

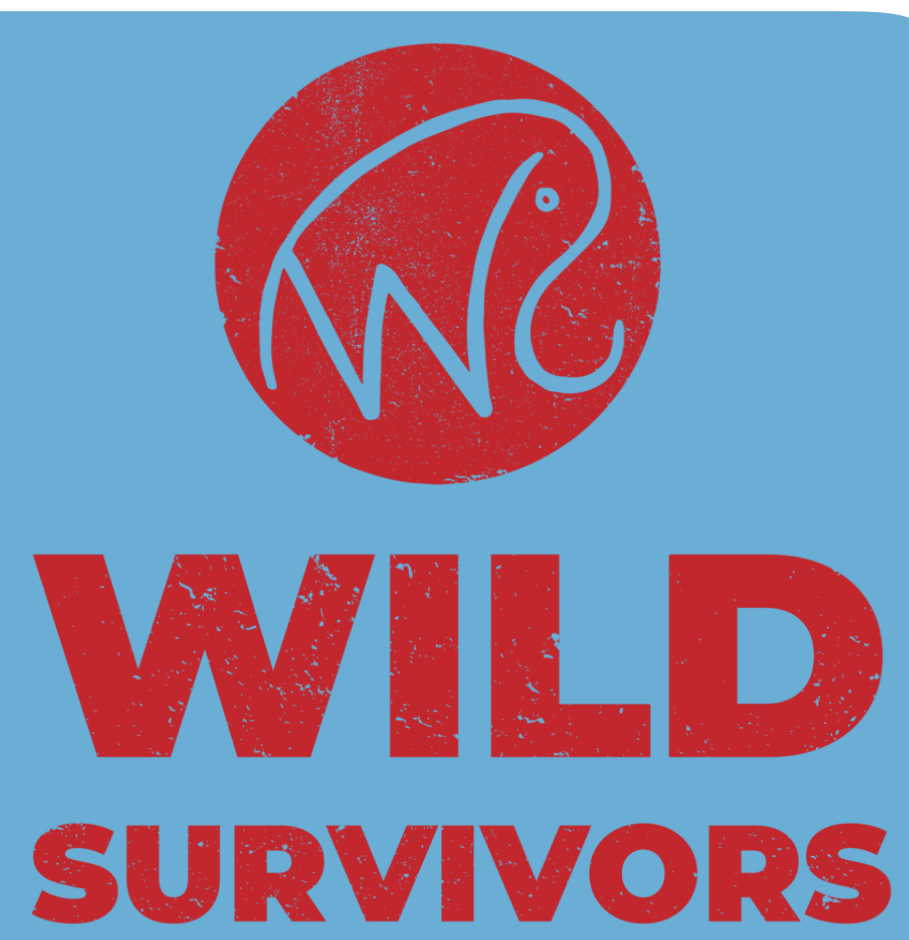
'Targeted personality device': Leveraging responses to multi-modal stimuli to support conservation

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Introduction

Elephants are facing increasing anthropogenic impacts to their environment and these changes bring them closer to humans, which results in human-elephant conflict⁽¹⁾ (HEC). Current HEC mitigation techniques include fences, trenches, human patrols, and translocations, which have been one-size-fits-all solutions. By custom tailoring a mitigation technique to the local



A local elephant bypassing an existing fence, to enter agricultural areas.

elephant population, we hypothesize that we can implement an effective, scalable method to promote coexistence that is based on understanding individual variation in elephant behavior, including personality traits⁽²⁾ such as: boldness, neophilia, neophobia, and innovation. To expand our understanding of an elephant's reaction to novelty, we will use an atomizer to assess how elephants react to novelty within the olfactory domain. The results from this experiment will enhance the programming of the targeted personality device (TPD). The TPD, adapted from an acoustic device developed by "Wild Survivors," is a programmable mitigation device that can produce sensory stimuli (auditory, olfactory, visual) in a variety of patterns that can be adjusted to target individuals in a localized elephant population. We will install the TPD in agricultural areas bordering the Salakpra Wildlife Sanctuary in Kanchanaburi, Thailand. We will test the efficacy of the TPD in deterring elephants from crop fields when it is programmed to emit stimuli across sensory domains based on the behavioral traits of specific, 'problem' elephants.

