CareCam
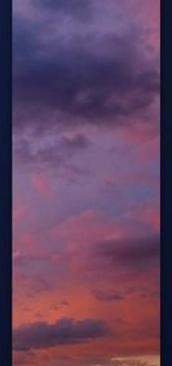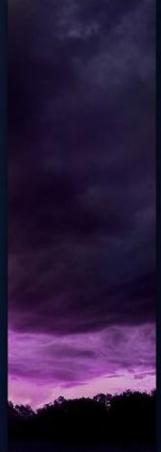
Providing a seamless way to record, track, analyze, and share behaviors of children with Autism Spectrum Disorder (ASD)

MHCI+D Capstone Project
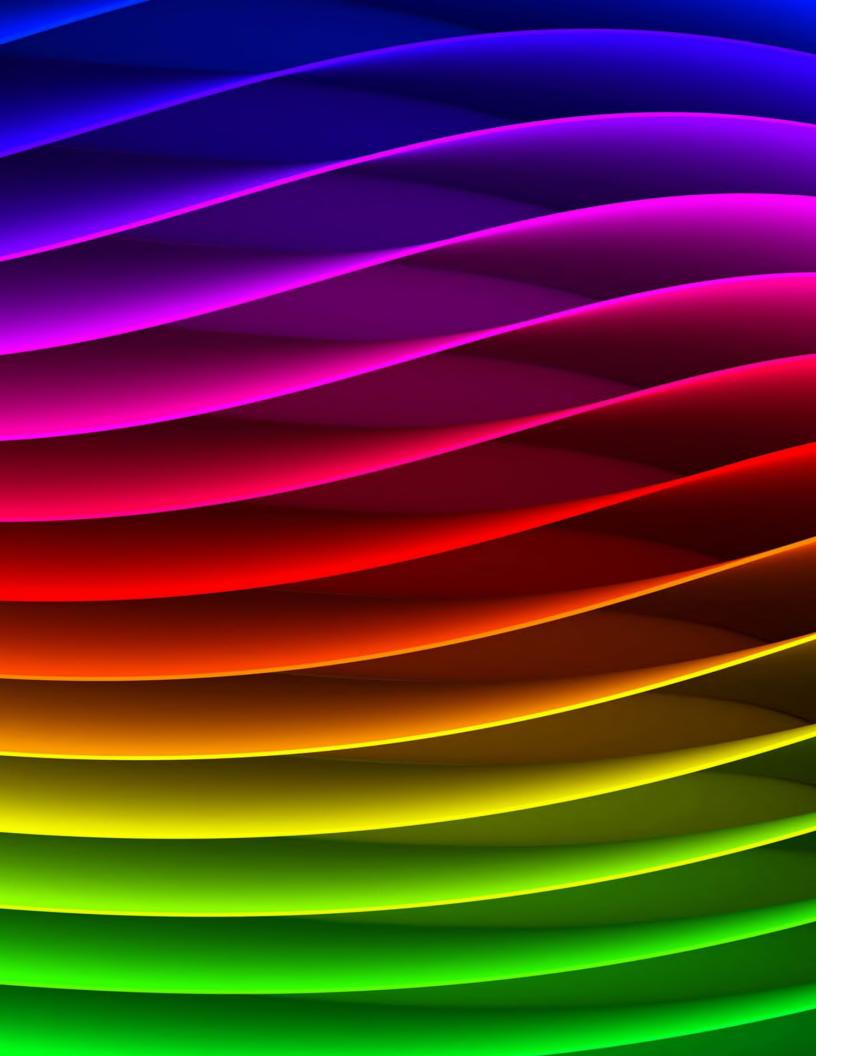
Author: Taysser Gherfal
August 19, 2015

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Acknowledgement

I am grateful to my colleagues who, over the year, have contributed much to my education. I am ever grateful for the advice and support provided by the director and the instructors of the MHCID program. I have been fortunate to work with Asta Roseway, our sponsor from Microsoft Research. Her mentoring was essential for the success of this project.

I would like to thank all experts and participants who helped us move forward and informed the decisions made in this project.

Finally, and most importantly, I would like to thank my parents for their support and encouragement. I thank my brother Shehab who stayed with me this year. It would have been a tougher year with out him. Also, I thank my fiance Khawla for her support, encouragement, and quiet patience throughout the year.

The Team

Taysser Gherfal

Liusu Wang

Junying Chang

Meishen Yin

Taysser has a Bachelor of Science degree in computer engineering from University of Tripoli and a Master's degree in Business Administration (MBA) from Atkinson Graduate School of Management. His experience includes network engineering and project management. Taysser was Project Manager during the first half of this project. Also, he was user researcher, and UX designer.

Liusu has a Bachelor of Science degree in Computer Science and Software Engineering from the University of Washington. Before joining this program, her experience includes software engineering and user research. Liusu was the Project Manager during the second half of the project. Also, she was user researcher, and UX designer.

Junying has a Master's degree in Architectural Design from University of Michigan. She has experience working as a designer in different offices around the world. In this project she was user researcher, and UX designer.

Meishen has a Bachelor of Science degree in Psychology. In this project she was user researcher, and UX designer.

INTRODUCTION

Background

Autism Spectrum Disorder (ASD)

Is a developmental disability that can cause significant social, communication and behavioral challenges (Centers for Disease Control and Prevention.)

Autism Prevalence

In 2014 CDC reported that the number of children with autism diagnoses had increased by 30% in the past 2 years (Centers for Disease Control and Prevention, 27 Mar. 2014).

Autism Challenges

Autism presents challenges for the parents and threatens the cohesion of the family unit because of the stress caused by the unpredictable behavior displayed in autism (Bryson & Smith, 1998).

1 in 68*

1 in 88*

1 in 110*

1 in 125*

1 in 150*

1 in 166*

$100 million

$105 million

$120 million

$159 million

$180 million

$178 million

'04   '06   '08   '10   '12   '14

AUTISM SPEAKS
It's time to listen.

* CDC prevalence estimates are for 4 years prior to the report date (e.g. 2014 figures are from 2010)

Appendix (1): Literature Research

Problem Statement

Parents need to learn how to **effectively respond** to the ASD behaviors of their children.

Dr. Yie-Wen Kuan, a therapist and psychological expert, explains why it is important for parents to learn how to respond to the ASD behaviors of their children.

"Children with Autism Spectrum Disorder exhibit a common set of characteristics that naturally make them more susceptible to danger. "

Dr. Kelly A. Johnson, a licensed clinical psychologist at the UW Autism Center, explains why it is challenging for therapists to diagnose a behavior that they do not get to see.

"A challenge that we face is when parents describe a behavior that we do not get to see. We can do school observations sometimes, but that is very expensive and time consuming."

Opportunity

In order for parents to **proactively respond** to their children's behaviors and **avoid triggers** to those behaviors, they need to **seamlessly** record, track, analyze, and share those behaviors.

Because parents needs to engage with their children when behaviours are happening, **current behaviour trackers are disruptive to the experience** and do not address parents needs.

A mom of a son with ASD.

"The therapist encourages me to track the data. I did that at the beginning, but then I gave up because I didn't have time."

A father of a son with ASD.

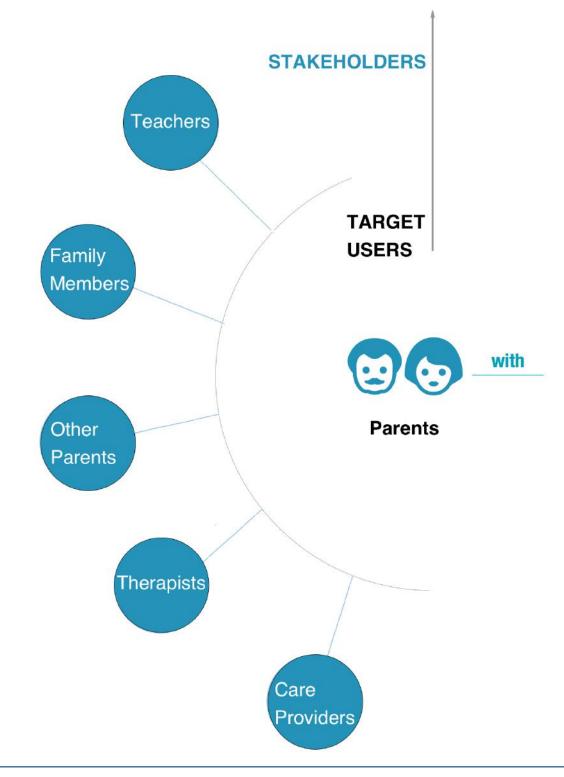*"I have tried using an app before. It was a free app. You have to be disciplined in order to use these apps because you would forget to track the behaviors."*

Target Users

Our target users are **parents of children who are 4 to 10 years old** and are **nonverbal,** which means that (they can't communicate verbally and express their needs and concerns.)

Other stakeholders are teachers, family members, other parents, therapists, and other care providers.

STAKEHOLDERS

Teachers

Family Members

Other Parents

Therapists

Care Providers

TARGET USERS

Parents   with   **Children**
4 - 10 years old

About CareCam

The Camera

A mini wearable camera that parents can use to capture their children's behaviors. Once parents notice a behavior, they simply need to press one button. After that, they can focus on taking care of their children. The camera saves two minutes of audio and still pictures taken right before parents press the recording button. It also records video for two minutes after parents press the recording button. The recorded data is automatically stored into the cloud where it can be accessed using the companion iPhone app.
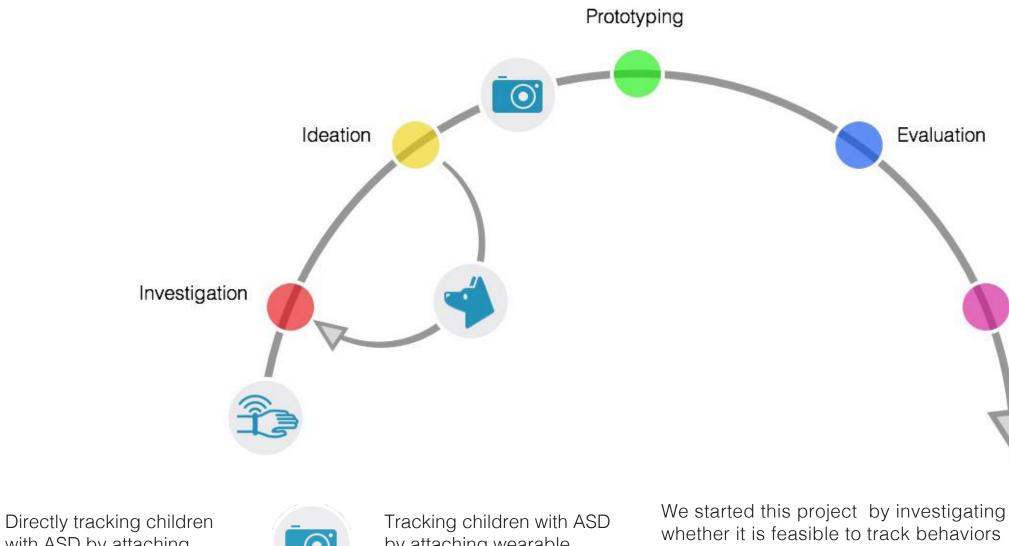
The App

At the end of the day the app reminds parents to annotate the data that they have captured. Once the recorded data is annotated, parents can analyze the data using the data visualization tool. After that, they can share specific events or share access to the data analysis with partners, family members, therapists, and teachers.

Design Process

Directly tracking children with ASD by attaching wearable devices to them.

Tracking children with ASD by attaching wearable cameras to their parents.

Tracking children with ASD through their assistance dogs.

We started this project by investigating whether it is feasible to track behaviors of children with ASD by attaching wearable devices to their bodies. Then we considered using assistance dogs as proxies to track children's behaviors. The final direction that we ended up pursuing is tracking children with ASD by attaching wearable cameras to their parents.
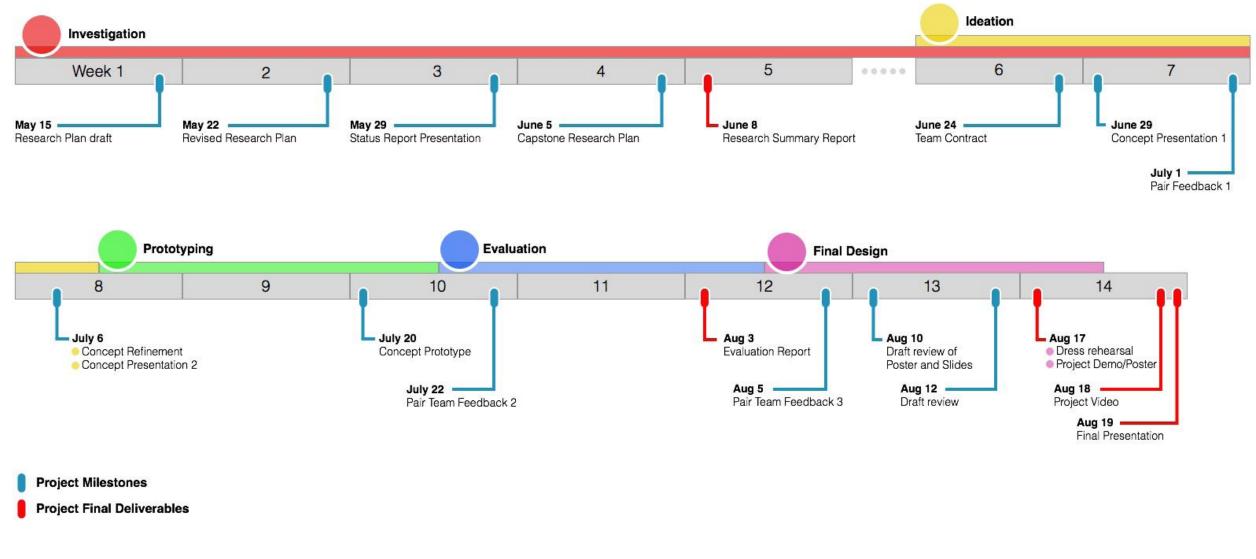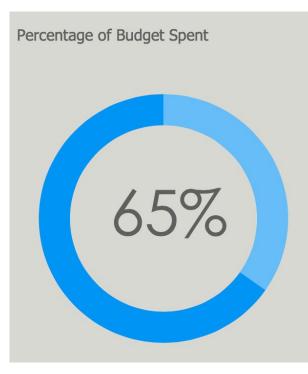
Project Timeline

Investigation

| Week 1 | 2 | 3 | 4 | 5 | | 6 | 7 |

May 15
Research Plan draft

May 22
Revised Research Plan

May 29
Status Report Presentation

June 5
Capstone Research Plan

June 8
Research Summary Report

Ideation

June 24
Team Contract

June 29
Concept Presentation 1

July 1
Pair Feedback 1

Prototyping

Evaluation

Final Design

| 8 | 9 | 10 | 11 | 12 | 13 | 14 |

July 6
● Concept Refinement
● Concept Presentation 2

July 20
Concept Prototype

July 22
Pair Team Feedback 2

Aug 3
Evaluation Report

Aug 5
Pair Team Feedback 3

Aug 10
Draft review of
Poster and Slides

Aug 12
Draft review

Aug 17
● Dress rehearsal
● Project Demo/Poster

Aug 18
Project Video

Aug 19
Final Presentation

● **Project Milestones**

● **Project Final Deliverables**

Project completed with on time

Project Budget

Percentage of Budget Spent

65%

Summary

CASH

$500

EXPENSES

$326

BALANCE

$174

Number of Gift Cards Left

1

ITEM	AMOUNT
Budget	
Cash	$500.00
Gift Cards	12

Expenses

ITEM	DATE	AMOUNT	Name
Easy Behavior Tracker for Teachers and Behavior Tracker Pro (apps)	7/13/15	$35.05	Junying
Starbucks purchase for a participant	7/17/15	$5.97	Taysser
DC MICRO - VIBRATION MOTOR	7/24/15	$4.37	Taysser
ION SNAPCAM LITE WEARABLE CAM	7/24/15	$87.59	Liusu
ION SNAPCAM LITE WEARABLE CAM	7/28/15	$87.59	Liusu
Uber Receipt	7/29/15	$7.38	Junying
Uber Receipt	7/29/15	$7.86	Meishen
Apps for Meishen- 1	8/12/15	$16.43	Meishen
Apps for Meishen- 2	8/11/15	$43.82	Meishen
Apps for Meishen- 3	8/16/15	$1.09	Meishen
Poster Picture Receipt	8/14/15	$29.00	Taysser

