

# Persuasive Games and Mental Health

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Driven to Discover<sup>SM</sup>

# Introduction

- According to the Substance Abuse and Mental Health Services Administration (SAMHSA) around 19.1 percent of US adults live with a form of mental illness
- Stigmas can make getting treatment difficult
- Could persuasive games be used to help deal with these problems?

# Outline

1. Background
2. Qualitative Study
3. “Kindness is Contagious”
4. Conclusion

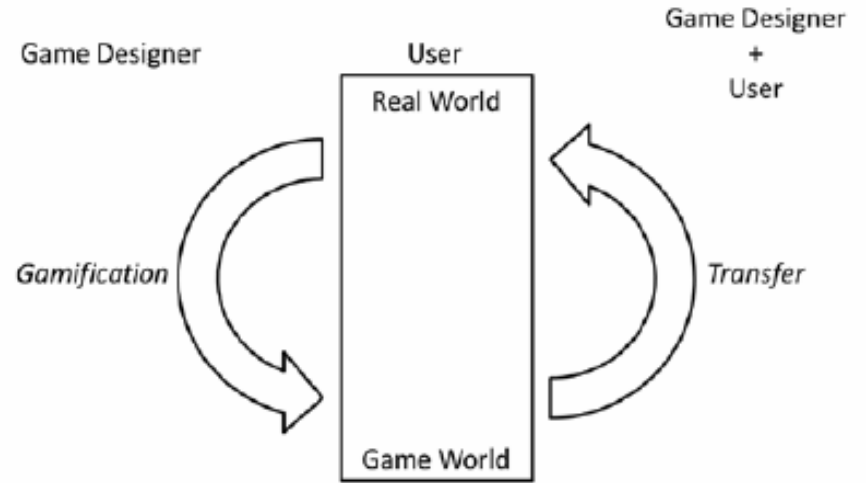
Background

# Outline

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  - a. What are persuasive games?
  - b. Persuasive Technologies
  - c. Gamification
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# Persuasive Games

- 3 Elements: Gamification, Game Worlds, and Behavioral Change Design (Visch et al.)



# Persuasive Technologies

- “Any interactive computing system designed to change people’s attitudes or behaviors.” (Fogg)
- Examples: Amazon.com, educational sites
- Can adapt to users
- Have history in health domain

# Gamification

- “The use of video game elements to improve user experience and user engagement in non-game services and applications.” (Deterding et al.)
- Can be seen as a persuasive technology (Llagostera)
- Has 4 of the 7 tools Fogg states persuasive technologies can have
  - Tunneling, self-monitoring, surveillance, and conditioning
  - Conditioning used in “Kindness is Contagious”



# Qualitative Study

# Outline

1. Background
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2. Qualitative Study
  - a. Study
  - b. Results
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# The Goal of the Study

- To answer these 4 questions:
  - What key stressors and impactors do students experience?
    - Stressors are external stimuli which cause stress
    - Impactors influence wellbeing and stress
  - What do we need to know about students and active stressors to personalize persuasive games effectively?
  - How can game challenges be adapted to different personalities, stressors, and attitudes?
  - What approaches to personalization should be applied in the design of a persuasive game for mental wellbeing?

# The Study Procedure

- 35 students were split into 6 groups (A1, A2, B1, B2, C1, C2)
- 6 fictional students were designed with high or low levels of three personality traits
  - Conscientiousness, Emotional Stability, and Extraversion
- Stressor and attitude indicators were included in the fictional student stories

# The Study Procedure

- The participants were given 4 tasks to complete
  - Anonymously write stressors and impactors for a fictional student
  - Consider which user characteristics are important for game challenges
  - Adapt challenges for two fictional students
    - A1 and A2 had conscientiousness
    - B1 and B2 had emotional stability
    - C1 and C2 had extraversion
  - Discuss which personalization approaches should be considered in a persuasive game for mental wellbeing

# Results: 1st Task

- Mental Demand was the most indicated stressor, Diet the most mentioned impactor

