

**Application of Cognitive-behavioural Approaches with Children with Autism
Spectrum Disorder**

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PhD - Thesis by Publication Model Explanatory Notes

A thesis must form a distinct contribution to knowledge either by the discovery of new facts or by the exercise of independent critical power. The thesis as a whole should be focused on a single project or set of related questions and should present an integrated body of work, reflecting a coherent program of research.

A typical thesis by publication typically would include:

- An introductory chapter providing a coherent overview of the background to the thesis, the research questions and the structure and organisation of the remaining chapters. The distinct contribution the thesis should be clearly identified.
- A number of chapters each written in the format of self-contained journal articles. These chapters can be published, in press or in submission ready format. Where articles are published, they do not need to be reformatted for inclusion in the thesis. Each chapter should be prefaced by a brief introduction outlining how the chapter fits into the program of research and, in the case of jointly authored chapters, the student's contribution should be clearly specified.
- A final chapter providing an integrative summary and conclusion, drawing together all the work described in the other parts of the thesis and relating this back to the issues raised in the introduction.

For further details refer to the Macquarie University Higher Degree Research website:

<https://students.mq.edu.au/study/my-research-program/before-submission-and-prep>

Abstract

This thesis by publication is focused on the application of cognitive-behavioural approaches (CBA) with children with autism spectrum disorder (ASD), in particular, in school settings. ASD is a developmental disorder with a range of difficulties in the behaviour, emotion and cognitive functioning of the affected individual. CBA is considered an extension to traditional behavioural approaches with the benefits of addressing behaviour, emotion and cognition concurrently. Three review papers and two research studies are presented in this thesis.

A trend-analysis was conducted for intervention studies examining 103 reports of CBA interventions for children with ASD providing an overview of the evolution of research over time. RCTs were examined using meta-analytic techniques, revealing large overall effect sizes. These findings from the meta-analysis were in the context of the moderate quality of the research studies, extensive reliance on informant reports as major outcome measures and substantial heterogeneity in the interventions. Given the diverse nature of interventions and outcome measures, a systematic literature review was conducted for intervention studies published to examine relationships between intervention aims, intervention content and outcome measures. Inconsistency was found between these intervention elements.

A survey study and a qualitative interview study were conducted to investigate the application of CBA by teachers in school settings. Respondents in the teacher survey self-reported reasonable level of knowledge and frequent use of CBA strategies although applications were not necessarily consistent with research evidence. Meanwhile interviewees in the in-depth teacher interviews demonstrated limited knowledge of CBA. The papers reported in this thesis contribute to our understanding the application of CBA to children with ASD with particular relevance to school settings.

STATEMENT OF CANDIDATURE

I certify this thesis entitled “Application of Cognitive-behavioural Approaches with Students with Autism Spectrum Disorder and Intellectual Disability in Education Settings” is an original piece of research and my own work. All assistance from others in conducting the research and preparing this thesis has been appropriately acknowledged.

I also certify that the work in this thesis has not been submitted for a higher degree to any university or institution other than Macquarie University.

In addition, I certify that all sources of information and literature used are indicated in the thesis.

The research presented in this thesis was approved by the Macquarie University Faculty of Human Sciences Human Research Ethics Sub-Committee on 11th July 2014 (reference no. 5201400675 with amendment approved on 3rd October 2014) and 1st September 2015 (reference no. 5201500569). Additionally, the same was approved by the Policy, Planning and Reporting Directorate of NSW Department of Education on 15th July 2014 (reference no. SERAP 2014121) and 3rd September 2015 (reference no. SERAP 2015334); as well as by Aspect Research Approvals Committee on 30th July 2014 (reference no. 1472) and 8th October 2015 (reference no. 1525).

Betty Ho

May 19

STATEMENT OF CONTRIBUTION

This is a statement of my contribution to this thesis and the jointly written papers included in it. The following is a list of papers written in conjunction with my principal supervisor Associate Professor Jennifer Stephenson and associate supervisor Associate Professor Mark Carter.

1. Ho, B. P. V., Stephenson, J., & Carter, M. (2014). Cognitive-behavioral approach for children with autism spectrum disorders: A meta-analysis. *Review Journal of Autism and Developmental Disorders*, 1, 18–33. doi:10.1007/s40489-013-0002-5

I wrote this review with advice and input from Associate Professor Jennifer Stephenson and Associate Professor Mark Carter.

2. Ho, B. P. V., Stephenson, J., & Carter, M. (2015). Cognitive-behavioural approach for children with autism spectrum disorder: A literature review. *Journal of Intellectual and Developmental Disability*, 40, 213-229.
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I wrote this review with advice and input from Associate Professor Jennifer Stephenson and Associate Professor Mark Carter.

3. Ho, B. P. V., Stephenson, J., & Carter, M. (2018). Cognitive-behavioral approaches for children with autism spectrum disorder: A trend analysis. *Research in Autism Spectrum Disorders*, 45, 27-41. doi:10.1016/j.rasd.2017.10.003

I wrote this review with advice and input from Associate Professor Jennifer Stephenson and Associate Professor Mark Carter.

4. Ho, B. P. V., Stephenson, J., & Carter, M. (2017). Cognitive-behavioural approaches for students with autism spectrum disorder: A teacher survey. *International Journal of Disability, Development and Education*, 64, 436-455.
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I conducted this study and wrote this paper with advice and input from Associate Professor Jennifer Stephenson and Associate Professor Mark Carter.

5. Ho, B. P. V., Stephenson, J., & Carter, M. (2019). Teacher understanding and application of cognitive-behavioural approaches for students with autism spectrum disorder and intellectual disability. *Australasian Journal of Special and Inclusive Education*, 1-15. Advance online publication. doi:10.1017/jsi.2018.19

I conducted this study and wrote this paper with advice and input from Associate Professor Jennifer Stephenson and Associate Professor Mark Carter.

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CHAPTER 1: INTRODUCTION

Chapter Overview

This chapter introduces the purpose of the research program conducted for this thesis and includes discussion of its conceptual and theoretical background relating to autism spectrum disorder (ASD) and cognitive behavioural approaches (CBA) to interventions for children with ASD. It gives an overview of the research methods, aims and research questions and the organisation of the thesis including an outline of each following chapter.

Purpose of the Research

The major purposes of this thesis are to track the patterns in the evolution of research on interventions using CBA for children with ASD, to ascertain the efficacy of interventions and to track any possible relationship between aims, content and outcome measures. Their current application in school settings, specifically, the knowledge, perspectives and implementation of such approaches by Australian teachers teaching students with ASD are also explored.

Background to the Research

ASD Definition and Characteristics

ASD is a neurodevelopmental disorder with an early childhood onset and usually impacting the individual lifelong, even though symptoms tend to abate with age (Shattuck et al., 2007). The two diagnostic criteria for ASD, qualitative deficit in social communication skills as well as restricted and repetitive patterns of behaviours and interest, are based on either behaviour deficits or atypical behaviours (American Psychiatric Association, 2013). Recent Australian figures suggest the prevalence of ASD may be as high as between 1.5 to 2.5% in the cohorts of birth to kindergarten age children (Randall et al., 2016) with a rising trend observed globally (Centers for Disease Control and Prevention, 2018; Lai, Lombardo, & Baron-Cohen, 2014; World Health Organization, 2018).

Specific social communication deficits identified in children with ASD include deficits in pragmatic language processing, non-verbal communication, responses in conversations,

understanding of complex social communication such as teasing, and in the intonation and expression of emotions (Bishop, Gahagan, & Lord, 2007; Hale & Tager-Flusberg, 2005; Heerey, Capps, Keltner, & Kring, 2005; Hubbard & Trauner, 2007). Children with ASD also have difficulties in identifying their own emotions (Bal et al., 2010) and other people's facial expressions (Volker, Lopata, Smith, & Thomeer, 2009).

The restricted and repetitive behaviours in the population with ASD are considerably heterogeneous with various classification methods and terminologies used to describe them (Bodfish, Symons, Parker, & Lewis, 2000). Lam and Aman (2007) categorised these behaviours into five sub-types: ritualistic/sameness behaviour, stereotypic behaviour, self-injurious behaviour, compulsive behaviour, and restricted interests. Many different factors influencing or relating to the restricted and repetitive behaviours of individuals with ASD have been proposed. These include, but are not limited to, environmental restriction (Lewis, Tanimura, Lee, & Bodfish, 2007), auditory discrimination ability (Kargas, López, Reddy, & Morris, 2015), sensory processing abnormalities, intolerance of uncertainty, anxiety (Wigham, Rodgers, South, McConachie, & Freeston, 2015), age, intellectual functioning (Esbensen, Seltzer, Lam, & Bodfish, 2009), and cognitive processing difficulties, in particular social information processing (Embregts & van Nieuwenhuijzen, 2009).

