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A PILOT STUDY OF THE *RETHINK* ONLINE VIDEO GAME APPLIED FOR COACHING EMOTIONAL UNDERSTANDING IN CHILDREN AND ADOLESCENTS IN THE THERAPEUTIC VIDEO GAME ENVIRONMENT: THE *FEELING BETTER* RESOURCES GAME

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Abstract

Introduction: Children and adolescents' ability to effectively identify and understand emotions is an important aspect of development that has been linked to a variety of beneficial outcomes (e.g., better mental health, social skills and academic performance; Sprung, Münch, Harris, Ebesutani, & Hofmann, 2015). According to the binary model of distress (David, Montgomery, Macavei, & Bovbjerg, 2005), stemming from the Rational-Emotive Behavior Therapy/Coaching (REBT/ REBC; Ellis, 1962) theory, there are functional and dysfunctional emotions, the latter ones being maladaptive. The *REThink* platform aims at using online gaming for coaching emotion regulation in children and adolescents based on these principles. **Objective:** We conducted a pilot study to investigate if the *Feeling Better* mini video game, part of the *REThink* therapeutic online platform as a resource activity, can be a useful tool in coaching the distinction between functional and dysfunctional emotions in children and adolescents in the therapeutic video game environment. **Method:** The online game was delivered to a sample of 22

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children and adolescents, aged between 10 to 16 years. Emotion understanding was indexed by the amount of acquired points for correctly collecting functional emotions. **Results:** The *Feeling Better* game was found to be a useful tool in improving in-game emotional understanding, children and adolescents indicating a significant increase in their ability to correctly identify and collect functional emotions after three trials of playing. **Conclusions:** Using therapeutic video games may be a useful tool for coaching emotion regulation skills in children and adolescents. Finally, satisfaction with and advantages for the use of online video games in coaching emotional skills are discussed.

Keywords: therapeutic video games, emotion regulation skills, coaching, Rational-Emotive Behavior Therapy, children and adolescents.

Key Practitioner Message:

- Emotional understanding is of particular relevance to children's and adolescents' mental health.
- Technology-based tools seem a very promising tool for increasing access to and engagement with mental health services for this age category.
- *REThink* therapeutic online video game adapted for tablets and smartphones could offer important resources for guiding children and adolescents to develop their emotion regulation abilities, like emotional understanding.

Introduction

Children's and adolescents' ability to effectively identify and understand emotions is an important aspect of cognitive and emotional development that has been linked to a variety of beneficial outcomes, like a better mental health, social skills, and academic performance (e.g., Aldao, Nolen-Hoeksema, & Schweizer, 2010; Barchard, 2003; Denham et al., 2003). Conversely, deficits in emotional understanding are associated with detrimental outcomes, including emotional disorders (e.g., anxiety disorders), aggressive behaviors, and poor academic performance (e.g., Bohnert, Crnic, & Lim, 2003; McLaughlin, Hatzenbuehler, Mennin, & Nolen-Hoeksema, 2011; Petrides, Frederickson, & Furnham, 2004; Saarni, 1999). Accumulating evidence from studies investigating emotion regulation abilities in children and adolescents suggests that training procedures aimed at developing emotional understanding are effective and may be powerful tools for the prevention of mental disorders, as well as for the psychotherapeutic process (e.g., Sprung, Münch, Harris, Ebesutani, & Hofmann, 2015).

According to the binary model of distress (David, Montgomery, Macavei, & Bovbjerg, 2005), stemming from the Rational-Emotive Behavior Therapy/Coaching (REBT/REBC; Ellis, 1962) theory, there are functional and dysfunctional negative emotions, the latter ones being maladaptive. More specifically, functional negative emotions (e.g., sadness, worry, annoyance) are triggered by rational

