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Adolescents with autism spectrum disorder: Understanding the influence of psychosocial risk factors and mothers' help-seeking behaviour on the experience of depressive symptoms

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**Adolescents with autism spectrum disorder:
Understanding the influence of psychosocial risk
factors and mothers' help-seeking behaviour on the
experience of depressive symptoms**

The thesis is presented for the degree of
Doctor of Philosophy

Rachel Gallagher

ADOLESCENTS WITH AUTISM SPECTRUM DISORDER

Running head: ADOLESCENTS WITH AUTISM SPECTRUM DISORDER

Adolescents with Autism Spectrum Disorder: Understanding the Influence of Psychosocial Risk Factors and Mothers' Help-Seeking Behaviour on the Experience of Depressive Symptoms

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B.Psych, M.Psych (App Dev), Grad.Dip.Ed

A Thesis submitted in partial fulfilment of the requirements for the award of Doctor of
Philosophy

School of Arts and Humanities

Edith Cowan University

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Abstract

Research has shown that adolescents with Autism Spectrum Disorder (ASD) are at an increased risk for experiencing depressive symptoms (DS) resulting in poor quality of life and further vulnerability for the recurrence of DS in adulthood. Adolescence is a complex developmental period marked by dynamic social contexts that must be effectively navigated for the maturation processes associated with psychological wellbeing. This period is particularly challenging for individuals with ASD due to deficits in social communication skills leading to atypical social functioning. Consequently, psychosocial risk factors of DS for ASD adolescents are likely to be multiple and complex, and prominent risk factors need to be identified to address their role in the development of DS. Whilst many factors, including the impact of multiple psychosocial causes, may play an ongoing role in the trajectory of DS, what is unique to ASD adolescents when it comes to accessing formal support is their reliance upon maternal help-seeking. Mothers are considered the drivers for accessing treatment for their ASD adolescent due to their age-based dependency and the complexity of their ASD symptomatology. However, due to symptom overlap between ASD and DS, as well as the biopsychosocial challenges associated with adolescence, identification of DS can be difficult for mothers. In order to understand the experience of DS for ASD adolescents, the overall focus of the current project was to examine, in the context of two quantitative investigations, the impact of multiple psychosocial risk factors of DS as well as assess the role of mothers as help-seekers for adolescent's DS. With a focus on understanding the link between psychosocial risk factors and DS and mothers' help-seeking behaviour, it is hoped that the current research will minimise the occurrence of DS and expedite recognition and subsequent treatment when symptoms present.

The objective of Investigation 1 was to explore the relationship between a number of psychosocial risk factors and adolescent's self-report of DS. An initial review of the literature

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identified that the most commonly researched psychosocial risk factors of DS in adolescents with ASD (age 12-17) were life events, peer victimisation (lack of recipient of pro-social behaviour, overt and relational), attributional style, and ASD symptoms. When the effect of these factors were examined concurrently using multiple regression analysis on DS for a sample of 102 adolescents (age 12-17), it was found that the adolescents who experienced higher frequency of life events in the 3-months prior to completing the survey and who experienced fewer examples of pro-social behaviour from peers were more likely to develop higher levels of DS when controlling for age, medication and anxiety symptoms. Whilst the impact of life events and pro-social behaviour from peers on DS was anticipated, what was not expected was the lack of impact of ASD symptoms, attributional style and overt and relational peer victimisation on DS.

The overall aim of Investigation 2 was to understand the impact of mother's help-seeking behaviour on the adolescent's experience of DS using the same adolescent sample and their mothers from Investigation 1. The aims of Investigation 2 were to examine a mother's capacity to recognise DS and the factors linked with how mothers sought formal services. Based on a correlational analysis it was found that there was moderate agreement between mother and adolescent rated DS with mothers over-reporting DS. Of those mothers who identified DS, a frequency analysis revealed that less than half of mothers sought help for their adolescent. A further frequency analysis identified that mother's opted not to access formal services if they held views that their own support was sufficient in meeting their adolescents' mental health needs. A logistical regression revealed that mothers were more likely to help-seek if they had a family history of mental health disorder and elevated levels of stress. It was also found that more than half of mothers reported low levels of satisfaction for services their adolescent had finished.

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Overall, Investigation 1 and 2 highlight that the experience of DS for adolescents with ASD is associated with both psychosocial influences and mother's help-seeking behaviour. Based on the findings of Investigation 1, parents may be mindful that youth with ASD may be at greater risk of developing DS if they experience an increase in life events and peer's lack of pro-social behaviour. The findings of Investigation 2 indicate that it would be useful to provide support to mothers so that they can better recognise DS in their adolescent and assist them to more effectively seek-help from formal services. Overall, it is concluded that multiple psychosocial risk factors influence the mental health of adolescents with ASD and preventative programs require the inclusion of mothers. Moreover, a multi-level biopsychosocial approach regarding the mental health of adolescents with ASD is warranted.

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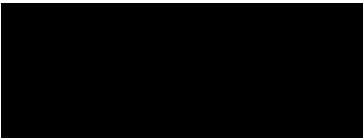
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Dedication

To my partner Darin Cairns whose constant support, unwavering belief in my abilities, and personal sacrifice made this possible.

Acknowledgments

First and foremost, I am grateful to the adolescents and parents who participated in this research and to the community organisations who helped to make it happen.

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Adolescents with Autism Spectrum Disorder: Understanding the Influence of Psychosocial Risk Factors and Mother's Help-Seeking Behaviour on the Experience of Depressive Symptoms

Over the last decade, the Centre for Disease Control (CDC) declared Autism Spectrum Disorders (ASD) “...an urgent public health concern” due to the significant increase in prevalence. CDC data on the prevalence of ASD in the United States identified that in 2000, 1 in 150 children were diagnosed with an ASD. In 2012, 1 in 68 children were diagnosed with an ASD (CDC, 2014). In Australia, the reported figures have seen an increase from 1 in 160 in 2007 (Williams, MacDermott, Ridley, Glasson, & Wray, 2008) to 1 in 100 in 2012 (Autism Spectrum Australia; Aspect, 2013; Brugha et al., 2011). According to the Organization for Autism Research (OAR), approximately 1 million people in the United States have received an ASD diagnosis, of which 80% are under the age of 22.

ASD is characterized by severe and pervasive impairment in several areas of development, including reciprocal social and communication skills, language, and/or the presence of a restricted repertoire of behaviours, interests, and activities (American Psychiatric Association (APA), 2013). Currently it is believed that genetic, epigenetic and purely environmental factors all may contribute to the aetiology of ASD as well as to its increased prevalence (Fakhoury, 2015; Hertz-Picciotto et al., 2005).

There has been considerable variation in terminology in the literature used to reference this population, including “high-functioning autism spectrum disorders” (HFA; Szatmari et al., 2009), Pervasive Developmental Disorders (PDDs), autistic disorder, Asperger's disorder, and Pervasive Developmental Disorder– Not Otherwise Specified (PDD-NOS). A large proportion of individuals diagnosed with ASD do not show a clinically significant delay in cognitive and language development (Autism and Developmental Disabilities Monitoring Network Surveillance: ADDMNS, 2014) and are often referred to as

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‘high functioning’ or ‘HFASD’, herein referred to as ASD without intellectual disability (ID). More recently, the aforementioned diagnoses were replaced by Autism Spectrum Disorder (ASD) in the latest edition of the Diagnostic and Statistical Manual of Mental Disorders (5th ed.; American Psychiatric Association, 2013). In line with current practice and the most recent terminology change within the DSM, the term ASD will be used in the current study.

Whilst an ASD diagnosis usually requires a paediatrician, psychologist and speech pathologist to address the diagnostic criteria, an ASD diagnosis does not necessarily occur in a sequential or predictable fashion due to the sometimes subtle and differing ways this condition may manifest developmentally. On occasion a parent, most likely having raised another child or due to issues raised by a child health nurse, will identify concerns at a young age due to unusual attachment dynamics, temperament or pattern of interests being exhibited. However, it is more common for parents to first note speech and communication delays as these are quite salient signs of atypical development. Having become aware of these issues this can lead to accessing of speech therapy or visits to a paediatrician. This may immediately lead to these health professionals raising the potential of an ASD diagnosis, conversely, they may only raise this concern after reviewing the child’s response to therapy. Whilst the above sequence results in health professional’s initiating diagnostic assessment due to developmental concerns, parent led requesting of an ASD diagnosis can also occur due to knowledge of this condition or having other members of the family with an ASD. It is also possible that issues are not noted until a child is at school and social deficits become more pronounced compared to age matched peers. In this case, it is often educators who highlight concerns and may raise ASD as a potential diagnosis to the parent and recommend they seek consultation from a paediatrician. Consequently there are a wide variety of ways in which diagnostic processes are initiated. This is due to the various ways ASD may impact

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development and how aware caregivers and significant others are in the importance of the behavioural patterns and developmental processes they are observing.

The importance of an early diagnosis of ASD and subsequently early intervention is well documented in the literature (Rotholz et al., 2017; Volkmar, 2014). The significance of early intervention is related to the core impairments that are symptomatic of ASD impacting the child with ASD's ability to attach to and learn from their social contexts and interpersonal dynamics. These attachment processes are necessary for developmental and socialisation processes to occur so that functional emotional regulation capacity, language and communication skills and social reasoning based on reciprocity and empathy are acquired. Without appropriate assistance to teach the individual with ASD how to adapt to these social emotional contexts, they can become increasingly isolated and/or highly dependent on their parents and caregivers as they may have not been able to develop the independent capacities needed for independence. As individuals with ASD develop, the complexities of the social-emotional contexts become more pronounced and if the negative implications of the core deficits of ASD have not been mitigated or addressed earlier, then the demand on parents is likely to be even higher. This is an ongoing challenge for parents and caregivers and has been identified as a significant burden when considering the economic cost of ASD.

A diagnosis of ASD places a considerable burden of care on the family and society. Follow-up studies have found that only 3% to 10% of people with ASD are able to live independently as adults (Billstedt, Gillberg & Gillberg, 2005; Howlin, 2005). ASD is an expensive diagnosis and costs are borne by individuals with ASD and their families, the government, on behalf of the individual (for example the provision of services) and the wider community (for example, via reductions in productivity) (Synergies, 2011). The time costs of caring for a child with a disability living in the community compared to caring for children

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without a disability has been found to be significantly greater and does not decrease with advancing age (Curran et al., 2007).

Adolescents with Autism Spectrum Disorder

While ASD is experienced across the lifespan, adolescence presents unique challenges for those diagnosed with ASD. Adolescence is a critical period of development, involving a range of social, emotional, physical, and cognitive changes (Damon & Hart, 1982; Erikson, 1982; Levesque, 2011). For young people with ASD, the transition can be especially difficult as they frequently experience deficits in cognitive and social skills that are associated with the successful negotiation of this developmental phase (Levy & Perry, 2011; McGovern & Sigman, 2005). For example, adolescents with ASD experience impairments in language abilities, perspective taking skills, cognitive flexibility and social skills, all of which impact deleteriously on the life challenges associated with adolescence (Tantum, 2003; Tager-Fusberg, 2003; White, Keonig & Scahill, 2007). It is, therefore, not surprising that adolescents with ASD can encounter many challenges beyond those experienced by their typically developing (TD) peers (Brent, Rios, Happe & Charman, 2004; Hale & Tager-Flusberg, 2005).

There are a number of ways impairments and cognitive differences impact individuals with ASD during the period of adolescence. These impairments and difficulties can be observed in a range of experienced social and emotional difficulties. Adolescents with ASD can become more socially isolated during this developmental period when they desire friendships and acceptance as they lack basic pragmatics (i.e., turn taking in conversations) to meet these social goals (Bellini, 2004; Carrington, Templeton & Papinczak, 2003). It follows that they can also become aware that they are socially different to their peers and this sense of isolation and inability increases during this period (Carrington et al., 2003; Shea & Mesibov, 2005; Wing, 1981). At high school, they often face rejection, isolation and bullying and

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report more loneliness than their peers despite being motivated to engage with others (Bauminger, Shulman & Agam, 2003; Whitehouse, Durkin, Jacquet & Ziatis, 2009). Schoolwork becomes more demanding (Hay & Win, 2012) in a period when they are encouraged to consider their future and plan for further studies and or to enter the workforce. Thus, the unique and ongoing challenges individuals with ASD encounter during adolescence and the impact these challenges have on their psychosocial development can leave them vulnerable to mental health problems such as depression (Tantam & Prestwood, 1999).

Adolescents with ASD and Depression

Recent research has indicated that 7.7% of youth with ASD experience depression under the age of 18, and 40% of adults with ASD experience depression at some point during their lifetime (Hudson, Hall & Harkness, 2018). Compared to TD individuals, individuals with ASD are 4 times more likely to experience depression in their lifetime (Hudson et al., 2018). It is also recognized that the risk for developing depression for adolescents with ASD is higher than the TD adolescent population (Simonoff et al., 2008; Skokauskas & Gallagher, 2012). Specifically, comorbidity rates between ASD and depressive symptoms in adolescent data are as high as 54% to 82% which is much higher than the 4–5% to 12.5% documented in the TD population (Barnhill, 2001; Centre for Behavioural Health Statistics and Quality, 2016; Kim et al., 2000; Mayes, Calhoun, Murray, & Zahid, 2011; Ghaziuddin et al., 1998; Solomon, Miller, Taylor, Hinshaw & Carter, 2012; Thapar et al., 2012).

The high rate of depression during adolescence is a concern for TD individuals for a number of reasons. First, depression onset at a young age is highly associated with recurrent episodes throughout adolescence and adulthood. Up to 70% of adolescents experience another episode of major depressive disorder within five years of their first episode, and have two to four times greater risk for depression as an adult (AACAP, 2007; Dunn & Goodyer, 2006; Lewinsohn et al., 2000). Recent research has shown that a majority of adults with ASD

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meet diagnostic criteria for at least one psychiatric condition (79%), with depression being the most common (Lever & Geurts, 2016). Lifetime prevalence rates of depressive disorders have been estimated at 10.1% to 76% (Billstedt et al. 2005; Joshi et al., 2013; Wozniak et al., 1997). Research regarding the course of depressive symptoms in youth with ASD has revealed higher rates of depression than in the general population, which remain into adulthood. One study showed improvements of depressive symptoms in youth with ASD as they aged (Gray et al., 2012). Other clinical trials, however, have shown symptoms of depression either remaining elevated at similar rates or at increasing rates in older adolescents and young adults with ASD (Gotham et al., 2015; Rai et al., 2018).

Second, depressive symptoms have been known to exacerbate the core symptoms of ASD and associated challenges with this developmental disorder (White et al., 2013). Intensification of autistic traits includes increases in ritualistic behaviour or obsessions, often coupled with irritability and hyperactivity. Less frequently associated with depression but reported through anecdotal reports or case studies is the loss of interest in repetitive behaviours and autistic preoccupations accompanying more social withdrawal and decreased adaptive functioning (Ghaziuddin et al., 2002; Stewart, Barnard, Pearson, Hasan, & O'Brien, 2006). The exacerbation of core ASD symptoms as a result of depressive symptoms affects the quality of life throughout adolescence and adulthood and can impact significantly on long-term functioning levels (Leyfer et al., 2006; Matson & Nebel-Schwalm, 2007).

Third, depression itself has important specific consequences for adolescents with ASD, among which is the risk of suicide (Mayes, Gorman, Hillwig-Garcia & Syed, 2013). Elevations in the incidence of attempted and completed suicide have been found to occur during a depressive episode for adolescents with ASD. Mayes and colleagues (2013) concluded that depression, and to a lesser degree behavioural problems and school bullying, are among the psychosocial problems most highly predictive of suicide ideation and suicide

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attempts in adolescents with ASD. Specifically, Mayes et al. (2013) found that suicide ideation and attempts were 28 times more frequent in children up to 16 years old with ASD than in TD children of a similar age.

Last, identification of depression and depressive symptoms in adolescents with ASD can be particularly challenging given atypical presentations of depression in ASD, and masking of common depression symptoms by features of ASD (Stewart et al., 2006) as well as the social, emotional and biological challenges associated with adolescence. For instance, symptoms and behaviours consistent with irritability (particularly with changes in routines), apathy, withdrawal from social situations, deterioration in communication, inappropriate or strange behaviours, cognitive deficits and negative symptoms are consistent with both ASD and depression.

Identification of depressive symptoms in individuals with ASD can also be missed during adolescence because the main symptoms of ASD can cause significant impairment, and symptoms of depression are usually not the primary focus of screening, diagnosis, or treatment in such cases (Lainhart & Folstein, 1994). This was evidenced in a review of 17 published cases conducted by Lainhart and Folstein (1994) which demonstrated that depression is often missed in individuals with ASD (Lainhart & Folstein, 1994). However, almost all of the patients in these reviews had an intellectual disability so it was unknown if the results from these published cases would hold true for adolescents without an intellectual disability.

It is important for mothers, who are often the main carer of an adolescent with ASD (Hoefman et al., 2014; Steinberg & Morris, 2001), to understand and identify the presentation of depressive symptoms in their adolescent. As adolescents are still heavily reliant upon their mothers for guidance and assistance with respect to their social-emotional care, insight and development (Steinberg & Morris, 2001) it is necessary for mothers to be able to distinguish

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depressive symptoms from ASD symptoms and from those behaviours that are a result of an adolescent moving through this developmental phase to further access services and treatment for them. Importance is also placed on mothers assisting mental health professionals in their diagnosis and treatment of depressive symptoms when mothers seek professional services. However, much like parents of TD adolescents, the task of identifying depressive symptoms in adolescents, let alone identifying co-occurring symptoms of depression in adolescents with ASD is challenging.

Not only is it difficult for mothers of TD and ASD children to identify symptoms of depression in their child, mothers are also relied upon to access professional services and supports for their child. Throughout adolescence for TD children, parents have been found to participate in adolescent help seeking by recognizing adolescent problems, facilitating adolescent help seeking behaviour (e.g., providing transportation), and directly referring adolescents to appropriate services (Bussing, Koro-Ljungberg, Gary, Mason, & Garvan, 2005; Logan & King, 2001; Wu et al., 2001; Zahner, Pawelkiewicz, DeFrancesco, & Adnopolz, 1992). In the case of adolescents with ASD, often the mother is relied upon to access help for her adolescent. This is recognised in the literature, with some researchers suggesting that mothers should be referred to as “gatekeepers” to professional services for children and adolescents (Bussing et al., 2005).

Mothers have been highlighted as being important in terms of sources of information, help and guidance when adolescents are seeking information regarding mental health issues (Jorm, Wright & Morgan, 2007; Ivancic et al., 2014). Given the challenges adolescents with ASD face specific to their ASD symptomatology (Angus et al., 2014), such as difficulties communicating with others and difficulties associated with planning and organisational skills, the mother’s role of accessing services for their adolescent with ASD would appear even more significant as the children are not in a position to seek out help independently.

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Consistent with this conclusion, research indicates that parents of individuals with ASD in many instances continue to be the primary caregiver, advocate, and/or main source of support for their offspring throughout their lifetime (Ganz, 2007; Howlin, Goode, Hutton & Rutter, 2004). It is not surprising then that caring for an individual with ASD is associated with high levels of caregiver burden (Cadman et al., 2012; Kring, Greenberg, & Seltzer, 2008).

Therefore, to be able to understand the experience of adolescents with ASD who have depression, and how their symptoms might be expressed it is important that the role of a mother seeking help for her adolescent's depressive symptoms be examined.

The importance of understanding the impact and challenges faced by adolescents with ASD and co-occurring depression can be seen in reviewing what is currently known about the impact of depression in TD adolescent populations. The relatively high prevalence of depression for TD adolescents has significant social and economic consequences, such as disability, functional impairment, reduced work productivity, and costs associated with the increased use of health services (Kessler, Petukhova, Sampson, Zaslavsky, & Wittchen 2012; Simon, 2003). Internationally, depression is identified as the leading cause of disability (WHO, 2008). In Australia, annual health-related expenditure on depression alone costs approximately 1,107 million dollars, with depression-associated disability estimated at \$14.9 billion (Australian Institute of Health and Welfare, 2007a; Beyond Blue, 2005). Organised efforts to reduce the burden of mental illness have traditionally focussed on the treatment of individuals who are unwell (Herrman, Saxena, Moodie, & Walker, 2005). This has been through services such as the Medicare Better Access scheme that have increased access to psychological therapies in Australia (Pirkis, Harris, Hall, & Ftanou, 2011), as well as increased use of psychopharmacological treatments such as selective serotonin reuptake inhibitors (McManus et al., 2000). However, the increasing national and international prevalence of depression in developed and developing countries suggests that a focus on

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treatment will not be enough to reduce the social and economic costs of this growing phenomenon (WHO, 2001a).

If the prevalence of depression is to be curbed and reduced, identifying preventative and more efficient ways of managing this problem needs to be a national and international priority. To reduce the burden of depression, it is essential to decrease the incidence (first occurrence) of depression during early adolescence when psychopathology often emerges (Jorm, 2014; Kessler et al., 2012). An important aspect of reducing the incidence of mental health disorders is targeting risk and protective factors to reduce the likelihood of mental health disorders occurring in the first instance. Risk factors are defined as, “any influences that increase the chances for harm” (Fraser, 2004, p. 14). Protective factors are defined as “both internal and external resources that modify risk” (Fraser, 2004, p. 28). Identifying the predictors of adolescent depressive symptoms and targeting these factors through population-level approaches offers the best opportunity to reduce the incidence of depression (Commonwealth Department of Health and Aged Care, 2000; Lewinsohn et al., 2004; WHO, 2001b).

Psychosocial Risk Factors of Depressive Symptoms in the ASD Population

To form an understanding of the experience of depression for individuals with ASD that will improve identification, treatment and prevention, psycho-social risk factors need to be examined. This is because causal and maintaining mechanisms for depressive symptoms in both the ASD and TD populations are considered to be multi-faceted and they are primarily comprised of psychosocial factors, potentially underpinned by a genetic or biological predisposition (De-la-Iglesia & Olivar, 2015; Fox & Kalin, 2014; Rapee & Heimberg, 1997). However, identifying a psychosocial factors as being a risk factor for depressive symptoms does not require knowledge of the underlying mechanisms of action which could be biological or non-biological (Bruce, 2002).

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By definition, psychosocial risk factors should exist or occur before the onset of the disease or condition of interest (Loeber, Slot, Stouthamer-Loeber, 2008). Psychosocial risk factors relate to an individual's psychological development and interaction with their social environment (Kelsey et al., 1996).

To date, only one critical review has been conducted that focused on describing the possible risk factors for depressive diagnostic and symptomatology in children, adolescents and adults with ASD without an intellectual disability (De-la-Igliesia & Olivar, 2015). Using a biopsychosocial framework, the authors concluded that the factors that presented the greatest specific risk for depression in children, adolescents and adults were predominantly psychosocial, and included higher cognitive functioning, self-awareness of their difficulties, capacity for introspection, stressful life events, quality of social relationships, and alexithymia. De-la-Igliesia and Olivar (2015) also stated in their review that whilst they were able to establish potential variables that are related to depressive symptoms by drawing upon literature, they were not of the opinion that there was not yet sufficient empirical evidence for any of these factors.

Overall, research to date indicates that the most frequently reported psychosocial risk factors associated with depressive symptoms in adolescents with ASD include peer victimisation, ASD symptoms, life events and attributional style (Barnhill and Myles, 2001; Ghaziuddin, 2005; Mayes et al., 2011; Shtayermman, 2008; Vickerstaff et al., 2007). Other than ASD symptoms, these psychosocial risk factors parallel those that have been widely published in the literature incorporating community or other clinical samples (e.g., see Thapar, Collishaw, Pine & Thapar, 2012 for a review) and it will be these psychosocial risk factors that will be examined in the current research project. Understanding the role of psychosocial factors in the risk of depression is important, as psychosocial factors may offer innovative avenues for prevention and treatment, as opposed to biological risk factors (e.g.

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gender, genotype) which are not considered changeable, although they may influence psychosocial risk factors (Garber, 2006; Kazdin et al., 1997).

Notably, the emerging research in the ASD population often evaluates only one psychosocial risk factor and its relationship to depressive symptoms, rather than analysing multiple psychosocial risk factors as well as psychosocial and biological co-variables that may be associated with depressive symptoms. For example, Barnhill and Myles (2001) examined the relationship between attributional style and depressive symptoms in adolescents with ASD using bivariate correlations. In addition, Fung (2015) using bivariate correlations identified a significant and positive relationship between life events and depressive symptoms in youth with ASD after controlling for age.

In addition, what appears to be unknown or evaluated, is how these psychosocial risk factors identified in the ASD literature operate concurrently. That is, it is unclear which particular psychosocial risk factors or which combination of multiple psychosocial risk factors have a major impact on individuals with ASD and depressive symptoms when examined through use of a multiple regression analysis. Such information could advance theory and research on the causes of depressive symptoms and how they might be expressed in the ASD population (Vanderbilt-Adriance & Shaw 2008). Thus, the inclusion of several psychosocial risk factors into one analysis is viewed by many in this field of research to be the next logical step in understanding the trajectory of depressive symptoms (De-la-Iglesia & Olivar, 2015).

Research conducted with TD adolescents indicates that risk factors of depressive symptoms interact with each other, and that multiple and persistent risk factors predict more strongly than any individual risk factor (Fraser, 1997; Mrazek & Haggerty, 1994). The effect of psychosocial risk factors on depressive symptoms do not operate independently but their effects depend on the presence or absence of other psychosocial risk factors (Assari, 2018).

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In order to look for possible opportunities for identification of depressive symptoms and intervention, it is necessary to identify as many risk factors as possible that impinge on individuals at different stages of development (Haggerty & Mrazek, 1994).

The process of critically examining risk factor research on mental disorders is part of the foundation for preventive interventions. However, not all evidence from risk factor research is conclusive enough to warrant the design of a preventative intervention (Institute of Medicine, 1994). Even when the evidence that a specific psychosocial risk factor is associated with depressive symptoms is strong (e.g., peer relationship and its relationship to depressive symptoms), it is still worth examining the impact of seeking other causal risk factors because targeting multiple risks may increase the success of a preventive intervention program. If risk factors can be decreased or in some way altered, the likelihood that at-risk individuals would eventually develop a mental health disorder would decrease. Thus not only is there a need to identify risk factors of depressive symptoms, there is a need to understand, as well as possible, how they causally interact in the development of depressive symptoms to best be able to develop and tailor preventative programs and related interventions as well as understand help-seeking behaviours (Institute of Medicine, 1994).

The literature regarding psychosocial risk factors of depressive symptoms for individuals with ASD has revealed that often psychosocial risk factors of interest and depressive symptoms are measured through the use of parent report (e.g., Fung et al., 2015; Ghaziuddin et al., 1995; Taylor and Gotham, 2016; Mayes et al., 2011) rather than adolescent self-report of symptoms. The use of child and adolescent self-report are important in order to gain an adequate clinical picture of psychopathology (Jensen et al., 1999) but self-reports are especially important for depression symptoms in older children and adolescents (Fraser et al., 2018). As such, the current body of knowledge presents little empirical evidence about what the most significant risk factors of depression would be among a large common group of

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psychosocial risk factors of depression as reported by adolescents with ASD and co-occurring depressive symptoms.

Although many adolescents with ASD have low intellectual ability posing a serious challenge to self-report, higher functioning youth appear to be able to provide reliable and valid information. A number of studies in the ASD literature that have used self-report questionnaires have shown moderate to good internal consistencies supporting the validity of self-report measures for children with ASD (e.g., Hill, Berthoz, & Frith, 2004; Rieffe et al., 2012, 2011). In addition, researchers, including Adams et al. (2013), examined the relationship between peer victimisation and depressive symptoms in youth with ASD and concluded that there was clear evidence to support that the group of adolescents used in their sample could provide valid reports about their perceptions of experiences of peer victimisation.

Whilst understanding the causal factors leading to depression is essential, it is also important to gain a better understanding of the factors that impact the experience of depressive symptoms in adolescents with ASD. Whilst many factors, including the psychosocial causes will likely play an ongoing role in the trajectory, what is unique to adolescents with ASD with depression is their reliance on maternal help-seeking. This factor appears to be of greatest relevance to this age group based on existing research which indicates that mothers are often a primary source for reporting depression (Jorm, Wright & Morgan, 2007; Ivanic et al., 2014). Moreover, mothers have been considered to be the drivers for accessing treatment for their adolescent with ASD due to their age group, and the very nature of their complex needs associated with symptoms of ASD (Ganz, 2007; Howlin et al., 2004).

Mothers' Ability to Recognise Adolescents' Depressive Symptoms

Research among TD children and their parents who are seeking help for them has documented associations between problem recognition and service use (Pavuluri et al., 1996; Teagle, 2002; Zahner & Daskalakis, 1997) and between intentions to use services and service use (Spoth, Redmond, Kahn & Shin 1997). The initial part of the help-seeking process involves a mother's ability to either identify or not identify her adolescent's symptoms of depression. The inability to correctly recognise mental disorders can result in inappropriate help-seeking and delays in treatment seeking (Jorm, 2000). Furthermore, studies have shown that delays in seeking appropriate treatment result in negative outcomes, due to longer duration of untreated illness, and consequently, poorer treatment outcomes (Marshall et al., 2005; Altamura et al., 2008, 2010; de Diego-Adeliño et al., 2010).

The large majority of TD literature indicates that mothers do not report adolescent depressive symptoms that are consistent with adolescent's self-report of depressive symptoms. That is, mothers will either over-report or under-report their adolescent's internalising symptoms (King et al., 1997; Kramer et al., 2004; Martin, Ford, Dyer-Friedman, Tang, Huffman, 2004; Rescorla et al., 2007a; 2007b; Roberts et al., 2005b). In the ASD literature only a small number of studies have been conducted regarding mothers' abilities to report their ASD adolescents' depressive symptoms and results have been varied, but consistent with the TD literature with parents over-reporting or under-reporting their adolescent's presentation of depressive symptoms (Hurtig et al., 2009; Lopata et al., 2010; Vickerstaff et al., 2007).

Reasons for discrepancies between parent report and adolescent self-report have been varied. For adolescents with ASD, researchers have argued several reasons for the lack of parent-adolescent agreement in reporting symptoms of depression in adolescents with ASD and co-occurring depression which have included symptom overlap (Kanne, Abbacchi

& Constantino, 2009; Stewart et al., 2006). For example, flat affect, social isolation, disturbances to appetite and sleep, are symptoms common to both ASD and depression (Cooper & Hanstock, 2009; Frazier, Doyle, Chiu, & Coyle, 2002; Magnuson & Constantino, 2011; Stewart, Barnard, Pearson, Hasan, & O'Brien, 2006). Thus, the presentation of depressive symptoms may be obscured by the presentation of ASD symptoms making it difficult for parents to recognise a problem and seek access to timely mental health treatment. Future research is required to examine if mothers are able to identify their adolescent's (with ASD) depressive symptoms. The current investigation will examine if mothers can recognise adolescent's depressive symptoms compared to adolescent's self-report of depressive symptoms.

