BABEȘ-BOLYAI UNIVERSITY
FACULTY OF PSYCHOLOGY AND EDUCATIONAL SCIENCES
DOCTORAL SCHOOL "EVIDENCE-BASED ASSESSMENT AND PSYCHOLOGICAL INTERVENTIONS"

Ph.D. THESIS SUMMARY

TRANSDIAGNOSTIC INTERVENTIONS FACILITATED THROUGH TECHNOLOGY

AUTHOR: Ph.D. CANDIDATE PĂSĂRELU COSTINA -RUXANDRA
SCIENTIFIC ADVISOR: PROFESSOR Ph.D. DOBREAN ANCA

CLUJ-NAPOCA
2016

ACKNOWLEDGEMENTS

I would like to express my gratitude to my scientific advisor: Professor Anca Dobrean, from Babeș-Bolyai University for her valuable scientific input, suggestions and support throughout this research. Special thanks to Professor Gerhard Andersson who inspired my interest in mental health treatments delivered via technology. My gratitude goes to Professor Daniel David, Associate Professor Oana David, Professor Aurora Szentagotai and to all the members from the Department of Clinical Psychology and Psychotherapy, Babeș-Bolyai University for their valuable suggestions, which contributed significantly to the quality of this thesis. Also, I would like to thank to my colleagues from the Doctoral School - Evidence-based Assessment and Psychological Interventions, Babeș-Bolyai University, for their friendship.

I would also like to thank to my family and to my friends for their unconditional support.

*Notes.*_____

(1) This is to certify by Păsărelu Costina - Ruxandra that:

(a) The thesis includes the original research work of Păsărelu Costina - Ruxandra (author) towards the Ph.D.;

(b) Parts of the thesis have been already published, are in press, or submitted for publication; appropriate citations for these publications were included in the thesis. Other co-authors have been included in the publications, if they contributed to the exposition of the published text, data interpretation etc. (their contribution was clearly explained in the footnotes of the thesis)

Păsărelu, C. R., Andersson, G., Bergman Nordgren, L., & Dobrean, A. (2016). Internet-delivered transdiagnostic and tailored cognitive behavioral therapy for anxiety and depression: a systematic review and meta-analysis of randomized controlled trials. *Cognitive Behaviour Therapy*, 1–28. https://doi.org/10.1080/16506073.2016.1231219

Păsărelu, C. R., Dobrean, A., Balazsi, R., Predescu, E., Şipos, R., & Lupu, V. (2016). The Penn State Worry Questionnaire for Children: Age, Gender and Clinical Invariance. *Child Psychiatry & Human Development*, 1–11. https://doi.org/10.1007/s10578-016-0663-2

Păsărelu, C. R., Dobrean, A., Predescu, E., Sipos, R., & Lupu, V. (2015). Intergenerational transmission of worry a transdiagnostic factor in child internalizing symptomatology. *Romanian Journal of Child & Adolescent Psychiatry*, *3*(1).

Păsărelu, C. R., și Dobrean, A. (in press). Parental involvement in remotely-delivered CBT interventions for anxiety problems in children and adolescents: a systematic review. In *New Acquisitions in Anxiety Disorders.* Intech Open Access Publisher, ISBN 978-953-51-4900-2.

(c) The thesis was written according to the academic standards (e.g. appropriate scientific acknowledgments and citations have been made in the text by the author of the thesis). All the text of the thesis and its summary was written by Păsărelu Costina - Ruxandra who assumes all the responsibility for the academic writing; also

- A software was used to check for the academic writing (see at http://plagiarism-detector.com); the thesis has passed the critical test;
- A copy of the research dataset/database was delivered at Department/Graduate School (electronic);
- Signature for certifying the Notes: Ph.D. candidate Păsărelu Costina – Ruxandra

(2) All the Tables and Figures are numbered within the corresponding chapter or subchapter of the thesis.

TABLE OF CONTENTS

Keywords: cognitive-behavioral therapy, transdiagnostic, comorbidity, technology enhanced, worry

CHAPTER I. THEORETICAL BACKGROUND

Anxiety and depressive disorders are two of the most prevalent mental health conditions, both in adults and children. In European countries, the prevalence of anxiety disorders is around 14 %, while the prevalence of major depressions is around 7 % (Wittchen et al., 2011). In youth populations, according to a meta-analysis on the worldwide prevalence of psychiatric conditions, the prevalence of any anxiety disorder is estimated at 6.5%, while the prevalence of any depressive disorder is around 2.5 % (Polanczyk, Salum, Sugaya, Caye, & Rohde, 2015).

Anxiety and depressive disorders often co-occur, as it is shown in a large epidemiologic study (Kessler et al., 2015) conducted with a sample of more than seventy four thousand participants. In youth populations comorbidity rates are also very common, as more than 95 % of the children with a diagnosis of depression also present one comorbid condition and approximately 80 % present two comorbid conditions (Biederman, Faraone, Mick, & Lelon, 1995). According to other estimates, up to 25 - 50% of youths with a diagnosis of depression also have anxiety disorders, while a smaller percentage of youths (10 - 15 %) with anxiety disorders present comorbid depression (Axelson & Birmaher, 2001).

According to a report on the burden of mental health problems in Europe, approximately two thirds of mentally ill patients are not receiving any treatment (Wittchen et al., 2011). In youth populations, almost 70 % of adolescents diagnosed with a psychiatric condition and approximately 50 % of youths diagnosed with more than one disorder do not receive treatment (Jörg et al., 2016).

Several potential explanations derived from World Health Organization World Mental Health Survey (Andrade et al., 2014) that have a direct influence on treatment help-seeking and receiving adequate mental health care could be the next:

- Many disorders remain underdiagnosed becoming chronic;
- Low perceived need for treatment;
- Shortage of mental health specialists;
- Financial issues;
- Availability of mental health services;
- Geographic distance (e.g., rural communities);
- Stigma;
- Lack of available treatments knowledge;
- Expectations/ attitudinal barriers.

Despite the existence of well-validated treatments for anxiety and depression, a large number of patients do not recover after receiving the gold standard treatment for their conditions (e.g., CBT). In fact, a high percentage of patients dropout treatments from various reasons, such as the type of disorder, treatment format, treatment setting, length of treatment, lack of satisfaction with the treatment, low treatment credibility (Fernandez, Salem, Swift, & Ramtahal, 2015; Wergeland et al., 2015).

In the "digital era" the fact that youth populations prefer to use technology it is not something new. However, despite focusing on how to use youths' appeal to technology environments in designing more effective mental health treatments, most of the prominent research has focused on the negative impact technology has on youths' lives, such as: problematic Facebook use

(Walburg, Mialhes, & Moncla, 2016), Internet addiction (Tsitsika et al., 2014), cyberbullying (Bottino, Bottino, Regina, Correia, & Ribeiro, 2015) or problematic gaming behaviors (Müller et al., 2015). Instead of focusing on the negative aspects of technology use, more research should be devoted to finding ways in which young peoples' positive attitudes towards technology and computer skills can be valued in mental health services.

Last three decades of developments in technology have come with great opportunities for physical and mental health services, both in adult and youth populations. In what regards the mental health domain, there are now available many modalities of treatments, such as: Internet, computerized, smartphones, apps, SMS, videoconferences, virtual reality, e-mails, games, social networking, websites and blogs. Aboujaoude and Salame (2016) conducted a review on the use of technology in young peoples' mental health and presented evidence for each of the included forms of treatment, as well as future directions. According to their review, incorporating technology in mental health practice is a promising approach that could be oriented in two major directions such as using technology-enabled interventions in order to increase compliance and symptom monitoring and using such interventions in case barriers related to costs or geographically disparities appear (Aboujaoude & Salame, 2016). Technology delivered treatments are appealing even in more severe cases, for example to participants with serious mental illness, where such interventions have the potential to improve engagement, a well-known major problem for this population, which has huge treatment dropout rates (Dixon, Holoshitz, & Nossel, 2016).

CHAPTER II. RESEARCH OBJECTIVES AND OVERALL METHODOLOGY

The present research aims to answer both to fundamental research questions but also to contribute to new developments in the applicative research, by taking into consideration innovations in the dissemination of evidence-based treatments. Implications of the six studies included in this research are large, both for the evidence-based assessments and for evidence-based treatments of anxiety and depressive disorders.

The general goal of this research was to integrate research coming from three distinct directions: (1) transdiagnostic approaches in mental health, (2) technological developments in mental health services, (3) evidence-based assessments and interventions for youths. Through the integration of these directions, we aim to contribute to theoretical and methodological advances in the assessment and treatment of youth internalizing disorders. A schematic overview of the studies is presented in *Figure 1*.

The first specific objective of our research was to quantitatively review existent research on transdiagnostic and individually-tailored CBT treatments delivered via technology. Namely, given the fast developments in technology and the rapid explosion of Internet delivered treatments, we conducted a meta-analysis regarding the efficacy of tailored and transidagnostic Internet delivered cognitive behavioral therapy (iCBT) interventions (Study 1).

The second specific objective of this research was to translate and adapt in Romanian one of the most frequently used instruments that assesses worry in children and adolescents. Therefore, this objective was pursued in Study 2, where we investigated the measurement invariance of the Romanian translation of the Penn State Worry Questionnaire for Children. Methodological aspects investigated in this study contribute to the domain of evidence-based assessments, as there is little research conducted on psychometric properties of instruments adapted from other languages. This can have major implications for research findings as potential biases in results can emerge unless measurement invariance of the instrument is established in the first place.

The third specific objective of this research was to investigate the transdiagnostic role of the intergenerational transmission of worry in children's internalizing problems (Study 3). In this study we aimed to contribute to the very heterogeneous literature existent on transdiagnostic factors involved in psychopathology. Further, we specifically investigate the contribution of parents in the transmission of this factor.

The fourth specific objective of this research was to investigate attitudes towards mental health treatments delivered through technology both in youths and in their caregivers. In the domain of evidence-based practice in psychology, patients' preferences play an important role along other variables related to research, clinician and patient. Also, attitudes towards treatment seem to influence engagement, drop-out rated and even treatment outcomes. Therefore, in Study 4 we investigated adolescents' and parents' views on technology based CBT interventions for youth mental health problems.

Given the fact that in the literature exists evidence for a transmission of mental health pathology from parents to offspring and that there is mixed evidence regarding the involvement of parents in youths treatment, we aimed to investigate whether parental involvement in remotely delivered interventions for children and adolescents is associated with improved outcomes. As a consequence, **the fifth specific objective** of this research was to qualitatively investigate the role of including parents in remote treatment for children and adolescents. Therefore, in Study 5 we conducted a systematic review of the literature and proposed a conceptual model for future developments in this area.

Finally, **the sixth specific objective** of this research was to investigate the efficacy of a transdiagnostic prevention program for anxiety and depression for adolescents, delivered in a school setting. Therefore, in Study 6 we tested the efficacy of a transdiagnostic prevention program based on a Rational Emotive and Behavioral Therapy protocol for anxiety and depression disorders in adolescents. This program was enhanced with technological elements, namely it was a cartoon-based prevention program (Study 6).

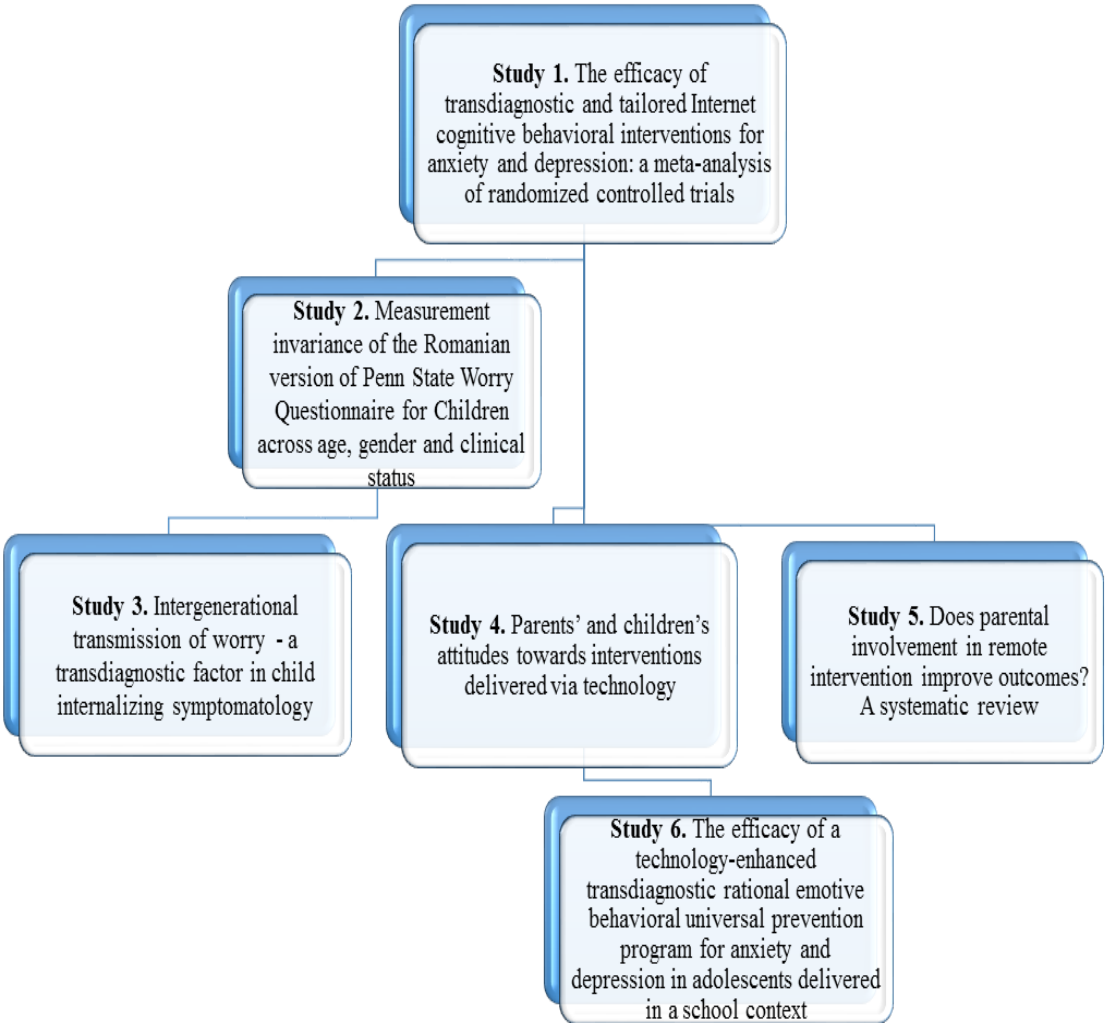

Figure 1. The schematic overview of the research studies

CHAPTER III. ORIGINAL RESEARCH

Study 1. The efficacy of transdiagnostic and tailored Internet cognitive behavioral interventions for anxiety and depression: a meta-analysis of randomized controlled trials[1]

Introduction

Anxiety and depression are two of the most prevalent mental health problems with a huge burden of disease both for society and for the quality of life of those individuals suffering (Whiteford, Ferrari, Degenhardt, Feigin, & Vos, 2015). As there is a high comorbidity between mental health disorders (Roca et al., 2009), there is a need for treatments that target common underlying mechanisms. Anxiety and depression clinical guidelines (see National Institute for Health and Clinical Excellence, 2009, 2013) indicate cognitive behavior therapy (CBT) as the first line psychological treatment. However, disorder-specific CBT interventions, which traditionally target one disorder at a time, may not be broad enough for anxiety or depression, as the comorbidity between the disorders is high.

Given the drawbacks of evidence-based treatments recommended by current guidelines (e.g., inaccessibility, stigma, costs, and lack of trained professionals), internet-delivered cognitive behavior therapy (iCBT) has emerged as a promising approach to the traditional formats of cognitive behavioral therapy (Andersson, 2016), proven to be cost-effective (Donker et al., 2015) and with long term gains (Hedman et al., 2011). In addition, disorder-specific iCBT has been found to be effective for a variety of psychiatric and somatic conditions (Andersson, Cuijpers, Carlbring, Riper, & Hedman, 2014).

One way to address comorbidity is to deliver transdiagnostic treatments. These interventions are based on a unified protocol that targets common mechanisms involved in multiple psychiatric disorders (for example avoidance). Furthermore, comorbidity can influence treatment response (Fracalanza, McCabe, Taylor, & Antony, 2014). Patients participating in these interventions receive the same treatment due to the fact that the protocol behind is not disorder-specific, being applicable to different patients with different pathologies (Barlow, Allen, & Choate, 2004; Norton & Paulus, 2015). Another way to deal with comorbidity is to deliver personalized treatments according to patients' particular clinical presentations (Andrews & Williams, 2014). Individually-tailored treatments are those interventions that combine modules from different treatment packages, targeting multiple disorders (for more details on differences between transdiagnostic and tailored treatments see Andersson & Titov, 2014).

