SIGCHI Conference Proceedings Format

Jana Prihodko
Affiliation
Address
jana.prohodko@gmail.com

Marcus Rönnmark
Affiliation
Address
ronnm@kth.se

ABSTRACT
This paper explores the domain of Autism Spectrum Disorder (ASD for short), in particular it looks at different issues that people suffering from ASD exhibit and focuses on one of the more common ones, namely difficulties understanding social interaction. The main focus of this paper is the design of a system that attempts to reduce the anxiety associated with social interaction for people with ASD. The system is designed for children between 5 and 10 years old to provide a tool that attempts to lessen the problems associated with ASD at an early stage. The design allows the user to have simple conversations with recognizable characters that helps the user to navigate through the conversation without using negative reinforcement.

Author Keywords
Responsible design; autism; ASD; interaction design; children.

INTRODUCTION
About one percent of the world's population has ASD [1]. There are a wide range of symptoms for ASD and people suffering for ASD may be affected in entirely different ways. For example, some suffer from sensory problems, sleep problems, intellectual disability, seizures or gastrointestinal problems. However, one of the most common symptoms of ASD is social impairment and communication issues. These symptoms make children reliably diagnosable by age two [2].

These more common, social, symptoms can make everyday life for people with ASD difficult, it can make them uncomfortable and make them want to avoid social situations. This can lead to depression [3]. One important thing about ASD is that while people suffering from it might have difficulties with social interactions they still have the same need for social interaction [4]. One way for them to manage daily social interaction is to learn every step, like rules of a game [5]. Although it is a tedious task it is still better than the alternative.

One way to help people with ASD is to create tools that allows them to learn normative social behaviour [4] [6] [7]. This paper will focus on the development of such a system, focusing on teaching simple conversational patterns for children between 5 and 10. The design is inspired by a study focused on teaching children to recognize facial expressions [8]. The goal of this particular design is to reduce anxiety and stress related to social interaction by teaching children simple conversational patterns in a safe and playful environment.

METHOD
The children conversational partner, or Conpa for short, was the result of an iterative design process with user testing in-between iterations.

Prototype
Conpa is a responsible design prototype of a game that helps children with ASD to learn different social rules and how to participate in conversations. The goal with Conpa is to provide a good training tool for children with ASD for conversations and other social events in safe and playful environment. Conpa is designed using teaching tips that is provided by Indiana Resource Center for Autism [9]. The game contain a selection of conservation scenarios to provide children a good variety of conversation to practice on. In the game the child is participating a conversation with an animated character that can be selected in the beginning of the game. The character will lead the conversation by asking some questions and the child will be given two choices to choose between. To continue the conversation the child need to answer correctly. If the child answers incorrectly the character will repeat or lead the child to the correct answer. During the conversation the child will get stars when answering the questions, depending if the answer is correct or not the stars will vary in size and in the end all the stars will be added to the total score.

User test

To evaluate the prototype one user test was made on an 6 years old girl with ASD. The user test was conducted in home environment. The user was instructed by test supervisor what to do and how to play. Due the prototype don't have sound the test supervisor did all the voice instructions. The test was successful and the user was interested in the game and liked to talk with the character (Mickey Mouse in our prototype).

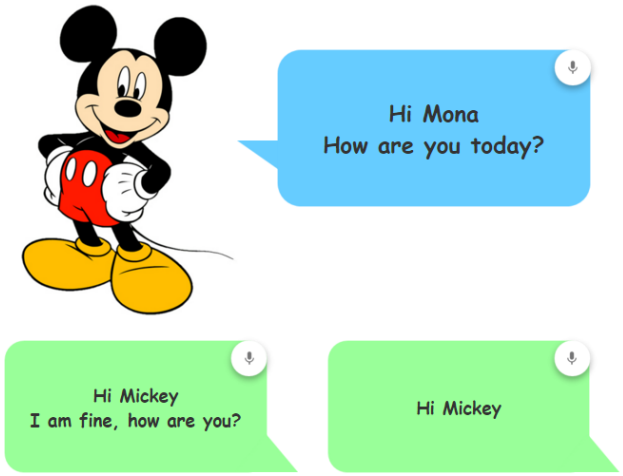

Figure 1. The prototype

Interview

To get more functionality focused feedback two interview was conducted with the girl's mother. The mother knows a lot about the ASD and what needs children with ASD have. The interview was semi-structured. During the interview the first prototype was shown and its idea explained. The feedback that was received was good and concrete. After second interview changes was made to the prototype and a second interview was conducted were second prototype was shown.

Feedback

The feedback from first interview that was received was that the sentences need to be shorter than they were, more color and pictures, no negative feedback when child chooses the wrong option, only positive feedback and when right even more positive feedback. After the feedback the first prototype was updated. The second iteration of the prototype had no 'wrong' alternatives. The alternatives that were considered wrong in the first prototype now created alternative conversational paths instead. Allowing the child to progress through the conversation without any unnatural breaks and without the discouragement of being told that they were wrong. The prototype now instead asked follow up questions whenever the answer the child gave was not satisfactory, e.g. whenever the response did not answer all parts of Mickey question.

The second prototype was tested again in a similar fashion as the first. The feedback for the second prototype revolved more around the aesthetics than the functionality. Both the child and the mother seemed satisfied with how the system worked now, but they asked for a more playful design. Preferably with animations, more colors and sound.

DISCUSSION

The use of animated characters as conversational partners were chosen due to the importance of using partners that the user is familiar with. People suffering from ASD can have problems with recognizing people, or being slower in learning what people looks like. By using well known characters such as Mickey Mouse, the design avoids this problem while making it more playful at the same time. This was reinforced further during the user test when the test subject explicitly said that it was 'fun talking to mickey'.