Gift Cards

PARTICIPANT	DATE	NUMPER	Name
	7/17/15	1	Meishen
	8/1/15	5	Meishen
	8/5/15	2	Liusu
	8/13/15	3	Liusu

Project completed with in Budget

INVESTIGATION
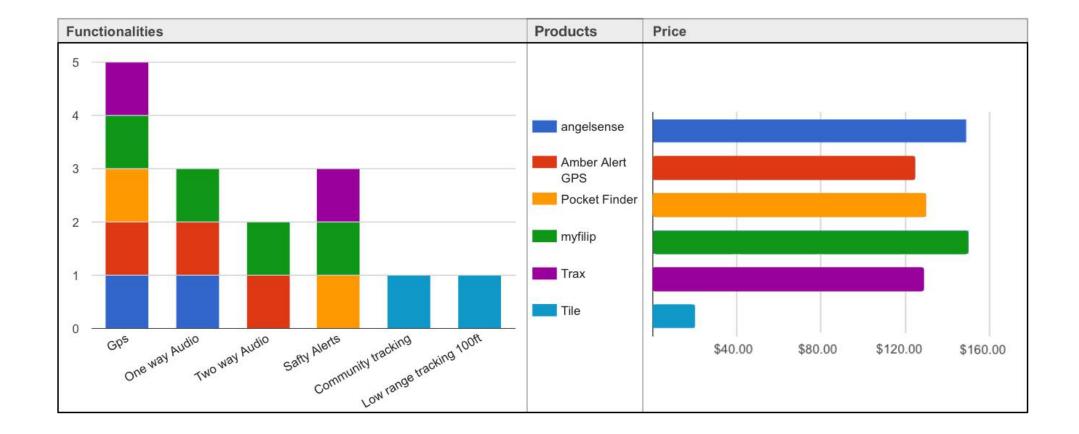
A group interview with a parent of two children with ASD and a therapist

Competitive Analysis

Directly tracking children with ASD by attaching wearable devices to them.

Popular Children Tracking Devices

The diagrams at the right side of this page shows some of the popular tracking devices that are used to track children with ASD. Most devices use Gps with some sort of one or two ways audio communications. We can see that these devices have similar prices. On the other hand other devices like Tile are using the short range bluetooth technology to alert parents if their children are going out of their range and can utilize other tile users to help parents find their children.

Functionalities | **Products** | **Price**

| angelsense |
| Amber Alert GPS |
| Pocket Finder |
| myfilip |
| Trax |
| Tile |

Heuristic Review

AngelSense

AngelSense is a tracking service that is made specifically to track children with sensory sensitivity. This analysis includes an evaluation of both the hardware and the web app that comes with this service. Physical ergonomic factors with Nielsen's Heuristics were used in this evaluation.

Software Evaluation

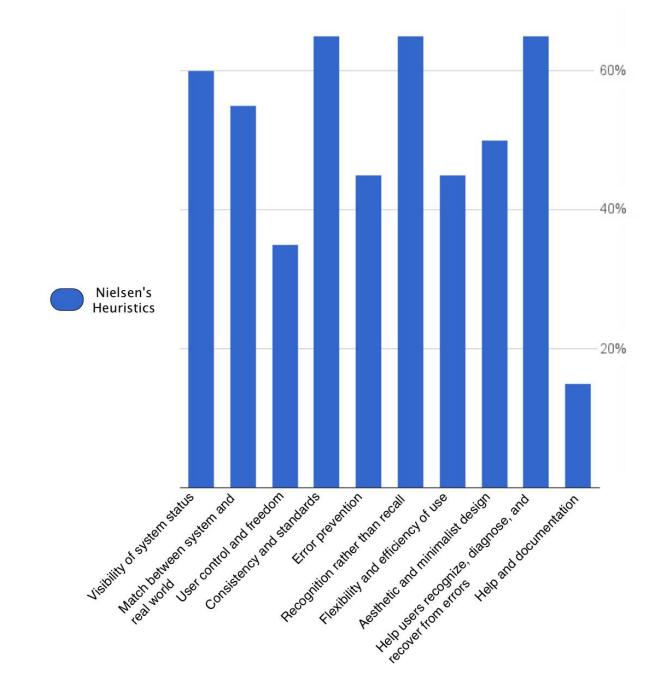User control and freedom scored low Because users have to jump between their text messages, phone calls and the web app to interact with the system. Also users do not get any emergency exits in some cases. On the other hand the web app is doing a good job keeping parents aware of the connectivity and the situation of the tracking device.
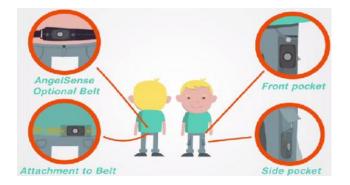

Nielsen's Heuristics

Heuristic Review

Hardware Evaluation

Reach, Clearance, and Posture did not score well because this device was advertized to be kept out of the child reach (e.g. in a pocket.) On the other hand the device did a good job in the Recognition section because it has a clear notifications and a simple design.
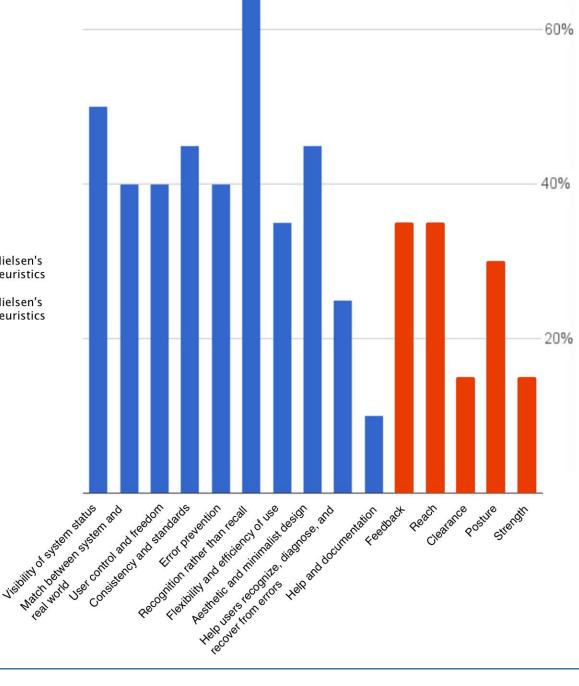

Strengths

The web app is doing a good job in terms of keeping parents aware of the connectivity and the situation of the GPS Device (e.g. battery indicator, etc.)

Weakness

- There is about about 4min notification delay between the time a child leaves a place and when the parent receive the notification
- The device can not tell if the child is in danger or needs help
- Disconnected tracking experience that require the user to leave the app to execute
- different tasks

Nielsen's Heuristics

Nielsen's Heuristics

Expert Interviews

Parents Stress

Parents of children with ASD feel stressful especially right after their children are diagnosed with ASD due to the following points.

- The overwhelming amount of instructions that they get
- The preparation that they need to do everyday with their children
- The **fear of triggering a behavior**
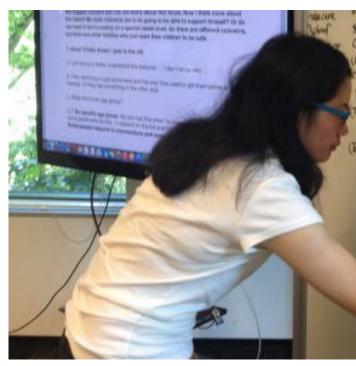

More Challenges

Parents find it **hard to send behaviors information** to therapists

A challenge that therapists face is when parents describes **a behavior that they do not get to see.**

At the end of a school day, some students will explode when they come home

Parents with younger children has the most urgent needs because their children need to further develop their language skills

Important Findings

- Children with ASD often do not like to be touched, which make them difficult to guard, and they **do not like wear things** (clothing is problematic for them in general.)
- Schools are **stopping the two way audio communications** devices due to privacy issues nowadays
- Parents say that **it is great to have animals in their houses**
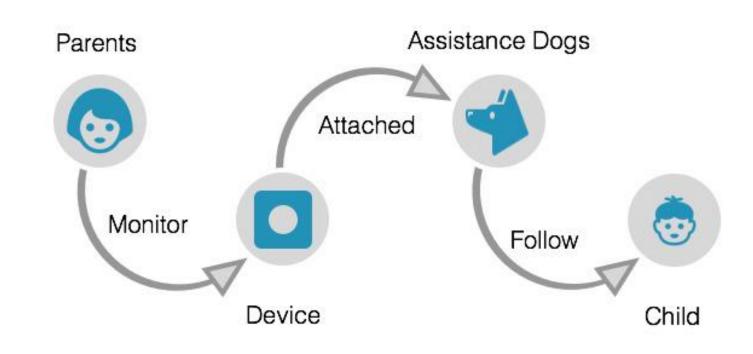
Looking for Other Opportunities

Tracking children with ASD through their assistance dogs.

Starting All Over Again

After finding that attaching wearable devices to children with ASD is not a viable solution, we started to look for other opportunities.

There is a strong relationship between children with ASD and their service dogs. Therefor, we wanted to utilize this close relationship in a way that would allow us to track children with ASD with out attaching anything to their bodies.

Assuming that service dogs are following children with ASD most of the time and assuming that these dogs proxy children with ASD, we thought about attaching tracking devices to service dogs in order to monitor children with ASD.
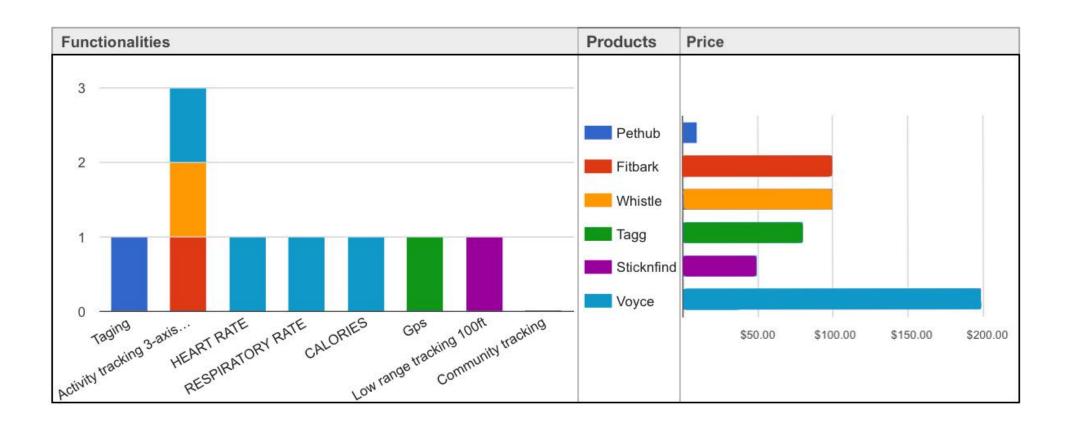
Competitive Analysis**

Popular Dogs Tracking Devices

The diagrams at the right side of this page shows some of the popular tracking devices that are used to track dogs. Similar to children tracking devices the devices that are using bluetooth as a way to track location are the cheapest and the ones that have more tracking capabilities are more expensive.

We can see that there is a good number of devices focusing mainly on tracking activities using 3-axis accelerometers.

Functionalities		Products	Price

Expert Interviews & Literature Research

Dogs and Wearables

"It is possible to create wearable electronics that dogs can reliably activate to communicate with their handlers." Facilitating Interactions for Dogs with Occupations .September 9–12, 2013.

Assistance Dogs Trainers

- Assistance dogs can not be reliably trained to intervene behaviors with out getting cues from parents
- Assistance dogs can not stick to children all day long. They are like humans and they need a time off
- "Dogs are tools, but not babysitters !"

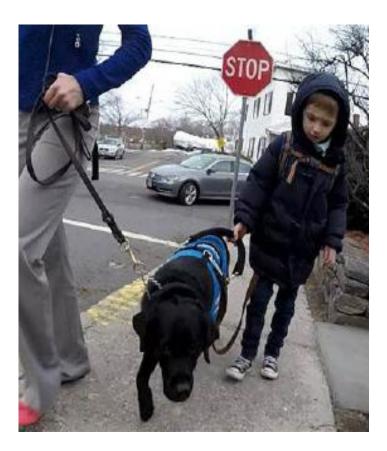## Dogs do not senses the symptoms if they are not extreme

A parent of a child with ASD who owns an assistance dog.

"If my daughter cries, our dog might come running to her, but the dog doesn't always do that."
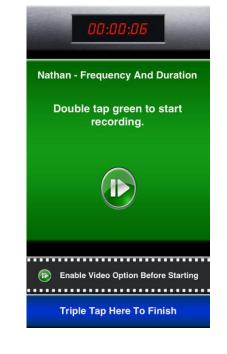
Competitive Analysis***

Tracking children with ASD by attaching wearable devices to their parents.

Autism Tracker Pro

Behavior Tracker

Tantrum Tracker

	Autism Tracker	Behavior Tracker	Tantrum Tracke
In The Moment	❌	👎	👎
Simple	👎	❌	👍
Seamless	❌	❌	❌

Popular Behavior Trackers

The three behavior tracking apps shown above are the most popular behavior tracking solutions in the apple's app store.

Design Principles

The design principles used to evaluate these behavior trackers are the following:

- **In The Moment:** allows in the moment tracking
- **Simple:** ease of use
- **Seamless:** Does not disrupt the interaction between the parent and the child

👍 Meets this design principle.

👎 Poorly meets this design principle.
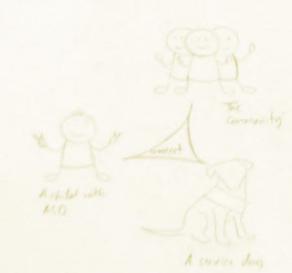
❌ Does not meet this design principle.

IDEATION

First Round of Ideation

Brainstorming Exercise

We started the the first round of ideation by a brainstorming exercise where we individually brainstormed and shared our ideas with the team.

After repeating this exercise for some time, we posted our sketches and ideas on the wall and categorized them.

My Sketches

The following sketches are the sketches that I made during this brainstorming session.

Speacking Through the Dog
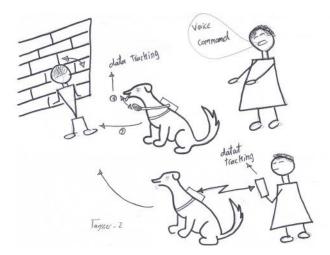
If parents can talk to their child through their assistance dog, they might be able to help their child become more social. If the child is not used to saying good morning for example, parents might be able to utilize the dog to train the child to say good morning.
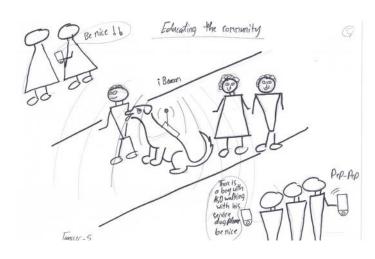
Track Repetitive Movements
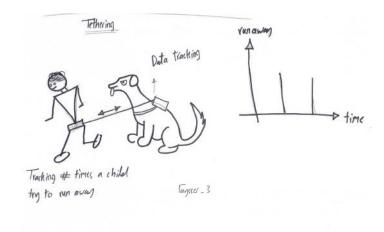
If assistance dogs can sense ASD behavior, it might be possible to train them to trigger a wirable every time the behavior happens. Otherwise behaviors can be tracked by providing parents with a device that sends commands to assistance dogs using haptic wirable on the dog. Every time parents want the dog to intervene, they can send their request to the dog using there phones for example and that is how they can do data tracking.