They may also have atypical and impaired cognitive functioning; for examples poor executive functioning, cognitive control deficits, impaired theory of mind, and weak central coherence (Baron-Cohen, Leslie, & Frith, 1985; Happé & Frith, 2006; Hill, 2004; Solomon, Ozonoff, Cummings, & Carter, 2008). Generalisation of learned skills has long been recognised as difficult to achieve with learners with ASD (Happé & Frith, 2006; McGee, Krantz, Mason, & McClannahan, 1983; Rao, Beidel, & Murray, 2008; Rincover & Koegel, 1975).

Among individuals with ASD, intellectual ability may range from superior levels to profound impairment (World Health Organization, 2018). It is further suggested that children with ASD have different cognitive strengths when compared to typically developing children. For example, Dawson, Soulières, Gernsbacher, and Mottron (2007) demonstrated advantages in

fluid intelligence in children with ASD using *Raven's Progressive Matrices* (1998). Mottron et al. (2013) also observed exceptional abilities in some individuals with ASD including enhanced perceptual functioning, specific savant abilities, absolute pitch, synaesthesia and enhanced pattern detection.

ASD frequently occurs with comorbidities (Gillberg & Fernell, 2014) particularly anxiety disorders, depression, attention deficit hyperactivity disorder and other mental disorders (Leyfer et al., 2006; Mandell, 2008; Salazar et al., 2015; Simonoff et al., 2008). Specifically, in children with ASD, generally higher levels of emotional or behavioural problems are found (Brereton, Tonge, & Einfeld, 2006; Dominick, Davis, Lainhart, Tager-Flusberg, & Folstein, 2007; Farmer & Aman, 2010). In particular, Australian school children with ASD attending educational settings had experienced learning difficulties (60.2%), communication difficulties (51.5%), intellectual disabilities (27.2%), and problems with fitting in socially (63%) (Australian Bureau of Statistics, 2017).

In connection with the above discussed difficulties in ASD, there is evidence from general population studies that impaired communication skills are associated with challenging behaviours (Holden & Gitlesen, 2006). More specific evidence was found that for typically developing children, the ability to recognise important social cues of emotions was directly associated with appropriate social behaviours (Izard et al., 2001) and the ability to recognise emotion expression was inversely related to behavioural problems (Blair & Coles, 2000). This evidence regarding typically developing children may suggest possible interlinkages between social communication deficits, emotional and behavioural problems in children with ASD.

Overall, the population with ASD is extensively heterogenous with considerable variations in their symptomology (American Psychiatric Association, 2013), patterns of restricted repetitive behaviours (Esbensen et al., 2009), intellectual ability (World Health Organization, 2018), and their exceptional abilities (Mottron et al., 2013); and their challenges can be inter-related. Their need for support and intervention often starts from early childhood and continues into adulthood but their adult outcomes are usually not satisfactory in many

aspects, even for high functioning individuals (Barnhill, 2007; Cimera & Cowan, 2009; Howlin, Goode, Hutton, & Rutter, 2004). Individuals with ASD thus typically require comprehensive, substantial, and multifaceted interventions involving considerable economic implication for families, social services systems, healthcare systems and education systems (Cimera & Cowan, 2009; Knapp, Romeo, & Beecham, 2009). Therefore, interventions for children with ASD should have long lasting effects, be highly effective, and include a focus on generalisation of skills learned.

Interventions and teaching strategies for children with ASD have been traditionally dominated by behavioural approaches with limited consideration of individual cognition (Duffy & Healy, 2011; Kasari & Lawton, 2010; Lockett, Bundy, & Roberts, 2007; Parsons et al., 2011; Volker & Lopata, 2008). It has been suggested that a wider range of intervention approaches should be researched to accommodate the wide diversity in their characteristics, strengths and needs (Duffy & Healy, 2011; Kasari & Lawton, 2010; Parsons et al., 2011). Cognitive-behavioural approaches (CBA) are proposed as an extension to behavioural approaches for children with ASD (Volker & Lopata, 2008; Wang & Spillane, 2009). Because cognitive impairments, behaviour deficits and emotional problems in children with ASD are intricately interlinked, interventions employing CBA that directly address cognition as well as behaviours or emotions offer the potential to achieve generalised improvement in adaptive functioning (Greig & MacKay, 2005; Klinger & Williams, 2009).

CBA Definition, Theoretical Background, and Features

Cognitive-behavioural approaches (CBA) are a family of approaches that are considered as a further development of traditional behavioural approaches. By integrating traditional approaches with cognitive approaches, CBA facilitate changes in behaviours or emotions through changes in cognition, with an emphasis on social cognition (R. Beck & Fernandez, 1998; Dobson & Dozois, 2010; Meyers & Craighead, 1984; Scarpa & Lorenzi, 2013; Thoma, Pilecki, & McKay, 2015). Interventions using CBA have been described variously as cognitive-behavioural therapy, cognitive behaviour modification, cognitive-behavioural intervention,

cognitive-behavioural strategies, cognitive-behavioural treatment, and cognitive-behavioural analysis (Kendall & Hollon, 1979; Mayer, Van Acker, Lochman, & Gresham, 2009).

With the roots of CBA being in traditional behavioural approaches, classical behaviour theories advocated by Skinner, such as operant conditioning (Skinner, 1969) and respondent conditioning (Skinner, 1978), were influential in the early development of CBA. For example, the early application of exposure tasks or systematic desensitization in CBA interventions for treating anxiety in children was believed to be inspired by respondent conditioning theories (Benjamin et al., 2011). With the acknowledgement that “stimulus to response links” concepts have certain limitations, theorists have also considered the role of cognition in understanding human behaviours (Ingram & Siegle, 2010). In his classic *Principles of Behavior Modification* (1969), Bandura highlighted the roles of vicarious, symbolic and self-regulatory processes in the conceptual framework of social learning. In *Cognition and Behavior Modification* (1974), Mahoney interpreted behaviour changes as being due to an active process of learning and with the basic element of learning being the use of information instead of it being a passive consequence of conditioning. The gradual integration of behaviourism and cognitive psychology constituted the conceptual foundations of CBA (Ingram & Siegle, 2010).

A core assumption in cognitive therapy is that psychological disorders are consequences of maladaptive cognitive processes, and by modifying these cognitive processes psychological disorders can be improved. Exemplars are provided by two influential theorists in CBA, Ellis with irrational thinking (Ellis, 1962) and Aaron Beck with cognitive distortions (Beck, 1976). In CBA, this assumption was manifested in notions such as belief revision (Kronemyer & Bystritsky, 2014) and it is argued that belief revision both motivates and reinforces new behaviours, serving as the key change mechanism in CBA (Kronemyer & Bystritsky, 2014). In fact, the inclusion of both training to directly address cognitive deficits or distortion and more behaviourally oriented strategies to address skill and behaviour deficits, is a major feature of CBA that differentiates them from traditional behavioural approaches (Dobson & Dozois, 2010).

An important part of the theoretical framework of CBA is the role of personal inner dialogues (e.g., private speech, self-talk, self-statements or self-instruction) as advocated by Meichenbaum (Meichenbaum, 1977; Meichenbaum & Asarnow, 1979; Meichenbaum & Goodman, 1971). In this framework, negative self-talk is targeted while positive self-statements or self-instruction are considered as agents in the mechanisms for changing an individual's cognition, emotion or behaviour. Thus, in contrast to traditional behavioural approaches, an important element in CBA is to develop narrative mediated concepts or beliefs relating to life situations which would then promote adaptive behavioural or emotional responses (Tai & Turkington, 2009; Wood, Fujii, & Renno, 2011). The emphasis on the development of self-control and coping skills in CBA is also claimed to lead to greater generalisation and maintenance of interventions using CBA (Feindler & Ecton, 1986).

Interventions using CBA are usually composed of multiple components incorporating intermediate elements that are believed to enable the attainment of the intervention goals as well as elements to directly change behaviours. For example, CBA interventions with the intended aim of improving social skills may address intermediate elements (e.g., affective education, and emotion expression and recognition) that are presumed to underpin social skills, as well as directly teaching the desired specific social behaviours (e.g., Lopata et al., 2015). The presence of intermediate elements further distinguishes CBA from traditional behavioural interventions that address the intervention aims by directly teaching or modifying specific behaviours (Bandura, 1969).

Many intervention components commonly used in CBA may be intended to address cognition, to cope with difficult social circumstances, to enhance understanding and regulation of emotion, or develop self-management. Some common components in CBA, such as problem solving, are either employed as one of the multiple components in an intervention (Little & Kendall, 1979) or form the basis for a model of CBA intervention. For example, problem-solving was included in the interventions of Beebe and Risi (2003) and Greig and MacKay (2005) and both interventions included a number of other components, such as self regulation skills, coping

skills, and teaching about emotion. Problem solving was also established as an intervention model, *problem solving therapy*, and its inclusion in the field of behaviour modification was considered as one of the shifts from more behavioural interventions to more cognitively oriented interventions by D’Zurilla and Nezu (2010).