Factors that are Associated with Mothers' Help-Seeking Behaviour

In the TD literature, researchers have found that parent-reports of adolescent problems are a powerful predictor of adolescents receiving professional help and treatment. For instance, Sourander et al. (2001) found that parental perceptions of adolescent problems were related to 28 percent of referrals to professional mental health services; in contrast, adolescent perceptions were related to only 13 percent of referrals. In a similar study Zwaanswijk, Verhaak, Bensing, van der Ende and Verhulst (2003) found that even fewer (i.e., 7 percent) adolescents self-reported mental health difficulties prompted referrals to mental health services. These findings indicate that parents are more likely to translate adolescent mental health concerns into help-seeking behaviour. In the TD population researchers have examined associations between specific factors that have been known to positively influence a mother's help-seeking behaviours for her adolescent's depressive symptoms (Boulter & Rickwood, 2013; Farmer et al., 1997; Wu et al., 2001). Well researched factors associated with depressive symptoms include a mother's family history of mental health disorder, age of the adolescent and the impact of stress or burden on families

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raising a child with mental health needs (Dulcan et al., 1990; Farmer & Burns, 1997; Oh et al., 2014; Rickwood et al., 2005; Wu et al., 2000; Zwaanswijk et al., 2003; Zwaanswijk et al., 2005).

In contrast to the research in the TD population, there is little research to date that specifically examines factors that positively influence mother's help-seeking for depressive symptoms in adolescents with ASD. And the little research that is available has examined predictors in isolation rather than examine the collective impact of predictors on help-seeking. For example, research by Weiss, Tint, Paquette-Smith and Lunsky (2016) has identified that families experience a combination of stressors from parenting their adolescent with ASD and will seek help including emergency services for support. However, access to services for mother's stress related to parenting children and adolescents with ASD and depressive symptoms has yet to be examined.

In addition, among youth with ASD, the transition from school settings to the adult sector is of particular concern due to the challenges faced by both the adolescent and mother (Hendricks and Wehman 2009). Along with the stresses of adapting to new environments and experiences, youth with ASD are confronted with changes in, and often loss of, supports that have taken significant time and effort to put in place yet cease as a result of an increase in age and unavailability of services (Ministry of Community and Social Services 2006; Roebuck et al. 2008; Weiss and Lunsky 2010). A loss of supports has also been identified as a precipitating factor to the onset of psychiatric symptoms in adolescents with ASD (Bradley & Bolton 2006). Whilst an increase in age can result in loss of services and supports for the individual with ASD and despite an increase in psychosocial, biological and social causes of depressive symptoms during adolescence, what is yet to be determined in the research is if these changes for the individual influence mothers to seek help for their adolescent's depressive symptoms.

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Severity of ASD symptomatology may be a unique factor that would warrant investigation in relation to the role it may have on mother's help-seeking behaviour for depressive symptoms. Significantly, research to date indicates that the intensification of ASD symptomatology has been reported with the onset of depression (Stewart et al., 2006). Given that ASD symptoms may serve to mask the symptoms of depression it is important to explore if this factor does in fact lead to increased help seeking behaviour. Research in this area is therefore required to close the gap regarding mother's help-seeking behaviour in relation to this unique factor where symptoms in one condition are actually indicative of another.

Overall, unmet perceived mental health needs in youth with ASD are associated with more severe clinical outcomes (Brown, Ouellette-Kuntz, Hunter, Kelley, & Cobigo, 2012; Hodgetts, Zwaigenbaum & Nicholas, 2015), and a host of sociodemographic factors (Lai & Weiss, 2017). Thus, examining factors that predict mother's decision to seek and obtain help for adolescent mental health problems can aid in clarifying and addressing issues underlying unmet needs and further understand the experience of depression in adolescents with ASD. In addition, it is also important to highlight that examining factors that influence parents' decisions to seek and obtain help for their adolescent with ASD may inform parents how to identify the risk factors associated with depressive symptoms and subsequently influence the course and severity of their child's depressive symptoms. Yet despite this, to date minimal research has been identified that examines predictors of mother's help-seeking behaviour and future research is needed in this area. Hence, the current research project will examine factors that predict mother's help-seeking behaviour for adolescents with ASD and co-occurring depression based on the TD literature and the emerging ASD literature. Specifically, multiple factors will include age of the adolescent, a family history positive for mental health disorder, mother's stress from parenting her adolescent with ASD and co-occurring depressive symptoms and ASD symptomatology.

Reasons Mothers Do Not Seek Formal Services After Identifying Depressive Symptom

Whilst knowledge of factors that influence mothers to seek help for mental health issues have led to more TD children than ever being identified and treated, there is still a significant gap between TD children who have met and unmet mental health needs (Jensen et al., 2011; Sawyer et al., 2018). Understanding the possible reasons as to why mothers do not always seek help for their adolescent's (with ASD) depressive symptoms is important to create more effective programs for all adolescents with mental health disorder.

Despite mother's identifying depressive symptoms in their adolescent, there are various reasons that they choose not to seek formal services for assessment and treatment of depressive symptoms. Regarding the TD population and youth with mild intellectual disability, reasons why mother's do not access formal treatment for their adolescent's mental health symptoms include believing that the problem will go away by itself, deciding to deal with the problem without outside professional help (Douma, Dekker, De Ruiter, Verhulst & Koot, 2006; Gulliver et al., 2010; Kessler et al., 2001; Thurston & Phares, 2008), lack of financial means (Gulliver et al., 2010; Kessler et al., 1997), issues of accessibility to services, as well as limited availability or lack of availability of services (Douma et al., 2006; Gulliver, 2010). In addition, research has also indicated that parents will not seek formal services as they did not believe their child's mental health needs were not serious enough to warrant professional help (Bannon & McKay, 2005; Girio-Herrera et al., 2015; Owens et al., 2002).

Despite the importance of examining reasons why mothers do not always seek formal services for their adolescents with mental health disorder, little research has been conducted with adolescents with ASD and co-occurring mental health disorders. The research that has been conducted often examines general services such as education and community services rather than mental health services (e.g., Aspect, 2009; 2013); in addition often child, adolescent and adult participants are combined into one sample rather than an exclusive focus

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on adolescents (Weiss & Lunskey, 2010). Research that has been conducted with the TD and ID populations have indicated that reasons mothers do not seek help for their child with mental health issues is frequently due to them not considering the problem is important or that they wanted to handle the problems themselves (Douma et al., 2006; Logan & King, 2001). Taking into consideration the research to date, the current research project will examine reasons why mothers do not seek help for adolescents with ASD and co-occurring depressive symptoms based on the research regarding youth with intellectual disabilities (Douma et al., 2006) and the research regarding adolescents and adults with ASD (Weiss et al., 2016). The current project will use a questionnaire designed specifically for the current project to ascertain reasons why mothers do not seek help for their adolescent's co-occurring depressive symptoms.

Service Satisfaction

When mothers choose to seek formal services for their adolescent's depressive symptoms and are influenced to seek services for their adolescent's (with ASD) depressive symptoms, research indicates that mother's satisfaction of services becomes an important factor in the continuation of treatment and support (Bjorngaard, Andersson, Ose, & Hanssen-Bauer, 2008; Hoagwood, 2005). As such, experiences and satisfaction with services are increasingly used as indicators of quality in health care (Holmboe et al., 2011).

A study by Weiss and Lunskey (2010) who conducted research with youth and adults with intellectual disability reported that past negative experiences and challenges associated with accessing services have resulted in parents being distrustful of future health care services. Consequently, this may have a detrimental impact on a parent's willingness to seek professional help for their child in the future. Naredorf et al. (2011) examined mental health service use among a large sample of 920 youth with ASD (age 13-17) and identified that 46% of youth had used a mental health service. Whilst frequency of mental health services was

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measured, authors did not examine satisfaction with these services. Despite the importance of parent satisfaction of services as evidenced in research with youth and adults with intellectual disability, there is little research exploring parents' satisfaction with mental health services for adolescents with ASD seeking help for depressive symptoms. Thus future research is required to explore parent levels of satisfaction regarding mental health services for adolescents with ASD. Therefore the current project will investigate mother's level of satisfaction regarding formal services their adolescent accesses for depressive symptoms.

Justification for the Current Research Project

Taking into consideration the difficulty identifying depressive symptoms in adolescents with ASD and the serious impact that depressive symptoms have on adolescents with ASD, it is important to understand the psychosocial risk factors that are associated with depressive symptoms and the impact that help-seeking factors have on the adolescent's experience of depressive symptoms. Understanding the psychosocial risk factors of depression and depressive symptomatology in adolescents with ASD is essential for the development and evaluation of etiological theories of depression for individuals with ASD and can influence the design of effective preventative intervention programs for the disorder. Psychosocial factors affect the onset of depressive symptoms and will likely play an ongoing role in the course of depressive symptoms.

Whilst many factors, including the psychosocial causes, will likely play an ongoing role in the course of symptoms, what is unique to adolescents with ASD and depression is their reliance on maternal help-seeking. This factor appears to be of greatest relevance to adolescents with ASD based on existing research which indicates that mothers are often a primary source for reporting depression (Jorm, Wright & Morgan, 2007; Ivancic, Perrens, Fildes, Perry, Christensen, 2014) and the drivers for accessing treatment due to their age group, and their complex needs associated with symptoms of ASD (Ganz, 2007; Howlin et

al., 2004). Notably, many individuals have already engaged with formal services and supports often prior to adolescence as part of the ASD diagnosis process and access to early intervention services. Thus, it can be assumed that many of these families are familiar on some level with accessing formal supports, however, there continues to be children with elevated levels of mental health problems that do not receive needed services (Kataoka et al., 2002). Consequently, in order to understand the course of depressive symptoms for adolescents with ASD it is necessary to examine the impact of multiple psychosocial risk factors of depression as well as assess the role of mothers as help seekers and if adolescents with ASD come to access the services they need to receive treatment for depression.

As mothers play a significant role in the management of their adolescent's mental health disorder, specifically, their ability to identify symptoms of depression and then actively seek help including services and supports for their adolescent, this role must be understood. Thus, identifying the psychosocial risk factors of depressive symptoms as well as understanding mother's help-seeking behaviours is required to more effectively understand the adolescent with ASD's experience of depression. Furthermore this is needed to assist in developing a more fully contextualised approach for the purpose of identification, prevention and treatment.

Aims of the Current Research Project and Thesis Structure

The overarching aim of the current research project was to understand the factors influencing the experience of depressive symptoms in adolescents with AS. Having this understanding may guide both researchers and clinicians to ultimately provide quality of life for adolescents with ASD and co-occurring mental health disorders as well as their family members. In order to achieve this overall aim, two cross-sectional investigations using the same participant sample were conducted to examine the psychosocial risk factors of depressive symptoms in adolescents with ASD and mother's help-seeking behaviour

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regarding their adolescent's co-occurring depressive symptoms. These investigations are referred to as Investigation 1 and Investigation 2. However, prior to Investigation 1, a narrative review was initially conducted to identify the psychosocial risk factors associated with depressive symptoms in adolescents with ASD (age 12-17). These psychosocial risk factors were identified as life events, peer victimisation (lack of recipient of pro-social behaviour, overt and relational), attributional style, and ASD symptoms. The objective of Investigation 1 was to explore the impact of the most frequently researched psychosocial risk factors identified in the narrative review, on adolescent's (with ASD) depressive symptoms through hierarchical multiple regression.

While investigation 1 examined multiple psychosocial risk factors of depressive symptoms, the overall aim of Investigation 2 was to understand the impact of mother's help-seeking behaviour on the experience of depressive symptoms for adolescents with ASD. The aims of Investigation 2 were to examine a mother's capacity to recognise depressive symptoms and seek formal services, as it was not clear how or if the presence of ASD symptomatology and related factors would confound or interfere with a mother's capacity in this context of care. To examine the ability to recognise depressive symptoms, mothers reported on their adolescent's depressive symptoms which were then compared to their adolescent's self-report. To understand mother's help seeking behaviour it was then further explored whether mothers would seek out help through formal services (e.g., psychology services) if they identified depressive symptoms in their adolescent with ASD. This choice to seek help or not was then further analysed in terms of the reasons mothers did not seek help and what factors impacted upon mother's help seeking behaviour. Reasons examined included mothers feeling they had the skills to help their child without the use of formal services, unsure of what services to access or how to access services. Last, mother's

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satisfaction with services accessed by their adolescent was examined with a view to understanding future help-seeking choices and experiences.

Regarding the structure of the thesis, Chapter 1 will provide an introduction to both Investigation 1 and 2. Chapter 2 will commence with Investigation 1 and provide a narrative review of the most frequently researched psychosocial risk factors associated with depressive symptoms in adolescents with ASD. Following the narrative review, an examination of the literature in relation to the psychosocial risk factors of depressive symptoms will be presented. Chapter 3 will discuss the overall research methodology for both Investigation 1 and 2 including the measures used in Investigation 1, the procedure, and characteristics of both adolescent and mother participants. Chapter 4 presents the analysis and results obtained from Investigation 1 and will be focussed on risk factors and depression. Chapter 5 will discuss the results from Investigation 1.

As outlined above, the overarching aim of Investigation 2 was to examine the influence of mother's help-seeking behaviour for adolescents with ASD and co-occurring depressive symptoms. Chapter 6 covering Investigation 2, will commence with a brief introduction to the investigation. Following this introduction, a review of the literature regarding mother's help-seeking behaviour and its influence on adolescent's depressive symptoms will be presented.

Chapter 7 will present the method section specific to Investigation 2 including the measures used. Chapter 8 will present the analysis and results of Investigation 2. Chapter 9 will include a discussion of the results of Investigation 2. An overall general discussion of findings emerging from Investigation 1 and 2, and the implications of these findings will be presented in the final chapter, chapter 10.

Summary of Chapter

The focus of chapter one was to provide a general background of the overall research project which included two quantitative investigations namely, Investigation 1 and 2. Chapter one outlined the significance of the research being conducted, and the importance of understanding the overall experience of adolescents with ASD and co-occurring depressive symptoms. The aims and structure of the current research project were also presented in this chapter. The overall aim of Investigation 1 was to identify the impact of multiple psychosocial risk factors of depressive symptoms in adolescents with ASD. The most frequently researched psychosocial risk factors would be identified through use of a narrative review and further examined in a literature review. For Investigation 2, the overall aim is to understand the influence of mother's help-seeking behaviour on adolescents with depressive symptoms. What is presented in the next chapter is a narrative review and literature review regarding the most frequently researched psychosocial risk factors associated with depressive symptoms in adolescents with ASD. The narrative review and literature review form part of Investigation 1.

Chapter 2

Investigation 1

Narrative Review of Psychosocial Risk Factors for Adolescents with ASD and Co-occurring Depressive Symptoms

The focus of the current chapter was to determine the most frequently examined psychosocial risk factors associated with depression in adolescents with ASD. Those psychosocial risk factors identified as frequently studied in the narrative review would then be examined in detail forming part of a larger literature review.

As noted earlier, psychosocial risk factors are those factors that relate to an individual's psychological development and interaction with their social environment that have been shown to precede a negative outcome (Institute of Medicine, 1994; Schotte et al., 2006). Psychosocial factors are loosely defined as factors related to one's psychological development in, and interaction with the social environment and processes (Kelsey, et al., 1996). Psychosocial factors encompass many life experiences as well as the environmental context in which individuals pursue their lives (Kelsey et al., 1996; Institute of Medicine, 1994; Schotte et al., 2006).

There are multiple pathways to the onset of depression in individuals across the lifespan (Kendler et al., 2002). In adolescents, one of the most common pathways is associated with social factors such as isolation and rejection (Tse, Strulovitch, Tagalakis, Meng & Fombonne, 2007). Given that individuals with ASD are more likely to experience these social contexts one could argue they are therefore more exposed to the common pathways associated with depression. Moreover, there are numerous aetiological theories to account for depression, including genetic, biochemical and endocrine, psychological, social and socioeconomic. While none of these theories are preeminent, the biopsychosocial model, formally presented by George Engel in 1977, remains popular in the field of health and

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clinical psychology. As the name suggests, the model proposes that biological, psychological and social factors interact with one another to create an individual's current state of mind and body. Biological factors include genetic predispositions to mental health disorders and hormonal factors that occur during adolescence; psychological factors include beliefs and attitudes about the world; and social factors include relationships with peers and social support (Garcia-Toro & Aguirre, 2006; Schotte et al., 2006).

The biopsychosocial model of psychopathology is a useful framework to identify the combination of multiple risk factors involved in triggering the emergence of depression. While the biopsychosocial model has not directly been tested in individuals with ASD, previous work has found support for the biopsychosocial model to identify the main functionality dimensions that experts in the field of child development and child psychopathology considered as essential in the assessment and intervention process with young children with ASD (Castro & Pinto, 2013). In addition, the biopsychosocial model has also been used as a framework to review risk factors of depressive symptoms in individuals with ASD (De-la-Iglesia & Olivar, 2015).

In the TD research, the biopsychosocial risk factors for depression and depressive symptoms have been studied regularly. It is well known that there are many risk factors for depression because it has multidimensional causes and pathogenesis (Jeon, Admidfar & Kim, 2017). For example, individuals may be born with genes leaving them susceptible to depression, acquire a head injury that alter their ability to control mood, suffer infections that result in altered brain metabolism, be exposed to family conflict or to negative peer group environments that alter the development of emotional processing and self-perception (Goodyer, 2001). There may also be risks associated with poor housing and living conditions. There is a broad agreement in the literature that the onset of depression occurs as a consequence of multiple rather than single risk factors that are frequently not independent

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of each other (Assari 2018; Fraser, 1997; Kraemer et al., 1997; Mrazek & Haggerty, 1994).

In addition, research indicates that it is unlikely that a single risk factor underlies or is seen as causal in the development of depression to the extent that targeting that factor would be enough to prevent or minimise the occurrence of depression (Garber, 2006; Kendall, Pilling, Pettinari, & Whittingham, 2004). For example, exposure to negative life events in adolescents occurring in the month prior to onset of depression is estimated to increase the risk for depression about nine times over not being exposed (Goodyer et al., 2000b). In addition, having a parent or other close biological relative with a mood disorder as well as having a sense of low self-efficacy or sense of helplessness and or living in poverty have been associated with an increase in the likelihood of depression (Garber, 2006). Thus the estimates regarding one risk factor can be misleading as seldom are all the known adversities measured in one study.

Given depression has a complex, multifactorial causal aetiology, it is therefore unlikely that any one risk factor will explain its development, nor will reducing the chances of the occurrence of a single risk factor be sufficient to prevent depression. Researchers concur that it is more likely that the accumulation (Institute of Medicine, 1994; Schotte et al., 2006; Smeroff et al., 2004) and/or interaction among multiple risk factors (Kendler et al., 2002) will lead to depression. There is however, less agreement about how risks exert their effects over time or how they affect the individual to bring about mental health issues and functional impairments (Slade, 2010).

Given the lack of knowledge that specifies how, or if, existing biopsychosocial models of depression can be applied to adolescents with ASD, it is not readily apparent how these factors should be selected for the current project. Consequently, the purpose of the narrative review is to identify the most frequently researched risk factors associated with depressive symptoms in adolescents with ASD. Furthermore, this review will focus more on

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the psychosocial factors due to these factors being more amenable to change for the purposes of informing early identification and treatment. Following the narrative review, the literature regarding those psychosocial risk factors identified will be reviewed.

Materials and Methods

A search of computerised data bases (PsycInfo, Pubmed, Web of Science, Medline and ERIC) was undertaken using the words, “Autism,” “Asperger”, “Autism Spectrum Disorder” in various combinations with the words “depression,” “depressive symptoms”, “depressive disorder,” “mood disorder” “risk factor”, “predictor”, “psychosocial variable” and “adolescents” and “youth”. The selected articles were then screened by title, abstract and reference lists using the approach recommended by the Preferred Reporting Items for Systematic Reviews and Meta-analyses guidelines (Knobloch, Yoon & Vogt, 2011). Potentially relevant papers were first identified through title and abstract searches. The full text of the retrieved articles was then assessed.

The study inclusion criteria were the following: (1) articles that were published in the past two decades, that is, between 1997 and 2017, as research has indicated that ASD has received increased attention during this time with rising rates of recognition and diagnosis (Coury et al., 2012); (2) articles that included participants diagnosed with ASD, autism or Asperger’s Disorder because this was consistent with the diagnostic framework of the DSM diagnostic criteria; and (3) studies where participants were considered adolescents (i.e., between the ages of 11 and 17). Whilst the aim of the narrative review was to review studies exclusive to adolescent’s age 11-17, it is acknowledged that this was not always possible as some research included children and adults. Thus, the exclusion criteria were as follows: (1) studies that only included children or adults; (2) case studies due to difficulties regarding generalisation of results (Yin, 2012); and (3) studies that were not translated in English.

Results

In the initial evaluation of the articles titles, 2062 paper abstracts were extracted and evaluated in terms of the exclusion and inclusion criteria. As can be seen in Figure 1, 556 duplicate studies were identified and removed leaving 1506 research articles. A further two references were identified by a manual search in the reference lists from the retrieved articles. From the 1508 research articles, 994 studies were excluded based on review of the title and abstract, 299 were excluded due to having an unrelated population or outcome and 187 papers did not report an outcome of interest. The literature review identified approximately 28 papers of interest. The final 28 studies are presented in Table 1. The study sample size, depression and ASD diagnosis of the participants, outcome measures used in the study, psychosocial risk factors under examination as well as the summary of the findings are presented in Table 1.

The risk factors identified in the narrative review in relation to depressive symptoms in adolescents with ASD reflected all aspects of the biopsychosocial model. An example of a psychological factor includes attributional style; biological factors include medication and age and examples of social factors include peer victimisation and life events.

In terms of the psychological component of this model, of the 28 studies identified in the narrative review, the most frequently studied risk factors of depressive symptoms were attributional style ($n=3$) and anxiety symptomatology ($n=3$). Regarding the biological the most frequently studied risk factor was age ($n=3$). For the social sphere, peer victimisation ($n=5$) was frequently studied as well as life events ($n=2$) and ASD symptomatology ($n=6$). These frequently studied psychosocial risk factors are consistent with the literature on biopsychosocial models of depression (Bruce, 2002; De-la-Iglesia & Olivar, 2015).

However, the vast majority of studies (24/28) examined the link between depression and only one or few psychosocial risk factors at one time. For example, Barnhill (2001)

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examined the relationship between attributional style and depressive symptoms in adolescents with ASD; Taylor and Gotham (2016) examined life events and depressive symptoms in young adults with ASD and Shtayermann (2007) examined the relationships between peer victimization and depressive symptoms in young adults with ASD.

Of note, ASD symptoms, attributional style, anxiety symptoms, peer victimisation and life events are the most frequently studied psychosocial risk factors in the ASD literature, and apart from ASD symptoms, they also parallel those biopsychosocial risk factors that are widely published in the literature in the community and clinical TD adolescent populations. For example, an Australian meta-analysis by Adelaide Health and Technology Assessment (AHTA, 2010), reported that the most commonly studied psychosocial variables associated with depressive symptomatology included negative life events and related stress, internalising disorders (i.e., anxiety disorder), negative attributional style, and low-quality relationships with peers and had a positive relationship. The review also highlighted that adolescents who had family members with mental health disorders had an increased risk of depressive symptoms and depression (Gourion et al., 2008).

Results indicated that studies that explored risk factors were collectively found to be diverse in terms of sample sizes, age ranges, and used different screeners and tools to measure ASD symptoms and mental health symptomatology (e.g., depression and anxiety symptoms). For example, research by Bitsika and Sharpley (2016) recruited 90 preadolescents (who were aged 6 to 12 years) and 60 adolescents (aged from 13 to 18 years) for their research project, yet Shtayermann (2007) recruited 10 youth and adults.

Some of the studies identified in the narrative review were considered to have small sample sizes. Specifically, approximately half of the studies presented in the narrative review had sample sizes of less than 50 participants (e.g., Kim et al., 2000; Shayermann, 2007; Vickerstaff et al., 2007). In addition, participant samples also varied widely in age range

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including a combination of children and /or adolescents and/or adults (e.g., Fung et al., 2015; Kim et al., 2000; Shtayermann, 2007).

There are currently no screening tools that screen for a range of psychiatric comorbidity such as depression or depressive symptoms (neither by third-party information or by self-reports) validated for use in individuals with ASD (Findon et al., 2016). The narrative review highlighted that instruments, questionnaires, and scales designed for use in the TD population or individuals with learning disabilities have been used in the majority of the studies, or that researchers have used the diagnostic criteria in the DSM to complete an assessment through diagnostic interview. Table 1 indicates that the most widely used scales for diagnosing and evaluating depression and depression symptoms includes Hamilton's Depression Scale (1960), the Children's Depression Inventory (Kovacs, 1992) and the Beck Depression Inventory (1961).

The majority of literature presented in the narrative review measured psychosocial risk factors (e.g., life events, peer victimisation, and anxiety symptomatology) through use of parent report rather than adolescent self-report of these variables (e.g., Cappadocia et al., 2012; Fung et al., 2016; Ghaziuddin et al. 1995; Kim et al., 2000; Mayes et al., 2011; Taylor & Gotham, 2016). In addition, the majority of studies measured depressive symptoms, mood disorder and anxiety symptomatology through use of parent report rather than through adolescent's self-reports of these variables (e.g., Bitsika & Sharpley, 2015; Fung et al., 2016; Kim et al., 2000; Mayes et al., 2011; Mazurek & Kanne, 2010; Strang et al., 2011).

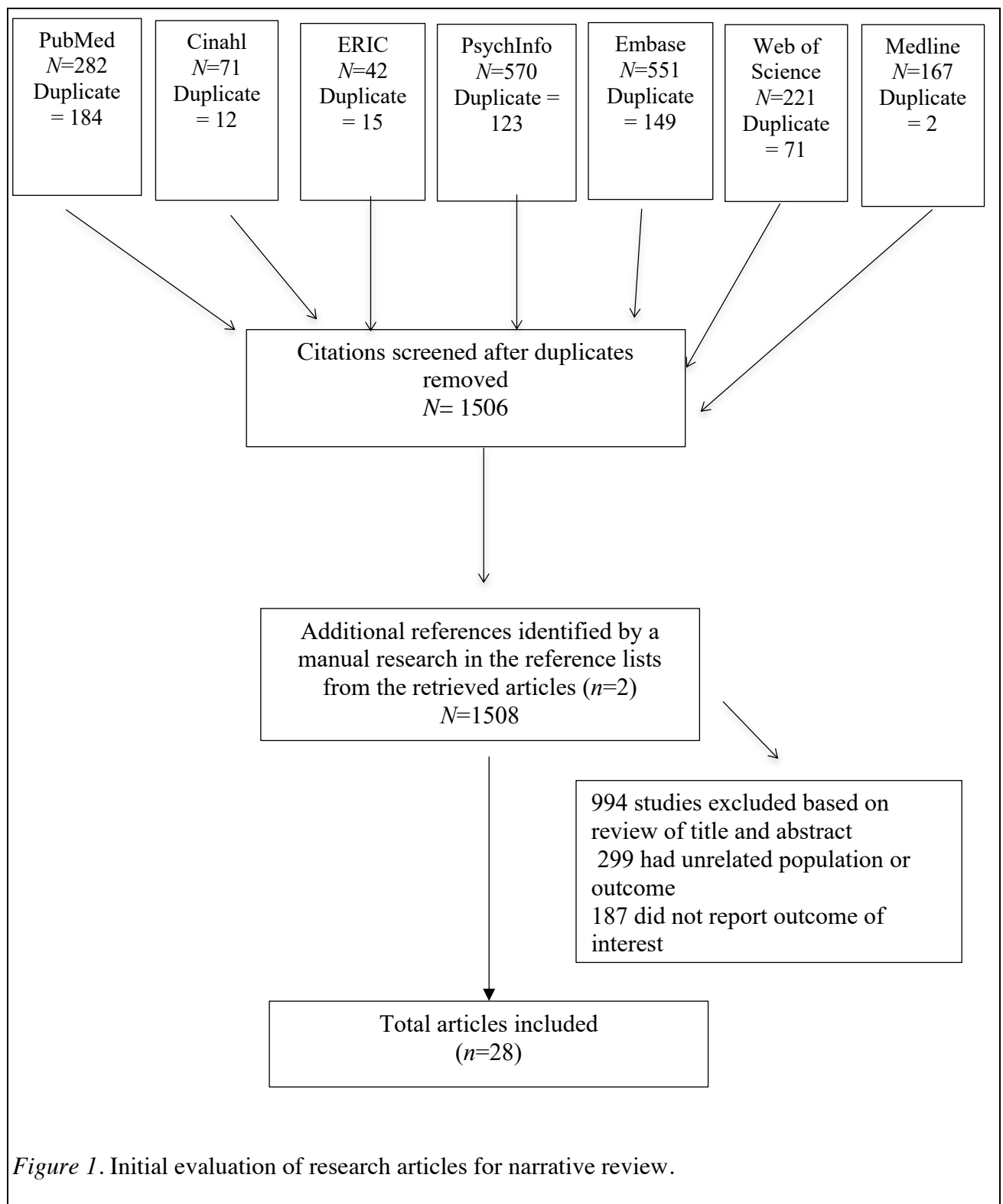


Figure 1. Initial evaluation of research articles for narrative review.

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Table 1

Overview of Risk Factors and Variables Associated with Depressive Symptoms in Children and Adolescents with ASD

Study	Sample Size and Age Range	Diagnosis	Predictor and Outcome Measures	Psychosocial Risk Factor Examined	Summary of Findings
Adams et al. (2013)	N = 54 Age range 10.39-17.99	AS, Autism, PDD-NOS, Multiple ASD diagnoses	SCQ, CDI, SROPV, PROPV	Peer victimisation	Adolescent reports of peer victimisation were associated with internalising symptoms
Barnhill (2001)	N=33 (30 males 3, females) Age range 12-17	Asperger's	Student Social Attribution Scale (SSAS), Children's Depression Inventory (CDI)	Attributional Style	The more participants attributed social failure with their ability and effort, the higher their depressive symptoms score
Barnhill & Myles (2001) (same cohort as above study)	N=33 Age Range 12-17	Asperger's	CASQ and CDI	Attributional Style	A significant positive relationship between depressive symptoms and general attributional or explanatory style was identified.
Bitsika and Sharpley (2016)	N=90 pre-adolescent (6-12yrs) and n=60 adolescent males (13-18 years)	ASD	ADOS, SRS, CASI-D, WASI-II	ASD symptoms	ASD symptoms positively associated with depression Adolescents feeling of depression predicted by SRS Autistic mannerisms - engaging in rigid or inflexible behaviour, and touching others in unusual ways were ASD-related behaviours associated with total depression

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Table 1 (continued).

