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Running head: ADAPTING INTERVENTION APPROACHES

Adapting Intervention Approaches to New Contexts: Three Case Studies of International
Adaptation of the Teen Online Problem Solving (TOPS) Program

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Abstract

Purpose/Objective: To describe the process of adapting the evidence-based Teen Online Problem Solving (TOPS) program, a telehealth problem-solving treatment addressing executive function and behavior regulation challenges in adolescents with traumatic brain injury, in Italy, New Zealand, and the United Kingdom.

Research Method/Design: We describe the process of adapting and translating the TOPS program in three case studies with unique methods and samples. In Italy, 14 parents of adolescents with TBI participated in focus groups and two adolescents with TBI and their parents and two physicians provided input on the resulting translation. In New Zealand, an independent Māori cultural advisor reviewed the content, and six adolescent-parent dyads and two health professionals completed the 10 modules independently over a five-week period to inform adaptation. In the United Kingdom, a team of neuropsychologists and a parent of an adolescent with ABI reviewed and adapted the content through successive iterations.

Results: In Italy, suggested changes included greater emphasis on nonverbal communication and clearer examples of inappropriate problem-solving responses. In New Zealand, parents and adolescents rated the program as acceptable and helpful. Suggestions included incorporating familiar Māori settings, integrating religion, and developing videos with New Zealand adolescents. In the United Kingdom, iterative refinements focused on adapting TOPS for other acquired brain injuries and reflecting cross-national differences (e.g., drinking age).

Conclusions/Implications: These three case studies suggest that programs such as TOPS developed in one cultural context can be broadly acceptable in other contexts, with adaptations focusing on tailoring to reflect the unique cultural and linguistic setting.

Keywords: brain injury, adolescents, intervention, executive functioning, problem-solving

Impact

- This paper is among the first to describe the adaptation of an evidenced-based, rehabilitation psychology intervention (Teen Online Problem Solving; TOPS) for use in other countries, cultures, and languages. It highlights the broad applicability of the program across cultures, as well as the need to tailor content to reflect unique contexts across countries.
- The three case studies describing adaptations of TOPS for delivery in Italy, New Zealand, and the United Kingdom provide a valuable roadmap for the adaptation of other evidenced-based rehabilitation programs as well as the broader implementation of TOPS. They also highlight the value of international partnerships and point to the need to establish broader networks to support widespread implementation.

Introduction

Traumatic brain injury (TBI) is the most common cause of acquired disability in children and causes significant stress and family burden (Zaloshnja et al., 2008). Interventions have been created to mitigate the family strain, neurocognitive, and behavioral difficulties associated with pediatric TBI. However, mounting evidence suggests that as many as 75% of children with clinically significant behavioral impairments do not receive needed care (Narad, Moscato, et al., 2019; Narad, Raj, et al., 2019). Various factors impede receipt of treatment, ranging from intervention accessibility to patient availability (Slomine et al., 2006). To address these challenges, telehealth interventions have been developed with evidence from randomized controlled trials supporting efficacy and high levels of patient satisfaction (Laatsch et al., 2020; Narad, Raj, et al., 2019; Wade, Cassedy, et al., 2019; Wade, Fisher, et al., 2019; Wade, Gies, et al., 2020; Zhang et al., 2018).

One telehealth intervention developed specifically for use with families impacted by TBI integrates the problem-solving framework of D’Zurilla, Nezu, and Maydeu-Olivares (2004) with the collaborative family problem-solving model of Robin and Foster (1989) to promote effective family coping with the challenges of pediatric TBI (Wade et al., 2006). Known variously as Online Family Problem-Solving Therapy, Counselor Assisted Problem-Solving therapy, or Teen Online Problem Solving (TOPS), the United States-based program includes a self-guided website that incorporates didactic information and skills training, activities to practice and reinforce skills, videos displaying effective and ineffective responses, and testimonials from other adolescents describing their experience living with a TBI (Wade et al., 2012; Wade et al., 2010; Wade et al., 2008). The self-guided online content is divided into 10 core sessions that are intended for all participants to complete at their own pace, as well as 9 supplemental sessions to address specific topics of interest (See Tables 1 and 2). Additionally, live psychotherapy sessions with a therapist are delivered via videoconferencing after completion of each online learning module or session to review the online content and work with the family to implement the problem-solving process around aims identified by the adolescent and parents.

