

High biodiversity environments as a way to improve emotional response towards arthropods and mental well-being



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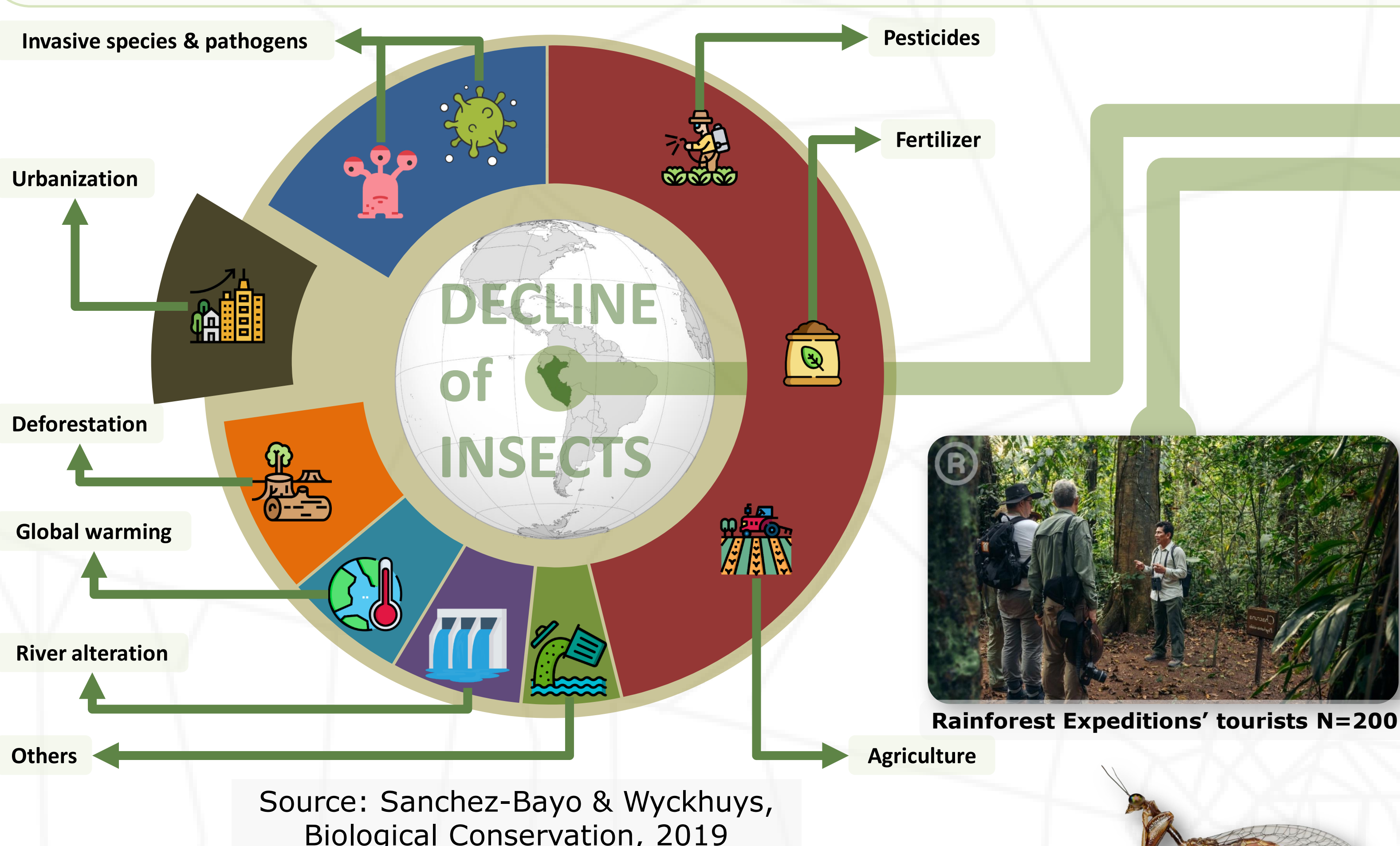
Avellaneda, A., Meemken, M., Rozario, K., Bonn, A., Oh, R.