First Round of Ideation

Educating the Community
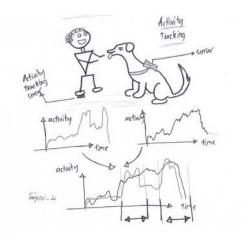
Assistance dogs can play a rule in educating the community about ASD. Providing assistance dogs with iBeacon device that broadcast educational information about the situation of their child to the community can help in reducing the bad looks and getting support and empathy from the community.

Wandering Tracking

Assistant dogs can be used to stop children with ASD from wandering by tethering children to dogs. Once a child try to run, his or her dog is trained to sit and not move. By sensing the number of times the tethering wire was tightened, we can track how many times this child tried to wander.

Child- Dog Interaction Tracking
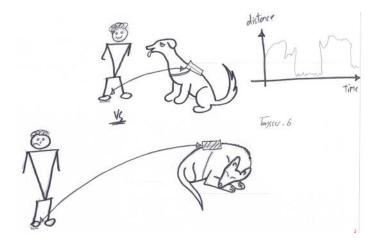
By tracking the activities that both the dog and the child are doing over time, parents will be able to see how much the dog contribute to the overall activities that the child is doing.
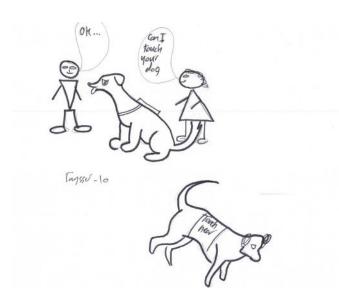
Distance Tracking and The Amount of Interaction

Tracking the distance between the child with ASD and the dog might be enough to track the amount of interaction between the dog and the child.

First Round of Ideation
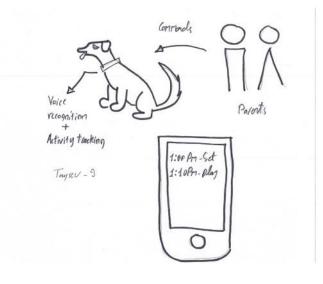
Social Interaction Tracking
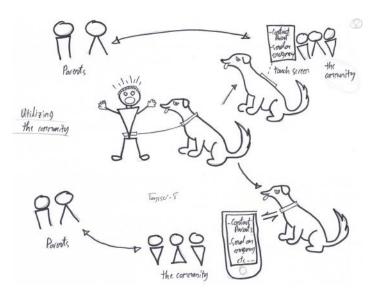
Service dogs are currently utilized to help with the social interaction of children with ASD. For example in schools students are allowed to touch service dogs after getting permission from the child with ASD. As a result this interaction can be tracked using a touch sensor on the body of the dog.

Voice Recognition and Data Logging

Service dogs receives voice commands most of the time from parents to interaction or intervene the child's behavior. Having a voice recognition system on the dog might be a good solution to track the behaviors that the child is having.

Utilizing the Community
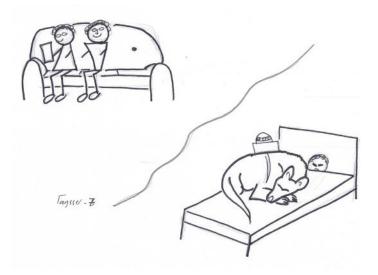
What if the community can interact with UI on the dog. This UI can allow individuals to contact parents and send emergency messages for example.

360 Camera

Mounting a 360 camera on an assistance dog can help parents monitor their child with ASD especially if the dog is with the child most of the time.

First Round of Ideation

Concept #1: Community
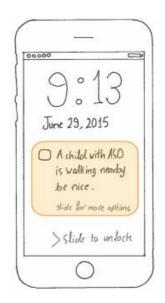
Problem
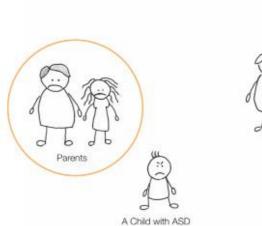
The Community can be problematic to families that have children with ASD (e.g.Parents get annoyed by the stares and the looks of people in the community)

Value

Help the community to support families that have children with ASD.

Parents

The Community

A Child with ASD

A child with ASD is walking in a public area with his assistance dog

Someone who was walking by receives a notification message and asks for an opportunity to touch the dog

The child with ASD agrees and the sensor on the dog capture the interaction

an encouraging comment can be sent directly to parent

at the end of the day parents can get a summary on the interaction that their child did with the community

Taysser's Drawings

First Round of Ideation
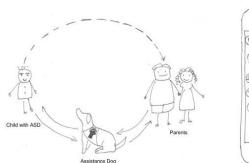
Concept #2: Improving Communication with Parents

Problem

Parents are not able to fully understand their children with ASD because the children have difficulties to expressing themselves.

Value
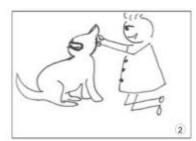
Improve the communication between children and their parents.

Child with ASD

Assistance Dog

Parents
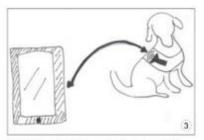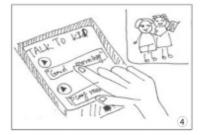
① Tom can not communicate with his parents. He gets nervous when talking to others.
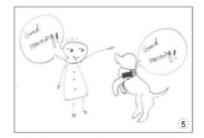
② Tom can get along with his assistance dog. His dog helps him be in a good mood.

③ What if there is a device on the dog that make it appear as if it is talking to the child?

④ Parents customize the conversation coming out of the device using their mobile phones.

⑤ The child start to improve his conversational skills by talking to his dog.
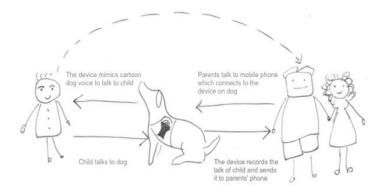
⑥ Gradually, the child is able to have conversation with his parents. He is saying "Good Morning!"

The device mimics cartoon dog voice to talk to child

Parents talk to mobile phone which connects to the device on dog

Child talks to dog

The device records the talk of child and sends it to parents' phone

First Round of Ideation
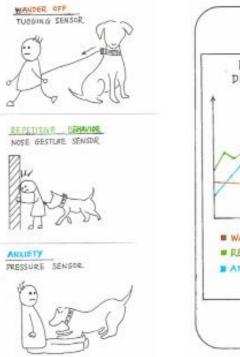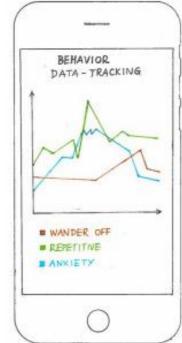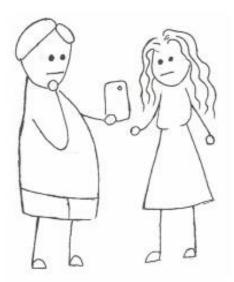
Concept #3: Negative Behavior
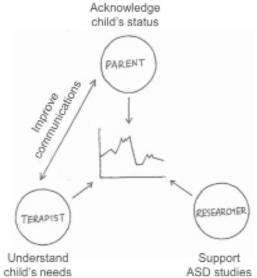
Value

- Help parents acknowledge their children's status and development of ASD
- Improve communications between parents and therapists
- Provide data to support researchers' studies of ASD
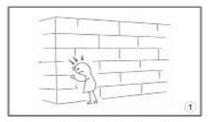
Tom's stemming behavior is triggered. He repetitively hits his head on the wall.

His assistance dog "Argo" intervenes him by nose touch, then Tom stops hitting the wall.

The device on Argo senses its nose gesture and sends the data to the mobile device.
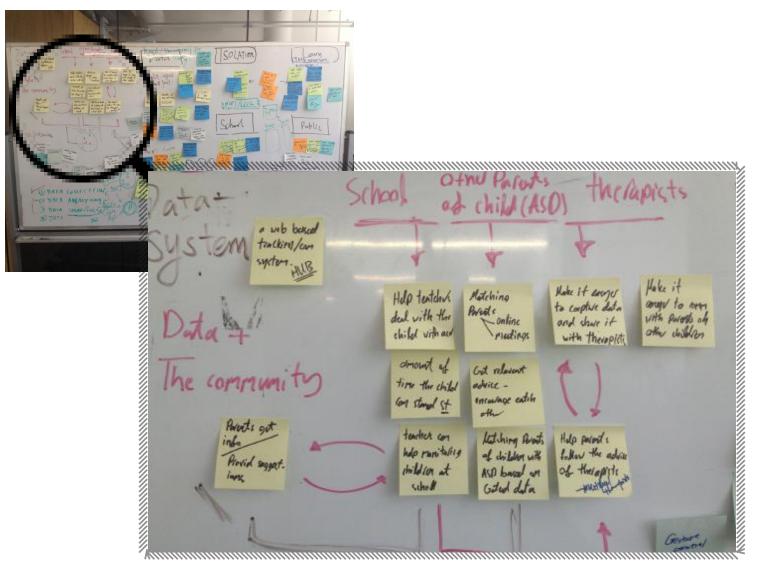
Tom's parents acknowledge Tom's status by accessing the app on the mobile device.

Liusu's Drawings

CareCam
The ASD Behavior Tracker

Second Round of Ideation

Brainstorming Exercise

We started the the second round of ideation by a brainstorming exercise where we individually brainstormed and shared our ideas with the team.

Second Round of Ideation

Concept #1: Simplify Behavior-Tracking

Problem
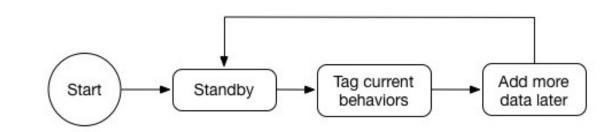
It is difficult and time-consuming to keep track of children's ASD behaviors.
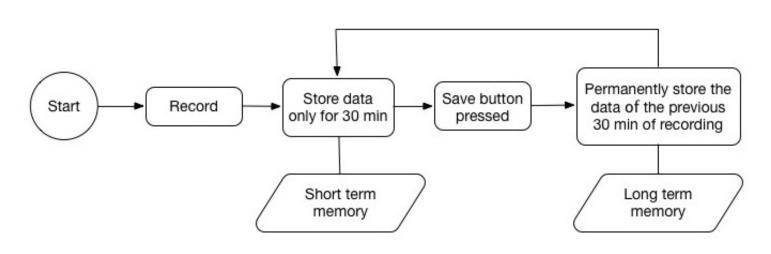
"The therapist encourages me to track the data, and I did at the beginning, and then I gave up because I didn't have time."

         - A mom of a son with ASD

Idea #1

Parents can tag behaviors in the moment and add more informations when they have time.

Idea #2

Parents can record the moment before the behavior happened (what triggers the behavior)

Users

Target user:
- Parents

Other stakeholders:
- Therapists
- School teachers

Value

Providing a simple way to help parents easily and intuitively record their children's quantitative and qualitative behavior data.
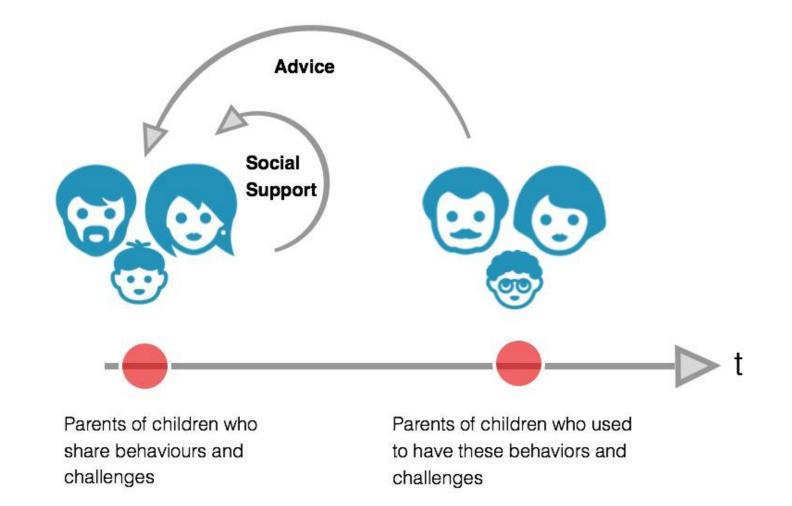
Second Round of Ideation

Concept #2: Matching Parents

Problem

Parents feel isolated and need an intuitive way to find support and helpful resource to take care of their children with ASD.

"Parent to parent meetings can be depressing when others have more dramatical problems"
          - A mom of two sons with ASD

Advice

Social Support

t

Parents of children who share behaviours and challenges

Parents of children who used to have these behaviors and challenges

Users

Parents
- Speak about their challenges
- Learn about other's experiences
- Provide and receive support from other parents
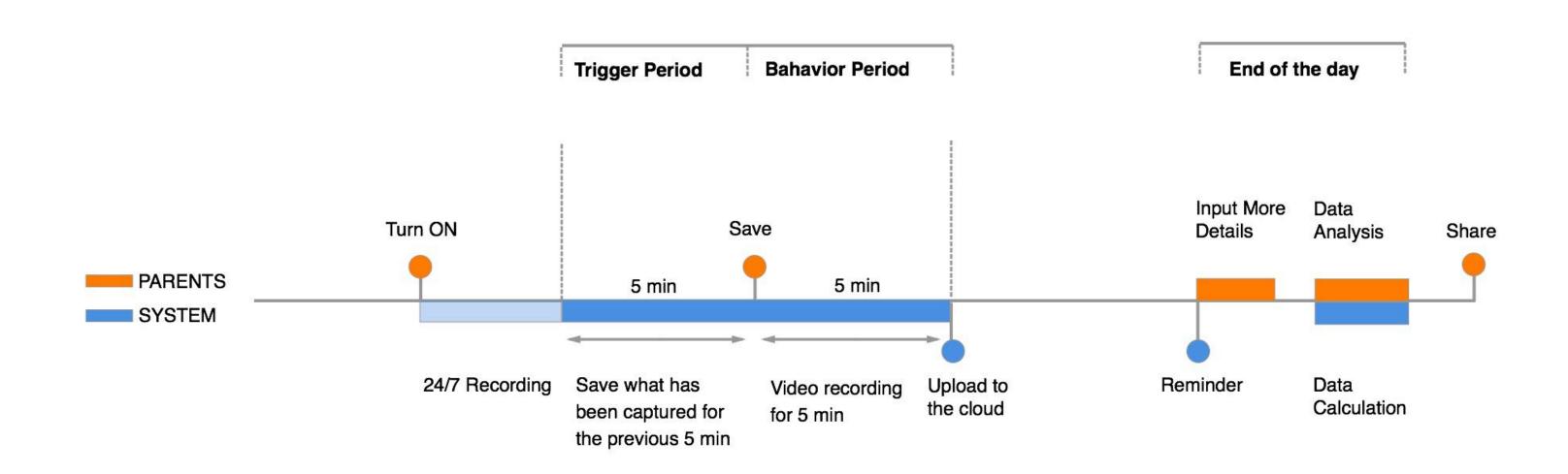
Value

Connecting parents with parents who have children with ASD that share similar behaviors and challenges.
- Getting social support
- Exchanging relevant advice
- Sharing resources