---

[1] This study has been published in this form.

Păsărelu, C. R., Andersson, G., Bergman Nordgren, L., & Dobrean, A. (2016). Internet-delivered transdiagnostic and tailored cognitive behavioral therapy for anxiety and depression: a systematic review and meta-analysis of randomized controlled trials. *Cognitive Behaviour Therapy*, 1–28. https://doi.org/10.1080/16506073.2016.1231219

The authors contributed to the article as follows: Păsărelu, C. R.: study design, data analysis and interpretation, writing the manuscript; Andersson, G.: study design, writing the manuscript; Bergman Nordgren, L. : study design, writing the manuscript; Dobrean, A.: study design, writing the manuscript.

Method

Protocol

The current meta-analysis was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement (Moher, Liberati, Tetzlaff, Altman, & PRISMA Group, 2009).

Inclusion and Exclusion Criteria (PICOS)

We included studies which were:

a) Randomized controlled trials;
b) Transdiagnostic or tailored interventions. Transdiagnostic interventions were defined as those interventions that target shared factors between anxious and/or depressive symptoms and/or disorders and are the same for all the participants, while individually-tailored interventions were defined as those treatments personalized according to patient's characteristics and in which each patients receives a different intervention according to his/her own case formulation and characteristics or preferences;
c) Based on a CBT protocol;
d) Delivered online, via internet (both self-help and clinician delivered);
e) Compared with a control condition. We included wait-list comparison groups, active wait-list, such as attention modification or online discussion groups, diagnostic-specific groups and treatment as usual;
f) Conducted with adult participants (aged 18 years or older) that had either symptoms of anxiety and/or unipolar depression or a primary diagnosis of anxiety and/or unipolar depression with comorbid anxiety and/or unipolar depression;
g) Written in English;
h) Published in a peer-reviewed journal;
i) Proving enough data for effect sizes computation;

Excluded studies

We excluded trials in which the intervention was not CBT, the treatment was computerized and not internet-delivered, there were insufficient data to compute effect sizes, the participants were not adults (e.g., were adolescents) or the studies were not published in English and not peer reviewed. We also excluded non-randomized controlled studies, pilot studies, open trials or feasibility studies. Studies which targeted comorbid mental health conditions in samples with a primary health condition were excluded. Secondary analyses on transdiagnostic or tailored iCBT were not included.

Search Strategy

To identify relevant studies, two independent assessors conducted comprehensive systematic searches of the electronic databases (PsychInfo, Cochrane, PubMed, Scopus, Web of Science) up to 1st July 2016. We combined terms related to the modality of delivery, with terms related to the transdiagnostic or tailored nature of the protocol, as well as various terms indicating treatment. Finally, all these terms were combined with terms related to anxious or depressive disorders. In order to identify additional studies we conducted searches also in the references of several papers and meta-analyses related with the subject. We repeated the search

on 1 July 2016 to double-check and to identify whether new articles have been published from the first search in the literature.

Study selection

The first and the third author (CRP and LBN) screened the titles and abstracts for all studies in order to determine their relevance for the present meta-analysis. After excluding the studies on the basis of their title and abstract, both CRP and LBN independently reviewed full text manuscripts to assess eligibility for inclusion. Disagreements were resolved through discussion.

Data extraction

The following information from each study was extracted: authors, year of publication, number of participants, mean age, age range, country of the research group, gender (proportion female), treatment target, clinical status of the sample, number of modules, intervention duration, adherence to treatment, follow-up duration, type of protocol, type of control group, therapist experience, average time spent by therapist per patient, type of data used for effect sizes computations, outcome measures.

Computing the effect sizes

To estimate the effect sizes, we computed Hedges's *g*. According to Cohen (1988) values between 0.20 - 0.50 represent small effect sizes, values between 0.50 - 0.80 are considered medium effect sizes and values of 0.80 or higher represent large effect sizes. Sample sizes, means and standard deviations, Cohen's *d* or Hedges's *g* with its 95% confidence interval were used as presented in the studies in order to compute the effect sizes.

Meta-analytical procedure

As we expected heterogeneity between studies, we employed a random effects model (REM) to computing effect sizes. All subgroup analyses were conducted using mixed effects analysis. Comprehensive Meta-Analysis (CMA; Version 2.2.046) software was used for all the analyses.

Moderator analyses

In order to investigate possible moderators of effect sizes, two categories of moderators were investigated, categorical and continuous. We used subgroup analyses to test for categorical moderators, while continuous moderators were tested using meta-regression analyses as implemented in CMA.

Testing heterogeneity

The heterogeneity of the effect sizes was calculated based on *Q* statistic (heterogeneity in effect sizes beyond random error) and the I^2 statistic (the percentage of the observed variance that shows actual differences in effect sizes between studies included). A value of 0% indicates no heterogeneity, whereas scores of 25%, 50% and 75% represent low, medium and high heterogeneity (Crombie & Davies, 2009).

Publication bias

To address publication bias, we inspected the funnel plot on primary outcome measures (Egger, Davey Smith, Schneider, & Minder, 1997) and used Duval and Tweedie's trim and fill procedure (Duval & Tweedie, 2000).

Quality assessment

We assessed the quality and risk of bias of included the RCTs using the 'Risk of Bias' tool, developed by the Cochrane Collaboration (Higgins et al., 2011). The possible sources of risk in the RCTs included were reported regarding: random sequence generation, allocation concealment, blinding of participants, personnel and outcome assessors, and handling of incomplete outcome data. As internet interventions with therapist contact cannot be blinded from the clinicians point of view, we did not include blinding of participants and personnel (see also Andersson et al., 2014), however we included blinding of outcome assessment.

Results

Literature search

The literature search resulted in 1056 records. After removing duplicates, we screened titles and abstracts of 685 papers. Of these, 640 papers were rejected and we further read the full text of 45 papers. Twenty six papers were rejected due to the next reasons: there was no comparison with a control condition (n = 5), the intervention was designed for a primary medical condition (n = 3), the intervention was used as a complementary tool and not as a main intervention (n = 2), the study was based on secondary analyses of a trial (n = 4), the intervention was based on a protocol that was neither transdiagnostic nor tailored (n = 3), studies were not randomized trials (n = 5) and studies were theoretical synthesis of the literature/systematic reviews (n = 4). This left a total of 19 RCTs that were analyzed. *Figure 1* presents the flowchart describing the inclusion of studies.

Descriptive characteristics of the included studies

We included 19 RCTs in which transdiagnostic (Day, McGrath, & Wojtowicz, 2013; Dear et al., 2015a, 2015b, 2016; Fogliati et al., 2016; Johnston, Titov, Andrews, Spence, & Dear, 2011; Mullin et al., 2015; Newby et al., 2013; Schröder, Jelinek, & Moritz, 2016; Titov et al., 2010, 2011, 2013, 2015, 2016) or tailored iCBT (Berger, Boettcher, & Caspar, 2014; Carlbring et al., 2011; Johansson et al., 2012; Nordgren et al., 2014; Silfvernagel et al., 2012) were compared to a control condition.

Quality assessment

Most of the included studies reported an adequate random sequence generation (n = 15). However in several studies selection bias risk was unclear (n = 4). Five studies reported allocation to conditions by an independent (third) party or by means of central allocation (web-based randomization). However, for most of the studies the allocation concealment was unclear (n = 14). Most of the studies had detection bias (n = 10) as they included only self-reported outcomes or unblinded assessors. No study met all four of the quality criteria, while all the included studies met 2 or 3 criteria.

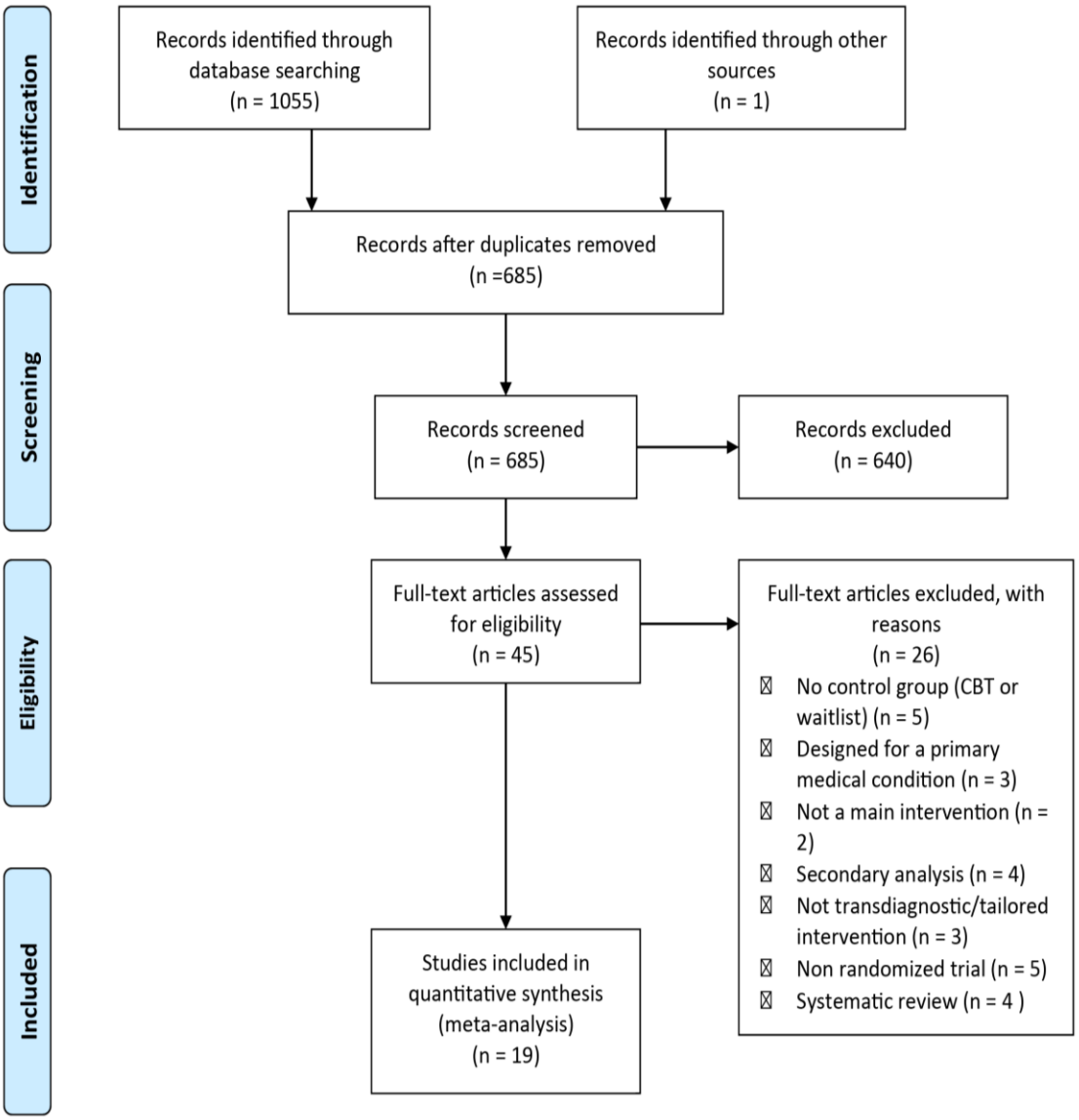

Figure 1. Flow diagram of study selection process.

Meta-analysis results

Uncontrolled effect sizes (within group effects)

Overall effect sizes on anxiety, depression and quality of life

There was a large overall effect size from pretest to posttest (pre-post) for anxiety (g = 1.06, 95% CI: 0.91 - 1.22, z = 13.61, p = .000, n = 19) and depression outcomes (g = 1.08, 95% CI: 0.88 - 1.28, z = 10.70, p = .000, n = 19), while for the quality of life outcomes there was a

moderate overall effect (g = 0.63, 95% CI: 0.53 - 0.73, z = 12.86, p = .000, n = 14). There was a high heterogeneity in the results for anxiety (Q(18) = 80.58, p = .000, I^2 = 77.66) and depression (Q(18) = 119.88, p = .000, I^2 = 84.98) and moderate for quality of life (Q(13) = 25.99, p = .000, I^2 = 49.98).

From pre-test to follow-up (pre-FU) the overall effect size was large for anxiety outcomes (g = 1.29, 95% CI: 1.08 - 1.51, z = 11.77, p = .000, n = 18), depression (g = 1.29, 95% CI: 1.07 - 1.51, z = 11.35, p = .000, n = 18) and quality of life (g = 0.85, 95% CI: 0.71 - 1.00, z = 11.51, p = .000, n = 13). There was a high heterogeneity in the results for anxiety (Q(17) = 118.04, p = .000, I^2 = 85.59), depression (Q(17) = 131.13, p = .000, I^2 = 87.03) and quality of life outcomes (Q(12) = 44.06, p = .000, I^2 = 72.76).

Between group effects

Effects of Transdiagnostic/ Tailored iCBT on self-reported Anxiety Outcomes

The effect size found for transdiagnostic/ tailored iCBT compared with controls on primary anxiety outcomes was large, g = 0.82, 95% CI: 0.58 - 1.05, z = 6.86, p =.000, n = 14. Inspection of the funnel plots and Duval and Tweedie's (2000) trim-and-fill procedure did not reveal any publication bias. Heterogeneity was moderate in the results, Q(13) = 46.97, p = .000, I^2 = 72.32.

Effects of Transdiagnostic/ Tailored iCBT on self-reported Depression Outcomes

The effect size found for transdiagnostic/ tailored iCBT compared with control on depression outcomes was large, g = 0.79, 95% CI: 0.59 - 1.00, z = 7.68, p = .000, n = 14. Inspection of the funnel plots and Duval and Tweedie's (2000) trim-and-fill procedure did not reveal any publication bias. Heterogeneity was moderate in the results, Q(13) = 35.54, p = .001, I^2 = 63.42.

Effects of Transdiagnostic/ Tailored iCBT on Quality of Life Measures

The effect size found for transdiagnostic/ tailored iCBT compared with control condition on quality of life measures was medium, g = 0.55, 95% CI: 0.37 - 0.73, z = 5.99, p = .000, n = 9. There was no indication of publication bias after inspecting the funnel plot and running Duval and Tweedie's (2000) trim-and-fill procedure. There was evidence of small heterogeneity in the results, $Q(8)$ = 10.87, p = .209, I^2 = 26.42.

Moderator analyses

Categorical moderators

In order to explain the heterogeneity in the effect sizes for anxiety, depressive and quality of life outcomes, we further tested for moderators. With one exception (treatment length effect on depression outcomes) all of the investigated moderators, namely the country of the research group, the protocol type, the type of the sample, the follow-up duration, therapist experience, control group, the type of data used to compute effect sizes, study quality the number of modules, or non-specific factors like therapist experience proved to be non-significant. Subgroup analyses indicated that despite the fact that there were statistically significant differences within some categories, between-group differences were not significant.

Continuous moderators

We tested for continuous moderators via meta-regression analysis procedures. Adherence to treatment was a significant predictor (anxiety: slope = .00, p = .022, depression: slope = 0.00, p = .027). However, adherence to treatment had no effect on quality of life outcomes (slope = .005, p = .097).

Comparisons between transdiagnostic/tailored iCBT versus controls on generic outcome measures

There was an overall large between-groups effect sizes compared to controls on generic measures (n = 10, g = 0.77, 95% CI: 0.55 – 0.99), with moderate heterogeneity between studies (I^2 = 58.24). There was evidence of publication bias as demonstrated by inspection of the funnel plot. After adjusting for publication bias using the Trim and Fill procedure, the estimate of the mean effect size comparing transdiagnostic/tailored iCBT interventions to controls on generic outcomes reduced to g = 0.67, 95% CI: 0.43 - 0.90 (n = 2 studies removed).

Comparisons between transdiagnostic/tailored iCBT versus controls on comorbidities (generalized anxiety, social anxiety and panic disorder)

There were moderate between-groups effect sizes compared to controls on measures of generalized anxiety (n = 5, g = 0.58, 95% CI: 0.35 – 0.81, I^2 = 32.12), panic (n = 4, g = 0.45, 95% CI: 0.15 – 0.75, I^2 = 54.98), and social anxiety (n = 5, g = 0.51, 95% CI: 0.19 – 0.82, I^2 = 65.91).

Comparisons between transdiagnostic/tailored iCBT versus disorder-specific treatments

There were no significant differences between transdiagnostic/tailored iCBT and disorder-specific treatments for anxiety (n = 6, g = 0.06, 95% CI: -0.06 - 0.19) but there were significant differences for depression (n = 6, g = 0.22, 95% CI: 0.06 - 0.38) and quality of life outcomes (n = 5, g = 0.12, 95% CI: 0.00 - 0.24), with the results in favor of the transdiagnostic iCBT and with no heterogeneity (I^2 = 0) amongst these effects.

