

A Good Balance Between Research and Outreach in an Informal Science Learning Environment

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Research on Autism and Development Lab

Main Questions

- What approaches can be used to teach and interact with the public about scientific research while also collecting data?
- Can STEM material be successfully taught in an informal science learning setting?

Our Research

- Collection of balance and reaction time data to observe changes over the lifespan
- Standardized balance data have been established in older adults (and are correlated with fall-risk), but there is lack of a similar normative data for children
- Balance is a foundational motor skill that is disrupted in most developmental disorders — and like other motor skills, can be readily trained
- Collection of data from children to appreciate what typical variability looks like to appropriately assess the outcomes of training balance

Engagement with the Public

Interaction Duration: 10 minutes

Project Duration: 6 months, with visits twice a month

150 Participants

Moments of Inquiry

- Hypothesize out loud and provide suggestions based on our knowledge of the literature (i.e., “Is your balance better with your eyes open or eyes closed?”, “Do you think you will be faster with your dominant or non-dominant hand?”)

So What?

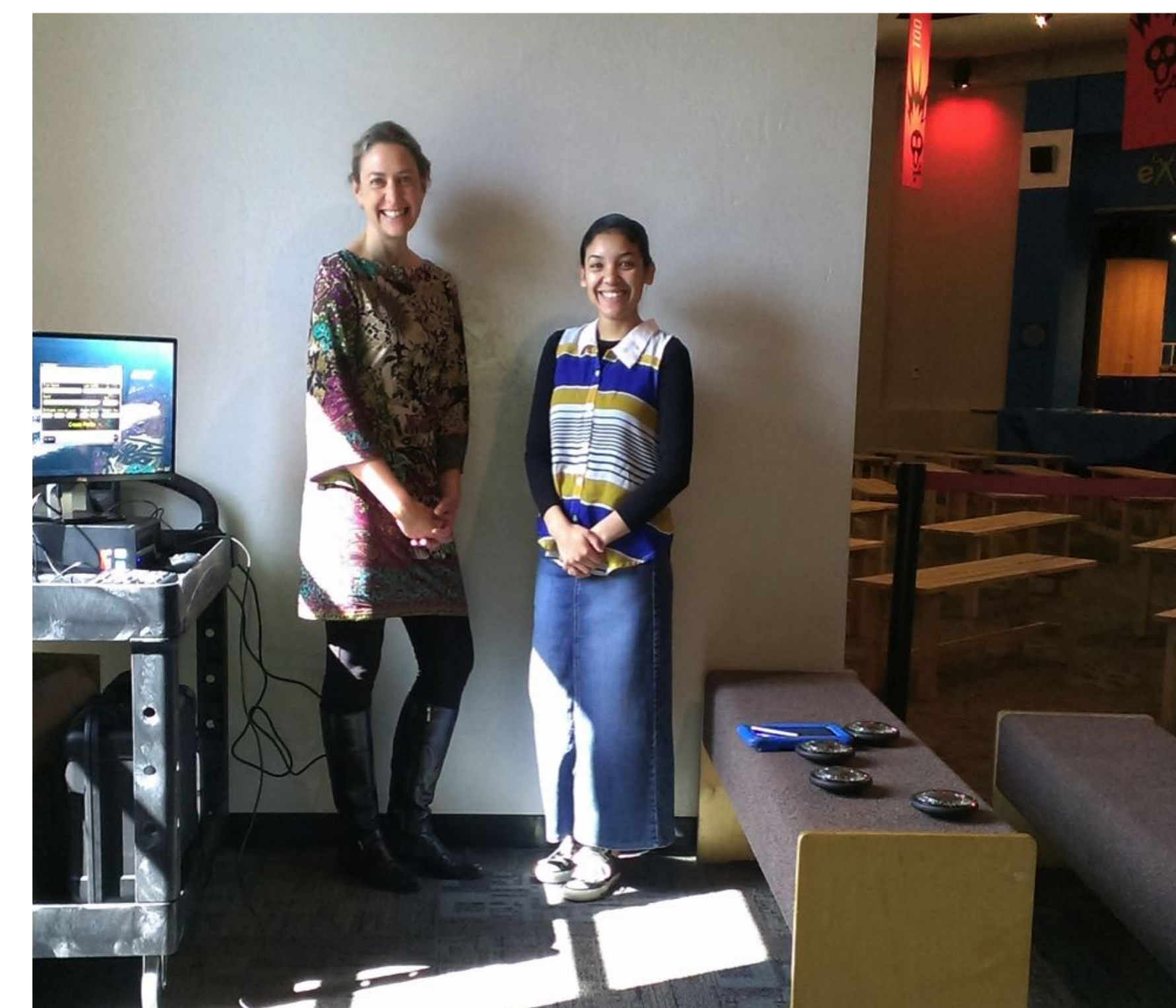
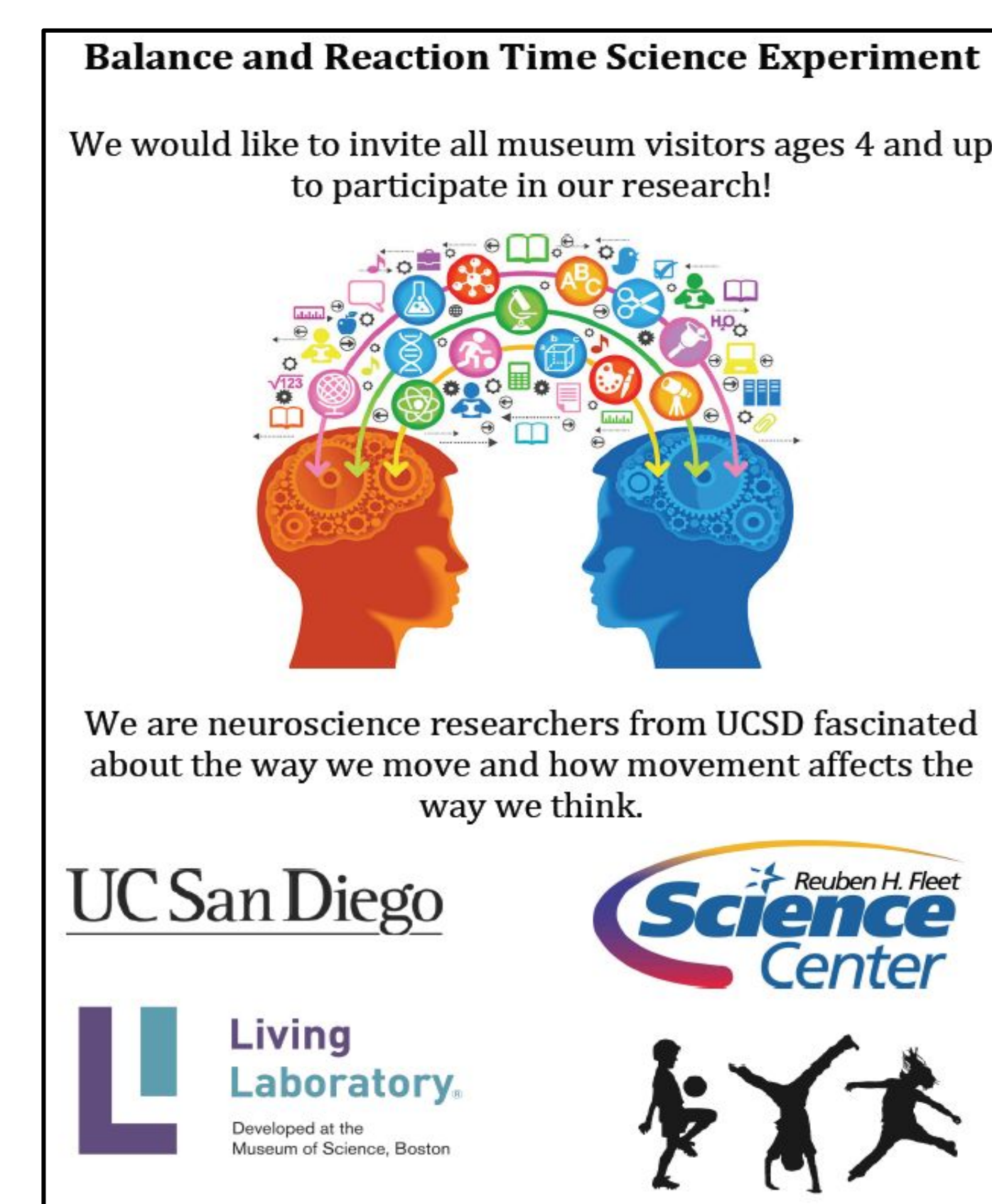
- Relate how balance is needed in everyday life, showing participants how balance shifts during sports activities or while riding a bicycle
- After testing, a graph of collected data was shown to participants so they can understand their results
- Discuss reasons for the overall U-shape of the curve and why there is so much variability at any given age
- Explain what activities can help train and improve balance



