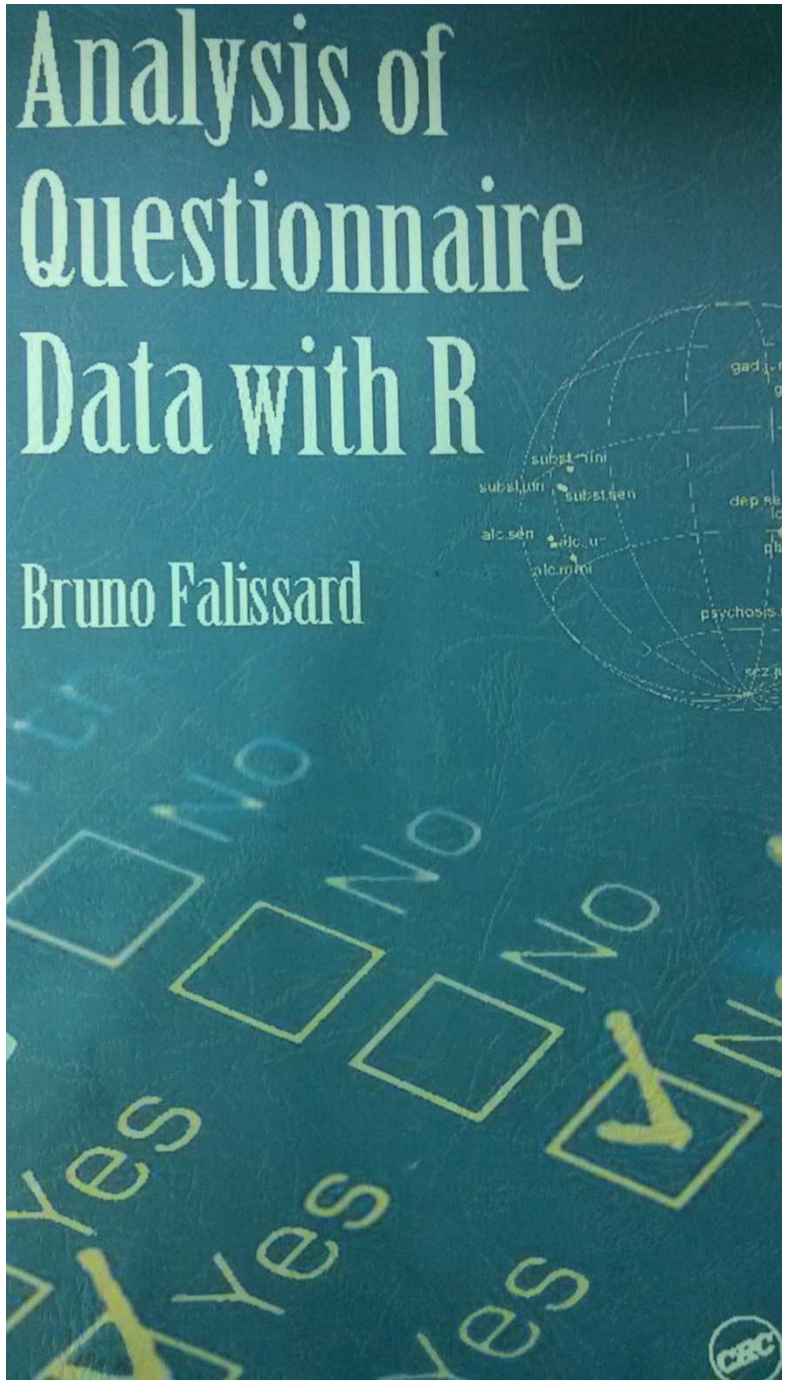
Data Analysis



Which factors prompts adolescents participation in nature observation

1) **Fit a GLMM (generalized linear mixed model) with multivariate normal random effects, binomial data. (Bolker et al., 2008).**

A candidate set of 20 models were developed to assess the predictors of participation in the natural observation clubs. The corrected Akaike's information criteria (AICc) were used to rank the models.

modles <- glmer(participation ~ age + gender + connection + … + (1|school), family= binomial)

Table 1. Summary of the five most highly supported models developed to assess the impact of connectedness to nature, previous nature experiences and enjoyment of animals on participation in natural observation clubs. School was included as a random factor in the models. Nagelkerke R square is estimated.

