

RICKY AND THE SPIDER – A VIDEO GAME TO SUPPORT COGNITIVE BEHAVIOURAL TREATMENT
OF CHILDREN WITH OBSESSIVE-COMPULSIVE DISORDER

Veronika Brezinka

Abstract

Objective: Paediatric obsessive-compulsive disorder (OCD) is a chronic condition with lifetime prevalence estimates of 1% to 3%. It is often associated with severe disruptions of family functioning and impairment of peer relationships as well as academic performance. The OCD Expert Consensus Guidelines for treating childhood obsessive compulsive disorder recommend cognitive behaviour therapy (CBT) as the first-line treatment of choice for prepubescent children. However, availability of cognitive behaviour therapy for paediatric obsessive compulsive disorder in the community is scarce. Moreover, there is a lack of treatment approaches specifically designed for younger children who suffer from obsessive compulsive disorder.

Method: In order to enhance dissemination of empirically supported treatments, the therapeutic video game Ricky and the Spider (www.rickyandthespider.uzh.ch) was developed for children between the ages of 6 and 12 who suffer from obsessive compulsive disorder. The game is not a self-help game and should be played under the guidance of a therapist. It offers a child-friendly metaphor to understand obsessive compulsive disorder and the cognitive-behavioural treatment approach by incorporating the following elements: psycho-education, the cognitive model of obsessive compulsive disorder, creating a symptom hierarchy, the use of externalizing techniques to cope with anxiety and unpleasant feelings, and exposure - response prevention exercises. The game exists in German and English.

Results: Ricky and the Spider is available since January 2012 and, up to now, has been purchased by 56 child psychiatric institutions or practitioners in Switzerland, Germany and Austria. In a preliminary evaluation, 13 therapists conveyed data of 18 children with a diagnosis of obsessive compulsive disorder in whose therapy the game was used. According to their therapists, all children had enjoyed playing the game during therapy. Therapists perceived the game as helpful for the explanation of important CBT concepts and to enhance child motivation for therapy. OCD was judged as remarkably less severe in the case of fifteen children and as unchanged in one child. All 15 children who answered the questionnaire reported being satisfied their therapist had used Ricky and the Spider during treatment, and they all appreciated the game as helpful to understand their OCD. A clear limitation of the data is the small number and the lack of a control group.

Conclusions: Preliminary data on the applicability and appropriateness of Ricky and the Spider show that the game seems to be well accepted by young children affected with obsessive compulsive disorder. Moreover, therapists perceive the game as helpful for the explanation of the CBT treatment approach for OCD and to enhance child motivation for treatment. However, Ricky and the Spider is only a therapeutic tool and cannot replace the therapist. As children and adolescents with obsessive compulsive disorder have a heightened risk for clinically significant psychiatric and psychosocial problems as adults, intervening early offers an important opportunity to prevent the development of long-standing problem behaviours.

Key words: paediatric OCD, therapeutic video game, cognitive behaviour therapy, exposure with response prevention

Declaration of interest: none

Veronika Brezinka, Ph.D.
Department of Child and Adolescent Psychiatry

Corresponding author

Veronika Brezinka University of Zurich, Zurich, Switzerland
E-mail: veronika.brezinka@ppkj.uzh.ch

Introduction

Paediatric obsessive compulsive disorder (OCD) is a chronic condition with lifetime prevalence estimates ranging from 2% to 4% (Geller 2006, Zohar 1999). The disorder is often associated with severe disruptions of family functioning (Renshaw et al. 2005) and

impairment of peer relationships as well as academic performance (Barrett et al. 2005). Mean age of onset of juvenile OCD is 10.3 years, with a range from 7.5 to 12.5 years (Geller 2006). However, reports on young children with OCD show that the disorder can manifest itself at an earlier age - in a sample of 58 children, mean age of onset was 4.95 years (Garcia et al. 2009, see also

Freeman et al. 2008).