Bitsika and Sharpley (2017)	N=150 age 6-18 years grouped in two age groups n=90 (6-12 years) and n=60 adolescents (13-18 years)	ASD (ADOS and DSM-5) None of cohort on anti-depressants)	ASDBC and major depressive disorder subscale of CASI-4 (CASI-4-D)	ASD symptoms	Depression associated with frustration experienced by adolescents when their environment is inconsistent and their need for sameness is denied.
Fung et al. (2015)	N=91 age range 7-25 years (and parents)	ASD	PAS-ADD, K6, GDS-CS	Parent distress, life events	High parent distress and exposure to 3 or more negative life events were associated with symptoms of depression in youth with ASD. Parents reported higher depression scores for youth with at least average intellectual functioning compared to youth with an intellectual disability. Youth age was negatively correlated with symptoms of depression.
Ghaziuddin et al. (1998)	N=35 Age range 8-51	Autistic / PDD	DSM-III criteria	Life events	82% of children with ASD and depression had experienced at least one stressful life event over their lifetime (such as a change in group home, bereavement, or family sickness) compared to 45% of children with ASD without depression.

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Table 1 (continued).

Gotham et al. (2014)	N=50 age range 16-35	ASD Asperger's and PDD-NOS	ADI-R, Vineland Adaptive Behavior Scales; WASI, Neale ARA, WRAT, ADOS, BDI-II, RRS, SSQ, BPI, SIH (social interests and habits)	ASD symptoms. Ruminated, social support	Elevated depressive symptoms associated with greater self-perceived autism-related impairments (n=48), greater rumination (n=21), and lower perceived social support (n=37).
Gotham et al. (2015)	N=109 with ASD, N=56 non- spectrum DD (age range 6-24 years)	ASD and non- spectrum Developmental Delay (controls)	Parent-rated CBCL; ABCL, DBC - measures done by parent every 3-6 months btw ages 9 and 24	Parent distress; parent exposure to negative life events	Anxiety and depressive symptoms more likely in ASD than non-spectrum. Males had elevated levels of anxiety and depressive symptoms in school age that remained high into young adulthood.
Greenlee et al. (2016)	N=1272 Age range 6-17 years	ASD (including autistic disorder, AS and PDD- NOS)	Abridged Stanford Binet, HMHH survey, PCQ, CSHQ, CBCL Parent report of depression history.	Increased cognitive ability	4.8% ASD aged 6-12 years and 20.2% ASD aged 13-17 yrs. Parent reported child /youth to have a history of depression diagnosis. Positive depression history was associated with greater chronological age, and higher IQ.

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Table 1 (continued).

Hedley and Young (2006)	N=36 (34 males, and 2 females) Age range 10-16	Asperger's	Social Comparison Scale and CDI	Group Membership	Depressive symptoms correlated with SCS, specifically perceived group membership - which significantly and independently predicted depression scores
Lieb and Bohnert (2017)	N=127 (103 males) 24.4% Autistic Disorder 57.5% Asperger's 18.1% PDD-NOS (Parent report of diagnosis) Age range 12-17 years	ASD (DSM-IV-TR criteria) - measures using ADOS	SRS; BRIEF - Parent Report; FQQ-A and FQQ-AP; CBCL-D and YSR-D; LS and LS-P	Loneliness	Loneliness and depressive symptoms were significantly and positively correlated
Mayes et al. (2011)	N= 627 Age Range 1-17 Grouped age 1-5 years; 6-10 years; 11-17 years	ASD	PBS (Peditatric Behaviour Scale)	ASD symptoms, age, IQ, gender, race, parental occupation	Maternal description indicated depression in 72% of the HFASD cases; Maternal autism severity rating and demographic variables were entered in stepwise linear regression analysis to predict anxiety and depression scores. Autism severity was the single best predictor of anxiety and depression. The best combined predictors of anxiety and depression were increasing autism severity, verbal IQ, and age. Gender, race, nonverbal IQ, and parent occupation did not contribute significantly more to the prediction of anxiety or depression.

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Table 1 (continued).

Mazurek and Kanne (2010)	N=1202 age range 4-17 years (Simons Simplex Collection)	ASD	ADI-R, ADOS and CBCL; DAS-II, Mullen, WISC-IV and WASI to assess intellectual functioning	ASD symptoms, quality of friendships	More severe the ASD, lower level of depression/anxiety symptoms, but the less likely the child is to have friends. Better quality friendships were associated with greater anxiety and depression
Mazefsky et al. (2010)	N=31 Age range 10-17 years	ASD - includes Asperger's and PDD-NOS (DSM-IV)	ACI-PL, ADI-R, Wechsler Abbreviated scale of Intelligence.	Maternal mood symptoms	32% participants had diagnosis of depression; 39% diagnosed with anxiety.
Mazzone et al. (2013)	n=20 Asperger's n=10 AS Age range 7-16 years N=30 Major Depression Age range 7-17 years N=35 TD age range 7-16 years	Asperger's syndrome and high functioning autism	CDI, CDRS-R, P-YMRS, CBCL, MASC, AQ, CGAS	Anxiety symptoms	A significant and positive association found between anxiety symptoms and depressive symptoms;
Meyer et al. (2006)	N=31 Age Range 7.9-13.9	Asperger's	BASC-SRP, BASC-PRS, SASC-R, SCI, WKDT, CAS, WISC-III, EPT, CTREP	Social Attribution	A significant correlation between depressive symptoms and social comparison scale was found when authors assessed whether certain patterns of social information processing and social attribution were related to depression

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Table 1 (continued).

Musnicky, 2013 (Thesis)	N=182, (83 with co-morbid depression, 99 with Asperger's alone) Age range 13-18	Asperger's Syndrome	SRS, Child with ASD Questionnaire - version 2.0,3	Social impairment	Asperger's and co-morbid depression - retrospective analysis no significant correlation between the presence of co-morbid depression and the total levels of social impairment (SRS), or any of the subscale components (social awareness, social motivation, social communication, social cognition and autistic mannerisms) - but 'hinted' at a correlation between social impairment issues and co-morbid depression in AS adolescents
Pelz-Sherman (2009)	N=98 age range 8-17	ASD (HFA, AS or PDD-NOS)	BDY-II and PLSS, and 1 week activity diary	Well being	The correlation between activity and well-being was positive, and the correlation between activity and depression was negative. Thus as the number of minutes that the participants spent completing activities increased, participants were more likely to endorse higher scores on the PLSS; the lower the number of minutes the participants spent completing activities, the more likely the participants were to report symptoms of depression.
Shtayermann (2007)	N=10 average age 19.7 (range not provided)	Asperger's	KADI, Social Experience Questionnaire, PHQ-A	Peer victimisation	No discussion if peer victimisation was risk factor for depressive symptoms, only that the group had high levels of both

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Table 1 (continued).

Strang et al. (2012)	N=95 Age range 6-18	ASDs (DSM-IV) IQ \geq 70	CBCL, WISC-IV and WASI	Cognitive ability, ASD symptoms	Despite elevated rates of depression identified, age, cognitive ability or few ASD symptoms were not a risk factor for depressive symptoms.
Stratis & Lecavalier (2013)	N=72 parents of youth with ASD age range 5-17	ASD: Autism (n=46), Asperger's (n=13 and PDD-NOS (n=10)	SCQ, RBS-R, CSI-4, ABAS-II	ASD symptoms, anxiety symptoms	36% had IQ below 70. Ritualistic and sameness behaviour predicted anxiety, depression and OCD. There was a high correlation between anxiety symptoms and depressive symptoms in this study.
Storch et al. (2012)	N=60 (48 males) Age range 11-14 years	ASD (includes Asperger's and PDD-NOS)	RPEQ, ALS, CBCL, CIS, RCADS, SRS	Peer victimisation, anxiety	Peer victimisation is associated with anxiety and depressive symptoms and loneliness in children with ASD and comorbid anxiety
Taylor & Gotham (2016)	N=36 youth (averaged 18.7 years) range 17.6-22.0	ASD	K-SADS-PL DSM-IV criteria for major depression, dysthymia, and/or bipolar disorder	Life events	Of the youth with clinical-level mood symptoms (e.g. major depression, dysthymia and or bi-polar) nearly 90% had at least one trauma, compared to 40% of those with no mood symptoms relevance

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Table 1 (continued).

Ung et al. (2006)	N=81 Age range 9-17	Autism Spectrum Disorders	PEQ-R, PPEQ-R, RCADS-C, RCADS-P, ALS	Peer victimisation, loneliness	Victimisation had a significant positive relationship with child's loneliness and anxiety and depressive symptoms
White & Roberson-Nay (2009)	N=20 Age range 7-14	Autism Spectrum Disorders	ADOS, SCQ, SRS (parent), SCI, MASC, CBCL, Loneliness questionnaire	Social initiation, anxiety	There was a significant relationship between the CBCL 'anxious/depressed' and the social initiation scale of the SCI (as rated by the parents) indicating that children whose parents rated them as more anxious or depressed also had lower social drive or were less likely to initiate with peers.
Whitehouse et al. (2009)	N=35 Age Range 12-16	Asperger's and controls	FQQ, FMQ, De Jong-Gierveld Loneliness Scale, CES-DC	Loneliness and quality of friendship	Relative to control group, adolescents with AS displayed higher levels of loneliness and depressive symptoms with loneliness being negatively correlated with the quality of their best friendship. Increased levels of depression in adolescents with AS was predicted by the extent to which their best friendships were characterised by high levels of conflict / betrayal.
Williamson et al. (2008)	n=19 (also control group n=19) Age range 11-15 years	Asperger's	Self-Perception Profile for Children; CDI; Spence Children's	Peer approval	No significant difference between AS and TD in depression subscale scores. In AS group, peer and parent approval significantly predicted depression scores. In TD group, peer and parent salient

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	Anxiety Scale; Peer and Parental approval Questionnaire;	competencies and peer approval were significant predictors of depression scores
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Note. The Autism Spectrum Disorder Behaviour Checklist (ASDBC; Bitsika, 2000); CDI 2: SR: The Children's Depression Inventory 2: Self-Report (Kovacs, 2011); CLES-A: Coddington Life Event Scales – Adolescent Version (Coddington, 1999); MASC: Multidimensional Anxiety Scale for Children (March, 1999); CASQ: Children's Attributional Style Questionnaire (Seligman et al., 1984); SEQ-S: Social Experience Questionnaire-Self Report (Crick & Grotpeter, 1996); CDI 2:P: The Children's Depression Inventory 2: Parent Report (Kovacs, 2011); Childhood Autism Rating Scale, Second Edition High Functioning Version (Schopler et al., 2010); The Diagnostic and Statistical Manual of Mental Disorders (5th ed.; *DSM-5*); *ICD-10* = Tenth revision of the International classification of disease, *SCS* = Social Comparison Scale, *BASC-SRP* = Behaviour Assessment System for Children-Self Report of Personality, *BASC-PRS* = Behaviour Assessment System for Children-Parent Report Scale, *CES-DC* = Centre for Epidemiological Studies Depression Scale, *SCID* = Structured Clinical Interview for DSM-IV Axis I Disorders, *DSM-IV* = Diagnostic and statistical manual of mental disorders (4th ed.), *SCAS* = Spence Children's Anxiety Scale, *SWQ* = Spence Social Worries Questionnaire, *SASC-R* = Social Anxiety Scale for Children-Revised, *MASC* = Multidimensional Anxiety Scale for Children, *CASI* = Child and Adolescent Symptom Inventory, *SPAI-C* = Social Phobia and Anxiety Inventory for Children, *CBCL* = Child Behavior Checklist, *Y-BOCS* = Yale Brown Obsessive Compulsive Scale and Symptom Checklist, *RBI* = Repetitive Behavior Interview, *YSII* = Yale Special Interests Interview, *RBQ* = Repetitive Behaviour Questionnaire, *CY-BOCS* = Children's Yale Brown Obsessive-Compulsive Scale, *BAI* = Beck Anxiety Inventory, *BDI* = Beck Depression Inventory, *OCI-R* = Obsessive Compulsive Inventory-Revised, *WURS* = Wender-Utah Rating Scale, *K-SADS-PL* = Schedule for Affective Disorders and Schizophrenia for School-Age Children, Present and Lifetime Version, *CGAS* = Children's Global Assessment Scale, *RPEQ* = Revised Peer Experiences Questionnaire (Prinstein, Boergers, and Vernberg, 2001), *ALS* = Asher Loneliness Scale (Asher et al., 1994), *SRS* = Social Responsiveness Scale (Constantino and Gruber, 2005).

Discussion

The current narrative review included 28 identified studies that assessed psychosocial risk factors associated with elevated depressive symptoms in children and adolescents with ASD. Based on the narrative review, the most frequently studied psychosocial risk factors of depressive symptoms were ASD symptomatology, peer victimisation, attributional style, and life events. In conducting this review, it became apparent that the relevant literature is still evolving and a number of methodological limitations exist. A detailed discussion of these risk factors and the identified limitations will highlight the directions that research will need to take to better understand depressive symptomatology for adolescents with ASD. The narrative review in the current study identified a number of methodological flaws and limitations in the research regarding psychosocial risk factors of depressive symptoms in adolescents with ASD. First, as highlighted above, the majority of literature presented in the narrative review involved only parent report of both the psychosocial risk factors (e.g., life events, peer victimisation, and anxiety symptomatology), and depressive symptoms rather than measuring adolescent's self-reports of these variables (e.g., Fung et al., 2015; Ghaziuddin et al., 1995; Taylor & Gotham, 2016; Mayes et al., 2011). The studies reviewed have relied upon the parents' ratings of their child's experience of depression and psychosocial risk factors despite findings that children with ASD are capable of understanding and reporting upon their mental health (Ozsivadjian, Knott, & Magiati, 2012). A problem that comes with relying exclusively on parent report to measure psychosocial risk factors (e.g., peer victimisation) is that parents of older children may not observe or be informed of their child's experiences as these children are developmentally becoming more independent from their parents (Charach, Pepler, & Ziegler, 1995). Furthermore,

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many of the measures of psychiatric symptomatology (e.g., mood disorder, anxiety disorder) were also informant reports and therefore the relationships between such measures may be inflated by informant or parental bias. This is not to say that parent reports do not provide valuable information regarding adolescent's psychiatric symptomatology; however, relying solely on parent reports may not provide an accurate representation of the adolescent's presenting symptomatology and issues. Future research is required using adolescent reports when measuring both depressive symptoms and psychosocial risk factors of depressive symptoms to further understand their experience of depression.

Second, a number of the studies included in the current narrative review had small sample sizes. Specifically, approximately half of the studies presented in the narrative review had sample sizes of less than 50 participants. Small sample sizes can undermine the internal and external validity of studies (Faber & Fonseca, 2014) and subsequent clinical implications. Small sample sizes pose many risks for scientific research and attempts to abstract or generalise findings into practical applications. Specifically, small sample sizes lead to an increased likelihood of false negatives and false positives. False positives are created by the smaller group of participants showing a response to a given variable when in fact the responses provided by the participants are unique to them and not representative of the larger population. Conversely, small sample sizes may also produce false negatives for similar reasons (Vadillo, Konstantinidis & Shanks, 2016). It is for this reason that Hackshaw (2008) states "While small studies can provide results quickly, they do not normally yield reliable or precise estimates. Therefore, it is important not to make strong conclusions about a risk factor or trial intervention, whether the results are positive or not" (p.1143). Hence, future research requires examination of psychosocial

risk factors of depressive symptoms using large sample sizes that are not statistically underpowered so that stronger conclusions can be drawn and generalised to applied settings with confidence.

Third, the existing research that is available regarding the relationship between psychosocial risk factors and depressive symptoms in adolescents with ASD has not always primarily focussed on adolescents per se (e.g., Fung et al., 2015). For example, some research has included a variation across age ranges such as children and adults (e.g., Shtayermann, 2007) making it difficult to know how results would apply specifically to adolescents. In the TD population, the profile and severity of depressive symptoms are different across different stages of development (Kessler et al., 2005; Trollor et al., 2007a, b) with increasing negative impact on functioning over time (Brenes et al., 2008) highlighting the importance of studying developmental age ranges separately. Therefore, as ASD is considered to be a lifelong condition, it is important to understand the psychosocial risk factors of depression across different developmental periods. Thus, future research is required using samples specific to adolescents with ASD.

Last, what has not yet been evaluated, is how these frequently reported psychosocial risk factors operate collectively. The narrative review indicates that many of the studies (24/28) presented examine depression in relation to only one or few psychosocial risk factors at a time. Examples include but are not limited to Barnhill and Myles (2001) who examined the relationship between attributional style and depression; Taylor and Gotham (2016), who examined only life events and depressive symptoms; and Shtayermann (2007) who examined the association between peer victimisation and depressive symptoms. It is unknown how the strength

of such effects may be altered when the frequently identified psychosocial risk factors in the ASD literature are considered simultaneously.

It is possible that quite different combinations of psychosocial risk factors are associated with onset of depressive symptoms. That is for some individuals, major depression can result both from genetic influences and from severe and impairing traumatic life events. For other individuals, where negative life circumstances predispose to depression, supportive relationships such as receipt of pro-social behaviour appears to protect against it (Coyne & Downey, 1991). Understanding the combination of multiple psychosocial risk factors that impact depressive symptoms may form part of the prognosis for treatment and need to be considered as targets for prevention. As more is understood about depression in adolescents with ASD, there is the opportunity to design and implement effective prevention strategies. For example, if it becomes possible to identify those at risk earlier during adolescence because of psychosocial factors, it may well be possible to more effectively target specific prevention approaches. Knowledge of psychosocial factors predicting or associated with depressive symptoms is critical to help those such as parents and professionals identify at-risk children and adolescents and target risk factors for intervention for depressive symptoms. It potentially may contribute to better outcome for adolescents. Further, knowledge of the psychosocial risk factors of depression and depressive symptoms may prevent suicide ideation and attempts in children and adolescents with ASD (Mayes et al., 2013).

The studies that were selected for the narrative review presented with issues and limitations regarding methodology. Methodological issues and limitations included an emphasis on parent report of psychosocial risk factors of depressive symptoms and psychopathology,

rather than the use of adolescent self-report; small sample sizes; and a wide age range of participants. In addition, many studies utilised a minimal number of risk factors when examining their relationship to depressive symptoms rather than examine the impact of multiple risk factors on depressive symptoms in adolescents with ASD.

Future research is required to address these limitations and build on the current ASD literature examining the psychosocial factors of depressive symptoms in ASD. Such information could advance theory and research on the causes of depressive symptoms including support for the biopsychosocial framework of depression. In addition, building on the current understanding of psychosocial risk factors and depressive symptoms may highlight which individuals are at risk, how they should be targeted for prevention as well as the design of prevention programs.

A Detailed Review of ASD Symptoms, Peer Victimisation, Attributional Style, and Life Events as Predictors of Depressive Symptoms in Adolescents with ASD

The following review will present literature findings regarding the most frequently studied psychosocial risk factors associated with depressive symptomatology of adolescents with ASD identified as a result of the narrative review. These include: ASD symptoms, peer victimisation, attributional style, and life events. All of the aforementioned risk factors have been outlined in Table 1. The psychosocial risk factors have not been presented in a specific order. Following this literature review, the justification of the current study will be presented as well as the research questions for the current study.

ASD Symptom Severity.

Given the prevalence and severity of symptoms of depression in youth with ASD, a number of studies have investigated the association between ASD symptoms and depression

(e.g., Bitsika and Sharpley 2016a; Bitsika et al. 2016b; Mayes et al., 2011; Mazurek & Kanne, 2010; Vickerstaff et al., 2007). It has long been postulated that 'higher functioning' children with ASD, who therefore have higher IQ's, and lower ASD symptom severity, are more likely to be socially adjusted. This increase in social engagement may lead these individuals to develop insight into their differences by virtue of their cognitive abilities as well as the social exposure that provides a greater opportunity to compare and reflect (Tse, Strulovitch, Tagalakis, Meng & Fombonne, 2007). The result of this insight is that these individuals are likely to form a more negative self-perception, lower self-worth and possibly depressed mood. This position has supportive evidence as can be seen in a large study done by Mazurek and Kanne (2010) who reported on 1202 children and adolescents (age 7 to 17). This study found that those individuals with lower IQ had an increased severity of ASD symptoms had a lower incidence of depression when compared to higher functioning individuals with ASD who had comparatively higher IQ's and less severe symptoms.

In contrast, a number of studies have identified a positive relationship between ASD symptoms and depressive symptoms. Research by Vickerstaff et al. (2007) predicted that children with ASD and no intellectual disability who perceived themselves as less socially competent, would report higher levels of depressive symptomatology. Participants included 22 children aged 7 to 13. This hypothesis was supported and Vickerstaff et al. (2007) found that depressive symptoms were elevated in children who were assessed as having higher levels of ASD symptoms. Despite these findings, the authors noted that generalisability of results was comprised by small sample size, restriction in the age range of the participants, and low number of females.

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In a study conducted by Bitsika and Sharpley (2016a), parents of 90 pre-adolescents (age 6 to 12) and 60 adolescent males (ages 13 to 18) with ASD completed the Social Responsiveness Scale (SRS; Constantino & Gruber, 2012) and a depression measure, the CASI-D (Gadow & Sprafkin, 2010). It was found that the SRS total score was significantly and positively correlated with the CASI-D total score for both age groups. Also, CASI-D scores for both groups were associated with scores on four of the five SRS subscales: Social Cognition, Social Communication, Social Motivation, and Autistic Mannerisms. This robust study used parent report measures for both ASD symptoms and MDD, thus it is unknown if these results will hold true when symptoms of depression are measured by adolescent report.

Evidence also indicates that there is an elevated risk of depression in individuals with ASD who have higher IQ and functioning as they age. A large study by Mayes et al. (2011) examined risk factors of anxiety and depression in 627 children and youth with ASD (ages 1-17). Mothers rated their children on the Pediatric Behavior Scale (PBS; Lindgren & Koepl, 1987) to measure anxiety and depressive symptoms in children and adolescents. Along with age, the biggest predictors of depression included increased verbal IQ and higher levels of maternal-rated ASD symptom severity, with the latter being the single best predictor of both anxiety and depression.

In contrast to the studies identifying a positive relationship between depressive symptoms and ASD symptoms, a number of studies have failed to identify a positive relationship between depressive symptoms and ASD symptoms. For example, Kim et al. (2000) examined the relationship between depressive symptoms as measured by a parent questionnaire (Ontario Child Health Checklist, Boyle, et al., 1987) and ASD symptoms (measured by Autism Diagnostic

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Interview-Revised (ADI-R; Rutter, Le Couteur & Lord, 2003). Participants included 40 children and their parents (aged 9 to 14) with ASD and no intellectual disability. Kim and colleagues found no significant association between the symptoms of autism and symptoms of anxiety and mood.

Kim et al.'s (2000) findings have been supported by research by Strang et al. (2012) who examined correlates of depression in 95 children and adolescents (aged 6-18) with ASD and intellectual quotients of 70 and above. Participants were grouped according to their reported depressive symptoms, i.e., into two groups based on obtaining scores either above or below clinical levels of depressive symptoms. Whilst elevated rates of depressive symptomatology were observed, the authors did not find any group differences in the reported level of ASD symptoms. They suggested that children and adolescents with ASD's have an increased risk for depression regardless of the severity of their ASD symptoms.

Six key papers have been identified as a result of the narrative review examining the relationship between ASD symptoms and depressive symptoms. Taken together, results of these studies are mixed and the research does not appear to clearly explain how the severity of ASD symptoms may or may not impact depression. It is possible less severe ASD symptoms could minimise social dysfunction and thus minimise the chances of depression. However, it is also possible that less severe ASD symptoms may actually allow individuals with ASD to be more aware of their challenges thus allowing social factors to negatively impact their mental health. Conversely, greater ASD symptoms may be protective or may actually worsen social-emotional experiences in such a way that individuals become depressed.

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Whilst most of the studies examined above identified a relationship between depressive symptoms and frequency and severity of ASD symptoms, they were varied in terms of their methodology and study samples. With respect to participants there were studies that included a diverse age range of participants. That is, whilst individuals in the adolescent age range (age 12-17) were included in these studies, adolescents were also grouped with children and young adults (e.g., Mazurek & Kanne, 2010; Strang et al., 2012) making it difficult to draw firm conclusion about the experiences primarily of adolescents. Hence it is unknown if results will generalise to adolescents and future research is required in this area.

Another methodological variation in the ASD symptomatology research is the manner in which the depressive symptoms were assessed. Specifically, the research in this area relies on parent report to identify and measure depressive symptoms (e.g., Bitsika & Sharpley, 2015; Mazurek & Kanne, 2010; Strang et al., 2012) where symptoms have been rated by parents rather than adolescents themselves. Parent report could present issues with validity due to reliance on the parent's perception alone. This is not to suggest that such measures cannot capture depression in adolescents with depression, however it does present challenges to the validity of the reports that can be difficult to address or exclude when reviewing the findings. For example, an adolescent may be hiding their depressive symptoms from their parents and thus the parent does not rate the adolescent as having depressive symptoms. Alternatively, a parent may not be able to identify depressive symptoms due to symptom overlap. It therefore remains unknown if a relationship will be identified between depressive symptoms and ASD symptoms when adolescents complete self-report measures of depression.

A final limitation of the above research is the lack of multiple psychosocial risk factors examined collectively at any one time. Whilst some studies examined ASD symptoms with age and cognitive ability, a limited number of studies examined ASD symptoms in combination with other factors such as life events and peer victimisation. This means that the exact contribution of ASD symptoms on depressive symptoms amongst multiple psychosocial risk factors of depressive symptoms remains unknown. There is a need for the research to move beyond identification of risk factors to an understanding of how they interact with each other as well as with ASD symptomatology. Understanding of these interactions would need to include large samples of adolescents with multiple risk factors of depressive symptoms. Given that parent report measures may have issues with validity it is significant that no known studies to date appear to have examined the relationship between ASD and depressive symptoms using adolescent self-report.

Peer Victimization. Another construct of interest for researchers has been the association between peer victimisation and depressive symptoms in the ASD population. Peer victimisation is commonly defined as when a socially or physically more powerful peer or peer group aggressively attacks a less powerful youth intentionally and repeatedly through physical, verbal, and relational aggression (Crick & Grotpeter, 1996; Hunter, Boyle, & Warden, 2007; Smith & Sharp, 1994). Overt or physical victimisation, which involves harm to an individual through physical actions or threats of harm (e.g., hitting, pushing, kicking, yelling), and relational victimisation, which consists of purposeful manipulations intended to damage personal relationships (e.g., shunning, ignoring, spreading rumours) are the two primary forms of peer victimisation commonly studied (Crick, Casas, & Ku, 1999; Crick & Grotpeter, 1996; Dempsey,

Sulkowski, Nichols, & Storch, 2009; Storch, Brassard, & Masia-Warner, 2003a; Storch, Masia-Warner, Crisp, & Klein, 2005; Storch et al., 2012b; Twyman et al., 2010).

Research regarding the TD population has indicated that pro-social behaviour may function as a protective factor for children that are victimized (Hodges, Boivin, Vitaro, & Bukowski, 1999; Martin & Huebner, 2007). Pro-social behaviour involves the receipt of pro-social support from peers (e.g., peers cheering up a child when they feel sad and/or a peer giving help when a child needs it). Crick and Grotpeter (1996) included items on their Social Experience Questionnaire (SEQ, Crick & Grotpeter, 1996) to assess pro-social treatment from peers and they theorized that the lack of such experiences could negatively affect those children even in the absence of victimisation. In Cohen and Wills' (1985) theory, social support serves as a "buffer" against stress by intervening between the stressor (victimisation) and the reaction (depression) to prevent or reduce the severity of the reaction. Social support may enhance the ability to cope with stressors. In peer victimisation, social support may diminish the importance and psychological impact of the victimisation and/or may offer protective social networks to reduce the victimisation. On the other hand, peer victimisation may restrict social interactions of the targeted child, which then limits opportunities to develop appropriate social skills. The lack of social skills may lead to further victimisation and reduced pro-social treatment from peers (Storch & Masia-Warner, 2004). Storch and Masia (2001) detected a moderating effect of pro-social behaviours on victimisation in adolescents. Students who were recipients of less pro-social behaviour or social support from peers had higher rates of depression (Crick & Grotpeter, 1996).

Regarding the relationship between receipt of pro-social behaviour, perceived social support and depressive symptoms, Bauminger and Kasari (2000) identified that children with

ASD were lonelier and had poorer quality friendships in terms of companionship, security, and help than TD peers. Lasgaard et al. (2010) reported a high rate of perceived loneliness in adolescent boys with ASD relative to TD peers, and perceived social support was negatively associated with loneliness. Finally, Humphrey and Symes (2010) found that students with ASD may seek out a friend if they were being victimised. Importantly, in individuals with ASD, isolation and loneliness have been found to be associated with increased rates of depression (Mazurek 2014; Whitehouse et al. 2009), suggesting the importance of social relationships as potential protective factors against poor mental health outcomes in this population.

Peer victimisation is a widespread childhood occurrence (Olweus 1994; Storch & Ledley 2005). Adolescents with ASD are common targets for peer victimisation with as many as 46 - 94% experiencing peer victimisation, which exceeds that of typically developing youth and youth with other special needs (Batten, Corbett, Rosenblatt, Withers, & Yuille, 2006; Cappadocia, Weiss, & Pepler, 2011; Carter, 2009; Chen & Schwartz, 2012; Humphrey & Symes, 2010; Little, 2001; Montes & Halterman, 2007; Sterzing, Shattuck, Narendorf, Wagner & Cooper, 2012; Twyman et al., 2010; van Roekel, Scholte, & Didden, 2010; Wainscott, Naylor, Sutcliffe, Tantam, & Williams, 2008).