Model	Age	Enjoyment of animals	Previous nature experience	Connectedness to nature	AICc	ΔAICc	Weight	Estimate R^2
1	√		√	√	981.20	0.00	0.84	0.17
2			√	√	984.48	3.27	0.16	0.15
3	√			√	1006.62	25.42	0.00	0.14
4	√	√	√		1006.76	25.56	0.00	0.15
5				√	1009.01	27.80	0.00	0.12

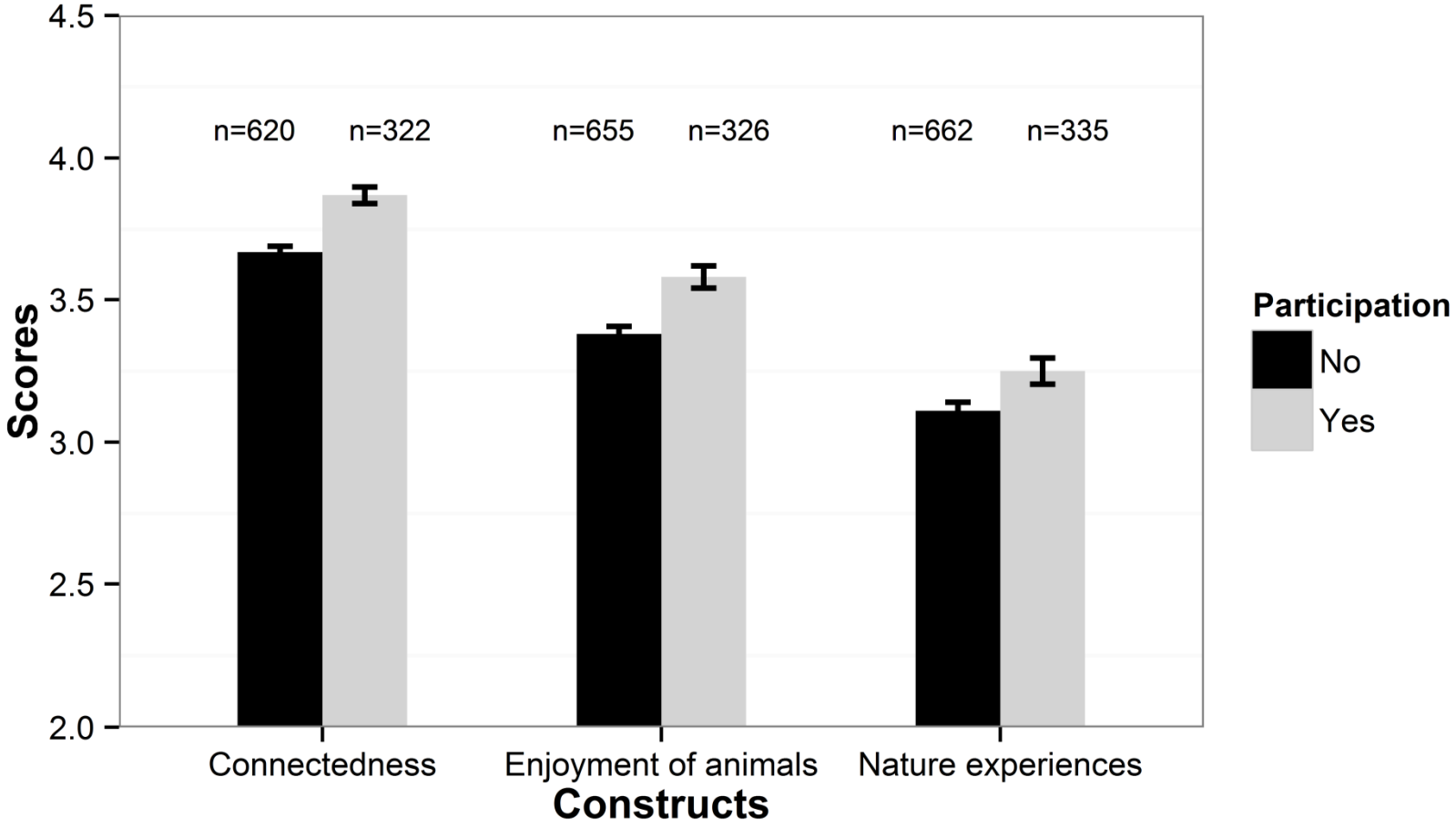
ΔAICc: Corrected Akaike's information criteria.