Symptom expression and clinical features of paediatric OCD seem to be quite similar to manifestations of the disease later in life, although there is some evidence of developmental variability. In the study of Geller and colleagues (2001), religious obsessions were more frequent in adolescents, whereas fears of catastrophic events were the most common obsessions in the paediatric age group. In their sample of young children with OCD, Garcia and colleagues (2009) observed contamination and aggressive/catastrophic obsessions and washing and checking compulsions most frequently. Likewise, Mancebo and colleagues (2008) found a remarkably similar phenomenology of juvenile OCD across the lifespan in a cross-sectional study of 20 children, 44 adolescents and 193 adults with OCD. Regardless of age at presentation, patients reported similar types of obsessions and compulsions. In children, the most common obsessions were responsibility for harm, contamination and symmetry, whereas the most common compulsions included checking, repeating and ordering rituals. Finally, in an Italian study of 257 children with OCD, patients with OCD-onset before 12 years of age did not differ with those with a later onset concerning OCD severity, symptomatology or functional impairment (Masi et al. 2010).

Both an earlier age of onset and a longer duration of illness have been associated with increased persistence of OCD. In a meta-analysis on the long-term outcome of obsessive-compulsive disorder with onset in childhood or adolescence, Stewart and colleagues (2004) reviewed sixteen study samples with in total 521 participants. Pooled mean persistence rate for full OCD was 41%. Earlier age of OCD onset, increased OCD duration and in-patient vs. out-patient status predicted greater persistence. Moreover, comorbid psychiatric illness and poor initial treatment response were poor prognostic factors. A similar persistence rate of 41% was found by Micali and colleagues (2010) in a follow-up study of 142 children and adolescents with OCD. The main predictor for persistent OCD was duration of illness at assessment, which underlines that early recognition and treatment of the disorder is crucial to prevent chronicity. Paediatric OCD also shows high rates of comorbidity with up to 74% of affected children having at least one comorbid diagnosis (Storch et al. 2008, Garcia et al. 2009). In the study of Storch and colleagues (2008), the number of comorbid conditions was negatively related to outcome. Especially the presence of externalizing disorders (ADHD and disruptive behaviour disorders) was predictive of poorer treatment response rates (see also Masi et al. 2010, Storch et al. 2010). In a sample of 56 children between 10 and 17 years of age and with a diagnosis of obsessive compulsive disorder, comorbid depression was associated with more extensive OCD symptomatology, higher family conflict and more social problems (Canavera et al. 2010).

As to the treatment of OCD, cognitive-behaviour therapy (CBT) based on exposure and response prevention is considered the best available treatment for adults (Foa et al. 1983, Abramowitz 1997, Franklin et al. 2000) as well as for children (Abramowitz et al. 2005, Geller 2006). The OCD Expert Consensus Guidelines for treating childhood OCD recommend CBT as the first-line treatment of choice for prepubescent children (King et al. 1998). The Pediatric OCD Treatment Study (POTS), a randomized controlled trial with 112 children and adolescents with OCD (March and Foa 2004) investigated the relative and combined efficacy of OCD-specific behaviour therapy or medication

with a serotonin reuptake inhibitor (SRI) as initial treatment for OCD. Patients treated with CBT alone or in combination with medication showed a remarkably higher probability of improvement, leading to the recommendation that children and adolescents with OCD should begin treatment with CBT alone or with CBT plus an SRI. However, availability of CBT for paediatric OCD in the community is scarce (March and Benton 2007, Marrs Garcia et al. 2010), and because SRI pharmacotherapy is the most widely available, it is also the most widely employed treatment for OCD (Abramowitz et al. 2005, Freeman et al. 2009). Yet, for children under 8 years of age few medications are approved and there is a lack of controlled studies for that age group (Abramowitz et al. 2005). Moreover, in order to enable early treatment and prevent chronicity, developmentally appropriate treatments tailored to the specific needs and concerns of younger children are required (Freeman et al. 2007). The need for dissemination of CBT is further underlined by the fact that antipsychotic medications are increasingly being prescribed as an augmenting agent in paediatric OCD patients (Cooper et al. 2006, Storch et al. 2010). Last but not least, when seeking community care many children with OCD still seem to receive trials of non-evidence-based psychotherapy, which stresses the critical need for dissemination of evidence-based treatments such as CBT for OCD (Storch et al. 2007, Storch et al. 2010).

