

## ABSTRACT

In our fast-paced society, stress and anxiety have become increasingly common. Meditation for relaxation has received much attention given recent evidence of its efficacy. There exist many meditation apps in smartphone application stores, nevertheless, little is known regarding the effectiveness of these apps. Meditation apps exploit various senses, e.g., touch, audio and vision, but the relationship between human senses and interactive meditation is not well understood.

This research empirically evaluates the effects of single and combined human senses on interactive meditation. The results show the respective roles and effectiveness of the senses in meditation.

This work is the first to attempt to understand these relationships which have broad implications for the field of interactive meditation applications.

## INTRODUCTION

- Meditation decrease stress level by bring the attention into the present moment and deliver the mind from distractions to relaxation [4].
- Nowadays, there are more than 300 meditation apps.
- The main goal is understanding how different human senses affect relaxation experience during the use of meditation apps.
- We focus on the three most commonly used senses applied in smartphone meditation apps: audio, vision, touch and combinations of using these senses (see Figure 1).
- Audio-based meditation apps comes mainly in guided meditation and relax sounds [2].
- Vision-based meditation apps come mainly in the form of gazing at calming visualizations such as, burning candle or a lava lamp [3].
- Touch-based meditation app is to focus on one gentle, slow finger movement on the smartphone screen [1].

## METHODS

- Seventeen volunteers students (10 females, age 24 to 35, M = 28.6).
- Meditation session took 10 minutes for each condition.
- The effectiveness of meditation was measured by:
  1. Relaxation technique rating scale (RTRS)
  2. Intrinsic motivation inventory (IMI)
  3. Semi-structured interview.
  4. Hart rate sensor.

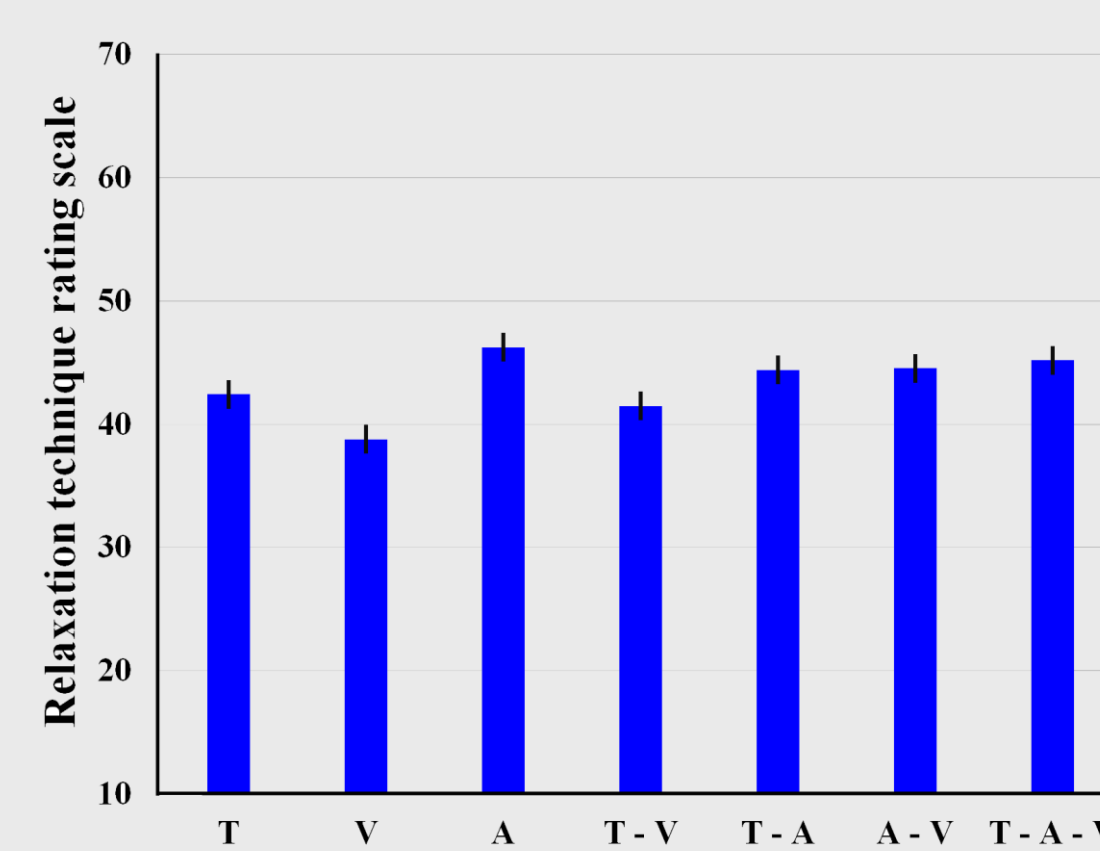
Conditions	Human senses
1	T
2	V
3	A
4	T+V
5	T+A
6	A+V
7	T+A+V