beliefs and lead to adaptive behaviors (e.g., problem solving), while dysfunctional emotions (e.g., depression, anxiety, anger) are triggered by irrational beliefs and lead to maladaptive behavioral responses (e.g., avoidance; David, Lynn, & Ellis, 2009; David & Szentagotai, 2006). When children and adolescents are confronted with negative life events the goal of REBT/REBC is to promote an adaptive functioning (i.e., functional emotions that lead to adaptive behaviors) by cultivating a rational/healthy way of thinking in relation to life's challenges (Cristea, Stefan, David, Mogoase, & Dobrean, 2015). Thus, an important first step of the REBT/REBC interventions is to help children and adolescents to identify and understand their own emotional experiences, specifically teach them that functional negative emotions represent normal reactions to every-day life events (e.g., annoyance), whereas dysfunctional negative emotions correspond to subclinical and clinical problems (e.g., depression; David & Cramer, 2010).

In this context, coaching children and adolescents to identify and distinguish between functional and dysfunctional negative emotions can bring important mental health benefits, even though it is sometimes a challenge taking into account their developmental particularities, as well as limited innovative techniques that could facilitate this process (DiGiuseppe & Bernard, 2006; Cristea, Stefan, David, Mogoase, & Dobrean, 2015).

Technology-based tools and their use in mental health

However, despite the fact that effective training procedures exists, most of the children and adolescents with emotional difficulties will never receive an evidence-based intervention due to access barriers (Farrell & Barrett, 2007). Considering the numerous barriers that limit access to evidence-based mental health services (e.g., cost, transportation, time constraints, stigma; e.g., Boydell, Hodgins, Pignatiello, Teshima, Edwards, & Willis, 2014), there is a growing interest in developing and using technology based tools (e.g., Internet, Smartphones, Tablets, Video Games), that provide the opportunity to overcome these obstacles and increase access to and engagement with these effective mental health services (e.g., Boydell et al., 2014). To date, developments in the field of Information and Communication Technologies (ICTs) proved their utility in improving psychological interventions and in promoting psychological well-being. For example, recent meta-analysis showed the efficacy of Internet and Computer-based interventions (e.g., Andersson & Cuijpers, 2009), Mobile-based interventions (i.e., via smartphones or tablets; e.g., Donker, Petrie, Proudfoot, Clarke, Birch, & Christensen, 2013) and Game-based interventions (e.g., Li, Theng, & Foo, 2014; David, Mogoase, Costescu, & Sucală, *Manuscript submitted for publication*) for the treatment of various psychological difficulties. Therefore, one of the most suitable strategies for increasing access to evidence-based mental health services is to utilize these recent technological advancements.

With regard to children and adolescents it is well known that they are early adopters and major users of technology based tools (e.g., O'Keeffe & Clarke-Pearson, 2011). Especially, among this population there is a rapid growth in the use of mobile devices (i.e., smartphones) and tablets as accessible, attractive, portable and multifunctional tools. Thus, the ubiquitous nature of these devices, as well as their increasing functionality make them a very promising tool for increasing access to and engagement with mental health services for children and adolescents. Preliminary data suggest that smartphone or tablet delivered interventions significantly reduce symptoms of depression, anxiety, substance use and general distress in children and adolescents (Donker et al., 2013; Harrison, Proudfoot, Wee, Parker, Pavlovic, & Manicavasagar, 2011).

Furthermore, considering that playing video games is one of the most common form of entertainment among children and adolescents (Granic, Lobel, & Engels, 2014; McFarlane, Sparrowhawk, & Heald, 2002), a growing number of therapeutic video games were recently developed to help them when confronting with mental health difficulties (e.g., Coyle, Doherty, and Sharry, 2009 - *Personal Investigator*; Merry, Stasiak, Shepherd, Frampton, Fleming & Lucassen, 2012 - *SPARX*). Briefly, therapeutic video games can be defined as entertaining video games with therapeutic goals (Ceranoglu, 2010). To date, there are few studies (e.g., Merry et al., 2012) showing that therapeutic video games can be effective in promoting mental health.

However, while it is well known that children and adolescents are very active users of mobile devices and tablets (Donker et al., 2013), as well as great fans of video games (McFarlane, Sparrowhawk, & Heald, 2002), to date very few therapeutic online games adapted for tablets and smartphones exists for promoting emotional resilience in this population. Moreover, most of them are not developed according to evidence-based psychological protocols, lack scientific evidence about their efficacy and can be used only within therapy sessions.