The high rates of peer victimisation reported are of concern particularly given that peer victimisation has been shown to be related to the development of internalizing symptoms (i.e., depressive symptoms) in TD adolescents (Reijntjes et al., 2010; Siegel et al., 2009; Sweeting, Young, West, Der, 2006; van der Wal, de Wit, & Hirasing, 2003; You & Bellmore, 2012). As many as 17–30% of TD adolescents experience overt (e.g., hitting, pushing, threatening, insulting), relational (e.g., ignoring, shunning), and/or reputational (e.g., spreading rumours,

gossiping) acts of aggression on a regular basis (Nansel, Craig, Overpeck, Saluja & Ruan, 2004; Nansel et al., 2004; Storch & Masia-Warner 2004).

In addition, longitudinal research with TD children and adolescents has indicated a positive relationship between victimisation and mental health problems. One longitudinal study indicated that children who were consistently victimised by peers had an increased risk of developing new mental health related symptoms within the year, while children who reported higher levels of mental health problems than their peers were more likely to be victimised within the year (Fekkes, Pijpers, Fredriks, Vogels, & Verloove-Vanhorick, 2006). In addition, a longitudinal study by Bowes et al. (2015) found TD adolescents who reported frequent victimisation by peers were about twice as likely to develop depression.

Despite the many studies examining the prevalence of peer victimisation in children and adolescents with ASD, research examining why children with ASD may be at greater risk for peer victimisation is minimal. However, it appears that children with ASD may become targets for their peers firstly due to atypical interests and/or behaviours compared to their peers, and secondly as a result of their intense emotional and/or behavioural reactions to victimisation, which serves to both reinforce and maintain the acts of bullying (Gray, 2004). Also, communication impairments in youth with ASD may place them at increased risk for victimisation (Ung, 2016).

Peer victimisation has been shown to exert independent adverse effects on children with ASD who are very commonly bullied or victimised, teased or ostracized in educational settings (Humphrey & Lewis, 2008; Little, 2002). In addition, observational reports document both social isolation and distress as direct consequences of being victimised in the school environment

(Brunstein Klomek, Marrocco, Kleinman, Schonfeld, & Gould, 2007; Humphrey & Lewis, 2008). Attwood (2007) has reported that the psychological consequences of prolonged peer victimisation is likely to last many years and may be a contributor to clinical depression for adolescents with ASD.

Furthermore, children with ASD struggle with initiating and sustaining peer interactions, due to their difficulties with respect to communication and social skills. These children have difficulties with forming and maintaining friendships with peers. Subsequently a lack of a protective and supportive peer network may place them at greater risk for victimisation (Delfabbro et al., 2006; Forero et al., 1999; Nansel et al., 2001; Williams & Guerra, 2007; (O'Connell, Pepler, & Craig, 1999).

Whilst the prevalence of peer victimisation in youth with ASD has been frequently studied (e.g., Carter, 2009; Chen & Schwartz, 2012; Little, 2002; van Roekel et al., 2010), little research has investigated the relationship between peer victimisation (relational, overt and recipient of pro-social behaviour) and depressive symptoms through quantitative analyses in adolescents. Shtayermann (2007) recruited 10 adolescents and young adults who had been diagnosed with AS. Participants reported experiencing high levels of relational and overt victimisation and anxiety and depressive symptoms. Twenty percent met criteria for a diagnosis of Major Depressive Disorder, 30% met criteria for Generalised Anxiety Disorder and 50% had clinically significant level of suicidal ideation. Overt victimisation, relational victimisation, and recipient of pro-social behaviours were not found to be significantly associated with level of suicidal ideation and level of depressive and anxiety symptoms. Although this study highlights the elevated prevalence rate of depressive symptoms and suicidal ideation in adolescents and

adults with ASD, the results indicated no significant association between depressive symptoms and overt victimisation, relational victimisation, or recipient of pro-social behaviours. Whilst these findings are of interest it is important to note that the sample size was small.

Consequently, one must be cautious when interpreting the findings of the study, due to the low statistical power.

Storch and colleagues (2012) investigated the associations between peer victimisation, loneliness, autism related social impairment and psychopathology in a sample of 60 youths (aged 11-14 years) with ASD. Adolescents self-reported on peer victimisation specifically, overt victimisation, relational victimisation, reputational victimisation and a receipt of pro-social behaviours index. Results identified that child and adolescent symptoms of depression were positively related to adolescent reported overt (medium effect size) and relational victimisation (medium effect size). There was no significant relationship identified between symptoms of depression and reputational victimisation (i.e., in which relationship status is used as the mechanism of aggression through social exclusion, gossip, or other means). In addition, no significant relationship was identified between depressive symptoms and receipt of pro-social behaviour.

Cappadocia and colleagues (2012) examined the association between peer victimisation and mental health problems amongst other variables. Participants were 192 parents of children between the ages of 5 and 21 years who were diagnosed with an ASD. Surveys regarding the child's internalizing mental health problems (e.g., conduct problems, insecure / anxious, hyperactive, self-injury/stereotypic, self-isolated / ritualised, overly sensitive) and frequency of victimisation were completed by parent's report online. Results indicated that frequent

victimization was related to many mental health problems among children with ASD. Children who experienced high levels of victimization (once or more per week) were rated by their parents as having higher levels of anxiety, hyperactivity, self-injurious and stereotypic behaviours, and over sensitivity compared to children who experienced no victimization or experienced low levels of victimization (i.e., less than once per week).

Adams et al. (2013) tested the associations between peer victimisation (verbal, relational, physical and social) and internalizing symptoms in 54 verbally fluent adolescent males aged between 10 and 17 with a diagnosis of ASD. Structural Equation Modelling (SEM) exploring the relationship between self-reported depressive symptoms and self-reported peer victimisation and parent reported peer victimisation and internalizing symptoms was conducted. Authors controlled for the effects of age, and ASD symptoms. SEM revealed that the adolescent reports of peer victimisation were significantly associated with the internalizing symptoms. The authors also noted that there was clear evidence to support that the group of adolescents could provide valid reports about their perceptions of experiences of peer victimisation, hence the current investigation will rely on adolescent self-report for peer victimisation.

Ung et al. (2016) conducted a study utilising 81 school-aged youth between the ages of 9 and 17 years diagnosed with ASD with a full-scale intelligence quotient (IQ) equal to or greater than 70 ($M = 104.10$, $SD = 14.24$). Parents of child and adolescent participants completed questionnaires examining the frequency of peer victimization and clinical characteristics of their children. Parents and their children reported that peer victimization occurred on average a few times in the past year. In addition it was found that parent and child reports of victimization had a significant positive relationship with child's report of depressive symptoms.

In summary, the detailed review has highlighted that emerging research has examined peer victimisation as a psychosocial risk factor for depressive symptoms in the ASD population. Of the studies that have been conducted to examine the relationship between peer victimisation and depressive symptoms in adolescents with ASD, inconsistent results have been reported, making interpretation of this relationship even more difficult to establish (Adams et al., 2014; Capoddocia et al., 2012; Shtayermann, 2007; Storch et al., 2012). These inconsistent results may be reflecting a complex relationship between peer victimisation and depression in the ASD population, however, it appears more likely these differing findings can be attributed to methodological variations between the studies.

There are a number of reasons to be cautious in interpreting and generalising the findings of the studies on peer victimisation for individual with ASD. Firstly, there were differing measures of peer victimisation used throughout the studies resulting in differences in types of victimisation being examined and operationalised. For example, some studies examined recipient of pro-social behaviour and its relationship to depressive symptoms (e.g. Adams et al., 2013; Shtayermann, 2007; Storch et al., 2012) whilst other studies did not (e.g. Ung, 2016). Given these inconsistencies in measurement and focus, it is difficult to state with certainty the type of peer victimisation that may lead to depressive symptoms in adolescents with ASD. Secondly, few studies focused only on adolescent participants (i.e., ages 12-17 years old). For example, some studies examined younger adolescent age ranges (e.g., Storch et al., 2012) and others focussed on the older adolescents and adults (e.g., Adams 2014; Shtayermann, 2007). This variation in ages raises issues about how generalizable the findings are to adolescent populations as a group.

As well as methodological variations, the research reviewed has been found to have a number of methodological limitations. For example, research by Adams (et al., 2013) and Storch et al. (2012) whilst having identified a relationship between peer victimisation and depressive symptoms have utilised small sample sizes, $n=60$ and $n=54$ respectively. Shtayermann (2007) research utilised a small sample of 10 adults and adolescents. As a result of the small sample, statistical power may have been too low to identify significant correlations among the multiple variables examined. Further research is needed to determine if these results hold true when larger samples are examined.

Other limitations in the research reviewed relate to the lack of self-report used to measure adolescents' experience of peer victimisation (Cappadocia et al., 2012). Instead, researchers have relied on the reports of parents. Further research is needed to determine if the results of the abovementioned literature hold true when adolescents' experience of depression are examined.

In conclusion, whilst the narrative review has identified positive relationships between some types of peer victimisation and depressive symptoms such as overt and relational (Storch et al., 2012; Ung et al., 2016) it is difficult to draw firm conclusions in this regard due to the limited research examining different types of peer victimisation (i.e., relational, overt, recipient of pro-social behaviour) in adolescents with ASD. Given the methodological variations and limitations of the reviewed literature, further research is required using larger sample sizes, examining only an adolescent sample as well as the use of adolescent self-report for measures of peer victimisation and depressive symptoms. Taking into consideration the results of the TD and ASD research presented above, it is anticipated for the current investigation, which will measure adolescent self-report on measures of peer victimisation and depressive symptoms, that a

positive relationship will be identified between depressive symptoms and overt and relational victimisation and an inverse relationship identified between depressive symptoms and pro-social behaviour.

Attributional Style. Another psychosocial risk factor associated with depressive symptoms that has been examined ASD adolescents is attributional style. According to the Reformulated Learned Helplessness (RLH) theory (Abramson, Seligman, & Teasdale, 1978) attributional style reflects how an individual explains an event they have experienced and influences their cognitive (optimistic / pessimistic) expectations of future events. (DeMoss, Milich, & DeMers, 1993).

According to the RLH model, a perceived lack of control in one situation is not sufficient to produce feelings and behaviours of helplessness in a different situation. Instead, the individual's attributions about what caused the initial lack of control must be considered in different situations. This model specifies three types of attributions for the cause of an uncontrollable event in a situation: stable versus unstable (i.e., Is the cause viewed as stable or unstable?); global versus specific (i.e., Does the cause extend across many events in the individual's life or as limited to a specific occasion?); and internal versus external (i.e., Does the individual attribute the cause to personal traits and behaviours or to environmental factors?). The reformulated model of learned helplessness holds that stable and global attributions for an uncontrollable event create the expectation of a lack of control over future events. This expectation then produces depressed behaviour and feelings. An internal attribution is said to lead to low self-esteem that characterises many individuals with depression (Abramson et al., 1978).

Considerable research has been conducted regarding attributional models of depression with TD adults and children (e.g., Gladstone & Kaslow, 1995; Nolen-Hoeksema, Girgus, & Seligman, 1986; Peterson & Seligman, 1984; Rueger & George, 2017; Sweeney, Anderson, & Bailey, 1986). Consistent with RLH theory research since 1990, examining the direct relationship between explanatory style and depression has shown that a pessimistic explanatory style is related to depression, although the effects are often found to be small.

Given the prevalence of adolescents with ASD and co-occurring depressive symptoms and the detrimental effects depressive symptoms have on their quality of life (Atwood, 1998; Ghaziuddin et al., 1998; Tantam, 1991) it is important to determine if adolescents with ASD have a learned helplessness style that may place them at risk for depressive symptomatology. Adding to the body of research on attributional styles in a large sample of adolescents with ASD and depressive symptoms will be an essential step in gathering empirical data that will further clarify the presentation of adolescents with ASD with depressive symptomatology (Barnhill & Myles, 2001). Only two studies to date have examined the role of attributional style and the reformulated learned helplessness model in children with ASD (Barnhill, 2001; Barnhill & Myles, 2001). Barnhill and Myles (2001) examined the relationship between level of depressive symptoms, and general attributional style or explanatory style in 33 adolescents with AS (age 12-17). Seventy percent of adolescents were taking anti-depressant medication, suggesting a high level of pre-existing depressive symptoms. They found a statistically significant negative relationship between depressive symptoms and their general attributional or explanatory style. The higher the depressive symptoms score, the lower the overall attributional style score as measured by the Children's Attributional Style Questionnaire (CASQ: Seligman et al., 1984). In

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other words, the more depressive symptoms reported, the more depressive attributional style reported. Specifically, individuals who reported more depressive symptoms were also more likely to exhibit ‘cognitive errors in thinking’ associated with a perception of having little control over negative life events. Participants seemed to blame themselves for a negative event or outcome, considered the cause to be consistent over time and generalised the cause across situations.

Similarly, in a related study, Barnhill (2001) found low significant positive associations between depressive symptoms and failure ability in 33 adolescents with AS (age 12-17). That is, the more depressive symptoms reported by the adolescents the more they attributed social failure to their ability and to the sum of their ability and effort. Inversely, the less they attributed social failure to their ability or to the sum of their ability and effort, the lower their depressive symptoms scores. Lack of ability is considered an internal, stable, and global attribution, whereas lack of effort is considered an internal, unstable, probably more specific, and controllable attribution (Abramson, Seligman, & Teasdale, 1978).

Both studies used the CASQ (Seligman et al., 1984) to measure attributional style in adolescents with ASD. Although the CASQ was originally designed for children between 8 and 13 years old, it has been used with adolescent samples (Saylor, Finch, Spirito, & Bennett, 1984) and appears preferable for adolescents to complete than the adult Attributional Style Questionnaire (Seligman, Abramson, Semmel, & von Baeyer, 1979), because of its ease (Artnz, Gerlsma, & Albersnagel, 1985). Furthermore, Seligman recommended using the CASQ for adolescents with Asperger’s Syndrome (M. E. P. Seligman, personal communication, November 20, 1998, as cited in Barnhill & Myles, 2001) rather than the adult Attributional Style

Questionnaire. Hence, similar to the research by Barnhill and Myles (2001) and Barnhill (2000), the current investigation will also use the CASQ to measure attributional style in adolescents with ASD.

Overall, the investigation of attributional style in adolescents with ASD and co-occurring depressive symptoms is one way to understand an adolescent's social and motivational patterns of behaviour (Barnhill & Myles, 2001). With regard to attributional style, there is evidence to indicate that there is a moderate positive relationship between the attributional composite negative score and depressive symptoms supporting the reformulated helplessness theory of depression. However, research to date has been minimal with small samples sizes and additional studies are warranted. In addition, due to the minimal studies conducted to date, it is unclear if these findings will hold true for larger samples. A final consideration includes if results will hold true for samples of adolescents not receiving medication given that the study by Barnhill and Myles (2001) identified that 70 per cent of adolescents were taking antidepressants.

Life Events. Another psychosocial factor identified in having a significant and positive relationship with depressive symptoms in adolescents with ASD is stressful life events. Experiences of stressful life events consist of difficult proximal situations in a person's life, which require a readjustment on the part of the individual involved such as death of a family member, parental divorce, or loss of a job (Coddington, 1972). Life events can be positive (e.g., receiving an award) or negative (e.g., death of close relative) and some life events (e.g., relocation) may be positive for one person, but negative for another (Owens et al., 2004). It is likely that people with learning difficulties are exposed to different and more life events than the

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TD population, because of different living circumstances, limited coping skills, and less control over their lives (Hartley & Maclean, 2005; Jansen et al., 2002).

Stressful life events have been associated with poor psychological functioning, including increased levels of distress, depression, intrusive thoughts, post-traumatic stress, and suicidal ideation (Adams & Adams, 1996; Copeland, Keeler, Angold, Costello, 2010; Meiser-Stedman, Dalgleish, Yule, & Smith, 2012; Schmidt & Joiner, 2004) in TD adolescents. Retrospective accounts of interpersonal life events immediately preceding non-suicidal self-injury or suicidal behaviour in TD samples have included intense loneliness, interpersonal rejection or loss, or a recent conflict with a family member, romantic partner, adult authority figure or peer (Hawton, Harriss, & Zahl, 2006). Further, research in the TD population has also found that symptoms of depression tend to present within a short period of time (i.e., between 0 and 3 months) after a stressful life event has occurred, as opposed to depressive symptoms presenting after a long period of time (i.e., 12 months) (Bebbington, Hurry, Tennant, Sturt & Wing, 1981; Brown, Bifulco, & Harris, 1987; Kenneth et al., 2010; Surtees et al., 1986).

Fung, Lunskey and Weiss (2016) examined the relationship between negative life events and depression in children, adolescents and adults with ASD. Participants included 91 parents of children, adolescents and young adults diagnosed with an ASD (ages of 7–25 years). Parents reported on their child's depressive symptoms and negative life events. Results indicated that exposure to 3 or more negative life events for adolescents with ASD was associated with a greater number of depressive symptoms as reported by the parents than exposure to fewer or no life events in the past 12 months.

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Taylor and Gotham (2016) focussed on the role of stressful life events and trauma in co-occurring mood and anxiety disorders among 36 adolescents with ASD who were preparing to exit high school. Two variables were constructed to capture whether adolescents had co-occurring mood symptomatology or co-occurring anxiety symptomatology. For each class of disorder, a number of parent report and self-report measures were used to determine whether the adolescents had clinical-level, sub-threshold, or no symptomatology. Frequency and the significance of life events were reported by parents. Findings from bivariate analyses of cumulative life events, presence/absence of trauma, and mood and anxiety symptomatology indicated that the relations between co-occurring symptomatology (mood and anxiety) and number of events were not statistically significant; however, having at least one trauma was related to a greater likelihood of mood problems. It is possible that a relationship was not detected between depressive symptoms and life events due to sample size.

The minimal research that is available regarding the relationship between life events and depressive symptoms in adolescents with ASD has not always primarily focussed on adolescents *per se*. For example, whilst Fung and colleagues (2015) researched life events and depressive symptoms, they did so with a large group of children, adolescents and adults. Variation across age groups in the sample, that is, samples included both adults and children, means that it is not clear how these results generalise specifically to only the adolescent population.

The majority of literature examining the relationship between life events and depressive symptoms in adolescents with ASD involves parent report, rather than adolescent report. For example, research by Taylor and Gotham (2016), Fung et al. (2015) and Ghaziuddin et al. (1995) all collected measures of life events via parent report. Relying on informants runs the risk of

missing life events that parents or researchers do not know about or differing appraisals of what constitutes a “trauma” between parent and child. In addition, many of the measures of psychiatric symptomatology were also informant reports and therefore, relationships between variables may be inflated by informant bias.

The lack of research on the impact and role of life events is of concern given that this psychosocial risk factor, particularly those with a negative impact, has been identified as a possible contributing factor to the occurrence of depression in children with an ASD (Fung et al., 2015; Ghaziuddin et al., 1995; Taylor & Gotham, 2016). It has also been argued that the accumulation of negative life events over time can increase the risk of negative psychological outcomes for individuals with ASD (Fung et al., 2016; Ghaziuddin et al., 1995; Taylor & Gotham, 2016).

Overall, emerging findings from the narrative review has indicated that there is a significant and positive relationship between life events and depressive symptoms for individuals with ASD. However, the literature needs to be extended to determine if these findings hold true for larger samples of adolescents with ASD and depressive symptoms using self-report measures of life events and depressive symptoms. In addition, analysis of life events along with other psychosocial risk factors is required to understand the unique contribution life events makes on depressive symptoms in adolescents with ASD.

Confounding Variables.

Overall, the current study will examine multiple psychosocial risk factors of depressive symptoms in adolescents with ASD reviewed above. Whilst previous studies have focussed on one measure and, thus, one psychosocial variable at a time this has made interpreting of the

relationship between these variables extremely difficult due to the challenges of comparing between different samples. By measuring all these factors at the same time using the same sample it is possible to examine the interplay of these factors without the challenges to validity posed by between group comparisons and differing methodologies. The psychosocial risk factors including life events, attributional style, anxiety symptomatology, peer victimisation and ASD symptoms play important roles in the development of psychopathology in individuals who are already vulnerable, and this may be the case for the combination of these psychosocial risk factors.

As well as the multiple psychosocial risk factors of depression in the current study, three control variables – the age of the adolescent, anxiety symptomatology and medication use – were also included in the present study of DS in ASD adolescents. Reasons that age of the adolescent, anxiety symptomatology and medication use to be considered as control variables are outlined in the following paragraphs.

Anxiety symptomatology. In the clinic setting, symptoms of anxiety are common presenting problems for school-age children and adolescents diagnosed with an ASD (Ghaziuddin, 2002; White et al., 2009) with comorbidity estimates ranging from 11 to 84% for these disorders (White, Oswald, Ollendick, & Scahill, 2009). Evans et al. (2005) reported that children with ASD had more specific fears and general anxiety (e.g., riding the school bus, bathrooms, medical procedures) compared to TD children and children with Down syndrome. Davis, et al. (2011) suggested that the course of anxiety symptoms in individuals with ASD (age 17 months to 65 years) largely resembles that seen in TD youth. Anxiety in individuals with ASD appeared to wax and wane with age, becoming increasingly severe in

childhood and adolescence, reducing in adulthood, but rebounding again in later life (49–65 years).

It has been suggested that generalised anxiety disorder (GAD) may be a part of the diagnosis of ASD itself (e.g., Wood & Gadow, 2010) because symptoms of anxiety such as obsessions and rituals are commonly seen in individuals with ASD (Wood & Gadow, 2010). However, the reporting of significant correlations between the presence of GAD symptoms and biological indicators of GAD (e.g., salivary cortisol) in only some children with an ASD (Taylor & Corbett, 2014) indicates that GAD may be independent of ASD but often co-occurring with it. Under the DSM-5 (APA, 2013) definition of GAD, a differential diagnosis may be made if the GAD is “a physiological effect” of ASD. That physiological connection remains to be validated in the ASD population and so the conservative position currently held is that the two diagnoses are independent but often comorbid.

Research has indicated that adolescents with ASD and depressive symptoms will often present with co-occurring anxiety symptoms. For example, in a study that measured both anxiety and depression as reported by parents in 59 children with an ASD, Kim et al. (2000) reported prevalence of 13.6% for anxiety and 16.9% for depression, well above those described in the TD adolescent population where by anxiety and depressive symptoms are often co-occurring.

Regarding the relationship between anxiety and depressive symptoms in adolescents with ASD, in a large study by Mayes et al. (2011) 627 mothers of children with autism (ages 1–17) reported on their adolescents’ depressive and anxiety symptomatology. Results indicated positive large correlations between anxiety and depression, pointing to a common pathway of origin.

Kim et al (2000) reported on the association between generalised anxiety disorder and mood disorder and various correlates in children with ASD, including ASD symptom profile. Parents reported on both anxiety and mood problems. The authors identified a high positive correlation between anxiety and mood problems in a sample of 1751 children and adolescents with ASD.

In the TD population, co-occurring anxiety and depression may have strong associations with one another such that the presence of anxiety symptoms may lead to an increase in depressive symptoms and vice versa (Bittner et al., 2007; Costello, Mustillo, Erkanli, Keeler, & Angold, 2003; Goodwin, Fergusson & Horwood, 2004; Moffitt et al., 2007). Most studies of sequential comorbidity have focused on anxiety as the predictor and depression as the outcome, rather than the reverse. In general, evidence indicates that anxiety symptoms and disorders in childhood often precede the onset of depressive disorders in adolescence and young adulthood (Chorpita & Daleiden, 2002; Pine, Cohen, Gurley, Brook & Ma, 1998). However, longitudinal research regarding community samples of TD population challenged this prevailing notion finding that depression develops into generalised anxiety almost as often as anxiety develops into depression (Moffitt et al., 2007).

Although co-morbidity between anxiety and depressive symptoms has been found in both the TD and ASD populations, there is no consensus in its origins in either population and in the TD population several models have been proposed to explain the frequent of their co-occurrence. Seligman and Ollendick (1998) offered four explanations: (1) comorbidity between anxiety and depression in youth is due to overlap in definitions; (2) anxiety and depression is a result of a shared underlying substrate such as negativity affectivity (e.g., negative affectivity; Clark &

Watson, 1991); (3) comorbidity is due to overlap in risk factors; and (4) anxiety causes or puts youth at risk for depression. Similarly, Klien and Riso (1993) offered explanations for comorbidity, including comorbidity by chance, population stratification (i.e., separate risk factors associated with each disorder tend to co-occur in subsets of the population), one disorder serving as a risk factor for the other, and overlapping risk factors between the two disorders.

In summary, whilst there are many studies describing the prevalence and symptoms of anxiety and depression in children and adolescents with ASD, very few studies evaluate the association between anxiety and depression in this population. Despite limited research regarding the relationship between anxiety and depressive symptoms in adolescents with ASD, there is emerging evidence to indicate a relationship (Kim et al., 2000; Mayes et al., 2011). It is, however, difficult to ascertain the nature of the relationship given the lack of research to date. Taking into consideration the complex relationship between anxiety and depression in the TD population, it may therefore be that studies examining the relationship between anxiety and depression in adolescents with ASD could benefit from consideration of the underlying structures of these disorders using separate measures of anxiety and depressive symptoms whilst controlling for anxiety symptoms.

Medication. Behavioural therapy is usually the first-line treatment with pharmacological therapies added to help individuals with ASD function in their daily activities (LeClerc & Easley, 2015). Pharmacological therapies have been used for treatment in irritability and aggression (Sharma & Shaw, 2012), aberrant social behaviour (Miral et al., 2008), hyperactivity and inattention (Handen et al., 2000), repetitive behaviours (Autism Speaks, 2009), insomnia (Cortesi et al., 2012) and symptoms of depression and anxiety (Spencer et al., 2013; Williams et

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al., 2013). Psychotropic medications (e.g., Zoloft, Prozac) are frequently prescribed to youth and adults with ASD, and polypharmacy is common. Of a group of 33,565 children with ASD, 64% were prescribed one psychotropic medication, 35% were prescribed two or more classes of psychotropic medication, and 15% used medications from three or more classes. Antidepressants were used in 66% of those receiving more than one class of psychotropic medication (Spencer et al., 2013).

The effects of medication on the individual's symptoms have included adverse effects, a reduction and / or increase in symptoms as well as no change to targeted symptoms. For example, Troost et al. (2005) conducted a 32 week placebo discontinuation trial to assess the long-term efficacy and safety of risperidone in children and adolescents with ASD accompanied by severe tantrums, aggression or self-injurious behaviour (age 5 to 17). Results indicated decreased levels of irritability, social withdrawal and stereotypy, hyperactivity and inappropriate speech. Weight gain, increased appetite anxiety and fatigue were the most common adverse effects. A study by Autism Speaks (2009) showed that Fluoxetine (Prozac), one of the most widely prescribe central nervous system drugs for disorders such as anxiety, depression and obsessive compulsive disorder was not effective for reducing repetitive behaviours in children and adolescents with ASD (ages 5-17) when compared to placebo.

Research by Golubchik, Sever and Weizman (2013) evaluated the effectiveness of reboxetine treatment in eleven adolescents with ASD, depressive and ADHD symptoms. Significant, but modest results indicated a decrease in the severity of depressive symptoms and ADHD symptoms after reboxetine treatment. The authors indicated that reboxetine treatment

may reduce, modestly but significantly, depressive symptoms in adolescents with ASD however adolescents presented with a high rate of adverse effects.

Treatment for depression in youth with ASD tends to be guided by evidence from studies of TD children and adolescents with depression. There are no randomized, placebo-controlled trials examining efficacy of antidepressants for the treatment of depression in youth with ASD (Baribeau & Anagnostou, 2014). Antidepressant treatment studies in youth with ASD have focused almost exclusively on the core symptoms of autism, specifically repetitive behaviours. Randomized controlled trials have failed to show efficacy of selective serotonin reuptake inhibitors (SSRIs) for repetitive behaviours in youth with ASD and side effects have been a concern in these studies (Autism Speaks, 2009; King et al, 2009). A small, 10-week, open-label study of escitalopram in 28 children and adolescents with ASD (aged 6 to 17 years) showed significant improvement in symptoms of irritability but did not measure depressive symptoms specifically (Owley et al., 2005). Although multiple studies have failed to demonstrate the efficacy of SSRIs for improving core symptoms or repetitive behaviours in ASD, to date no studies exist to determine the efficacy of SSRIs in treating comorbid depression in youth or adults with ASD (Baribeau & Anagnostou, 2014).

Research indicates that adolescent with ASD are often prescribed a multiple medication regime to treat the symptoms of ASD as well as symptoms of mental health disorders including depressive symptoms. Research indicates that individuals with ASD experience adverse effects, no effects and some improvement in symptoms during pharmacological therapy. Taking this into consideration the current investigation will treat medication as a control variable when analysing the relationship between psychosocial risk factors and depressive symptoms.

Age. The aim of the current investigation was to examine the relative association between psychosocial variables and depressive symptoms of adolescents with ASD. Several studies have indicated that depression and depressive symptoms are less common in children with ASD compared to adolescents and adults with ASD (Brereton, Tonge & Einfeld, 2006; Ghaziuddin, Ghaziuddin & Greden, 2002). In addition, the majority of the studies including children with ASD show that the older the child and increased cognitive functioning as measured by intelligence quotient (IQ), the greater the incidence of depression and depressive symptoms (Brereton et al, 2006; Vickerstaff et al., 2007). Specifically, research regarding depressive symptoms and cognitive functioning has found that depression is positively related to IQ, but also, especially, to age (Mayes et al, 2011).

Researchers have stated that the psychopathological pattern in individuals with ASD begins in early childhood and that, independent of the level of cognitive functioning, adolescents present with greater depression than preadolescents, who in turn are more depressed than preschool age children (Mayes et al., 2011). Researchers explain these results based on the assumption that individuals of greater age and/or IQ might have greater capacity for introspection. Studies such as the one conducted by Vickerstaff and colleagues (2007) also found that the older the child and adolescent with ASD and increased IQ, the greater the self-reporting of symptoms of depression. Taking into consideration the relationship between depressive symptoms and age in individuals with ASD, the current investigation will treat age as a control variable.

Justification for Current Investigation

In the current review, it was found that researchers have typically examined few psychosocial risk factors for depression and depressive symptoms in adolescents with ASD in a single point in time. Hence, the current body of knowledge provides little empirical evidence about what the most significant risk factors of depression would be among a large common group of psychosocial risk factors and biological and psychosocial covariates.