Discussions

Comorbidity is an important factor that needs to be considered when treating patients. To our knowledge this is the first meta-analysis synthetizing the effects of transdiagnostic/ tailored iCBT as possible ways of taking comorbidity into account in the treatment of anxiety disorders and depression. Our findings suggest that transdiagnostic/ tailored iCBT produce large effects on measures of anxiety and depression. This result is in line with previous research regarding the general effect size of transdiagnostic treatments (Newby, McKinnon, Kuyken, Gilbody, & Dalgleish, 2015; Newby et al., 2016). When considering the effect sizes regarding the quality of life measures we obtained a similar effect size as compared to those from other recent meta-analysis (Hofmann, Wu, & Boettcher, 2014; Newby et al., 2015, 2016), namely there was a moderate effect of transdiagnostic/tailored iCBT on quality of life outcomes.

We did not find differences between transdiagnostic and individually-tailored interventions, neither for uncontrolled (within effect sizes) or controlled effect sizes (between effect sizes) as they are all based on the same mechanisms, despite few differences in the intervention packages (number and structure of the modules).

As internet-delivered treatments emerged as a modality in which evidence-based treatments can reach more patients, the development of iCBT that could target multiple disorders could be an important modality of optimization of current treatments. However, these results should be interpreted cautiously taking into consideration the limitations of the current research. One important limitation that is general for all available transdiagnostic and tailored treatments regards the assessment of improvements. Despite the fact that many pilot studies, open trials or feasibility studies exist on transdiagnostic/ tailored iCBT interventions, very few are randomized controlled trials comparing an experimental group with at least a waiting-list control group. Another important limitation of the current research is the fact that at follow-up, the experimental group cannot be compared with the control group, as the control is in fact a delayed-treatment group. The only comparisons that can be done are those within the same group, which cannot allow us to draw conclusions regarding the factors involved in symptoms' remission. The lack of investigation of mechanisms of change is a common aspect in most internet research. Despite only focusing on the reduction of the symptomatology, a focus on the theory on which that protocol is based should be done (David & Montgomery, 2011).

Future research should investigate whether transdiagnostic and tailored treatments delivered online are appropriate to use with different populations (e.g., children, adolescents, emerging or older adults) and to further explore the importance of cross-cultural factors (e.g., Kayrouz et al., 2015, 2016) in the successful implementation of such interventions.

Study 2. Measurement invariance of the Romanian version of Penn State Worry Questionnaire for Children across age, gender and clinical status[2]

Introduction

In children and adolescents, worry could be considered a normative developmental phenomenon, as studies show that it is a frequent activity, with over 70% of fifth and sixth grade children reporting worries about school, illness, dying and social problems (Henker, Whalen, & O'Neil, 1995; Orton, 1982; Silverman, La Greca, & Wasserstein, 1995).

Due to the fact that worry is a common factor across mental disorders (Kertz, Bigda-Peyton, Rosmarin, & Björgvinsson, 2012; McEvoy, Watson, Watkins, & Nathan, 2013), it is highly important to assess it rigorously. The Penn State Worry Questionnaire for Children (*PSWQ-C;* Chorpita, Tracey, Brown, Collica, & Barlow, 1997) is the most widely used instrument that assesses trait worry in children and adolescents. The PSWQ-C, an adaptation of the Penn State Worry Questionnaire (Meyer, Miller, Metzger, & Borkovec, 1990), comprises 14 items, 3 reverse and 11 non-reverse, assessing general characteristics of worry, such as generality, intensity, and uncontrollability. PSWQ-C scores can range between 0 and 42, with higher scores indicating greater levels of worry.

The Penn State Worry Questionnaire-Child Version has so far been adapted to several cultures and translated into multiple languages, with good psychometric properties. However, there is mixed evidence regarding the structure of the scale. While exploratory factor analyses form the initial validation studies (Chorpita et al., 1997; Gosselin et al., 2002; Muris et al., 2001) indicate that the PSWQ–C is unifactorial, other studies sustain the two-factor model (Esbjørn et al., 2012; Kang et al., 2010; Pestle et al., 2008).

A precondition of the evaluation of hypotheses involving cross-group comparisons (e.g., between group mean differences, theoretical structural model differences), is the determination of invariance across groups (Vandenberg & Lance, 2000). An unexamined issue so far regarding PSWQ-C has been whether the same model is invariant across samples of different genders, age groups and mental health status. Establishing measurement invariance would legitimate direct comparisons across girls and boys, children and adolescents and community and clinical populations. To date, no study has examined the measurement invariance of the PSWQ-C between different samples of children and adolescents.

Method

Participants

Participants were recruited both from community, namely from several Romanian schools (n = 570), and from a psychiatric inpatient unit for day admission (n = 189). The final sample consisted of 759 children and adolescents (M_{age} = 13.28; SD = 1.54, age range 8-18; 58.1% girls).

[2] This study has been published in this form.

Păsărelu, C. R., Dobrean, A., Balazsi, R., Predescu, E., Şipos, R., & Lupu, V. (2016). The Penn State Worry Questionnaire for Children: Age, Gender and Clinical Invariance. *Child Psychiatry & Human Development*, 1–11. https://doi.org/10.1007/s10578-016-0663-2

The authors contributed to the article as follows: Păsărelu, C. R.: study design, conducting the study, data analysis and interpretation, writing the manuscript; Dobrean, A.: study design, writing the manuscript; Balazsi, R.: study design, data analysis and interpretation, writing the manuscript; Predescu, E.: data collection, writing the manuscript; Şipos, R.: data collection, writing the manuscript; Lupu, V.: data collection, writing the manuscript.

Clinical patients were diagnosed by psychiatrists with a primary anxiety disorder according to the *International Statistical Classification of Diseases and Related Health Problems, 10th Revision* (ICD-10; World Health Organization, 1993). Also, the authors critically evaluated the diagnosis by conducting clinical assessments with patients, using the *Diagnostic and Statistical Manual of Mental Disorders 5* (American Psychiatric Association, 2013) criteria.

Measures

The Penn State Worry Questionnaire for Children (Chorpita et al., 1997) is a self-report measure that assesses young people's tendency to worry excessively and uncontrollably. The instrument was translated and adapted for the purposes of this study, according to International Test Comission guidelines for translating and adapting tests (Muñiz, Elosua, Hambleton, & International Test Commission, 2013). In the present study the PSWQ-C exhibited adequate reliability (Cronbach's alpha = .85).

The Screen for Child and Anxiety Rated Emotional Disorders (Birmaher et al., 1999) is a 41 – item measure of different types of anxiety where children answer questions using a 3-point Likert scale from 0 (*not true*) to 2 (*very or often true*). Cronbach's alpha for the scale in the present study was .90.

The Youth Self-Report Questionnaire (Achenbach & Rescorla, 2001) was used to assess internalizing symptomatology in children. This questionnaire contains 119 items, which are scored on a 3-point Likert scale (0 = *not true*; 1 = *somewhat or sometimes true*; or 2 = *very true now or during the past six months*). Internal consistency for this instrument was excellent (Cronbach's alpha = .93).

Procedure

After the consent of school/clinic boards was obtained, children were invited to participate in the study and letters were sent to their parents. Both parents and children gave their written consent prior to participation in the study. Research assistants collected data from children in their classrooms and in a child psychiatric unit. They provided instructions and responded to any questions that arose during the administration of the questionnaires. Assessment sessions took up to approximately 30 minutes. After the assessment sessions were completed, children were rewarded with small gifts.

Data Analysis

First, univariate statistical indicators were computed and the normality of the PSWQ-C scores was examined. Secondly, confirmatory factor analysis (CFA) was used to examine the construct validity of PSWQ-C. Thirdly, we conducted multi-group confirmatory factor analysis (MGCFA) to investigate the factorial invariance and the latent mean differences across clinical diagnosis, gender and age groups. The analyses of factorial invariance and latent mean structure were performed using CFA with maximum likelihood (ML) estimation in IBM AMOS 22.0 (Arbuckle, 2006).

Results

Descriptive statistics

In Table 1, participants' mean scores and standard deviations of PSWQ-C are presented for each gender, age and clinical/community sample. The mean PSWQ-C score in the community sample was 12.89 (7.28), similar to previous findings (M = 12.98, SD = 2.86 Chorpita et al., 1997). However, the mean PSWQ-C score in the clinical sample was 22.44 (9.68), higher than what had previously been reported when research was conducted in clinical populations (M = 15.79, SD = 9.05 Pestle et al., 2008). We also investigated whether

children who had anxiety and another not-anxious comorbid disorder score higher on the questionnaire, however the difference between the group with anxious comorbidity and the group with the non-anxious comorbidity was non-significant (t = 1.58, p = .120, 95% CI [-1.40, 11.83]).

Table 1
Means and standard deviations for PSWQ-C across samples (N = 759)

Sample	Gender	Statistic	Age	*M*	*SD*
Community (n = 570)	Girls (n = 308)	$\chi^2_{(1)}$=2.248 p=.134	Children (n = 106)	12.14	6.83
			Adolescents (n = 202)	13.50	7.60
	Boys (n = 262)		Children (n = 74)	9.15	5.86
			Adolescents (n = 188)	10.80	6.72
Clinical (n = 189)	Girls (n = 133)	$\chi^2_{(1)}$=.320 p=.572	Children (n = 23)	22.40	10.65
			Adolescents (n = 110)	23.32	9.22
	Boys (n = 56)		Children (n = 12)	21.90	12.69
			Adolescents (n= 44)	20.38	9.46

CFA using covariance matrices was performed using ML estimation. The calculated fit indicators were: χ^2 = 479.52 (df = 77, p = .001), χ^2/DF = 6.22, GFI = .908, NFI = .902, TLI = .901, CFI = .916, SRMR = .063, RMSEA = .084 (90%CI [.077, .092]). The estimated factor loadings were acceptable for most of the items (between .602 and .823), but we found three items with very low item loadings, namely: item 2 (λ = - .052), item 7 (λ = - .058) and item 9 (λ = - .176). Analyzing the standardized residuals matrix, we found that the specified measurement model did not reproduce correctly the correlations between positively and negatively worded items (residual values above z=3). Model modification indices suggest the inclusion of correlations between the unique variances of these items, or establishing direct effects between these items. Such messages could be interpreted as suggestions to load these items on a second factor. The re-specified model shows improved model fit indices: χ^2 = 270 (df = 76, p = .001), χ^2/DF = 3.55, GFI= .948, NFI = .945, TLI = .952, CFI = .96, SRMR = .038, RMSEA = .059 (90%CI [.051, .067]). We removed the three negatively worded items and conducted all the analysis on the short version of the scale (short PSWQ-C). Internal consistency of the short PSWQ-C was excellent, as alpha Cronbach coefficient increased after the elimination of the three negative items, having a value of .92.

Effect sizes for all three latent mean comparisons were d = .437 for gender, d = .259 for age and d = .998 for clinical diagnostic groups.

In order to test convergent and divergent validities, first order correlations between PSWQ-C, short PSWQ-C and other measures were conducted (see Table 2). The analyses show that both versions of the scale, PSWQ-C and short PSWQ-C, have significant positive relations with different anxiety disorders – generalized anxiety, panic/somatic, separation anxiety, social anxiety, school phobia and with affective disorders (depression, dysthymia). These significant relationships indicate the transdiagnostic nature of worry.

Table 2

Pearson correlations between PSWQ-C, short PSWQ-C and other assessment measures (N=759)

	1	2	3	4	5	6	7	8	9	10
1. PSWQ-C	-									
2. short PSWQ-C	.96	-								
3. SCARED Total	.53	.50	-							
4. Panic/ somatic	.42	.41	.88	-						
5. Generalized anxiety	.53	.50	.88	.70	-					
6. Separation anxiety	.29	.28	.71	.55	.49	-				
7. Social anxiety	.38	.35	.79	.58	.65	.45	-			
8. School avoidance	.30	.28	.62	.54	.49	.33	.35	-		
9. YSR anxiety	.53	.52	.45	.37	.42	.19	.39	.29	-	
10. YSR affective	.51	.51	.41	.36	.38	.17	.32	.29	.62	-

Discussions

To our knowledge, this is the first study investigating the measurement invariance of the Penn State Worry Questionnaire – Child version in a youth population across gender, age and mental health status. Although there are a few studies investigating the psychometric properties of this scale available in different languages (Chorpita et al., 1997; Esbjørn et al., 2012; Gosselin et al., 2002; Kang et al., 2010; Muris et al., 2001; Pestle et al., 2008), research is scarce regarding the measurement invariance of this instrument

The findings of the current study support configural, metric, and scalar invariance for the PSWQ-C scores across boys and girls, children and adolescents, community and clinical samples. The results of this study provide evidence that the measurement invariance requirement for valid group comparisons has been satisfied for the PSWQ-C, suggesting that worry, as measured by PSWQ-C, has the same meaning across different samples.

Both the initial and the short version of the worry scale have demonstrated high construct validity. There were positive relations with anxiety disorders, depression, and as expected, the relations were greater for worry and generalized anxiety disorder than with other types of disorders. Furthermore, associations between worry, as assessed with PSWQ-C and short PSWQ-C and panic or somatic symptoms, social anxiety, separation anxiety, school phobia and depression/dysthymic disorders, are indicators of the transdiagnostic nature of worry.

The results of the present study should be interpreted by also taking into consideration several limitations. Firstly, as children and adolescents have been recruited from a psychiatric inpatient unit for day admission, usually diagnoses found in their medical records are based

on the multiple information psychiatrists receive and not on a single diagnostic interview. Secondly, there was an unequal child-adolescent distribution between groups, as the number of children included in the study from both community and clinical sample is considerably smaller than the number of adolescents. Due to the cross-sectional nature of the study, we cannot state the scale's accuracy when assessing constructs over time. As a consequence, future research should investigate PSWQ-C longitudinal invariance (Widaman, Ferrer, & Conger, 2010).

Study 3. The intergenerational transmission of worry - a transdiagnostic factor in child internalizing symptomatology[3]

Introduction

Anxiety disorders are one of the most prevalent psychiatric conditions in children and adolescents (Polanczyk, Salum, Sugaya, Caye, & Rohde, 2015) with high comorbidity rates with both internalizing (e.g., depression Garber & Weersing, 2010) and externalizing disorders (e.g., attention deficit hyperactive disorder Sciberras et al., 2014). The burden of these psychiatric conditions is huge, for the individual and the society. For example, the costs of the families of children diagnosed with anxiety disorders are approximately twenty times higher than those of families from the general population (Bodden, Dirksen, & Bögels, 2008).

Separate lines of research provide evidence that anxiety runs in families, with both genetic and environmental factors explaining the transmission of anxiety and depression (Creswell & Waite, 2015; Shimada-Sugimoto, Otowa, & Hettema, 2015). Having a parent with a history of mental health problem is an important risk factor for the development of internalizing problems in childhood (Low et al., 2012). Furthermore, this factor could stand for both a genetic and an environmental influence, as parents could transmit their anxious/mood disorders through genes to their offspring but they could also influence children's anxiety or depression by means of information transfer, reinforcement or modeling (Burstein & Ginsburg, 2010; Fisak & Grills-Taquechel, 2007; Muris & Field, 2010).

Given the fact that the comorbidity between mental health problems is rather the rule than the exception (Rhee, Lahey, & Waldman, 2015), research should focus on identifying such factors implicated in the etiology of internalizing disorders that cross the disorder-specific boundaries with a focus on the transmission through generations. Worry, the cognitive component of anxiety (Borkovec et al., 1983), is a form of repetitive negative thinking, a transdiagnostic factor implicated in many psychiatric problems (Ruscio, Seitchik, Gentes, Jones, & Hallion, 2011). Research investing the transmission of cognitive vulnerability factors only recently started to emerge, with studies showing that parental worry is a more robust predictor of children's anxiety than parent's anxious symptomatology(Fisak, Holderfield, Douglas-Osborn, & Cartwright-Hatton, 2012).

Method

Participants

Participants of the presents study were 87 mother-adolescent dyads recruited from several Romanian schools. The sample consisted of both children and adolescents, as the age range varied from 11 to 17 years old (67 girls; M_{age} = 14.64; SD = 1.77), and their mothers with ages ranging from 29 to 56 years old (M_{age} = 41.22, SD = 5.38). Both mothers and children gave their informed consent prior to being enrolled in the study. The study was in agreement with internal school regulations.

---

[3] This study has been published in this form.

Păsărelu, C. R., Dobrean, A., Predescu, E., Sipos, R., & Lupu, V. (2015). Intergenerational transmission of worry a transdiagnostic factor in child internalizing symptomatology. *Romanian Journal of Child & Adolescent Psychiatry, 3*(1).