**Figure 1.** Mobile apps exploit different senses for interactive meditation. This study investigates the effect of touch (T), vision (V), audio (A) and their combinations on meditation apps.

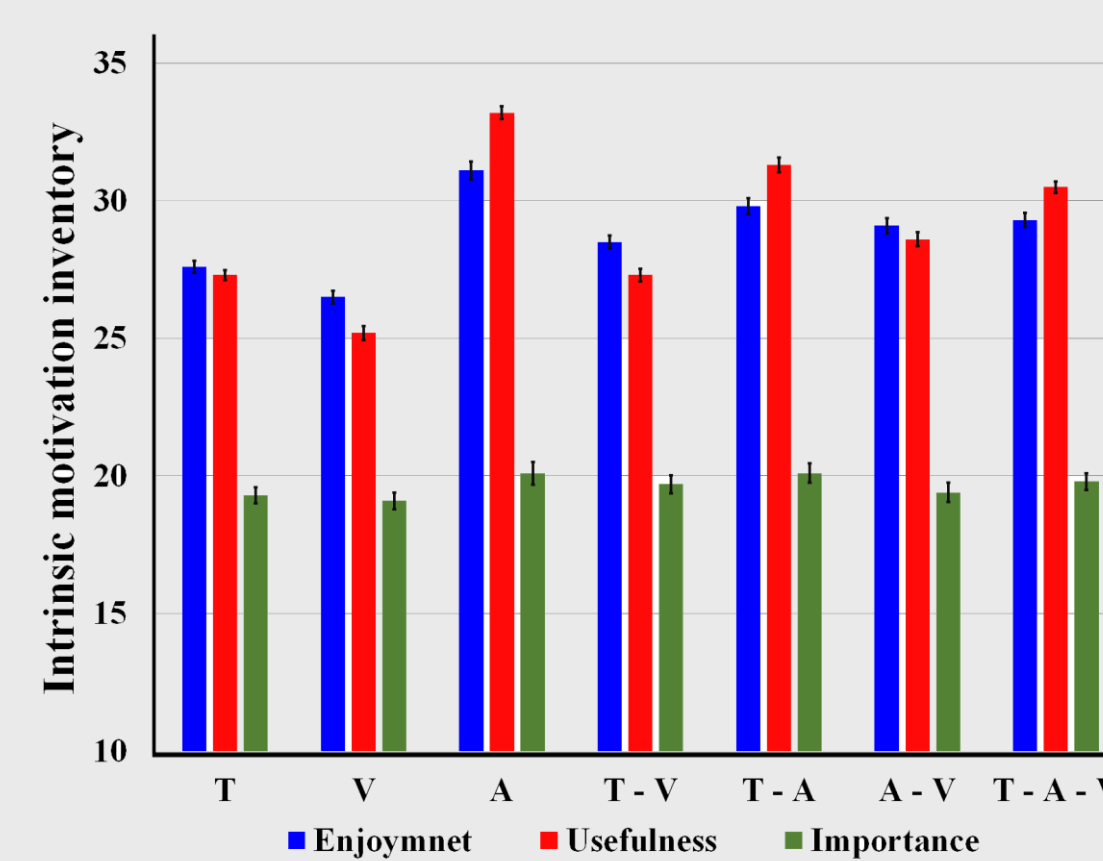
## Analysis

34 (IMI and RTRS) questionnaires and 17 session of semi-structured interview were analyzed, we analyzed delta heart rate (*max-min*) data and we calculated the correlations between user preferences with IMI, RTRS and delta heart rate.

