



Real World Evidence for the narrative therapy game Shadow's Edge

Since its inception, the Shadow's Edge game was built on two principles: **design with young people for young people** and **build real world evidence** to understand the impact of gameplay on players' resilience through in-house and third-party research. We have engaged intensively with over 1000 young people, including 172 patients with serious and chronic illness, and analyzed millions of public online conversations to understand the attitudes and needs, drivers and barriers of young people toward their emotional and mental wellbeing.

Research Types and Studies performed



Clinical Trials and independent psychological studies.

These studies are independent and are led by academic research partners to understand the impact of Shadow's Edge from a clinical perspective. The Digging Deep Project provides the game and sets-up the secure data exchange based on the study partners needs. Studies completed:

- **Lurie Children's Hospital Clinical Trial (Dec 2018 – Nov 2020)** on identity formation, affect variability and emotional regulation. The clinical trial reported that players who engaged endorsed higher levels of personal or ideological identity exploration and higher levels of social and interpersonal identity exploration.
- **University Zurich Pilot Study (Nov 2021 – Jan 2022)** to investigate the impact of gameplay as a means of primary prevention in mental health. Results suggest the Mobile Game Shadow's Edge may represent a promising, low-threshold support measure for improving mental health care and promotion for adolescents and young adults.
- **CINDE International Center for Youth and Child Development, Colombia (Feb – April 2022)** to investigate the impact of gameplay and of using the Shadow's Edge workbook on wellbeing, resilience and resilient coping. Study results will be available as of May.



In-house psychological studies and data analytics.

With our psychological impact studies we measure the impact of gameplay on our players. These studies typically engage players over a longer period of time and often combine quantitative and qualitative research techniques, such as self-assessments on scales for resilience and wellbeing, with player diaries or the thematic analysis of anonymized or player published game content. Using the anonymized gamedata pool, we also investigate the emotional and mental states reflected in the journals and art. Our first completed study investigates the impact of gameplay on Emotional Resilience with support of University Twente during our Beta phase from Aug – Oct 2017. Results showed a significant impact on seven factors contributing to emotional resilience, mainly optimism, positive self identity and emotional regulation. Currently we are performing a quantitative analysis on gameplay data combined with a thematic analysis of player interviews to understand the path that players take through the game to support their wellbeing and to deal with their mental and emotional struggles.



Product design studies.

Since game inception we have worked with over 400 young people to co-create the Shadow's Edge game. Through in depth player interviews, surveys and focus groups to work to understand players' context, objectives, needs, emotions, frustrations, behaviors, preferences and strategies around taking care of their emotional and mental wellbeing and translate this into game design. We perform playtests and player observations with various kinds of prototypes to validate and adjust our design choices. We are seeing a high awareness and willingness to engage around their emotional and mental wellbeing and a high prevalence of stress, depression, anxiety, ADHD or ADD and identity questions that drive the young people to us. The positive change they report back is finding a voice to express their struggles and connect with others more easily around difficult topics, building a practice to use writing, art and breathing for dealing with mental turmoil and reflecting about themselves in a new way that opens fresh perspectives.



Research regarding the science of wellbeing.

We commission big data studies to understand how young people communicate online about their mental and emotional wellbeing and what drivers and barriers they see to wellbeing. We see the majority of conversations taking place on message boards and topical sites and not on Social Media. So far we commissioned three big data studies:

- Drivers, barriers, needs and attitudes towards Mental and emotional wellbeing in youths and young adults facing serious or chronic illness – (Culturintel, 2018)
- Youth perception of wellness/wellbeing, mental health and self-help and self care – (Culturintel, 2020)
- Drivers, barriers, needs and attitudes towards Mental and emotional wellbeing in youths and young adults in the cities of Soacha and Pereira in Colombia – (Culturintel, 2021)

Summary of Study set-up and results



Lurie Children's Hospital, Chicago Clinical Trial

Dec 2018 – Mar 2020

Shadow's Edge Mobile Game promotes Identity formation among adolescent and young adult survivors of pediatric cancer: short term results of a randomized clinical trial

Overview: The Northwestern University Feinberg School of Medicine / Lurie Children's Hospital Chicago under the lead of Dr. Bonnie Essner conducted a clinical trial using the Shadow's Edge game as an intervention. Study participants were 177 adolescents and young adults who have completed their cancer directed treatments at Lurie Children's hospital and are in remission and between 14 and 24 years of age during the study year.