It is generally acknowledged that the components in CBA interventions can be ranged on a continuum from pure behavioural to strictly cognitive (Dobson & Dozois, 2010). No absolute consensus is reached on the classification of strategies (Crawley, Podell, Beidas, Braswell, & Kendall, 2010; Graham, 2005; Meichenbaum & Goodman, 1971; Scott, 2009; Sturmey, 2006; Sweet & Loizeaux, 1991). Strategies involving more active information processing might be considered as being more cognitively oriented (e.g. cognitive-restructuring, self-instruction and problem solving) and other strategies with less active cognitive processing as being more behaviourally oriented (e.g. relaxation and exposure).

Application of and Brief Overview of Research in CBA

General population. CBA have been practiced widely with the general population since mid-last century and are used generally in interventions to address a variety of mental illnesses and psychological problems targeting improvements in cognition, behaviour and managing emotions (Hofmann, Asnaani, Vonk, Sawyer, & Fang, 2012). Interventions with CBA have mostly been delivered in clinical settings (Hofmann et al., 2012).

Research plays an important role in the development of CBA through interactions with both theory and practice (Tai & Turkington, 2009). CBA is now considered the most researched form of psychotherapy and reviews of meta-analyses consistently support the claim that CBT is the paradigm of empirically supported practice for the general population (Butler, Chapman, Forman, & Beck, 2006; Hofmann et al., 2012). Currently research effort in CBA with the general population is shifting to clarifying the change mechanism including mediators, moderators and predictors of treatment outcomes, and investigating why and for whom CBA work (Burns, Day, & Thorn, 2012; Driessen & Hollon, 2010; Uwatoko et al., 2018; Zalta, 2015). Another branch of research has been extended to the cost effectiveness of CBA and comparing the cost of different

delivery formats (El Alaoui, Hedman-Lagerlöf, Ljótsson, & Lindefors, 2017; Stikkelbroek, Bodden, Dekovic, & van Baar, 2013).

Typically developing children. Most interventions using CBA with children target training of their thinking processes in order to modify their problematic behaviours and, typically, use self-instructional training techniques (Kendall, 1984). Initially, these techniques were usually used together with other components, such as modelling and response cost contingency (Kendall, 1984). Later, broader strategies for changing behaviours were adopted in CBA (Benjamin et al., 2011) by integrating cognitive training strategies into behavioural models.

CBA has been used with children to address problematic behaviours, and to target social skills, executive functioning, school learning tasks, problem solving, role taking, and self-control (Little & Kendall, 1979; Meichenbaum & Asarnow, 1979; Meichenbaum & Goodman, 1971). It is reported that CBA intervention by regular teachers in weekly lessons at school for typically developing children has yielded positive outcomes (Domitrovich, Cortes, & Greenberg, 2007). When using CBA with typically developing children, the focus has been usually on the interaction of the learning process, the social environment, and the centrality of information-processing factors (Braswell & Kendall, 1988). Some self-management strategies (e.g. self-evaluation, self-monitoring and self-recording), often used in CBA, have been shown to be effective with generalisation and maintenance in the context of more behaviourally oriented interventions (Alberto & Troutman, 2006). Research directions similar to those for the general population are observed in the studies of CBA for typically developing children (Armbrust et al., 2015; Peris et al., 2015).

Population with ASD in general. CBA have also been used with individuals with a range of difficulties and disabilities (Hofmann et al., 2012; Taylor, Novaco, & Brown, 2016), including the population with ASD. The first report on such intervention for an adult with ASD was published late last century by Hare (1997). One of the major aims of intervention using CBA in the population with ASD has been managing their psychiatric disorders (Anderson & Morris, 2006). The cognitive impairments of individuals with ASD are intricately interlinked with their

behavioural and emotional problems and thus, interventions, such as CBA, that directly address cognition as well as behaviour may offer the opportunity for improvement in adaptive functioning. Further, interventions for people with ASD should include a focus on generalisation of skills, which has long been identified as a concern by researchers (Happé & Frith, 2006; McGee et al., 1983; Rao et al., 2008; Rincover & Koegel, 1975).

A number of CBA intervention studies targeting adults with ASD also reported encouraging results with some maintenance and generalisation of treatment gains, specifically regarding reduction in obsessive-compulsive disorder symptoms, social anxiety and avoidance of social situations (Cardaciotto & Herbert, 2004; Dansey & Peshawaria, 2009; Hare, 1997; Russell et al., 2013; Weiss & Lunskey, 2010).

Children with ASD. Intervention programs using CBA particularly for children with ASD began at similar time to intervention with adults with ASD (Lord, 1996). Some self-management strategies commonly taught to typically developing children in CBA interventions were also taught to students with ASD successfully. These included strategies to address: on-task behaviours (Callahan & Rademacher, 1999; Coyle & Cole, 2004); attention to task and academic accuracy (Holifield, Goodman, Hazelkorn, & Heflin, 2010); social interactions (Koegel, Koegel, Hurley, & Frea, 1992; Shearer, Kohler, Buchan, & McCullough, 1996; Strain, Kohler, Storey, & Danko, 1994); appropriate play (Stahmer & Schreibman, 1992); inappropriate vocalisations (Mancina, Tankersley, Kamps, Kravits, & Parrett, 2000); and generalisation of responses to others' verbal initiations, and social initiation behaviours (Deitchman, Reeve, Reeve, & Progar, 2010; Koegel et al., 1992).

Interventions using CBA may have significant potential for supporting children with ASD, due to the versatility of CBA for addressing a range of issues. The application of some common CBA strategies with children with ASD was proven feasible, and generalisation and maintenance of treatment effect with CBA were possibly enhanced. At the commencement of this thesis in 2012, a number of research studies on interventions using CBA with children with ASD had been published including case studies (e.g., Beebe & Risi, 2003; Greig & MacKay,

2005) and randomised controlled trials (e.g., Chalfant, Rapee, & Carroll, 2007; Wood et al., 2009). It is thus of interest to track the development of research studies to reveal the process through which CBA developed for children with ASD, examine more thoroughly and comprehensively evidence of its effectiveness, the quality of evidence supporting the claimed effectiveness, and the key features in such interventions contributing to their effectiveness.

Rationale of current thesis. Children with ASD exhibit a wide range of heterogeneity with various needs and thus a wide range of intervention approaches are required to support them. With their address of both cognition and behaviour, interventions using CBA appear to be feasible and beneficial for children with ASD whose cognition, behaviour and emotion issues may be interlinked, and they may promote generalisation and maintenance of learned skills. At the commencement of this thesis (2012), there was no analysis of the evolution of relevant research on CBA for children with ASD; no comprehensive systematic reviews establishing their efficacy statistically; or examining their intervention aims, content, and outcome measures, and the relationships between these elements.

The benefit of facilitating skill generalisation with interventions in school settings was suggested in view of the difficulty in generalising learned skills experienced by students with ASD (Rotheram-Fuller & MacMullen, 2011). Interventions designed to improve academic learning skills, problem solving skills, social skills, and to manage anxiety would be of particular relevance to students with ASD in school settings. Given the potential of CBA to support schooling of children with ASD (Luxford, Hadwin, & Kovshoff, 2017), investigating the application of CBA by their teachers in school settings is one reasonable endeavour to explore the transition of research knowledge to practical implementation.

However, there was surprisingly limited information about how Australian teachers understand and apply CBA in schools to support the social skill development, anxiety management and academic skills learning of students with ASD. This might plausibly be due to the difficulties in locating suitable participants given the wide range of education options students with disability are offered and the lack of available information.

Aims of the Research

In conducting this program of research, three main research questions were asked:

1. What are the quality and characteristics of the research studies conducted to investigate the efficacy of CBA interventions with children with ASD and how has research evolved over time?
2. What research evidence is available for the efficacy of CBA interventions with children with ASD?
3. What are Australian teachers' level of knowledge, perspectives and classroom practice of CBA?

Methodological Approaches

In this research project, both quantitative methods (i.e., trend analysis, meta-analysis, systematic review, and survey) and qualitative methods (i.e., semi-structured interview and thematic analysis) were used to answer the various research questions. Quantitative methods were used for collecting objective empirical data to provide broad numerical information. The more flexible qualitative interview method allowed more in-depth exploration of teacher perspectives than is possible in survey research.

The evolution of research on CBA with children with ASD over time was tracked through a quantitative trend analysis approach. To explore the efficacy of CBA with children with ASD statistically, a meta-analysis was conducted, examining effect sizes of intervention outcomes across studies. By evaluating the quality of the relevant research studies that provided data for the meta-analysis, the strength of the evidence on the efficacy of these interventions was examined. A quantitative systematic review was subsequently completed to further investigate the characteristics of intervention studies included in the extant literature as well as to detect any patterns that may affect efficacy of such interventions.