Against this background, the *REThink* platform aims at using online gaming for coaching emotion regulation in children and adolescents based on the principles of REBT/REBC, a well-established empirically supported therapy (Ellis, 1962; Trip, Vernon, & McMahan, 2007). Specifically, we designed and developed a therapeutic online videogame adapted for tablets that can be used as a standalone application for coaching this age category to learn healthy strategies to cope with dysfunctional negative emotions such as anxiety and anger. The game is based on the RETMAN cartoon character, developed at the Albert Ellis Institute, USA (Merrieffield & Merrieffield, 1979) to make REBT principles more accessible and attractive among children and adolescents.

We suggest that therapeutic video games adapted for tablets and smartphones could offer important resources for guiding children and adolescents to develop their emotion regulation abilities, like emotional understanding. Considering the

novelty of this application, as well as the fact that it is still under development and improvement, we suggest that an important first step is to test its effectiveness in facilitating emotional understanding in children and adolescents (i.e., in game-based learning) and further investigate how these in-game acquired skills transfer to real-life situations. Thus, the objective of the current pilot study is to investigate if the *Feeling Better* mini video game, part of the *REThink* therapeutic online platform as a resource activity can be used to improve children's and adolescents' ability to learn the distinction between functional and dysfunctional negative emotions in the therapeutic video game environment.

Method

Participants

Twenty-five children and adolescents, aged between 10 to 16 years (9 females and 16 males; $M_{age} = 13.4$; $SD = 0.70$), were recruited based on volunteering from one middle school, from a small urban community. Three participants were excluded due to errors in scores registering. The parents of all children and adolescents were asked to provide an informed consent for their children to participate in the present study. The study was approved by the Institutional Review Board of Babeş-Bolyai University.

Intervention

The *Feeling Better* mini video game is part of the *REThink* therapeutic online platform as a resource activity and aims to promote emotional understanding in children and adolescents by teaching them the distinction between functional and dysfunctional negative emotions. The participant selects a character and undertakes a flying challenge by tapping on the tablet touchscreen to maintain the character in the air and collect functional emotions written on balloons of different colors, while avoid dysfunctional emotions and other obstacles (see *Figure 1*). If the participant collects a dysfunctional emotion the player has lost a bid and has to press retry to play again. Emotion understanding is indexed by the amount of acquired points for correctly collecting functional emotions.