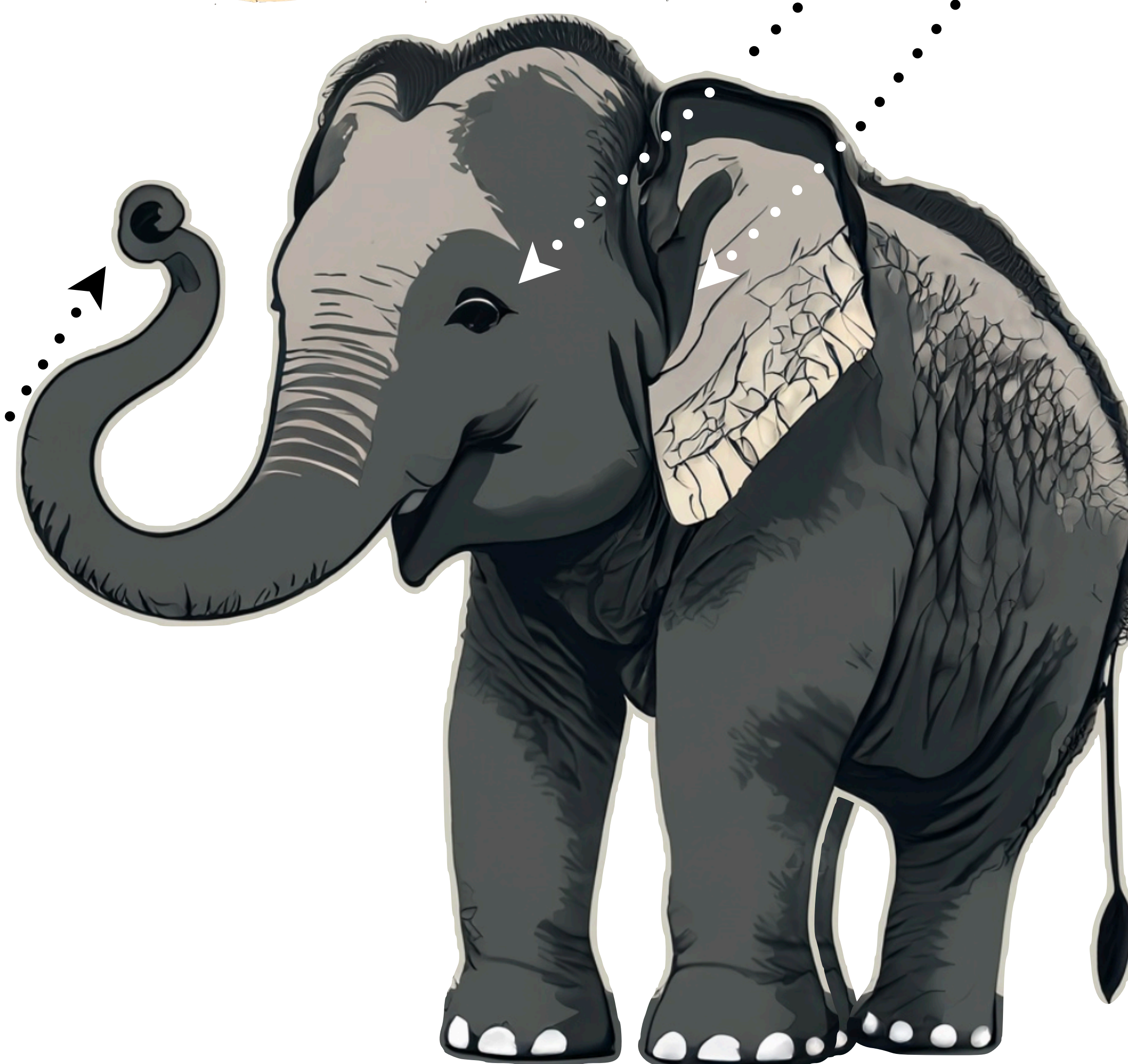


Infrared view of an Elephant in a crop field. White light is from nearby farmers attempting to deter the elephant.



The Salakpra study site (double green highlight) in Western Thailand.

The Targeted Personality Device (TPD) prototype.



Hypotheses

1a: Elephants will exhibit variation in responses between three different odor conditions (novel, neutral, and deterrent).

1b: Elephant responses to the odor conditions will vary by location, with the strongest fear of novelty responses coming from protected areas inside the Sanctuary and away from human habitation.

1c: There will be consistent individual variation in responses within odor conditions.

2: The TPD can combine different sensory modalities to be used as an effective personality-driven mitigation technique.

Odor	Hypothesized Reaction
Nutmeg	Novel Reaction indicator
Cologne	Novel Reaction indicator
Local Water	No Reaction
Local non-favorable plants	No Reaction
Non-musth Urine	Interest
Musth Urine	Deterrence
Chili Water	Deterrence

Olfaction

Elephants receive chemosensory information by inhaling odors through their trunk or by delivering liquids to their mouth and/or vomeronasal organ⁽³⁾.

Chemical compounds will be atomized with a TOVIA 1L mister (right), which we will use to assess reactions to:

- Novel odors (nutmeg, cologne).
- Deterrent odors (chili water, musth urine from bull elephants).
- Neutral odors (local water, ground local non-favorable plants).



The TPD's atomizing mister

Vision

Visual stimuli can be produced by the TPD's LED mini-strobe light.

We will use this modality to assess reactions to:

- Different colors, intensities, and patterns of light.
- With the future addition of a projector, different shapes, such as: human or predator silhouettes, conspecific outlines, or novel geometric projections.



The TPD's strobe light on (left), off (right)

Audition

Auditory stimuli can be produced by the TPD's 4" speaker, which has an output of 93+/- decibels. We have previously used

audio playbacks to assess elephants' level of boldness to predator vocalizations and their level of attraction to novel sounds (see poster presentation by Robbie Ball). We will use the results to inform our implementation as it pertains to:

- If an individual elephant would likely be deterred by the playback of predator vocalizations.
- If novel sounds or familiar sounds would be a more effective auditory deterrent.



The TPD's internal speaker

Discussion

By assessing elephants' reaction to novelty and integrating their reactivity into custom-tailored TPD mitigation programming, we hope to:

- Customize elephant mitigation at the individual level, targeting elephants based on their specific behavioral profiles.
- Develop a single device that can integrate multiple different mitigation techniques.
- Create a multi-sensory mitigation method that is scalable, affordable and effective.

Acknowledgements

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