Background

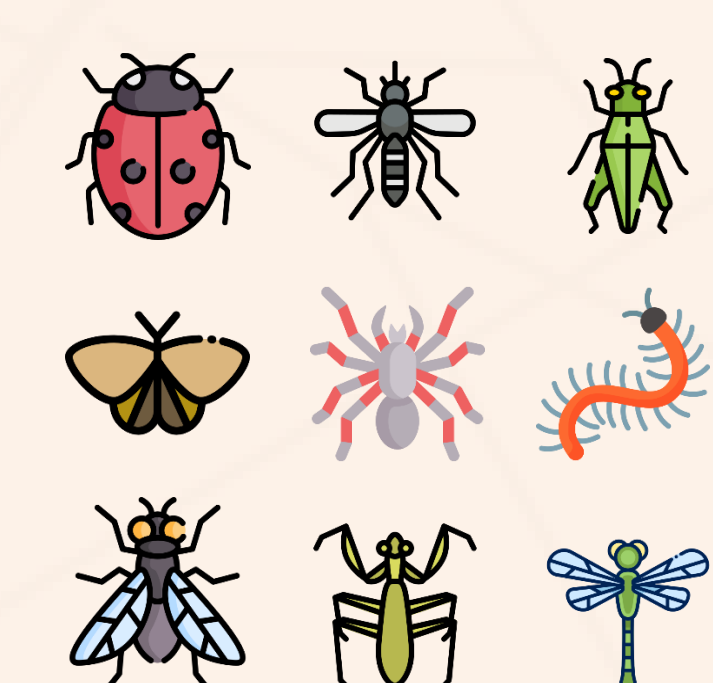
Our planet approaches critical tipping points and conservation is often restricted by limited resources and due to a negative social perception, leaving key species like insects poorly represented. A mismatch that significantly enhance the threat to conservation actions. In face of a global biodiversity and mental health crisis, interdisciplinary approaches are needed to reconcile biodiversity conservation and mental health promotion. Our study investigates the potential of ecotourism in the Peruvian rainforest to generate solutions for both insect conservation and human mental well-being.



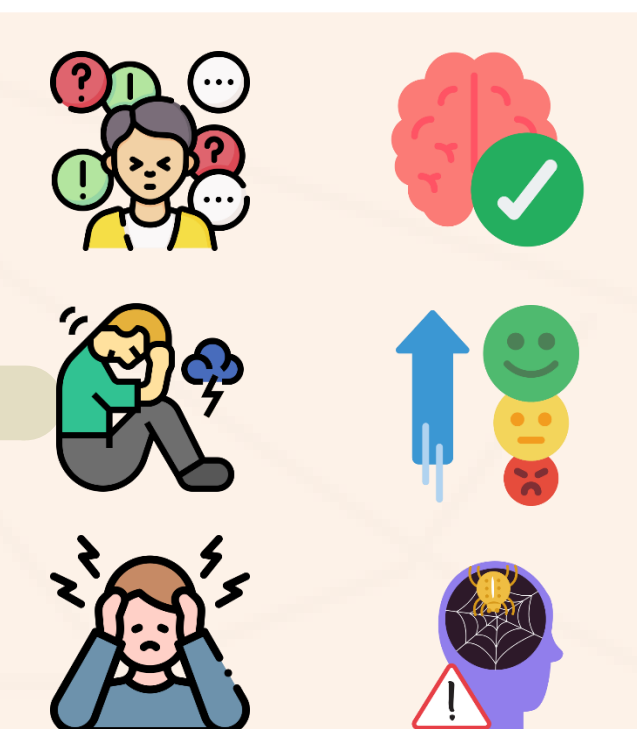
Methods



Where: Peruvian amazon rainforest
Who: Rainforest Expeditions' tourists
What: Arthropod emotional response & well-being
How: before / after / follow-up surveys