CareCam
The ASD Behavior Tracker

Refinement

Simplify Behavior-Tracking: **Interaction Model**

Refinement
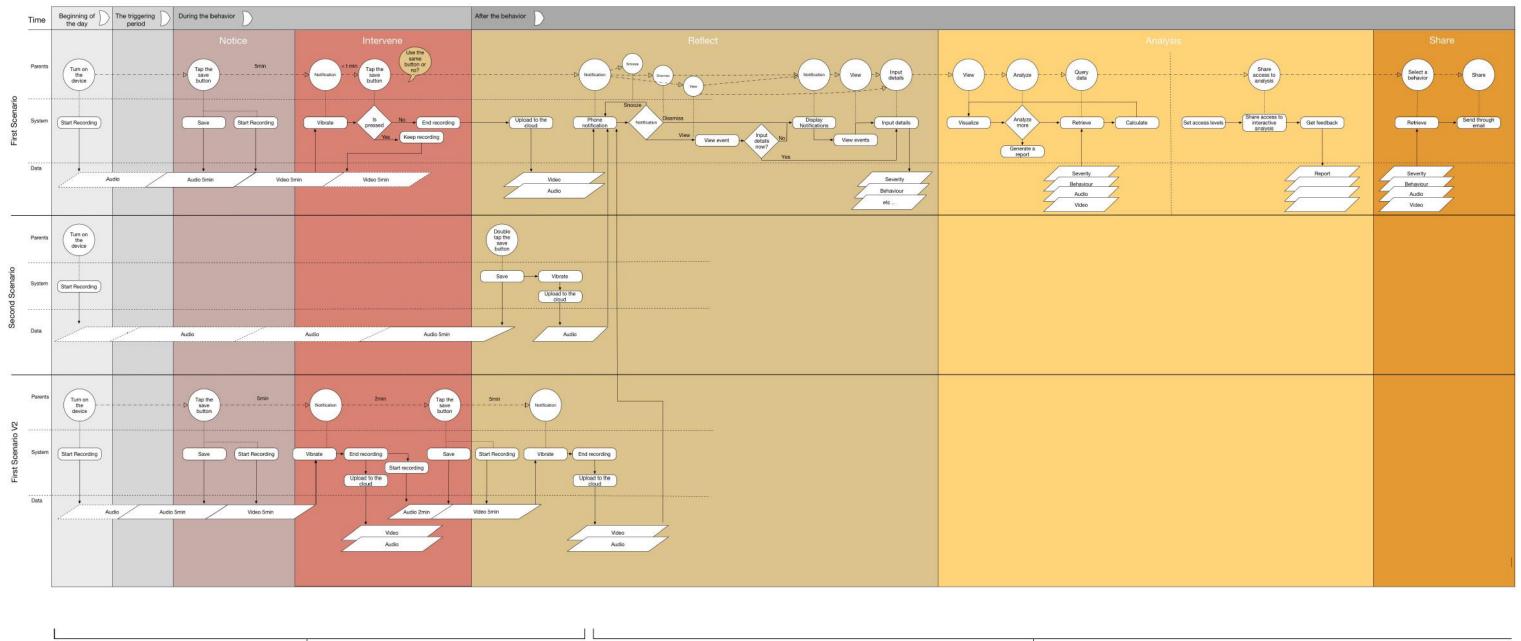
Simplify Behavior-Tracking: **Detailed Interaction Model**
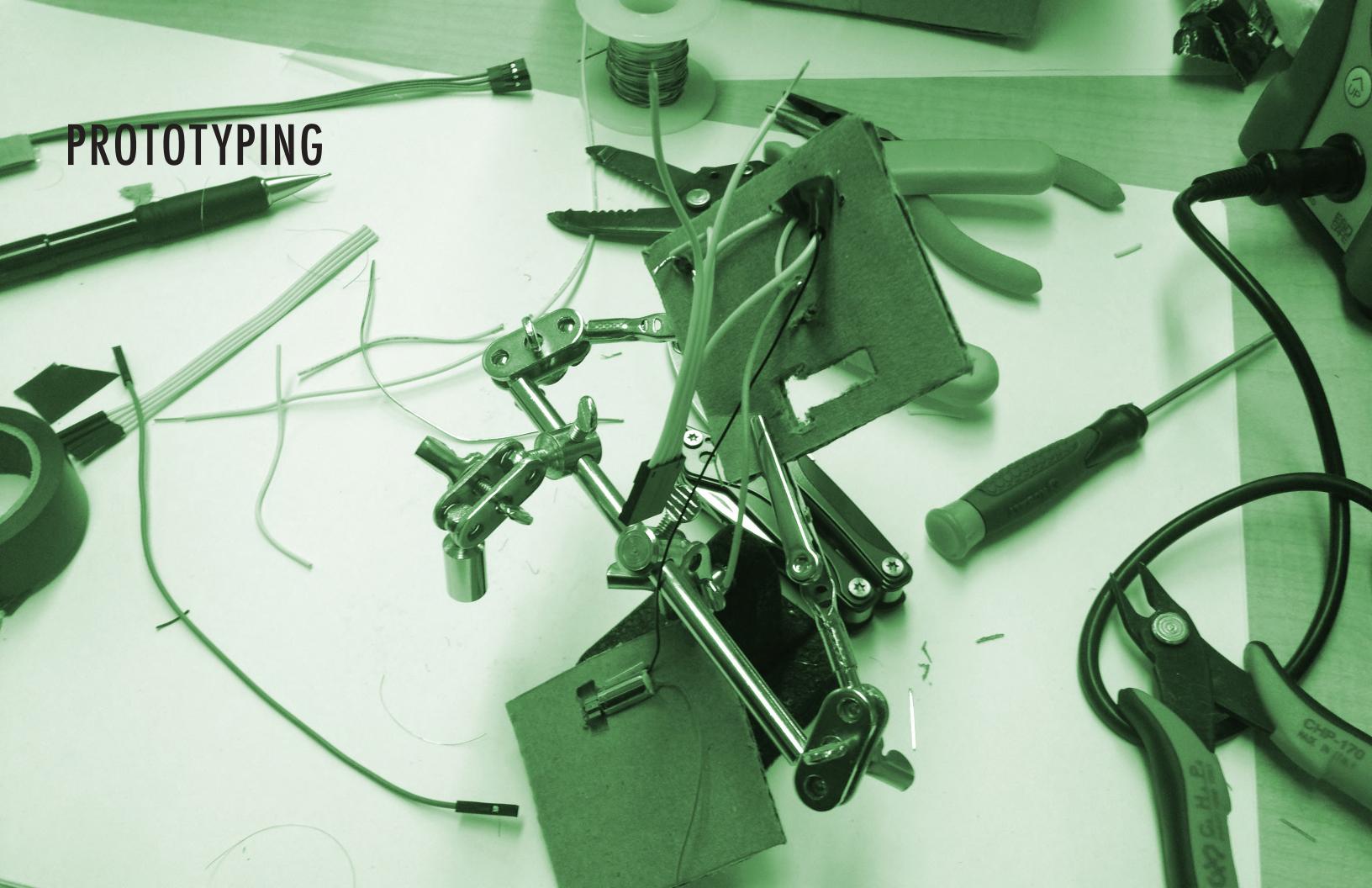
PROTOTYPING

Model Prototyping
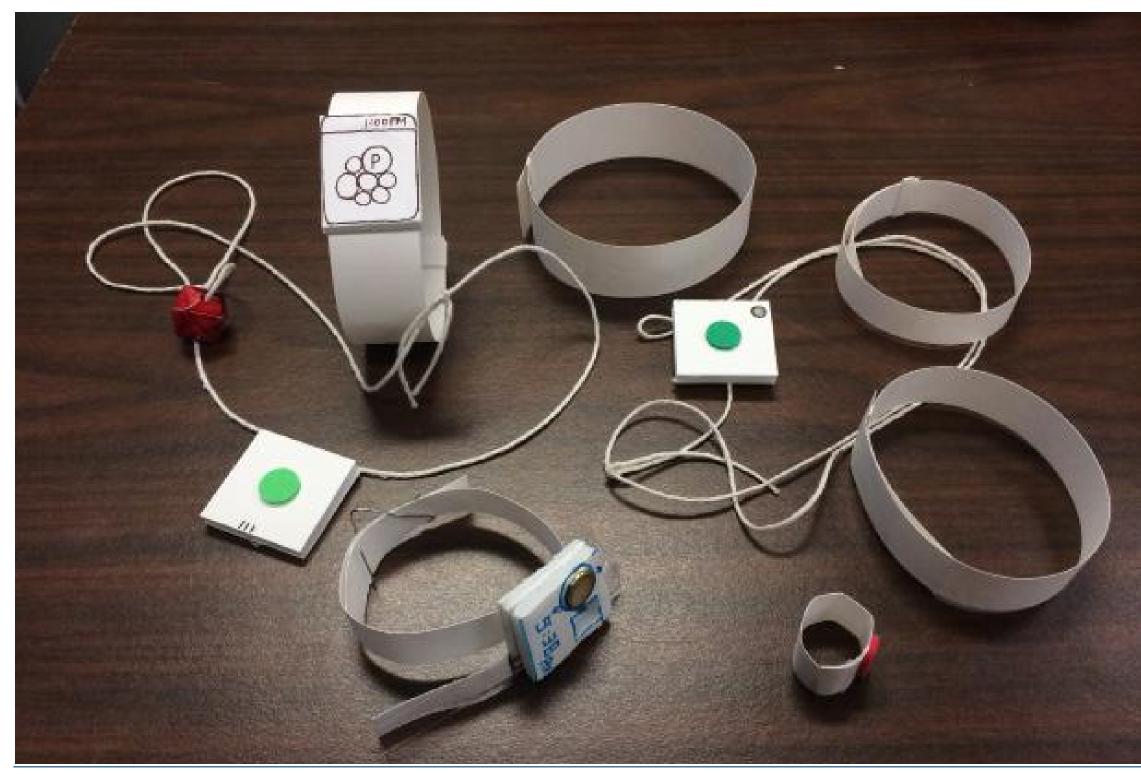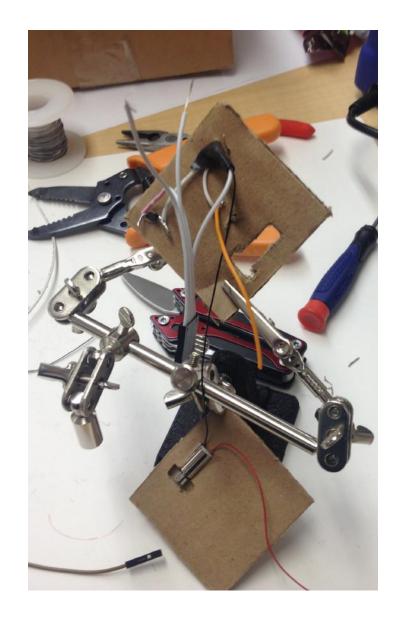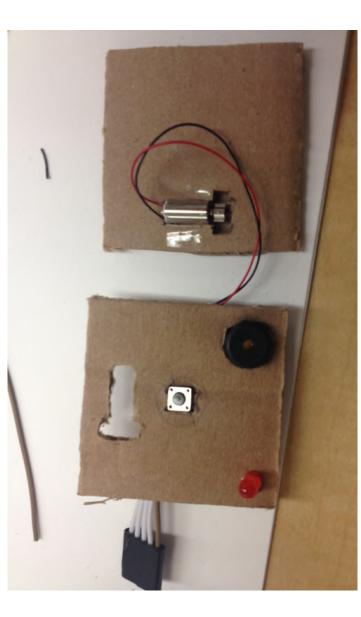
Model prototypes were used to figure out the hardware form. These prototypes included watch, ring, bracelet, necklace, etc. These prototypes were also used to start a conversation about the type of data that will be recorded.

Electronics Prototyping

An Arduino prototype was made with cardboard and included a vibrating motor, led, piezo speaker, and a push button. This prototype was used to evaluate the hardware interaction model and the type of indication that parents wanted to receive from the camera (vibration, sound, or light.)
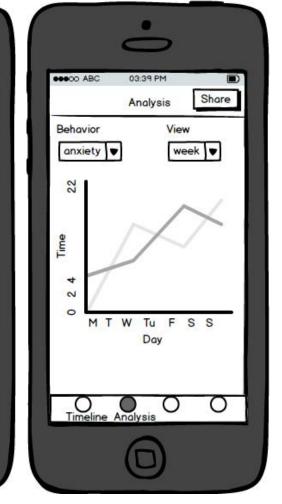
Paper Prototyping

The paper prototype was used in our user testing to get an initial feedback from parents about the software interaction model and to learn about the different behaviors that they would like to annotate and the type of annotation that they would like to use.
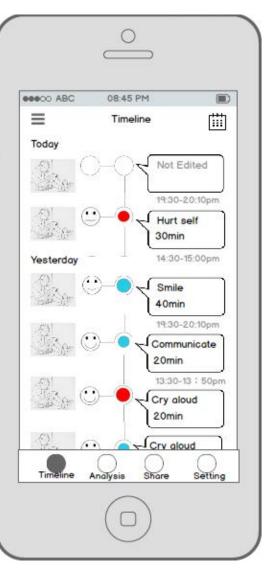
Mobile Prototyping

The mobile prototype was made by including the feedback that we got from user testing the paper prototype. This prototype was made interactive using marvel prototyping tool. We used this prototype to further test the app with our class mates. The interactive prototype can be accessed through the following link.

https://marvelapp.com/55b38e
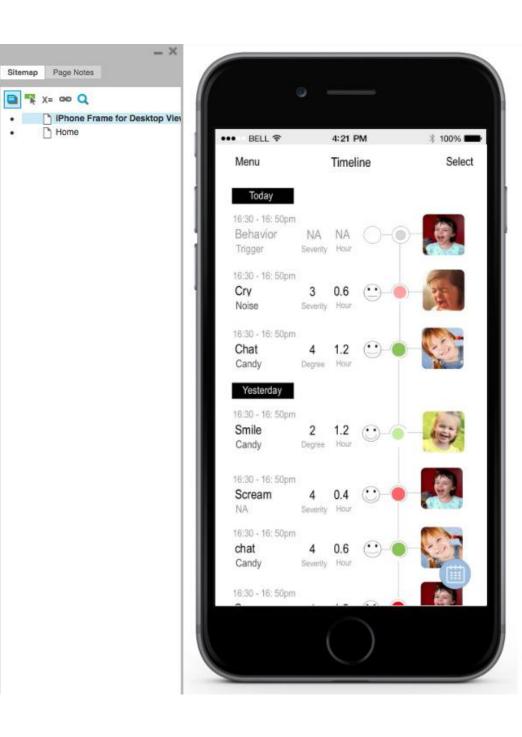
Wizard of OZ Prototyping

The wizard of oz prototyping was used to test the data that parents wants to record (video, audio, and still pictures.) This prototype was made using axure and video, audio, and still pictures that parents captured during the diary study using a wirable camera.
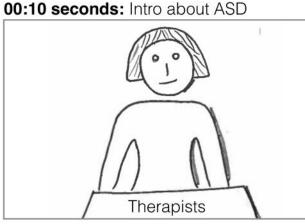
Video Prototyping

A video prototype was made to communicate the problem, the opportunity, the user experience of the concept, and the outcome or result.

The first step in making the video was to draw the storyboard shawn in this page and in the coming page.

This storyboard helped us communicate the idea behind this video and get feedback before starting video capturing. During video capturing the storyboard was our guid. However, during video editing we made some changes that improved overall quality of the video.

The Problem: Before

00:10 seconds: Intro about ASD

Therapists

What is ASD?
What is different about ASD's behaviors?
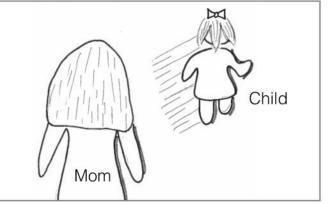
00:20 seconds: Why Tracking Behavior?

Therapists

- Parents need to Learn how to respond to ASD behaviors.
- "It is challenging for Therapists when parents describe behaviors that they do not get to see" -Doctor Kelly

00:35 seconds:

Child

Mom

scene: A child exhibits a behavior; parent tries to intervene the behavior with out success
script: "… however, it is very hard to track their children's behaviors in the moment when the behavior is happening."
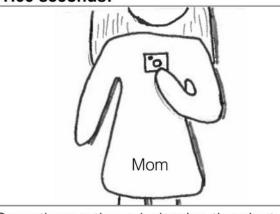
The Solution: After

00:55 seconds:

Child

Mom

Parents no longer need to worry about keeping track of their children's behaviors.