A key objective when designing TOPS was to increase adolescent participation in treatment postinjury and improve retention rates. Families found the length and structure of TOPS to be feasible, easy to use, and helpful (Wade et al., 2009; Wade et al., 2008), as well as more convenient and beneficial when compared to face-to-face therapy (Wade, Cassedy, et al., 2019). Delivery by telehealth allowed flexibility around the families’ schedules and eliminated barriers such as transportation, time, and distance that are common in traditional intervention settings (Wade et al., 2009). These qualities of TOPS translated into significantly lower attrition rates, underscoring the feasibility, utility, and efficacy of the online family problem solving

Running head: ADAPTING INTERVENTION APPROACHES

approach for adolescents with TBI and their families (Wade, Cassedy, et al., 2019). Multiple studies and reviews have provided support for the broader adaptation and implementation of the online family problem-solving program (Narad, Raj, et al., 2019; Wade, Cassedy, et al., 2019; Wade et al., 2018; Wade et al., 2017; Wade, Kurowski, et al., 2019; Wade et al., 2015; Wade et al., 2014; Wade et al., 2012; Wade et al., 2010). Meta-analyses of the online problem-solving studies conducted to date provide support for its efficacy in improving behavioral outcomes (Corti et al., 2019), and recent evidence-based guidelines identified the program as a standard of care for executive dysfunction and behavior problems following TBI (Laatsch et al., 2020; Zhang et al., 2018).

More broadly, telehealth improves service access, reduces the stigma of therapy, provides the patient with a greater sense of control over their therapy, and is described by patients as useful (Bender et al., 2011; Cuijpers et al., 2008; Griffiths & Christensen, 2007; Wuthrich et al., 2012). Factors that have historically limited telehealth treatments in the United States (US), such as the ability to deliver treatments across state borders or authorization for payment through Medicaid or third-party insurers, may pose fewer difficulties in other countries with single-payer health care and fewer legislative divisions (Alverson et al., 2008; Pass et al., 2015). With the embrace of telehealth throughout Europe, New Zealand, and Australia, among other regions, established evidence-based programs, such as TOPS, may be ripe for adaptation and implementation.

The potential utility of telepsychology/telehealth interventions, such as TOPS, has been underscored by the ongoing global COVID-19 pandemic, which has drastically limited or curtailed non-essential in-person care, including behavioral health care services (Wade, Gies, et al., 2020). This context has led to rapid uptake and growing interest in the availability and use of

Running head: ADAPTING INTERVENTION APPROACHES

proven telehealth programs. The TOPS program is uniquely suited to meet the needs of the current moment as it was developed to maximize the potential benefits of telepsychology by integrating online materials with videoconferencing.

As researchers have already developed and adapted various measures and interventions to be used online, models and guidelines have been developed to ensure faithful and culturally sensitive adaptations (Bartholomew & Brown, 2012; van Daele et al., 2014). While these guidelines and models provide broad outlines of steps in the adaptation process, any adaptation is driven by both the context of the adaptation and the content to be adapted. In general, psychological, linguistic, lifestyle, and cultural contexts should all be considered to create an effective cross-cultural adaptation. Likewise, content adaptations must account for differences in the target population, including diagnostic and family characteristics.

Context and content constitute essential considerations when adapting an intervention for delivery in different countries and/or with new diagnostic groups. If cultural influences on the patient's experiences, beliefs, and assumptions are not taken into consideration, the effectiveness of therapy can be diminished (Rathod et al., 2019). As researchers aim to translate TOPS and examine efficacy in different cultures, countries, and languages, adaptations made to TOPS to support its use with other neurological populations, including brain tumor survivors (Raj et al., 2018) and adolescents with epilepsy (Glaser et al., 2017), provide some insight into the process and potential considerations. Of note, these adaptations were driven by qualitative feedback from key stakeholders including patients, their families, and health care providers to ensure that content was tailored to address key concerns for a given population and capture differences in how adolescents and families are impacted in the context of differing neurological diagnoses.

Running head: ADAPTING INTERVENTION APPROACHES

Likewise, adaptation for novel cultural contexts could benefit from similar processes for understanding stakeholder perspectives.

This paper describes the process of adapting TOPS in three different countries—Italy, New Zealand (NZ), and the United Kingdom (UK)—with the overarching goal of identifying strategies for and challenges to cross-cultural adaptation in an effort to inform future adaptation efforts. Psychologists and neurologists (Authors AB, CC, KJ, AA, and JL), recognized this need and approached Author SW with interest in adapting and implementing TOPS for their target population. As common with research, these partnerships were self-selected and were maintained through institutional and external funding to facilitate collaboration. Given the unique nature of the adaptation efforts in each country, we present these efforts as three case studies with separate considerations, particularly emphasizing the cultural context and implications for modifications to content.