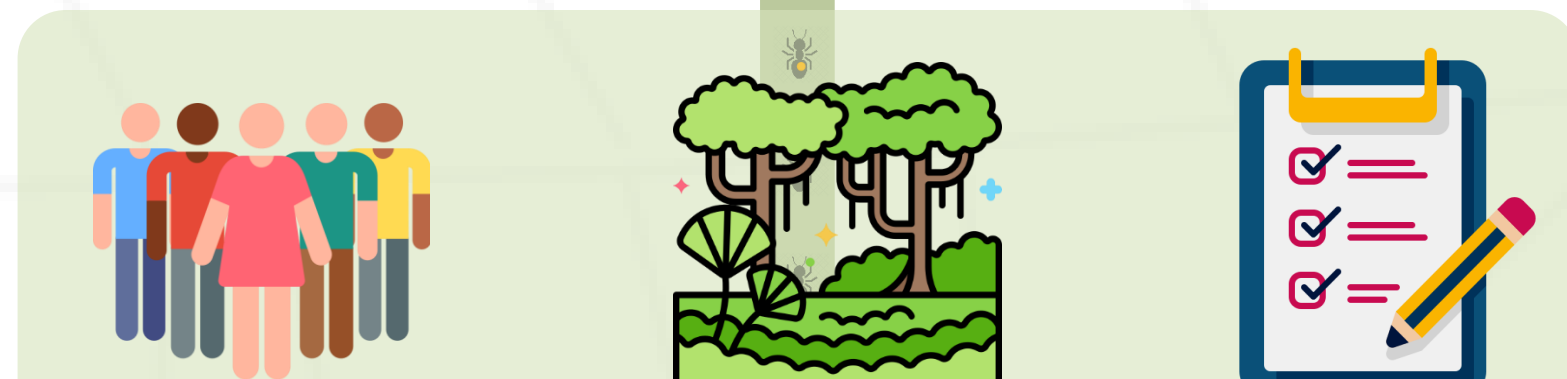
Emotional response



Mental well-being



T1 = Before exposure



T2 = After exposure

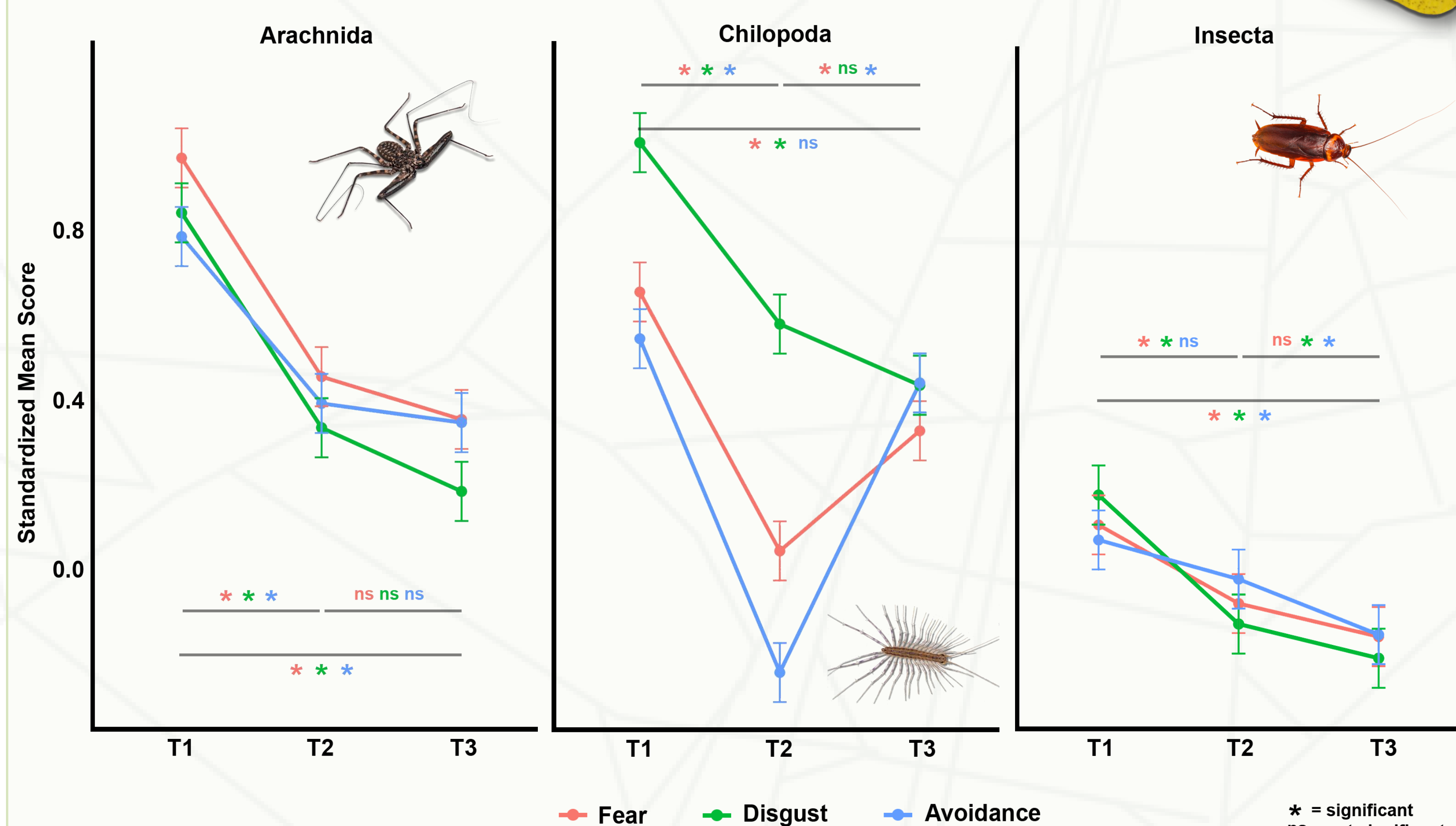


T3 = 6w after exposure

- Insects receive only 10% of all conservation funding
- They lack popular appeal associated to charismatic animals
- Social and environmental aspects influence emotions towards insects
- Urbanization reduces mental well-being benefits associated to nature
- Individual feelings can influence public actions that affect conservation
- Social perceptions contribute to NGOs and governmental decision-makers