01:00 seconds:

Mom
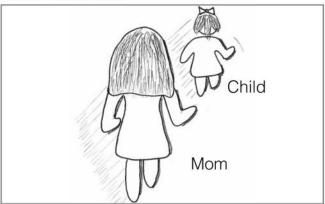
Once they notice a behavior, they just need to press the record button.

01:15 seconds:

REC

Child
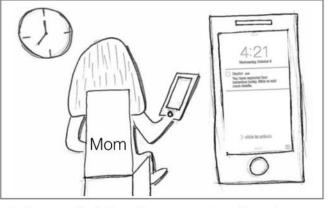
Then they can freely interact with their children and intervene the behavior.

Video Prototyping

The video prototype can be accessed through the following link.
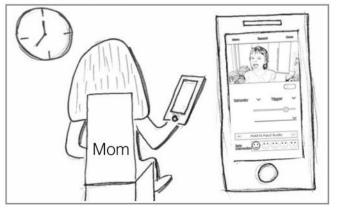
https://www.youtube.com/watch?v=arfw_r3smSs

01:20 seconds:
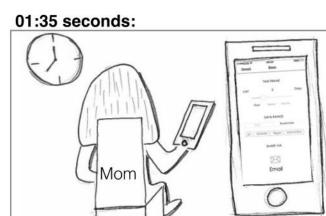
At the end of the day parents will get a notification reminding them to annotate the content that they have captured.

01:25 seconds:
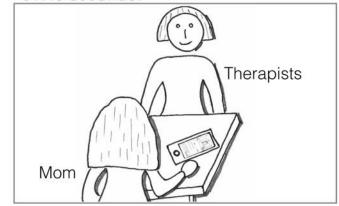
Then parents can review the behaviors that they captured to refresh their memory and annotate the content.

01:30 seconds:

Parents can analyze their data using the data visualization section of the app.

01:35 seconds:

After that they can share content with their therapists.

01:45 seconds:

Therapists will be able to see the different behaviors and provide a better advice.

02:00 seconds:

Parents learn how to better respond to their children's behaviors.. Happy ending.

EVALUATION

Diary Study with Parents of Young Children

The diary study with parents that have young children with out autism was a pilot study for this project. Still we learned a lot from this study.

During this study parents recorded their children's behaviors in a table that we provided. While one parent wanted us to remind him to fill the table using a text message, the other two did not want us to do that.

The following points summarizes our findings.

- Recalling the triggers is hard at the end of the day
- Being able to track time is important. "There were times when we couldn't figure out what behaviours happened first."
- It is important to remind parents to annotate their children's behaviors at the end of the day. "I only remembered to input info in the behavior tracking list when you sent me a reminding text messages every night."
- Parents want to learn from and reflect on their parenting. "All parents think they are bad parents. I want to learn from my interaction with my son."
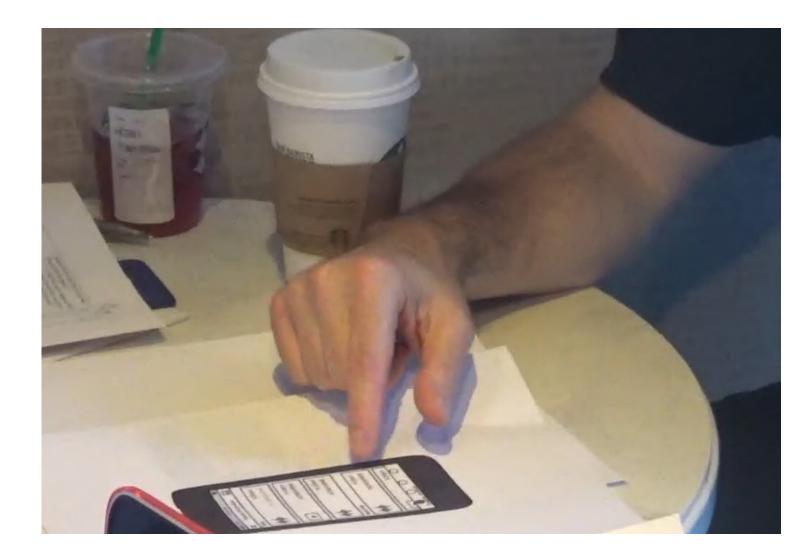
Usability Testing

This was our first usability testing with a parent of a son with ASD. We learned the following points.

- This device has to be placed high so that It can capture everything.
- One touch to start recording is perfect because that is what you might have time for.
- would want a video and an audio.
- I would want a notification
- predetermined scales is going to be more precise.
- Being able to track the time that each behavior take is important.
- Showing the number of meltdowns, steaming is good.
- I would like to not just be able to track bad behaviors, but good behaviors as well.

"It is very challenging to explain to teachers that the kid can not do his homework for example. Sharing a video that shows what happened at home to teachers would be good."

"Doctors might not believe us some times when we talk about behaviors. Having this device well allow us to share videos of behaviors with them."

- A father of a son with ASD

Appendix (3): Usability Testing Notes

Diary Study with Parents of Children with ASD

We conducted a diary study with two parents of children with ASD. During this study we provided both parents a wearable camera that takes a picture every 30 second. we asked parents to record video during behaviors. The duration of the study was one day with the first parent and two days with the second parent.

After we took the camera back from parents, we uploaded different combinations of still pictures, audio and video recordings to our axure prototype.

At the end of the study we user tested our axure and electronic prototype and got feedback.

"It was nice to see how a good job I am doing."
- A mom of a son with ASD

We learned the following.

- Parents did not forget to press the recording button.
- Parents liked the experience because it allowed them to see if they did a good job or not.
- Watching the video helped parent's remember specifications. (E.g. Specific moments, specific problems, and specific interventions)
- Parents found it hard to distinguish between different event's in the time line.
- Parents wants the playback to start at the time of the behavior and if they want they can go back and review what the camera has captured before pressing the button.
- Parents would like to know if a certain behavior is increasing or decreasing over time and see how successful the responses are over time
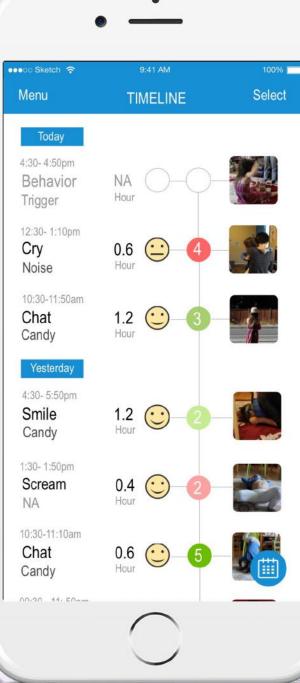
"I pressed the button every time I thought that the my kid will act differently than other children."
- A mom of a son with ASD
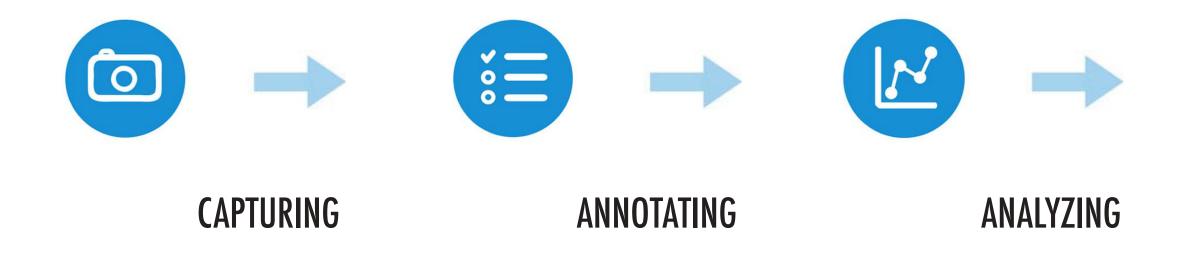
Final Design

TIMELINE

Menu · TIMELINE · Select

Today

4:30- 4:50pm
Behavior
Trigger — NA Hour

12:30- 1:10pm
Cry
Noise — 0.6 Hour — 4

10:30-11:50am
Chat
Candy — 1.2 Hour — 3

Yesterday

4:30- 5:50pm
Smile
Candy — 1.2 Hour — 2

1:30- 1:50pm
Scream
NA — 0.4 Hour — 2

10:30-11:10am
Chat
Candy — 0.6 Hour — 5

DATA CLOUD

User Interaction

CAPTURING   **ANNOTATING**   **ANALYZING**   **SHARING**

The user interaction of the final product can be categorized in to four stages.
- Capturing
- Annotating
- Analyzing
- Sharing
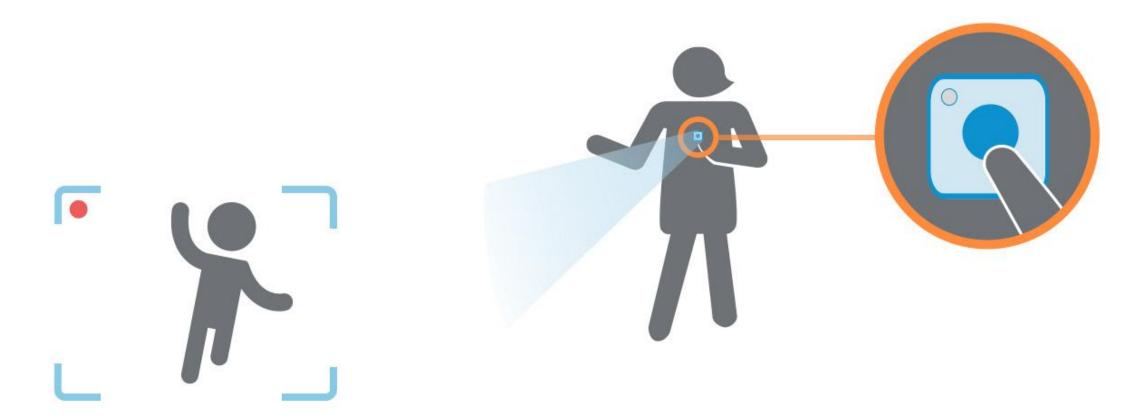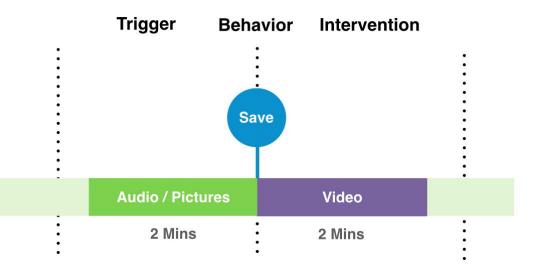
CAPTURING

The camera vibrates to indicate the beginning and the end of recording. After the data is successfully uploaded to the cloud, parents receives a confirmation notification.

Trigger	Behavior	Intervention
	Save	
Audio / Pictures	Video	
2 Mins	2 Mins	

ANNOTATING
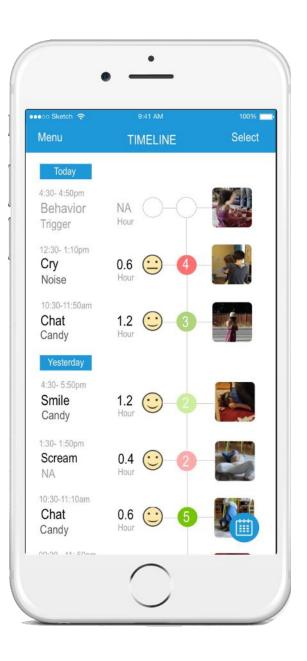
The camera vibrates to indicate the beginning and the end of recording. After the data is successfully uploaded to the cloud, parents receives a confirmation notification.

The main screen

The annotation screen

ANALYZING

The data analysis tool helps parents find behaviors patterns, discover behaviors triggers, and assess the effectiveness of their responses.

SHARING
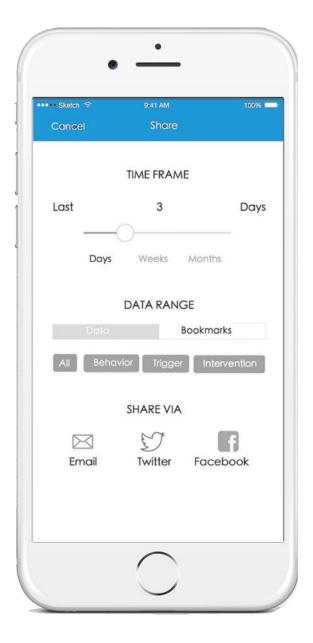
Users can share data or analysis with others to communicate their children's behaviors and learn how to better respond to specific situations.

Share specific behavior from the main screen

Share access to analysis

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APPENDIX

Appendix (1): Literature Research

Autism & Children with ASD

More than 3.5 million Americans live with ASD. (Buescher et al., 2014)

The U.S. cost of autism over the lifespan is about $2.4 million for a person with an intellectual disability, or $1.4 million for a person without intellectual disability. (Buescher et al., 2014)

Every child with ASD is different. (Barina, 2015, CDC 2014, PHAME Inc. (2015,) Kuan (2015,) Buescher et al. (2014)

Safety of Children with Autism Spectrum Disorder

Children with ASD are at greater risk than children without, as they exhibit more impulsive behavior and less concern for potentially dangerous things. (Stull & Ladew, 2010)

They may respond in abnormal or unusual, sometimes dangerous, ways to tastes, tactile stimuli (whether pain or seemingly mild sensations), sounds, smells, and visual stimuli(Kellie Snider, 2008)

Assistance Dogs

Autism presents challenges for the parents and threatens the cohesion of the family unit because of the stress caused by the unpredictable behavior displayed in autism (Bryson & Smith, 1998).

the contribution of service dogs might extend beyond physical safety to therapeutic and communicative domains. Dogs provide a powerful multisensory stimulus that can

combat the low sensory and affective arousal levels of autistic children (Redefer & Goodman, 1989)

Animals are believed to act as transitional objects, allowing children to establish a bond with them and then extend the bond to people (Martin & Farnum, 2002).

Service dogs perform simple, repetitive, nonverbal actions that are more easily interpreted by the autistic child than adult commands (Redefer & Goodman, 1989).

A study by Martin and Farnum (2002) indicated that children might exhibit a more playful mood, focus better, and are more aware of their social environment when in the presence of a therapy dog.

The use of service dogs for children with autism has specific effects because of the physical proximity, time spent together, and the triadic relationship between dog, child and parent/handler. Service dogs for children with autism differ from traditional guide-dog services because the dog is handled by the parent, but is connected to the child. The dog must take its commands from the parent or handler, but must also follow and bond with the autistic child. It is necessary to assess the effect of service dogs in the family, rather than in relation to the child with a disability (Davis, Nattrass, O'Brien, Patronek, & MacCollin, 2004).

The most important expected function of the service dog was to improve the safety and security for the autistic child at home and in public, with the parent, and when separated from the family. For example, the dog inhibits the child from bolting by physically anchoring the child. This delay gives the parent time to react to the situation and catch up with the child (Burrows, 2008).

Appendix (1): Literature Research

At home, the service dogs were acknowledged as an extra caregiver because they provided a second set of eyes, even when the dogs were not "in harness." Before the dog's arrival, many parents had resorted to extreme measures to ensure home safety. Some locked the child into the bedroom at night to prevent wandering (falling down stairs, leaving the house). Others installed video cameras to track movement, and added numerous locks and alarms on doors and windows. The integration of the service dogs into these homes provided an additional sense of security for the parents, especially at night. Most families chose to train their service dog to sleep on the child's bed or at least in the child's room (Burrows, 2008).

Many parents were successful in training the service dog to break their child's trance behavior, directing the child's attention back to the dog to redirect his/her attention from what had initially startled him/her (Burrows, 2008).

Service dogs trained to assist children with autism can provide numerous benefits for the child they have been matched to, as well as the family that has integrated the dog into their home. Benefits for the parents and family include an increase in family outings, a sense of security both in the home and in public, and a dramatic increase in positive social acknowledgment (Burrows, 2008).

The service dog provides a family-oriented service that allows the parent to regain some control. The presence of the dog encourages normal patterns of living in both the home and community, and is a source of support for the parents. The support maximizes the family's independence and functioning, two important components of intervention needed to help families cope with
autism (Briskin & Liptak, 1995).