Stressors (S) & Impactors (I)	A1	A2	B1	B2	C1	C2	Total
Mental Demand (S)	4	4	2	5	5	10	30
Temporal Demand (S)	6	7	4	2	2	2	23
Isolation (S)	2	2	5	2	5	3	19
Societal Demand (S)	4	3	3	4	3	-	17
Frustration (S)	3	2	-	-	2	1	8
Diet (I)	3	6	6	1	4	4	24
Finance (I)	2	1	4	3	3	3	16
Sleep and Rest (I)	3	5	2	-	2	1	13
Environment (I)	1	1	4	4	-	1	11
Physical Activity (I)	1	3	1	1	3	2	11
Employment (I)	-	1	1	4	2	1	9
Academic Performance (I)	-	1	1	2	1	1	6

# Results: 2nd Task

- All groups agreed interests need to be considered
- Majority thought stress levels, personality, emotions, and performance were also important

Characteristic	A1	A2	B1	B2	C1	C2
Personality	+		+	+		+
Motivation				+	+	
Emotions		+		+	+	+
Stress Level	+		+	+	+	+
Performance		+		+	+	+
Age	+	+	+ (3) - (2)	-	-	+
Location	+	+			+	+
Culture	-	+		+ (4) - (2)	-	-
Interest	+	+	+	+	+	+
Diet		+	+		+	
Physical Activity		+		+		+
Health Condition	+	+	+ (1) - (4)		-	+

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Emotions		+		+	+	+
Stress Level	+		+	+	+	+
Performance		+		+	+	+
Age	+	+	+ (3)	- (2)	-	+
Location	+	+			+	+
Culture	-	+		+ (4)	- (2)	-
Interest	+	+	+	+	+	+
Diet		+	+		+	
Physical Activity		+		+		+
Health Condition	+	+	+ (1)	- (4)	-	+



## Results: 3rd Task

- Fictional students with positive attitudes received challenges with increased difficulty
- Students with low levels of the 3 personality traits were given fewer challenges than those with high levels

## Results: 4th Task

- All groups agreed real-time personalization would be effective
- Most groups agreed that explicit (questionnaires) and implicit methods for user profiling would be useful

“Kindness is Contagious”

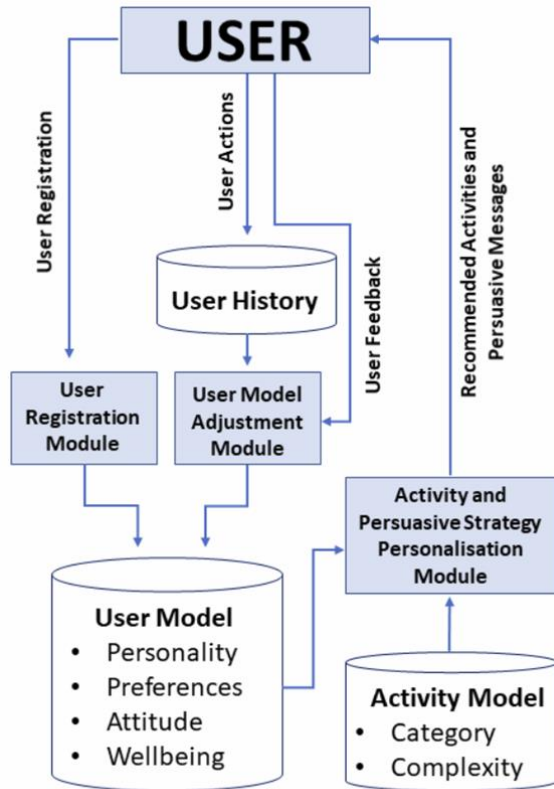
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# The Design of “Kindness is Contagious”

- Persuasive game designed for mental health improvement
- Browser-based
- Users are given 5 activities a day based on 5 categories of wellbeing:
  - Positivity, generosity, gratitude, friendliness, and self-kindness
  - 10 points for completing an activity
- Users receive a persuasive message each day
- Anonymous message board

# The Design of “Kindness is Contagious”



The screenshot shows the user interface of the 'KINDNESS IS CONTAGIOUS' application. The interface includes a navigation bar with links for Home, Help, Participants, and Account. The main content area features a 'Message of the Day' and a 'The Wall (Micropost Feed)'. The 'DAY 7 Activities' section lists seven tasks for the day, such as spreading kindness and writing poems. A 'Complete Daily Questionnaire' button is visible. The micropost feed shows several user posts with their avatars and timestamps.