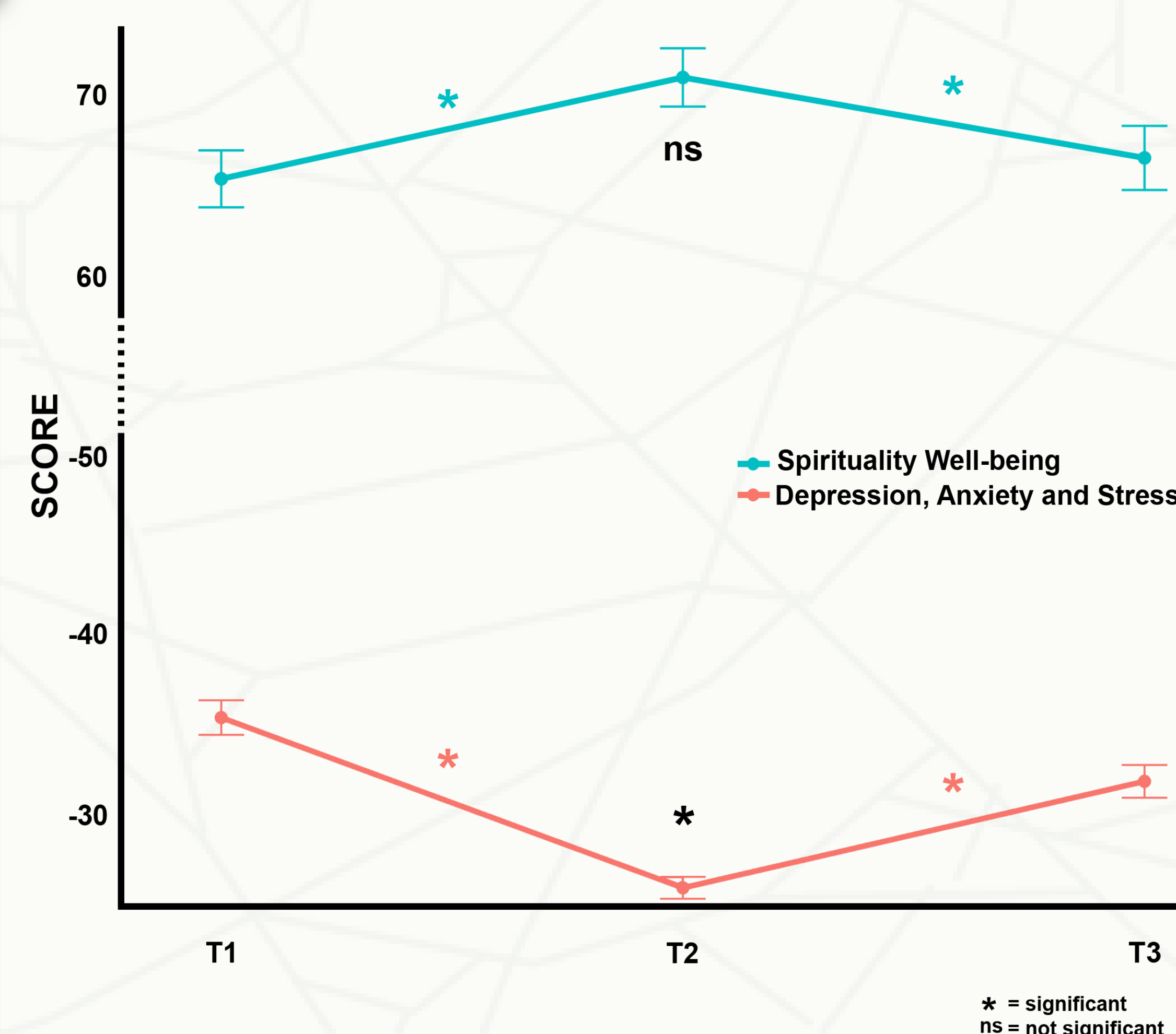
Results

Outcomes Over Time by Class



Arachnida and Chilopoda showed significant higher initial values in fear, disgust and avoidance behaviour than Insecta. While for Arachnida and Insecta we found a consistent decrease of all outcomes tested, there was a rebound effect for fear and avoidance behavior for Chilopoda. These results help support that people fear among arthropods is higher in Arachnids (spiders, tarantulas) and Myriapods (millipedes, centipedes, house centipedes) than with Insects.

Mental Well-being Over Time



Results shows that SW and DASS got an immediate improvement after exposure. Therefore, only benefits towards DAS was retain over time (6-9 weeks after T2).