Methods

All of the human subject activities described here were approved by the relevant ethics and institutional review boards. Each site was responsible for obtaining funding to support cultural adaptation with Author SW as a co-applicant. Additionally, researchers needed to consider the cost for the pursuit of resources, including administrative costs, technology platforms, and changes to cultural contexts due to national advocacy movements. The adaptation and translation process varied across sites based on the resources and objectives of the adaptation, as described in greater detail below.

Italy Adaptation: I-TOPS

Background

In Italy, many children and adolescents with acquired brain injury (ABI) fail to receive adequate rehabilitation after hospital discharge (Zampolini et al., 2012), highlighting the need for the National Health System to ensure more rehabilitation opportunities for these young people. Among children with ABI admitted to rehabilitation centers in Italy, 51.6% have a TBI (Gazzellini et al., 2012). There is a clear national need for interventions accessible to all rehabilitation patients with ABI, as the presence of geographical barriers, including remote rural areas, islands, and mountains, make it difficult for many Italian patients to reach rehabilitation centers (Maresca et al., 2020). A review published in 2020 (Maresca et al., 2020) reported that, between 2010 and 2020, telehealth cognitive rehabilitation in Italy for pediatric patients was described in only four original research articles (Corti et al., 2018; Pecini et al., 2019; Simone et al., 2018; Tucci et al., 2015), of which only one included brain-injured children (Corti et al., 2018) while the others focused on developmental dyslexia, ADHD, or pediatric multiple sclerosis. All these training programs stimulated specific cognitive domains through drill-based exercises. Overall, results were promising in terms of feasibility or preliminary efficacy. Based on this overview, it was clear how scarce Italian literature is regarding pediatric ABI, which only included drill-based activities.

In this respect, other studies (Corti et al., 2019; Corti et al., 2020; Robinson et al., 2014; Zhang et al., 2018) have found that drill-based training programs, even though effective, fail to address the concerns that adolescents and families experience at home. In contrast, the TOPS program, which aims to remotely address behavioral dysfunction and problem-solving in everyday situations, has the potential to improve functioning at home, school, or other everyday settings by improving adolescent's executive functioning, self-regulation, and associated skills. For this reason, such a program offers the opportunity to fill a gap in outpatient rehabilitation

Running head: ADAPTING INTERVENTION APPROACHES

support in Italy, while mitigating geographical and economical barriers to care, which have previously limited outpatient rehabilitation offered by the Italian National Healthcare Service. Moreover, as the intervention has been developed for patients with TBI and subsequently adapted for other neurological populations, such as epilepsy or pediatric brain tumor (Modi et al., 2017; Raj et al., 2018), it seems to represent a promising treatment opportunity for children with ABI that, as reported above, often fail to receive the recommended dose of rehabilitation for optimal recovery.

Context Considerations

In the Italian adaptation of the TOPS program, some contextual factors have influenced the process. First, the Italian school system differs from the one in the US, as Italian students take classes with the same group of students throughout high school without having the possibility to change classmates while attending the lessons from various disciplines. This was an important factor to consider when reproducing the videos in the school setting. Further, rehabilitation and care treatments are provided based on a universal model of healthcare; therefore, references to insurance coverage were omitted. Finally, the age at various milestones differs between Italy and the US. For example, the age of obtaining a driving license is later in Italy than in the US, whereas the age to purchase alcohol is earlier (i.e., 18 years instead of 21 years compared to the US). These differences were taken into account when creating videos and developing examples in the web-based intervention.

In terms of the clinical research context, the Italian institute responsible for the TOPS adaptation is a Scientific Institute for Research Hospitalization, and Healthcare (IRCCS), which drives clinical assistance in strong relation to research activities in select institutes. Given this distinction, the Italian Ministry of Health provided support for the program adaptation through

Running head: ADAPTING INTERVENTION APPROACHES

two research projects aimed at improving rehabilitation opportunities for children with brain damage.

Content Considerations

Two 45-minute focus groups with a total of 14 parents of adolescents with TBI were conducted by a psychologist and physician to determine necessary adaptations to the English language/American version of the program to meet the needs of the patients and their families. Parents received access to the Italian-TOPS (I-TOPS) program with Italian translations and summaries of the original English videos and were allowed to navigate and explore the website for a month prior to the focus group discussions. Navigation through the program could be monitored through the backdoor platform created for I-TOPS, which allowed therapists to check whether parents completed each session and confirm the day of the last visit. Participants were asked their opinions on the relevance and clarity of TOPS content and for suggestions to improve the adaptation of the program to the Italian context.