**KINDNESS IS CONTAGIOUS** Home Help Participants Account

Message of the Day: There not many chances left to complete all 5 activities. Will you complete all of them today?

**The Wall (Micropost Feed)**

**DAY 7 Activities**  
*Activities reset daily at lunch time: 12PM (UK Time)*

1. Spread kindness! Hide a happy message for someone else to find!
2. Write a very short poem or a haiku about being generous.
3. Reflect on three good things you are looking forward to this month.
4. Leave an encouraging note on the wall for the other participants.
5. Don't forget to play! Play any game you like today and write a note on the wall about it.

**Complete Daily Questionnaire**

Compose new micropost...

**Post**

**Admin**  
view my profile  
7 microposts

**Participant 132PZE**  
Hey everyone, I hope you are all having a good day and that you have achieved anything/will achieve of meaningful value today.  
Posted 26 days ago.

**Participant 131LVI**  
I am grateful for all the lovely people that I get to work alongside, who are always kind, understanding, patient and willing to offer me a helping hand.  
Posted 26 days ago.

**Participant 131LVI**  
Hello all you lively people. No matter the difficulties or obstacles you might be experiencing in your lives right now, just keep on doing your best. Things always have a way of sorting themselves out.  
Posted 26 days ago.

**Participant 128KPZ**  
Glad to meet you all! Hope you beautiful people are having a stellar day! ^^  
Posted 26 days ago.

**Participant 125XAY**  
Very nice to meet good people today. I hope God bless you all with happiness  
Posted 26 days ago.

**Participant 123BWL**  
I'm glad to see so many others contributing to this experiment!  
Posted 26 days ago.

**Participant 122SMW**  
Good day to you all. It's nice to have a comfortable working environment.  
Posted 26 days ago.

# The Study

- 45 participants were split into two groups, A and B
- Users received 5 activities and a persuasive message a day for 7 days
- On days 4 and 5, groups A and B received different messages
  - Group A's message focused on group goals
  - Group B's message focused on individual goals

# The Study

- A pre-, daily, and post-questionnaire were used
- The pre-questionnaire had 3 sections
  - Participant mental wellbeing was found using the Subjective Happiness Scale
  - Given 10 activities based off the in-game categories to gauge participant intention levels
  - Personalities were assessed using the TIPI scale
- The daily questionnaire asked about general happiness levels and how activities were going
- The post-questionnaire re-assessed happiness and intention levels



# Subjective Happiness Scale

- Developed by Sonja Lyubomirsky in 1999

1. In general, I consider myself:

not a very happy person                      1                      2                      3                      4                      5                      6                      7  
a very happy person

2. Compared with most of my peers, I consider myself:

less happy    1                      2                      3                      4                      5                      6                      7                      more happy

3. Some people are generally very happy. They enjoy life regardless of what is going on, getting the most out of everything. To what extent does this characterization describe you?

not at all    1                      2                      3                      4                      5                      6                      7                      a great deal

4. Some people are generally not very happy. Although they are not depressed, they never seem as happy as they might be. To what extent does this characterization describe you?

not at all    1                      2                      3                      4                      5                      6                      7                      a great deal

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# Results

- Participants with high levels of Conscientiousness completed more activities on average
- A weak negative correlation exists between Extraversion and activities completed

(\*\*\*=p<0.001, \*\*=p<0.01, \*=p<0.05)