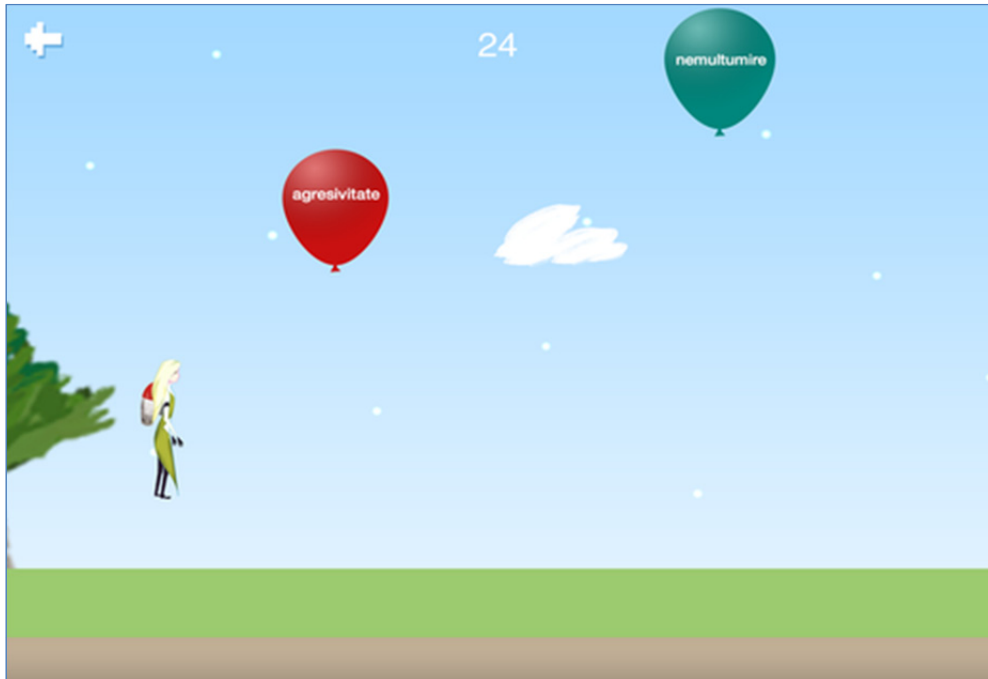


Figure 1. The character in the air collecting functional emotions written on balloons of different colors.

Procedure

The *Feeling Better* mini video game was delivered during one session of 30 minutes in a group setting (i.e., 4 participants at a time). The session consisted of 7 trials in which each participant played the *Feeling Better* video game on an Apple iPad Air 2. First, a licensed clinical psychologist gave a brief presentation of the REBT/ REBC principles and game instructions, which was followed by the 7 trials session. Further, they were asked to start playing the game. Finally, participants were debriefed and thanked for their participation.

Data Analysis

The assumption of normality was assessed using a Kolmogorov-Smirnov test (Chakravart, Laha, and Roy, 1967). Since our data was not normally distributed a non-parametric Friedman test of differences among repeated measures was conducted to analyze whether there is significant change in the amount of acquired points over the 7 trials. Also, to identify where the specific differences lie we conducted a series of Wilcoxon signed-rank tests, with a Bonferroni correction applied for multiple comparisons.

Results

A Kolmogorov-Smirnov test was used to test for normality. Assumptions of normal distribution were not fulfilled, acquired points for collecting functional emotions deviate significantly from normal in all 7 trials (p range from 0.001 to 0.017), and therefore a non-parametric Friedman test of differences among repeated measures was conducted. The acquired points for collecting functional emotions significantly changed over the seven trials, $\chi^2(6) = 15.048$, $p < .05$. Median and Interquartile Range for all trials are shown in *Table 1*.

Table 1. Median and Interquartile Range

	<i>Median</i>	<i>IQR</i>
<i>Trial 1</i>	0	0
<i>Trial 2</i>	2,5	9
<i>Trial 3</i>	4	7.25
<i>Trial 4</i>	2,5	5.75
<i>Trial 5</i>	3	4
<i>Trial 6</i>	2,5	5.25
<i>Trial 7</i>	2	2.25

Note. *IQR* = Interquartile Range

Follow-up pairwise comparisons were conducted using a Wilcoxon signed-rank tests, with a Bonferroni correction applied, resulting in a significance level of $p < 0.002$. It appeared that acquired points participants' performance for collecting functional emotions significantly increased from Trial 1 to Trial 3 ($Z = -3.178$, $p = 0.001$, $r = -0.677$), indicating a better performance in emotional understanding after three trials. There were no other significant changes between trials, however visual inspection of medians showed a decrease in acquired points from Trial 3 to Trial 7 (see Figure 3).

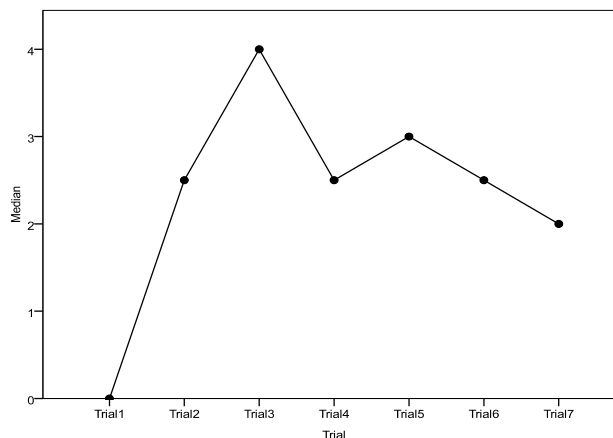


Figure 2. Changes in acquired points for collecting functional emotions over the seven trials.