Overall, parents found the content to be very relevant. Suggested modifications largely focused on the scripted videos and included recommendations to modify the videos to emphasize the nonverbal aspects of communication that are integral to Italian culture. Based on this feedback, new videos were developed that paralleled the content of those in the original TOPS program, but with greater emphasis on nonverbal communication (i.e., the video camera specifically focused on gestures and glances, which were explicitly brought out by actors, to capture attention on them) and clearer depiction of the negative consequences of the adolescent's behavior in the videos depicting what not to do. Participants reviewed the final scenarios after modifications based on their feedback but did not have the opportunity to review the updated videos.

The translation of the website text from English to Italian was made by three different psychologists with expertise in brain injury and cognitive-behavioral techniques. Using forward-backward methods, translations were subsequently produced by one bilingual expert aware of psychological terminology and discrepancies were then discussed and resolved. The final text was reviewed by two adolescents with TBI, their parents, two physicians, and the class of students who acted in the scripted videos. They provided written feedback on expressions not sounding fluent in the Italian language and suggested changes, which were evaluated by a psychologist working on the final version of the program. Suggested changes were included if they did not change the meaning of the sentence. This process required 5 months of work, during which further content revisions were made to improve ease of comprehension and flow in the Italian language.

After the adaptation of TOPS for Italian patients with TBI, the resulting program was further adapted for pediatric patients with other types of ABI and congenital brain malformation associated with impaired executive and social functioning (e.g., Joubert syndrome, cerebellar malformation) to address the limited research on the best treatment practices for these populations. With this aim, the research team modified or deleted content of the program focusing on TBI and inserted more information regarding the cognitive and behavioral consequences of brain damage. Specific content for specific etiologies of ABI or congenital brain damage was added in the supplemental sessions. The research team in Italy plans to investigate the effects of the TOPS program compared to an active control treatment not focused on problem-solving, as well as the usefulness of the program for different brain injured populations based on etiology.

For the ongoing I-TOPS efficacy study (see “Discussion” for results), the research team developed an active control version of the program, focusing on health and wellness, but omitting problem-solving training. This active control group will enable the team to control for placebo effects associated with being involved in a rehabilitation treatment and to isolate the effects of the intervention on problem-solving for the experimental group. For the active control condition for other diagnoses (e.g., ABI, congenital malformation, etc.) an adaptation was also created, resulting in 10 sessions as the other versions, in order to maintain the same methodological format for the program across diagnoses and research conditions.

New Zealand Adaptation: TOPS-NZ

Background

In New Zealand (NZ), an estimated total of 36,000 people sustain TBIs each year, with approximately 95% of all injuries classified as mild in severity (Feigin et al., 2013). Children (aged 0–14 years) and adolescents and young adults (aged 15–34 years) constituted almost 70% of all TBI cases. Evidence of increases in fall-related injuries suggest that TBI services in NZ will inevitably come under growing pressure. Another important consideration is the significantly higher incidence of TBI among Māori people, the indigenous population of NZ (Feigin et al., 2013). Although, NZ has a universal, no-fault injury scheme run by a government entity (Accident Compensation Corporation; ACC), in 2010-2011 only 14,000 (39%) of people with TBI received treatment (Accident Compensation Corporation, 2017). Together, this evidence highlights opportunities to improve treatment access and broaden delivery options. While ~80% of all households in NZ have internet access (Zealand, 2017), no online telehealth solutions in NZ offer a single treatment designed to specifically address both adolescent and

Running head: ADAPTING INTERVENTION APPROACHES

family difficulties following TBI. The family focus of TOPS and flexible approach to online delivery also offers a valuable opportunity to maximize benefit among Māori people.

Context Considerations

An independent review of all TOPS materials and program content highlighted key areas for enhancing cultural relevance for Māori. These included identifying opportunities for integrating Māori practices into the treatment (e.g., taking more time to get to know families before starting treatment, karakia (prayer) at the start and end of each online session), Te Reo Māori (language) words and phrases into the TOPS online therapy sessions (e.g., Kūra [school], Āko [learn]), and traditional Māori locations in scenarios (e.g., marae [meeting house]) to contextualize the program to the NZ audience.