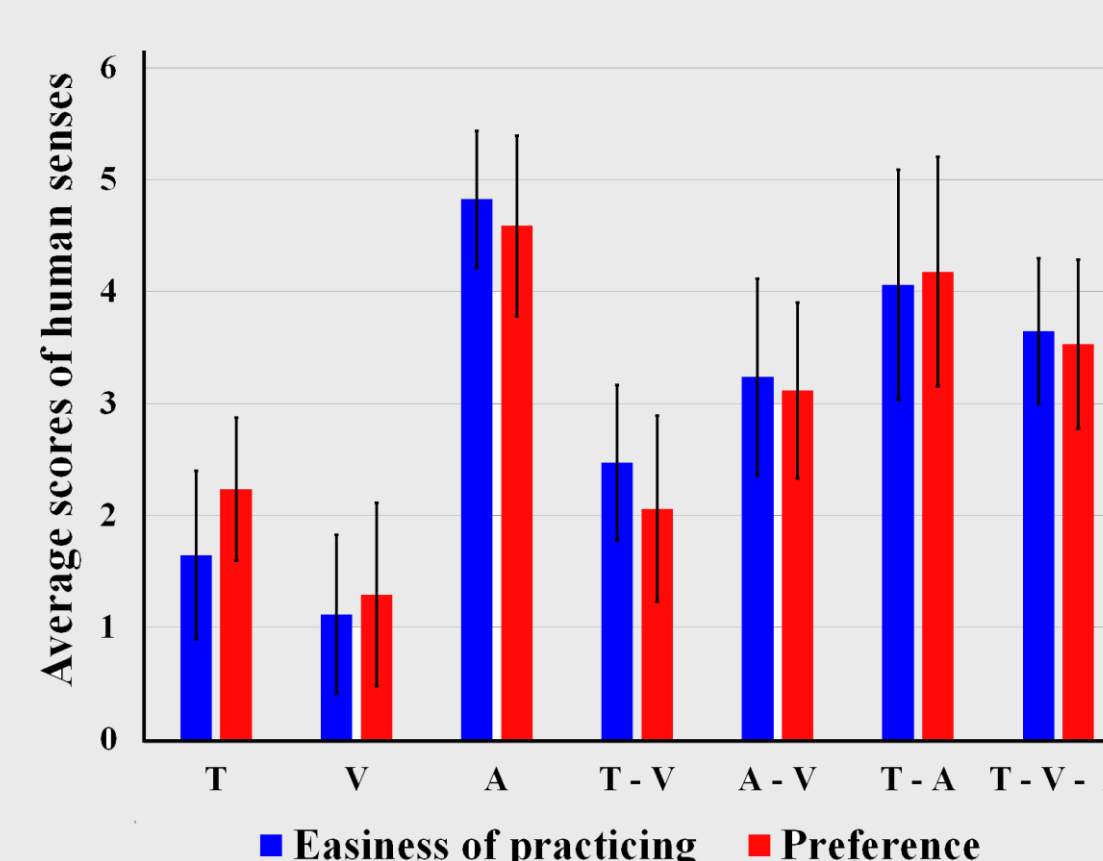
## RESULTS



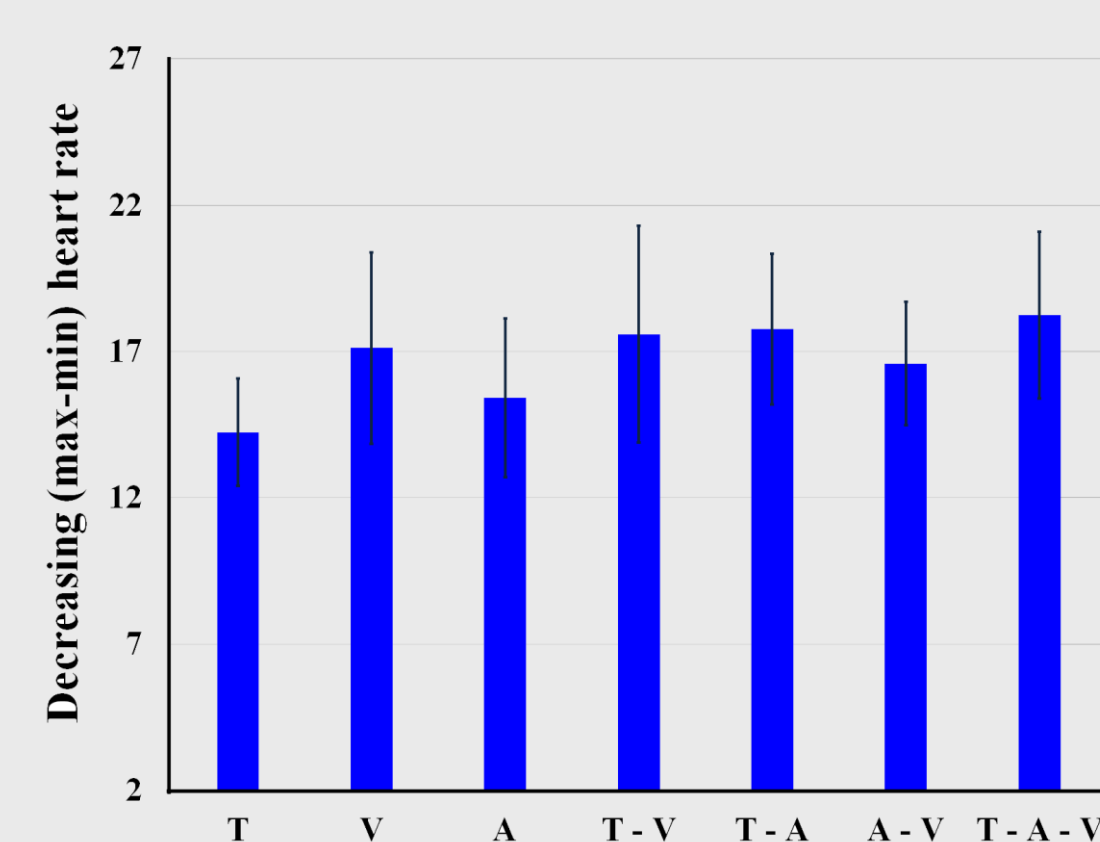
**Figure 2.** There is a significant effect on RTRS. Significant differences between V and (A, T+A+V).



**Figure 3.** There is a significant effect on (1) enjoyment, a significant differences between V and (A, T+V, A+V, T+A+V). (2) usefulness and a significant differences between V and (A, T+A+V). Also, between A and T+V. In contrast, there is no significant effect on (3) importance.



**Figure 4.** There is a significant effect on (1) preference and a significant differences between T and (T+A, A, A+V and T+A+V). Between V and (T+A, T+V, A+V and A). (2) easiness and a significant differences between T and (T+A, A). Also, between A and V.