The authors contributed to the article as follows: Păsărelu, C. R.: study design, conducting the study, data analysis and interpretation, writing the manuscript; Dobrean, A.: study design, writing the manuscript; Predescu, E.: data collection, writing the manuscript; Şipos, R.: data collection, writing the manuscript; Lupu, V.: data collection, writing the manuscript

Measures

Parent measures

Maternal worry. To assess worry in mothers, we used *the Penn State Worry Questionnaire* (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990). In our sample, it showed good internal consistency (Cronbach's alpha = .80).

Maternal social anxiety. *The Social Phobia Inventory* (SPIN; Connor et al., 2000) is a 17-item scale that measures the presence and severity of fear, avoidance, and physiological symptoms associated social anxiety disorder. SPIN showed excellent internal consistency for the current study (Cronbach's alpha = .91).

Child measures

Children's worry. To assess worry in children, we used *the Penn State Worry Questionnaire for Children* (PSWQ-C; Chorpita et al., 1997), a 14-item self-report measure assessing youths' pathological worry. In our sample, it showed good internal consistency (Cronbach's alpha = .79).

Childrens' generalized anxiety symptoms. The Generalized Anxiety Subscale from *The Screen for Child and Anxiety Rated Emotional Disorders* (SCARED; Birmaher et al., 1997) was used in order to assess children's generalized anxiety symptomatology. Cronbach's alpha for the present study was .90.

Children's depressive symptoms. The Affective Problems subscale of *the Youth Self-Report Questionnaire* (YSR; Achenbach & Rescorla, 2001) was used to assess depressive symptomatology. This scale showed excellent internal consistency (Cronbach's alpha = .93) in the present study.

Children's social anxiety. *The Social Anxiety Scale for Adolescents* (SAS-A; La Greca & Lopez, 1998) was used to assess social anxiety symptomatology in children. In our sample, it showed good internal consistency (Cronbach's alpha = .85).

Procedure

Both parents and children signed informed consent forms prior to participation in the study. Children completed the questionnaires in their classrooms at school, in the presence of a research assistant who answered to any questions, while mothers completed the questionnaires in another room at school. Both mothers and adolescents were informed that they could withdraw at any time without prejudice.

Data analysis

Correlations were first computed to examine zero-order associations among maternal social anxiety, maternal worry, children's worry, and children's social anxiety, generalized anxiety and depression. Furthermore, through structural equation modeling, namely through path analysis, the hypothesized model was tested. The descriptive and correlational analysis were computed using Statistical Package for Social Sciences (IBM SPSS 21) while the model fit estimation and multigroup analysis were conducted with Analysis of Moment Structures (IBM AMOS 21) using maximum-likelihood estimation (Arbuckle, 2006).

Results

Correlations and descriptive statistics

Means, standard deviations and range for all measures as well as bivariate correlations among the study variables are presented in *Table 1*. As expected, significant positive correlations were found between maternal worry and maternal social anxiety. Maternal worry positively correlated with children's worry and with children's generalized anxiety symptoms

and depressive symptoms. Maternal social anxiety symptoms positively correlated with depressive symptoms and with children's social anxiety. However, maternal worry was uncorrelated with children's social anxiety symptoms and maternal social anxiety was uncorrelated with children's social anxiety.

Table 1

Means, standard deviations, range and bivariate correlations between variables (N = 87)

	Variable	M	SD	Range	1	2	3	4	5	6
1	Maternal worry	47.86	12.92	24-78	-	.45*	.25*	.21*	.25*	.07
2	Maternal social anxiety	18.09	12.41	0-60		-	.17	.21*	.20	.26*
3	Children's worry	22.64	9.60	1-41			-	.55*	.64*	.57*
4	Children's depression	9.19	4.78	0-23				-	.66*	.54*
5	Children's generalized anxiety	9.62	4.34	0-17					-	.65*
6	Children's social anxiety	53.34	15.55	20-88						-

*Note. * $p < 0.01$*

Path analysis

The path analysis approach allowed the examination of unique paths through which maternal worry, correlated with maternal social anxiety symptoms, predicts children's worry, which is the most proximal predictor of children's social anxiety, generalized anxiety and depressive symptoms. Model fit indices for the final path model were found to be good, $\chi^2(8) = 8.60$, $p = .37$, CFI = .99, GFI = .96, SRMR = .06, RMSEA = .03. The hypothesized model with both significant and insignificant paths is presented in *Figure 1*.

As is shown in *Figure 1,* maternal worry correlated with maternal social anxiety ($\beta = .46$, $p = .001$). As expected maternal worry significantly and positively predicted children's worry ($\beta = .25$, $p = .001$). Children's worry predicted both generalized anxiety symptoms ($\beta = .65$, $p = .001$), social anxiety symptoms ($\beta = .49$, $p = .001$) and depressive symptoms ($\beta = .56$, $p = .001$). In all cases maternal worry and maternal social anxiety had only an indirect effect on children's internalizing symptomatology, through children's worry.

Discussions

The purpose of this study was to investigate the role of worry in the intergenerational transmission of internalizing disorders from mothers to offspring. Our findings support a model in which maternal worry and maternal social anxiety only indirectly relate to children's internalizing disorders through children's worry. As hypothesized, children's worry was found to be a more proximal predictor of children's internalizing symptoms, fully mediating the relationship between mothers' worry and children's anxious (generalized and social anxiety) and depressive symptomatology. The association between mothers' and children's social anxiety is in line with studies that showed that maternal social anxiety could be passed from one generation to another (Rapee, 1997) by means of controlling and overprotective parenting behaviors that prevent children from experiencing exposure to social situations.

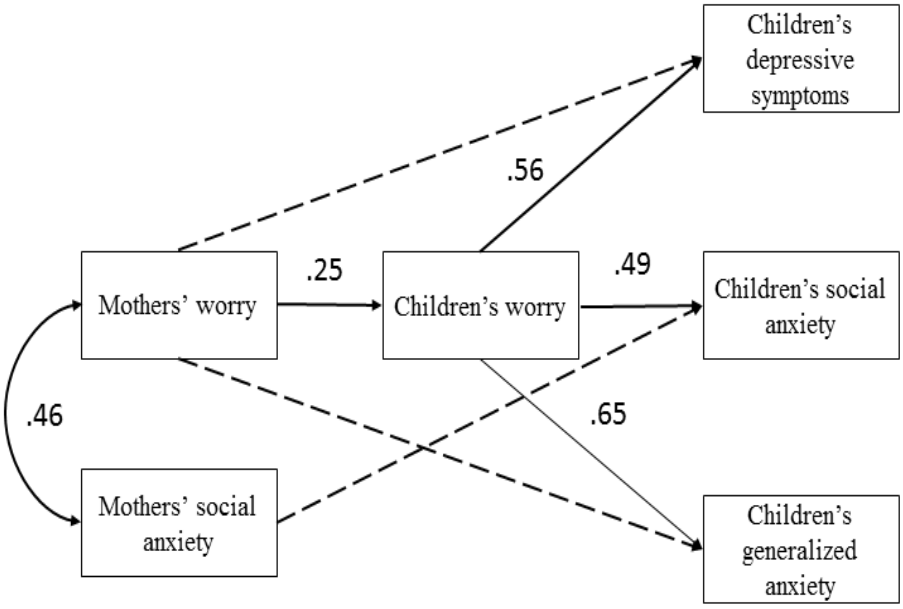

Figure 1. Path analysis of the hypothesized model on the relations between maternal worry, maternal social anxiety, children's worry, children's generalized anxiety, children's social anxiety and children's depressive symptoms with their standardized path coefficient estimates. For figure clarity, indicators for latent variables, error terms, and control variables have been omitted. All parameter estimates are standardized values. Dashed lines represent estimated but nonsignificant paths. All the other path coefficient estimates illustrated were significant at $p < .001$.

The fact that maternal worry was associated with children's worry, children's generalized anxiety and children's depressive symptoms but not with children's social anxiety could mean that maternal worry might have a different contribution to internalizing disorders. For example, the associations between maternal worry and children's generalized anxiety disorder and depressive disorder could be explained by the latent factor of negative repetitive thinking that worry (specific to anxiety) shares with rumination (specific to depression). It is possible that in these disorders perseverative cognition might play a more important role compared to social anxiety, in which other factors (i.e., avoidance) could explain a higher amount of variance.

The cross-sectional nature of this study prevents us to draw causal inferences about the influence of maternal worry on children's internalizing symptomatology. Larger scale studies with experimental designs, where these variables could be manipulated could be useful in determining causality. Also, longitudinal studies observing children across different developmental stages could inform research by indicating possible variations in these relationships as a function of children's age. A second limitation of this study could be the reliance only on self-report measures.

This study shows unique paths in the transmission of anxiety from parent to offspring, where worry plays a significant role. These findings are of real clinical importance as they expand existent evidence on the etiological factors involved in the familial aggregation of anxiety and mood disorders. A step forward would be the development of prevention or intervention programs for vulnerable individuals, either mothers or children with high trait worry (e.g., disseminated in schools).

Study 4. Parents' and children's attitudes towards interventions delivered via technology

Introduction

A large percentage of adolescents with emotional disorders do not receive treatment for their condition. Namely, in a large sample of Norwegian adolescents only a small percentage of participants with elevated problems had search-seeking behaviors in the last year (Zachrisson, Rödje, & Mykletun, 2006).

Technological developments in mental health interventions came to help in the dissemination of evidence-based treatments, both in adult and in child populations. For example, cognitive behavior therapy (CBT) can be delivered via mobile phones (mCBT), computerized programs (cCBT), Internet (iCBT), apps or gamified interventions. As these are important new developments in mental health services, users' attitudes are important to consider as they are related to behaviors.

Intentions/ attitudes towards iCBT are important to consider given the framework of Planned Behavior Theory (Azjen, 1985), where intentions predict behaviors. Much research has been conducted so far on attitudes related to computerized CBT (cCBT), however large differences exist between iCBT and cCBT. For example, several studies investigated clinicians'/ mental health workers' attitudes regarding cCBT (Donovan et al., 2015; Vigerland et al., 2014), other investigated parents' attitudes (Sweeney et al., 2015, 2016) or both parents' and children's attitudes toward cCBT (Stallard et al., 2010).

In general, Australian and British parents hold positive attitudes towards cCBT delivered, but given cross-cultural differences we cannot assume this would also be the case of Romanian parents and youths. There are big differences between countries in what regards access to Internet (Eurostat, 2014). Namely, parents' attitudes are of great importance to consider as they are the ones that legally decide whether their offspring will receive or not a treatment for their mental health problems.

Method

Participants

Eighty nine teenagers (M_{age} = 16.34, *SD* = .54, age range 14 - 18; 65.2 % girls) and their parents (M_{age} = 44.01, *SD* = 5.25; 75.3 % mothers) agreed to participate in the study. No incentives were offered for participation.

Measures

Demographic data. Adolescents and parents completed a questionnaire regarding demographic characteristics (age, gender).

Attitudes towards mental health treatment. In order to assess parents' and adolescents' attitudes related to mental health treatment, we translated and adapted a questionnaire that was developed by Stallard and collaborators (2010). We further added several items related to different technological means to delivered CBT (e.g., via animated cartoons, via Internet or via social networking sites, such as Facebook).

Procedure

School principals agreed to conduct research in their units. After adolescents and parents' informed consent were signed, the assessment was conducted. Children completed the questionnaires at school, in groups, in the presence of a research assistant that helped children with possible difficulties. At the beginning of the session, adolescents were

explained different concepts (e.g., difference between various modalities to deliver CBT, types of mental health problems etc.).Parents completed at home and returned the questionnaires the next day. No incentives were given for participation.

Results

Computer literacy

Adolescents had high computer literacy, as 20.2 % reported they had *Very much* experience in working with computers, 68.5 % *Enough* experience, 10.1 % *Little* experience, 4 % adolescents had *Very little* experience and 0% *No* experience at all.

Parents reported little computer literacy, specifically only 3.3 % of parents reported they had *Very much* experience, 36 % had *Enough* experience, 38.2 % had *Little* experience, 11.2 % had *Very little* experience. Finally, 11.2 % parents had *No* experience at all.

Current emotional problems

According to adolescents reports 32.6 % (n = 29) of them are confronted with emotional disorders, while only 22.5 % (n = 20) of parents said their offspring suffers of an emotional problem.

Treatment searched for the emotional problems

Only 34.1 % of the adolescents that identified themselves as having an emotional disorder actually searched for treatment, while only 19.1 % parents searched for treatment for their offsprings.

Type of treatment searched

Regarding type of treatment searched for those adolescents identified as having emotional problems, search on the Internet was the most frequent answer (72.7%), followed by going to school psychologist (9.1%), talking with their parents (9.1%) or talking only with close friends (9.1%).

Parents consulted GP (33.3 %), followed by searching over the Internet (16.7 %), talking with their relatives (16.7 %) or attend psychotherapy sessions (16.7 %). A smaller percentage of parents went to the school psychologist (5.6 %) or only discussed about their child's emotional problems with their partners (5.6 %).

Knowledge regarding CBT technology enhanced (Internet, Facebook or animated cartoons)

Most of the adolescents reported little knowledge regarding CBT technology enhanced, both in what regards the content of such programs, the manner in which such programs are used and whether these programs have a solid empirical background (see *Figure 1*).

Parents had little knowledge regarding CBT technology enhanced in all three aspects investigated, with a high percentage of participants rating *Not at all* and *A little* information known (See *Figure 2*).

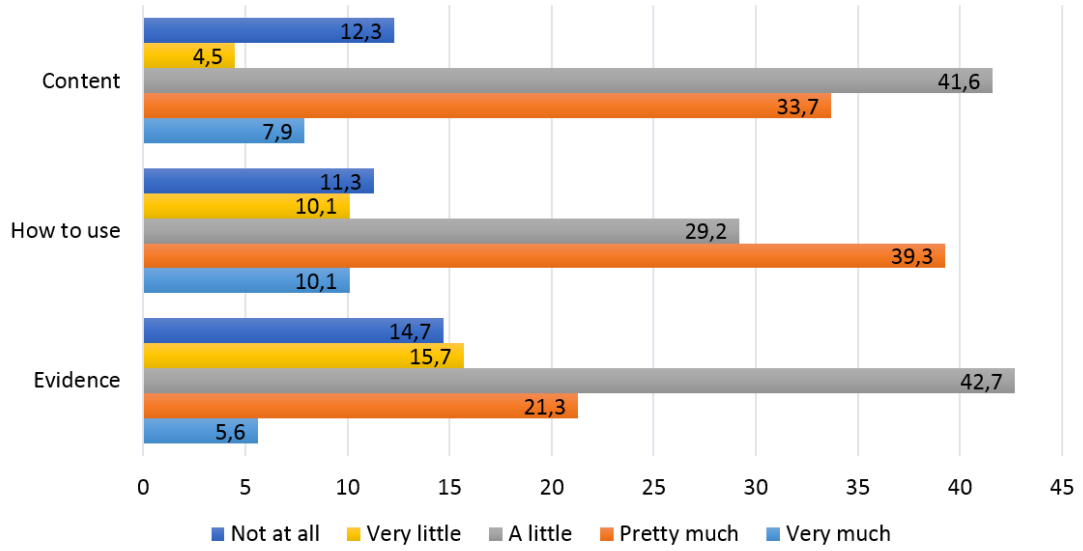

Figure 1. Adolescents' knowledge regarding CBT technology enhanced

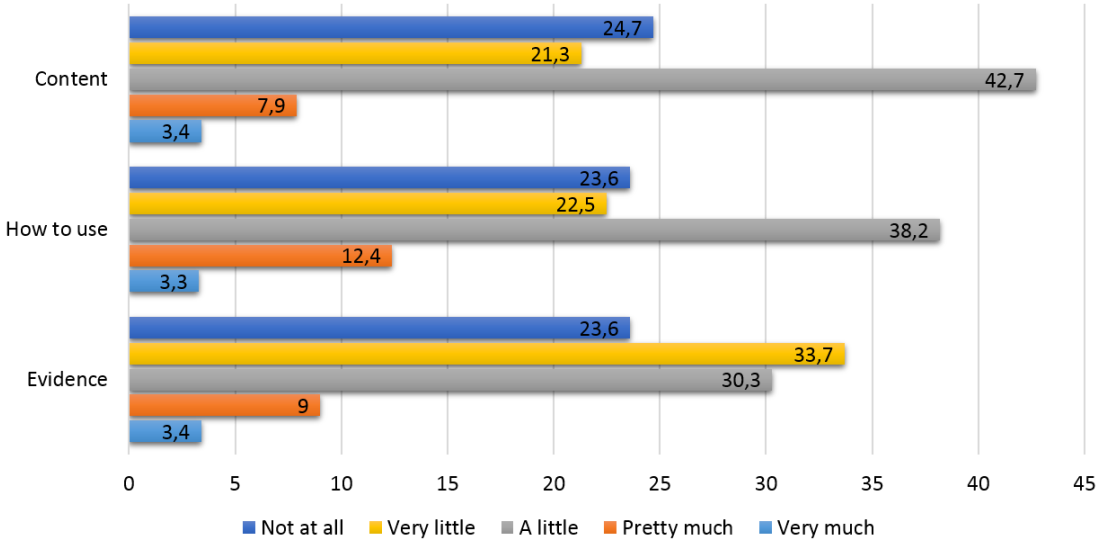

Figure 2. Parents' knowledge regarding CBT technology enhanced

Intentions to use CBT technology enhanced if available in Romania

When asked whether such programs would be available in Romania, adolescents were positive towards participating in such a program if available in Romania (12.4 % rated *Definitely yes*) as compared with parents (6.7 % rated *Definitely yes*). There was a large percentage of undecided youths and parents (choosing either the option *Maybe* or *I don't know*). A higher percentage of parents chose the option *Definitely no* (28.1 %) as compared to adolescents (13.5 %).