Discussion

In the current study we examined if the *Feeling Better* mini video game, part of the *REThink* therapeutic online platform as a resource activity, can be used to improve children and adolescents' ability to learn the distinction between functional and dysfunctional negative emotions in the therapeutic video game context. The *Feeling Better* video game has been shown to facilitate in-game emotional understanding, children and adolescents indicating a significant increase in their ability to correctly collect functional emotions after three trials of playing this game. Even though non-significant, our results also showed a decrease in children and adolescents' performance after trial 3. One possible explanation for this result may be that the participants acquired skills rapidly and a ceiling effect was attained after playing three trials. This suggests that a three trials sequence of the game may be sufficient for coaching emotional skills in children and adolescents.

Current findings offer preliminary evidence suggesting that therapeutic video games adapted for tablets and smartphones can be a useful tool in improving emotion regulation skills in children and adolescents in the therapeutic video game environment, a necessary first step to further transfer these skills to real life situations. Our results support and extend other findings related to the usefulness of therapeutic video games in promoting mental health (e.g., Merry et al., 2012). The innovative nature of this study is reflected in the fact that it bridges together the attractiveness of online video games and the increasingly accessibility and functionality of mobile phones and tablets with principles from a well-supported psychological intervention (i.e., REBT) in coaching emotional skills in children and adolescents. Also, our results point towards the potential of therapeutic online video games as suitable supports for making evidence-based coaching interventions more accessible for this population. We believe that this may be especially due to a series of advantages that online video games entail. Specifically, they are a ubiquitous part of children and adolescents entertainment (Gentile & Walsh, 2002) and offer a complex and attractive environment. Moreover, one of the biggest advantage is the potential to incorporate and deliver evidence-based principles in an interactive (i.e., responsive, adaptable, individualized) and playful manner that facilitate engagement from users. In addition, therapeutic video games can be used as standalone applications both for prevention purposes and/or as an effective adjunct to therapeutic interventions. These aspects are particularly important considering that engaging and maintaining this age category in the therapeutic or coaching process may be a very challenging task for professionals (Crenshaw, 2008).

Our study has a few notable limitations. One of the most important limitations of the present study is that it is not clear if the in-game learning effects the participants showed does indeed transfer outside the therapeutic video game. Future studies (in preparation) should incorporate some other measures (e.g., self-

reports, emotion identification tests) to assess if children and adolescents' in-game skills improvements translate into real-life situations. Also, it is possible that in the game environment children and adolescents learned that one emotion is functional (e.g., worry) and collected it repeatedly, still not learning the distinction between functional and dysfunctional emotions. Thus, expanding emotion understanding assessment will address this limitation as well, clarifying if they conceptually learned this distinction. Another important limitation is the lack of a control group and the small sample size (N=22) that was underpowered to detect some of the outcome effects. Future studies will be needed to investigate the efficacy and effectiveness of the *REThink* therapeutic online platform using larger samples and a control group. Finally, while the game was developed to be attractive and enjoyable, it is not clear why children and adolescents' performance decreased after three trials and what percentage of them would have played to completion without being prompted. It is possible that making the game more challenging would have enhanced its usefulness.

Despite these limitations, the present endeavor represents a first pilot study suggesting that therapeutic video games may be a useful tool for coaching emotion understanding in children and adolescents in the therapeutic video game context. Moreover, therapeutic video games adapted for tablets and smartphones hold promise to increase children and adolescents access to and engagement with evidence-based mental health services. In conclusion, our results point towards the potential that therapeutic online video games adapted for tablets and smartphones can have as standalone, very accessible and interactive interventions for coaching emotional skills in children and adolescents.

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Contributions: The 1st author contributed to the design of the study, data analysis, interpretation of data, and manuscript writing; the 2nd author brought contributions to the design of the study, data collection, data analysis, interpretation of data, and manuscript writing; the 3rd author brought contributions to the design of the study, data analysis, interpretation of data, and manuscript writing.

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