In order to enhance dissemination of the CBT-treatment-approach for paediatric OCD, a therapeutic video game specifically directed at children with OCD seemed an appropriate medium. No child therapist can ignore how fascinated children are by computers and video games, yet only few initiatives make use of this fascination for psychotherapy. In 2008, the Department of Child and Adolescent Psychiatry of the University of Zurich released the therapeutic video game *Treasure Hunt* (www.treasurehunt.uzh.ch) to support cognitive-behavioural treatment of children with various disorders (Brezinka 2008). *Treasure Hunt* can be described as a broadband-CBT-game covering issues that are relevant in the treatment of various disorders, with each level of the game corresponding to a certain step in cognitive-behavioural treatment. The game is available in English, German, Dutch and Greek and counts more than 2100 professional users (child psychiatrists and clinical child psychologists) from 38 countries. Data of 218 children who played *Treasure Hunt* in psychotherapy showed that the vast majority of children reported being satisfied their therapist had used the game during treatment. Moreover, the 42 therapists taking part in the study judged the game as helpful for the explanation of CBT concepts as well as for the enhancement of child motivation for psychotherapy (Brezinka 2012). With this positive feedback in mind, a therapeutic video game was judged an appropriate means to enhance dissemination of the CBT-treatment-approach for young children with OCD. Accordingly, the therapeutic video game *Ricky and the Spider* (www.rickyandthespider.uzh.ch) was specifically developed for children between the ages of 6 and 12 who suffer from OCD.

Objectives and Methodology

The purpose of *Ricky and the Spider* is to encourage children and their therapists to fight OCD with CBT-strategies and thus enhance the dissemination of evidence-based treatment strategies in the community. *Ricky and the Spider* contains various elements of

cognitive behaviour therapy that are based on CBT treatment approaches for children (March and Muelle 1994, Piacentini et al. 2007) as well as adults with obsessive-compulsive disorder (Foa et al. 1983, Salkovskis 1999). The game is not a self-help game and should be played under the guidance of a therapist. It offers a child-friendly metaphor to understand obsessive-compulsive disorder and the CBT treatment approach by incorporating the following elements: psycho-education, the cognitive model of OCD, the use of externalizing techniques to cope with anxiety and unpleasant feelings, creating a symptom hierarchy, and exposure with response prevention exercises. *Ricky and the Spider* is a 3D-adventure game programmed with Actionscript. It exists in English and German, in both PC and Mac versions.

Story and therapeutic content

Ricky and the Spider takes place in a field. Ricky the Grasshopper and Lisa the Ladybug are very unhappy. For a certain time now a Spider has been living in their neighbourhood and has been putting specific demands on insects living there. As a result, Ricky can only hop through the fields if he hops in a distinct pattern. As for Lisa, she has to count all her polka dots before she falls asleep each night. The Spider frightens the insects by threatening them that horrible things will happen if they do not follow her orders. That is why they carry out her orders and get further and further entwined in the web of obsessive-compulsive disorder. One day, Ricky is so confused that he decides to ask Dr. Owl for advice. Dr. Owl is to be well trusted with Ricky's problem but first he must find a child that understands and that is willing to help him...

The core elements of cognitive behaviour therapy for patients with obsessive-compulsive disorder consist of psycho-education, externalizing techniques and exposure with response prevention. These elements are integrated in *Ricky and the Spider* in the following ways:

Level 1 – The subtle beginnings of the disorder

Ricky and Lisa tell about the subtle beginnings of their disorder and how they follow orders because of the fear that the Spider generates. Ricky realizes that he is being pulled further and further into the Spider's web of OCD and decides to ask Dr. Owl for help.

Level 2 – The concept of a thought filter

The Spider wields such power over the insects because she successfully frightens them. In accordance with Salkovskis' (1999) cognitive model of OCD, Dr. Owl compares our stream of thoughts to a brook. Things that don't belong in the water are filtered out thanks to a grate. In our stream of thoughts, there is a thought filter that prevents absurd thoughts from passing through. Unfortunately, the Spider has damaged Ricky's and Lisa's thought filters and they are aware of every absurd thought, while others can ignore them.

Level 3 – Tools that help fight OCD, externalizing strategies

In their fight against the Spider, Ricky and Lisa need four things: to be kind to themselves, the courage to change, patience and a helper. A four-leaf clover represents these four strategies and returns in later levels, where the child has to find out which help

strategy is best suited. As an externalizing technique, Dr. Owl encourages the friends to come up with silly nicknames for the Spider.