Thus, the purpose of Investigation 1 was to examine the unique association between ASD symptoms, attributional style, peer victimisation (overt, relational and recipient of pro-social behaviour), and life events on symptoms of depression whilst controlling for age, anxiety symptoms and medication. To examine the relationships between these most frequently identified psychosocial risk factors and depressive symptoms, Investigation 1 examines these factors at single point in time whilst addressing identified methodological limitations noted in previous studies. The effect of the frequently researched multiple psychosocial risk factors of depressive symptoms were analysed through a hierarchical multiple regression in order to determine their unique impact on depressive symptoms in adolescents with ASD. The inclusion of multiple psychosocial risk factors into one analysis, whilst building on methodological limitations, is viewed by many researchers in this field to be the next logical step in understanding the course of depressive symptoms (e.g., De-la-Iglesia & Olivar, 2015). This approach would allow for a clearer and more comprehensive understanding the relative associations between these factors and their relative impact on symptoms depression.

The current investigation addressed a number of methodological limitations that had been identified in the narrative review. Consequently, this investigation would build on the existing

knowledge base by addressing these limitations whilst further investigating the relationship between psychosocial risk factors and depression.

First, the issue of a small sample and generalisability was addressed in the current investigation through recruitment of a large sample of adolescents with ASD across a specific adolescent age range (age 12-17). Adolescence is the age range of focus, as it is a time in the lifespan that is of critical importance to individuals with ASD and their families, as they transition to adulthood. During adolescence, depression is considered to be one of the most serious forms of mental health disorders due to the prevalence, chronicity, co-morbidity and pervasive consequences associated with depressive symptoms, making adolescence an important age range to study.

The second methodological limitation to be addressed was the use of only parent report in the research to date. Many studies identified in the narrative review have used parent report to measure adolescent's severity of depressive symptoms as well as their experience of psychosocial risk factors of depressive symptoms. However, lack of adolescent self-report does not always lead to a greater understating of adolescents' experience of depressive symptoms and also their experience of psychosocial risk factors of depressive symptoms. This is not to say that parent report is not important, but self-report allows researchers to further understand the experience of adolescents with ASD and depressive symptoms. Using self-report measures enables researchers to capture each adolescent's unique perspective regarding their depressive symptoms and experience of psychosocial risk factors rather than relying on parent report. The current investigation incorporated adolescent self-report measures of depressive symptoms and other psychosocial risk factors (i.e., peer victimisation, life events, anxiety symptomatology,

attributional style). However, ASD symptom severity was not measured by self-report as a self-report measure of ASD symptom severity had not been identified in the literature.

Last, much of the research to date has included small sample sizes in studies that examine the association of psychosocial risk factors with depressive symptoms (e.g., Barnhill & Myles, 2001). Thus it is unclear if the findings of these studies will hold true for larger samples of adolescents with ASD and depressive symptoms. Therefore, the current investigation will employed a large sample of adolescents with ASD and their mothers. A large sample assists in providing clarity if the results of the current study are consistent with previous research and hold true for large samples.

Aim and Hypothesis for Investigation 1

Aim 1: To examine the association between ASD symptoms, peer victimisation (overt, relational, recipient of pro-social behaviour), life events (3-month interval), attributional style and depressive symptomatology in adolescents with ASD whilst controlling for age of the adolescent, anxiety symptomatology and medication use using a hierarchical regression analysis.

Hypothesis: Based on the literature regarding adolescents with ASD and co-occurring depressive symptoms, and after controlling for age of the adolescent, anxiety symptomatology and medication use, it was anticipated that for adolescents with ASD:

1. greater ASD symptoms would be positively associated with depressive symptoms. That is, the more severe the ASD symptoms, the greater the depressive symptoms;
2. Peer victimisation (overt and relational) would be positively associated with depressive symptoms. Specifically, an increase in overt and relational victimisation experienced by adolescents with ASD, would be associated with an increase in depressive symptoms;

3. A negative relationship would be anticipated regarding the association between recipient of pro-social behaviours and depressive symptoms. That is, a decrease in pro-social behaviours from peers towards adolescents with ASD, would be associated with an increase in depressive symptoms;
4. Life events will be positively associated with depressive symptoms. That is, when the frequency of life events increases, depressive symptoms will increase; and
5. Generalised positive attributional style will be negatively associated with depressive symptomatology in adolescents with ASD. That is, a more 'positive' attributional style will be associated with fewer symptoms of depression.

Summary of Chapter

The current chapter presented the narrative review followed by the literature review for Investigation 1. The narrative review identified that the most frequently reported psychosocial risk factors for adolescents with depressive symptoms in the ASD literature included; life events, peer victimisation, attributional style, as well as severity of ASD symptoms. These frequently researched psychosocial risk factors were subsequently reviewed in detail. The literature review highlighted that the majority of these studies recruited small sample sizes with varying participant age ranges, and used predominately parent report when measuring psychosocial risk factor variables of depressive symptoms as well as parent report to measure child and adolescent psychopathology (e.g., mood disorder). Of note, the majority of studies reviewed examined only a few psychosocial risk factors of depression at one time rather than a larger combination of multiple psychosocial risk factors which would be representative of the biopsychosocial model of depressive symptoms. The aim of the current investigation was to

examine the impact of multiple psychosocial risk factors of depressive symptoms, specifically life events, peer victimisation, attributional style, as well as severity of ASD symptoms, whilst controlling for anxiety symptomology, medication use and age of the adolescent. The anticipated hypothesis for Investigation 1 were also stated in the chapter. The current chapter is followed by the methods section of Investigation 1.

Chapter 3

Method

Aims of Chapter

This chapter introduces the quantitative approach used in Investigation 1. The importance of using a quantitative methodology to develop a common research language with other disciplines involved in the treatment of adolescents with ASD will be discussed. The design outline is followed by a description of the participant recruitment process as well as characteristics and demographics of the participant sample. The measures used are outlined in this section including a detailed explanation of the procedures used to collect the data. This chapter is followed by analyses and results in Chapter 4.

Research Design

The preferred method for investigation 1 was the quantitative method because of its appropriateness for beneficiary data available, the alignment to empirically-driven, evidence-based guidelines for researchers and clinicians, and the mathematical methodology used best to assess relationships between two or more variables (Kleinbaum, Kupper, Nizam, & Rosenberg, 2008). A central purpose of the current study was to address gaps in the current body of knowledge in relation to adolescents with ASD and depressive symptomatology. Most research available to date regarding these topics has been conducted using quantitative studies. By utilizing the same methodology and standardised measures that have already been shown to be reliable and valid, this study can draw more readily upon the existing research base to guide hypotheses, measures, data collection methods and analyses. Furthermore, by working within

established methodologies in this fashion the findings of the current study can be more readily located in the existing body of knowledge. This in turn will allow for reader targeted comparison and replication of studies to be conducted in the future. A cross sectional research design was used for the current project. This design enabled the observation of two or more variables at the point in time and was useful for describing the relationship between two or more variables (Breakwell, Hammond & Fife-Schaw, 1995).

Participants

Participant Characteristics: Adolescents. The initial sample consisted of 200 adolescents and their mothers who verbally consented to the study. Information and consent forms were mailed to mother and adolescents, however, only 133 consent forms for adolescents and their mothers were returned. Of the 133 consenting adolescents and their mothers, 8 withdrew from the study due to conflicting appointments and commitments. A further thirteen participants were excluded due having a non-verbal presentation ($n=13$) a diagnosis of PDD-NOS ($n=18$) and a co-occurring diagnosis of intellectual disability ($n=2$). Participants with an IQ lower than 70 or with a non-verbal presentation were excluded from the research project because below this level (i.e., 70) there may be significant cognitive and adaptive impairments which would not have allowed the participants to complete the questionnaires. Of the final sample of 104 adolescents, all met DSM-IV-TR criteria APA (2000) for AD or AS after being assessed by a speech pathologist, psychologist, and paediatrician or child and adolescent psychiatrist in Australia. These diagnostic clinicians used a minimum of one or a varying combination of assessment measures including the ADI-R (Lord, Rutter & Le Couteur, 1994), ADOS (Lord,

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Rutter, DiLavore, & Risi, 2001) and the DSM-IV-TR (APA, 2013) to diagnose participants with AD or AS. Demographic information is presented in Table 2. Sixty-nine (67.6%) of the participants were diagnosed with AD and 33 (32.4%) were diagnosed with AS.

The mean age of the adolescents in the sample was 14.04 years ($SD=1.64$). The ages ranged from 12 to 17 years 11 months. Adolescents participated from all states and territories in Australia; however, the majority of participants were from Western Australia (76.5%). Copies of all diagnostic information concerning the adolescent's developmental history were obtained and carefully checked to determine that participants met inclusion criteria. Where the formal diagnosis was unclear, the diagnosing team was contacted following approval from the parent or carer and the final diagnosis was verified. When scrutinising all clinical reports in possession of the mother, it was discovered that 11 adolescents had a formal diagnosis of PDD-NOS, and thus the adolescents and their mothers were excluded from the study because they did not meet the inclusion criteria.

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Table 2

Frequency and Percentages of Demographic Data Distribution for Adolescents

Adolescents' Demographic	Frequency (N=102)	Percent (%)
<hr/>		
Gender		
Males	84	82.40
Females	18	17.60
Diagnosis		
Autistic Disorder	69	67.60
Asperger's Disorder	33	32.40
Comorbid mental health disorder	44	43.10
Currently taking medication	40	39.20
Family history of mental health disorder or developmental disorder	82	80.39
<hr/>		

Medication. Of the 102 adolescents, 40 (39.2%) were reported by mothers to be taking at least one medication and 62 (60.8%) adolescents were not taking any medication. Children and adolescents taking medication were not excluded from the current study to allow for a true representation of the sample as it is expected under current treatment guidelines that children with this clinical concern would be receiving medication.

The generic name, an example trade name and percentage of adolescent cases taking medication during the current study are presented in Table 3. Medication was not tabulated

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according to drug class (e.g., SSRI) as some drugs may be categorised into more than one class, and not having available an explanation of the function of the prescribed medication by the treating physicians would lead to inaccurate presentation of data. Furthermore, generic medications can have more than one function; therefore, medication was recorded according to generic name rather than by diagnosis. For example, one mother reported that her son had epilepsy and depression and was prescribed Carbamazepine (i.e., Tegretol) to treat both epilepsy and depressive symptoms, as Tegretol has mood stabilising properties. The most common medication to be prescribed as reported by mothers was Risperadone (e.g., Risperdal), which was taken by 45% of adolescents on medication followed by Fluoxetine (Prozac) which was used by 37.5% of adolescents on medication.

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Table 3

Frequency Analysis for a Multiple Response Question asking Mothers to Report the Medication their Adolescent was Taking at Time of the Current Study

Generic Name of Medication (Trade name)		Reponses	Percent of Cases
		<i>N</i> (%)	(%)
Melatonin	(Circadin)	10 (17.9)	25.0
Lamotrigine	(Lamictol)	3(5.4)	7.5
Risperadone	(Risperadal)	18(32.1)	45.0
Fluoxetine	(Prozac)	15(26.8)	37.5
Clonidine	(Catapres)	1 (1.8)	2.5
Aripiprazole	(Abilify)	1 (1.8)	2.5
Escitalopram	(Lexapro)	1(1.8)	2.5
Atomoxetine	(Strattera)	3(5.4)	7.5
Imipramine	(Tofranil)	1(1.8)	2.5
Carbamazepine	(Tegretol)	2(3.6)	5.0
Setralin	(Zoloft)	1(1.8)	2.5
Total		56(100)	140

Note. *N* =102.

When this research began in 2011, the current version of the DSM at the time was the DSM-IV-TR. Therefore, the diagnostic criteria used for this research was the criteria specified in the DSM-IV-TR. However, in 2013, the DSM-5 was released (American Psychiatric Association, 2013) and one of the changes in the DSM-5, was the removal of Rett's Disorder and

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Childhood Disintegrative Disorder from the Pervasive Developmental Disorder (PDD) umbrella term. This does not impact the current research as no participants in this study were diagnosed with either of these disorders. Furthermore, AS, AD, and PDD-NOS have all been merged into a single disorder of ASD. The diagnostic criteria for ASD as presented in the DSM 5 are only slightly different to those of either AS, AD, or PDD-NOS. For an individual to be diagnosed with ASD they must still present with persistent deficits in social communication, social interaction, and restrictive, repetitive patterns of behaviours, interests, or activities (American Psychiatric Association, 2013). However, the diagnostic criteria in the DSM 5 outlines that individuals with ASD can develop strategies to mask these characteristics later in life and so the diagnostic criteria now states that individuals can receive a diagnosis if they have a history of meeting the criteria. All individuals with a diagnosis of AS, AD, and PDD-NOS under the DSM-IV-TR are automatically classified with a diagnosis of ASD under the DSM-5 (American Psychiatric Association, 2013).

Sample recruitment occurred between the years 2012 and 2013, and therefore prior to DSM 5. Adolescents were not included in the current study if they had been diagnosed with a comorbid genetic disorder such as Down's syndrome, an intellectual disability (i.e., IQ below 70) or met DSM-IV-TR criteria for PDD-NOS, as defined by the DSM-IV-TR (APA, 2000). Furthermore, adolescents were not included if they were non-verbal because they would not be able to participate. For the purpose of the current study, non-verbal was defined as having a severe speech delay, no full words, and limited vocal repertoires including a restricted range of monosyllables.

Participant Recruitment. Recruitment of participants was conducted in three ways. First, information sheets and consent form packs (see Appendix 1) were sent to clinicians in private practice including speech pathologists, psychologists, paediatricians and child and adolescent psychiatrists of Western Australia. Some participants were also recruited from the principal researcher's (RG) private practice. These participants had been seen for a collaborative and multidisciplinary Pervasive Developmental Disorder (PDD) assessment approximately 5 years ago and were not receiving any form of treatment from the researcher (RG) during time of participation in the current study.

Second, adolescents with ASD and their mothers were recruited from associations, support groups and agencies throughout Australia. Advertisements were placed in electronic newsletters of various associations (e.g., Kalparrin Western Australia, and Autism Spectrum Australia) and support groups (e.g., Autism West Support Incorporated, South West Autism Network, Western Australia) or contacted via a group email by an organisation (e.g., Telethon Institute for Child Health Research). Flyers were distributed at seminars relating to ASD (e.g., Mr Tony Attwood and Ms Sue Larkey Seminar). A Facebook page was also created for recruitment Australia wide.

Finally, adolescents with ASD and their mothers were recruited via local newspapers and community newspapers (e.g., The Melville Times, Albany Times, and the West Australian Newspaper). Participants were recruited from the following States and territories in Australia: Western Australia (76.5%), Northern Territory (2%) South Australia (3.9%), Queensland (4.9%), New South Wales (2%), Australian Capital Territory (2.9%), Victoria (6.9%), and Tasmania (1%).

Researchers

As well as the principal researcher, two research assistants were employed to interview adolescents and to provide mother participants with the questionnaire package in the current study. One research assistant worked as an Australian Health Practitioner Regulation Agency (AHPRA) approved provisionally registered psychologist, and the other was a postgraduate Masters of Psychology (Clinical) candidate. Both research assistants were employees of the principal researcher and both had significant experience working with individuals with ASD and their families. The research assistants were trained to administer and score all measures used in the current study.

Inter-rater agreement of 100% between the principal researcher and research assistants was obtained on the CARS-2. Researchers were also trained by the principal researcher on how to administer a suicide risk assessment, identify at-risk behaviours and facilitate referrals to clinicians when necessary. The principal researcher completed all of the intake interviews over the phone with the mother. The principal researcher also interviewed 82 (79.6%) adolescents. The provisionally registered psychologist interviewed 14 (13.6%) adolescents and the postgraduate Masters of Psychology candidate interviewed 7 (6.8%) adolescents.

Measures

In the current investigation, adolescents completed 5 questionnaires: The Children's Depressive Depression Inventory 2: Self Report (CDI 2: SR, Kovacs, 2011); Coddington Life Event Scales – Adolescent Version (CLES-A; Coddington, 1999); Multidimensional Anxiety Scale for Children (MASC; March, 1999); Social Experience Questionnaire-Self-Reports (SEQ-

S; Crick & Grotpeter, 1996) and the Children's Attributional Style Questionnaire (CASQ, Seligman et al., 1984).

For Investigation 1, mothers completed two questionnaires: Demographic Questionnaire and the Childhood Autism Rating Scale (Second Edition, High Functioning Version, CARS 2, Schopler & Van Bourgondien, 2010). The Demographic Questionnaire (see Appendix 2) was completed over the phone prior to the interviews. The CARS 2, designed to measure autism symptom severity, was also completed by both the researcher and the mother to enable a validity check.

Demographic Questionnaire. An intake form (see Appendix 2) was designed for the current study. The intake form was used to obtain basic demographic information about the adolescent and their eligibility for participation in the current study. Questions were asked specifically about the adolescent's diagnosis of an ASD (i.e., Has your child been diagnosed with Asperger's Disorder or Autism?), whether the child had been diagnosed with any other mental health disorders, the name and occupation of the diagnosing clinician, the use of medication for alleviating neurological and behavioural concerns and issues and family history regarding mood disorders or developmental disorders.

The Children's Depression Inventory 2 (CDI 2; Kovacs, 2011). The CDI was designed to assess depressive symptoms in 7- to 17-year-old children and adolescents. The CDI 2 evolved from the original CDI developed by Kovacs in 1977 and formally published by Multi-Health Systems (MHS) in 1992. The CDI is one of the most widely used and researched self-report scales for measuring depressive symptoms in children and adolescents (Kendall, Cantwell & Kazdin, 1989; Twenge & Nolen-Hoeksema, 2002) and has been used in numerous studies with

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children and adolescents with ASDs (e.g., Barnhill & Myles, 2001; Hedley & Young, 2006; Kobe & Hammer, 1994; Gotham, Unruh & Lord, 2015; Park, Park, Kim & Yoo, 2013).

The CDI 2 is a multi-informant scale and contains two self-rated scales: a full-length (CDI 2: SR) designed for a more robust description of a child's depressive symptoms and a short version designed for screening (CDI 2: SR[S]). The time interval for rating the presence of depressive symptomatology in each form of the CDI 2 is the past 2 weeks. In the current study, the CDI 2: SR full; length scale was used to measure the adolescent's depressive symptomatology.

The CDI 2: SR includes two subscales: Emotional Problems and Functional Problems. In addition, the scales on Emotional Problems of CDI 2 SR are subdivided into Negative Mood/Physical Symptoms and Negative Self-esteem, and the scales on Functional Problems are subdivided into Ineffectiveness and Interpersonal Problems. The scales on Emotional Problems indicate distressed feelings, such as sadness and guilt, and abnormalities in interests, sleep, appetite, and energy. The scales on Functional Problems reflect dysfunctions in social relationships and performance such as decrease in school grades and troubles in peer and/or family relationships resulting from irritability. Individual subscales will not be used in the current project. The Emotional Problems Scale and Functional Problems Scale make up the Total Scale. Consistent with previous research (e.g., Friedberg & Sinferman, 2011), only the total raw score from the Total Scale for the CDI 2 will be used in the current project. Several studies (Kovacs, 1992; 1998; Matthey & Patrovski, 2002) recommended a raw score of 13 as a cut-off for clinical populations and a raw score of 19 as the ideal threshold for a child at risk of depression (e.g., Solomon et al., 2012). The CDI -2 manual recommends 14 as a cut-off raw score for the CDI 2: SR.

As with the original CDI, child and adolescent respondents answer each of the 28 items of CDI 2:SR on the three-choice scales from 0 (none) to 2 (definite). The total raw scores on the CDI 2: SR range from 0-39+ with higher scores on this scale indicating elevations of depressive symptomatology. The CDI 2: SR Form has high levels of internal consistency with Cronbach's alpha values ranging from .73 to .91. ($N=1,351$) (Kovacs, 2011). Test-retest reliability estimates range from .76 to .92 therefore indicating that the scale has excellent temporal stability (Kovacs, 2011).

Coddington Life Event Scales – Adolescent Version (CLES-A; Coddington, 1999).

The CLES is one of the two most commonly used checklists in the adolescent stress literature (see summaries by Blount et al. 2008, Johnson, 1986; Hammen et al., 2008). The CLES has been used with child and adolescent populations with a history of developmental disability (e.g., Coe et al., 1999). The CLES-A is a 50 item self-report measure designed to assess major life events for children or adolescents between 12 and 19 years of age. Adolescents were required to indicate whether a significant life event such as the death of a parent, a major decrease in the parent's income, or breaking up with a boy/girlfriend occurred in the past 12 months.

The CLES-A also contains certain positive life events such as being recognised for excellence in an activity (e.g., In the last 12 months, have you experienced, being recognised for excelling in a sport or other activity) or getting a first job. The majority of life events, however, are negative (e.g., In the past 12 months have you experienced death of a brother or sister). The respondent was required to indicate how many times the event occurred and whether it happened 0-3, 4-6, 7-9, or 10-12 months ago. The CLES-A yields Life Change Unit scores for different time periods; separate scores are computed for the last 0-3, 4-6, 7-9 and 10-12 months. Life

events are weighted so that major events and more recent events contribute more heavily to the Life Change Unit scores (Coddington, 1999). The higher the Life Change Unit score, the greater the number of significant life events that have occurred during that time interval. In the current study Life Change Unit scores were obtained for all four-time intervals, i.e., 0-3 months ago, 4-6 months ago, 7-9 months ago and 10-12 months ago.

The psychometric properties of the CLES-A are based on a normative sample of 3617 children and parents drawn from samples of convenience and house-to-house surveys in Columbus, Ohio (Coddington, 1999). Test-reliability was found to be .69 for a 3-month period for a sample of adolescents (Blount et al., 2008; Coddington, 1999).

Multidimensional Anxiety Scale for Children (MASC; March, 1999). In the current study the MASC was used as a measure of anxiety symptomatology for the adolescent participants. The MASC is a widely used self-report measure completed by TD children and adolescents aged between 8 and 19 years of age and has also been used with children and adolescents with PDD-NOS, Autism and Asperger's Disorder (White, 2009). The MASC consists of 39 items that are answered on a 4-point Likert-type scale (0= Never true about me, 3= Often true about me). Examples of test items include, "I check things out first" and, "Bad weather, the dark, heights, animals or bugs scare me."

The MASC provides a total score as well as scores on four sub scales: physical symptoms, social anxiety, separation anxiety, and harm avoidance. Raw Scores range from 0 to > 97 with higher scores indicating greater levels of anxiety. According to the MASC manual, a raw score of 66 indicates the presence of anxiety symptoms. For the purpose of the current study only the MASC total raw score will be used as a measure of anxiety.

Because the current study requires measures that can readily distinguish between anxiety and depressive symptoms, this scale was chosen because it had strong discriminant validity (Baldwin & Dadds, 2007). The discriminative validity of the MASC has also been replicated in a large clinical sample of anxious and depressed children and adolescents, where the MASC subscales were able to discriminate between these two groups (Rynn et al., 2006). Furthermore, its ability to discriminate between these clinical groups is superior to that of the Revised Children's Manifest Anxiety Scale (RCMAS; Dierker et al., 2001). This discriminative validity of the MASC makes it the most clinically useful self-report anxiety measure for children available (Baldwin & Dadds, 2007).

Test-retest reliability coefficients for the MASC indicate high three-week retest reliability in both clinical ($r=.70$; March et al., 1997) and school ($r=.88$; March & Sullivan, 1999) samples. The MASC total score has an internal reliability of .90, and subscale scores range in internal consistency from .74 to .85 (March, et al., 1997).

Social Experience Questionnaire-Self Report (SEQ-S; Crick & Grotpeter, 1996). In the current study, adolescents' ratings of peer victimisation were obtained using the SEQ-S. This widely utilised scale (Crick & Grotpeter, 1996) has been incorporated into studies with children aged between 5 and 10 years old (Desjardins et al., 2013); adolescents aged between 13 and 17 years old (Storch, Crisp, Roberti, Bagner, Masia-Warner, 2005); and adolescents with PDD (Shtayermman, 2007). In addition, the SEQ has been used with adolescents and young adults diagnosed with Asperger's Syndrome investigating the link between depressive symptomatology, anxiety and suicidal ideation (see Shtayermman, 2007).

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This 15-item questionnaire is made up of three sub-scales: Overt Victimisation, Relational Victimisation, and Recipient of Pro-Social Behaviours. Each subscale contained five items that asked adolescents to rate how often they experienced overt victimisation (e.g., “How often do you get pushed or shoved by another kid at school?”), relational victimisation (e.g., “How often does another kid tell lies about you to make others not like you anymore?”), and receipt of pro-social acts (e.g., “How often do you get cheered up by another kid when you’re sad or upset?”). Adolescent participants are instructed to indicate the frequency with which they have experienced the situation in each statement using a 5-point Likert scale with five response options: Never (1), Almost Never (2), Sometimes (3), Almost All the Time (4), All the Time (5). A total peer victimisation score is not calculated for this instrument. Instead, a total score for each sub-scale is calculated by summing the scores of the five items and each raw total subscale score will be used in the current project. The theoretical range for each sub-scale is calculated between 5 to 25. Higher scores on the Overt Victimisation Scale and the Relational Victimisation Scale as well as lower scores on the Recipient of Pro-Social Behaviours indicate greater victimisation.

Test-retest reliability over a four-week interval was found to be .90 in a sample of 474 third- through sixth-grade children from four public schools in a moderately sized mid-western town (Crick & Grotpeter, 1996). Cronbach’s alpha score for the subscales was $\alpha=.76$ for the Overt Victimisation subscale, $\alpha=.86$ for the Relational Victimisation subscale and, $\alpha=.76$ for the Recipient of Pro-Social Behaviours subscale (Crick & Grotpeter, 1996). Adequate internal consistency across the factors ($\alpha =.77$ to $.80$) and significant positive correlations with measures of depressive symptoms, loneliness, and social anxiety, providing evidence for the convergent

validity of the SEQ has been found (Crick & Grotpeter, 1996; Storch et al., 2003; Storch et al., 2002). For example, Storch et al. (2003) found correlations of a medium to large effect size among overt and relational victimisation and depressive symptoms ($r = .49$ and $.49$), loneliness ($r = .44$ and $.34$), and social anxiety ($r = .47$ and $.51$).

In another study by Storch, Masia-Warner, Crisp and Klein (2005), using a sample of 1158 adolescents aged 13–17 years, internal consistency was adequate across gender, and test-retest stability over 12 months was modest. Inter-correlations among overt and relational victimisation scales suggested that the scales assess related, but relatively independent constructs of peer victimisation supporting the use of the SEQ with adolescents.

Children's Attributional Style Questionnaire (CASQ; Seligman et al., 1984).

Adolescent participants' attributional style was measured in the current study using the CASQ. The CASQ is a 48-item forced-choice instrument designed to measure children's general attributional or explanatory style. The instrument was designed to measure individual differences in the use of the following three attributional dimensions: internality versus externality, stability versus instability, and globality versus specificity.

Each item on the CASQ presents a hypothetical event and two conceivable explanations for why that event occurred. Participants are asked to imagine the hypothetical event actually happening to them and then to choose which of the two explanations best describes why that event would occur. Both causes hold constant two attributional dimensions (internal-external, global-specific, and stable-unstable) while varying the third. A sample item from the CASQ that measures internality versus externality (while holding constant stability and globality) is as follows, "A good friend tells you that he hates you." The response choices are: (a) My friend was

in a bad mood that day (external) or (b) I wasn't nice to my friend that day (internal). The participant is required to choose either response option A or B. The CASQ contains 16 events that pertain to each of the three explanatory dimensions (i.e., internal-external, stable-unstable, and global-specific). Half of the events are positive and half are negative.

A composite explanatory style for positive events is calculated by adding the child's scores on each of the three subscales for positive events. A composite explanatory style for negative events is calculated by adding the participant's scores on each of the three subscales for negative events. An overall attributional or explanatory style score is calculated by subtracting the composite negative score from the composite positive score. The lower the overall attributional style score, the more the participant explains bad events in relation to internal, stable, and global causes and explains good events in relation to external, unstable, and specific causes (Nolen-Hoeksema, Girgus, & Seligman, 1986; Seligman et al., 1984). For the current study the overall attributional or explanatory style raw score was used.

Psychometric examination of the original CASQ (Nolen-Hoeksema, Girgus, & Seligman, 1992; 1996; Panak & Garber, 1992; Seligman et al., 1984) revealed moderate internal consistency reliabilities: positive events (.47 to .73), negative events (.42 to .67) and overall composite (.62). Test-retest reliabilities are .71 and .66 for positive and negative events, respectively, across 6 months, and .35 for the overall composite over 12 months.

Childhood Autism Rating Scale, Second Edition High Functioning Version (CARS 2-HF; Schopler, Van Bourgondien, Wellman, & Love, 2010). In the current study, the Childhood Autism Rating Scale (CARS) 2-HF was used to obtain a measure of the severity of adolescents' symptoms of ASD completed by the researcher. The Childhood Autism Rating

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Scale, Second Edition, Questionnaire for Parents and Carers (CARS2-QPC) is an unscored form which was also completed by the mother of the adolescent being assessed. Its purpose was to give the researchers more information on which to base CARS2-HF ratings. The areas covered by the CARS2-QPC include the individual's early development; social, emotional, and communication skills; repetitive behaviours; play and routines; and unusual sensory interests.

The CARS2 is considered to be an appropriate diagnostic tool for individuals referred for an ASD evaluation across the lifespan (Dawkins, et al., 2016). The CARS was designed to differentiate between children with autism and those with severe cognitive deficits, and in distinguishing mild-to-moderate from severe autism for individuals aged from 2 to 57.