	Total Activities	Positivity	Generosity	Gratitude	Friendliness	Self-Kindness
Conscientiousness	0.712***	0.641***	0.563***	0.586***	0.600***	0.525***
Agreeableness	0.462***	0.385**	0.432**	0.434**	0.595***	0.98
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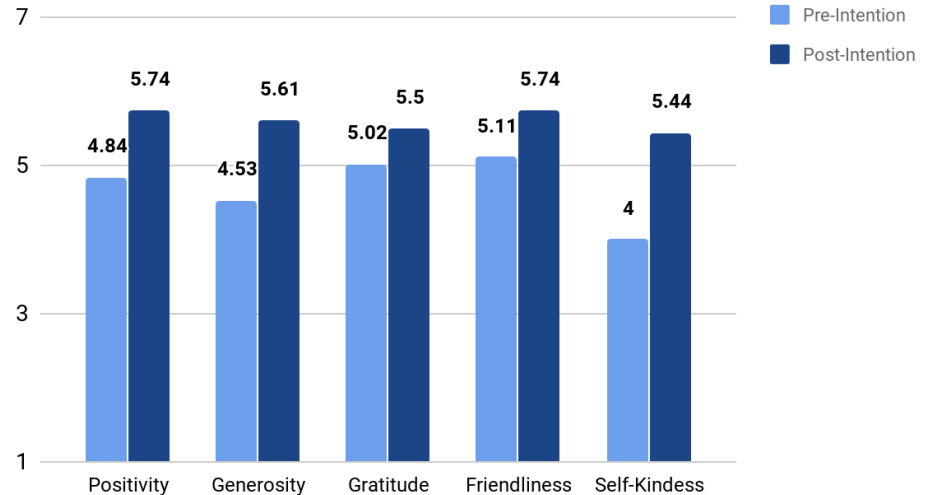
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# Results

- Participants were more likely to complete positive activities after the study
- On average, participants had a 0.522 increase on their Subjective Happiness Scales

Pre-Intention and Post-Intention Averages



Conclusion

# Conclusion

- Persuasive games for mental health improvement seem to work
- Some personal concerns:
  - Study was too short
  - Daily questionnaires might have altered results



# Acknowledgments

- KK Lamberty
- My classmates
- Friends and Family

Questions?

# References

- A. Ciocarlan, J. Masthoff, and N. Oren. Kindness is contagious: Demonstration of a persuasive intervention for wellbeing. In Adjunct Publication of the 26th Conference on User Modeling, Adaptation and Personalization, UMAP '18, pages 219–220, New York, NY, USA, 2018. ACM.
- A. Ciocarlan, J. Masthoff, and N. Oren. Kindness is contagious: Study into exploring engagement and adapting persuasive games for wellbeing. In Proceedings of the 26th Conference on User Modeling, Adaptation and Personalization, UMAP '18, pages 311–319, New York, NY, USA, 2018. ACM.
- A. Ciocarlan, J. Masthoff, and N. Oren. Qualitative study into adapting persuasive games for mental wellbeing to personality, stressors and attitudes. In Adjunct Publication of the 25th Conference on User Modeling, Adaptation and Personalization, UMAP '17, pages 402–407, New York, NY, USA, 2017. ACM.
- S. Deterding, M. Sicart, L. Nacke, K. O'Hara, and D. Dixon. Gamification. using game-design elements in non-gaming contexts. InCHI '11 Extended Abstracts on Human Factors in Computing Systems, CHI EA '11, pages 2425–2428, New York, NY, USA, 2011. ACM.
- B. Fogg. Introduction. In B. Fogg, editor, Persuasive Technology, Interactive Technologies, pages 1 – 59. Morgan Kaufmann, San Francisco, 2003.
- E. G. Llagostera. On gamification and persuasion. 2012
- SAMHSA. Key substance use and mental health indicators in the united states: Results from the 2018 national survey on drug use and health. HHS Publication, pages 1–65, 2018.
- S. Lyubomirsky and H. Lepper. A measure of subjective happiness: Preliminary reliability and construct validation. Social Indicators Research, 46:137–155, 1999
- V. Visch, N. Vegt, H. Anderiesen, and K. van der kooij. Persuasive game design: A model and its definitions. 04 2013