In terms of clinical implementation context, in NZ, the Accident Compensation Corporation (ACC) is the entity responsible for administering the country's no-fault accidental injury compensation scheme. Using a tendering process, a range of rehabilitation treatment providers and specialists are contracted by ACC to deliver services to clients with TBI and their families and whanau. This range includes established providers, services that provide assessment and rehabilitation, and individual providers (e.g., neuropsychologists). This approach presents challenges in terms of facilitating the uptake of new programs, such as TOPS-NZ. Implementation requires relationship building, negotiation of implementation processes, and careful alignment of TOPS-NZ with the service goals and resources of each TBI provider during the period of tender.

Content Considerations

A two-pronged approach was taken to understand how to adapt the TOPS program for use in NZ. First, to understand how the program fit with Māori beliefs and values, the TOPS

Running head: ADAPTING INTERVENTION APPROACHES

program, predominantly the therapist manual, was reviewed by an independent Māori cultural advisor. There is no formal training to become a cultural advisor in NZ, but rather the cultural advisor identified as Māori (the indigenous people and culture of NZ) and demonstrated knowledge, an understanding, and experience with tikanga (Māori customary practices), kawa (Māori protocol), and te reo Māori (being a fluent speaker in the indigenous language of Aotearoa, NZ). The review focused on identifying opportunities to increase the cultural relevance of TOPS for Māori. Second, to better understand how the TOPS program content fit for NZ adolescents and the providers who work with them, six adolescent-parent dyads and two health professionals completed the 10 TOPS-NZ sessions over a five-week period (without therapist involvement) and then participated in a focus group to provide feedback about their experiences. Participating adolescents with mild TBI were aged 12-17 years (mean age 13.67 years, 50% male, 83% NZ European ethnicity) and an average of 3 years postinjury.

Following the 5-week period, all participants were invited to attend a single focus group session conducted by an experienced facilitator or to be interviewed by phone to discuss the acceptability of TOPS for use in NZ. Participants were asked a series of open-ended prompt questions to gain insight into their experiences using the TOPS program (e.g., “What did you find helpful?”, “What did you dislike or find difficult?”). Focus group data were summarized by the facilitator using Braun and Clarke’s (2006) approach to thematic content analysis (Braun & Clarke, 2006). Applying a deductive, semantic approach, key themes were identified using six steps: familiarization, coding, generating themes, reviewing themes, defining and naming themes, and write-up. Parents, adolescents with TBI, and health professionals also completed an 8-item adapted version of an online satisfaction survey to indicate their level of agreement with statements about the capacity of TOPS-NZ website material to assist adolescents post-TBI.

Using a scale of 1 = strongly agree to 5 = strongly disagree, adolescents and parents strongly agreed with statements that TOPS will help teenagers to plan for future handling of problems (adolescent mean = 1.17, parent mean = 1.17), understand their injury better (adolescent mean = 1.33, parent mean = 1.67), get along with their parents better (adolescent mean = 1.50, parent mean = 1.83), feel less stressed (adolescent mean = 1.67, parent mean = 1.83), and would help make positive changes with their family (adolescent mean = 1.50, parent mean = 1.67). While to a lesser extent, health professionals also agreed with all statements about the extent to which the TOPS-NZ website content would help adolescents with TBI (mean ratings ranged from 2.00 to 3.00). Focus group feedback also identified issues with the program's length and intensity, although this may be in part due to the compressed time to complete (five weeks versus six months). Specifically, parents identified the need for shorter more concise sessions given their busy schedules. Similarly, adolescents noted that longer sessions became boring after a while. Some technological issues (e.g., varying sound quality on the videos) were also raised.

Based on findings from the survey, focus group, and cultural review, several adaptations were made to the TOPS content and therapist manual. Videos of young American adolescents were replaced with recordings of young New Zealanders with TBI sharing their personal experiences and videos of role-play scenarios with NZ actors. The spelling of all words was also updated from American to NZ English and word usage was modified. The therapist manual was extended by adding examples of alternative scenarios relevant to the NZ content. For example, including settings that may be common for some Māori (i.e., marae). Additional advice was also added to the therapist manual to allow space within the program—and overall therapist-client relationship—for clients of Māori descent to opt in (or out) of including Māori customs and

Running head: ADAPTING INTERVENTION APPROACHES

protocols, if desired. While the focus group facilitator reviewed the feedback and summary points at the end of the focus group for accuracy, participants did not have the opportunity to review subsequent adaptations.