Families experiencing crisis or chronic illness might use pet involvement to help with critical developmental tasks or to cope with depression or loss (Cox, 1993).

The dog acts as a form of respite and provides the parents with social support that buffers some of the stress associated with the safety and social issues they face. Researchers exploring coping in families with autistic children emphasize the importance of helping parents develop coping strategies that reduce the strain on the family and enable them to meet both their own needs and those of their children (Sivberg, 2002).

Pets might enhance social interaction between people, increasing or strengthening social networks and social provisions, and thus elevating psychological well-being (McNicholas & Collis, 2000)

People with visual, physical, mobility, or psychological impairments are publicly identifiable by the presence of an assistance dog (Sanders, 2004).

The dogs helped keep the children calm and distracted during medical visits. Methods such as using companion animals have been found useful to reduce physiological arousal and behavioral distress for children who frequently endure physical examinations (Hansen, Messinger, Baun, & Megel, 1999; Nagengast, Baun, Megel, & Leibowitx, 1997).

Appendix (1): Literature Research

More Research of Assistance Dogs

According to a recent survey with 70 families of children with ASD, nearly 70 percent of the participating families had dogs, half had cats, and some owned other pets including fish, rodents, rabbits, reptiles and birds.(The social skills and attachment to dogs of children with autism spectrum disorder _ Gretchen Carlisle)

A service dog for an Autistic person is not an all-purpose 'Autism service dog' but rather a dog specifically trained to mitigate the individual problems that a specific person experiences as a result of Autism. (Service Dog Central, 2015)

For the most part these dogs for autism are trained to perform tasks similar to those of service dogs for other sensory processing disabilities. (Service Dog Central, 2015)

Dogs can become habituated to familiar routes(Service Dog Central, 2015)

Dog is providing *information* and *assistance* rather than *control*.(Service Dog Central,2015)

The dog might be trained to find or track children with ASD.(Service Dog Central, 2015)

Dogs can be tasked-trained to use touch intervention, as well as pressure intervention and mobility assistance when these repetitive or self-injurious behaviors occur. (Pawsitivity_Service_Dogs, 2015)

Trained Autism Service Dogs can help reduce the anxiety of children with ASD.(Pawsitivity_Service_Dogss, 2015)

In some cases when a person with Autism is over-stimulated, pressure on his or her body can be very calming. (Service Dog Central, 2015)

Even in cases when the service dog cannot prevent a meltdown, the service dogs often help soothe the child afterwards.(Pawsitivity_Service_Dogs, 2015)

A dog may react to certain stimulus that the children in spectrum are not capable of processing in order to protect the children in spectrum from potential dangers or assist the children in autistic spectrum to better communicate with other people and build their social skills. (Service Dog Central, 2015)

Many programs set age limits on who they will accept in their programs for partnership with a service dog. The lower cut-off is usually somewhere between 12 and 16 years of age. Unless and until a child has exhibited a positive response to animals on multiple occasions, an assistance dog is not recommended. (Service Dog Central, 2015)

Nonprofits nationwide often don't place a dog with a child under 5, and they require that families stay at the facility for a couple of weeks to train with the dog. (Service Dog Central, 2015)

Rather than looking for a child's direct nonverbal behavior to assess their relationship to their service dog, the best practice is to look for reductions in symptoms(Pawsitivity_Service_ Dogs 2015)

Appendix (2): Expert Interviews

Jack MacNichol from PHAME by Taysser

Data documentation: Transcripts

▢ Autistic students after high school face lots of problems. They have limited access to services, high unemployment rate and even those who work get minimum wages. As a result, it is impossible to sustain themselves

▢ Autistic individuals with age range from 60 to 70 years face lots of challenges when they lose their parents. If they are lucky a family member will look after them. Otherwise, they will suffer a lot because their parents kept treating them as children. As a result, parents should start pushing their children to take risks

▢ It is not possible to evaluate the outcomes of our students. There is no specific indicators. Therefor, we do not do traditional evaluation. We hear stories and collect subjective data

▢ The biggest challenges that parents with autistic children face are time management and cost of living because their children will keep living with them even when they get older

SME Interview with doctor Kelly by Taysser

For this interview I met with doctor Kelly A. Johnson at the UW Autism Center. Doctor Kelly had a copy of my question list before the meeting and at the beginning of this meeting she said that she might not have answers to all the questions. I didn't have enough time to go over all the questions one by on because doctor Kelly had lots of questions about the project and the program.

Doctor Kelly is a clinic specialist working at the UW Autism Center since 2006. Before that she worked with families that had autistic children. Doctor Kelly said that currently the Autism Center is working on multiple research projects. these projects are mainly focused on genetics and early interventions. Doctor Kelly meets with parents who have children with ASD frequently. Her work is focused on the evaluation side (wether a child has ASD or not.)

From Doctor Kelly's point of view a common issue that parents face is in the diagnoses stage. She said that parents currently face a very long waiting lists if they want their children to be tested. Sometimes parents end up waiting for eight months. As a result, parents try to sign up for multiple places at the same time, which makes it hard for doctors to manage waiting lists. The sign up process is not an easy process. Doctor Kelly said that "parents have to do lots of paper work and they normally face insurance issues."

Appendix (2): Expert Interviews

Doctor Kelly said that parents differs. Some families come prepared to dive in and start addressing the new situation (having a child with ASD.) Some families take time to adjust to the new situation. When a child get diagnosed with ASD his parents are provided with lots of recommendations and instructions. This also includes finding the

right therapy provider for the child based on the situation.
The Diagnosis process is based on direct testing done at the clinic and a set of questioners that are provided to parents and teachers. Doctor Kelly said "a challenge that we face in this process is when parents describes a behavior that we do not get to see. We can do school observation sometimes, but that is very expensive and time consuming."

When I asked Doctor Kelly about how can we research and user test parents and children she was not sure, but she said that we might be able to talk to parents while their children are in therapy. She said most parents have limited amount of time; however, she thinks that some might be interested in talking to us.

At the end Doctor Kelly told me about an open house that is happening this Thursday,

April 30, 2015 4:30-7pm. This event is about celebrating the fifteen years of improvinglives at the UW Autism center. Doctor Kelly recommended that we go to this event because there will be lots of people whom we can talk to.

By Liusu Wang
Participant: Dr. Yvonne Kuan, Ph.D, Psychologis

Highlights
book: dsm 5th edition
parents care most about safety of the children with asd
children may hurt themselves, e.g. a child repeats a behavior pattern hitting a wall
cannot guard them well because they don't like to be touched, e.g. crossing a busy road
but they don't like be held.
suggested to design a product
teaching proper conversations in new situations, e.g. birthday party
teaching eye contact
teaching greetings to different people
safety
challenges:
need to pass an agreement in the University to do research - about 1-2 months
time limit - 6 months
no funding for the expense - travel and incentives
large samples over 100+ including people with and also without autism
evaluation for different degrees of their development, treatment

suggested to find a person who is doing a project about autism, and join the project.

suggested to find Ph.D students, professors, therapists. Students are easier to start with.

Appendix (2): Expert Interviews

current products:

software helping children with asd recognize emotions by reading facial expressions
ipad app helping interactions between parents and children

organizations
seattle children's hospital
UW has a children mental autism development center (similar name)

Interview guide and notes

Hi Dr. Kuan, This is Liusu and I am currently a graduate student in the Human-Computer Interaction + Design program at the University of Washington. Currently, I am working on our capstone project which is about supporting parents who have children with Autism Spectrum Disorder. The purpose of this interview is to understand the general problems that ASD people with, understand the challenges that the parents face, and your suggestions about my project. During this interview, I will have a set of questions to ask and discuss with you. If you think of anything that would be relevant, please don't hesitate to share it with me. I will be very careful about not asking questions crossing the line of privacy. If there are any questions against your professional ethics, we can totally understand if you won't answer these questions. I appreciate your support.

Q: Have you worked with disabilities before?
Dr. K: Yes, I have.

Q: How was your experience with Autism?

Dr. K: This can be a really broad question, like what kinds of autism spectrum disorders, they can be very different. Are you trying to get the general ideas about autism?

Q: Yeah, some general ideas can be helpful as well.
Dr. K: This is "spectrum disorder", so there are so many different types of autism, and the problems are hard to categorize. I will introduce more today, but I still recommend one book to you which will be a good start – "DSM the 5th edition". It is a great book for you to systematically understand this spectrum disorder.

Q: Thanks. From your point of view, what are the main challenges that these groups of people face?
Dr. K: So many kinds. As I said, ASD has many different types, so the needs of different people with different types are not the same. The types include problematic social skills, problems with communication skills. There is no health physical problems with language development, but they are still not functional in speaking. Also, some of them do not have eye contact with others including their parents. No touch with people, repetitive behavior patterns, hyperactive…

Q: What is the particular reason causing the Autism problem?
Dr. K: many reasons include aged parents, and sometimes one child has ASD, the parent will have higher chance to have another child later with ASD.

Q: What are the challenges for ASD children's parents?
Dr. K: The parents worry about their children's safety issues, which is huge concern. Because the children may hurt themselves. A child may repeat a behavior pattern hitting a wall and does not feel hurt. The parents cannot guard them well because they don't like to be touched, which can be dangerous when run in to traffic because they don't like be held.

Appendix (2): Expert Interviews

Other challenges include they have limited time to bring them to therapists, which can be a couple times per week. The treatment is very expensive. The children like staying in their own world without communication and touch with the parents.

Q: What do they especially need? How can we possibly help the parents?

Dr. K: Helping the kids is helping the parents. Still, help with guarding the kids – safety

Q: Anything may help the interactions between the parents and their ASD children?

Dr. K: An app on iPad for communication between kids and parents because some kids like typing more than talking.

Q: What are some of the most successful technological solutions in this area?

Dr. K: There is software helping children with ASD recognize emotion by reading facial expressions.

Q: Do you have recommendations about ideas of designing a new product?

Dr. K: spectrum disorder is broad. I recommend a product teaching eye contact, physical touch, or teaching conversation in new situations, for example, an app teaching greetings in a birthday party. Some child does not know how to properly say congratulations in a birthday party. One may say "congratulations for being older", but the proper way should be "Happy Birthday".

Q: Do you have any information about using robotics as a solution to some of the problems that these people have?

Dr. K: People with ASD like robot because they feel closer with a robot because they do not feel emotionally overwhelming when they are interacting with a robot. They feel comfortable.

Q: How hard is it to test products with people who have Autism? What are the challenges for this project?

A: You have very limited time for this project. It is usually a 1-2 year project. You will need to collect a large sample size with over 100+ participants including people with or without autism to compare. You need to set comparison groups during the evaluation, also evaluate the degree of their development or treatment. In addition, there is a policy to do research with disabilities. There is an agreement that needs to pass and that requires up to two months. And, you need fundings for the expense in travel, incentives and etc.

Q: From your point of view, how to measure or evaluate if the product successfully helps the autism kids/parents?

Dr. K: You can refer the DSM book. There is a checklist to diagnostic ASD.
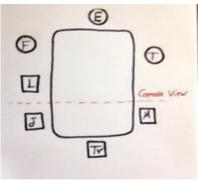
Q: How hard to talk to families with autism children?

Dr. K: You need to initialize an agreement with the parent about the confidential information during the study. Time can also be a challenge because the parents are usually very busy with taking care of their kids.

Other challenges include they have limited time to bring them to therapists, which can Q: What are their concerns to meet with us?

Dr. K: Privacy in general.

Q: What organizations we are able to get help with my project?

Dr. K: You probably want to talk with the professors, therapists who are doing a project related to Autism, and maybe join the project. Usually it is easier to talk with the Ph.D students. There is a Children Mental or Autism development center at UW – maybe the name has been changed but should be similar with it. They will be happy to talk to you. And Seattle Children's Hospital, you can try to contact them.

Appendix (2): Expert Interviews

Autism Society of Washington Board Meeting Taysser's notes

Site Map

Participants:

E: Erin Gayton

A mother of two children with ASD. A nine years old and a high functional eleven years old boys.

T: Teresa McCann, M.Ed, BCBA (President)

A behavior therapist and the current president of the Autism Society of Washington.

F: Vanessa López-Kopp, BA (Secretary)

Secretary

Observers:

L: Liusu

Moderator

Tr: Taysser

Co-moderator and Note taker

M: Meishen Yin

Note taker

J: Junying Chang

Video/audio recorder

L: Asking about the initial feeling when A's son was diagnosed with ASD?

E: Right now... Not quite sure what you are looking for but there is a stress.

know lots of parents with ASD —> creating a network with others who has Children with ASD helped us a lot.

ex sun Nate has his first swim listen — we but him in a class, but we prepared a lot —> lots of preparation !! If you don't do that things can get very stressful

T: That is what we hear from families.

E: Families will have different needs based on the situation of their kids —> having a kid who can talk vs.

E: I went to parent to parent meetings and it was so depressing —> some problems can be more dramatic than your problems and in that case you can't speak about your challenges.

T: That is why ASD UW separated their society

L: Asking about the daily life

E: I am with mine all the time. I am a little bet hands on.

During the first days I felt that I had to measure every thing before comes out of your mouth because you are afraid of triggering a behavior --> this was very tiring

With ASD there is as much care as you can afford.

School —> My friend had a different experience. The school were calling her all the time. I had to working with teachers all the time as well. At the end of a school day some students will come home and explode that is what happened to my older kid.

T : That is a common problem -- some children can take a specific number of hours / day.

E: ABA (Applied Behavior Analysis) changes your world —> you are bringing strangers to your home everyday, you will be told how to parent your child !!

C: My doughtier is not diagnosed yet but she is delayed. Do you want that one more person to tell you what to do !!

Appendix (2): Expert Interviews

T: for someone showing on your home 5 times a week it is too much --> ABA

L: How many hours needed to take care of your children?

E,C,T: 24 h

ABA —> only some of us has it —> it is not covered by all insurance services

E: I use my parents

L: What behaviors that keeps you very busy?

E: In my case intense anxiety - the feeling of not wanting to leave the house for my older sun. Most kids do not do well with loud noise— We had a leak in our house so we used fans for some time— this triggered a difficult three weeks were he had an enormous reaction to any thing — his t does not like a t when he is writing — it was just an explosion after explosion.

T: Risk -- Cheaper to keep kids at home than to keep them in a group home —> the state has a waiver that they do —> this is where you can see the most extremes behaviors —> running on streets "they do not think about traffic", jumping to water. I think this is a big concern for parents to keep their kids safe.

L: I hear all of these concerns. What is the biggest concern?

E: It depends on the family and on the stage. There was a time where safety was the biggest concern but I do not worry about that know. Now I think more about the future! My main concerns are is he going to be able to support himself? Or do we need to be focussing on a special needs trust. So there are different concerns, but there are other families who just want their children to be safe.

T: about 15 kids drawn / year in the US.

L: I am trying to better understand this behavior ... I don't know why ...

E: They are trying to get some were and the way they used to get their before is the freeway. Or they see something in the other side

L: What kind of an age group?

E,T: No specific age group. My son has this when he was younger, but there are still some adults who do this - it depend on the kid and the amount of intervention they get. Some people respond to interventions and some do not.

T: If you can not ask to go their then you will just go. I have worked with kids who can't talk, but they would talk when you ask them. So we worked on asking and when we say no we put it on a calendar where they can see when they are going so that they do not try to go by themselves. This might work with some kids!!

When we do the police training on September we hear a lot about families that do not sleep because they are trying to keep their kids safe and away from wandering.

L: what is the biggest challenge hear?

E: the safety is a big issue and some families can't just have someone staring at their kids all the time.

T: I was in a house were there was an authentic kid and the kid run away so fast. they sometimes push you and run. I don't want you to worry about that, but this is what parents worry about.