The proposed design doesn't cover all possible conversational paths, and that is not its purpose. The overarching goal is not to provide the perfect answer to every possible situation but rather to provide something to fall back on, when required. The proposed design would allow children to learn some basic social skills and through that become more confident in social interactions. One of the things that was pointed out during design workshops with other interaction designer was that the system could have the option for the user to enter their own choice, either by typing it or saying it. This goes against the main feature of the design which was to give suggestions. By giving suggestions the system allows a child to more easily understand what is appropriate and what is expected to say. While it makes the system less flexible, it simultaneously makes the system reliable. Using only pre-determined suggestion makes the system more recognizable to young children and especially children with ASD. There are no unexpected turns, the system is exactly the same every time you go through a certain conversation. Use Arial if Helvetica is not available. Sections should not be numbered.

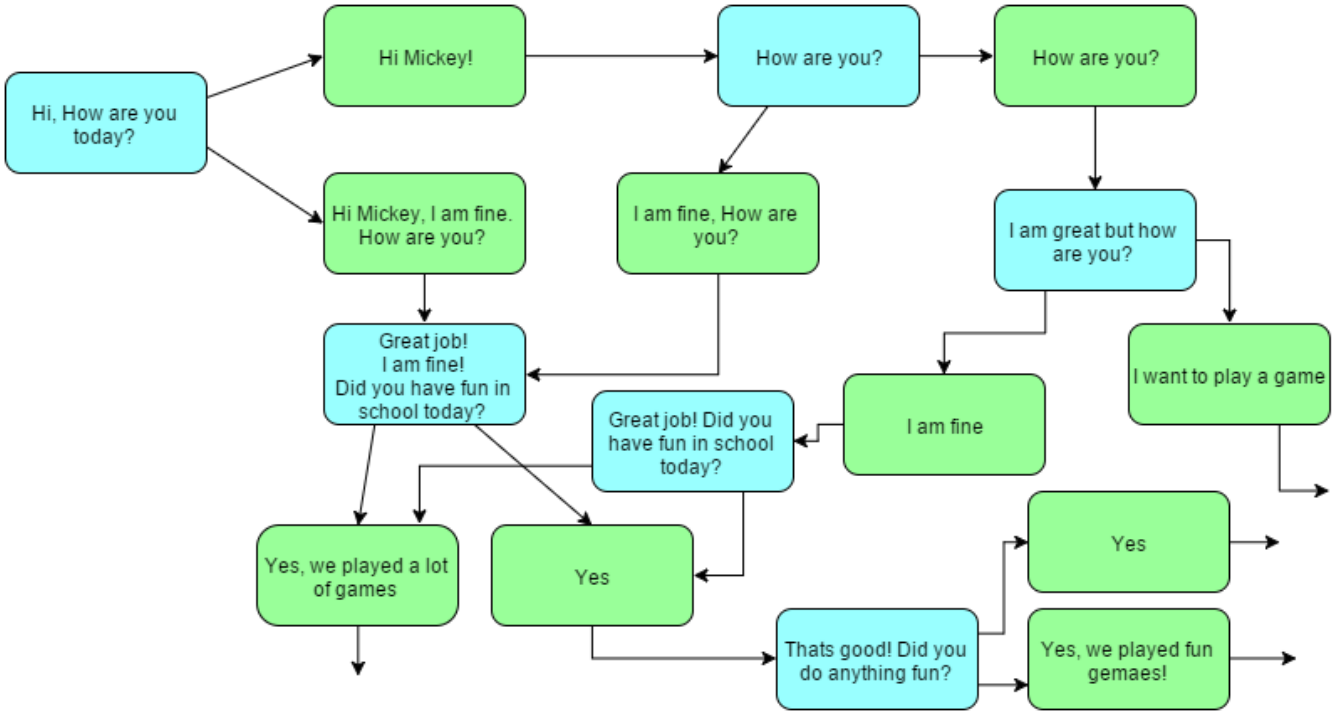

Figure 2. Conversational flowchart of the second prototype.

CONCLUSION

A system similar to Conpa is something that would be useful to help children with ASD develop their social skills and reduce the risk of them feeling alienated. Based on the research we read and our finding during the development of this design, we see great potential and opportunity in further expanding on our current design. Due to the basics of the system itself it would also possible to create and release different conversations and add-ons after the product is finished. Since there are an infinite amount of possible conversational patterns and almost as many topics as well, a system like this would never be completely finished. However, already with one path through one topic it can provide a helpful tool in the process of raising children suffering from ASD.

ACKNOWLEDGMENTS

We would like to thank the mother and her child who volunteered to help us out as test subjects during this project.

We would also like to thank all of our classmates who supplied us with feedback during the sessions in class, as well as the teachers who help us stay on the right path during the project.

REFERENCES

1. http://www.autism-society.org/what-is/facts-and-statistics/
2. http://www.nimh.nih.gov/health/topics/autism-spectrum-disorders-asd/index.shtml
3. http://www.autism-help.org/adults-aspergers-depression.htm
4. http://www.sciencedirect.com/science/article/pii/S0360131511001710
5. http://www.dailymail.co.uk/femail/article-3204573/People-autism-explain-everyday-challenges-face-moving-Reddit-thread.html
6. http://link.springer.com/article/10.1007/s10209-005-0116-3
7. http://chais.openu.ac.il/research_center/chais2011/download/weiss-92_eng.pdf
8. http://www.researchgate.net/profile/Ellen_Do/publication/221629823_Facial_expression_wonderland_(FEW)_a_novel_design_prototype_of_information_and_computer_technology_(ICT)_for_children_with_autsim_spectrum_disorder_(ASD)/links/02e7e538a149be649d000000.pdf
9. http://www.iidc.indiana.edu/pages/Teaching-Tips-for-Children-and-Adults-with-Autism