Table 2. Results from generalized linear mixed models about the

Independent variables	Model.1	Model.2	Model.3	Model.4	Model.5
	Estimate (Std. Error) X_1^2	Estimate (Std. Error) X_1^2	Estimate (Std. Error) X_1^2	Estimate (Std. Error) X_1^2	Estimate (Std. Error) X_1^2
Intercept	-0.51 (1.56) 0.11	-3.77 (0.67) 31.90	-0.64 (1.53) 0.17	0.27 (1.49) 0.03	-3.56 (0.64) 30.52
Age	-0.24* (0.10) 5.22		-0.21* (0.10) 4.36	-0.23* (0.10) 4.84	
Enjoyment of animals				0.33* (0.13) 6.28	
Previous nature experiences	0.30** (0.12) 6.73	0.30** (0.12) 6.65		0.38** (0.12) 10.54	
Connectedness to nature	0.62*** (0.17) 12.73	0.62*** (0.17) 12.40	0.81*** (0.16) 25.83		0.80*** (0.16) 25.26
AIC	981.12	984.42	1006.57	1006.68	1008.98

Binary response variable is whether schoolchildren participate in the natural observation club. Bold number indicates significant predictor contributing to the generalized linear mixed models.
* $p < 0.05$, ** $p<0.01$, *** $p<0.001$.

2)The differences of students' connectedness to nature, enjoyment of animals and past nature experiences between participants and non-participants (MANOVA)



3) Quality analysis

Qualitative approach was applied in the present study due to its exploration of meaning, heterogeneity and contradiction offering greater potential for understanding (Drury et al., 2011).

Compelling “pull” and “push” factors leading to adolescents whether participate in the natural observation clubs. Larger font size stands for more frequencies for reasons push away or pull in participate in the clubs.

Pull factors refer to individual intrinsic psychological characters and external resources convenience that prompt people make a decision to participation in natural observation. On the contrary, **push factors** refers to all kinds of barriers that push away people participating in natural observation.