Associations between adolescents and parents reports on emotional problems, computer literacy, knowledge and intentions to use CBT technology enhanced

In order to investigate existent relationships between adolescent and parent variables on emotional problems, computer literacy, knowledge and intentions to use CBT technology enhanced, we computed Pearson correlations (See Table 1).

Table 1
Pearson correlations between adolescent and parents variables included in the study (N = 89)

	1	2	3	4	5	6	7	8
1. Adolescent current emotional problems	-							
2. Adolescent computer literacy	.17	-						
3. Adolescent knowledge regarding CBT technology enhanced	.13	.13	-					
4. Adolescent intentions to use CBT technology enhanced	.24*	.03	.30**	-				
5. Parent reported emotional problems in adolescent	.31**	.02	.03	.14	-			
6. Parent computer literacy	.00	.14	.13	.02	.08	-		
7. Parent knowledge regarding CBT technology enhanced	.04	.11	.00	.28**	.08	.20	-	
8. Parent intentions to use CBT technology enhanced	.09	.23*	.05	.07	.13	.09	.27*	-

Note. ** $p < .001$, * $p < .05$

Hierarchical regression analysis

A hierarchical regression analysis was carried out to determine the effect of adolescent related variables (current emotional problems, computer literacy and knowledge regarding CBT technology enhanced) and parent related variables (parent knowledge and parent intentions to use CBT technology enhanced) (see Table 2). Adolescent related variables were entered in the first step, while parent related variables were entered in the second step. Adolescent related variables accounted for 36% of the variance in adolescent intentions to use CBT technology enhanced, *F change* (3, 84) = 4.32, $p = .007$. Parental knowledge and intentions to use CBT technology enhanced explained and additional 8 % of the variance of adolescent intentions to use CBT technology enhanced, *F change* (2, 82) = 4.43, $p = .015$. All the variables accounted for 46.7 % of the variance of adolescent intentions to use CBT technology enhanced.

Table 2
Summary of the hierarchical regression analysis for variables predicting *adolescents' intentions to use CBT technology enhanced (N = 89)*

Variable	B	SE B	β
Step 1			
Adolescent current emotional problems	1.06	.48	.22*
Adolescent computer literacy	.13	.38	.03
Adolescent knowledge regarding CBT technology enhanced	.18	.07	.25*
Step 2			
Adolescent current emotional problems	.92	.50	.20
Adolescent computer literacy	.04	.39	.01
Adolescent knowledge regarding CBT technology enhanced	.19	.07	.26*
Parent knowledge regarding CBT technology enhanced	.22	.08	.30**
Parent intentions to use CBT technology enhanced	.02	.10	.03

Note. ** $p < .001$, * $p < .05$

Discussions

The aim of the present study was to investigate adolescents' and parent's treatment preferences, knowledge and intentions to use CBT technology enhanced (delivered via Internet, Facebook or cartoons). We conducted this study as there is limited knowledge regarding adolescents' and parents' attitudes related to CBT technology enhanced. Results of this study show that a great majority of adolescents and parents prefer traditional CBT (face-to-face) or they choose not to search for any treatment. When it comes to preferences regarding various new modalities to deliver CBT, both adolescents and their parents were more positive to CBT delivered via cartoons as compared to iCBT or to CBT delivered via Facebook. Youths and their parents have limited knowledge regarding the content of such programs, how these programs can be used and the empirical evidence on which they are based.

We investigated several predictors related to adolescents' intentions to use CBT technology enhanced and both adolescent and parent related predictors significantly contributed to the variance of adolescents' intentions to use CBT technology enhanced. Adolescents' and parents' knowledge regarding CBT technology enhanced were the most proximal predictors of adolescents' intentions to use CBT technology enhanced if available in Romania. This has major implications for designing effective interventions aimed to improve mental health treatments literacy in youth and parents.

We obtained different results as compared with studies conducted on Australian parents, where for example 94 % parents were favorable to using cCBT in case their children needed treatment and this would also be available (Sweeney et al., 2015). In our study, only 6.4 % parents indicated that they would definitely chose CBT technology enhanced if available in Romania, with a large percentage of undecided parents or parents that hold negative attitudes towards utilizing CBT technology enhanced. Further, our results were contrary to those found by Stallard and collaborators (2010) where parents hold more positive views regarding cCBT as compared with their children.

These results are contrary to those found in previous studies on cCBT and several potential reasons could be considered. Firstly, previous studies have been conducted in highly developed countries (e.g., Australia, Sweden, and United Kingdom) and there are significant differences between countries in what regards Internet access, Internet use and peoples' access to technology of information and communication. According to Eurostat (2014) only 68% of Romanian households have access to Internet as compared with more developed countries such as Sweden (91%), Norway (97%), United Kingdom (91%). Romania has the largest population without any experience of using Internet (39%) as compared with other European countries (Eurostat, 2014). There are also major differences in average daily use of Internet in Romania (32%) as compared to Norway (89%) or Iceland (94%). Second, results of our study indicated that Romanian adolescents and their parents have little computer literacy, which could have influenced their lack of trust in such programs.

These results should be interpreted in light of the existent limitations, such as relying on self-reported assessments, including only community samples of adolescents. Also, as we included only adolescents, results cannot be generalized to other Romanian youths and to their parents (e.g., to school-age children).

In conclusion, CBT technology enhanced literacy is the most proximal predictor of intentions to use such new treatments, therefore campaigns to inform the general public on the efficacy of such interventions should be conducted. Preliminary evidence shows that through interventions aimed to inform parents regarding CBT delivered via technology, knowledge regarding such interventions, attitudes (perceived benefits, intentions to use) and even perceived problems can be effectively changed (Sweeney et al., 2015, 2016).

Study 5. Does parental involvement in remote intervention improve outcomes? A systematic review[4]

Introduction

At present, according to mental health guidelines (National Institute for Health and Clinical Excellence, 2009), the first line treatment delivered in youth anxiety disorders is cognitive behaviour therapy (CBT), which is an efficient intervention for youths (James et al., 2015). However, a high number of youths are unresponsive to treatment (40%) (James et al., 2015).

Due to current problems in disseminating evidence-based treatments, remotely-delivered interventions have emerged and proved to be efficient treatments for multiple conditions, both in adults (Mayo-Wilson & Montgomery, 2013) and in youth populations (Ebert et al., 2015). There is a wide variety of remotely-delivered treatments for child and adolescents with anxiety disorders (Kazdin & Blase, 2011). Remote interventions can be delivered over Internet, computer, telephone, SMS, mobile apps, videoconferences, serious games and virtual reality devices. In the last years there has been a surge in such interventions due to people's greater access to technology.

There is mixed evidence regarding parental involvement in child CBT treatment, while there is proof that parental involvement does not add significantly to a child's therapy (James et al., 2015; Manassis et al., 2014). Recent studies show that parental involvement in child therapy is associated with better outcomes in terms of remission rates at follow-up (Walczak, Esbjørn, Breinholst, & Reinholdt-Dunne, 2016). So far, no qualitative or quantitative approaches have been conducted in order to investigate/summarize parental involvement in remotely-delivered CBT interventions with anxious children and adolescents. Such an approach is needed due to the fact that there are many remote interventions targeting mental health problems in youths which differ in several characteristics. Apart from characteristics related to the number of modules/sessions delivered, content, multimedia presentations, therapists involved (with or without clinician guidance), there are also differences with regard to parental involvement. While in several studies on remote CBT interventions, parents are mentioned only because they are the legal caregivers of the youth and they offer parental consent on their child's involvement in treatment, and are sometimes involved in the youths' mental health assessments (self-reports and clinician assessments) at the beginning and end of treatment, in other trials parents are actively involved in youth therapy. In these trials, parents read materials, help their children cope with anxiety and have phone sessions with clinicians. However, it is unclear whether parents should be involved in youth remote CBT anxiety treatment.

---

[4] This study has been accepted for publication in this form.

Păsărelu, C. R., și Dobrean, A. (in press). Parental involvement in remotely-delivered CBT interventions for anxiety problems in children and adolescents: a systematic review. In *New Acquisitions in Anxiety Disorders,* Intech Open Access Publisher, ISBN 978-953-51-4900-2.

The authors contributed to the article as follows: Păsărelu, C. R.: study design, conducting the study, writing the manuscript; Dobrean, A.: study design, writing the manuscript.

Method

The current systematic review has been conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement (Moher et al., 2009).

Inclusion and Exclusion Criteria

We included only (a) randomized controlled trials with (b) remotely-delivered (c) cognitive behavioural interventions for (d) youths (children and adolescents), with (e) either a primary diagnosis and/or elevated symptoms of anxiety, which also involved (f) parents in the intervention.

We excluded trials in which the intervention did not includ parental involvement in the treatment, the protocol was not CBT-oriented, or if the intervention was delivered exclusively for parents or conducted with adult participants. Also, trials in which the primary disorder was not anxiety, or targeted a primary medical condition, were excluded. Studies analysing secondary data, systematic reviews/theoretical synthesis of literature and feasibility studies were excluded. We selected only those studies published in English. There was no limitation regarding the year of publication.

Search Strategy

Electronic databases (PsychInfo, PubMed, Scopus, Web of Science) were consulted by two independent assessors up to 10th April 2016. We combined various terms related to the means of delivery, with terms pertaining to anxiety, as well as various terms indicating CBT treatments, and terms germane to children and adolescents. Finally, all these terms were combined with those related to randomized controlled trials. The reference lists of pertinent papers and meta-analyses published on the subject were screened in order to identify potentially relevant articles. We repeated the search on 25th July 2016 to double-check and identify whether new articles had been published since the first search.

Quality assessment

We assessed the quality of the studies included using the Risk of Bias' tool, developed by Cochrane Collaboration (Higgins et al., 2011). We included the following sources of bias: random sequence generation, allocation concealment, blinding outcome assessments and the incomplete outcome data. We did not include blinding of participants and personnel due to the fact that in remotely-delivered treatments, most of the time, the therapists involved cannot be blinded regarding patients' allocation.

Results

Literature search

The literature search resulted in 3121 records. After removing duplicates, we screened the titles and abstracts of 2340 papers. Of these, 2298 papers were rejected and we further read the full text of 42 papers. Thirty-four papers were rejected due to the following reasons: no parental involvement (n=12), interventions delivered exclusively with parents of anxious children (n=2), delivered only with adult participants (n=8), targeting a primary medical condition (n=1), not CBT (n=1), secondary analysis (n=1), not RCT (n=5), systematic reviews (n=2), primary disorder not anxiety (n=2). Subsequently, a total of eight RCTs were included in the synthesis. *Figure 1* presents the flowchart describing the inclusion of studies.

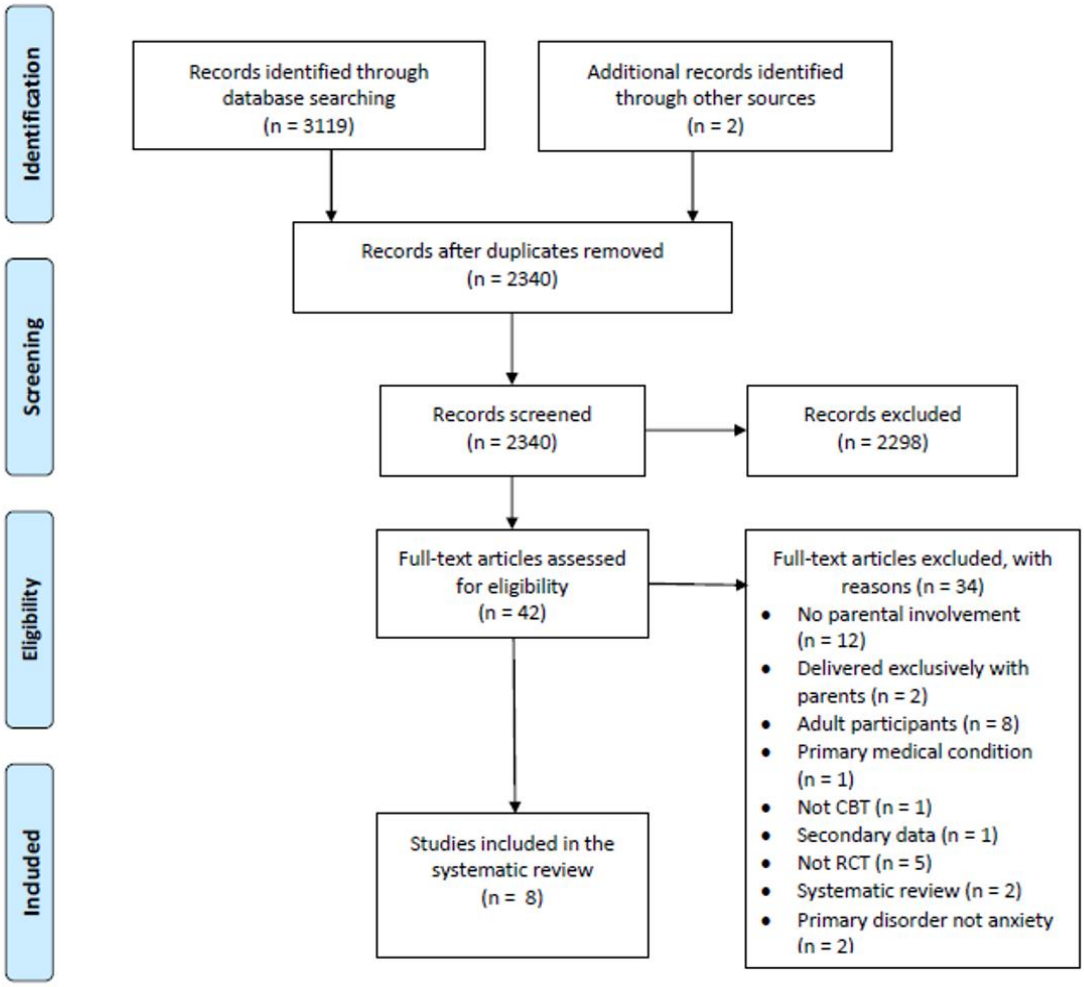

Figure 1. Flow diagram of the study selection process

Quality assessment

Most of these studies reported an adequate random sequence generation (n = 6), although in several studies the selection bias risk was unclear (n = 2). Only in one study was the allocation assignment concealed by sealed double envelopes, while in the other studies allocation concealment was unclear (n = 7). In most of the studies there were blind assessors (n = 7), whilst in one study there was a high risk of detection bias. There was no evidence of attrition bias, as there were either no missing data, or adequate statistical methods (intent-to-treat analysis) were used in order to control the effects of missing data. Only one of the studies included met all four of the quality criteria, while most of the trials included met two or three criteria.

Description of Interventions

We included three computerized interventions (Khanna & Kendall, 2010; Storch et al., 2015; Wuthrich et al., 2012), three CBT interventions delivered over the Internet (March et al., 2009; Spence et al., 2011; Vigerland et al., 2016), one audio intervention (Infantino et

al., 2016) and one intervention delivered through telephone (McGrath et al., 2011). Youths from the studies included were aged between 5 and 17, with more female participants (54%). Each intervention consisted of several module/lessons/sessions that ranged between 8 and 12, lasting between 20 and 60 minutes, and delivered between 5 and 12 weeks. Seven interventions also included a therapist/clinician, while one intervention did not include therapist guidance (Infantino et al., 2016).

All the interventions were conducted in highly developed countries: Australia (n = 4), USA (n = 2), Canada (n = 1), Sweden (n = 1). Four of the studies included compared a remotely-delivered intervention with waiting list control (Infantino et al., 2016; Spence et al., 2011; Vigerland et al., 2016; Wuthrich et al., 2012), two of the previous studies also compared remote intervention with psychoeducation (Khanna & Kendall, 2010; March et al., 2009), two studies compared it with treatment as usual (McGrath et al., 2011; Storch et al., 2015) and in three studies, remotely-delivered interventions were also compared with face-to-face CBT (Khanna & Kendall, 2010; March et al., 2009; Spence et al., 2011).