E: Nate when he was young, he sometimes disappear and when we run around and yelling he doesn't respond. This was very frustrating so we worked with a behaviorist and we practiced it "answering when calling his name." We trained a lot —> there is nothing that make you feel as a bad parent as losing your child

Once my neighbors came and knocked on my door when we first moved in and asked if it is ok for my child to walking around with the dog and I have not even noticed.

—> there is nothing that makes you feel as a bad parent as not noticing that your kid is out side the house.

T: This is true for all parents. They want to get help but no one want to tell that they have lost their kid.

Appendix (2): Expert Interviews

L: Asking about Dogs —————————

It depend on the family. Animals are great for kids with ASD and dogs in particular.
we have a serves dog the does:
— provide immolation !!
— Pressure and touch -- > My son lays-down and the dog lay on top of him giving him
pressure
the sate of w do not provide a GPS --> GPSing the dog
L: What other tools ?
E: the iPad -->
- How to fly with kids —> When every something comes up we will have and app to go
- Behavior managements and check lists are not efficient
T- communication devises — some kids can type what they want to say
L: If there is a tool that can help what would it be --> wish
T: Something that has to do with the community -
- the stares and the looks are annoying , more of an understanding
- the safety would be the second thing
- behaviors videos for practicing interaction—> not being able to pick up all the queues
E: Some times my child asks me to make a frustrated face.
- better ways to access resources —> knowing what to do when you get diagnosis
- school districts do not want to be targeted —> information highway
- the insider info about the schools that you are not supposed to go to
Huge needs --
I help organize families -- they come her
Some families have kids that do not fall into any specific spectrum
Parents are in a fight --

Each year a new teacher comes and the battle goes on.

Tracking tools to monitor children
the first q -- wander -- current GPS will not find them if they go under water -- need a
radio tracking but exp
there is no good one
the police says you have to have two systems --
if you call the fire department -- they will come home meet your children and take
pictures -- this is a free program
E: a friend - knowing
T: a study that shows <----------- go back to this point and read more about this study
L: What info you would like to know when you are taking?
E: I would love to see what is going on in the schools
T: Schools stoping the two way audio communications --> privacy issue
There are some good behavior devices —> it is hard to figure out the behavior that
they are showing—> anxiety for ex looks different compared with other people's
anxiety
the problematic behaviors --> 11:56
- An app that would help calming --> lots of different items
- Parents find it hard to send behaviors --> sending me text all the time
Wash ABA -->
These things become a one more layer to do !!
some families -- don't worry about any thing more than
a tracker that would let you know if the kid is on water --> is good for camping
tracking an adult with higher functionality —> not a good idea —> privacy
Age group -- 2-3 up to 12 --- if you can't tell people what you want --> the non-
verbal --> even 17
more concentrated with the younger ones -- teen-
pret. young to pretty old 2-- 18

Appendix (2): Expert Interviews

Independent —>

Children with ASD would prefer to be a lone for a long time - they still want to be alone

I probably would not try a device for security with my son -- does not need it

Neither one of my boys like to ware things - no hats no necklaces --> clothing

is problematic - shows are as well

What you do has to do what your child is doing -- triggering

it is because i have let down some of the structure -- relaxing when things go well

for some time --> you learn from experience and having a good therapist

Stress:

there are two types of stress: one during learning and one is when you feel out of

control "not knowing what is going on"

Social media:

--> gets tricky because the responses that parents get sometime is not the most

helpful because there is not a right path -- people will become defensive because

they look down and don't want to know that they are wrong

life style --

Calling 911 --> scared + violent +

even if a child with ASD needs help he might not know what he need

stressed out because I don't feel comfortable interacting with someone

Age range:

parents of young ch have the most energy

Waiting lists --> not enough therapists

good groups on face books

hack autism --> Microsoft event

Serves dogs

pros: go to nate he will go

a good companion

reenforcers

some are trained to help in water

if you have a kid that goes to water -->

a problem with a dog --> can't stop it from going to the freeware

If you can tap into it

Dog --> promt --> look both ways --> reminders + follow me

took a lot notes on food -->

parents are scared that they might break or miss with their children

A --> spent 15000 on an eq that she doesn't use because she does't have time

Robot --> I would want to see a research !! parented with these number of children

Appendix (2): Expert Interviews

Assistance Dogs for Autism
a division of Highland Canine Training, LLC

We do train our Autism Assistance Dogs to trail after children who bolt or wander from their parents. The number is 704.728.9494 and you can just ask for me, **Brandi**.
http://autismassistancedog.com/

Training and Skills → type of training

We train dogs in different ways. For example:
→ We can train dogs to touch children with their noses when children have repetitive motions to interrupt them.
→ We can also train dogs to give pressure
→ Depending on how young the child is → tying the dog with belt ot the child is one thing that we train our dogs to be able to do → Tethering
→ Search and rescue is something else that we train our dogs to do

Training differs

Tethering works only when dogs are stronger than children

Tethering → **5 years depending on the child -- stronger than the dogs the not work**
        5 or older. will see the children behavior before giving the dogs

Behaviours and situations that an assistance dog **can be reliably trained to sense**

A lot of that depends on time the dog have with the child
touch commands → parents give a signal and then the dog will touch the children with ASD
Parents practice with dogs - the big thing is that you can train dogs, but parents will have to keep the training -- we teach the parents about dog training. once a year, they need to train the dog again.

Training and challenges

For us it depends on the dogs some are fast to learn and others take more time.

We get these dogs when they are young. Then we train them for 6 months. With in this training period we match them with families.
For parents it is difficult and takes time. They need to keep very consistent daily or weekly training for a year. After that they need to do reminder sessions from time to time.

Wandering

Depending on the situation of the child there are two ways to deal with wandering.
1- **Tethering** and trailing by tying gods to children. Dogs can be trained to sit and pin to the ground when children try to run away.
 2- **Alert parents** when their child are running away, but it is not practical because there is no way to practically train dogs to do this.

Dogs **informing parents** when their children runaway

Barking is they way that dogs use to inform parents in this situation and **there is no reliable way to train dogs to do that**. In dog training you have to reward the right thing and in this case there is no accurate cue for the dogs to distinguish. Therefor, whenever a child leaves home even with his parent a dog might start barking and wanting a reward.

For behaviors -- **stemming** -- e.g. Hitting the head on the wall there is still a need for a cue for the dog to alert, which is clear in this case -- **parents usually do not chose to train dogs to track these behaviors because they change so often.**

in both situations you have to reward

Requirements and current tracking devices

Yes. One, kids must show a need to have an assistant dog. That is something required by the law and these dogs need to be trained in order for them to be considered as assistant dogs. Secondly, kids must not be violent. Otherwise these dogs will quit their jobs after some time !!

We like children to be around 5 years old because we need to see their personality before we assign dogs to them.

Current Tracking devices

Yes. You mean the Microchip. They are used when dogs get lost. Then if someone finds the lost dog they scan the chip and let its owner know.
The GPS devices are not reliable. Therefor, we do not use them.

By Taysser

Appendix (2): Expert Interviews

Constraints of assistance dogs

Parents see movies and how dogs in those movies can do lots of things that are not realistic. For example they would as can the dog sit and watch the child when he is having a bath so that I can do something else.

Aspects of assistance dogs that parents and their children may **like or dislike**

Parents love how these dogs can make children more sociable. For example, others can ask children with ASD whether it is ok to touch their dogs and parents can let their children to answer by saying Yes, no, or even by using a sign.

Most of children have better connection with dogs because they are not judgemental like people. Also, these children do not have friends and these dogs can fill that gap.

Not too many things that these people dislike about these dogs - one disadvantage is that the general public is not aware of the current laws that cover these dogs. Therefor, once in awhile these dogs can be kicked out of places.

What assistance dogs wear

According to the law assistance dogs do not need to wear anything except their leash unless they need not to. We recommend parents to have their dogs wear vests the shows that this is a service dog. **This helps with their interaction with the community**

Other important info

- It would be really nice to see a progress in the current GPS technology to make it more reliable.
- Dogs can not stick to children all day long. It is just not practical. These dogs are like humans they need a time off.
- The only time where children and dogs can stay away from parents are when these children can fully handle their dogs. Handling dogs means being able to hold the leash, give rewards and commands
- We always tell parents that these dogs are tools, but not babysitters !!

Appendix (2): Expert Interviews

My name is **Mike Hanna** and I am the Training and Quality Manager at **PAWS** With A Cause and I would be happy to speak with you about this subject. I would like to include **Becky Canale** who is our client services coordinator.
mhanna@pawswithacause.org
800-253-7297
pawswithacause.org

Relevant Research Qs:
- What **behaviors** of children with ASD **can be intervened by assistance dogs?**
- What **skills of assistance dogs** can be **trained** to help children with ASD?
- What can an ASD dog be reliably trained to sense?
- How do **assistance dogs interact** with children with ASD?
- What are the **requirements or barriers for keeping an assistance dog** for children with ASD ?

Interview Guide: (1hr)

New questions that Liusu suggested

1- We have learned that assistance dogs need to take a time off from time to time? Is that correct? What do you think?

Correct. Actually, we train parents on how to figure out when dogs are tired. For example dogs have a bed command that parents can give to dogs to take a rest. Other commands can be given to dogs to walk away from specific situations.

2- How much time off do dogs need to take?
It depending on the dog and the child. In situations where kids are physically invasive, dogs might need more time. Staying with the child at night can be considered as a time off as well. **The benefit is in the existence of the dog.**

3- Actions that dogs takes when children do a specific behaviour?
There is no study about this or anything, but from my experience dogs move closer to children when they are nerves. This happened after dogs developed a relationship with children

Requirements or Barriers

1. Are there some **requirements** for children with ASD to have an assistance dog?
   a. age, skills, behavior, size of the houses, yard, or etc

Yes. We have an age requirement. It is around 7 and 12.
Research shows that therapies work best with this age rang. This is also the age rage where you can see the most improvements. Too young children do not interact much with dogs and too old children have their behaviour set.

There is a similarity between what children are trained to do when they go to therapists and the interaction that they do with their dogs. Dogs have a face, eyes, etc. Therefore, they provide a good way for children to improve their social skills-- kids needs to learn how to play and how to interact.
Dog can be considered as pear to pear programs !!
We hear lots of interesting stories all the time. for example "the child and the dog have created a game together."

Dogs also act similarly all the time and do not change much → **consistent**. That is why children with ASD like them and feel more stable and relaxed around them.
The interaction with these dogs also help in improving motor skills -->interacting with dogs requires children to move differently → move in sequences that are different than the repetitive movements that children with ASD do.

Training and Skills of Assistance Dogs

2. What type of training do assistance dogs for ASD receive in general?

The first training that we start with is safety and how to read social cues from people.
wandering → children want to be independant but they can't because there parents are not allowing them to stay alone → a good way to solve this issue is to put a dog between the child and the parent. Parents are holding the dog and children are connected to these dogs. It is a physical control using two leashes → this is great because both parents and children start to relax after doing this.

Appendix (2): Expert Interviews

3. Does training differ based on the dog or the child? How? **(skills for what behaviors)**

We give a similar training at the beginning. When families come we match based on the family unit and change our training based on the family and its requirements → It is a **two stage training**

4. What are different behaviours and situations that an ASD dog can be reliably trained to sense?

Dogs are good physical communicators. They do not get distracted by other things like us because their world is simple. The problem is how to train these dogs to be more reliable. Currently we give a general training that allows parents to communicate with dogs e.g.Tom sit down, stay , etc..
We do not train dogs to stop repetitive movements → dogs depend on cues from parents → That can not be done reliably with the absence of the parents.
Children just feel that they are wanted when they are with their dogs→ parents use these dogs as tools they would put the dog where they want the child to go and do. E.g. Parents that used to struggle to make their kid take a bath will just make the dog go to the bathroom and suddenly having a bath no longer is a problem.
Parents also use these dogs to help children sleeping alone and go to different places.

Assistance Dogs Interaction

5. How do assistance dogs keep children from wandering?

We have a specially designed harness and dogs have a command to stop. Therefor, parents will give the command to the dog to stop the child.
Publicly dogs are used as facilitator. Children do not have the skills to keep up with the their dogs alone.

We hear stories about dogs that they can do incredible things. These stories might be accurate and might not and dogs are different. There might be some really nice dogs out there, but we make sure that we tell families what they can expect from these dogs.

For example in a scenario where a blind person interact with his dog it is the blind person's responsibility to control the dog and make decisions (e.g. cross the road or not.) There are lots of things that are not possible for dogs to do.

6. How do assistance dogs inform parents when their children runaway?

This is not something that we teach because we do not feel that it is safe. We do not make our dogs responsible.

Also we do not train our dogs to do tracking because maintaining the tracking skills need continuous training from parents and we want parents to reach out to rescue teams when they lose their child rather than looking for it by themselves.

Other questions

7. What **constraints** do ASD dogs have?

The biggest constraint is that not all of these dogs can work with children. Matching the right dog to the right job and person is important.

8. What aspects parents care about regarding their children's safety, but ASD dogs can not provide?

The public at large has changed. People used to wanted to see miracles, but these days people are just looking for a friend for their child or help with the stress level and make their child calmer (e.g. sit in the back seat.)

Sometimes parents do not see improvements in their children with ASD when they are worried about a specific problem that their child is suffering from. Other parents just do not understand that it takes time for there kids to improve.

9. What aspects of ASD dogs that parents and their children may like or dislike?

We look for families that we call dog people -- families that predict the dog to be as a dog. There are families that don't know what !!

The only disadvantage that we heard from one family regarding these dogs is the extra time and effort required to take care of them → you have your dog to get ready + the kid + the family. The same family side that one day they went shopping without the dog and they said they will not do that anymore !!

10. What kind of things do ASD dogs **wear**? why dog need to wear it?

We have harness -- an identifier for a working animal -- safety feature

11. How challenging is it to train an assistance dog for a new task?

It depends on the dog.There are dogs who are sensitive for example and we try to place them in the right family.
we are just asking dogs to do a lot. Live with humans, understand them and interact with them.

Appendix (2): Expert Interviews

Other notes:

A good idea that you guys can do is to have two tracking devices one on the child and the other is on the dog. This will allow you to track the interaction and the activities that both the child and the dog do → **activity / tracking over time.** This might match with their social improvement → physical activities might correlate with social skills.

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Future recruiting →

Keep in touch → follow- up questions

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Comments:

start behavior, interaction then the barrier

are dogs will be continually trained when children get older

we are looking at this general population what do you think

Which audience → do

Are these dogs comes with trackers? what is being working what is not working and why?

the cost of training a dog + the funding +

Appendix (2): Expert Interviews

Interview with Phill, a father of a child with ASD, by Taysser and Liusu

Context Question

How old is your child with ASD?
my daughter is a 12 yrs old.

you have mentioned that your child is high functioning with Asperger
Does your daughter go through any meltdowns?

Mostly comes across as anxiety that turns to repetitive behaviours

What behaviors does your child exhibit?

Anxiety

Behavior Tracking ☐ Ask about typical scenarios (Kids and Behaviors)

What kind of behavior does your children exhibit? Which behavior is your biggest concern? and why? Could you rank these behaviors one by one?

Anxiety is the biggest concern. If she is at school it is going to be hard to bring her back to her school work.

Could you tell me about a typical day?

Her typical day is a normal standard day. She goes to a normal school and attend normal classes then in the afternoon she goes to a therapist where she can work on different issues

that she might face.

Can you give an example of a worst and a best moment?

An example of a worst moment was when she was younger -- there was a fire drill at school and she was afraid even though we explained that her teachers will be helping her out. She was afraid about the sound that will happen during the fire drill. She took an ear blockers with her that day. Sound might make physical pain to some children with ASD.

How regularly does your child experience meltdown or exhibit specific behaviours?

almost on a daily basis.

☐ I cannot hear well
☐ can we call back?

Have you ever tried to find out what trigger the behavior of your child?
How do you identify what triggers meltdowns and behaviours?

We identify what triggers meltdowns by experience. Over time you would figure out the source and for her that was about loud sounds.

Do you think it is useful to know what triggers behavior?