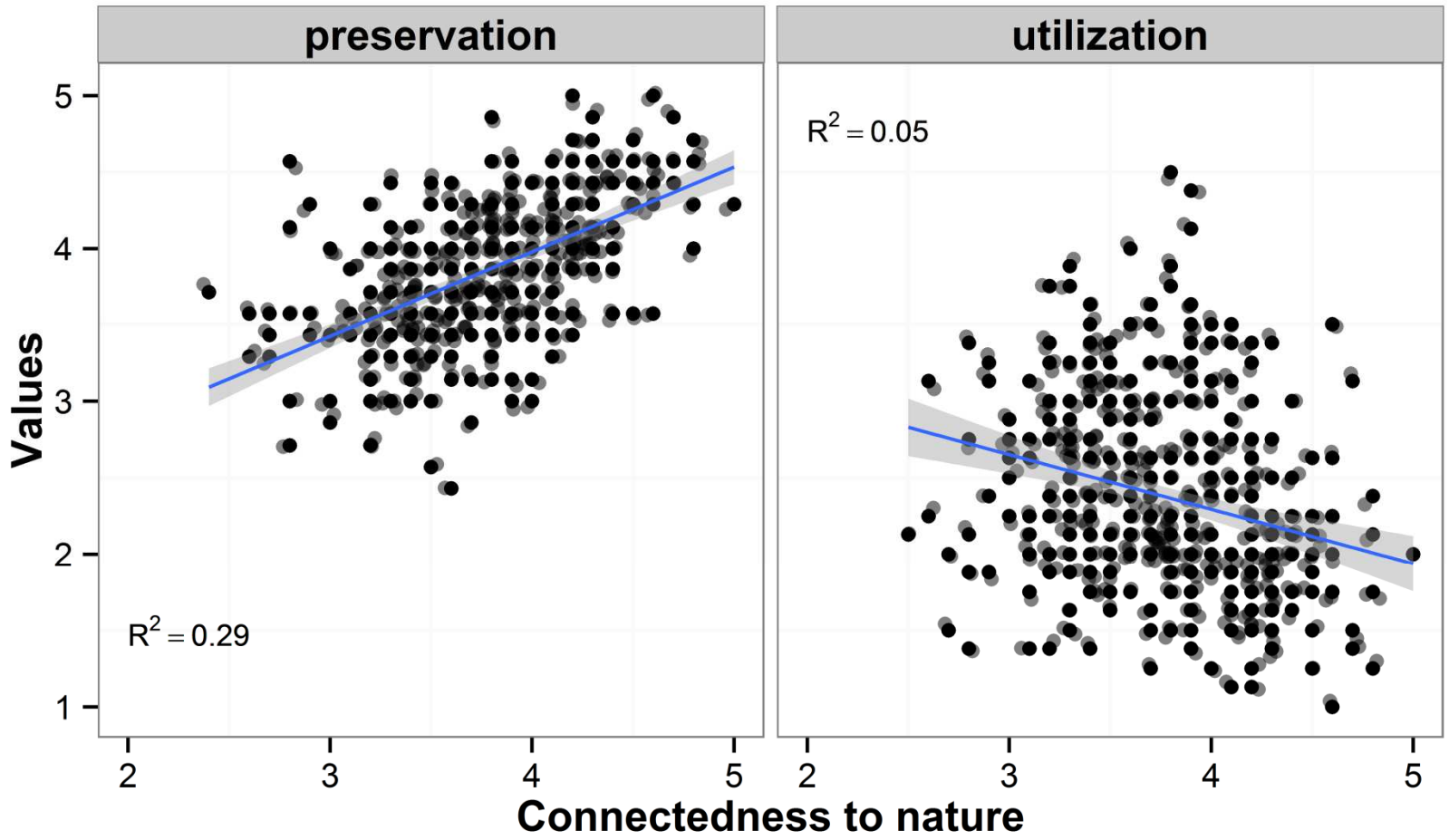


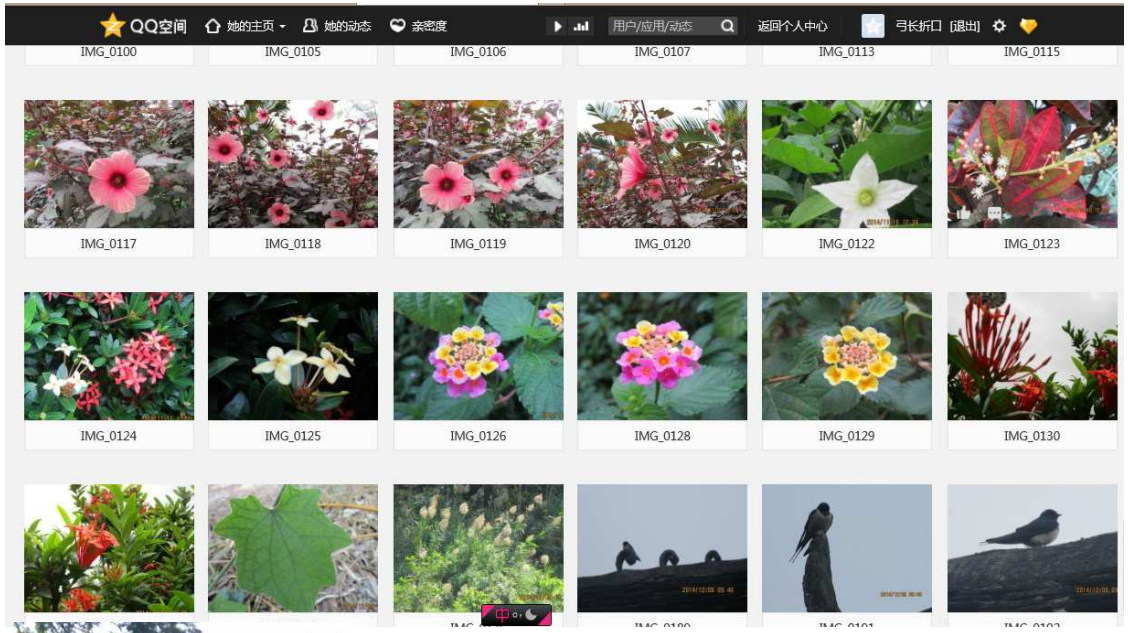
Figure 4. The relationship between connectedness to nature and adolescents' preservation and utilization attitudes. Preservation attitudes is positive correlated with connectedness to nature; while utilization is negative correlated with connectedness to nature.