United Kingdom

Background

Similar to other countries, TBI is the most common cause of ABI in the UK with approximately 700,000 people under the age of 15 years diagnosed with a TBI by the UK Accident and Emergency services each year. While many children and adolescents survive, they are left with a host of long-term cognitive and behavioral deficits despite advances in acute medical care. In the UK, there is an increasing awareness of the long-term rehabilitative and educational needs following pediatric ABI (Menon & Bryant, 2019); however, these are not well-supported by clinical and educational services. Barriers to follow-up care for neurocognitive and behavioral challenges in the UK include the lack of evidence-based interventions and restricted access to neuropsychological rehabilitation services (e.g., no local service provision, difficulty attending appointments at distant specialist centers due to family/work commitments and financial constraints affecting travel). TOPS has the potential to overcome both constraints in that it is an evidenced-based intervention which can be delivered remotely.

As part of setting up a clinical and cost-effective randomized controlled feasibility trial of TOPS in the UK (Limond et al., 2019), five adolescents with ABI and their families from three pediatric neuropsychology services in the UK were given access to the TOPS website and were asked to view the session content online. In consultation with their child, parents were then asked to complete a brief questionnaire asking for comments on the suitability of the materials for the age of their child, the suitability of the materials for the needs of their child, whether they would

Running head: ADAPTING INTERVENTION APPROACHES

access the materials if the materials were available in the UK, if they consider the materials to be helpful, and any recommended adaptations to the materials for UK families. Families were given a month to review the materials and return their comments. The adolescents and families confirmed the relevance of the TOPS modules, said that the intervention would be relevant to individuals with other types of ABI (e.g., brain tumor, central nervous system infections, stroke), and that they would have found such an intervention helpful at least a year after discharge from hospital (i.e., when the acute rehabilitation is likely to have stopped and the adolescent is likely to be attempting to re-engage in education and social participation activities). Based on this feedback, it was decided to extend TOPS to meet the needs of adolescents with ABI as well as TBI. This decision ensured that adolescents represented in the UK neuropsychological rehabilitation services could receive services.

Context Considerations

Unlike the US, the UK healthcare system is a combination of universal healthcare (National Health Service, NHS), private sector provision, and charity sector provision. All citizens of the UK are considered National Health Service patients; however, provision varies across UK nations and regions due to varying needs and budgets. While private and charity sectors may fill some service gaps, health care disparities based on location still exist. Providing the intervention remotely is consistent with other psychological telehealth services in the UK, such as computerized Cognitive Behavioral Therapy (Cavanagh & Shapiro, 2004) and, therefore, it was deemed likely that adolescents and their families would find it acceptable. Although remote delivery could overcome some issues surrounding access (i.e., intervention provision was not dependent on local service configuration), it creates a different set of issues regarding recruitment, such that local services still needed to identify and refer patients who might benefit.

Running head: ADAPTING INTERVENTION APPROACHES

Consequently, some eligible participants may not be linked to the program because they are not known to services (or that there are no local services to be ‘known’ to).

Other contextual factors to consider when adapting TOPS for the UK included differences in the education system with academic subjects becoming more specialized at an earlier age and formal qualifications at two time points in the UK. Similar to Italy, adolescents in the UK have a later age for learning how to drive and having access to cars compared to adolescents in the US, but an earlier age for legal alcohol consumption. These factors needed to be considered when developing appropriate scenarios and activities to help demonstrate the strategies in the web-based intervention.

In terms of the research and clinical implementation context for TOPS in the UK, the adaptations to the intervention were completed as part of a National Institute for Health Research (NIHR) funded clinical and cost-effectiveness feasibility RCT of TOPS-UK. The research was conducted in collaboration with the NHS, a national child brain injury charity, the University of Exeter, and Cincinnati Children’s University Hospital. The intervention will be available to the NHS and organizations outside of the NHS (e.g., charity sector, private sector) for delivery across the UK.

Content Considerations

The most significant change made to TOPS-UK was broadening the program to include all types of ABI, including TBI. Initially, all of the TOPS modules were reviewed by a pediatric clinical neuropsychologist (Author JL) and a research team member to map out the key changes. The suggested changes, along with the original modules, were then shared with a member of the Child Brain Injury Trust (a national charity who support children with ABI and their families) and a parent of a child with ABI to obtain their feedback and suggestions. This cycle of review-