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Results

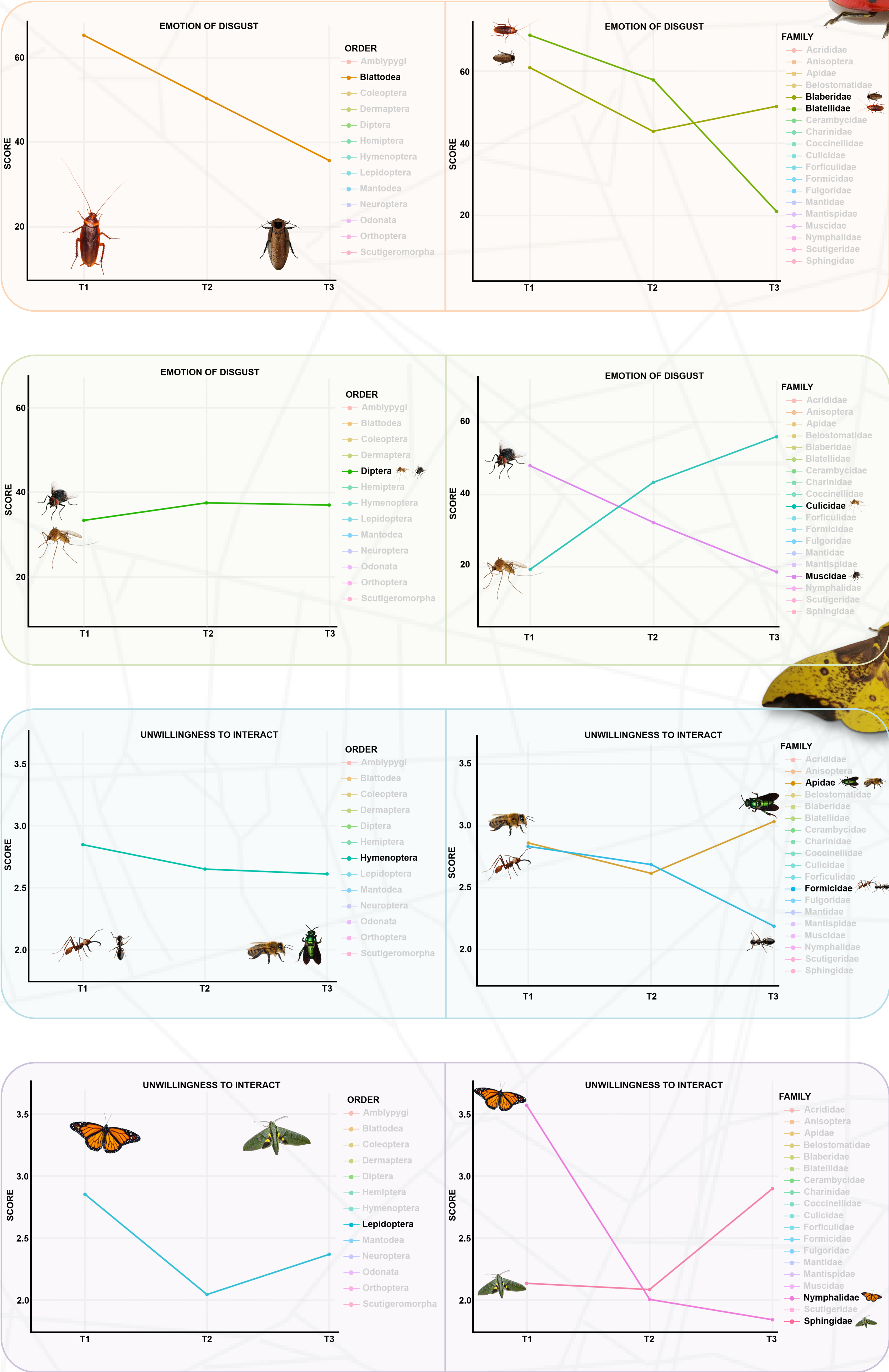


Figure 3. Differences between Order and Family levels. Standardized mean scores toward different arthropod orders and its families measured at baseline (T1), post-exposure (T2), and follow-up (T3). n = 59.

The results across taxonomic categories reveal consistent trends at the Class and Family levels, suggesting that comparisons among broader arthropod groups are informative. However, due to the high diversity of insects within Orders, these results may be biased by the particular pictures of species selected to represent each group. At Family level, responses appeared more specific and consistent, likely because this taxonomic resolution captures more relevant morphological and behavioral similarities.

Conclusion

- Short-term exposure to high biodiversity environments has a significant impact on people's emotional response towards arthropods and mental well-being.
- Results shows that SW and DASS got an immediate improvement after exposure. Therefore, only benefits towards DAS was retain over time (6-9 weeks after T2).
- People's negative emotions among arthropods are higher in Arachnids (spiders, tarantulas) and Myriapods (millipedes, centipedes, house centipedes) than Insects.
- Responses toward insects are highly dependent on interspecific similarities, making it difficult to generalize reactions across broader taxonomic groups.
- Knowledge could help understand that just a few insects may be harmful to humans, and most of them are ok to be close by.