The more specific enquiry addressing Australian teachers' level of knowledge, perspectives and classroom practice included a quantitative survey study and a qualitative interview study. Informed by the findings of the quantitative literature reviews, the empirical survey included questions about teacher knowledge and application of the common CBA

strategies identified from the reviewed intervention studies. In the qualitative study, interviews were used to further pursue issues identified in the survey study. The interview was designed with open and semi-structured questions to gain more in-depth insights into teachers' knowledge, perspectives and classroom practice.

Structure and Style of the Thesis

The current thesis includes five chapters each presenting an individual manuscript. In addition, an introductory and a concluding chapter are provided along with linking paragraphs. The next three chapters are trend analysis and literature reviews which are followed by two chapters including a survey study and an interview study both examining Australian teachers' knowledge and perspectives on the application of CBA.

All reports completed during this research project were either published or are in press and the individual manuscripts are presented here as formatted in journal article style. Some inconsistency exists among the manuscripts to meet the varying publication requirements of the different journals in language use (i.e., use of American English or British English spelling) and formatting style (e.g., different styles in abstracting, heading and referencing). There is also some repetition of information across the individual manuscripts because of the self-contained nature of each manuscript. The publication status for each manuscript is presented at the beginning of the relevant chapter. Further details are included in the chapter outline.

The terminology around autism spectrum disorders and people with ASD is evolving. Generally, in this thesis person-first terminology is used to reflect that people with ASD are people first and are not defined by their condition. Some terminology reflects older perspectives (such as high-functioning and low-functioning) and is used because that terminology was adopted in older research reports that are reviewed in the thesis.

Chapter Outline

Chapter 2: Cognitive-Behavioral Approaches for Children with Autism Spectrum

Disorder: A Trend Analysis.

This chapter includes a trend analysis paper published in *Research in Autism Spectrum Disorder* (Ho, Stephenson, & Carter, 2018). The trend analysis provides an overview of the past development of research and thus included suggestions for future research. It included analysis of 103 relevant research reports. The major issues addressed in the trend analysis were the changes over time in terms of research designs (e.g., the number of randomised controlled trials reported in different years), participant characteristics (e.g., number of participants within certain ranges of intellectual ability), intervention aims (e.g., number of studies specifying a primary aim of addressing certain skills or problems), programs used (e.g., number of studies replicating previously trialled programs), and outcome measures (e.g., number of studies using informant reports) including data on generalisation and maintenance of skills learned. This analysis of the broad trends in research on CBA interventions for children is the first attempt to examine changes and developments in this intervention research since the earliest report of an intervention by Lord (1996).

Chapter 3: Cognitive-Behavioral Approach for Children with Autism Spectrum Disorders: A Meta-Analysis.

A meta-analysis published in the *Review Journal of Autism and Developmental Disorders* (Ho, Stephenson, & Carter, 2014) is presented in Chapter 3. The purpose of this meta-analysis was to address the fundamental question of whether CBA interventions are efficacious with children with ASD. The meta-analysis was conducted on ten randomised controlled trials (RCTs) located through a systematic search in four databases at the commencement of the thesis project. The effect sizes calculated from the outcome data of these ten RCTs were synthesised. The quality of the RCTs reviewed in the meta-analysis was quantified by scoring study features (e.g., participant selection process) and research design (e.g., randomisation method) individually and possible moderators of intervention effects were investigated. This review was the first meta-

analytic synthesis of the research for the efficacy of CBA in children with ASD that was not restricted to specific intervention targets.

Chapter 4: Cognitive–Behavioural Approach for Children with Autism Spectrum

Disorder: A Literature Review.

Interventions with CBA often include many components and so an important issue is to examine the possible relationships between the intervention aims, the intervention components, and the outcome measures. The systematic review published in *Journal of Intellectual and Developmental Disability* (Ho, Stephenson, & Carter, 2015) and presented in Chapter 4 was designed for this purpose. The review provided an examination of 39 relevant intervention studies including the ten RCTs examined in the meta-analysis, other experimental studies and some case studies. The focus was on a detailed examination of the intervention aims, intervention components and outcome measures reported in this larger body of studies as well as on tracking the relationship between these elements. Prior to the publication of this paper, no systematic and comprehensive review of empirical literature provided an analysis of these aspects of the CBA intervention research.

Chapter 5: Cognitive-behavioural Approaches for Students with Autism Spectrum

Disorder: A Teacher Survey.

Chapter 5 includes a survey study of Australian teacher knowledge, implementation and perspectives on CBA with their students with ASD. This paper was published in *International Journal of Disability, Development and Education* (Ho, Stephenson, & Carter, 2017). As discussed earlier, CBA have been used to address issues relevant to students with ASD such as school learning tasks, social skills, executive-functioning, problematic behaviours, and anxiety management. Meanwhile a number of research reports on interventions using CBA with students with ASD and administrated by teachers described positive results (e.g., Bauminger-Zviely, Eden, Zancanaro, Weiss, & Gal, 2013; Lopata et al., 2013). Children with ASD exhibit a wide range of heterogeneity and would benefit from an array of evidence-based practices in their

education, thus investigating the knowledge and perspectives on CBA held by their teachers is a reasonable strategy to explore the relationship between research and educational practice.

An anonymous survey was used in this study with a sample of 270 NSW Australian teachers and the survey protocol was informed by the literature reviews presented in earlier chapters. Questions in the survey explored teacher perceptions of CBA strategies identified in the reviewed intervention studies. The survey also included questions about teachers' perspectives on the age and ability level of students for whom CBA would be suitable, to allow comparison with the characteristics of students in intervention studies. This study represents the first teacher survey focusing on teacher knowledge about, implementation of and perspectives on CBA when applied to their students with ASD.

Chapter 6: Teacher Understanding and Application of Cognitive-Behavioural Approaches for Students with Autism Spectrum Disorder and Intellectual Disability.

The content of Chapter 6 is a qualitative study drawing on teacher interviews and is now in press in the *Australasian Journal of Special and Inclusive Education* (Ho, Stephenson, & Carter, 2019). The interview study is an in-depth follow-up examination of issues identified from the earlier survey study. Respondents to the survey study reported in Chapter 5 considered CBA as being feasible for students with ASD and intellectual disabilities; and they reported using such approaches for this cohort of students. Although a previous literature review and meta-analysis on CBA for children with special education needs suggested the feasibility of such interventions in school settings (Ho, Carter, & Stephenson, 2010), research studies including students with intellectual disability were extremely limited. To explore the knowledge, perspectives and application of CBA by teachers with students with both ASD and intellectual disability, a sample of 13 New South Wales teachers teaching students from this cohort were interviewed using a semi-structured interview protocol. As for the survey study, this study appears to be the only one designed to gain a more thorough understanding regarding Australian teacher knowledge, implementation and perspectives on CBA for students with ASD and intellectual disability.

Chapter 7: Conclusion.

This concluding chapter provides a summary of the findings of the research presented in the papers that comprise this thesis. Implications for future research and practice are discussed, and the original contribution of this research is highlighted.

Summary

In this chapter the purpose of the research contained in this thesis was introduced. Literature providing a background to and rationale for the aims of the research were presented and included discussion of the characteristics of children with ASD, the theoretical background and features of CBA, and the application of CBA. An overview of the structure and content of this thesis by publication were provided. Methodological approaches adopted in this thesis were also described.

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CHAPTER 2: COGNITIVE-BEHAVIORAL APPROACHES FOR CHILDREN WITH AUTISM SPECTRUM DISORDER: A TREND ANALYSIS

Chapter Overview

This chapter consists of a trend analysis published in *Research in Autism Spectrum Disorders* (Ho, Stephenson, & Carter, 2018) examining the trends in research on CBA for children with ASD. The term *cognitive-behavioural interventions* was used in this chapter to meet the specific requirements of *Research in Autism Spectrum Disorders* and this is an exception to the other chapters in this thesis, where the term *cognitive-behavioural approaches* was adopted.

The earliest published report on intervention using CBA for children with ASD was in the late 1990s (Lord, 1996). Within a couple of decades, CBA with children with ASD had reached the status of being considered evidence-based (National Autism Center, 2015; Wong et al., 2015). Thus, it was of interest to track the evolution over time of research on this subject.

This trend analysis was conducted on 103 relevant research reports located through a systematic search in major research databases at the commencement of the thesis project and an updated search in 2015. The full list of the reports reviewed in this trend analysis is attached as the Appendix to this chapter. Observations are focused on the change patterns of the proportions of studies using various experimental controls and of group study sample sizes. Other change patterns analysed included participant characteristics especially their verbal and intellectual ability; intervention aims; the types of programs used and their specific features, and the types of outcome measures and data reported on generalisation and maintenance.

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Pages 34-48 of this thesis have been removed as they contain published material. Please refer to the following citation for details of the article contained in these pages.