Parental involvement

Not all the studies reported demographic characteristics of the parents included, albeit most of the mothers and fathers included had completed higher education (university studies) and had a high annual income (expressed in several studies as more than 100.000 $). Studies differed slightly in what parental involvement meant, as while several interventions are described as a combination of parent and child treatment, in which parents have to also read several modules independently, in other interventions parents are involved only in two sessions in which psychoeducation is offered. In most of the interventions, parents learn core CBT principles and strategies in order to comprehend how to help their children to acquire the skills learnt in therapy and to assist them effectively when they encounter situations in which they can become anxious.

Conceptual model – how to design effective remotely-delivered interventions for anxious youth

Parental involvement in remotely-delivered CBT interventions needs to have a sound scientific background. Efficient remote CBT interventions need to take into consideration an important aspect that is often not considered: tailoring or personalizing an intervention according to patients' unique characteristics. Designing efficient interventions for children needs to take into account aspects related to: parents, children, parent-child relationship and treatment.

Several socio-demographic characteristics (age, gender) can be considered when designing remote interventions for anxious children and adolescents. Unique mental health symptoms and disorderly clinical presentations (anxiety and comorbidities) should be tackled with a focus on tailored and transdiagnostic remote treatments.

Several factors related to parents that have been investigated so far are: parental psychopathology, several socio-demographic factors related to parents (gender, education, income and family structure), parenting styles and parental accommodation. Parental psychopathology is related to treatment outcomes in anxious children (Liber et al., 2008), via family functioning and caregiver strain (Schleider et al., 2015). The proposed model is presented in *Figure 2*.

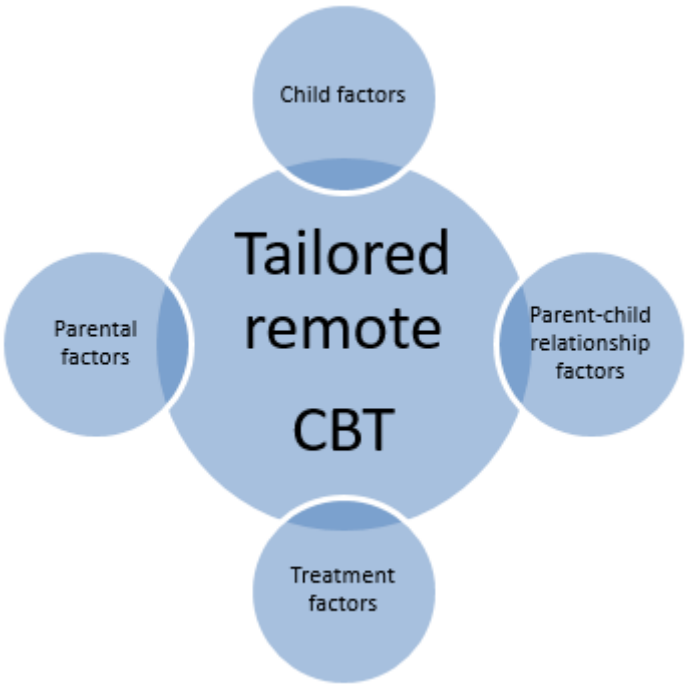

Figure 2. Conceptual model for designing tailored remotely-delivered CBT interventions with parental involvement.

Parental behaviors and parental cognitions have also been related to CBT outcomes (Esbjørn et al., 2014; Festen et al., 2013), with CBT treatment for anxious youth successfully changing parent-related variables (parenting, cognitions). Family accommodation for anxiety, defined as the involvement of parents in an anxious youth's efforts to avoid anxiety-provoking activities/situations is another important factor that should be considered. There is evidence that individual CBT delivered with anxious youths has an effect on parental accommodation (Kagan, Peterman, Carper, & Kendall, 2016); however, much research needs to be conducted regarding this aspect.

Parent-child relationship is an important variable that has to be considered when designing family interventions, as it is related to treatment outcomes (Crawford & Manassis, 2001). Relationship quality, family conflicts and familial dysfunction (for a review of parental involvement in CBT see Breinholst et al., 2012) should be assessed and considered when designing parental involvement in remote CBT.

Several factors related to treatment are: attitudes (expectations, credibility, myths/erroneous information, concerns about remote CBT, treatment preferences), treatment compliance, in and out session behaviors (Pereira et al., 2015). In a study investigating parental attitudes towards cCBT, it becomes apparent that parents are positive about using such interventions to help their anxious child. Except for parental demographic factors, clinical factors, and engagement with technology, knowledge of cCBT treatments is a great predictor of cCBT usage (Sweeney et al., 2015).

Discussions

The present study aims to present the current evidence on remote CBT interventions delivered for anxious children and adolescents with parental involvement. The systematic review includes eight papers in which remotely delivered interventions have been described. Interventions delivered over the computer (CD-ROM), Internet, telephone, and video were tested against waiting lists, psychoeducation, treatment-as-usual and face-to-face CBT. Parental involvement in most of the papers included was directed to teaching parents how to help their children or adolescents deal with situations triggering anxiety and to help their offspring to better acquire the core CBT elements they learn in therapy.

We then proposed a conceptual model in which several factors (parent-, child-, parent-child relationship, treatment-related) were considered in order to design efficient CBT remote interventions for youths with anxiety disorders.

This review should be interpreted considering several limitations. First, we included a small number of studies. Second, the majority of studies included were computerized and Internet CBT interventions. Future studies should test the efficacy of remote CBT interventions in randomized controlled trials. Also, the investigation of mechanisms of change is a major limitation in all these studies and future research should investigate such factors.

In conclusion, our systematic review raises several directions for future research on parental involvement in remote CBT interventions for anxious children and adolescents.

Study 6. The efficacy of a technology-enhanced transdiagnostic rational emotive behavioral universal prevention program for anxiety and depression in adolescents delivered in a school context

Introduction

Anxious and depressive disorders are highly prevalent in youth populations. They are often comorbid as they overlap in symptomatology, they involve common ethiopatogenetic mechanisms or the presence of anxiety gives a higher risk for the development of depression (Garber & Weersing, 2010). Preventing such problems could be an important aspect as there is evidence that often these disorders remain undetected, or even when they are diagnosed, a small percentage of adolescents receive adequate treatment. A main limitation of existent universal prevention programs, either for anxiety or depression, is the fact that only those outcomes that are targeted improve. For instance, a review shows that delivering prevention programs specifically targeting anxiety or depression disorders as main diagnosis are not associated with considerable reductions in the symptomatology of the comorbid condition (Garber et al., 2016). Here comes the need for transdiagnostic prevention programs, that target both anxiety and depression.

Research on transdiagnostic prevention programs delivered in school settings only recently started to emerge. There is high heterogeneity in studies investigating the efficacy of such programs, as the protocol/ theory on which these programs are based is very different from one study to another. For example, Nehmy and Wade (2015) tested the efficacy of a perfectionism program aiming to reduce negative affect in adolescents, while other prevention transdiagnostic programs are based on a mindfulness protocol (Johnson, Burke, Brinkman, & Wade, 2016), on interpersonal psychotherapy (Greca, Ehrenreich-May, Mufson, & Chan, 2016) or on cognitive behavior therapy (Martinsen, Kendall, Stark, & Neumer, 2016).

Technology can be an important vehicle in youth mental health services (Jones, 2014) as it improves access to evidence-based treatments in rural communities, it can surpass costs associated with mental health treatment.

Method

Design

A cluster (class) randomized controlled trial was conducted. After participants were recruited and baseline assessments were conducted, they were randomized by a computer program (www.random.org) in one of the three treatment conditions.

Participants

Eligible participants were adolescents: (1) aged between 14 and 17 years old, (2) attending middle school, (4) with sufficient understanding of the Romanian language. Children were recruited starting with March 2016 up to June 2016 through six public schools from Cluj-Napoca, Romania. Prior to assessment, parents signed the informed consent, agreeing to participate in the trial. No incentives were offered for participation.

Measures

Demographic characteristics. Adolescents completed a demographic questionnaire regarding their age, gender and current living situation.

Primary outcomes

Anxiety symptoms. *The Beck Anxiety Inventory for Youth* (BAI-Y; Beck et al., 2005) was used in order to assess adolescents' anxiety symptomatology. This scale contains 20 items rated on a 3 point Likert scale, with 0 = *Never* and 3 = *Always*. This instrument has adequate internal consistency in the current study for all three assessments (Alpha Cronbach rage .89 - .96).

Depressive symptoms. *The Beck Depression Inventory for Youth* (BDY-Y; Beck et al., 2005) was used to assess adolescents' depressive symptoms. This instrument contains 20 items, rated on a 3 point Likert scale, with 0 = *Never* and 3 = *Always*. Internal consistency in the current study for all three assessments was good (Alpha Cronbach rage .92 - .95).

Mechanisms of change

Treatment expectancies. We translated and adapted *The Credibility/ Expectancy Questionnaire* (Devilly & Borkovec, 2000) and used this instrument to assess adolescent's expectancies related to treatment. This instrument consisted of six items, scored on a 9 points Likert scale.

Irrational beliefs. In order to assess adolescents' irrational beliefs we developed a questionnaire, *The Irrationality Scale for Child and Adolescents* containing 24 items, rated on a 5 points Likert scale (1 = *Strongly disagree*, 5 = *Strongly agree*). This instrument has proved adequate internal consistency at all three assessments (Alpha Cronbach rage .89 - .92).

Secondary outcomes

Satisfaction with treatment. We translated and adapted *the Client Satisfaction Scale* (Vigerland et al., 2016). The adapted questionnaire consisted of 7 items, rated on a 9 points Likert scale. Higher scores on the Satisfaction with treatment scale indicate greater levels of satisfaction.

Procedure

The trial was registered at *clinicaltrials.gov* (identifier no. NCT02756507). The study was approved by the Institutional Review Board of Babeș-Bolyai University. Before pre-test assessments, parents gave their informed consent and adolescents agreed to participate in the study. Assessments and intervention sessions were conducted at school with the whole class. Three experienced psychotherapists conducted the sessions, randomly assigned to patients. Weekly supervision sessions with two senior psychotherapists (authors C.P.R and A.D.) took place in order to solve possible difficulties encountered during treatment.

Interventions

Group REBT with technology enhancements

The intervention consisted of six sessions of REBT technology enhanced delivered for three weeks (two times per weeks) in a group format. Research assistants presented each session a cartoon and after this a guided PowerPoint presentation. Basically, adolescents learned various aspects related to internalizing problems, how irrational beliefs influence dysfunctional emotions, how to construct a hierarchy of feared situations and to expose gradually. Also, they learned breathing and relaxation exercises. Between sessions homework were provided and these were checked at the beginning of each session.

Waiting list

Participants in the waiting list did not receive an intervention. They completed assessments at all three points.

Therapists

All the group sessions conducted in schools were conducted by three registered psychologists, Masters Students. Weekly sessions were conducted with the therapists in order to solve potential issues that resulted in the administration of the interventions. Treatment fidelity and therapists' adherence to the protocol were assessed by randomly listening to audio recordings of the sessions.

Statistical analyses

Statistical analyses were conducted using SPSS 23.0 software. First, one-way ANOVA/ Chi-Square tests were conducted to explore potential differences between participants from the three groups regarding age, gender, anxiety and depressive symptoms. At post-treatment and one month follow-up, continuous analysis were conducted using intent-to-treat principle the last observation carried forward. Repetead measures (RM) analyses of variance (ANOVAs) were used to investigate the efficacy of the REBT technology enhanced intervention to reduce anxiety and depressive outcomes as compared with control. For effect size data we used the multivariate partial η^2 (small effect size η^2 = .01, medium effect size η^2=.06, large effect size η^2= .14; Cohen, 1988).

Sample size estimation

A priori power analyses using G*Power version 3.1.5 (Faul et al. 2007) indicated that a total sample size of 112 would be sufficient to detect a small to medium effect size (f = 0.15) in a repeated measures ANOVA (Global Effects within-between interaction) with two groups and three time measurements with an alpha of 0.025 and a power of 90%, with a correlation between measurements assumed at 0.50.

Results

Baseline differences

Participants were 113 adolescents with ages between 14-17 years (M_{age} = 15.73, *SD* = .72). No significant differences between the two groups emerged in terms of demographic characteristics or anxiety, depressive symptomatology, irrationality, or expectancies regarding treatment (all $p > .05$).

Post-treatment differences

Table 1 presents participants' scores on anxiety, depression, and irrationality outcomes for each time assessment and within effect sizes for the experimental group from pre-treatment to 1 month follow-up.

Primary outcomes

For anxiety symptoms, results of 2*3 ANOVA with repeated measures showed a significant effect of time, F (2, 111) = 11.05, p <.001, η^2 = .19, a significant effect of group, F (2, 111) = 15.11, p < .001, η^2 = .14 and a non-significant interaction between Time and Group, F (2, 111) = 2.29, p = .107, η^2 = .04. Regarding Time differences, Bonferroni post-hoc tests indicated significant differences from T1 to T2 (p = .037), from T1 to T3 (p < .001) and from T2 to T3 (p = .002).

For depression symptoms, results of 2*3 ANOVA with repeated measures showed a significant effect of time, F (2, 111) = 5.79, p = .004, η^2 = .11, a marginally significant effect of group, F (2, 111) = 3.90, p = .051, η^2 = .04 and a significant interaction between Time and

Group, F (2, 111) = 4.90, p = .009, η^2 = .09. Regarding Time differences, Bonferroni post-hoc tests indicated significant differences from T1 to T2 (p = .034), from T1 to T3 (p = .003). There were no significant differences from T2 to T3 (p = .160). For Group x Time interactions, pairwise comparisons (Sidak adjustments) indicated significant differences in the Experimental group from T1 to T2 (p = .001), from T1 to T3 (p < .001) and from T2 to T3 (p = .037), while in the WL condition there were no significant changes from T1 to T2, T1 to T3, T2 to T3 (all p > .005).

Table 1
Means and standard deviations for the experimental group and waiting list group for each time point assessments and within group effect sizes with confidence intervals

	Baseline		Posttest		Follow-up		Pre-follow up within effect sizes *d* [95% CI]
	Exp	WL	Exp	WL	Exp	WL	
Anxiety symptoms	15.98 (1.35)	19.79 (1.47)	12.29 (1.30)	18.88 (1.42)	8.45 (1.31)	17.04 (1.43)	.53 [.29, .77]
Depressive symptoms	15.08 (11.42)	14.32 (9.97)	9.85 (8.98)	14.26 (10.07)	7.39 (6.71)	14.02 (11.22)	.39 [.15, .62]
Irrationality	63.98 (12.68)	66.02 (13.09)	52.05 (13.51)	67.13 (13.09)	51.69 (14.90)	61.15 (14.75)	.58 [.35, .81]

Note. EXP = Experimental group; WL = waiting list; CI = Confidence interval

Mechanisms of change

Expectancies regarding treatment

Mean expectancies ratings were high as reported to maximum scores that could be obtained on this scale (M = 31.82, SD = 7.88).

Irrationality

On irrational beliefs, results of 2*3 ANOVA with repeated measures showed a significant effect of time, F (2, 111) = 16.24, p < .001, η^2 = .28, a significant effect of group, F (2, 111) = 12.44, p < .001, η^2 = .13 and a significant interaction between Time and Group, F (2, 111) = 5.89, p = .017, η^2 = .16. Regarding Time differences, Bonferroni post-hoc tests indicated significant differences from T1 to T2 (p < .001) and from T1 to T3 (p < .001). There were no significant differences from T2 to T3 (p = .080). For Group x Time interactions, pairwise comparisons (Sidak adjustments) indicated significant differences in the Experimental group, while in the WL condition there were no significant changes from T1 to T2, T1 to T3, T2 to T3 (all p > .005).

Secondary outcomes

Treatment satisfaction

The means scores for adolescents' ratings on treatment satisfaction (M = 41.10, SD = 14.88) are considered high as reported to maximum scores that could be obtained on this scale.

Attrition analysis

Figure 1 presents the flow diagram of the study. Dropout rates were low, namely 15.78 % of the participants in the Experimental group, 21.42 % of the participants in the WL dropped out. There were no significant differences in demographic characteristics or baseline measures between completers and non-completers ($p > .05$).