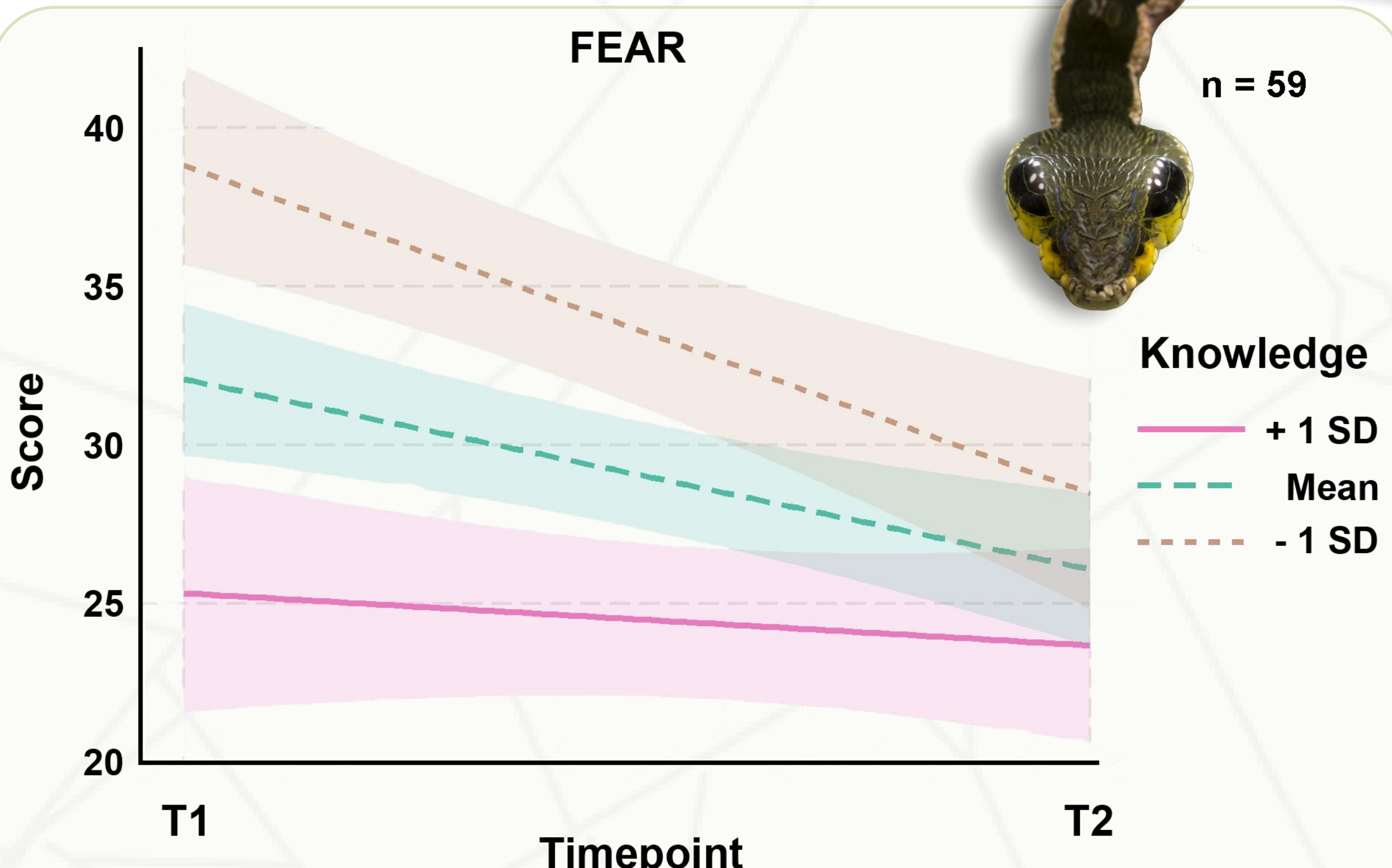


Figure 4. Fear Moderation Plot. Change of fear scores decreased from T1 to T2, with the steepest decline observed among participants with lower initial insect knowledge (-1 SD). Those with higher knowledge (+1 SD) started with lower fear levels and showed smaller changes, while average knowledge participants showed intermediate trends.