Key impact of gameplay is identity exploration and flexibility in identity. Further analysis and publication of the study data and results in 2021 by the research team. This is one of the largest Mobile game studies of AYAs.

Method: This is a two-group, randomized wait-list control trial, in which Game-Play participants (N=95) played Shadow's Edge daily for six consecutive weeks while the Wait-list Comparison group (N=82) had no study procedures. Participants completed standardized, self-report measures of identity formation, life meaning and purpose, positive affect, and benefit-finding. ANCOVA was used to assess group differences at the post-intervention, controlling for baseline levels of each outcome.

Outcome: The hypothesis that playing Shadow's edge is associated with adaptive identity status, positive affect and benefit finding was partially validated. Adolescents and young adult participants who played Shadow's Edge did endorse higher levels of personal or ideological identity exploration and higher levels of social and interpersonal identity exploration. Playing moved them further along on the continuum of identity exploration, personal, career interests and social roles.

Publication: 7th IPPA World Congress, 17 July 2021.



Zurich University, Department of Psychology

Nov 2021 – Feb 2022

Empirical evidence of the mobile game "Shadow's Edge" to promote mental health and resilience in adolescents and young adults: A pilot study.

Overview: The aim of the University Zurich pilot study was to examine the effectiveness of the mental health app the mobile game "Shadow's Edge" in relation to the resilience, mental health, and well-being of adolescents and young adults. The study specifically aimed to understand, whether the mobile game Shadow's Edge can be used as an effective tool in primary prevention. Furthermore, the study wanted to understand whether age, the presence of a physical illness and gameplay duration contribute to the effect and whether these effects are mediated by a change in self-efficacy of players..

Results suggest the Mobile Game Shadow's Edge may represent a promising, low-threshold support measure for improving mental health care and promotion for adolescents and young adults.

Method: The pilot study conducted was a pre-post design without a control group with an intervening intervention. Participants were recruited online, in schools and in universities. The initial 75 participants received a gift voucher payment or study credit. The study participants were interviewed at two measurement points (baseline (T0)) and directly after completion of the intervention (T1). During the intervention, study participants were asked to play the mobile game Shadow's Edge on their own mobile device for at least ten minutes per day for 30 days. To assess participants' wellbeing and mental health

situation, the study used standardized and validated measurement instruments for resilience (CD-RISC-10), depression (PHQ-9), anxiety (GAD-7) and wellbeing (WHO-5).

Outcome: The findings of a University of Zurich psychological pilot study suggest that the Mobile Game Shadow's Edge can contribute to mental health promotion in primary prevention - promoting resilience, well-being and self-efficacy in adolescents and young adults. In addition, the reported findings suggest that the Mobile Game Shadow's Edge has promising potential in secondary prevention, meaning it may be most effective for people who are already experiencing some psychological symptoms. In this area of application, it could contribute to the reduction of depressive and anxiety-specific symptoms (secondary prevention) in addition to promoting well-being and self-efficacy (mental health promotion). Consequently, the Mobile Game SE may represent a promising, low-threshold support measure for improving psychiatric-psychological health care and promotion among adolescents and young adults

Publication: Shadow's Edge website and social media.



In-house / University Twente / EGGZ

Aug 2017 – Oct 2017

Playing Shadow's Edge promotes positive self identity, emotional regulation and optimism.

Overview: During our beta phase we ran an impact study with 55 players, between 13 and 22 years old. 50% of the players were dealing with a physical illness (i.e. cancer, chronic lyme disease), 20% with mental illness (i.e. depression, ADHD) and 30% chose not to disclose.

Objective: Understand the impact of gameplay on the resilience of players. We investigated seven factors that contribute to emotional resilience. See box for details

Method: Player self-assessment before and after four weeks of gameplay; player diary for seven consecutive days; in depth player interviews. Players received USD 75 for study participation.