Level 4 - Creating the compulsion map

Ricky and Lisa need to gather all of the different things that the Spider forces them to do and rate the difficulty of not obeying the Spider's orders (1= very easy, 10 = very difficult). Because they need courage to confront the Spider, these exercises on the compulsion map are called 'courage tasks'. The child also needs to make a compulsion map with courage tasks to complete.

Level 5 - First exposure task

After having helped the two friends to simplify some of their courage tasks, Dr. Owl instructs them to carry out the easiest of the tasks. Lisa is eager to be the first to try and Ricky follows her for better or worse... Dr. Owl encourages the child to practice his or her easiest courage task several times a day.

Level 6 - Further exposure tasks

Lisa receives additional courage tasks and is encouraged by Ricky and the child to not give up in their fight against the Spider. Dr. Owl warns that the friends should not rush ahead to the next courage task before completely having mastered the previous task.

Level 7 - Further exposure tasks

Ricky receives additional courage tasks. As he hesitates and tries to put them off, Lisa and the child help motivate him to continue by using the four-leaf clover as support.

Level 8 - Presentation of the certificate

To congratulate Ricky and Lisa for their hard work, Dr. Owl presents them with a certificate. This certificate describes everything that they have learned. The child also receives a certificate that states that he or she may ask for help at any time, when needed.

In each level, the treatment concept is explained. After the first four levels, which deal with psycho-education, an interactive worksheet has to be solved by the child. A similar worksheet can be downloaded from the website as a homework assignment. As of level five the therapeutic homework consists of carrying out individual exposure tasks, called 'courage tasks' in the game. How and when to approach this part of the therapeutic homework can only be determined by the therapist in collaboration with the parents. No more than one level should be completed per therapy session. Working through a level takes approximately 15 minutes. Each level is relatively short, however, compact in terms of content. It is recommended to look at the level together and then let the child recount the content of that level.

In order to evaluate the applicability and appropriateness of *Ricky and the Spider*, all users received an e-mail inquiring after their willingness to participate in the evaluation of the game.

Those who consented received two questionnaires by email, one for the child and one for the therapist, which were to be completed at the end of treatment. The questionnaire for the therapist inquired after the treatment setting, the therapeutic orientation and the length of professional experience, if and how the therapist felt supported by the game, the length of treatment as

well as OCD severity before and after treatment. The questionnaire for the child inquired about gender and age, whether the child had appreciated *Ricky and the Spider*, which level was judged the favourite and which the most difficult one, what the child had learned from the game, whether he / she had told parents about the game, whether he / she had suggestions for new tasks and whether OCD had gotten better after treatment.

Results

Data on the applicability and appropriateness of *Ricky and the Spider* reported here have clear limitations - the lack of a control group and the fact that, up to now, data are available only for a small number of patients. Moreover, a positive bias cannot be excluded, as therapists with a positive attitude towards therapeutic computer games may have been more likely to download *Ricky and the Spider* and participate in the evaluation of the game. Thus, reported data should be seen as preliminary.

Ricky and the Spider is available since January 2012 and, up to now, has been purchased by 56 child psychiatric institutions or practitioners in Switzerland, Germany, Austria and Belgium. From these 56 users, nine represent child psychiatry departments at a general hospital, children's hospital or a university. The other 47 users are child psychiatrists or child psychologists working in a private practice. Twenty-two of the 56 users answered the first email. Of these, ten had not used the game yet and said they had purchased it in case they would get a patient with OCD. Finally, thirteen therapists completed questionnaires concerning eighteen children with obsessive compulsive disorder in whose treatment *Ricky and the Spider* had been used. Fifteen of these eighteen children answered the corresponding child questionnaire. As to the remaining three children, therapists reported that their treatment had already ended before they were able to give them the questionnaire, which means that therapists implemented the game immediately after its release in January 2012. However, as therapist questionnaires on these three children were complete, it was decided to include them in the sample.