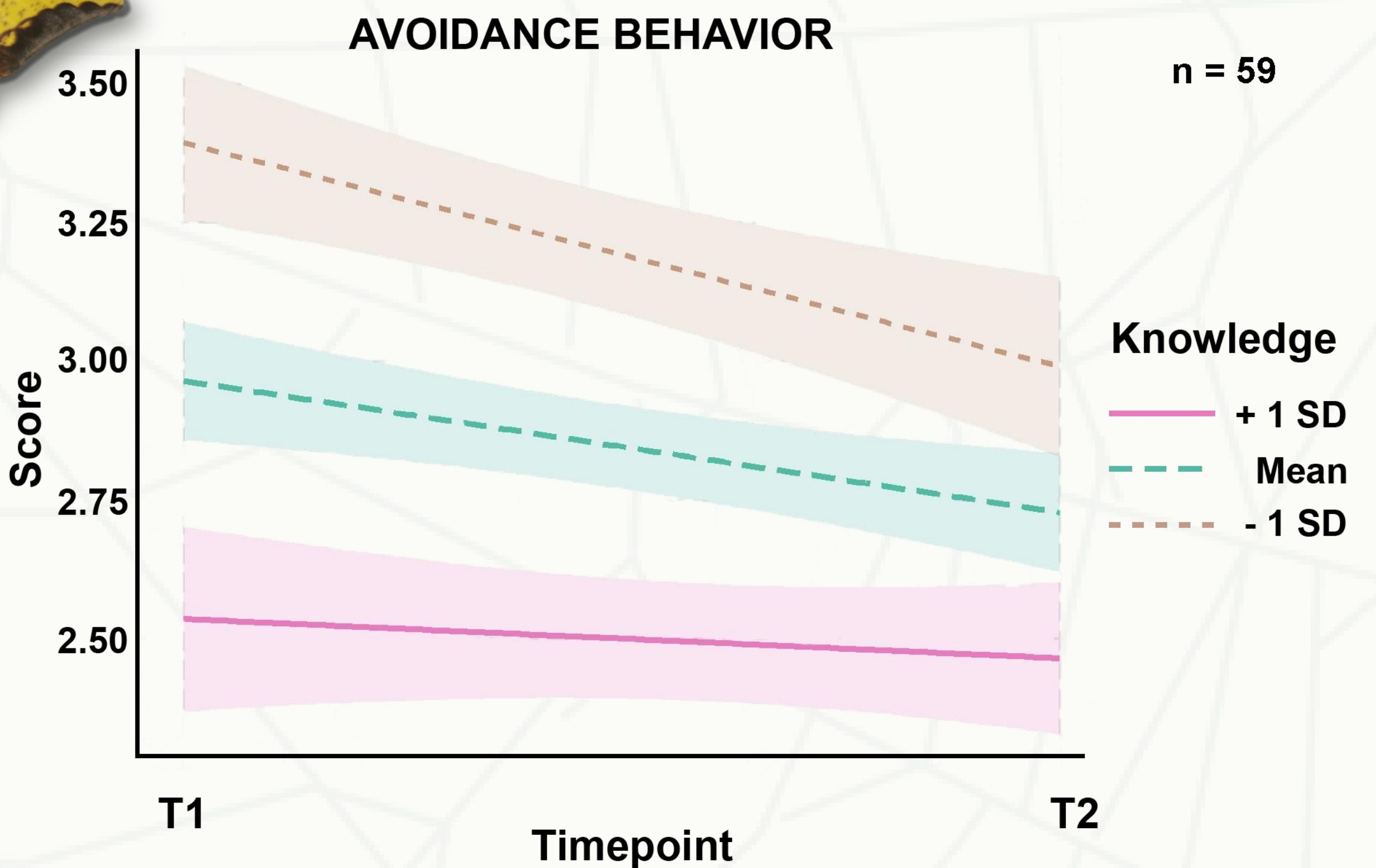


Figure 5. Avoidance Moderation Plot. Change of avoidance scores decreased from T1 to T2, with the steepest decline observed among participants with lower initial insect knowledge (-1 SD). Those with higher knowledge (+1 SD) started with lower fear levels and showed smaller changes, while average knowledge participants showed intermediate trends.

Moderation analysis showed a positive interaction between increase knowledge with lower levels of fear and avoidance behaviour towards insects. Knowledge could help understand that just a few insects may be harmful to humans, and most of them are ok to be close by. But unlike fear, disgust is thought to be more influenced by the Behavioral Immune System (BIS). Opposite to the physiological immune system that protects us during an infection, the BIS is in charge to prevent this infection.

What's next?

- How eco-tourism in high-biodiversity areas impacts conservation attitudes?
- Are pro-environmental behaviors enhance by hotspot of biodiversity?

References

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Russell, R., Guerry, A. D., Balvanera, P., Gould, R. K., Basurto, X., Chan, K. M., ... & Tam, J. (2013)