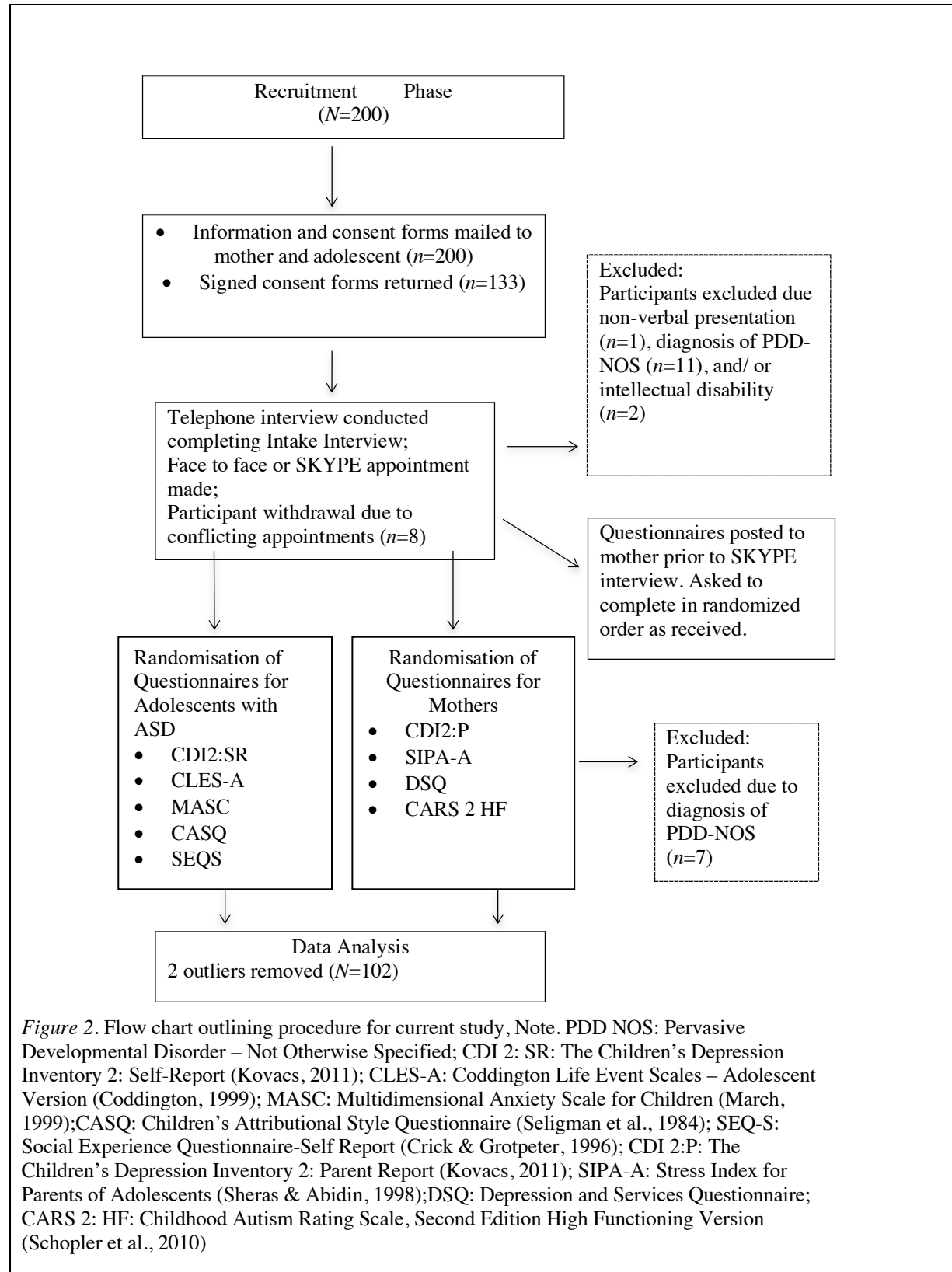
The CARS-2 consists of three rating forms designed to identify symptoms associated with ASD. The CARS-2 builds on its predecessor by adding an additional rating scale intended to identify individuals with high functioning autism (CARS2-HF). The CARS2-HF can be used for individuals aged six or older who have an IQ above 80 and who exhibit fluent communication (Schopler et al., 2010). Core items on the CARS2 were refined to be more sensitive to detecting ASD symptoms in children and adults with high functioning autism and Asperger's Disorder (Schopler et al., 2010). The CARS2-HF consists of 15 items. Each item corresponds to a specific domain of functioning potentially related to autism diagnosis (e.g., relating to people and verbal communication). Each item is rated with a score of 1 (normal for child's age), 2 (mildly abnormal), 3 (moderately abnormal), or 4 (severely abnormal). Midpoint scores of 1.5, 2.5, and 3.5 are also possible on this rating scale. Rating values are summed together to make a total score. There are no subscale scores, only the total score. The Total

CARS-2-HF score ranges from 15 to 60, with a score of 30 serving as the cut-off for a diagnosis of autism.

Internal consistency reliability coefficients are robust for the CARS2-HF (.96). Item to item correlations range from .53 to .88 (Shopler et al., 2010). The overall inter-rater reliability estimate obtained for total scores was .95, indicating generally good agreement between raters (Shopler et al., 2010). For the CARS2-HF, correlations among item ratings are moderate to high, ranging from .40 to .79. Sensitivity and specificity values for the CARS2-HF for distinguishing high functioning individuals with ASD from all non-autism groups in the sample are .81 and .87 respectively (Dawkins et al., 2016; Shopler et al., 2010).

Procedure

Regarding the procedure of the current investigation, there was one data gathering time session for each adolescent participant and their mother. That is, information required for the current investigation and the subsequent investigation, Investigation 2, was gathered at one assessment session. The procedure for both Investigation 1 and 2 will be outlined in the current chapter and also presented in Figure 2.



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Ethics approval for conducting the current investigation was sought and granted from Edith Cowan University Ethics Committee. All relevant documentation regarding this process is presented in Appendix 1. Following approval from the Edith Cowan University Ethics Committee, information packs and consent forms were mailed to all individuals who made contact regarding Investigation 1. When consent forms were returned, mothers were telephoned and provided with additional information pertaining to the purpose of both Investigations. In addition, an intake interview was administered over the telephone to obtain demographic information and screen participants to determine suitability for both investigations. If the intake interview indicated that an adolescent was not suitable for Investigation 1 the mother was informed of this and thanked for her time. If the information gained from the mother met inclusion criteria for the current project, a date and time was made for the completion of questionnaires to take place. When participants were found to be suitable for Investigation 1 the mothers of these participants were also asked to make available copies of the PDD diagnostic reports and other relevant reports regarding the adolescent's relevant mental health history.

Prior to the completion of questionnaires, the researcher and research assistants informed both mothers and adolescents that participation was purely voluntary and that no explanation or justification was needed if they chose not to participate. Furthermore, both were free to withdraw consent to further involvement in the research project at any time without prejudice to any future relationship with the investigators or current practitioners. If agreement to participate in the current

project was reached, then the adolescent was asked to complete the questionnaires. The presentation of the questionnaires to the participants was conducted in two ways depending on the adolescent's place of residence. If the participants lived in the Perth Metropolitan Area, questionnaires were completed in the family home or at the principal researcher's private psychological practice. If the participants lived outside the Perth Metropolitan Area, including other territories and states, questionnaires were conducted via SKYPE. Using SKYPE as a research medium allowed the principal researcher and research assistants to reap the well documented benefits of the traditional face-to-face interviews in research (Hanna, 2012), while also benefiting from the aspects that telephone interviews bring to such research (Holt, 2010). For the current project, conducting questionnaires by SKYPE was inexpensive, geographically flexible, easy to implement and user friendly. Other advantages to using SKYPE included the researchers and the participants being able to see non-verbal cues when speaking. When using SKYPE there were no time lags in the conversation, the technology itself did not fail and there were no disconnection problems. The findings in a meta-analytic review by Barak et al. (2008) have provided much support for the application of psychotherapeutic interventions through the Internet, using various approaches, methods, and online modalities, to treat various problems differentially but effectively. Carolyn Turvey, a professor of psychiatry at the University of Iowa, has stated that, "timely diagnoses by behavioural scientists via telehealth, for example, can help a child with autism....." (as cited in Novotney, 2011). In Australia, teleconferencing is a valuable tool as

highlighted by that fact that Medicare benefits are available for video consultations between specialists and patients who are located in rural and remote regions (Australian Government Department of Human Services, 2009). Hence teleconferencing is widely used in clinical practice to assist with diagnosis and treating of mental health disorders.

As seen in Figure 2, mothers completed a battery of questionnaires: Demographic Questionnaire and the Childhood Autism Rating Scale (Second Edition, High Functioning Version, CARS 2, Schopler & Van Bourgondien, 2010), CDI 2-P, and the SIPA. The Demographic Questionnaire (see Appendix 2) was completed over the phone prior to the interviews. The CARS 2, designed to measure autism symptom severity, was also completed by both the researcher and the mother in order to enable a validity check.

When questionnaires were conducted in person, the mother was given the CDI 2-P, SIPA, and Depressive and Services Questionnaire and asked to complete these in a separate room to where the adolescent was completing their questionnaires. When SKYPE sessions were to be conducted, questionnaires were posted to the mother prior to participation and the mother was asked to complete the questionnaires whilst her adolescent was completing their questionnaires via SKYPE. During both types of participation formats, adolescents were in a separate room to where the mother was completing the questionnaires.

Whilst the mother was completing all of questionnaires for both investigations, the nature of the research project was explained to the adolescent and what they were required to do, such as answering questions about their worries, mood, peers and life events. The adolescent was assured that the questionnaires were not tests and there was no right or wrong answer. During

this time, the adolescent was informed that when there was risk of imminent danger to him/herself or to another person, the researchers were ethically bound to take the necessary steps to prevent such danger.

Adolescents were administered the CDI-SR2, MASC, CLES-A, CASQ, and the SEQ. These measures were presented to participants using a counterbalanced design through use of Latin squares to counterbalance immediate and remote sequential effects (Zeelenberg & Pecher, 2014). The researchers read aloud the instructions regarding completion of the questionnaire as stated on the questionnaire prior to reading the questionnaires to the adolescent. All questions and statements from each of the questionnaires were read aloud to the adolescent. This was the preferred method of questionnaire administration (rather than the adolescent completing the questionnaires on their own) for the following reasons: to determine that the participant was on task; to relieve them of a possible reading difficulty; to minimise their fatigue; and to ensure that the question was read correctly. When participants sought clarification, or asked for a definition regarding a word or statement from the questionnaires, an answer was provided to them in the context of the questionnaire. Regarding administration of the MASC, CDI 2:SR and CLES, salient points in time such as holidays, birthdays and school calendar events were used to give adolescents a reference for how long ago specific time intervals had been. Giving salient points in time to all participants was not standard procedure for these questionnaires, however, this strategy was used to assist participants who were having difficulties regarding the concept of time. Reading the battery of questionnaires to the adolescent participant took approximately 1 hour and 45 minutes. The mothers completed a battery of questionnaires in approximately 45 minutes. During the time that adolescents were completing questionnaires, the researcher also

completed the CARS-2-HF. The researchers noted down observations in the CARS-2-HF scoring booklet regarding the child's behaviours and presentation of ASD symptoms. These observations were used to complete the rating of the CARS-2-HF. The booklet was scored after the adolescent had completed the questionnaires. Where further information was required to rate the CARS-2-HF, information was obtained from diagnostic reports and/or the mother was asked to assist.

After the adolescent completed all questionnaires, the CDI-2:SR and MASC were scored immediately. If the adolescent participant reported suicidal ideation (identified by question 8 on the CDI 2: SR), or presented with above average symptoms of anxiety (identified by a total T-Score of 61 and greater on the MASC) then, appropriate measures (in accordance with Australian Psychological Society Ethical Guidelines (Australian Psychological Society, 2017) and University Ethical Guidelines National Health & Medical Research Council codes (National Health & Medical Research Council, 2007) were taken to ensure that the adolescent was not in danger to him/herself or others. Such measures included alerting the adolescent's mother of the results of the interview and providing her with a list of information sources that she could contact for further support (see Appendix 4). Other measures included the researcher facilitating a referral to a clinician (e.g., Princess Margaret Hospital in Western Australia, clinical psychologist, General Practitioner) regarding suicide and at-risk behaviours where necessary.

On completion of the interview all participants were read a debriefing letter thanking them for their participation and were asked if they had any questions about the current study. Mothers who were participating via SKYPE were reminded to place their completed questionnaires in the pre-paid envelope provided. An overview of the procedure for both Investigation 1 and 2 is outlined in Figure 2.

Data Analysis

Data Preparation. Missing data was avoided in the current study as the questionnaires were read out aloud by the researchers to the adolescents during testing. Mothers who completed the questionnaires in person had their questionnaires reviewed by the researchers directly after they had been completed. If a question was not completed, mothers were asked to complete the missing entry at that time. For mothers who completed their questionnaires via SKYPE, mothers were asked to take time to scan their questionnaires for missing or incomplete answers. If missing answers were identified, mothers were asked to amend these prior to returning the questionnaires to the researcher.

The data set was initially examined for outliers and normality. To determine the presence of univariate outliers, box plots were examined. Univariate outliers were defined as z scores that are not between -3.29 and + 3.29 (Tabachnick and Fidell, 2007). Skewness and kurtosis values were examined to determine if the distributions were sufficiently normal. If the distribution for a variable was perfectly normal, skewness and kurtosis values would be zero (George & Mallery, 2003; Tabachnick & Fidell, 2007). Skewness and kurtosis values falling between ± 1 were categorised as excellent. Values between ± 2 are considered acceptable (George & Mallery). Normality of the distributions for each of the variables were examined using the Shapiro-Wilk test which is a preferred method for testing normality of data due to its good power properties (see Mendes & Pala, 2003). With large enough sample sizes (> 30 or 40), researchers argue that the violation of the normality assumption should not cause major problems (Pallant, 2007) and implies that parametric procedures can be used even when the data are not normally distributed (Elliott & Woodward, 2007). According to the central limit theorem, (a) if the sample data are

approximately normal, then the sampling distribution too will be normal; (b) in large samples (> 30 or 40), the sampling distribution tends to be normal, regardless of the shape of the data (Elliott & Woodward; Field, 2009); and (c) means of random samples from any distribution will themselves have normal distribution (Altman & Bland, 1995).

A frequency analysis was conducted to identify the severity of ASD symptoms as measured by the Childhood Autism Rating Scale, Second Edition -High-Functioning (CARS2-HF; Schopler, Van Bourgondien, Wellman, & Love, 2010). Scores on the CARS2-HF range from 15 to 60 with a cut-off of 27.5 for ASD with scores lower than 27.5 viewed as in the minimal to no autism related symptoms compared to those with an autism diagnosis (Schopler et al., 2010). Following this, adolescents with ASD were allocated to one of two groups based on the severity of their ASD symptomatology. These groups reflected the severity of the ASD symptoms of the adolescents in the current study and would allow for meaningful conclusions to be drawn and generalisations to be made based on a specific presentation of symptoms (i.e., adolescents having minimal or severe symptoms).

Descriptive statistics were also calculated to determine the severity of self-rated depressive symptoms in adolescents with ASD. Following the descriptive statistical analysis, the adolescents were allocated to groups according to severity of depressive symptoms to understand the adolescent sample regarding levels of depressive symptoms. The groups, were as follows: group 1: lower average to Average Range (total raw score 0-12); group 2: average range to elevated range (total raw score 13-19); and group 3: very elevated range (total raw score 20-33). These groups were defined as per the interpretive guidelines from the CDI 2 Manual (Kovacs, 1992). These groupings have also been cited in other research involving adolescents with ASD

(e.g., Barnhill and Myles, 2001) and typically developing adolescents to screen for depressive symptomatology using CDI raw scores (Rivera, Bernal & Rosello, 2005; Roelofs et al., 2010; Stark et al., 1993).

Analysis was conducted to examine gender differences between female and male adolescents with ASD on mental health measures and psychosocial risk factors of depressive symptoms to provide further support for existing research which has not identified gender differences in depression in the ASD population (e.g., Greenlee et al., 2016; Hurtig et al., 2009; Sukhodolsky et al., 2008). An independent samples t-test was conducted to evaluate whether male adolescents and female adolescents differed significantly on any of the measures used in the current study. Cohen's d (Cohen, 1988) was also reported to determine effect size and effect sizes will be interpreted as small ($d = 0.2$), medium ($d = 0.5$), and large ($d = 0.8$) based on commonly referred to benchmarks suggested by Cohen (1988).

Analysis was also conducted regarding the psychosocial variable of life events and its relationship to depressive symptoms. It was anticipated that given there were multiple measures (i.e., 3, 6, 9, 12 month intervals) of the same construct of Life Events (as measured the Coding Life Events Scale) it was highly likely that multicollinearity would be identified between the life events time intervals (Field, 2009). Therefore, a correlational analysis was conducted to examine the relationship between the CLES-3 month, – 6 months, -9 months and -12 month intervals and depressive symptomatology (as measured by the CDI 2:SR) to assess for multicollinearity. In addition, correlational analyses were also conducted to identify the strongest predictor of depressive symptoms to reduce predictor variables and subsequently retain power of the current study.

Main Analysis. In the main analysis, a two-step Hierarchical Multiple Regression (HMR) was used to predict the unique effect of Life Events, Peer Victimization (Overt, Relational and Recipient of Pro-social), Attributional Style and ASD symptoms on Depressive Symptoms in adolescents with ASD after controlling for the influence of Anxiety Symptoms, Age and medication. Because of the numerous variables involved in measuring psychosocial predictors of depressive symptoms, a HMR analysis required an additional complexity over simple correlational analysis (Green & Salkind, 2014). The selection of a HMR approach to determine predictors of depressive symptoms also enabled the identification of the independent effects on depression as well as controlling for specific variables (Leleu et al., 2014).

Prior to analyses, data was checked for potential problems of multicollinearity between the independent variables in order to provide valid and reliable data analysis (Saunders, Lewis, & Thornhill, 2016). A conservative approach to assess the degree of multicollinearity by VIF involved caution over 5, and the tolerance as a proportion of the regression variance not accounted for by other regressors in the model cautions of values under .20 (Green & Salkind, 2014; Grégoire, 2014; Tabachnick & Fidell, 2012). Preliminary analyses was also conducted to ensure no violation of the assumptions of linearity and homoscedasticity. Correlations between all variables in the HMR were reported, and Cohen's (1988) criteria were used to evaluate the magnitude of correlations: small ($r = .10 - .29$), medium ($r = .30 - .49$) or large ($r \geq .50$).

The dependent variable of this research was adolescent's self-report of their depressive symptoms as measured by the CDI. The independent variables of this research were (1) ASD symptoms, (2) peer victimisation (overt), (3) peer victimisation (relational), (4) peer victimisation (recipient of pro-social behaviour), (5) life events (3-month interval), and (6)

attributional style. Several additional variables were included as control variables. These included age of the adolescent, anxiety symptomatology as reported by the adolescent and medication use of the adolescents.

In the first step of the HRM, anxiety symptomatology, age and medication were included as control variables. As noted earlier, previous research indicates that the study of anxiety symptomatology and depressive symptoms occur jointly during childhood (Achenbach, 1991; Moffitt et al., 2007). Therefore, in the current investigation, anxiety symptomatology was included as a control variable and not a predictor of depressive symptoms so that what was analysed was the effect of the predictors on the unique part of depressive symptoms. Age was also included in the first step to control for the possible effects in obscuring the role of psychosocial predictors on adolescent depression. Medication was included as a control variable given the possible confounding effects on depressive symptoms. In the second step of the HMR analysis, peer victimisation (overt, relational and recipient of pro-social behaviour), attributional style, ASD symptoms, and the measure for Life Events included in this analysis were entered into the equation.

All statistical analyses for the current study were performed with Statistical Package for Social Sciences (SPSS 22.0.0.0). A power analysis was conducted using the freeware statistical software program G*Power software version 3.0.10 (Erdfelder, Faul, & Buchner, 1996) to determine if the sample size was appropriate and HMR would find a statistically significant difference when such a difference actually exists. That is, the null hypothesis will be rejected when necessary and thus avoid a Type II error. Alpha was set at .05 (given the nature of the current study with a population that is difficult to access in large numbers and the greater

concern over Type II errors relative to Type I) (Tabachnick & Fidell, 2013). Setting of alpha to .05 is also consistent with existing research in the ASD research field (e.g. Gadow, DeVincent, & Schneider, 2008). With 6 predictor variables and 3 control variables and a priori power analysis indicated that a minimum of 114 participants were required to have 80% power for detecting a medium effect size ($f^2 = .15$) as based on previous research (Okumura & Sakamoto, 2011) when employing the traditional .05 criterion of statistical significance.

Summary of Chapter

The current chapter discussed the quantitative research design used in the current Investigation. Characteristics of the 102 adolescent participants were also presented, such as, nearly half of adolescents were taking at least one medication and over 80% of participants had a family history of mental health disorder. For both Investigation 1 and 2 there was only one time in which data was collected and this data collection process and procedure was presented in the current chapter. All of the psychosocial measures presented in the current chapter, other than the questionnaire measuring severity of ASD symptoms, were self-reported measures.

This chapter is followed by the results section of Investigation 1.

Chapter 4

Investigation 1: Results

Data Preparation

Missing Data. For the current project, there were three occasions where questionnaires were returned by mothers participating via SKYPE and missing answers were identified. In these situations, the mother was contacted via phone and asked to answer the question retrospectively. Such follow up meant that there were no missing values in the current study.

Outliers. Box plots were examined, yielding one outlier within three variables. The first outlier identified on a box plot as an extreme value was related to the age of a mother participant. The z -score value was 3.98. As a mother's age was not considered a variable of interest in the current study, the participant was retained and the sample remained at 104. Two other univariate outliers were identified. One adolescent female, scored in the clinical range of self-reported depressive symptoms with her overall score on the depressive symptom measure identified as extreme. The total score of her depressive symptomology had a z -score value of 3.62. As this value was higher than the z -score value of > 3.29 suggested by Tabachnick and Fidell (2007), this participant's responses on all questionnaires were removed.

After the responses of the female adolescent were removed from the sample the outlier analysis was re-run and a second adolescent, a male adolescent participant, was identified as having an extreme value for self-rated depressive symptomatology. His total depressive symptom score had a z -score value of 3.62. As this value was higher than >3.29 , as suggested by Tabachnick and Fidell (2007), his responses to all questionnaires were removed from the data

set. Once this participant was removed, the analysis was re-run and there were no extreme scores identified. The final sample consisted of 102 participants.

Normality. Skewness and kurtosis are presented in Table 4. As can be seen in Table 4, most of the skewness and kurtosis values indicated these distributions were normal. Only the life events at 9-month and 12-month intervals were considered leptokurtic having z scores greater than 3.29 (Field, 2013).

In the current study, results of the Shapiro-Wilk test (see Table 4) indicated that data was non-normally distributed for the measures of anxiety and attributional style only. However, it was decided that these variables would not be transformed for the following reasons: (1) the current study had a large sample size ($N=102$) and therefore the violation of the normality assumption should not cause any issues (Pallant, 2007); (2) many of the skew and kurtosis values were within Tabachnick and Fidell's (2007) conventional Z skewness value of 3.30 with $\alpha = .001$; and (3) all the scales are meaningful, are widely used, and all the scales are standardised. Furthermore, Tabachnick and Fiddell (2007) recommend against transformation of such scales as it often hinders interpretation.

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Table 4

Means, Standard Deviations, Range, Skewness, Kurtosis and Shapiro-Wilk's Values for Variables of Interest

Measure	<i>M</i>	<i>SD</i>	Possible Range	Observed Range	Skewness	Kurtosis	<i>z</i> Skewness	<i>z</i> Kurtosis	Shapiro-Wilk	Shapiro-Wilk <i>p</i>
ASD Symptoms	24.26	6.12	15-60	15-42	0.73	0.12	3.04	0.25	0.95	.01
Peer Victimization: Overt	8.87	3.87	5-25	5-21	1.09	0.85	4.58	1.79	0.86	.01
Peer Victimization: Relational	9.39	3.64	5-25	5-21	0.84	0.27	3.50	0.57	0.92	.01
Peer Victimization: Recipient of Pro-social Behaviour	16.01	4.07	5-25	5-24	-0.53	-0.04	-2.23	-0.07	0.97	.01
Life Events-3M	55.20	73.24	0-4272	0-348	1.65	3.11	6.89	6.57	0.77	.01
Life Events-6M	111.75	132.32	0-7487	0-615	1.66	3.19	6.93	6.73	0.81	.01
Life Events-9M	133.72	152.58	0-9623	0-729	1.73	3.58	7.25	7.55	0.81	.01
Life Events-12M	145.25	165.07	0-10703	0-755	1.75	3.35	7.31	7.06	0.80	.01
Depressive Symptoms (Self)	13.26	9.74	0-56	2-46	1.45	1.78	6.08	3.75	0.85	.01
Anxiety	54.12	18.38	0 to>103	7-96	-0.10	-0.15	-4.22	-0.31	0.99	.57
Attributional Style	6.27	4.13	0-23	0-22	1.08	2.04	4.55	4.31	0.93	.01

Note. *N*=102; *df*=102. *M* = Mean. *SD* =Standard Deviation. CARS 2HF: Childhood Autism Rating Scale-2nd Edition High Functioning; CSEQ-SR-OVS: Children Self-Experience Questionnaire-Self Report-Overt Victimization Scale; CSEQ-SR-RVS: Children Self Experience Questionnaire-Self Report-Relational Victimization Scale; CSEQ-SR-RPB: Children Self Experience Questionnaire-Self Report-Recipient of Pro-social Behaviour; CLES-3 MONTH: Coddington Life Event Scale-3 month interval; CLES-6 MONTH; CLES-9MONTH; Coddington Life Event Scale – 9 month interval; CLES-12 MONTH: Coddington Life Event Scale-12 month interval; CDI 2:SR: Children's Depression Inventory 2nd Edition: Self-Report; CDI -P : Children's Depression Inventor P: Children's Depression Inventory 2nd Edition: Parent Report; MASC: Multidimensional Anxiety Scale for Children; CASQ: Children's Attributional Style Questionnaire. Possible Range is presented in raw scores.

Preliminary Analysis

ASD Symptom Severity. Table 5 shows the results of the frequency analysis regarding ASD symptom severity for adolescents. Over 72% of adolescents presented with minimal ASD symptoms and categorised on the CARS2-HF as ‘High Functioning’ when rated by parent and researcher. Table 5 also shows the medication use of participants according to ASD symptom severity. Of the 73 participants who presented with minimal ASD symptoms, 31 (42.46%) were taking medication and 42 (57.5%) were not taking any medication. Of the 29 participants who presented with mild to moderate symptoms, 9 (31.03%) were taking medication and 20 (68.96%) were not taking any medication.

Table 5

Frequency Analysis of Severity of Adolescents’ ASD Symptoms as measured by the CARS 2-HF and Medication Use

	Adolescents Frequency <i>n (%)</i>	Medication Use Frequency <i>n (%)</i>
CARS2-HF Symptoms of ASD (Raw Score)		
Minimal Autistic Symptoms 15 to 27.0	73 (71.57%)	31 (42.46%)
Mild-to-Moderate to Severe Autistic Symptoms 27.5 to 60	29 (28.43%)	9 (31.03%)

Note: N= 102. Childhood Autism Rating Scale, Second Edition (High-functioning clinical tool) (CARS2-HF) (Schopler, Van Bourgondien, Wellman, & Love, 2010). Scores range from 15 - 60 with a cut-off of 27.5 for ASD.

Table 6 shows the results of the self-reported adolescent depressive symptoms for the adolescent participants. In total, nearly two in five of the sample rated the level of their

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symptomatology as being in the high average to very elevated range. Table 6 also indicates frequency of medication according to depressive symptom severity. Participants with the lowest level of ASD symptoms were found to present with the highest medication use.

Table 6

Frequency Analysis of Adolescent Self-Report of Depressive Symptoms and Medication Use

	Adolescents	Medication Use
	Frequency	Frequency
	<i>n</i> (%)	<i>n</i> (%)
CDI Severity Range		
Average Range or Lower (0-12)	62 (60.80%)	26 (41.93%)
High Average to Elevated Range (13-19)	21 (20.60%)	8 (38.09%)
Very Elevated (20-33+)	19 (18.60%)	6 (31.58%)

Note. *N*= 102. CDI 2: SR: Children's Depressive Inventory 2nd Edition: Self-report.

Gender Differences. Table 7 shows the results of the independent sample *t*-test and descriptive statistics for gender differences on predictors of depressive symptoms and control variables. Results indicated that male adolescents reported more severe ASD symptoms as measured by the CARS 2-HF (Schopler et al. 2010) and had a higher use of medication than female adolescents. A follow-up analysis using a Mann-Whitney U Test was conducted due to the relative imbalance in the number of boys and girls that made the study sample. There were 1.5 times more boys than girls in this study and therefore the gender groups were not considered equal. Consistent with the results from the independent samples *t*-test, a Mann-Whitney U Test revealed significant difference on symptoms of ASD as measured by the CARS between boys ($Md=23.50, n=84$) and girls ($Md=20.25, n=18$), $U = 460.00, z = -2.6$, $p = .009, r = -.26$.

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Given that existing research has not identified gender differences in depression in the ASD population (e.g., Greenlee et al. 2016), as well as preliminary results of the current investigation (i.e., only 2 of 9 variables showed differences on measures), there was no compelling evidence to continue analyses for gender differences. Similarly, as there were no gender differences found on the other measures, the effect of gender was not examined in the current investigation.

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Table 7

Independent Samples T-Test and Descriptive Statistics for Gender Differences on Predictors of Depressive Symptomatology and Control Variables

Predictors	Adolescent Males (<i>n</i> =84)		Adolescent Females (<i>n</i> =18)		95% CI for Mean Difference	<i>t</i>	<i>df</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
ASD Symptoms	24.94	6.12	21.08	5.20	.99, 6.72	2.76*	28.07	.68
Peer Victimisation (Overt)	8.82	3.76	9.11	4.48	-2.29, 1.71	-.28	100.00	.07
Peer Victimisation (Relational)	9.20	3.58	10.28	3.91	-2.95, .79	-1.14	100.00	.29
Peer Victimisation (RPB)	15.90	4.15	16.50	3.75	-2.70, 1.51	-.56	100.00	.15
Life Events-3M	51.45	67.46	72.67	96.24	-58.91, 16.48	-1.12	100.00	.25
Life Events-6M	103.79	120.16	148.89	178.16	-113.04, 22.83	-1.32	100.00	.30
Life Events-9M	124.61	139.19	176.22	203.51	-129.97, 26.74	-1.31	100.00	.30
Life Events-12M	135.94	152.95	188.67	212.73	-137.57, 32.12	-1.23	100.00	.28
Depressive Symptoms (Self)	13.36	9.35	12.83	11.66	-4.52, 5.57	.21	100.00	.05
Anxiety Symptoms	54.63	17.82	51.72	21.19	-6.59, 12.41	.61	100.00	.15
Attributional Style	6.31	4.10	6.11	4.38	-2.12, 2.52	.18	100.00	.05
Medication	.42	.49	.28	.46	1.11, .39	1.09	100.00	.29
Age	14.22	1.67	13.34	1.23	.05, 1.70	2.10	100	.60

Note. There was a violation of Levene's test for homogeneity for CARS 2 FH and therefore equal variances were not assumed $p < .01$. There was no violation of Levene's test for homogeneity on the remaining measures and therefore equal variances were assumed. *CI*= Confidence Interval. Sample population for all measures is $N=102$. *M* = Mean. *SD*=standard deviation. CARS 2HF: Childhood Autism Rating Scale-2nd Edition High Functioning; CSEQ-SR-OVS: Children Self Experience Questionnaire-Self Report-Overt Victimisation Scale; CSEQ-SR-RVS: Children Self Experience Questionnaire-Self Report-Relational Victimisation Scale; CSEQ-SR-RPB: Children Self Experience Questionnaire-Self Report-Recipient of Pro-social Behaviour; CLES-3 MONTH: Coddington Life Event Scale-3 month interval; CLES-6 MONTH: Coddington Life Event Scale-6 month interval; CLES-9 MONTH: Coddington Life Event Scale – 9 month interval; CLES-12 MONTH: Coddington Life Event Scale-12 month interval; CDI 2:SR: Children's Depression Inventory 2nd Edition: Self-Report; MASC: Multidimensional Anxiety Scale for Children; CASQ: Children's Attributional Style Questionnaire.