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APPENDIX

Full List of Reports Included in Trend Analysis

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CHAPTER 3: COGNITIVE-BEHAVIORAL APPROACH FOR CHILDREN WITH AUTISM SPECTRUM DISORDERS: A META-ANALYSIS

Chapter Overview

This chapter presents a meta-analysis published in the *Review Journal of Autism & Developmental Disorders* (Ho, Stephenson, & Carter, 2014). Following the presentation of the range of research in CBA and a broad characterisation over time with the trend analysis presented in Chapter 2, Chapter 3 presents an analysis of the effectiveness of CBA interventions for children with ASD. Effect sizes of outcomes measured in ten randomised controlled trials of interventions using CBA involving 402 children with ASD were estimated. Findings on intervention efficacy, study quality, program features and participant characteristics are presented.

Prior to the submission of this paper, there had been no published meta-analyses examining CBA for children with ASD. One year before the publication of this paper, Sukhodolsky, Bloch, Panza, and Reichow (2013), published their meta-analysis which was restricted to interventions for anxiety management for high functioning children with ASD.

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Pages 66-81 of this thesis have been removed as they contain published material. Please refer to the following citation for details of the article contained in these pages.

Ho, B. P. V., Stephenson, J., & Carter, M. (2014). Cognitive-behavioral approach for children with autism spectrum disorders: a meta-analysis. *Review Journal of Autism and Developmental Disorders*, 1, p. 18-33.

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CHAPTER 4: COGNITIVE-BEHAVIOURAL APPROACH FOR CHILDREN WITH AUTISM SPECTRUM DISORDER: A LITERATURE REVIEW

Chapter Overview

A systematic literature review on interventions using CBA for children with ASD published in the *Journal of Intellectual and Developmental Disability* (Ho, Stephenson, & Carter, 2015) provides the content of this chapter. The main objectives of this systematic review were to examine the intervention aims, intervention content and intervention outcome measures of the reviewed reports; and to clarify the relationships between these three elements. Overall, large effect sizes for the intervention studies examined were reported in the meta-analysis in Chapter 3. Nevertheless, considerable heterogeneity found among the intervention programs, and the use of child and parent reports as outcome measures, suggested further systematic examination of these elements was warranted. This systematic review examined 39 intervention studies including both published reports and theses/dissertations located from four databases and ranging from randomised controlled trials to case studies.

This is the largest scale inclusive systematic review of intervention studies on CBA for children with ASD published. Systematic reviews published prior to this were either of much smaller scale (Kincade, 2009; White, 2004) or restricted to CBA interventions for anxiety management (Vasa et al., 2014) and children with high functioning ASD (Ung, Selles, Small, & Storch, 2015).

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Pages 84-100 of this thesis have been removed as they contain published material. Please refer to the following citation for details of the article contained in these pages.

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DOI: [10.3109/13668250.2015.1023181](https://doi.org/10.3109/13668250.2015.1023181)

CHAPTER 5: COGNITIVE-BEHAVIOURAL APPROACHES FOR STUDENTS WITH AUTISM SPECTRUM DISORDER: A TEACHER SURVEY

Chapter Overview

An Australian teacher survey on their level of knowledge, implementation and perspectives about CBA for students with ASD is presented in this chapter. This study was published in *International Journal of Disability, Development and Education* (Ho, Stephenson, & Carter, 2017).

CBA has been identified as an evidence-based practice, has been used to target a range of issues relevant to students with ASD, and has been suggested to be beneficial in school settings for students with ASD (Rotheram-Fuller & Hodas, 2015). However, only a very small number of intervention studies conducted in school settings and by teachers were conducted (see Chapter 4). Nevertheless, positive outcomes were reported in these research studies (e.g., Bauminger-Zviely, Eden, Zancanaro, Weiss, & Gal, 2013; Lopata et al., 2013). Little was known about the actual implementation status of CBA in school settings, how teachers learned CBA, or how they perceived the application of CBA. The main aims of the study described in this chapter were to determine how familiar Australian teachers were with CBA, how frequently they used these approaches and particular strategies, which cohorts of students with ASD they considered suitable candidates for CBA, and how they learned about CBA.

A survey was distributed to Australian teachers teaching in special classes in New South

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Wales and 270 usable surveys were returned. A copy of the survey questionnaire is attached as the Appendix to this chapter. This survey represented the first Australian teacher survey regarding knowledge, implementation and perspectives on CBA when used with students with ASD.

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Pages 103-122 of this thesis have been removed as they contain published material.
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APPENDIX

CBA for students with ASD: Teacher Survey Questionnaire

Please tick the appropriate box/boxes for the following questions.

What is your gender? (tick one box only)

☐ Male

☐ Female

What is your highest academic qualification in general education? (tick one box only)

☐ Diploma

☐ Coursework masters

☐ Bachelor degree

☐ Research degree

☐ Postgraduate diploma

☐ Other _____

What is your highest academic qualification in special education? (tick one box only)

☐ No formal qualification

☐ Coursework masters

☐ Diploma

☐ Research degree

☐ Bachelor degree

☐ Other _____

☐ Postgraduate diploma

How many years of teaching experience do you have in any role & any education setting? (tick one box only)

☐ 0 – 5 years

☐ 11 – 15 years

☐ 6 – 10 years

☐ More than 15 years

How many years of experience do you have in teaching students with autism spectrum disorder? (tick one box only)

☐ 0 – 5 years

☐ 11 – 15 years

☐ 6 – 10 years

☐ More than 15 years

What is your current position? (tick all boxes that apply)

☐ Classroom teacher of autism-specific support class in regular school

☐ Classroom teacher of non-autism-specific support class in schools for specific purposes

☐ Classroom teacher of non-autism-specific support class in regular school

☐ Classroom teacher in ASD specific school

☐ Classroom teacher of autism-specific support class in schools for specific purposes

☐ Other _____

What level of intellectual abilities do your students with autism spectrum disorder have? (tick all boxes that apply)

☐ Typical intellectual abilities

☐ Moderate intellectual disability

☐ Mild intellectual disability

☐ Severe/profound intellectual disability

The cognitive-behavioural approach is regarded as an extension to the traditional behavioural approach and is based on the proposition that cognitive activity affects behaviours and desired behaviour changes may thus be achieved through changing how students think.

In the following, you will answer questions about your knowledge or use of common cognitive-behavioural strategies in your pre-planned teaching activities, either individually or as part of an intervention to change student behaviours or help students deal with emotions such as anger and anxiety. For example, if you had heard about cognitive restructuring but never used it, you would tick the second box for “Heard about it but never used” as per below:

Have you used these strategies as part of an intervention to change student behaviour or help students deal with emotions such as anger and anxiety?		Please tick the boxes which describe your usage of the strategy			
CBA Strategy	Definition	Never learned about	Have heard about	Use occasionally	Use frequently
Cognitive restructuring	Teaching students to identify and challenge unhealthy, unhelpful and negative thoughts, then replace them with healthy, helpful and positive thoughts; for example, Socratic questioning and cost-benefits analysis		✓		

Some examples are given in some of the definitions for further illustration. Your answer will be based on whether you have tried or used a certain strategy as defined in the definition and not based on whether you have tried or used the exact examples quoted inside the brackets.

Have you used these strategies as part of an intervention to change student behaviour or help students deal with emotions such as anger and anxiety?		Please tick the boxes which describe your usage of the strategy			
CBA Strategy	Definition	Never learned about	Have heard about	Use occasionally	Use frequently
Self-instruction	Teaching students a sequence of statements or self-prompts to help them work through a situation and gradually gain control over their own behaviours.				
Cognitive restructuring	Teaching students to identify and challenge unhealthy, unhelpful and negative thoughts, then replace them with healthy, helpful and positive thoughts (e.g., Socratic questioning, cost-benefits analysis)				
Problem solving	Teaching students to recognise and define problems, generate alternative solutions, decide which solution to implement, implement the solution and verify the results (e.g., plan an attempt to join in peer group, alternative travelling plan when the usual train is cancelled).				

Have you used these strategies as part of an intervention to change student behaviour or help students deal with emotions such as anger and anxiety?		Please tick the boxes which describe your usage of the strategy			
CBA Strategy	Definition	Never learned about	Have heard about	Use occasionally	Use frequently
Relaxation	Teaching students to reduce stress or to restore a calm state of the body (e.g., deep breathing, muscle relaxation).				
Emotion knowledge & skills	Teaching students to identify facial expressions, emotions, or signs of being aroused; and to deal with feelings, values or a provocative situation.				
Coping actions	Teaching students specific actions used to cope with difficult situations which are stressful and may arouse anxious feelings (e.g., asking help from others, moving away from the spot, or taking a walk).				
Metaphor	Teaching students more abstract or difficult concepts using metaphor (e.g., describing in control as “being the boss”, describing being calm as “being cool”, describing a set of strategies for specific purpose as “a toolbox”).				
Self-monitoring	Teaching students to keep track of their own performance (e.g., following teacher’s instructions) or emotional status (e.g., having been angry). This may be followed up with informing the teacher/adult to record the instance or self-recording such instance.				
Self-evaluation	Teaching students to appraise and evaluate their own work or mental status (e.g., rate themselves on the academic task completed, assess how well they have solved a problem).				
Visual presentation	Teaching students to use visual materials to express themselves (e.g., using pictures to illustrate feelings or situations)				
Emotion or feeling thermometer	Teaching students to indicate their different emotional status using charts in the shape of a thermometer with different colours or graduations to represent different mental status from being relaxed, calm, upset to being mad; or similar usage.				
Exposure / Desensitization	Teaching students to face their feared objects or context by exposing them to these objects or context in a systematic manner in order to overcome their anxiety or specific phobias.				
Role play	Teaching students the appropriate behaviours or certain concepts by role-playing to model the skills or situations.				

