

Background

The Scale for Habitat Usability (SHU) is a standardized subjective scale created for collecting user feedback on habitat/vehicle design at NASA.

Problem Statement

The second phase of the study occurred during COVID-19. The scale developers were unable to collect psychometric data in person. This was challenging because the SHU is meant to collect post-use ratings after users complete a task in a habitat.

Non-traditional approaches were employed to evaluate the SHU in terms of validity and reliability.

Prospective Habitat Evaluation

Participants ($N = 34$) performed two evaluations based on a set of procedures and pictures (**Figure 1**). Participants rated the habit using:

- The SHU and the Adjective Usability scale (for validation)
- Estimated success (“I think I would be able to complete the task successfully.”)
- Estimated time (“About how long do you think it would take you to complete this task?”)

Figure 1 (a): Setting Up Exercise Machine

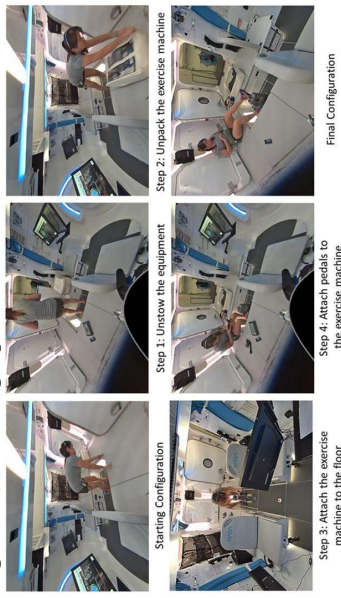
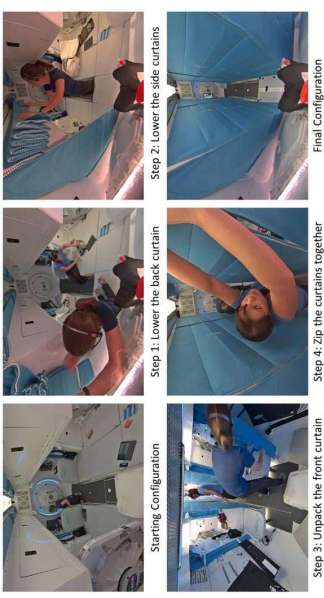


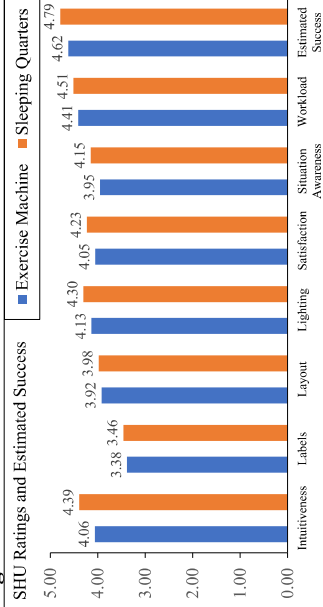
Figure 1 (b): Setting Up Sleeping Compartment



Descriptive Stats

- Participants rated the habitats highly in terms of usability and success.

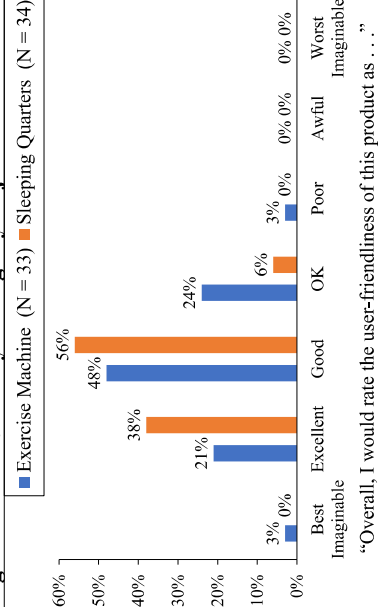
Figure 2: SHU and Estimated Success Means



Note. All scales rated from 1 (Strongly disagree) to 5 (Strongly agree).

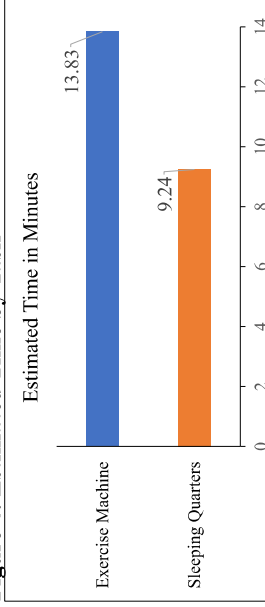
- Participants rated the habitat highly on the Adjective Rating Scale for both tasks.

Figure 3: Task Usability Ratings by Adjective



- Participants estimated the exercise machine would take longer to set up than the sleeping quarters.

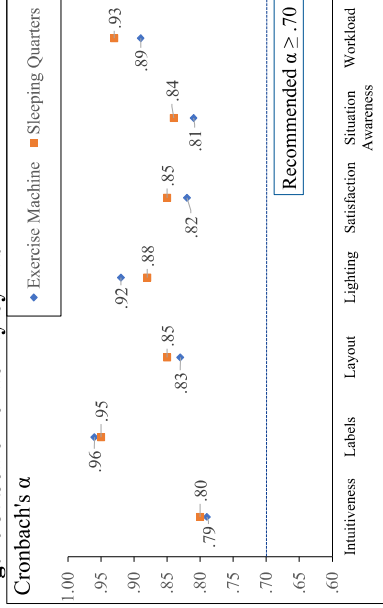
Figure 4: Estimated Time by Task



Reliability and Validity

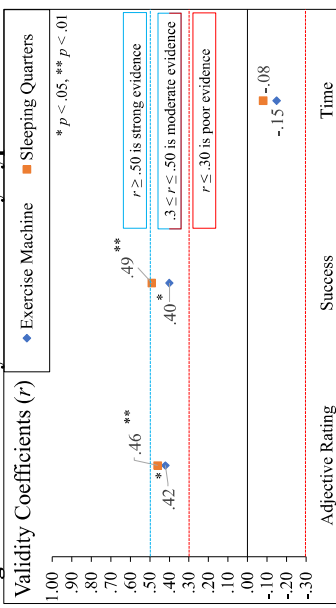
- Scales exceeded minimum recommended threshold for internal consistency ($\alpha \geq .70$) indicating high agreement between scale items.

Figure 5: Scale Reliability by Task



- SHU composite moderately correlated with two of the three validity criteria (Adjective Rating scale and estimated success), supporting validity of the SHU.

Figure 6: Task Validity Coefficients by Type



Discussion and Future Directions

- COVID-19 created a situation in which traditional research methodologies were no longer employable
- Prospective usability, assessment without using the product, allowed scale developers to collect survey responses on the SHU
- Although this was not a preferred method, evidence supported the reliability and validity of the SHU
- Future work should further examine the psychometric properties of the SHU under more realistic conditions
 - Replicate results from this study
 - Increased generalizability of results