Results: A positive trend in the satisfaction for every resilience factor category among the respondents. For three categories Optimism, Emotional regulation and positive self-identity respondents answered significantly more positive in the follow-up survey. Many answers to open ended questions show a shift in how players relate to their situation:

Seven factors of emotional resilience positively impacted

- Proactive Coping
- Mindfulness & Acceptance
- Optimism
- Emotional Regulation
- Derived Meaning
- Positive Self Identity
- Connectedness

"The game does make you expose your feelings if you are honest and challenges you to continue to believe healing does come." – David (14) "The game helped me relieve stress, cope with new challenges, and makes me feel less alone in my struggles. I loved being able to process ideas directly related to my situation. I felt like the journal prompts were written just for me!" – Katrina, 23

Limitations: This was a study without randomized sample or control group.



Product Design Research

Overview: More than 1000 teen and young adult players were part of surveys, design sessions, playtests, player observations and interviews. We are seeing several commonalities in the young people who are attracted to our project and game: they are aged 16 – 24 years old, with a secondary group up to 34 years old, they enjoy writing or art already in their free time and are feeling overwhelmed or stressed and conscious about needing support for their emotional and mental wellbeing and search for support in the app stores directly or get the game recommended by their doctor or therapist.

The majority of Shadow's Edge players has seen a therapist. About a third have been exposed to mindfulness, many are diagnosed with depression, anxiety disorders or ADHD. They display a high readiness to identify strategies and practices to support themselves.

Objective: Understand player motivation, context and outcomes, validate design, story, mechanics and experience.

Method: Combination of surveys, speed interviews, empathy mapping and paid one hour think-aloud play sessions using game prototypes

Outcome: Players report gaining a new perspective and building a practice around using their writing and art to deal with difficult life situations and being able to communicate better about their situation. Some players reported gaining clarity on specific situations such as guilt and grief or gender identity related questions. The game has also helped players recognize their own potential even when others don't see it yet; Players report gameplay impacted their ability to express themselves and reach-out to others. They describe using the game often at night before falling asleep or in the morning as a positive alternative to social media. They also play during breaks when at work. We see a certain fatigue on the multitude of health apps out there and an unwillingness to pay for meditation apps. Players welcome the game approach, combination of therapeutic and relaxing elements and enjoy contributing to a project with a cause through the playtests.



Big Data Research

Overview: We commission big data studies of public online conversations to understand the unfiltered voice of young people online. An initial study in 2018 focused on what teens and young adults dealing with chronic or serious illnesses are looking for online. A second study in 2020 focused on how teens and young adults define wellbeing and their stance on mental health and self-help. A next study is planned for spring / summer 2021 and will focus on definitions and mental health needs of youth in Colombia.

Objective: Understand the needs, drivers, barriers around mental and emotional wellbeing young people express in public online conversations.

Method: Qualitative studies using machine learning for thematic analysis mining over 30 million public posts on message boards, topical sites and social media. Research done by CIEN+/ Culturintel.

Results: The 2018 and 2020 studies reveal that teens and young adults gravitate more towards topical sites, message boards and forums in addition to social media when they are looking for around mental health with a ratio of about 2 : 1. The thematic analysis of the online conversations show that these are a means to vent, gather information and to get social support. For teens and young adults facing serious and chronic illness there is a trajectory from using online conversations to gather facts and information about the situation they are facing, to learning from the experience of others and to then use online as a key channels for giving back when they are feeling better or have come to term with their situation. Teens and young adults overall define wellbeing as having four key components: physical, emotional, social and positive circumstances. Attaining and maintaining physical wellbeing seems less challenging for youth than emotional, social and circumstantial wellness. Needs and struggles youth express is learning to deal with strong emotions and the fear to be a toll on others – this even when they already practice self-care. Also there are many more asks than answers about health and wellbeing. This is an unmet online need.

Publication: The results of the 2018 study on online asks of teens and young adults facing serious or chronic illness was presented at the American Child Life Conference in April 2019.

Teens and young adults across all three studies express a need and desire for straight facts, advice from others in the same situation and giving back to the community once better. Emotional and circumstantial discussions have the largest gap between asks and answers.