Please tick the appropriate box/boxes for the following questions.

How did you learn about CBA? (tick all boxes that apply)

- | | |
|--|---|
| <input type="checkbox"/> During pre-service teacher training | <input type="checkbox"/> Reading |
| <input type="checkbox"/> In-service professional training course | <input type="checkbox"/> Off the internet |
| <input type="checkbox"/> Observing other teachers | <input type="checkbox"/> Other _____ |

How well do you rate your understanding of CBA? (tick one box only)

- | | |
|-------------------------------------|---|
| <input type="checkbox"/> Very good | <input type="checkbox"/> Limited |
| <input type="checkbox"/> Reasonable | <input type="checkbox"/> No understanding |

How well do you rate your skills in using CBA? (tick one box only)

- | | |
|-------------------------------------|------------------------------------|
| <input type="checkbox"/> Very good | <input type="checkbox"/> Limited |
| <input type="checkbox"/> Reasonable | <input type="checkbox"/> No skills |

At what age levels do you consider CBA is appropriate for students with ASD? (tick all boxes that apply)

- | | |
|---|--|
| <input type="checkbox"/> Younger than 10 years old | <input type="checkbox"/> Older than 18 years old |
| <input type="checkbox"/> Between 10 to 13 years old | <input type="checkbox"/> Don't know |
| <input type="checkbox"/> Between 13 to 18 years old | |

At what cognitive levels do you consider CBA is appropriate for students with ASD? (tick all boxes that apply)

- | | |
|---|---|
| <input type="checkbox"/> Typical intellectual abilities | <input type="checkbox"/> Severe intellectual disability |
| <input type="checkbox"/> Mild intellectual disability | <input type="checkbox"/> Don't know |
| <input type="checkbox"/> Moderate intellectual disability | |

For which of the following have you used any of the CBA strategies listed in the above table? (tick all boxes that apply)

- | | |
|---|--|
| <input type="checkbox"/> Reduce problematic behaviours | <input type="checkbox"/> Help students manage anxiety |
| <input type="checkbox"/> Improve social skills | <input type="checkbox"/> Reduce a specific phobia |
| <input type="checkbox"/> Improve friendship skills | <input type="checkbox"/> Reduce obsessive compulsive disorders |
| <input type="checkbox"/> Improve classroom skills | <input type="checkbox"/> Help students manage anger |
| <input type="checkbox"/> Improve academic skills | <input type="checkbox"/> Other (please list): _____ |
| <input type="checkbox"/> Improve self-management skills | |

CHAPTER 6: TEACHER UNDERSTANDING AND APPLICATION OF COGNITIVE-BEHAVIOURAL APPROACHES FOR STUDENTS WITH AUTISM SPECTRUM DISORDER AND INTELLECTUAL DISABILITY

Chapter Overview

A qualitative study based on interviews with Australian teachers regarding their knowledge, implementation and perspectives on CBA for students with both ASD and intellectual disability is presented in this chapter. This report is now available pre-publication in the *Australasian Journal of Special and Inclusive Education*.

The interviews were used to explore in-depth several issues identified from the teacher survey study presented in Chapter 5. For example, teachers indicated frequent use of CBA strategies for a range of purposes that have not been extensively examined in research and for students with intellectual disability. There was very limited research on the use of CBA with children with intellectual disability (Ho, Carter, & Stephenson, 2010) so it was of interest to investigate how teachers perceived the application of CBA with students with both ASD and intellectual disability. In the teacher survey, teachers indicated frequent use of CBA strategies for a range of purposes and for students with ASD and a range of intellectual disability. Australian teachers teaching students with both ASD and intellectual disability were recruited with 13 participants completing interviews. The interviews were based on a semi-structured protocol and data collected was analysed using a thematic analysis approach. A copy of the

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interview protocol is attached as an Appendix to this chapter. Directions for enhancing teacher knowledge and supporting their practices of CBA are suggested based on the themes identified from the interview data.

This study is the first interview study examining Australian teacher knowledge, implementation and perspectives on CBA in relationship to students with both ASD and intellectual disability.

Reference

Ho, B. P. V., Carter, M., & Stephenson, J. (2010). Anger management using a cognitive-behavioural approach for children with special education needs: A literature review and meta-analysis. *International Journal of Disability, Development & Education*, 57, 245-265. doi:10.1080/1034912X.2010.501169

Pages 129-143 of this thesis have been removed as they contain published material.
Please refer to the following citation for details of the article contained in these pages.

Ho, B. P. V., Stephenson, J., & Carter, M. (2019). Teacher understanding and application of cognitive-behavioural approaches for students with autism spectrum disorder and intellectual disability. *Australasian Journal of Special and Inclusive Education*, 43(1), p. 12-26.

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Appendix: CBA for students with ASD: Teacher Interview Protocol

Opening

Thank you very much for taking part in this interview and sharing your experience and thoughts with us. We are interested in learning more about how teachers who teach students with autism use cognitive-behavioural approaches (CBA) in schools. We haven't found much literature out there regarding how teachers use cognitive-behavioural approaches and we are trying to find out what teachers think and do in their daily teaching. Information provided by you and other teachers will help us to fill this gap in the literature.

Our interview will have three main parts, first some background information about yourself as a teacher, then information about how you use cognitive-behavioural approaches, and last your perspectives in these approaches.

I will record our interview and the transcript of the recording will be sent to you for checking before entering into our database.

Cognitive-behavioural approaches are intervention approaches based on the principle that changes in cognition will lead to changes in behaviours and feelings. These approaches support students' behaviours or teach them new skills by examining and intervening with their cognition and behaviours.

Background information

What is your highest academic qualification in general education?

- | | |
|---|---|
| <input type="checkbox"/> Diploma | <input type="checkbox"/> Coursework masters |
| <input type="checkbox"/> Bachelor degree | <input type="checkbox"/> Research degree |
| <input type="checkbox"/> Postgraduate diploma | <input type="checkbox"/> Other _____ |

What is your highest academic qualification in special education?

- | | |
|--|---|
| <input type="checkbox"/> No formal qualification | <input type="checkbox"/> Coursework masters |
| <input type="checkbox"/> Diploma | <input type="checkbox"/> Research degree |
| <input type="checkbox"/> Bachelor degree | <input type="checkbox"/> Other _____ |
| <input type="checkbox"/> Postgraduate diploma | |

How many years of teaching experience in total do you have in any role & any education setting?

- | | |
|---------------------------------------|---|
| <input type="checkbox"/> 0 – 5 years | <input type="checkbox"/> 11 – 15 years |
| <input type="checkbox"/> 6 – 10 years | <input type="checkbox"/> More than 15 years |

How many years of experience in total do you have in teaching students with autism spectrum disorder?

- | | |
|---------------------------------------|---|
| <input type="checkbox"/> 0 – 5 years | <input type="checkbox"/> 11 – 15 years |
| <input type="checkbox"/> 6 – 10 years | <input type="checkbox"/> More than 15 years |

What is your current position in this school?