Life Events. The correlations between Life Events and depressive symptoms are shown in Table 8. As anticipated, multicollinearity was identified as large, positive and significant correlations were observed between depressive symptoms and life events for the 3-month, 6-month, 9-month and 12-month intervals. Similar to research regarding the TD population (e.g., Bebbington et al., 1981; Brown et al., 1987; Kenneth et al., 2010; Surtees et al., 1986), of all the time intervals, the 3-month interval was found to be the strongest predictor of depressive symptoms. Therefore, only the 3-month measure was used in the main analysis.

Table 8

Coddington Life Event Scale at 3,6,9,12 Month Intervals as Predictors of Depressive Symptomatology in Adolescents with ASD: Correlations and Descriptive Statistics

Variable	1	2	3	4	5
1. Depressive Symptoms (Self-reported)	-				
2. Life Events -3M	.38**	-			
3. Life Events-6 M	.29**	.82**	-		
4. Life Events-9M	.28**	.82**	.97**	-	
5. Life Events-12M	.29**	.82**	.95**	.99**	-
<i>M</i>	13.26	55.2	111.75	133.72	145.25
<i>SD</i>	9.74	73.24	132.32	152.58	165.07

Note. *N*= 102. *M* = Mean. *SD*= standard deviation. CDI 2: SR: Children's Depressive Inventory 2nd Edition: Self-report; CLES: A-3M: Coddington Life Event Scale: Adolescent -3 Month Interval; CLES-6 M: Coddington Life Event Scale: Adolescent-6 Month Interval; CLES: A-9 M: Coddington Life Event Scale: Adolescent – 9 Month Interval; CLES: A-12 M: Coddington Life Event Scale: Adolescent-12 Month Interval. ** Correlation is significant at the .01 level.

After conducting regression analysis, inspection of residual scatterplots supported normality assumptions for the data use in the current study, as well as for assumptions of linearity and homoscedasticity. Table 9 presents the measures of the collinearity statistics (tolerance scores and variation inflation factor/VIF) for age of the adolescent, anxiety

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symptomatology, medication use, ASD symptomatology, peer victimisation (overt, relational and recipient of pro-social behaviour) life events (3 month interval) and attributional style (IVs) on adolescent's self-report of depressive symptoms (DV). Neither the tolerance nor the VIF values indicated a significant presence of multicollinearity.

Table 9.

Table of Tolerance and VIF Values for Independent Variables used in Hierarchical Multiple Regression Analysis.

Independent Variables	Collinearity Statistics	
	Tolerance	VIF
Age of Adolescent	.93	1.07
Anxiety symptomatology	.88	1.14
Medication use	.84	1.18
ASD symptomatology	.95	1.05
Peer victimisation (overt)	.41	2.42
Peer victimisation (Relational)	.42	2.36
Peer victimisation (recipient of pro-social behaviour)	.90	1.11
Life events (3 month interval)	.82	1.22
Attributional Style	.89	1.13

Note: $N = 102$

Main Analysis: Hierarchical Multiple Regression Analysis

Correlations between all variables in the HMR were reported as seen in Table 10.

There was an inverse and significant relationship between adolescent's self-report of depressive symptoms and peer victimisation - recipient of pro-social behaviour (small effect).

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A positive and significant relationship was identified between depressive symptoms and life events (3-month interval, small effect) and anxiety symptoms (small effect). A positive and significant relationship was identified between peer victimisation (overt) and peer victimisation (relational) and life events – 3-month interval (large and small effect respectively). There was a positive and significant relationship between peer victimisation (relational) and life events 3-month interval and anxiety symptoms (small to medium effect and small effect respectively).

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Table 10

Predictors of Depressive Symptomatology and Control Variables in Adolescents with ASD: Correlations and Descriptive Statistics

Variable	1	2	3	4	5	6	7	8	9	10
1. Depressive Symptoms	-									
2. ASD Symptoms	.08	-								
3. Peer Victimization (Overt)	.15	.05	-							
4. Peer Victimization (Relational)	.18	.09	.74**	-						
5. Peer Victimization (RPB)	-.28**	.03	.01	.01	-					
6. Life Events-3M	.38**	.02	.35**	.30**	-.20	-				
7. Anxiety Symptoms	.37**	.12	.26**	.29**	-.05	.15	-			
8. Attributional Style	.06	-.03	.02	.11	.18	.01	-.03	-		
9. Age	.07	.02	-.14	-.08	-.04	.07	-.05	-.08	-	
10. Medication	-.17	-.16	.08	-.01	-.14	.11	-.11	-.22	.16	-
<i>M</i>	13.26	24.26	8.87	9.39	16.01	55.20	54.12	6.27	14.06	0.39
<i>SD</i>	9.74	6.12	3.87	3.64	4.07	73.24	18.38	4.13	1.63	0.49

Note. *N* = 102. *M* = Mean. *SD* = Standard Deviation. CDI 2: SR: Children's Depressive Inventory 2nd Edition: Self report; CARS 2 HF=Child Autism Rating Scale – 2nd Edition High Functioning; CSEQ-SR-OVS: Children Self Experience Questionnaire-Self Report-Overt Victimization Scale; CSEQ-SR-RVS: Children Self Experience Questionnaire-Self Report-Relational Victimization Scale; CSEQ-SR-RPB: Children Self Experience Questionnaire-Self Report-Recipient of Pro-social Behaviour; CLES: A – 3M = Coddington Life Event Scale: Adolescent -3 Month Interval; MASC: Multidimensional Anxiety Scale for Children; CASQ= Children's Attributional Style Questionnaire. ** Correlation is significant at the .01 level.

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The results of the HRM are presented in Table 11. In the first step of the HRM, anxiety symptomatology, age and medication were included as control variables. At stage one, anxiety symptomatology contributed significantly to the regression model $F(3,98) = 16.7, p < .01$, whereas medication and age did not make a significant contribution of the variance explained in depressive symptoms.

After entry of the psychosocial variables of depressive symptoms in stage 2 of the analysis, the total variance explained by the model as a whole was 33.8%. The variation in depressive symptoms and the change in R^2 was significant, $F(9,92) = 5.21, p < .01$. The six psychosocial variables explained an additional statistically significant 17.1% of the variation in depressive symptoms, when the effects of age, anxiety and medication were statistically controlled.

When all six independent variables were included in stage two of the regression model, only peer victimisation (recipient of pro-social behaviour) and life events had a unique and significant effect on depressive symptoms. The strongest predictor of depressive symptoms was life events in the previous 3 months while controlling for age, medication and anxiety symptomatology at the time of the survey. With every one unit increase in life events in the past 3 months, adolescent's depressive symptoms rose by .31 units.

Peer victimisation (lack of recipient of pro-social behaviour) also made a unique and significant contribution to the model to explain the variation in depressive symptoms while controlling for age, medication and anxiety symptomatology. Inspection of the standardised effects indicated an inverse association between the lack of pro-social behaviour by peers with an increase in depressive symptoms for adolescents with ASD. That is, for every one unit increase in peer victimisation (lack of recipient of pro-social behaviour), depressive symptoms increases by -.23 units.

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Table 11

Hierarchical Multiple Regression for Variables Predicting Adolescent Self-Report Depressive Symptoms Controlling for Age and Anxiety

Symptoms and Medication

	b	SE	β	<i>t</i>	<i>p</i>	R^2	ΔR^2
Variable							
Step 1						.17	.17
Age	.67	.56	.11	1.20	.23		
Anxiety Symptoms	.19	.05	.36	3.90	<.01 ***		
Medication	-2.90	1.86	-.15	-1.56	.12		
Step 2						.34	.17
Age	.50	.52	.08	.95	.34		
Anxiety Symptoms	.16	.05	.29	3.24	<.01 ***		
Medication	-4.21	1.83	-.21	-2.30	.02*		
ASD Symptoms	.02	.14	.01	.17	.87		
Peer Victimization (Overt)	-.10	.33	-.04	-.29	.77		
Peer Victimization (Relational)	.01	.35	.04	.28	.78		
Peer Victimization (Reciprocal Pro-social Behaviour)	-.55	.21	-.23	-2.58	.01**		
Life Events 3M	.04	.01	.31	3.36	<.01 ***		
Attributional Style	-.03	.21	-.01	-.14	.88		

Note: b = unstandardized b-coefficients; SE = Standard Error; β = standardised beta coefficients; R^2 R square; ΔR^2 R square change; * p < .05, ** p < .01, *** p < .001

Regarding control variables, anxiety symptomatology continued to make a unique and statistically significant contribution to the model in stage 2. That is, with every increase of one unit in anxiety symptomatology, an adolescent's depressive symptoms rose by .29 units. The unique effects of medication on depressive symptoms was also significant. Inspection of the standardised effects indicated that, while opposite in direction, the effect of lack of medication was associated with an increase in depressive symptoms in adolescents with ASD (-.21).

Chapter 5

Discussion of Results

Aim of Chapter

The current chapter discusses the results from Investigation 1. Strengths and limitations of the current study will be discussed as well as clinical implications of the results and directions for future research.

In the current investigation, results indicated a positive association between a greater frequency of life events (3-month interval) and depressive symptoms and an inverse relationship with peer victimisation (recipient of pro-social behaviour) and depressive symptoms, whilst controlling for anxiety symptomatology, age of the adolescent and medication use. These results supported the hypothesis that there would be a positive relationship between frequent life events (3-month interval) and peer victimisation (recipient of pro-social behaviour) and depressive symptoms. However, a positive relationship between depressive symptoms was not observed between ASD symptoms, peer victimisation (overt and relational) and attributional style whilst controlling for age, anxiety symptomatology and medication and therefore did not support the current hypothesis.

The finding that higher frequency of life events (3-month interval) was associated with higher levels of depressive symptoms in adolescents with ASD after controlling for age, anxiety symptoms and medication use is similar to other findings in existing ASD research. For example, Taylor and Gotham (2016) and Fung and colleagues (2016) found a positive relationship between life events and mood disorder. In addition, Ghaziuddin et al. (1995) found that life events such as family losses, personal disappointment such as failing a subject at school, changing schools and other difficulties, had an effect on children and adolescents with ASD.

Of note was the time in which the life events took place and their relationship to depressive symptoms. In the current investigation life events occurring within 3 months prior to the adolescent being interviewed were found to have a significant positive relationship with depressive symptoms. This result is consistent with research in the general population which has identified that depressive symptoms tend to present within a short period of time (i.e., between 0 and 3 months) after a stressful life event has occurred, as opposed to depressive symptoms presenting after a long period of time (i.e., 12 months) (Brown et al. 1987; Bebbington et al., 1981; Kenneth et al., 2010; Surtees et al., 1986).

Regarding peer victimisation, it was found that when pro-social behaviour of peers decreased, depressive symptoms in adolescents with ASD increased. This result is consistent with research regarding social support and depressive symptoms in the ASD child and adolescent population which highlighted the importance of social relationships as potential protective factors against poor mental health outcomes (Bauminger & Kasari, 2000; Humphrey & Symes, 2010; Lasgaard et al., 2010; Mazurek 2014; Whitehouse et al. 2009). The results of the current investigation are also consistent with research regarding the TD child and adolescent populations. For example, researchers Crick and Grotpeter (1996) theorized that the lack of pro-social experiences could negatively affect those children even in the absence of overt and relational victimization and lead to depressive symptoms.

Notably, the results of the current study are in contrast to those found by both Shtayermman (2007) and Storch et al. (2012), who both reported a non-significant relationship between peer victimisation (pro-social behaviour) and depressive symptoms. Differences in results compared to the current investigation may be due to differences in sample sizes as well as different participant age ranges. For example, Shtayermman recruited a smaller sample size of 10 youths and adults with an average age of 19.7 years compared to the current study which included 102 adolescents only. Shtayermman's study may have been

underpowered and hence did not identify a significant relationship between peer victimisation (pro-social behaviour) and depressive symptoms. However, Storch et al. using a sample size of 60, greater than Shtayermann's sample size, but smaller than the current investigation, recruited youth between the ages of 11 and 14. The results from Storch's study, like the current investigation, identified an inverse relationship between adolescent report of depressive symptoms and pro-social behaviour. However, the inverse relation between depressive symptoms and pro-social behaviour in Storch's study did not reach significance which may be as a result of a smaller sample size and low power.

As adolescents with ASD have a unique style of processing social information (Bauminger et al., 2003; Osterling & Dawson, 1994), it is possible that it is this style that may also explain the relationship between depressive symptoms and the lack of receipt of pro-social behaviour during adolescence. Whilst with TD youth the concepts of rejection and isolation imply harm done through exclusion and a lack of belonging, it is possible that it may not be the 'social' component of pro-social behaviours specifically from peers that may be associated with depressive symptoms. Rather it may be possible that individuals with ASD are simply not getting their daily needs met due to the lack of practical support and the opportunities such support would offer. For example, it may not be the lack of social reciprocity from peers that adolescents with ASD miss, but the fact that day to day tasks may be difficult, and help of any sort, from anyone such as teachers or parents, would ameliorate possible contexts that lead to depressive symptoms (e.g., directions on where to go or clarification on teacher instruction etc.). When one considers that adolescents may already feel less secure in their judgements, the impact of not being able to access social supports (Howlin et al., 2004) especially as social expectations and challenges become more complex, becomes an even more significant concern (Lai and Weiss, 2017).

Contrary to existing research in the ASD literature (e.g., Barnhill & Myles, 2001, Storch et al., 2012), there were a number of psychosocial risk factors included in the current investigation that were not found to have a relationship with adolescents with ASD and co-occurring depressive symptomatology when it was expected that they would. These psychosocial risk factors included two types of peer victimisation (overt and relational), as well as attributional style and ASD symptoms.

In the current investigation a non-significant relationship was identified between depressive symptoms and overt victimisation and relational victimisation. These findings occurred in the context of the reporting of the correlations (see Table 10) as well as the results of the hierarchical multiple regression analysis (see Table 11); and so these non-significant findings are considered robust. These findings did not support the current hypothesis that a positive relationship between overt and relational victimisation would be identified. However, over and relational victimisation did relate to anxiety. In addition, the current finding is not consistent with previous research by Storch et al. (2012) who found that overt and relational victimisation were positively associated with depressive symptoms but in the context of smaller samples of adolescents with ASD (compared to the sample participants for the current investigation) and different measures of victimisation. The discrepancy in findings between the current investigation and research by Storch et al. may be due to a variation in age range. Storch et al. recruited adolescents with a younger and narrow age range (age 11-14) compared to the wider age range in the current investigation (age 12-17). Storch et al. also used a different questionnaire for peer victimisation compared to the assessment used in the current investigation. Lastly, in contrast to the current investigation, Storch et al. did not statistically control for anxiety symptomology. These variations in methodology may account for the different results.

In the current investigation, adolescents appeared to report relatively low levels of overt and relational peer victimisation and this constriction in the dispersion of scores for this variable may explain why a significant and positive relationship was not found. The non-significant relationship between overt and relational victimisation and depressive symptoms is similar to that reported in the TD child and adolescent population. Specifically, overt victimisation occurs less due to it being a more obvious, and thus an easily policed form of victimisation that children are consistently taught not to engage in and how to defend (Rivers & Smith, 1994; Scheithauer et al., 2006; Sutton et al., 1999; Woods & White, 2015).

The relationship between ASD symptom severity and depressive symptoms in the current investigation was small and not statistically significant. Thus, this result did not support the hypothesis in the current investigation that there would be a positive relationship identified between ASD symptoms and depressive symptoms. The findings of the current investigation are not consistent with research by Vickerstaff et al. (2007), Mayes et al. (2011) and Bitsika and Sharpley (2016) who did identify a positive relationship between depressive symptoms and ASD symptoms. Differences in results may be attributed to methodological variation between the studies. For example, the current investigation relied on adolescent report to measure adolescent's depressive symptoms, and parent and researchers to measure ASD symptom severity using a large sample of adolescents ($n = 102$). Yet research identified in the narrative and literature review identified that researchers Bitsika and Sharpley (2016) whilst recruiting a large sample of children and adolescents ($n = 150$) used parent report to measure adolescent's MDD symptoms; Mayes et al. (2011) used a very large sample size ($n = 627$) yet relied on parent report to measure depressive symptoms and ASD symptoms; and Vickerstaff et al (2007) recruited a small sample ($n = 22$) of child participants who were limited in age (ages 7-13). Findings of the current investigation are consistent with research by Kim et al. (2000) who did not identify a significant relationship between symptoms of

ASD and symptoms of mood disorder in children and adolescents. The current investigation recruited participants similar in character to Kim's et al. (2000) research. A similar age range (11-14) and cognitive ability above 70 may explain the similar results identified. It is noted that in contrast to the current investigation, Kim et al (2000) used parent report to measure depressive symptoms and ASD symptoms. It is important to clarify the relationships between depressive symptoms and ASD traits as well as specific features of ASD as this may elucidate potential pathways for intervention.

In the current investigation, the relationship between attributional style and depressive symptoms was small and not statistically significant and did not support the current hypothesis. This finding was in contrast to the findings emerging from studies regarding children and adolescents with ASD (Barnhill and Myles, 2001) and TD children and adolescents (Rueger & George, 2017) who found that elevated levels of symptomatology were associated with a more pessimistic attributional style in adolescents who were considered to have autism without ID. The difference in these results and the results of the current investigation may be explained by a number of variables including the attributional style (i.e. more or less pessimistic) of the children and adolescents and control variables. That is, the participants in the current investigation presented as more optimistic compared to the study by Barnhill and Myles (2001) which may explain the differences in results identified. In addition, research by Barnhill and Myles (2001) and Barnhill (2001) who shared the same participant sample reported that 31 of the 33 participants (93.93 %) were being treated with medications such as antidepressants. Whilst participants in the current investigation were also taking prescribed medications for mental health disorders, medication was controlled for. As such it is possible that confounding effects were present hence the differences in results between Barnhill and Myles' research and the results identified in the current investigation.

As well as the findings regarding the key psycho-social factors of interest, biological and psychosocial covariates being age of the adolescent, anxiety symptomatology and medication use were examined in the current investigation. Findings from the current investigation have indicated that age was not associated with depressive symptoms. This result is consistent with a number of studies that have suggested a lack of association between prevalence of depressive symptoms and age (Gadow et al., 2008; Lopata et al., 2010; Vickerstaff et al., 2007). Vickerstaff et al. (2007) theorised that emotional age likely has more influence than chronological age on the development of depression.

The results of the current investigation identified a positive relationship between adolescents self-reported anxiety symptomatology and depressive symptomatology (self-report) even when anxiety was treated as a covariate (medium effect size). The positive relationship identified between depressive symptoms and anxiety symptoms in the current investigation is consistent with existing research regarding individuals with ASD (e.g. Mayes et al., 2011) and TD adolescent research (e.g., Costello et al. 2003; Moffitt et al. 2007). Mayes et al. suggested that continual changes to an individual's environment, as would be expected in adolescence, may lead to anxiety and susceptibility for depressive symptoms. And as purported by both Attwood (1998) and Mayes et al. the stress of increased social demands during adolescence can result in symptoms of anxiety leading to depression. Whilst prevailing thought is that generalised anxiety leads to depression, it remains unclear how and in what sequence they impact one other.

The results of the current investigation identified a small negative relationship between medication use and adolescent's self-reported depressive symptoms. That is, adolescents who did not use medication tended to report higher levels of depressive symptoms. When the effect of medication on depressive symptoms was controlled a significant relationship between life events and peer victimisation (lack of recipient of pro-

social behaviour) remained. These results indicated that use of medication may not change an adolescent's reported perception of their experience of life events, peer victimisation (lack of recipient of pro-social behaviour) and depressive symptoms. Whilst there is limited research regarding medication use for treating depressive symptoms in adolescents with ASD, this finding may add to the existing body of research regarding medication use for depressive symptoms in adolescents with ASD (Autism Speaks, 2009; Golubchik et al., 2013).

Strengths and Limitations of the Current Study and Future Research

The current investigation is one of the few studies to examine the impact of multiple psychosocial risk factors on depressive symptoms in adolescents with ASD. Whilst similar research has been conducted regarding psychosocial risk factors of depression, these are often small studies examining minimal risk factors (e.g., Barnhill, 2001; Shtayermman, 2008). The rich covariate information minimised the possibility of confounding bias.

Key strengths of the current study also include a relatively large and well characterised sample of adolescents, and a rigorous screening procedure that included diagnostic confirmation using the CARS-HF-2. Another important strength of the current study is the use of self-report measures of psychopathology (i.e., depressive symptoms and anxiety symptoms) and psychosocial risk factors (i.e., peer victimisation) provided by the adolescents. Most research regarding mental health disorders experienced by individuals with ASD relies heavily on information obtained from parents. Although many adolescents with ASD have low intellectual ability posing a serious challenge to self-report, higher functioning adolescents, such as those that participated in the current study, appear to be able to provide reliable and valid information through this means of assessment.

Despite these strengths of the current investigation, some limitations to the findings of the current investigation are noted. The first limitation relates to the cross-sectional design of

the study. The cross-sectional design does not allow for conclusions regarding the directionality of the associations. For example, it remains unclear if, using a cross-sectional design, whether peer victimisation is a cause or a consequence of depressive symptoms, or both. Future longitudinal studies are needed to elucidate the directionality of these associations. Tracking the psychosocial risk factors and symptoms of depression via longitudinal study may allow for the interactions and dynamics between the risk factors to be observed and understood. A longitudinal study may also closely examine the individual factors associated with adolescent's response to stressors and the relevant coping skills they possess. The aim of the current investigation was to identify the unique variance contributed to by the predictor to the outcome variables hence the decision to select a HMR approach for the current investigation. It is acknowledged that whilst a HMR analyses continues to remain important in health research, its intercorrelations between predictor variables (i.e., multicollinearity) may challenge the interpretation of hierarchical multiple regression weighting regarding each predictor contributions to the outcome variable (Nimon & Oswald, 2013).

Results of the current investigation are restricted to those adolescents with an IQ above 70 and those with minimal symptoms of ASD. The selection criteria used in Investigation 1 and subsequent findings may not apply to individuals with adolescents with ASD who have lower IQ's, as well as those individuals who have ASD traits considered severe in presentation. Future research may examine whether the findings from Investigation 1 hold true for adolescents with an IQ below 70 and or with severe presentation of ASD symptomatology.

Not only is it important to examine whether findings from Investigation 1 hold true for adolescent's with various cognitive functioning levels and varying severity of ASD symptoms, it is also important to conduct future studies to determine if non-significant

findings hold true for adolescents who experience various severity levels of psychosocial risk factors. For example, in the current investigation results indicated that adolescents reported low levels of overt and relational peer victimisation, which may explain why a significant and positive relationship was not found. Future research is required to determine if these non-significant findings hold true for adolescents with ASD who experience both low and greater levels of overt and relational victimisation. Understanding the impact of the severity and frequency of psychosocial risk factors on depressive symptoms for adolescents with ASD may assist with early identification of depressive symptoms and subsequent treatment.

Whilst the results of the current investigation identified an association between life events and depressive symptoms in adolescents with ASD, it is important to consider and further explore the impact of certain life events or stressful events. Experiences known to be distressing for adolescents with ASD such as unexpected schedule changes, the prevention or discouragement of repetitive or preferred behaviours, and certain sensory sensitivities, could be perceived as stressful or negative particularly when such distress occurs on a regular basis, adding to the potential for comorbidity (Kerns et al., 2015). Yet given that there are no measures specific to adolescents with ASD that examine stressful, negative or frequency of life events these experiences are not measured. Such a conclusion is theoretical and requires further research.

Clinical Implications

Whilst acknowledging the limitations of the current investigation, there are a number of clinical implications that emerge. Life events play a significant role in adolescents with ASD much like has been established with their TD peers (Adams & Adams, 1996; Copeland, Keeler, Angold, Costello, 2010; Meiser-Stedman, Dalgleish, Yule, & Smith, 2012; Schmidt & Joiner, 2004) and thus clinicians may be able to approach life events as a concern for depressive symptoms in a similar way. Implications for those working with adolescents with

ASD are significant as clinicians may view life events as risk factors for depression similar to TD adolescents. Notably, intervention for adolescents with ASD is needed soon after the significant life event occurs, within a 3-month period, similar to TD adolescents (Bebbington et al., 1981; Brown et al., 1987; Kenneth et al., 2010; Surtees et al., 1986).

As well as life events having important implications for clinical practice, the role of pro-social behaviour on depressive symptoms has important implications for clinical practice. The current investigation found that when ASD adolescents experienced a decrease in receiving pro-social behaviour from peers, depressive symptoms increased. This finding impacts the focus and assumptions behind common peer victimisation and bullying interventions for this population. For example, current programs often focus on the more easily understood aspects of overt and relational peer victimisation. This focus leads to strategies being taught to adolescents such as assertiveness and knowledge about personal rights and boundaries. However, the findings of the current investigation indicate that peer victimisation does not negatively impact adolescents with ASD, at least in regards to depressive symptoms, as one would expect. Specifically, the process by which peer victimisation impacts the adolescent with ASD is less to do with overt or relational victimisation but rather the experience and interpretation of how pro-socially TD peers respond to adolescents with ASD. Consequently, peer victimisation programs designed to assist adolescents with ASD may need to target the individual experience and perception of social dynamics especially as they relate to pro-sociality. Goals of programs may also include teaching complex social rules such as understanding higher order humour and slang, how to take the perspectives of others to understand emotions and situations, how to interpret abstract language and social cues within the context of the social environment, and how to seek out pro-social behaviour of peers all of which are areas of impairment for individuals with ASD (APA, 2013). As such, peer victimisation programs for adolescents with ASD may

need to consider their individual social skills to fully understand and consider the dynamics of victimisation they are likely to experience.

Conclusion

The current investigation examines multiple psychosocial risk factors and the impact that they have on depressive symptoms in adolescents with ASD. The psychosocial risk factors identified may be viewed as an array of factors that are dynamically interacting at the individual level as a result of personal experience and history. The impact of psychosocial risk factors on depressive symptoms played a large part in understanding the individual experiences of adolescents with ASD. This is consistent with research on TD populations where biopsychosocial models have been used as explanatory models for depressive symptoms.

While this area of research requires further replication and examination, the current findings raise important questions for clinical psychologists and other mental health professionals as to how they conceptualise the issues facing those with ASD and co-occurring depressive symptoms and ultimately their clinical practice. Frequency of life events and peer victimisation should be considered by clinical practitioners when conducting assessments and determining appropriate treatment plans for adolescents with ASD experiencing symptoms of depression. These findings, therefore, can be used to better inform diagnosis and treatment for adolescents with ASD, however, they do not inform the process in which these adolescents may access the treatment required.

Accessing treatment becomes a significant factor in understanding the experience of depression for adolescents with ASD. Parents of adolescents are consistently identified as gatekeepers to accessing help of this nature (Bussing et al., 2005). Consequently, research will need to examine the role of parents as help seekers for adolescents with ASD and depressive symptoms, as their role and impact is both specific to getting help but also

potentially broad in terms of the individual experiences the adolescent with ASD is having. In summary, it is likely that the combination of knowledge of psychosocial risk factors of depressive symptoms, as well as the help-seeking behaviour of mothers which greatly increases sensitivity to the presence of depression in adolescents with ASD (NICE, 2005) and allows for more effective assessment and treatment.

Summary of Chapter

The current chapter presented a discussion of the results for Investigation 1 highlighting strengths and limitations of the research as well as future research and clinical implications. This chapter is followed by Investigation 2 which overall, aims to understand mother's help-seeking behaviour for their adolescents' (with ASD) depressive symptoms. Investigation 2 will commence with a brief introduction prior to a literature review. The literature review will examine literature regarding if mothers can identify symptoms of depression, factors that promote help-seeking of formal mental health services as well as mother's satisfaction with these services.

The current chapter reviews parental help-seeking literature regarding mother's ability to perceive depressive symptoms in their adolescent(s) with ASD and mothers' help seeking behaviour. Factors that affect mother's help-seeking as well as reasons why mother's do not seek help for their adolescents' depressive symptoms will also be reviewed. Mother's satisfaction with mental health services is also discussed. As there is limited information regarding the help-seeking behaviour of mothers and adolescents with ASD, the TD literature will also be used as a reference point.

Chapter 6

Investigation 2

Literature review of parent adolescent agreement of depressive symptoms and mothers' help-seeking behaviour

Depression is common among children and adolescents with ASD with prevalence estimates of depression ranging from 0.9% to 29%, depending on age range and distribution of the sample, sampling method, and assessment procedures (Leyfer, Folstein & Bacalman et al, 2006; Mayes, Calhoun, Murray Ahuja & Smith, 2011; Steward, Barnard, Pearson, Hasan & O'Brien, 2006; van Steensel, Bögels, & de Bruin, 2013). In comparison, approximately 3% of children and 11% of adolescents in the Typically Developing (TD) population are or have recently been depressed (Avenevoli, Swendsen, He, Burstein & Merikangas, 2015; Costello & Angold, 2006). Investigating depressive symptoms in adolescents with ASD is important because mental health disorders typically present during adolescence more so than during childhood and adulthood (Brereton et al., 2006; Magnuson & Constantino, 2011). Moreover, the negative impact of poor mental health in childhood and adolescence extends into adulthood, and may be associated with severe consequences, including attempted suicide (Cassidy & Rodgers, 2017; Richa et al. 2014), a regression in level of functioning (Magnuson & Constantino, 2011), and the need for higher levels of care. Therefore, failure to address co-occurring depression in the treatment of ASD adds significantly to the personal, familial and societal burden associated with the disorder.