Running head: ADAPTING INTERVENTION APPROACHES

edit-review was implemented multiple times until agreement was reached in terms of the number of modules and the module content. The selected modules (with suggested content edits) were then shared with the wider research team (i.e., Author SW, a psychiatrist, a pediatrician, a statistician, a health economist, trial managers) for final agreement. It took approximately 6 months to co-create the adapted content and a parent collaborated directly with the research team to review every aspect of the work throughout the study. The final version of TOPS-UK included 10 sessions supported by the coach, but the number of core sessions was reduced to 6 sessions, while 4 sessions were chosen by the adolescent and their parent from 6 options (i.e., managing anger, fatigue, anxiety, communication skills, social behavior, and working with school) depending on their primary concerns. The intention was to acknowledge the differences typically seen between traumatic and other etiologies of ABI. For example, it is well documented that TBI often results in externalizing behavior difficulties such as aggression and impulsivity, whereas anxiety and fatigue are more commonly experienced following treatment for a brain tumor.

Some other small adjustments were required to change language and spelling to make the content more accessible to UK participants. Narrations for all modules were recorded using a British speaker. Due to limited funding and resources, videos from both the US and NZ versions were used. In the TOPS-UK feasibility study (Limond et al., 2019), feedback by the adolescents participating in the TOPS-UK intervention arm on the video content was mostly positive, with no mention of the videos being international; however, the adolescents in the main study reported finding the videos ‘dated’.

In the UK, research uptake did not reach the planned level of recruitment (target number to be randomized to treatment-as-usual vs. treatment-as-usual plus TOPS-UK = 25 participants; actual number randomized = 12 participants). The primary reason for difficulty with recruitment

Running head: ADAPTING INTERVENTION APPROACHES

was that the clinical teams were unable to contact the participants identified as being eligible for the study (59% of participants identified as being eligible could not be contacted). Other reasons included the parent or adolescent declining the opportunity to participate in the study. However, the positive feedback from participating families, along with the findings from Wade and colleagues (2017) indicating TOPS to be an acceptable and effective intervention, suggested the need to consider alternative approaches to make the intervention available, while also evaluating levels of recruitment in a real-world context.

Discussion

We describe three approaches for adapting the TOPS content to fit the cultural and language contexts of Italy, NZ, and the UK with the goal of informing other adaptation efforts. Across countries and contexts, we found widespread acceptability of the TOPS content, the problem-solving framework, and the broader telehealth approach, which integrates online learning modules with synchronous videoconferences with a therapist. However, the adaptations identified to improve acceptability in each country underscored the need to consider the cultural context when modifying content. As described in greater detail below, the three adaptations modified content (e.g., videos, language/spelling) and intervention delivery (e.g., offering prayer before online sessions in NZ) in response to key differences in the cultural context. These included differences in health care delivery across countries, interactions and nonverbal communication, and unique religious, language, and cultural contexts (e.g., Māori contexts and language, changes in scenarios to account for the age difference of driving and alcohol use in the UK, nonverbal communication in Italy). We discuss commonalities and differences in approaches to undertaking international adaptations, limitations of these approaches, and implications for clinical implementation.

Improved access to care spurred development of the original TOPS program and served as a key factor driving adoption in other countries. Even in countries with nationalized health care, such as Italy and the UK, access to care varies by region and children with TBI or other ABI may be particularly unlikely to receive services, particularly ones that are informed by the etiology of their neurological impairments.

International partners also sought to broaden the scope of TOPS to address the needs of other pediatric ABI populations who may experience similar challenges with executive function skills, behavior, and social relationships and have similarly limited access to care. Modifications to TOPS to support its application with other diagnoses is consistent with recent U.S. adaptations for brain tumor survivors and children with epilepsy (Modi et al., 2017; Wade, Narad, et al., 2020). Feedback from stakeholders across cultural and diagnostic contexts provided support for the broad acceptability of the TOPS program with other diagnostic groups.

Across the three international contexts, stakeholder input informed content modifications. However, the nature of this feedback and the resulting modifications were unique to the cultural and language context of that country. Thus, feedback in Italy focused largely on the need for videos that reflected the Italian context and the important role of physical gestures and nonverbal communication. Similarly, in NZ, stakeholder feedback acknowledged the need to identify opportunities to refer to local cultural contexts (e.g., marae) and to incorporate Te Reo Māori (the Māori language) and customs. Future interventions should consider the input from stakeholders and focus groups to create an adaptation that is widely accepted by participants. It is worth noting that creating high quality video content is costly and was financially unavailable in the UK adaptation, although the existing videos were viewed as dated.