- | | |
|--|--|
| <input type="checkbox"/> Classroom teacher of autism-specific support class in regular school | <input type="checkbox"/> Classroom teacher of non-autism-specific support class in schools for specific purposes |
| <input type="checkbox"/> Classroom teacher of non-autism-specific support class in regular school | <input type="checkbox"/> Classroom teacher in ASD specific school |
| <input type="checkbox"/> Classroom teacher of autism-specific support class in schools for specific purposes | <input type="checkbox"/> Other _____ |

What are the disabilities your current students have? (tick all boxes that apply)

- | | |
|--|--|
| <input type="checkbox"/> Intellectual disability | <input type="checkbox"/> Emotional and behavioural disorders |
| <input type="checkbox"/> Autism spectrum disorders | <input type="checkbox"/> Other _____ |

What is their age range? (tick all boxes that apply)

- | | |
|--|---|
| <input type="checkbox"/> Early primary | <input type="checkbox"/> Late primary |
| <input type="checkbox"/> Early secondary | <input type="checkbox"/> Late secondary |

What level of intellectual ability do your students with autism spectrum disorder have? (tick all boxes that apply)

- | | |
|---|--|
| <input type="checkbox"/> Typical intellectual ability | <input type="checkbox"/> Moderate intellectual disability |
| <input type="checkbox"/> Mild intellectual disability | <input type="checkbox"/> Severe/profound intellectual disability |

How old are your students with autism spectrum disorders? (tick all boxes that apply)

- | | |
|--|---|
| <input type="checkbox"/> Early primary | <input type="checkbox"/> Late primary |
| <input type="checkbox"/> Early secondary | <input type="checkbox"/> Late secondary |

Specific successful example

- Would you tell me about a specific CBA program/strategy you are using currently or one you recently used with your students with ASD who also have intellectual disabilities, which you thought was successful
- Tick the box if the following element is included in the answer for the successful program/strategy. Otherwise, ask the probe question:
 - ☐ Source of learning
 - ☐ Content of course about CBA
 - PQ: How did you find out about this intervention/strategy you described? (Target: the source e.g., pre-service training, in-services training, reading etc., the content e.g., theory, implementation, or discussion on relevant issues)
 - ☐ Purpose of using this program/ strategy
 - PQ: What is or was your purposes of using this intervention/strategy, i.e., what did you want to improve or manage?
 - ☐ Factors in decision making
 - PQ: What factors have influenced your decision to use this intervention program / strategy? (the answer may include the fitness to purposes, student character and classroom setting; the available resources, the foreseeable constraints, and other factors)
 - ☐ Student age
 - ☐ Student diagnosis
 - ☐ Student IQ
 - ☐ Student verbal ability
 - ☐ Student social ability
 - PQ: Would you mind giving me a brief description of the student who you used this intervention/ this strategy with, such as their age, major diagnosis, IQ and social ability?
 - ☐ Support/resources to organise the intervention
 - ☐ Support/resources to implement the intervention
 - PQ: As teachers, we always have to organise our resources in any activities we planned. What sort of support/resources did you rely on when organising and implementing your

CBA intervention program/strategy (e.g., input from colleagues, school exec, school counsellor, speech path, occupational therapist etc.)?

☐ Problem in organising implementation

➤ PQ: What was the major problem when you organised the implementation?

Details of actual implementation

- Can you tell me more about what you do during your implementation? (e.g., the procedure including the use of any manual or documented program, the data collection, the evaluation of the outcomes, the other involved such as peer etc.)

- Tick the box if the following element is included in the answer. Otherwise, ask further probe question:

☐ Concrete description for each step

➤ PQ: Teaching is a very busy business and a teacher has to deliver thousand instructions in a day. Can you tell step by step what did you actually intervene on or teach the student using this intervention program / strategy?

☐ Documentation of program/strategy implementation

➤ PQ: Did you prepare any lesson plans or protocol for implementing this program/strategy

☐ Participants and others involved

➤ PQ: Who were involved in the intervention?

☐ Data collection

➤ PQ: How did you keep track of students' changes in this intervention program / strategy?

☐ Outcome evaluation

➤ PQ: How did you feel about the outcome of this intervention program / strategy after your last implementation

☐ Any modifications

- PQ: How did you modify your intervention program / strategy in the instances when you had to (e.g., to suit the specific needs of your students)?

- ☐ Any problems
- PQ: Were there some downsides or challenges when you implement this intervention/strategy? Can you give me some examples?

- ☐ Any working very well elements
- PQ: For your successful intervention, are there some ways in which you think CBA is really working well in your intervention program / strategy you used? Can you give me an example?

- ☐ Factors contributing to the success
- PQ: What factors or elements you think have contributed to this successful implementation?

Specific unsuccessful example

- Would you now tell me a specific CBA program/strategy you are using currently or recently used with your students with ASD and intellectual disabilities, which you thought was unsuccessful?
- Tick the box if the following element is included in the answer for the unsuccessful program. Otherwise, ask the probe question:
 - ☐ Source of learning
 - ☐ Content of course about CBA
 - PQ: How did you find out about this intervention/strategy you described? (Target: the source e.g., pre-service training, in-services training, reading etc., the content e.g., theory, implementation, or discussion on relevant issues)
 - ☐ Purpose of using this program/ strategy
 - PQ: What are your purposes of using this intervention/ strategy, i.e., what do you want to improve or manage?
 - ☐ Factors in decision making
 - PQ: What factors have influenced your decision to use these intervention program / strategy? (the answer may include the fitness to purposes, student character and classroom setting; the available resources, the foreseeable constraints, and other factors)
 - ☐ Student age
 - ☐ Student diagnosis
 - ☐ Student IQ
 - ☐ Student verbal ability
 - ☐ Student social ability
 - PQ: Would you mind to give me a brief description of the student who you used this intervention/ strategy with, such as their age, major diagnosis, IQ and social ability?
 - ☐ Support/resources to organise the intervention
 - ☐ Support/resources to implement the intervention

- PQ: As teachers, we always have to organise our resources in any activities we planned. What sort of support/resources did you rely on when organising and implementing your CBA intervention program/strategy (e.g., input from colleagues, school exec, school counsellor, speech path, occupational therapist etc)?

☐ Problem in organising implementation

- PQ: What was the major problem when you organise the implementation?

Details of actual implementation

- Can you tell me more about what you do during your implementation? (e.g., the procedure including the use of any manual or documented program, the data collection, the evaluation of the outcomes, the other involved such as peer etc)
- Tick the box if the following element is included in the answer. Otherwise, ask the probe question:
 - ☐ Concrete description for each step
 - PQ: Teaching is a very busy business and a teacher has to deliver thousand instructions in a day. Can you tell step by step what did you actually intervene or teach the student using this intervention program / strategy?
 - ☐ Documentation of program/strategy implementation
 - PQ: Did you prepare any lesson plans or protocol for implementing this program/strategy
 - ☐ Participants and others involved
 - PQ: Who were involved in the intervention?
 - ☐ Data collection
 - PQ: How did you keep track of students' changes in this intervention program / strategy?
 - ☐ Outcome evaluation
 - PQ: How did you feel about the outcome of this intervention program / strategy after your last implementation

☐ Any modifications

➤ PQ: How did you modify your intervention program / strategy in the instances when you had to (e.g., to suit the specific needs of your students)?

☐ Problems

➤ PQ: Were there some downsides or challenges when you implement this intervention/strategy? Can you give me some examples?

☐ Any elements that still worked well in this unsuccessful example

➤ PQ: For your unsuccessful intervention, are there some ways in which you think CBA is still working well in your intervention program / strategy you used? Can you give me an example?

☐ Reasons for being unsuccessful

➤ Why do you think it failed?

- Would you use it again?
- What changes would you like to make if you're to use it again?

Perspectives

- What factors do you see being important to the successful implementation of CBA in general for students with ASD and intellectual disabilities?
- On the other side of the story, what problems or issues would you see will impact the implementation of CBA at school setting?
- To what extent do you think CBA is relevant to your own teaching of students with ASD? Why? Can you give an example?
- What may be factors which influence your decision to or not to use CBA in the future?
- In an ideal situation, how might you imagine using CBA? What kinds of supports would be most helpful?
- To what extent would the school curriculum affect your implementation of CBA? Can you give some examples?
- People have lots of different interpretations of cognitive-behavioural approaches. What does this term mean to you?

- What do you consider being the essential elements in cognitive-behavioural approaches?

Ending

- What have I forgotten to ask you that you think important for me to understand about your thoughts and practices in CBA?
- Would you have any questions for me?
- Our final report will be a summary of all the teachers' views and we are not going to put on any record your name or school name together with your information. Instead, we would only use a number to identify the information you provided us, and then a pseudo name in any papers written on this project if necessary.
- Would you like to have our final report?

Present thank you card.

Points to watch out

- ❖ Use the word “again” when ask “Can you tell me again” to indicate that I just did not listen careful enough and not to arouse defensive attitude.
- ❖ Ask for elaborations when participants use vague descriptors such as ‘nice’ ‘bad’

CHAPTER 7: CONCLUSION

Chapter Overview

In this chapter, a summary of the thesis and conclusion is provided. A summary of how the overarching research questions set in Chapter 1 were addressed in relation to the individual studies is presented. The major suggestions for future research arising from the whole thesis project are offered and the contribution of the research to the field is identified.

Summary of the Research

The main purposes of the current thesis project are to map out the evolution of research on interventions using CBA for children with ASD, to determine the efficacy of these interventions and to find any possible relationship between aims, content and outcome measures. Further, the current application of CBA in school settings, specifically, the knowledge, perspectives and implementation of such approaches by Australian teachers are explored

To accomplish the above purposes, three main research questions were asked:

1. What are the quality and characteristics of the research studies conducted to investigate the efficacy of CBA interventions with children with ASD and how has research evolved overtime?
2. What research evidence is available for the efficacy of CBA interventions with children with ASD?
3. What are Australian teachers' level of knowledge, perspectives and classroom practice of CBA?