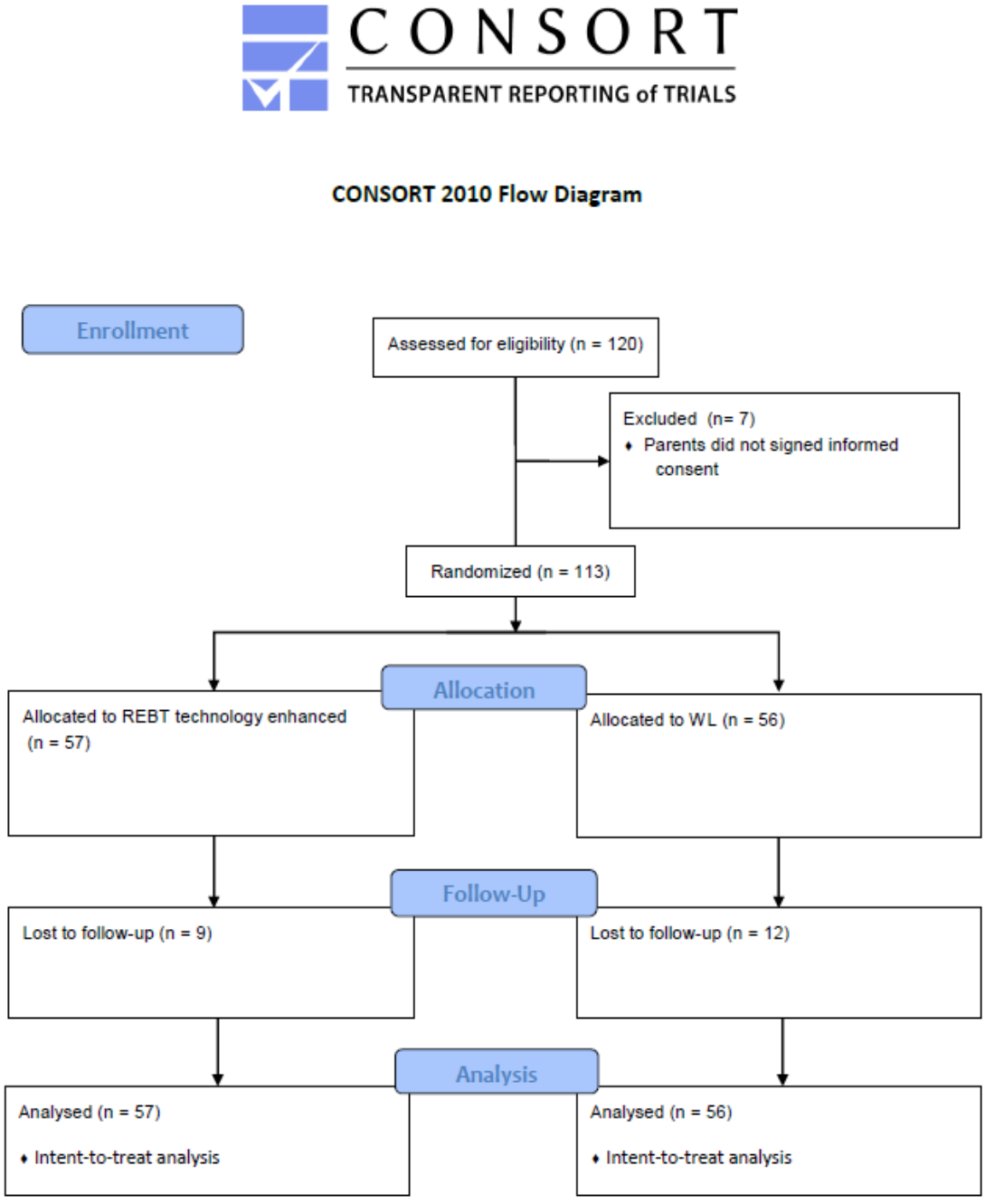

Figure 1. Flow diagram of the study participants

Discussions

Universal school delivered prevention programs are great ways to prevent the onset of youths' anxiety and depression disorders, two of the most common problems that emerge in adolescence. The aim of the present study was to investigate the efficacy of a universal prevention transdiagnostic REBT intervention delivered in a school format as compared with waiting list. This is the first study investigating the efficacy of a transdiagnostic REBT program in reducing anxiety and depression in adolescents. Also, it is the first study that integrated REBT with technology in the format of a cartoon-based program efficient in reducing anxiety and depression outcomes in youths.

Results of our study indicated that a prevention REBT program delivered in a school setting can be effective in reducing anxiety and depression outcomes. Furthermore, the intervention has a significant effect on irrational beliefs and adolescents' satisfaction ratings were high. Cartoon-based interventions take into consideration young peoples' predilection to use technology. Adolescents' opinions regarding how to design effective mental health interventions are an important aspect that needs full consideration when designing treatments.

Future studies should investigate several moderators, such as the role of variations in terms of program durations (short vs. long) or the importance of different technological supports (website, app, SMS intervention). Also, the efficacy of REBT interventions with technology enhancements, either delivered via cartoons, Internet, DVDs, text-messages, apps, social media should be investigated in clinical populations of adolescents.

When interpreting results of the present study we need to keep in mind several limitations, such as: the lack of clinical assessments conducted with teens, the lack of an active control group. Future randomized controlled trials should try to replicate findings of the present study in diverse samples of youths (preschool or school-age children). Also, comparing such program with active controls and with gold-standard treatments should be a further step in establishing the efficacy of such programs that could be next included in clinical guidelines on prevention programs for internalizing problems in youths.

CHAPTER IV. GENERAL CONCLUSIONS AND IMPLICATIONS

The general aim of the present research was to investigate the efficacy of transdiagnostic treatments delivered with technology enhancements. Given the high prevalence (Remes et al., 2016; Polanczyk et al., 2015; Wittchen et al, 2011) and huge burden of anxiety and depressive disorders (Erskine et al., 2015), focusing on developing the best treatments for these conditions is an important aspect. Major gaps in the dissemination of evidence-based treatments exist (Andrade et al., 2014; Rocha et al., 2015) and even when patients have access to treatments, a significant percentage of them are unresponsive (Fernandez et al., 2015; Wergerland et al., 2015). Most of the gold-standard treatments offered for youths with anxiety and depression disorders are diagnostic-specific, delivered in a sequential manner. Transdiagnostic treatments came to solve such problems (Barlow et al., 2004), however up to this moment their efficacy is insufficiently investigated in youth populations.

Technological innovations in mental health services have the potential to overcome barriers in the dissemination of mental health treatments. However, research on transdiagnostic treatments delivered via technology is scarce and despite the fact that they are promising approaches (Titov et al., 2011, 2013, 2015, 2016), much research is needed in order to determine their efficacy in youth populations.

In an effort to offer a comprehensive view on the efficacy of transdiagnostic treatments delivered via Internet, our research began with a first study where we computed an overall effect size of transdiagnostic and individually-tailored iCBT on anxiety, depression and quality of life. Further, in the second study we were oriented towards evidence-based assessment as we translated and adapted one of the most frequently used scales that assesses worry in children and adolescents. We did not only investigated its psychometric properties (e.g., reliability, validity), but proceeded further, and by means of confirmatory factor analysis, we aimed to determine its measurement invariance across age, gender and clinical status. Once established a worry assessment instrument, with sound psychometric properties, in Study 3 we investigated the transdiagnostic role of child worry in internalizing problems, such as social anxiety, generalized anxiety and major depression. The special focus of this study was on the transmission of worry across generations. As patients' preferences are important aspects in psychological evidence-based treatments, in Study 4 we aimed to investigate Romanian adolescents' and parents' attitudes towards mental health treatments delivered via technology. Further, given the fact that parents have important contributions to their offspring internalizing problems and that there are mixed results coming from the literature on traditional CBT in what regards parental involvement in youths' therapy, we aimed to determine in a comprehensive review the state of the art regarding parental involvement in remotely-delivered treatments for child anxiety problems. Finally, in Study 6 we aimed to investigate the efficacy of a technology-enhanced transdiagnostic universal prevention program for anxiety and depression in adolescents, based on a REBT protocol.

4.1. THEORETICAL AND METHODOLOGICAL ADVANCES

The present research has important contributions, both theoretical and methodological. The contributions of this research at a methodological level are illustrated in the first two studies. In Study 1 we quantified the overall effect size on anxiety, depression and quality of life outcomes of two types of technology enhanced treatments, namely transdiagnostic and individually-tailored CBT treatments delivered via Internet. Further, by investigating the role that several moderators have on treatment outcomes, we provide evidence for further developments in such treatments. This findings are important as they show that transdiagnostic and individually-tailored iCBT interventions have large effect sizes on anxiety and depression outcomes and moderate effect sizes on quality of life outcomes. Such findings clearly set the stage for the upcoming studies investing technological enhancements in delivering evidence-based treatments that target comorbidities.

In Study 2 we investigated the psychometric properties of the Penn State Worry Questionnaire for Children. This study contributes to the domain of evidence-based assessments in youth mental health. By establishing measurement invariance across age, gender and clinical status, we validated in Romanian language a sound instrument that can be easily administrated and scored. Moreover, by conducting this study we established that existent differences in scores between girls and boys, children and adolescents, community and clinical samples, are not determined by errors in measurement.

Theoretical findings coming from Study 3, Study 4 and Study 6 have important implications for fundamental research. Results from Study 3 show that intergenerational transmitted factors, such as worry, can be transdiagnostic factors in several of the most common youth mental health disorders (e.g., social phobia, depression, generalized anxiety disorder). These findings, along with those coming from the literature that show mixed findings regarding parental involvement in youths' treatment, guided us to investigate whether parents should be involved into remotely-delivered treatments. Therefore, Study 4 brings light on a much neglected aspect in child's remote treatment, namely parental involvement. Research conducted so far is extremely heterogeneous, without the possibility of extracting conclusions whether parents should or should not be involved in their offspring's treatment when this is delivered via technology. This is in line with studies coming from traditional CBT where the debate of involving parents in therapy is an ongoing process. Our theoretical contribution from this study is indicated by the proposed model illustrating important factors that need to be considered when designing effective remotely-delivered interventions.

Finally, results of Study 6 contribute to the scarcity of randomized controlled trials on transdiagnostic universal prevention programs for internalizing problems in youths. The fact that the prevention program was superior to a waiting list control in terms of anxiety and depression reductions contributes to the integration of evidence-based treatments with the rapid developments in technology and calls for further investigations that compare such intervention with active treatments such as gold standard.

4.2. PRACTICAL/ CLINICAL ADVANCES

First, the present research contributes substantially to new developments in the field of evidence-based practice. Study 2 adds to the literature pertaining to the development of assessment tools designed to measure worry in children. By validating the Romanian version of the *Penn State Worry Questionnaire for Children*, we contribute to the amount of existent instruments adapted for Romanian populations. Further, we provide Romanian clinical psychologists and researchers with a valid instrument, easy to administer and score, that can be used to detect children at risk of developing anxiety problems.

Second, by developing a series of cartoons we provide a valuable tool that can be used both in research and in clinical practice with children and adolescents. By testing the efficacy of a Rational Emotive and Behavioral Therapy prevention program technology enhanced, we contribute to innovations in the dissemination of mental health treatments. Such transdiagnostic programs, easy to deliver and developed using a technological format request very little input from the people that administer the intervention. This could have important practical implications, as such interventions could be easy delivered by staff that is not trained in mental health (e.g., school teachers, nurses, general practitioners), parents and other caregivers or it could be available in a self-help format.

Through Study 6, we provide "a rational-emotive behavioral vaccine" for children and adolescents at risk of developing internalizing disorders, in an appealing manner, with minimal costs associated. Also, another important step in the mental health services of youths is the ecological validity. This research has ecological validity as it was delivered in a universal format delivered in a school setting where children spend a large amount of time. As most of the mental health problems have the onset in adolescence, targeting more than one disorder at a time in a prevention program could contribute to a delayed onset of such disorders.

4.3. SUMMARY OF GENERAL CONCLUSIONS

Several conclusions that emerged from this research paper can be summarized as follows:

(1) Individually-tailored and transdiagnostic iCBT interventions have moderate to large effects on anxiety and depression outcomes and small to moderate effect sizes on quality of life outcomes;
(2) The Romanian version of the *Penn State Worry Questionnaire for Children* has proved measurement invariance across ages, gender and clinical status;
(3) Worry is a transdiagnostic factor involved in youths internalizing problems that is transmitted across generations;
(4) Adolescents' and parents' knowledge regarding technology delivered CBT interventions is the most important predictor of the adolescents' intentions to use such programs;
(5) Existent research conducted in the domain of remote treatments for children anxiety are inconclusive regarding whether parents should be included or not;
(6) Group transdiagnostic REBT universal prevention programs with technology enhancements (e. g., via cartoons) delivered in a school setting can be promising approaches in adolescents' anxiety and depressive problems.

4.4. LIMITATIONS AND FUTURE DIRECTIONS

Results of the present research should be interpreted in the light of several limitations. Directions for future research, derived from these limitations are mentioned in this section.

First, the main limitation from Study 1 is the lack of randomized controlled trials comparing individually-tailored or transdiagnostic iCBT with face-to-face CBT. Due to the fact that no such study was found, caution is required when interpreting these results in terms of relative efficacy. Second, the main limitation coming from Study 2, Study 3, Study 4 and Study 6 is the reliance on self-reported data. No diagnostic interviews were conducted with children or with their parents and this can have important implications in terms of possible confounds such as the presence of mental health pathology. Even though in Study 2 we included a clinical sample recruited from a child psychiatric unit, in Study 3, Study 4 and Study 5 we recruited participants only from schools. Therefore, in these studies data was collected only from convenience samples.

Another important methodological consideration is the fact that Study 3 is correlational, therefore not allowing us to draw conclusions on causality. Important relationships in the dynamics of worry in parents and children across development coming from experimental and longitudinal studies could have informed more our research on the intergenerational transmission of worry. Another important aspect is that even though in Study 3 and Study 4 both parents have been invited to take part in our research, more mothers participated. This limited the investigation of parent gender as a moderator, without possibilities to inform whether mothers or fathers contribute differently to child's worry (Study 3), or whether mothers and fathers differ in attitudes towards their offspring's treatment (Study 4).

Despite considering these limitations, the present thesis has important contributions in the research on evidence-based assessments and interventions for youth populations. The promising results that we found on the efficacy of transdiagnostic interventions delivered via technology, either derived from the meta-analysis where Internet delivered CBT interventions were considered, either coming from the results of the randomized controlled trial where technological enhancement consisted of a series of cartoons based on a Rational Emotive and Behavioral Therapy protocol, set the stage for further investigations in the area of transdiagnostic interventions technology-enhanced in children and adolescents.

Future replications of this research with more diverse samples, consisting in younger children could inform whether the efficacy of universally transdiagnostic prevention programs might be influenced by youths' age. Also, testing the efficacy of transdiagnostic interventions as compared with controls in randomized controlled trials for clinical samples of children diagnosed with anxiety and/or depressive disorders would be an important aspect to investigate further. Further, determining mechanisms of change should be an important target of new studies, as so far there is limited research on such factors in mental health interventions delivered via technology. Another important focus of future research should be on the efficacy of interventions that aim to improve parents' and youth' mental health treatment literacy. Such an approach would be useful in order to discover potential misconceptions and to clarify the scientific support of technology enhanced treatments for anxiety and depression in children and adolescents.

SELECTIVE REFERENCES

Aboujaoude, E., & Salame, W. (2016). Technology at the Service of Pediatric Mental Health: Review and Assessment. *The Journal of Pediatrics*, *171*, 20–24. https://doi.org/10.1016/j.jpeds.2015.12.009

Achenbach, T. M., Rescorla, L. (2001). *Manual for ASEBA school-age forms & profiles.* Burlington, VT: University of Vermont, Research Center for Children, Youth, and Families.

Andersson, G. (2016). Internet-Delivered Psychological Treatments. *Annual Review of Clinical Psychology*, *12*(1), 157–179. https://doi.org/10.1146/annurev-clinpsy-021815-093006

Andersson, G., Cuijpers, P., Carlbring, P., Riper, H., & Hedman, E. (2014). Guided Internet-based vs. face-to-face cognitive behavior therapy for psychiatric and somatic disorders: a systematic review and meta-analysis. *World Psychiatry: Official Journal of the World Psychiatric Association (WPA)*, *13*(3), 288–295. http://doi.org/10.1002/wps.20151

Andrade, L. H., Alonso, J., Mneimneh, Z., Wells, J. E., Al-Hamzawi, A., Borges, G., … Kessler, R. C. (2014). Barriers to Mental Health Treatment: Results from the WHO World Mental Health (WMH) Surveys. *Psychological Medicine*, *44*(6), 1303–1317. https://doi.org/10.1017/S0033291713001943

Arbuckle, J. L. (2006). Amos (Version 22.0) [Computer Program]. Chicago, IL: SPSS.

Axelson, D. A., & Birmaher, B. (2001). Relation between anxiety and depressive disorders in childhood and adolescence. *Depression and Anxiety*, *14*(2), 67–78.