Client characteristics: The eighteen children were ten boys and eight girls. The youngest was six, the oldest was thirteen years old. Mean age was 9.94 years (SD 1.83). Twelve children received treatment in a child psychiatry department; of these, two stayed at an in-patient ward whereas ten received ambulatory care. Six children received treatment in a private practice of a child psychiatrist or psychologist. For 14 children, IQ-data were at hand, whereas for four children, no IQ-test was available. However, these children were judged as average intelligent by their therapist. IQ-data were grouped into three categories - below average (< 85), average (between 85 and 115) and above average (above 115). Distribution of IQs was average (between 85 and 115) for eleven and above average (> 115) for seven children. The seven children with an IQ above average had all undergone IQ-testing. All children had a diagnosis of obsessive-compulsive disorder. For 13 children, diagnosis had been established by means of the CY-BOCS (Scahill et al. 1997), whereas for five children a clinical interview had been used. Although the CY-BOCS is internationally recognized as representing the gold standard for establishing a diagnosis of obsessive-compulsive disorder in children, it is not always implemented outside university departments or by clinicians in the field. For the same

reason, CY-BOCS scores at start of treatment are only available for ten children; the mean score was 21.70 which lies above the score of 16 defined as clinically meaningful (Scahill et al. 1997). Sixteen children did not receive medication, whereas for two children an SRI was prescribed. As to comorbidity, seven children did not have another psychiatric disorder, whereas eleven children did. Of these, three were diagnosed with a comorbid anxiety disorder, two with a chronic tic disorder, two with a depressive episode, one with an adaptation disorder, two with an attention deficit hyperactivity disorder and one with a disruptive behaviour disorder.

Client feedback. Of the 15 children who completed the child questionnaire, all reported being satisfied their therapist had used *Ricky and the Spider* during treatment. They all appreciated the story of *Ricky and the Spider* as helpful to understand their own obsessive-compulsive disorder. Moreover, all children declared that their OCD had become considerably better after treatment. All children had told their parents about the game and reported thinking of the game after the end of treatment. The favourite level of most of the children (46.7 %) was Level 2 in which the concept of the thought filter is explained and where the Spider can be seen damaging a thought filter.

Therapist characteristics. Of the thirteen therapists, two were licensed child psychiatrists and eleven licensed clinical psychologists. Eleven worked in Switzerland and two in Germany. Mean years of experience in working with children was 16 years (SD 10.5), with a range from two to 28 years. Nine therapists said they mainly work with a CBT-framework, whereas this was only incidentally the case for four therapists. Six therapists (among them the two child psychiatrists) worked in a private practice, the remaining seven, who were all clinical psychologists, worked in three child psychiatry departments.

Therapist feedback. According to their therapists, all eighteen children had liked playing the game during treatment. Therapists were also asked in which way they perceived *Ricky and the Spider* as helpful for the particular child in treatment. Multiple answers were allowed. The most frequent answer (n = 18, 100%) was the explanation of important CBT concepts, followed by the enhancement of child motivation for therapy (n = 14, 77.8 %). In the case of seven children, therapists also reported they had used the game to explain the CBT-treatment approach to parents. Mean length of treatment for the 18 children was 17 sessions with a range from 5 to 40 sessions. Therapists had given the homework assignments included in the game to 16 of the 18 children. As to treatment outcome, therapists judged the obsessive compulsive disorder as remarkably less severe in 17 cases and as unchanged in one case. This was a girl with a comorbid disruptive behaviour disorder that stayed at an in-patient ward of a child psychiatry department for eight months without any progress. She also received medication with an SRI.

Conclusion

CBT is the recommended treatment for paediatric obsessive compulsive disorder (March and Foa 2004). However, availability of CBT in the community is scarce (Marrs Garcia et al. 2010). In order to enhance dissemination of the CBT-treatment-approach for young children affected with obsessive-compulsive disorder, the video game *Ricky and the Spider* was developed as a therapeutic tool to support therapists in their treatment

of young children with the disorder and to encourage children to fight their obsessive compulsive disorder with CBT strategies.

As children and adolescents with obsessive compulsive disorder have a heightened risk for clinically significant psychiatric and psychosocial problems as adults, intervening early offers an important opportunity to prevent the development of long-standing problem behaviours (Freeman et al. 2007). Preliminary findings of eighteen children with obsessive-compulsive disorder in whose treatment *Ricky and the Spider* was used show that all children appreciated the game. Therapists judged the game as helpful for the explanation of important CBT-concepts and to enhance treatment motivation of the child. Moreover, in 17 of the 18 children, the obsessive-compulsive disorder was judged as considerably less severe after treatment by the therapists.