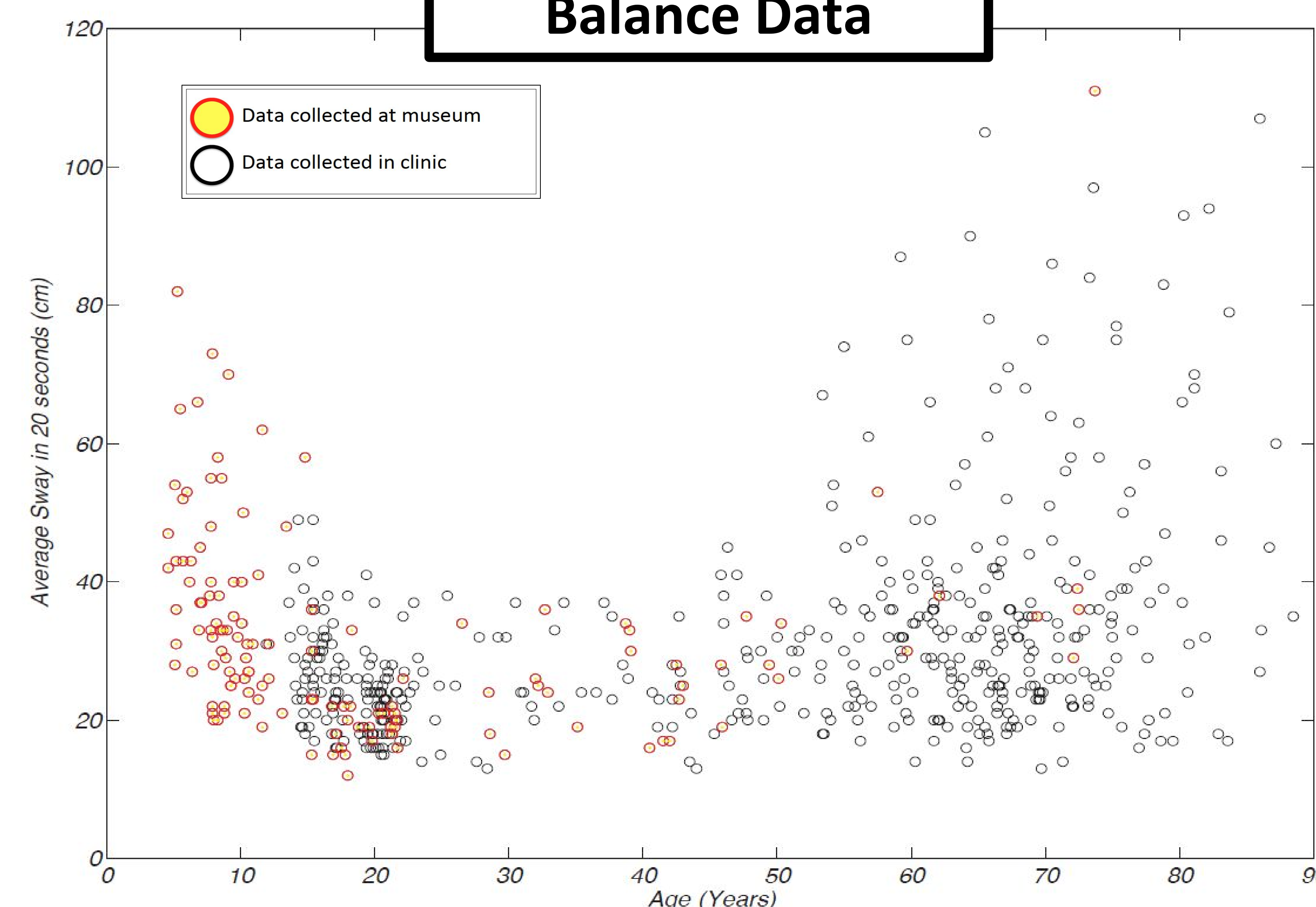
Left: Children are shown the FitLights, which record reaction time data.

Bottom left: Our banner that was created to explain our purpose at the museum and to let participants know what our demonstration is about.

Bottom right: The setup of the demonstration includes two platforms (one for the FitLights, one for the participants to sit on), and an open space for the balance board and computer system.



Balance Data



Experiences

Paul Siboroski

Exhibits director at the Reuben H. Fleet Science Center

- This is a unique experience that directly reinforces the science center’s mission to encourage lifelong learning by advancing the public’s understanding of science

Patron Perspective

Middle School P.E. teacher and his students

- This data collection is applicable to what he teaches and he is inspired to incorporate a balance lesson later this school year
- He encouraged his students to observe how we collected the balance data and he hopes to see similar interactive experiments like this in the future

Discussion

- The museum setting allots only a short amount of time to hold patrons’ interest, making this 10 minute experiment appropriate
- Recognition that there is no black-and-white mold of a scientist
- The gain from this project is not only for the researchers, but also for the participants
- Allows patrons to become scientists and experience the process of the scientific method
- Knowledge and understanding of participants’ results are discussed
- Conversations with patrons to connect this information to their lives

Future Directions

Our Research

- Incorporate the study of the mind, eyes, and body to the existing project
 - Eye-tracking glasses that record saccades made when performing manual tasks
 - Corresponding Kinect device to monitor and record body movements
 - Wireless EEG headset to observe how brain waves are associated with the performance of manual tasks

Engagement with the Public

- Reach underprivileged San Diego communities that might not have access or exposure to these unique STEM learning environments
 - Provide this experience in community centers and schools throughout San Diego
- Incorporate this idea into programs that designate more time to invest in scientific outreach (i.e., schools)