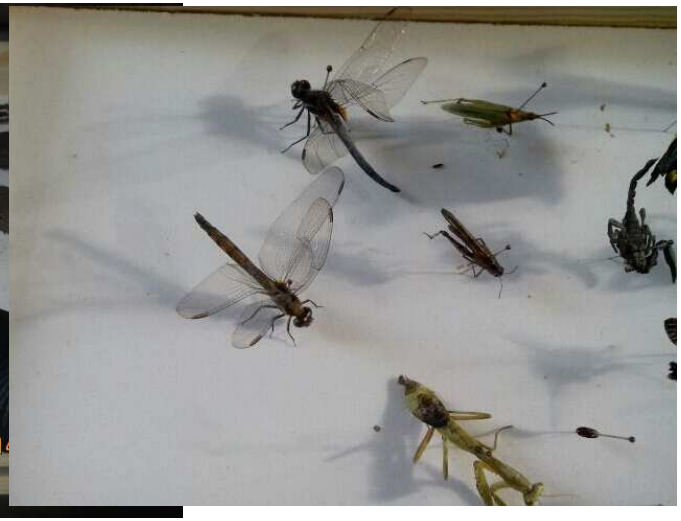
Conclusion

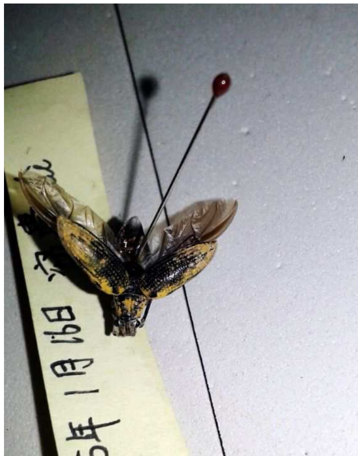
①. Our findings affirm the idea that affective connectedness to nature is a critical factor to connect people with nature and support the nature conservation (Miller, 2005) ;(Hinds and Sparks, 2008) .