The data reported here have several limitations. First, 18 is only a small number of patients. Second, there is no control group of children in whose therapy the game was not used. Third, a positive bias cannot be excluded, as therapists with a positive attitude towards therapeutic computer games may have been more likely to purchase *Ricky and the Spider* and participate in the evaluation of the game. Therefore, data reported here can only be seen as a pilot evaluation. Moreover, it should be kept in mind that *Ricky and the Spider* is a therapeutic tool, but cannot replace the therapist. Although exposure with response prevention, the essential element of the CBT-treatment-approach for obsessive-compulsive disorder, is integrated into the game, it remains the task of the therapist to encourage the child to practice his / her exposure exercises regularly. Likewise, progress in the game from Level 5 onwards depends on feedback of the parents on the child's motivation to perform exposure exercises as homework assignments. Thus, a regular exchange between parents and the therapist is absolutely necessary for treatment to be successful. This also holds for the important topic of family accommodation to OCD symptoms that is not targeted in the game. Many parents of children with OCD seem to accommodate and even participate in rituals of the affected child (Renshaw et al. 2005). However, family accommodation is reported to be detrimental for patients with OCD because it further reinforces OCD symptoms and avoidance behaviour, thus enhancing stress and anxiety (Renshaw et al. 2005, Freeman et al. 2008). Due to financial restraints, parents or siblings are not mentioned in *Ricky and the Spider*. However, the importance of a helper is continuously underlined. It remains the task of the therapist to address the important issue of family accommodation with the parents and help them reduce adaptation to the child's rituals.

In recent years, several publications have focused on predictors of response to CBT for obsessive-compulsive disorder (Storch et al. 2008, Canavera et al. 2010). Absence of comorbid disorders and good insight are reported to increase a positive CBT outcome, whereas presence of comorbidities such as major depressive disorder, anxiety disorder or disruptive behaviour disorders seems to limit treatment response in afflicted children (Geller 2006). This may be a reason why antipsychotic medication is increasingly being prescribed as an augmenting agent in children with obsessive-compulsive disorder (Storch et al. 2010). Yet, it should be kept in mind that CBT is an empirically supported treatment for both anxiety disorders as well as disruptive behaviour disorders in children and adolescents (Kazdin 1993, Weisz et al. 1995, Kazdin and Wassell 2000, Weisz et al. 2006). Therefore, the

reason for an unfavourable response to treatment with CBT might also lie in the fact that comorbidity was not diagnosed at time and that treatment of OCD started before treating a comorbid disruptive behaviour disorder or anxiety disorder, which should be treated first in order to enhance patient compliance as well as tolerance of anxiety provoking situations. Especially in the case of comorbid disruptive behaviour disorder, parent management training, one of the oldest and most effective cognitive-behavioural treatment approaches (Patterson 1968, Webster-Stratton 1984, Chambless and Hollon 1998) should be implemented first in order to increase child compliance, minimize family accommodation to OCD symptoms and increase homework compliance (see also Storch et al. 2010).

As to therapeutic video games, up to now rather little use is made of them in the field of child psychotherapy, although video games are a normal part of life for millions of children. It seems time to acknowledge that psychotherapy of children and adolescents is an area in which innovative use of computers in the form of therapeutic video games may increase a child's or an adolescent's motivation for therapy and offer new ways of treatment. Therapeutic video games have the potential to enhance child compliance, offer attractive work assignments, structure therapy sessions and support treatment of migrant children who could play the games in their own language and share their content with parents and siblings (Brezinka 2010, Ceranoglu 2010). Last but not least, video games incorporating evidence-based treatment approaches may enhance dissemination of these approaches in the community, one of the purposes of *Ricky and the Spider*.

It is important to underline, however, that therapeutic computer games cannot replace child psychotherapy. In fact, therapeutic video games will show their maximum potential only under the guidance of a therapist who can explain and comment on the concepts introduced in the game. Only then a meaningful change will take place. Moreover, cognitive-behavioural treatment of children always warrants regular sessions with the parents. In the case of OCD, important issues to discuss are ways of reducing family conflict and family accommodation to OCD symptoms, feedback on exposure with response prevention exercises as well as reinforcement of desired behaviour. The many different tasks of a behaviour therapist may be alleviated by a therapeutic video game, but cannot replace the importance of a positive and long-standing relationship with the child and its family.

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