To answer these three questions, five research projects were undertaken including a trend-analysis, a meta-analysis, a systematic review; an empirical teacher survey study and a qualitative teacher interview study.

Research Question 1

The trend analysis was conducted to answer the first research question by examining the quality and characteristics of the relevant research and its evolution over time. It was found that qualitative case studies in the early years were gradually replaced by experimental studies. However, the proportion of randomised, controlled trials as well as their sample sizes did not increase as much as might have been expected. On the other hand, by combining and analysing outcome data from several related intervention trials, the recent supplementary analyses provided data not available in the original reports such as the possible treatment moderators, correlates of outcomes and treatment maintenance.

Managing anxiety and related problems were the dominating primary aims in the majority of intervention research studies at all times and this trend was rising while social skills were targeted consistently. Also, throughout the years, the majority of participants included were those with typical or above intellectual ability while children with mild or below intellectual disability were seldom included. Some important participant demographic information (e.g., IQ scores, instruments for making ASD diagnoses, ASD symptom severity) were often missed from the research reports.

Regarding the specific characteristics of these research studies, a wide range of different programs were used in the field and most studies since the last decade used manualised programs. The majority of studies were conducted in clinical settings by psychologists with the increasing trend toward interventions conducted outside the clinics and with parent involvement. CBA was much less often investigated in school settings or with teachers delivering the intervention.

To measure intervention outcomes, most researchers used rating scales and mostly rating scales by parents, followed by participant self-rating. In contrast, direct behaviour observation as an outcome measure was very limited. Maintenance was measured in some trials but generalisation was much less often reported.

More detailed examination was conducted in the systematic review regarding the intervention aims, intervention content/skills addressed, and intervention outcome measures of interventions studies using CBA with children with ASD, as well as the relationships between these elements. It was found that more cognitively oriented CBA components were less often included in interventions than behaviourally oriented CBA components. More importantly, a notable lack of correspondence was found among these examined elements. Also, in these multi-component interventions examined, learning of intermediate knowledge and skills was not typically measured. There was often absence of evidence regarding mastery of specific knowledge/skills taught as part of the CBA interventions, which was presumed to result in changes in the targeted outcomes. The inconsistency between intervention elements and lack of measurement of intermediate knowledge/skills in research studies makes it difficult to evaluate how the intended effects were achieved through the different components in interventions using CBA.

Research Question 2

To answer the second question about the research evidence available for the efficacy of CBA interventions with children with ASD, synthesis of intervention effects across relevant studies was conducted via meta-analysis. Overall, statistically significant and large effect sizes were obtained. The evidence for efficacy was all generated in clinical settings by psychologists or therapists, from participants with typical to above average intellectual ability, mostly addressing anxiety. Further, outcomes were measured mainly with informant or self-report rating scales with some data on maintenance and very few data on generalisation. Possible moderators were also examined in the meta-analysis and results indicated the potential of parent involvement, research design quality, and overall study quality to moderate intervention outcomes. Nevertheless, reviewed studies varied widely in their quality, which was moderate in most cases.

Subsequent to the submission of this meta-analysis, three additional meta-analyses reviewing intervention studies using CBA with children with ASD have been published. They were all restricted to interventions for anxiety management (i.e., Kreslins, Robertson, & Melville, 2015; Sukhodolsky, Bloch, Panza, & Reichow, 2013; Ung, Selles, Small, & Storch, 2015). Nevertheless, their findings were broadly consistent with those in the current meta-analysis. Moderate to large effect sizes were reported in these meta-analyses. All participants in their reviewed studies were high functioning, and all their effect sizes were calculated from clinician, informant or self-report rating scale data. The limited maintenance data reported in constituent studies was also noted by Kreslins et al. (2015).

Research Question 3

The final research question concerned Australian teachers' level of knowledge, perspectives and classroom practice of CBA. To address this question, an empirical survey study and a qualitative interview study were conducted. The survey included a sample of 270 New South Wales teachers teaching students with ASD in support classes. The survey results suggested a self-reported reasonable level of knowledge in these teachers and a moderate level of implementation of some of the common strategies used in interventions with CBA. When survey respondents with and without qualifications in special education at or above diploma level were compared, a modest difference was found between them in their level of awareness of and frequency of implementing the surveyed strategies. An interesting outcome from the survey study was teacher perspectives being not fully consistent with extant research evidence or recommendations, including their view that CBA was suitable for students from a very young age and with a wider range of intellectual abilities (i.e., from typical intellectual ability to moderate intellectual disability). Further, the respondents also used the surveyed strategies for purposes over and beyond those typically investigated in the intervention research studies.

In view of the above inconsistency with research evidence and recommendations, the more in-depth interview study had a focus on teacher actual application with students with both ASD and intellectual disability. In addition, teacher understanding of CBA was examined in greater depth in this study. A total of 13 New South Wales teachers were interviewed and several key themes emerged. It was evident that most teachers did not have extensive understanding of the key principles or the specific features unique to CBA and their practices in relation to CBA also deviated from those described in the research literature. They typically considered CBA as a behaviour management strategy, used CBA for addressing emotion but did not often use CBA in addressing student cognition. The strategies they described as their CBA strategies were often more generic special education teaching strategies.

Pertinent to the discrepancy between the survey findings and the interview results, it should be noted that teachers in the survey self-rated their knowledge. They indicated which CBA strategies they used by selecting options in multiple-choice survey questions, whereas in the interviews, teachers answered open-ended questions and were not provided with examples of possible strategies.

Future Direction

A number of broad directions for future research arise from the current thesis. Specifically, there is a case that future research should be targeted to include children with ASD as well as intellectual disability, particularly given evidence that practitioners extend CBA to this population. To deepen the understanding on the efficacy of CBA for children with ASD and differing intellectual abilities and symptomology, future research reports should include more detailed demographic data and description of participants.

Also, more studies need to be carried out to investigate the applications of CBA for purposes other than anxiety management and social skills. The use of CBA for addressing specific cognitive dysfunction in children with ASD is an area worthwhile examining due to

their non-typical cognitive profiles and the possible association with their issues and daily functioning (Kenworthy et al., 2014).

An emerging trend in ASD research has been the involvement of people with ASD themselves. Their input into research studies and to the design and evaluation of interventions was seldom reported in the past. Future research could include collaboration with people with ASD in determining intervention goals, strategies and outcome measures.

One feature of the studies reviewed in this thesis was the multicomponent nature of the interventions applied in the research, with numerous interventions typically forming part of a CBA package. An important task is to clarify the working mechanisms of CBA including the key components in CBA that contribute to efficacy. Such research has the potential to lead to more efficient intervention approaches. Another feature of these studies was the common use of standardised report measures while direct observation of behaviour changes was seldom conducted. In order to objectively measure intervention outcomes and mitigate possible issues with standardised measures, future research studies should more often include observations of behaviours in natural settings.

Large groups of homogeneous samples may be difficult to recruit in the population with disability, researchers should thus consider the use of single-subject design as an alternative method to achieve experimental control, in particular when examining the effectiveness of individual intervention components. Given the potential of CBA, more research in school settings is suggested. With evidence of limited teacher understanding of core concepts and tendency to apply CBA beyond applications suggested by the current research base, research into training and support to teachers using CBA is likely to be important.

Main Contributions

Each of the three reviews conducted in the current thesis project, the trend analysis, the meta-analysis, and the systematic review, provided a substantially distinct contribution to the field.

The trend analysis conducted for this thesis was the first analysis of this type, providing an overview of broad trends in the development of relevant research. The systematic review included an examination of the specific intervention aims, intervention content or outcome measures as well as the relationships between them across studies. Such relationships are an important aspect for understanding how efficacy is achieved in interventions using CBA. These issues had not been addressed in this level of detail in prior reviews. At the time of submission of the Ho, Stephenson and Carter (2014), no meta-analysis had been published examining interventions using CBA with children with ASD. Thus, the meta-analysis provided an initial analysis of RCTs in this area.

The teacher survey and interview together provided information on teacher perspective and implementation of CBA with students with CBA. They were so far the only sources of information on how the practitioners understand and apply CBA in school settings and the only research conducted in the Australian context.

Summary

In this chapter, a summary of the research undertaken for this thesis and the major conclusions from the research were provided. The distinct contribution of this research to the field of CBA for children with ASD was identified, in particular, the research as the first initiative in the emerging Australian research base related to teacher knowledge and application of CBA with children with ASD in education settings. This may assist the design of teacher training in CBA for children with ASD.

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Appendix: Macquarie University Ethics Approval

- 1. Approval for teacher survey effective on 11th July 2014**
- 2. Approval for amendment to teacher survey dated 30th July 2014**
- 3. Approval for teacher interview dated 1st September 2015**

Appendix (Ethics Approval) of this thesis has been removed as it may contain sensitive/confidential content