Barlow, D. H., Allen, L. B., & Choate, M. L. (2004). Toward a unified treatment for emotional disorders. *Behavior Therapy*, *35*(2), 205–230. http://doi.org/10.1016/S0005-7894(04)80036-4

Berger, T., Boettcher, J., & Caspar, F. (2014). Internet-based guided self-help for several anxiety disorders: a randomized controlled trial comparing a tailored with a standardized disorder-specific approach. *Psychotherapy (Chicago, Ill.)*, *51*(2), 207–219. http://doi.org/10.1037/a0032527

Biederman, J., Faraone, S., Mick, E., & Lelon, E. (1995). Psychiatric comorbidity among referred juveniles with major depression: fact or artifact? *Journal of the American Academy of Child and Adolescent Psychiatry*, *34*(5), 579–590. https://doi.org/10.1097/00004583-199505000-00010

Birmaher, B., Khetarpal, S., Brent, D., Cully, M., Balach, L., Kaufman, J., & Neer, S. M. (1997). The Screen for Child Anxiety Related Emotional Disorders (SCARED): Scale construction and psychometric characteristics. *Journal of the American Academy of Child & Adolescent Psychiatry*, *36*(4), 545–553. https://doi.org/10.1097/00004583-199704000-00018

Bodden, D. H. M., Dirksen, C. D., & Bögels, S. M. (2008). Societal Burden of Clinically Anxious Youth Referred for Treatment: A Cost-of-illness Study. *Journal of Abnormal Child Psychology*, *36*(4), 487–497. https://doi.org/10.1007/s10802-007-9194-4

Borkovec, T. D., Robinson, E., Pruzinsky, T., & DePree, J. A. (1983). Preliminary exploration of worry: Some characteristics and processes. *Behaviour Research and Therapy*, *21*(1), 9–16. https://doi.org/10.1016/0005-7967(83)90121-3

Carlbring, P., Maurin, L., Törngren, C., Linna, E., Eriksson, T., Sparthan, E., … Andersson, G. (2011). Individually-tailored, Internet-based treatment for anxiety disorders: A randomized controlled trial. *Behaviour Research and Therapy*, *49*(1), 18–24. http://doi.org/10.1016/j.brat.2010.10.002

Chorpita, B. F., Tracey, S. A., Brown, T. A., Collica, T. J., & Barlow, D. H. (1997). Assessment of worry in children and adolescents: An adaptation of the Penn State Worry Questionnaire. *Behaviour Research and Therapy*, *35*(6), 569–581. https://doi.org/10.1016/S0005-7967(96)00116-7

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Earlbaum Associates.

Connor, K. M., Davidson, J. R., Churchill, L. E., Sherwood, A., Foa, E., & Weisler, R. H. (2000). Psychometric properties of the Social Phobia Inventory (SPIN). New self-rating scale. *The British Journal of Psychiatry: The Journal of Mental Science, 176,* 379–386.

David, D., & Montgomery, G. H. (2011). The Scientific Status of Psychotherapies: A New Evaluative Framework for Evidence-Based Psychosocial Interventions. *Clinical Psychology: Science and Practice, 18*(2), 89–99. http://doi.org/10.1111/j.1468-2850.2011.01239.x

Day, V., McGrath, P. J., & Wojtowicz, M. (2013). Internet-based guided self-help for university students with anxiety, depression and stress: A randomized controlled clinical trial. *Behaviour Research and Therapy, 51*(7), 344–351. http://doi.org/10.1016/j.brat.2013.03.003

Dear, B. F., Staples, L. G., Terides, M. D., Fogliati, V. J., Sheehan, J., Johnston, L., … Titov, N. (2016). Transdiagnostic versus disorder-specific and clinician-guided versus self-guided internet-delivered treatment for Social Anxiety Disorder and comorbid disorders: A randomized controlled trial. *Journal of Anxiety Disorders, 42,* 30–44. http://doi.org/10.1016/j.janxdis.2016.05.004

Dear, B. F., Staples, L. G., Terides, M. D., Karin, E., Zou, J., Johnston, L., … Titov, N. (2015b). Transdiagnostic versus disorder-specific and clinician-guided versus self-guided internet-delivered treatment for generalized anxiety disorder and comorbid disorders: A randomized controlled trial. *Journal of Anxiety Disorders, 36,* 63–77. http://doi.org/10.1016/j.janxdis.2015.09.003

Dear, B. F., Zou, J. B., Ali, S., Lorian, C. N., Johnston, L., Sheehan, J., … Titov, N. (2015a). Clinical and cost-effectiveness of therapist-guided internet-delivered cognitive behavior therapy for older adults with symptoms of anxiety: a randomized controlled trial. *Behavior Therapy*, *46*(2), 206–217. http://doi.org/10.1016/j.beth.2014.09.007

Donovan, C. L., Poole, C., Boyes, N., Redgate, J., & March, S. (2015). Australian mental health worker attitudes towards cCBT: What is the role of knowledge? Are there differences? Can we change them? *Internet Interventions*, *2*(4), 372–381. https://doi.org/10.1016/j.invent.2015.09.001

Esbjørn, B. H., Sømhovd, M. J., Nielsen, S. K., Normann, N., Leth, I., & Reinholdt-Dunne, M. L. (2014). Parental changes after involvement in their anxious child's cognitive behavior therapy. *Journal of Anxiety Disorders*, *28*(7), 664–670. https://doi.org/10.1016/j.janxdis.2014.07.008

Eurostat. (2014). Households having access to the Internet by type of connection. Retrieved October 20, 2016, from http://ec.europa.eu/eurostat/statistics-explained/index.php/Digital_economy_and_society_statistics_households_and_individuals#Further_Eurostat_information

Fernandez, E., Salem, D., Swift, J. K., & Ramtahal, N. (2015). Meta-analysis of dropout from cognitive behavioral therapy: Magnitude, timing, and moderators. *Journal of Consulting and Clinical Psychology*, *83*(6), 1108–1122. https://doi.org/10.1037/ccp0000044

Fisak, B. J., Holderfield, K. G., Douglas-Osborn, E., & Cartwright-Hatton, S. (2012). What do Parents Worry About? Examination of the Construct of Parent Worry and the Relation to Parent and Child Anxiety. *Behavioural and Cognitive Psychotherapy*, *40*(05), 542–557. https://doi.org/10.1017/S1352465812000410

Fogliati, V. J., Dear, B. F., Staples, L. G., Terides, M. D., Sheehan, J., Johnston, L., … Titov, N. (2016). Disorder-specific versus transdiagnostic and clinician-guided versus self-guided internet-delivered treatment for panic disorder and comorbid disorders: A randomized controlled trial. *Journal of Anxiety Disorders, 39,* 88–102. http://doi.org/10.1016/j.janxdis.2016.03.005

Garber, J., & Weersing, V. R. (2010). Comorbidity of Anxiety and Depression in Youth: Implications for Treatment and Prevention. *Clinical Psychology: A Publication of the*

Division of Clinical Psychology of the American Psychological Association, *17*(4), 293–306. https://doi.org/10.1111/j.1468-2850.2010.01221.x

Garber, J., Brunwasser, S. M., Zerr, A. A., Schwartz, K. T. G., Sova, K., & Weersing, V. R. (2016). Treatment and Prevention of Depression and Anxiety in Youth: Test of Cross-Over Effects. *Depression and Anxiety*, *33*(10), 939–959. https://doi.org/10.1002/da.22519

Infantino, A., Donovan, C. L., & March, S. (2016). A randomized controlled trial of an audio-based treatment program for child anxiety disorders. *Behaviour Research and Therapy*, *79*, 35–45. https://doi.org/10.1016/j.brat.2016.02.007

Johansson, R., Sjöberg, E., Sjögren, M., Johnsson, E., Carlbring, P., Andersson, T., … Andersson, G. (2012). Tailored vs. standardized internet-based cognitive behavior therapy for depression and comorbid symptoms: a randomized controlled trial. *PloS One*, *7*(5), e36905. http://doi.org/10.1371/journal.pone.0036905

Johnston, L., Titov, N., Andrews, G., Spence, J., & Dear, B. F. (2011). A RCT of a transdiagnostic internet-delivered treatment for three anxiety disorders: examination of support roles and disorder-specific outcomes. *PloS One*, *6*(11), e28079. http://doi.org/10.1371/journal.pone.0028079

Kertz, S. J., Bigda-Peyton, J. S., Rosmarin, D. H., & Björgvinsson, T. (2012). The importance of worry across diagnostic presentations: prevalence, severity and associated symptoms in a partial hospital setting. *Journal of Anxiety Disorders*, *26*(1), 126–133. https://doi.org/10.1016/j.janxdis.2011.10.005

Kessler, R. C., Sampson, N. A., Berglund, P., Gruber, M. J., Al-Hamzawi, A., Andrade, L., … Wilcox, M. A. (2015). Anxious and non-anxious major depressive disorder in the World Health Organization World Mental Health Surveys. *Epidemiology and Psychiatric Sciences*, *24*(3), 210–226. https://doi.org/10.1017/S2045796015000189

La Greca, A. M., & Lopez, N. (1998). Social anxiety among adolescents: Linkages with peer relations and friendships. *Journal of Abnormal Child Psychology*, *26*(2), 83–94. https://doi.org/10.1023/A:1022684520514

Mayo-Wilson, E., & Montgomery, P. (2013). Media-delivered cognitive behavioural therapy and behavioural therapy (self-help) for anxiety disorders in adults. *The Cochrane Database of Systematic Reviews*, (9), CD005330. http://doi.org/10.1002/14651858.CD005330.pub4

McEvoy, P. M., Watson, H., Watkins, E. R., & Nathan, P. (2013). The relationship between worry, rumination, and comorbidity: evidence for repetitive negative thinking as a transdiagnostic construct. *Journal of Affective Disorders*, *151*(1), 313–320. https://doi.org/10.1016/j.jad.2013.06.014

Meyer, T. J., Miller, M. L., Metzger, R. L., & Borkovec, T. D. (1990). Development and validation of the Penn State Worry Questionnaire. *Behaviour Research and Therapy*, *28*(6), 487–495.

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & PRISMA Group. (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *Annals of Internal Medicine*, *151*(4), 264–269.

National Institute for Health and Care Excellence (2013). *Social Anxiety Disorder: Recognition, Assessment and Treatment. NICE Clinical Guideline 159*. Manchester: National Institute for Health and Care Excellence.

National Institute for Health and Clinical Excellence (2009). *Depression: Management of depression in primary and secondary care. Revised clinical practice guideline Number 23*. London: National Institute for Health and Clinical Excellence

Norton, P. J., & Paulus, D. J. (2015). Toward a Unified Treatment for Emotional Disorders: Update on the Science and Practice. *Behavior Therapy*. http://doi.org/10.1016/j.beth.2015.07.002

Orton, G. L. (1982). A comparative study of children's worries. *The Journal of Psychology*, *110*(2d Half), 153–162. https://doi.org/10.1080/00223980.1982.9915336

Pestle, S. L., Chorpita, B. F., & Schiffman, J. (2008). Psychometric properties of the Penn State Worry Questionnaire for children in a large clinical sample. *Journal of Clinical Child and Adolescent Psychology: The Official Journal for the Society of Clinical Child and Adolescent Psychology, American Psychological Association, Division 53*, *37*(2), 465–471. https://doi.org/10.1080/15374410801955896

Polanczyk, G. V., Salum, G. A., Sugaya, L. S., Caye, A., & Rohde, L. A. (2015). Annual research review: A meta-analysis of the worldwide prevalence of mental disorders in children and adolescents. Journal of Child Psychology and Psychiatry, and Allied Disciplines, 56(3), 345–365. https://doi.org/10.1111/jcpp.12381

Rhee, S. H., Lahey, B. B., & Waldman, I. D. (2015). Comorbidity Among Dimensions of Childhood Psychopathology: Converging Evidence From Behavior Genetics. *Child Development Perspectives*, *9*(1), 26–31. https://doi.org/10.1111/cdep.12102

Schröder, J., Jelinek, L., & Moritz, S. (2016). A randomized controlled trial of a transdiagnostic Internet intervention for individuals with panic and phobias - One size fits all. *Journal of Behavior Therapy and Experimental Psychiatry*, *54*, 17–24. http://doi.org/10.1016/j.jbtep.2016.05.002

Silverman, W. K., La Greca, A. M., & Wasserstein, S. (1995). What do children worry about? Worries and their relation to anxiety. *Child Development*, *66*(3), 671–686.

Spence, S. H., Donovan, C. L., March, S., Gamble, A., Anderson, R. E., Prosser, S., & Kenardy, J. (2011). A randomized controlled trial of online versus clinic-based CBT for adolescent anxiety. *Journal of Consulting and Clinical Psychology*, *79*(5), 629–642. https://doi.org/10.1037/a0024512

Stallard, P., Velleman, S., & Richardson, T. (2010). Computer Use and Attitudes Towards Computerised Therapy Amongst Young People and Parents Attending Child and Adolescent Mental Health Services. *Child and Adolescent Mental Health*, *15*(2), 80–84. https://doi.org/10.1111/j.1475-3588.2009.00540.x

Sweeney, G. M., Donovan, C. L., March, S., & Laurenson, S. D. (2016). Can we improve parent attitudes and intentions to access computer-based therapies for their children and adolescents? *Child and Adolescent Mental Health*, n/a-n/a. https://doi.org/10.1111/camh.12180

Sweeney, G. M., Donovan, C. L., March, S., & Laurenson, S. D. (2015). Logging into therapy: Parent attitudes and intentions to use computer-based therapies for youth mental health. *Internet Interventions*, *2*(4), 437–445. https://doi.org/10.1016/j.invent.2015.11.001

Titov, N., Andrews, G., Johnston, L., Robinson, E., & Spence, J. (2010). Transdiagnostic Internet treatment for anxiety disorders: A randomized controlled trial. *Behaviour Research and Therapy*, *48*(9), 890–899. http://doi.org/10.1016/j.brat.2010.05.014

Titov, N., Dear, B. F., Johnston, L., Lorian, C., Zou, J., Wootton, B., … Rapee, R. M. (2013). Improving adherence and clinical outcomes in self-guided internet treatment for anxiety and depression: randomised controlled trial. *PloS One*, *8*(7), e62873. http://doi.org/10.1371/journal.pone.0062873

Titov, N., Dear, B. F., Staples, L. G., Terides, M. D., Karin, E., Sheehan, J., … McEvoy, P. M. (2015). Disorder-specific versus transdiagnostic and clinician-guided versus self-guided treatment for major depressive disorder and comorbid anxiety disorders: A randomized controlled trial. *Journal of Anxiety Disorders*, *35*, 88–102. http://doi.org/10.1016/j.janxdis.2015.08.002

Titov, N., Fogliati, V. J., Staples, L. G., Gandy, M., Johnston, L., Wootton, B., … Dear, B. F. (2016). Treating anxiety and depression in older adults: randomised controlled trial

comparing guided v. self-guided internet-delivered cognitive–behavioural therapy. *British Journal of Psychiatry Open*, *2*(1), 50–58. http://doi.org/10.1192/bjpo.bp.115.002139

Vandenberg, R. J., & Lance, C. E. (2000). A review and synthesis of the measurement invariance literature: Suggestions, practices, and recommendations for organizational research. *Organizational Research Methods*, *3*(1), 4–69. https://doi.org/10.1177/109442810031002

Vigerland, S., Ljótsson, B., Thulin, U., Öst, L.-G., Andersson, G., & Serlachius, E. (2016). Internet-delivered cognitive behavioural therapy for children with anxiety disorders: A randomised controlled trial. *Behaviour Research and Therapy*, *76*, 47–56. https://doi.org/10.1016/j.brat.2015.11.006

Wergeland, G. J. H., Fjermestad, K. W., Marin, C. E., Haugland, B. S.-M., Silverman, W. K., Öst, L.-G., … Heiervang, E. R. (2015). Predictors of dropout from community clinic child CBT for anxiety disorders. *Journal of Anxiety Disorders*, *31*, 1–10. https://doi.org/10.1016/j.janxdis.2015.01.004

Whiteford, H. A., Ferrari, A. J., Degenhardt, L., Feigin, V., & Vos, T. (2015). The Global Burden of Mental, Neurological and Substance Use Disorders: An Analysis from the Global Burden of Disease Study 2010. *PLOS ONE*, *10*(2), e0116820. http://doi.org/10.1371/journal.pone.0116820

Wittchen, H. U., Jacobi, F., Rehm, J., Gustavsson, A., Svensson, M., Jönsson, B., … Steinhausen, H.-C. (2011). The size and burden of mental disorders and other disorders of the brain in Europe 2010. *European Neuropsychopharmacology: The Journal of the European College of Neuropsychopharmacology*, *21*(9), 655–679. https://doi.org/10.1016/j.euroneuro.2011.07.018

Zachrisson, H. D., Rödje, K., & Mykletun, A. (2006). Utilization of health services in relation to mental health problems in adolescents: a population based survey. *BMC Public Health*, *6*, 34. https://doi.org/10.1186/1471-2458-6-34