Of note, the telehealth approach used in TOPS was viewed as widely acceptable despite important differences between countries and cultural contexts. Given ongoing restrictions in the provision of nonessential, in-person care due to the COVID-19 pandemic, it may be increasingly necessary to turn to telehealth approaches to optimize access. Access to care was the impetus for developing TOPS and evidence for successful utility of online interventions can be used to address the insufficient access to care in the changing medical and health provider environment. Despite concerns from therapists about implementing telehealth interventions, therapist perceptions among those delivering programs, such as TOPS, have been largely positive (Wade, Raj, et al., 2019). Moreover, since the advent of COVID-19, psychologists around the world have successfully adapted their clinical practice to incorporate telepsychology. Thus, this approach may be even more viable and feasible in 2021 than just a few years ago.

Adaptation for use in these three distinct countries and cultures was undertaken with the overarching goal of eventually making the evidenced-based TOPS program clinically available to adolescents and their families. Thus, the next steps in each country involve obtaining sufficient evidence regarding efficacy in that culture and context to support clinical implementation, developing a plan to support clinical roll out, and identifying and addressing costs and other barriers to successful program delivery. In this respect, each country is in a different place in the process. In Italy, research on the use of the TOPS for different diagnoses is currently underway that will provide the evidence needed to support clinical implementation. The possibility of extending the program nationwide is under discussion, to make rehabilitation more accessible and overcome barriers to treating patients living in the South of the country, the Isles, and rural areas. Next steps in NZ will include implementation research examining the uptake and use of TOPS-NZ by existing TBI service providers via a phased approach. In Phase

Running head: ADAPTING INTERVENTION APPROACHES

1, service providers will access and begin to use TOPS-NZ with a focus on growing familiarity with the program and incorporation into standard treatment practices. During Phase 2, providers will begin collecting baseline and follow-up outcomes of adolescents and parents taking part in the TOPS-NZ program. Finally, in Phase 3, data will be collected to evaluate each TBI service provider's independent maintenance of use of the TOPS-NZ program without support from the research team. In the UK, a feasibility trial was completed in 2019 and efforts are now underway to develop a plan for nationwide implementation. The team plans to use a single point of service through the University of Exeter to maximize access across the NHS, private health services, and charity sector providers. This service delivery model will enable the team to provide TOPS-UK to adolescents and families across the whole of the UK, while keeping the training and supervision costs of the TOPS-UK therapists/coaches to a minimum. The UK team is working to address challenges with establishing referral and reimbursement channels. Given the well-documented “valley of death” between research and successful clinical implementation, efforts such as these become increasingly important to understand and document.

Our description of three pragmatic approaches to adapting an evidence-based treatment program for novel cultural and language contexts should be considered in the context of its limitations. First, we considered adaptation of a single program, TOPS, and thus the considerations may not generalize to other programs that do not involve websites, videos, or telehealth delivery. Second, the approach to adapting the program, including how stakeholder input was obtained, varied across countries, and did not conform strictly to guidelines for adaptation and cross-cultural translation (Bartholomew & Brown, 2012; Guillemin et al., 1993; O’Cathain et al., 2019; Sousa & Rojjanasrirat, 2011; van Daele et al., 2014). Consistent approaches to evaluating acceptability and feasibility across cultural contexts may have yielded

Running head: ADAPTING INTERVENTION APPROACHES

more generalizable and reproducible approaches. Nonetheless, it is important to recognize the pragmatic and context-specific nature of intervention adaptation and the limitations of trying to adopt a single process for adaptation across cultures and context. In fact, the current paper suggests that the process for tailoring an intervention for a new context or population may need to be unique to that context. Moreover, Williams and colleagues (Williams et al., under review) argue against the assumption of telehealth being the most acceptable mode of intervention delivery. In fact, Williams et al. (under review) found lower attrition rates for participants assigned to their preferred intervention modality. Other factors, such as telehealth fatigue and the flexibility of hybrid models, may have considerable influence on intervention outcomes. These factors are particularly important as the reality of health services continues to change due to pressure to overcome the challenges created by the COVID-19 pandemic, and TOPS, among other interventions, will need to be further adapted to meet the new expectations of telehealth services.

Despite these limitations, the process of adapting the TOPS program for three unique language and/or cultural contexts underscores the broad appeal of the TOPS content and its online problem-solving approach, as well as the high rates of unmet clinical need, even in countries with nationalized health systems. The three case studies suggest that stakeholder feedback can be used to inform modifications and to develop culturally tailored versions that are acceptable while remaining faithful to the original program. Ongoing data collection is needed to determine if these cross-cultural adaptations preserve the efficacy of the original program.

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Running head: ADAPTING INTERVENTION APPROACHES

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