She is 12 now we can look at her face and know it. We know what type of sound harms her. when she was little it was hard for us to figure this, but now we are not blind sighted. She asks lots of question if she think that there might be an alarm going of. She would start to ask the same questions again and again and again. She might sit at the edge of her seat

Appendix (2): Expert Interviews

and look everywhere trying to find the alarm.

After you finding out the potential triggers to the behavior of your child, what did you do?

If she is separated from me and my wife and she is in a noisy environment, she might emotionally shut down "stop speaking now." Used to cry when she was younger.

What was the last time your child had a behavior that you were not able to predict? What was the situation?

What might help you figure out how to predict these behaviours?

Do you use any method to keep track of these behavior?

Not so much anymore, but we used to talk me and my wife all the time about these behaviours. then we had my daughter tested and she got diagnosed.

(if no), Would you be interested in tracking/analyzing these behaviors? Why?

What type of behavior would you like to track?

And what specific information of this behavior would you like to track?

When she was a little. Location could have been one thing. What is unique about the environment is another thing. (e.g. a speaker turned on at two locations at the same time.) another way maybe is to film the environment when the behaviour happens and look at it later.

What methods are you using to track the behaviors? notes?

How do you track the behavior? Why? pros and cons? how do you take notes?

How do you store and backup the data? Why?

Do you share the data with others? How and Why?

We share with her teachers and worn them about her situation. E.g. If she goes through this, she will do this. tell them to be prepared to answer her questions again and again because if you say don't worry then the behaviour might escalate.

Do you visit therapist regularly?

We did go for some time. we went to a child psychologist. We don't currently go. We would if we do not know how to handle a situation. Everyone know her very well, but if something goes wrong and we couldn't figure it how sure.

How do you share the data with therapist?

Now there is a school psychologist that we would talk to, but we were in wala wala. We had to call a therapist if needed.

Community

How is relationship with community?

Appendix (2): Expert Interviews

It is really good. I live in a small town. we are well known. It is an easy environment. everyone know her in our town…. We want people to know because if they know, they would know how to deal with her. She will get more understanding help. The more people know about it, the better understanding you will get.

What are the pros and cons of this relationship?
cons:
There is a stigma against ASD. some people might pull back and avoid her. That is because they don't know about it. If they know that she is a normal child with some things to consider. It could have been different.

Would you like your community to learn that you have a child with ASD, or you child is with ASD?
Do you usually like your community acknowledge your child's condition? Why?
//Would more understanding from the community help?
Do you want more understanding and help from the community
              yes - what kind of help
              no - why
How do you feel about sharing educational information about your child with the community

It depends on who the people are. If the child is going to a place where I think there will be loud sounds yes.. especially when she was younger and couldn't verbalize. Not that much now. I wouldn't share personal stuff.. I would share what triggers her .. and what might happen to her.

Improving the communication with parents

Do you experience any communication problems with your child. Would you like to let us

know the story?

not any real major stuff

If yes ☐ How did you solve the problem?
How did that help the communication between you and your child?
How do that help the communication skills of the child?
 (example).

How many hours do you spend to take care of your children everyday?
What do you think about having a device on the dog that speaks to the child?

How does your dog help your child?
By accident we discovered that having a dog around helps her. We have a german shepherd. The dog helps with her anxiety. Having the dog around her would decrease her anxiety.
As she was growing up, she would seek out a time with the dog. this is our second dog. the dog would sit on her lap.

if she is crying the dog would just come and sit down -- if she is distressed the dog would come.

Appendix (2): Expert Interviews

Feedback from Phil, a parent of a child with ASD about the interaction model

Data type
- Audio is going to be helpful
- Recording both video and audio is good
- The more data you record the better it is going to be because parents will be sharing the data with therapists and doctors and there are a wide variety of behaviours and triggers

Privacy of parents
- It depends on whom the data is going to be shared with

Privacy of others
- People record videos all the time these days and sometimes you can see other people in their recordings. Therefor, I don't think that this is an issue
- You might just want to accept the fact that data is not private
- Giving options to parents on what to record is a good idea
- People are using their iphones to record all the time, but it is not apple's responsibility to make sure that there is no privacy issues
- Now video is hard culturally, but sound is ok (google glass !)
- There is no privacy problem in side homes
- Even Though your product is on, but it is not recording all the time !!

Device type
- Anything that can get enough visual data
- Parents are not always with their children. At least provide the option for children to wear something. Maybe a watch so that they do not take it off
- The device needs not to draw attention. Something that sits on the front pocket, but do not have a screen or a clear camera
- Combining still pictures with audio is one way to capture data

Recording time
- Recording for 10min before and 10 min after is good enough
- **Parents might only hit the record button after their child calms down !!**

Appendix (3): Usability Testing Notes

7/17/15 Usability Testing at Starbucks Notes
Name: Taysser

7/17/15 5:08 PM
Have you tracked your child before?
No. Not really

7/17/15 5:08 PM
Type of data that you want to record --> I would like to record different types of behaviors and the transition from one activity to another. It is very important to figure whether the transition was smooth or not.

7/17/15 5:10 PM
I have tried using an app before. It was a free app. You have to be disciplined in order to use these apps. You would forget to track the behaviors.

7/17/15 5:11 PM
Over time I can see how important this can be. I might consider a solution if I see the coast and benefit.

7/17/15 5:12 PM
Goal --> rather than trying to change the child change the parent

7/17/15 5:14 PM
Showing the physical prototype

7/17/15 5:14 PM
this looks like a device that I can wear. I see this might have a cam. Then I would be able to play what I have recorded at night and see if I have done something wrong.

7/17/15 5:15 PM
This device has to be placed high so that It can capture everything.

7/17/15 5:16 PM
I would be concerned if other people are concerned about it, but maybe if you explain it to them, they might be fine. I would want to wear it at home all the time. I might want to….
Tourretts is hard to be diagnosed with --> 15% ….

7/17/15 5:18 PM
Doctors might not believe us some times when we talk about behaviors. Having this device well allow us to share videos of behaviors with them.
The size of this device should not be bigger than this size "our prototype."

7/17/15 5:19 PM
Moms wears lots of things already. if you made this look like Jewelry.

7/17/15 5:20 PM
I would wear it if it was black

7/17/15 5:20 PM
One touch to start recording is perfect because that is what you might have time for

7/17/15 Usability Testing at Starbucks Notes
Name: Taysser

7/17/15 5:21 PM
I would want to do it (activate the device) first. Then I would intervene.

7/17/15 5:21 PM
The idea of being able to record before hitting the button is smart.

7/17/15 5:23 PM
You might have no behaviors during some days, one on another day, and 5 on others.

7/17/15 5:24 PM
During the day all the sensory things might fill up the cup, at the end of the day he might meltdown easily!

7/17/15 5:25 PM
Meltdowns can last for 2 min to 2 hours. Talking too loud or too close to the child can cause meltdowns.

7/17/15 5:27 PM
The interaction can take 10 to 5min, but 20min will give you the buffer if you forget to push the button

7/17/15 5:28 PM
Other parents might want an hour --> make this adjustable.

7/17/15 5:29 PM "testing the UI"
Notification 1 --> I would want a notification --> I am assuming people would want to be able to remove them.

7/17/15 5:31 PM
Deleting or snoozing a reminder is something that I would want to do.

7/17/15 5:31 PM
Categorized vs not categorized -- need more notes vs not

7/17/15 5:32 PM
What info would you like to be notified about?
The notification is all what I need there – having a reminder + the option to add more info - would be nice if you can categorize it - some times you don't have time. Therefor adding the ability to customize the app so that it will not take time to input data (data tagging)

7/17/15 5:35 PM
Impacting the memory on the phone is an issue --> saving the data to the cloud would be nice.

7/17/15 5:37 PM
If I could get access to the past week would be ok --> worry about memory

7/17/15 5:39 PM
I would rather add audio notes than typing stuff

Appendix (3): Usability Testing Notes

7/17/15 Usability Testing at Starbucks Notes
Name: Taysser
_____

7/17/15 5:39 PM
The Trigger is very important --> sometimes it is easy to figure the trigger, but sometimes it is no.

7/17/15 5:40 PM
Sometimes the child comes from school and his cup is full. The device will not be able to capture the trigger in this case. Therefor, I would want to be able to enter more information.

7/17/15 5:41 PM
"If this happen do this." It is good to share this type of info with grand pa for example. Parents already know what to do in different situations; however, it is hard to explain everything to others (how to deal with different situations.)

7/17/15 5:43 PM
I was thinking about food. Eating lots of sugar sometimes can trigger behaviors.

7/17/15 5:43 PM
Lots of other apps are doing that (having food as a trigger.) It is good to have food as a potential trigger in the trigger reporting section.

7/17/15 5:44 PM
Pre populated radio buttons with the opportunity to write more is a good thing to have.

7/17/15 5:44 PM
It would help to have numbers in your scale -- what is the different between having a circle hear or their -- predetermined scales is going to be more precise.

7/17/15 5:46 PM
Liked the drop down list.

7/17/15 5:46 PM
I would like to see a customized list as a way to input data rather than the audio. You have to be in a quite place to use audio input.

7/17/15 5:48 PM
What data would you like to deal with?
The more sever the behavior is, the more likely I will come back and view the data.

7/17/15 5:49 PM
Data type?
I would want a video and an audio

7/17/15 5:54 PM
Capturing an audio for the past section (before the behavior) and a video for the future section (after the behavior) is a good idea.

7/17/15 5:56 PM
Having the ability to name events and add locations is good (e.g. Starbucks, name the behavior.)

7/17/15 Usability Testing at Starbucks Notes
Name: Taysser
_____

7/17/15 5:57 PM
I like the ability to visualize the data. Having a history of 30days is good and being able to have different views of the data (e.g. go from week to month) is nice. Being able to chose behaviors categories during data visualization is a big one.
Being able to track the time that each behavior take is important (e.g. this one was an hour→ hopefully the duration is getting shorter and shorter.)

7/17/15 5:58 PM
Showing the number of meltdowns, steaming is good. Ideally the number of meltdowns and durations will go down by time.

7/17/15 6:00 PM
I would like to not just be able to track bad behaviors, but good behaviors as well.

7/17/15 6:00 PM
Switching between medicines might have an affect. (E.g. ADHD medicines - depression medicines, etc.)

7/17/15 6:02 PM
You might use a pie chart to show that 70% of time the trigger is this ####
I like analysis and I am a visual person.

7/17/15 6:04 PM
Sharing data would be with therapists, spouse, possibly grandma and grand pa and teachers for sure.

7/17/15 6:06 PM
It is very challenging to explain to teachers that the kid can not do his homework for example. Sharing a video that shows what happened at home to teachers would be good. There is a trust with the teacher and I am the one who decide what to share so there is no privacy issue. I would want to select the videos that I want to share !!

7/17/15 6:07 PM
The teachers might not want to see the hall story of the child. (seeing only relevant data)

7/17/15 6:11 PM
A spouse would want to get access to every thing, but there are situations were you wouldn't want to share every thing (e.g. a divorced spouse or a therapists.)

Appendix (4): Diary Study Table

BEHAVIOR 1

Current Date and Time: _____

Behavior

Behavior Type(s): _____

Time of Behavior: _____

Behavior Duration: _____

Severity/Degree: 1   2   3   4   5

Trigger

Possible trigger(s) of this behavior:

_____

Intervention

Intervention Method:

_____

Rate Effectiveness of this intervention:

Very Ineffective   Ineffective   Neutral   Effective   Very Effective

Appendix (5): Informed Consent Form for the Diary Study and Usability Testing

Informed Consent Form

Human-Computer Interaction + Design Program
University of Washington
http://mhcid.washington.edu/

ASD Behavior Tracking
Diary Study and Usability Testing

Introduction
- You are being invited to participate in a graduate capstone project study done for course credits and not for a commercial product development.
- This project is sponsored and under the supervision of experienced researchers and instructors.
- This study is part of a project focused on designing a solution to assist parents tracking behavior of their children with Autism Spectrum Disorder.
- The goal of this project is to simplify the tracking process and help parents benefit from the data that they are tracking.
- We ask that you read this form and ask any questions that you may have before agreeing to participate in this study.

Purpose of the study
- Evaluate our current prototype and designs.
- Answer questions that we have about how parents want to record, annotate, and share their children's behaviors.
- The results of this study will inform the future design decisions of our project.

Description of the Study Procedures
- In this diary study you will need to simply operate a mini wearable camera to capture certain behaviors of your child/children at home for one day.
- During this time we would like you to to capture any instances of at least two positive or negative behaviors of your child/children. This could be any observable behavior that you define.
- At the end of the day, you will fill in a simple table to make note of more information about the circumstances of the behavior of your child/children when you look back to the audio/video recording.
- On the following day we will return to pick up the camera to prepare the videos and pictures that you captured for our user testing session.

1

- We will schedule a time with you to review your videos and evaluate some interface design ideas and ask about your experience .This will take approximately 60 minutes.

Confidentiality
- The records of this study will be *kept strictly confidential*.
- All the pictures and videos that you will record will be erased at the end of the study.
- We will not share or display the videos or pictures that you recorded publicly.
- We will not publish any of your personal information.
- This research will obey the official research confidentiality requirements of the University of Washington.

Incentives
- You will receive a $100 Tango card after you finish the diary study and the usability testing.

Participants Rights
- The decision to participate in this study is entirely up to you.
- You have the right to withdraw from this study at any point in time.
- You have the right to not answer questions that you might not feel comfortable answering.
- You have the right to ask questions about this study at any point in time.
- Feel free to contact us if you have any further questions about this study.

Consent
- Your signature below indicates that you have decided to volunteer as a research participant for this study, and that you have read and understood the information provided above. You will be given a signed copy of this form for you to keep, along with any other printed materials deemed necessary by the study investigators.

Investigators:

Name:	_____	Program:	MHCI+D
Name:	_____	Program:	MHCI+D
Name:	_____	Program:	MHCI+D
Name:	_____	Program:	MHCI+D

Participant's Printed Name   _____

Participant's Signature: _____

Investigator's Signature: _____

Date: _____

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Appendix (6): Informed Consent Form for Video Recording

Informed Consent Form

M HCI +D   W

Human-Computer Interaction + Design Program
University of Washington
http://mhcid.washington.edu/

ASD Behavior Tracking
- Interview

Introduction
- You are being invited to participate in a graduate capstone project done for course credits and not for a commercial product development.
- This project is sponsored and under the supervision of experienced researchers and instructors.
- This study is part of a project focused on designing a solution to assist parents tracking behavior of their children with Autism Spectrum Disorder.
- The goal of this project is to simplify the tracking process and help parents benefit from the data that they are tracking.
- We ask that you read this form and ask any questions that you may have before agreeing to participate in this study.

Purpose of the video recording interview
- Present the problem space and the design questions that we had.
- Explain our solution and the product that we have designed.
- Show the value of using our product to different stakeholders (e.g. therapists, teachers, parents, etc.)

Description of the Interview and Recording Procedures
- We will schedule a time with you to do the video recording.
- We will send you a list of the questions that we would like you to answer during the recording process in advance.
- After recording, the video will be edited and included in our final video.
- We will share our final video with you once the editing is done.

Confidentiality
- This video will be used as a part of our final presentation at the end of this quarter; therefore, part of this video will be *publicly shared with our program and will be posted on Youtube*.

Incentives
- You will receive a $50 Tango card during our video recording session.

Participants Rights
- The decision to participate in this video recording interview is entirely up to you.
- You have the right to withdraw from this activity at any point in time.
- You have the right to not answer questions that you might not feel comfortable answering.
- You have the right to ask questions at any point in time.
- Feel free to contact us if you have any further questions about this study.

Consent
- Your signature below indicates that you have decided to participate in our video recording activity, and that you have read and understood the information provided above. You will be given a signed copy of this form for you to keep.

Students:

Name: _____   Signature: _____

Name: _____   Signature: _____

Name: _____   Signature: _____

Name: _____   Signature: _____

Participant's Printed Name   _____

Participant's Signature: _____

Date   _____

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