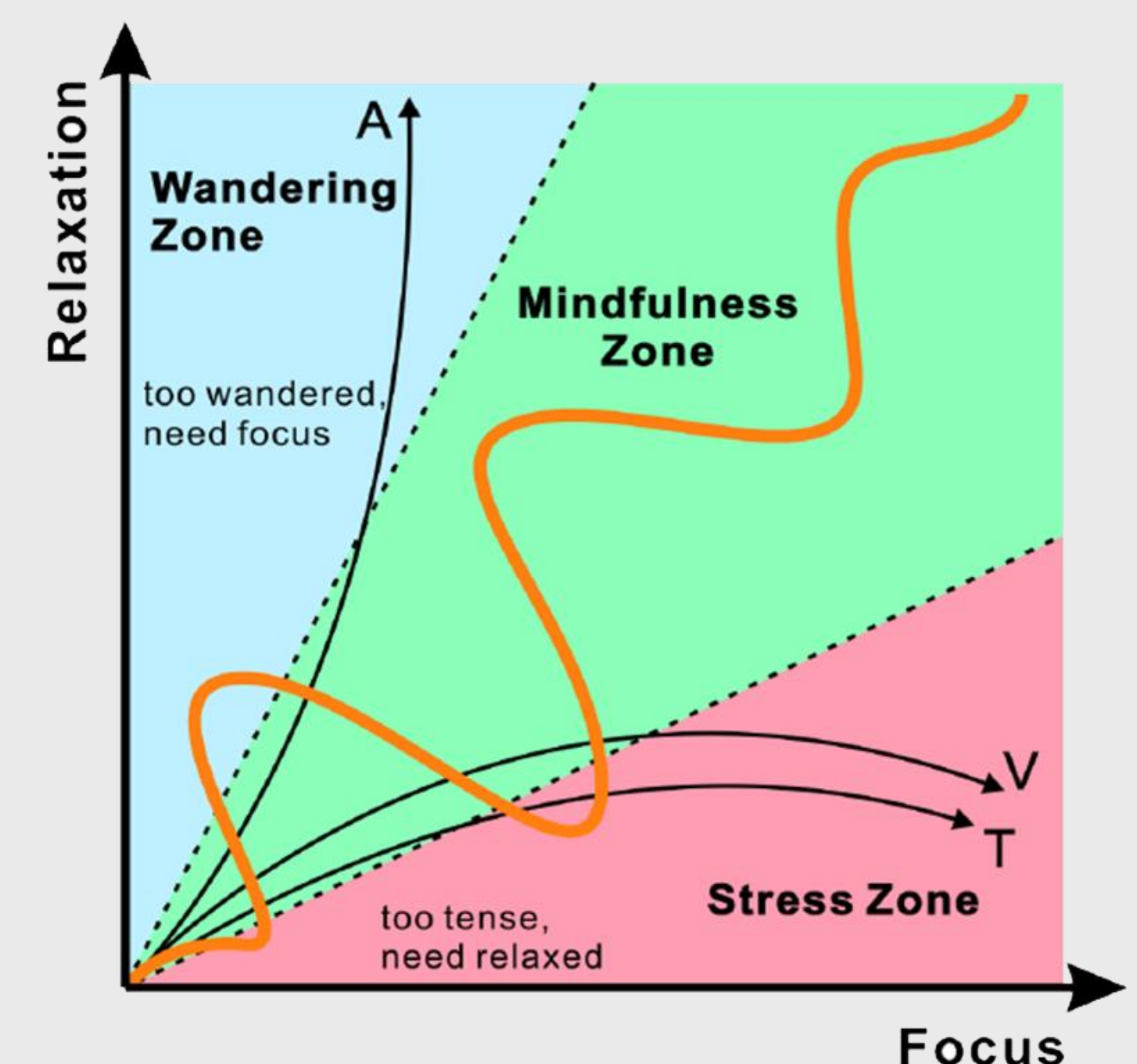


**Figure 5.** There is a significant effect on heart rate and we revealed a significant differences between T+A and T.

There is a moderate positive correlation between user preferences and enjoyment, a strong positive correlation between user preferences and usefulness, and a strong positive correlation between user preferences and (RTRS).

## DISCUSSION

- The conflict between metrics ensure and define more precisely how to approach the design of meditation apps.
- We found the effectiveness of human senses can be defined by their respective roles.
- Practicing meditation through smartphone app is depend on: relaxation and focus (see Figure 6).
- Human senses need to be applied situationally to maintain both relaxation and focus.
- Designers of interactive meditation apps should include awareness of relaxation, focus and mindfulness.



**Figure 6.** We found that the effectiveness of human senses can be described by their role in maintaining the balance between relaxation and focus.

## CONCLUSIONS

Audio is useful for relaxation but may easily lead to sleepiness or wandering mind. Vision and touch are useful to promote focus but may get tensed after a period of time. Thus, it is important to know how to use different human senses situationally to maintain both relaxation and focus.

## REFERENCES

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