

## NRI:INT Design and Development of a Social Robot to Gather Ecological Momentary Stress Data from Teens

Elin A. Björling, Maya Çakmak, Emma Rose, Patrícia Alves-Oliveira University of Washington



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### Teen mental health: **a wicked problem** requiring a crosscutting design solution

Increased, chronic stress  $\rightarrow$  teen depression



## A social robot can:

- •Engage teens to provide data
- Invite social conversations about stress
- •Be an **innovative** idea to solve wicked problem



## **Participatory Interaction Studies in the Wild**



#### **Collaborating with teens as:**

- Co-Designers
- Co-Researchers
- Robot Operators



#### **Our research**

- 17 studies so far!
- 11 Seattle Area High Schools
- 425+ teens and counting, now from all over the country

How do teens *envision* a social robot designed to help with stress?







[Boom Boom]



[CARLBot]



[Lucy]

Tea



[Petunia]



[Joaquin Bartholomew III] [Comfort Zone]

#### How do teens experience sharing stressors with a robot?







#### **Study findings**

- Sharing stress with a robot is
  - therapeutic
- Customization and transparency are key in a robot
- Empathetic interactions
- Teens will engage with robots remotely

# Finalizing the hardware and software



# Finalizing the hardware and software



- *Open-source software* development kit for social robots
- Includes tools for designing the robot face, controlling the robot through a Wizard-of-Oz interface, and scripting autonomous interactions
- Lower the barrier to entry for HRI through end-use tools



#### Studies of Customization

- Allows for *endless customization*
- Accessible to a *large range* of use cases
- Can be used across *multiple application scenarios*, with attachment pieces
- Open-source accessible end-user programming for interdisciplinary teams

# Community<br/>RobotAlf dog-half mailbox rab (h)<br/>Simple decorated robot (c)<br/>Simple decorated robot with a hat (d)

Robot Holding a heart creature (e) Geometric robot (f) Aquarium robot (g)

Cactus robot (h)

**Mental Health** 

Educational Robot

> Dressed up robot (i) Playful robot (j) Back covered robot (k) Vampire robot (l)



Robot that delivers inspiring messages to passengers. It lives outdoors in a public space, such as a city park. This robot is meant to be used by passengers of all ages, serving as an inclusive technology.

Robot provides microinterventions to decrease levels of stress and anxiety. It lives in libraries, at home, or in a school. This robot is meant to be used by the youth.



Robot enables the training of educational skills by repeating exercises with students. It lives in a school or a summer camp. This robot is meant to be used by children.

#### Project EMAR: Broader impacts & next steps

- Teens are the *future roboticists*, designers, and engineers.
- Novel, creative and scalable solutions to support their mental health are essential to the success of our future.
- We have learned alot about teen-robot interaction and the strong need for customization of both hardware and software













# Thanks!

Elin Björling: <u>bjorling@uw.edu</u> @elinbjorling @projectEMAR

http:/sites.uw.edu/emar

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