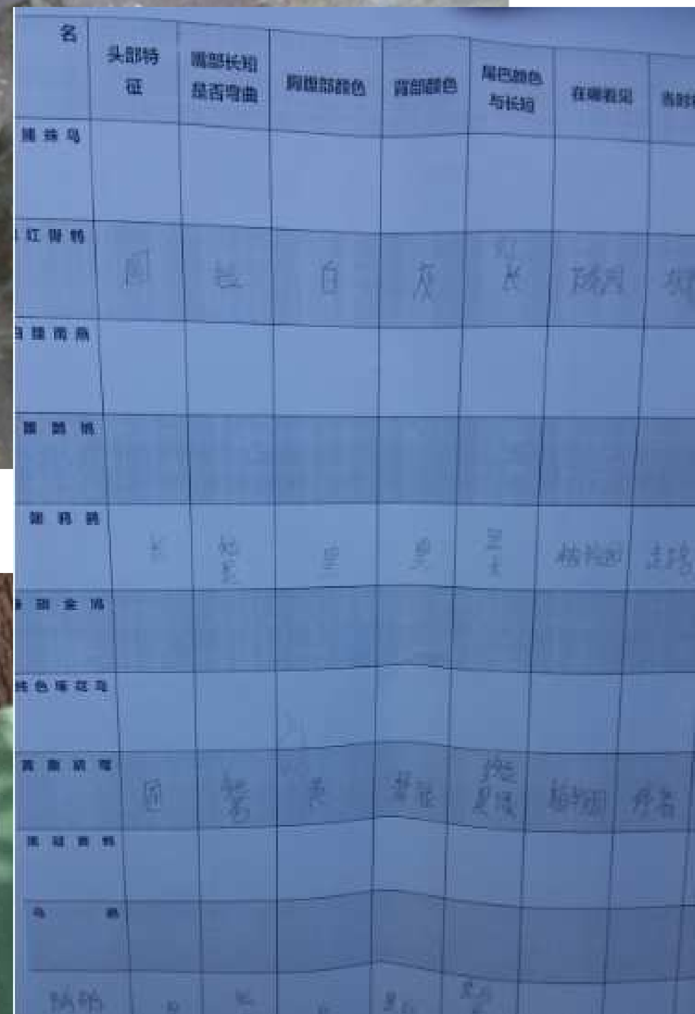
②. Adolescents' lifestyle shift to indoor activities. Heavy schoolwork, indifference in, scarce time resource and smart phone-philia have the potential for causing a vicious cycle with reduced opportunities of adolescents' access to outdoor activities diminishing their connection to nature.

Some examples of observation records





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头部特征
嘴部长短是否弯曲
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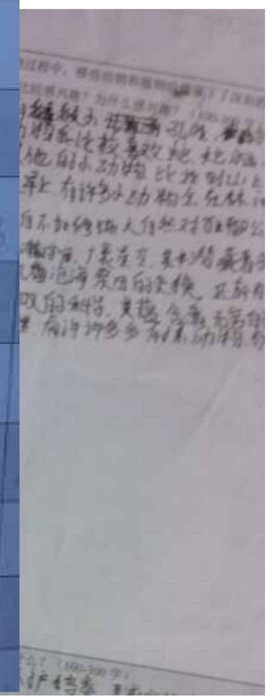
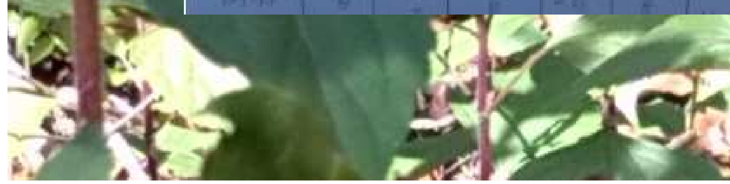
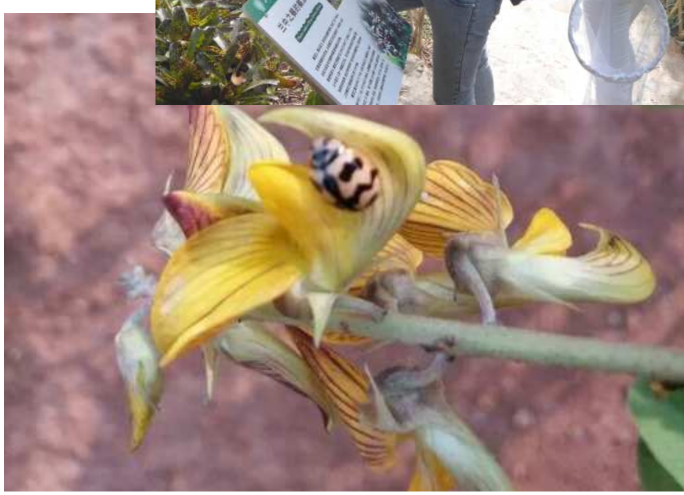
尾巴颜色与长短
在哪看见


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Thank you
Any suggestions and comments are welcome

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Wild Ideas Worth Sharing

BGCI's 9th International Congress on Education in Botanic Gardens