In the last decade, there has been a growing body of research in the development of evidenced-based treatments for mental health disorders in individuals with ASD (e.g., Deacon & Abramowitz, 2005; Propper & Orlik, 2014; Spain, Sin, Chalder, Murphy & Happe, 2015; Williams, Wheeler, Silove, & Hazell, 2010). However, poor rates of treatment access have been reported for individuals with ASD and co-occurring mental health disorders

(Cassidy et al., 2018a; Crane et al., 2018; Hedley et al., 2017) indicating that they are not getting the help that they require and experiencing difficulties accessing services. For example, Ruble and colleagues (2005) found that the rate of children with ASD served in a medical program was only one tenth of expected estimates. In a survey conducted in several US states (Krauss, Gulley, Sciegaj, & Wells, 2003) 37% of the children with ASD had had problems obtaining needed care from specialty doctors in the preceding year.

One aspect of understanding adolescent's experience of depressive symptoms is to understand the factors associated with accessing treatment and service utilisation for these symptoms. Understanding these factors are important to be able to prevent and/or minimise the onset of depression as well as how to facilitate services and supports in a timely manner for the adolescent when depressive symptoms present. TD research has drawn on models of help-seeking behaviour (e.g., Logan & King, 2001; Zwaanswijk, Verhaak, Bensing, Van der Ende, & Verhulst, 2003) to conceptualise different stages and processes regarding treatment access and service utilisation for children and adolescents with mental health issues. Specifically, factors in the TD population that have been explored include the role of parent recognition of mental health symptoms and difficulties, the decision or intention to seek help, and contact with mental health services.

Studies of parent recognition suggest that parents who perceive that a problem exists and view the problem as having a negative impact on the family are more likely to seek help and access mental health services for their children than those who do not recognise a problem or its negative impact (Sayal, Goodman & Ford, 2006; Teagle, 2002). The decision for parents to seek help for their child and adolescent may be prompted by a family history of mental health disorder, previous experience of mental health services and satisfaction with services (Brookman-Frazee, Baker-Erickzen, Stanick & Taylor, 2011a; WHO, 2013). Factors such as long waitlists, cost of services and parents not knowing where to seek help have all

been associated with reduced help-seeking behaviour (WHO, 2013; Stadnick, Drahota & Brookman-Frazee, 2013).

Such TD studies as those referred to above, highlight the ‘gate-keeper’ role mothers play in access to treatment for their children and adolescents’ with co-occurring mental health disorders and further highlight the reasons that predict mothers to seek help or not access help for their child. However, to improve access to treatment and services for adolescents with ASD and understand their experience of depressive symptoms, it is important to examine mother’s help-seeking behaviour regarding parental recognition of difficulties, factors associated with help-seeking for services, reasons why parents do not seek help and mothers’ satisfaction with child and adolescent mental health services.

Like mothers of TD adolescents, mothers of adolescents with ASD are considered the ‘gate-keepers’ for accessing treatment for their children and adolescents with ASD as they are rarely able to seek and access help alone due to their age-based dependency (Adib et al., 2019). Moreover, due to their ASD symptomatology and complex bio-psychosocial needs (DePape & Lindsay, 2015), children and adolescents with ASD rely heavily upon caregivers to initiate, direct, and access appropriate supports and services (Hoefman et al., 2014; Steinberg & Morris, 2001). This reliance is potentially due primarily to adolescents not knowing how to seek or recognise the need for support plus their reliance on caregivers and authority figures for guidance in a general sense due to their stage of development (Boulter & Rickwood, 2013; Farmer, Burns, Angold, & Costello, 1997; Rickwood, Deane, Wilson, & Ciarrochi, 2005; Rothi & Leavey, 2006; Sayal, 2006). Consequently, in addressing the question of how to best assist and treat children and adolescents at risk of developing depressive disorder, the help-seeking behaviour of caregivers should be considered.

In regard to identification of depressive symptoms, it may not be easy for parents to identify presenting depressive symptoms as ASD symptoms can overlap to the extent that

they are not identified (Kanne, Abbacchi & Constantino, 2009; Stewart et al., 2006). For example, flat affect, social isolation, appetite and sleep disturbance, are symptoms common to both ASD and depression (Cooper & Hanstock, 2009; Frazier et al., 2002; Magnuson & Constantino, 2011; Stewart et al., 2006). Impairment in verbal and non-verbal communication skills can also mask the symptoms of depression. Furthermore, even if mothers do recognise depressive symptoms in their adolescent with ASD, it is unclear whether they will take the appropriate course of action and seek out help through the use of formal services (Madell et al., 2005; Narendorf et al., 2011; Weiss & Lunsky, 2010). The complexities of identification of depressive symptoms for mothers with children with ASD highlights the importance of understanding mothers' help-seeking behaviour for their adolescent's depressive symptoms.

To seek help during difficult times in life for mothers caring for an adolescent with ASD and co-occurring depressive symptoms is one of the most important problem-solving actions (Fallon & Bowles, 1999). However, people are often reluctant to seek help in general, even if they have severe problems (e.g., Kessler et al., 1994; Naanuma et al., 2006). If mothers' do not seek help for their adolescent's (with ASD) presenting mental health symptoms, there is a strong possibility that their adolescent will not access the mental health services they require (Breland-Noble & Weller, 2011; King et al., 1997; Liptak et al., 2008; Ruble et al., 2005). Understanding reasons why mother's do not seek help for their adolescent when they recognise depressive symptoms and understanding factors that predict help-seeking are important steps towards facilitating early access to mental health services and improving mental health and wellbeing. Therefore, it becomes important to examine factors that both predict mother's help seeking behaviour and reasons why mothers do not seek help for their adolescent with ASD and co-occurring depressive symptoms in the face of

biopsychosocial problems. As such the current investigation will examine both factors that predict help-seeking and reasons why mothers do not seek help.

Regarding factors associated with mother's help-seeking behaviour, the TD research, as noted above, has indicated that there are a number of factors that are associated with mothers seeking help for their adolescent's depressive symptoms such as the severity of the child's mental health issues (Hastings, 2002). Research to date regarding the ASD population has not specifically examined multiple reasons associated with mothers' seeking help specifically for their adolescent's depressive symptoms. Some studies have examined specific variables in isolation to determine their impact on mother's help seeking in general. These have included mother's stress as a result of parenting a child with ASD (e.g., Lecavalier et al, 2006) and severity and fluctuation of ASD symptoms and their impact on mother's help-seeking behaviour (Ghaziuddin et al., 2002). Age has also been theorised to predict mothers' help-seeking behaviour as children enter adolescence they may become more aware of social difficulties and vulnerable for peer rejection leading to increased risk of depression (Fung, Lunskey & Weiss, 2015). Despite the importance of understanding factors that prompt mothers to seek help, little research has been conducted in this area regarding adolescents with ASD and co-occurring depression. The research conducted to date often examines variables in isolation failing to provide a more accurate picture of what factors are associated with mother's help-seeking which would ultimately inform service use and treatment for their children.

As well as minimal research regarding factors that prompt mothers to seek help for their adolescents with ASD and co-occurring depressive symptoms, there is little research regarding why mothers do not seek help for their adolescent's depressive symptoms, particularly when compared to the volume of research in the TD population and other clinical populations such as individuals with intellectual disabilities (ID) (Boulter & Rickwood, 2013;

Weiss & Lunsky, 2010; Man & Kangas, 2018; Rickwood, Deane, Wilson, & Ciarrochi, 2005). Research regarding children with ID has indicated numerous reasons why mothers do not seek help for their adolescent. For example, in a Canadian study, mothers of children with ID, reported that a lack of trust and previous negative experiences with professionals, uncertainty around where to find help, fear of not being taken seriously, uncertainty regarding how to describe the problem and lack of proximity of services dissuaded mothers from seeking help (Weiss & Lunsky, 2010).

A recent Australian study used an online survey to interview 26 parents of children (ages 11 to 40) including those with ID and co-occurring mental health disorder, autism, and language disorders in relation to barriers encountered regarding accessing services and management of challenging behaviour or mental health concerns (Man & Kangas, 2018). Overall, carers reported concrete barriers to help-seeking including finances, lack of insurance, lack of transportation, lack of knowledge about the sorts of help available, and lack of trust in care providers as well as attitudinal barriers such as keeping ones emotions under control and out of public view. Despite the importance of understanding why mothers do not seek help for their adolescent's (with ASD) co-occurring mental health disorders, specifically their depressive symptoms, relatively few studies have specifically examined these issues.

For adolescents with ASD, access to formal services for depressive symptoms requires their mother to recognise a problem, choose to seek help and engage in services. Parents are responsible for contacting health services on behalf of their child and their involvement in treatment is important for its success (Gerkenmeyer & Austin, 2005). However, it has been suggested that parents' experiences of services and satisfaction with care might influence their expectations of and involvement in future treatment ultimately impacting on their child's recovery (Balder, 2007; Rey et al, 1999).

International research, including research conducted in Australia has indicated that families of children and adolescents with disabilities and TD adolescents with mental health disorders report both negative and disempowering experiences and low levels of satisfaction with mental health services (Donner, Mutter, & Scior, 2010; Sayal et al., 2010; Weiss & Lunsky, 2010). These findings suggest the needs of individuals with disabilities and their carers are not being met by mental health services and as such, parents are reporting dissatisfaction with these services. Mother's experience of their child and adolescent's mental health services are important to consider as their dissatisfaction with services may have a detrimental impact on their willingness to seek professional help for their child in the future. Indeed, studies focussing on service satisfaction during treatment engagement (i.e., continuing treatment after initial access) and service satisfaction at the end of treatment may lead to the identification of actors that impact access to treatment.

The overall aim of Investigation 2 was to understand the impact of mother's help-seeking behaviour on adolescent's (with ASD) experience of depressive symptoms. Mother's help-seeking behaviour is important as it involves their ability to recognise their adolescent's depressive symptoms, and seek formal help for them after recognition of these symptoms. The current investigation also examined reasons why mothers do not seek help and predictors of their help seeking behaviour. Finally, the current investigation aimed to understand mothers' satisfaction with service provision as it provides information about how likely mothers are to continue to access treatment or initiate additional treatments for their adolescent.

Mothers' Recognition of Adolescent Depressive Symptoms.

In the domain of mental health of children and adolescents, the role of mothers in the identification of depression cannot be overstated as they are most likely to recognise symptoms of depression, due to their closer access and familiarity with the child (Boulter &

Rickwood, 2013; Farmer, Burns, Angold, & Costello, 1997; Rickwood, Deane, Wilson, & Ciarrochi, 2005; Rothi & Leavey, 2006; Sayal, 2006). This closer awareness of children's behaviour by mothers is pivotal in the help-seeking process as many of the psychosocial stressors known to foster depressive symptomatology may not be closely examined until depressive symptoms are apparent. For example, social isolation is not readily identified in an adolescent until closer investigation of the adolescents' perspective and experiences takes place. Consequently, it is often only once that an adolescent exhibits symptom of depression that such investigations of those psychosocial factors take place. Given that a health professional would likely not gain access to conduct such an assessment without the mother first initiating contact, the central and pivotal role of the mother's capacity to identify and then seek out appropriate help becomes readily apparent. This has therefore been recognised in the TD literature as a significant variable to address when identifying the key concerns regarding how to recognise and subsequently treat adolescent depression (Boulter & Rickwood, 2013; Rothi & Leavey, 2006). Furthermore, it is important to research if mother's can identify depressive symptoms specifically in adolescents (age 12-17), as depressive symptoms typically present during adolescence more so than children (Thapar et al., 2012) and the prevalence of mental illness is high compared to children in this age cohort (Thapar et al., 2012).

For parents of adolescents often the first step before help-seeking occurs is recognising that their child has a problem (Bussing et al., 2003; Cauce et al., 2002). Research has indicated that fewer than half of the parents who have a TD child with a mental health disorder recognise problems in their child (Sayal, 2006). In Australia, for instance, it is estimated that although 40% of children with ID are identified with co-occurring mental health disorders, only 10% receive mental health care services (Einfeld et al., 2006). In their review, Zwaanswijk and colleagues (2005) found that a TD child's mental health disorder

was insufficient to predict parents recognising a problem; however, help-seeking was enhanced with increased severity, comorbidity, and persistence of problems (Zwaanswijk, Van der Ende, Verhaak, Bensing, & Verhulst, 2005). A parent's perception of need has been identified as a stronger predictor of problem recognition due to a family's own understanding of the child's problematic behaviours and how the family's perception influences help-seeking (Srebnik Cauce & Baydar, 1996). The way parents conceptualise their TD child's problematic behaviours has been shown to influence their perception of the need for treatment (dosReis, Mychailyszynm Myers, & Riley, 2007). Further, family characteristics, higher education level and greater family stress influenced help-seeking, and parental psychopathology increased problem recognition but not utilisation (Zwaanswijk, Van der Ende, Verhaak, Bensing, & Verhulst, 2003).

Overall, mother's play an important role in recognising adolescent's depressive symptoms as identification leads to assessment and treatment. In the TD population, parents are often viewed as "gatekeepers" for their child and adolescent to enable access to mental health services (Breland-Noble & Weller, 2011; King et al., 1997). Despite this, there is a substantial body of literature pointing to the lack of agreement between parent/adolescent reports of TD adolescent mental health problems with findings reflecting low-to-moderate agreement (Angold et al., 1987; Choudhury, Pimentel, & Kendall, 2003; Comer & Kendall, 2004; Martin et al., 2004; Roberts et al., 2005b; Salbach-Andrae et al., 2009). For example, Salbach-Andrae et al. (2009) examined whether parent-youth agreement differs when co-occurring mental health disorders are present among adolescents aged 11 to 18. Adolescents were diagnosed with no mental health disorder, one mental health disorder or more than one mental health disorder. Results indicated that there was poor to low agreement between parent and youth reported problem behaviours on internalising symptoms of behaviour for youth with no mental health disorders, one mental health disorder or more than one mental

health disorder. The study also demonstrated that parents were likely to emphasize the severity of the difficulties, whereas adolescents under-report symptoms.

Scholars have posited a number of explanations for the discrepancies in agreement between parent report and TD adolescent report (Sourander, Helstela & Helenius, 1999). First, mother's high levels of stress and caregiver burden may result in them having difficulties identifying the mental health needs of their adolescent (Bode, Weidner, & Storck, 2000; see De Los Reyes & Kazdin, 2005 for review; Monck et al., 1994; Kazdin and Wassell, 2000; see Richters, 1992 for a review). Moreover, research has suggested that mothers' perceptions of adolescent problem behaviour may be more a function of their own adjustment than of the children's actual level of problem behaviour. For example, maternal anxiety (Klein, 1991), and particularly maternal mood disorders (De Los Reyes & Kazdin, 2005; Monck et al, 1994) have been found to negatively influence a mother's perception of her child's behaviour problem (e.g., depression– distortion hypothesis; Chi & Hinshaw, 2002; Richters, 1992).

Second, it has been suggested that some parents overlook the internalising behaviours because the externalising behaviours are perceived as more distressing to the parent (Tarullo et al., 1995). Third, parents might not have accurate information about the depressive symptoms their child is experiencing, because thoughts and emotions are less obvious to the parent than overt behaviour (van der Ende, Verhulst, & Tiemeier, 2012). As children enter adolescence, they spend increasingly more time outside the home, making it even more difficult for parents to observe them (Sourander et al., 1999). Further, adolescents might avoid talking with their parents about personal problems (Sourander et al., 1999) or purposely hide their symptoms from their parents (Draucker, 2005a; Draucker, 2005b; McCombs et al., 1990).

Fourth, parents are often unaware that adolescents can experience depression and therefore do not actively consider this as a potential explanation for the presence of symptoms (Jorm & Wright, 2007). Fifth, research has suggested that mothers with stress and depression report more problems in their children than are reported by non-depressed mothers. These findings have led many researchers to conclude that parents' depression or stress leads to a potentially distorted view of children's behaviours (Achenback et al., 1987; Reynolds and Kamphaus, 2004). Last, it has also been argued that disagreement between mothers' reports of depressive symptoms and adolescent self-reports may be due to differences between parents' and adolescents' understanding of what behaviours are problematic rather than the result of parents' lack of awareness of adolescents' behaviours (Kramer et al., 2004).

Regarding agreement between adolescent reported and parent reported mental health issues in ASD populations, studies have also been conducted similar to the TD population research. A number of studies have been conducted in the ASD population using samples of children, often aged 7-13, examining mother's ability to recognise their adolescent's depressive symptoms through use of questionnaires measuring symptoms of mood. For example, Meyer and colleagues (2006) conducted research with 31 children with AS aged 7 years 9 months to 13 years 9 months. Results using the Behavioral Assessment System for Children–Parent Report Scale (BASC–PRS: Reynolds & Kamphaus, 1998) indicated that children rated themselves as having a low likelihood of depressive symptoms and parents rated the children as being at risk for depressive symptoms. Overall, they found that parents of children with AS reported higher rates of internalising symptoms on the BASC–PRS compared to their children's self-report on the BASC-PRS. Reasons for parent's reporting higher rates of internalising symptoms compared to the children's self-report were not

examined. However, differences in ratings may be attributed to adolescents presenting with a low likelihood of depressive symptoms and small sample size.

Lopata et al. (2010) identified a significant low correlation between parent and child reports of depressive symptoms for 40 adolescents with ASD, ages 7-13 years using the BASC. Parents were identified as over-reporting their adolescents' depressive symptoms and rated children in the "at risk range", while children rated themselves in the low likelihood of having depressive symptoms. These results indicated a substantial discrepancy in the magnitude of symptoms between the parent and child reports with significantly higher parent ratings of depressive symptoms than self-report ratings (large effect).

Vickerstaff and colleagues (2007) examined parent and child ratings of depressive symptomatology in 22 children with ASD aged 7-13 using the BASC. Parents rated children in the "clinically significant" range and children rated themselves as in the "average range" for depressive symptoms indicating a low likelihood of depression. A comparison of parent and child reports of depressive symptomatology yielded a significant difference. Children rated significantly less depressive symptomatology than parents, that is parent's over-reported depressive symptoms (large effect). Vickerstaff et al. suggested that parents of children with ASD may be sensitive to behavioural changes that indicate a psychological problem and are better able to interpret the idiosyncratic emotional expressions of their children. Differences in ratings may have also been attributed to a small sample size and a failure to include of adolescents in their sample.

Regarding mother's ability to identify depressive symptoms in samples exclusive to adolescents with ASD, the results are mixed making it difficult to draw firm conclusions from the research. For example, Hurtig and colleagues examined adolescent and parent report of 46 adolescents with ASD aged 11-17 using the Child Behavior Checklist (CBCL; Achenbach, 1991). Hurtig et al. (2009) found parents to underreport symptoms of depression

in adolescents with ASD. They identified that adolescents with ASD tended to report more problems in the anxious/depressed scale stating “high internalising symptoms” compared to the ratings offered by the parents in the parent report (medium to large effect). Results indicated weak to moderate correlations in that scale which indicated some emotional distress may be hidden from parents.

In more recent research, Jepsen, Gray and Taffe (2012) compared ratings of behaviour and emotional problems and social functioning provided by 45 adolescents aged 12–18 years with ASD. Using a depression sub scale from the CBCL (Achenbach, 1991) moderate to strong correlations were found between parent and adolescent ratings of depressive/withdrawn subscale. The results indicated no statistical difference between parent and adolescent ratings of withdrawn/depressive symptoms (very small effect size).

Based on the ASD research and research in the TD populations as described above, one would speculate that mothers of adolescents with ASD would present with low to moderate agreement when identifying depressive symptoms in their adolescent with ASD compared to adolescent’s self-report of depressive symptoms. For example, it is well documented that mothers of adolescents with ASD have a significant burden caring for their adolescent (Abbeduto et al., 2004; Cadman et al., 2012; Smith & Anderson, 2014) and therefore, like mothers of TD adolescents, may have difficulties identifying the mental health needs of their adolescent (Bode et al., 2000; see De Los Reyes & Kazdin, 2005). It is also anticipated that mothers of adolescents with ASD would also have the additional difficult task of identifying and discriminating ASD symptoms from symptoms of depression (Stewart et al., 2006). Thus, like the TD adolescent population, parent and ASD adolescent agreement regarding depressive symptoms would be low.

There are, however, a number of methodological shortcomings in the existing research presented above which makes it difficult to draw firm conclusions about parent’s

ability to report on their adolescent's depressive symptoms. First, studies reviewed above present with variations in sample size. For example, sample sizes have ranged from 22 participants to 45 participants making it difficult to draw firm conclusions specifically about adolescents (Butzer & Konstantareas, 2003; Jepsen et al., 2012; Hurtig et al., 2009; Lopata et al., 2010; Meyer, Mundy, Van Hecke & Durocher, 2006; Vickerstaff et al., 2007). Thus, one aim of the current investigation will be to examine the association between mother's reports and adolescent's reports of depressive symptoms with a sample size much larger than was used in previous studies as previous studies have been underpowered.

Second, there have also been many differences with respect to the way in which depression has been measured. Some studies have used different scales (i.e., CBCL; see Hurtig et al., 2009) whereas other studies have used measurement tools specific to depression or have used different measurement instruments for adolescents and parents to measure the same construct (i.e., CDI; see Vickerstaff et al., 2007). The administration of a consistent measure (parent and child or adolescent version of the scale) in a study has been described as important as use of similarly-named scales from different instruments does not always ensure the scales measure the same behavioural dimension (Reynolds & Kamphaus, 2004). Thus, for the current study, the administration of a consistent measure, namely the Children's Depression Inventory 2 (CDI 2: Kovacs, 2011) will be used because it allows for the reporting of depressive symptomatology by multiple informants.

Third, additional methodological differences amongst studies include variation in inclusion and exclusion criteria of participants. For example, some studies have included both children and adolescents with ASD, while other studies have included children and adolescents with AD, AS and PDD-NOS. The different inclusion criteria are significant, as a diagnosis of PDD-NOS is applied to individuals with autistic symptoms who do not meet full criteria in all three diagnostic domains. PDD-NOS was traditionally used as a diagnosis for

children with milder symptoms of autism, or sometimes it has been used as an initial or tentative diagnosis for younger children or before diagnostic evaluations are completed. It should be emphasized that this "subthreshold" category is thus defined implicitly, that is, no specific guidelines for diagnosis are provided. While deficits in peer relations and unusual sensitivities are typically noted, social skills are less impaired than in classical autism. The lack of definition(s) for this relatively heterogeneous group of children presents problems for research on this condition. In the current investigation, only adolescents with AS and AD without a co-occurring ID will be included.

Overall, when examining the results of adolescent and child studies collectively regarding mother's and their child's agreement of depressive symptoms, it appears that for the majority of the ASD literature, there is weak to medium agreement (e.g. Lopata et al., 2010; Vickerstaff et al., 2007). In addition, when examining the results of both adolescent and child studies collectively regarding mother's over-reporting of symptoms, it appears that for the majority of the ASD literature, parents over-report their adolescents' depressive symptoms (e.g. Lopata et al., 2010; Meyer et al., 2005; Vickerstaff et al., 2007). Notably, most of this research has been conducted with small samples of young children with ASD, not adolescents with ASD and it is unknown if the results will hold true for larger samples of adolescents should the research be replicated with this cohort.

In light of the evidence to date, the current investigation addressed the limitations identified in the literature above regarding parent-adolescent agreement of adolescent's depressive symptoms. Limitations were addressed through the recruitment of adolescents diagnosed with AD and AS without an intellectual disability (age 12-17) to minimise variations in inclusion and exclusion criteria. A large sample of mother and adolescent participants was recruited to minimise risk of the current investigation being underpowered. Last, the administration the Children's Depression Inventory 2 (CDI 2: Kovacs, 2011) was

used because it allows for the reporting of depressive symptoms by both mothers and their children. Findings about mother's ability to recognise depressive symptoms in their adolescent's with ASD will assist in drawing firm conclusions about agreement between adolescent's reported and parent reported depressive symptoms which is often the first step in mothers seeking formal services and treatment.

Mothers' Help-Seeking Behaviour

Common to many help-seeking models in general is an understanding that help seeking involves multiple components: an individual must first recognise that a behaviour is problematic, decide to seek help, determine who to seek help from, and take action (e.g., use a service) (Andersen, 1995; Cauce et al., 2002; DiClemente & Prochaska, 1982; Srebnik et al., 1996). Indeed, research among children and their parents who are seeking help has identified associations between problem recognition and service use (Pavuluri et al., 1996; Teagle, 2002; Zahner & Daskalakis, 1997) and between intentions to use services and service use (Spoth et al., 1997). Research in the TD population has also identified that if parents recognise psychopathology in their child, the likelihood of help-seeking behaviours and service use increases (e.g., Logan & King, 2001).

Help-seeking behaviours form part of the process toward service utilisation and are influenced by problem recognition, and predisposing characteristics (i.e., age and knowledge of the parent) (Cauce et al., 2002). Research with the TD child and adolescent populations have attempted to explain parent help-seeking processes using different pathways and models. For example, Logan and King's help-seeking model (Logan & King, 2001) intended to convey the reality that the parent-mediated help-seeking process is dynamic and that the process can vary across families. Logan and King's (2001) parent-mediated pathway to mental health services for adolescents outlines the following steps: a) gaining awareness of their youth's distress, b) recognizing the problem as psychological, c) considering possible

courses of action, d) developing an intention to seek mental health services, e) making an active attempt to seek services, and f) obtaining mental health services. Logan and King (2001) effectively modelled the pathway to mental health services as a series of levels or decisions, rather than a single planned choice (Costello, Pescosolido, Angold, & Burns, 1998; Stiffman, 2004; Zwaanswijk et al., 2005). They purport that it is a reality that many families will revert to earlier steps along the process when they encounter powerful barriers to seeking help. For example, when a parent introduces the idea to their adolescent to formally seek help by accessing professional services for their mental health issues, and this idea is met with a negative attitude by the adolescent, the parent may revert in the help-seeking process and consider alternative actions for gaining assistance.

For the purpose of the current investigation, formal help-seeking is defined as being assistance from professionals who have a legitimate and professional role in providing relevant advice, support and/or treatment (Rickwood, Thomas & Bradford, 2012). Formal help-seeking includes a wide range of professions including psychologists, psychiatrists, counsellors and sometimes generalist health care providers (Rickwood, Thomas & Bradford, 2012). In contrast, help can also be sought from informal sources such as friends and social networks as well as self-help sources such as online and computer mediated processes.

Research regarding the parent help-seeking process for adolescents with ASD and co-occurring depressive symptoms is sparse and models of help-seeking have not been identified that attempt to explain parent mediated help-seeking processes regarding adolescents with ASD and co-occurring mental health disorders. A study was conducted with one hundred adolescents and sixty-five parents regarding service provision on a range of issues including education, employment, health and social activities (ASPECT, 2009). This information was collected through surveys from both parents and adolescents. In this study the adolescents were asked about their support needs and their experiences with specific mental health issues

and parents were surveyed about their child's support needs. Forty-nine percent of parents reported that their child required more mental health support than they were currently receiving. Whilst the authors provided rich results regarding service provision on a range of issues there was no investigation of parental help-seeking processes specifically for their adolescents' mental health disorders.

Despite the essential role that parents play in their children's mental health care, to date, previous studies have not examined parent facilitated help-seeking processes for adolescents with ASD and their co-occurring depressive symptoms, specifically. Given the lack of research in this area, little is known about parent help-seeking processes for adolescents with ASD and mental health disorders, specifically help-seeking processes for depressive symptoms.

The study of factors associated with the help-seeking processes is essential in order to help with an appreciation of prevention and psychosocial risk factors associated with depressive symptoms. There is a marked mismatch between the prevalence of adolescents with mental health disorders and adolescents accessing help for their symptoms. Investigation 2 begins to address this gap in the literature by understanding the help-seeking behaviour of mothers including factors that predict mother's help-seeking behaviour as it is widely accepted that unmet need for mental health care represents a critical marker of access to health care (Newacheck et al., 2000; Warfield & Gulley, 2006).

Parents' Perceptions of Adolescents' Psychopathology and Mothers' Help-Seeking Behaviour

One of the first components in a parent mediated help-seeking process is for a child's needs to be recognised by their parent and subsequently for the parent to decide to seek help (Logan & King, 2011). Research regarding the TD child and adolescent population has identified that the severity of child mental health problems are associated with parent

appraisal processes between increased symptom severity and increased likelihood of problem recognition/service use (Farmer, Stangl, Burns, Costello & Angold, 1999; Haines, McMunn, Nazroo & Kelly, 2002; Horwitz, Gary, Briggs-Gowan & Carter, 2003; Pavuluri, Luk & McGee, 1996) and that help-seeking is enhanced with increased severity, comorbidity, and persistence of problems (Zwaanswijk, Van der Ende, Verhaak, Bensing & Verhulst, 2005). A study by Douma et al. (2006) identified that when parents perceived psychopathology in their child with ID, specifically, problems of anxiety and depression, parents help-seeking increased. A more recent study by Thurston, Phares, Coates and Bogart (2015) examined parents' ability to identify psychopathology in vignettes depicting a 10 year old child with mental health disorder. Results indicated that parents who recognized a mental health problem were 21.59 times more likely to seek help compared to parents who did not recognize a problem.

To date, research has not been identified examining if mothers are more likely to seek help after recognising depressive symptoms in their adolescent with ASD. Thus it remains unknown that if parents recognise psychopathology in their adolescent with ASD, the likelihood of help-seeking behaviours and service use increases as it often does in the TD population (e.g., Logan & King, 2001).

Factors Associated with Mothers' Help-Seeking Behaviour for Adolescents with ASD and Co-occurring Depressive Symptoms. Little research has been conducted regarding factors affecting parental help-seeking for adolescents with ASD and co-occurring depressive symptoms (Lake, Perry & Lunskey, 2014). This is in contrast to research in the TD population whereby the past two decades has seen researchers seek to understand the unmet need in relation to childhood mental health disorders and identifying factors affecting service use and predictors of service use (e.g., Lawrence et al., 2015, Leaf et al., 1996; Satcher, 2000; Sawyer et al., 2002; Verhulst & van der Ende, 1997; WHO, 2003). By using findings

from research conducted with the TD population as a framework for the current investigation, one may begin to understand the help-seeking behaviour of mothers of adolescents with ASD and co-occurring depressive symptoms. In addition, if results of the current investigation are found to be similar to those identified in the TD research, results could then be compared across studies and population groups. Subsequently, this would benefit understanding of policy and practice initiatives aimed at improving access to and engagement with services for adolescents with mental health concerns.

In the TD literature, frequently reported factors that affect mother's help-seeking behaviours for their child's mental health symptoms include a family history of mental health disorder, age of the child with the mental health condition, and mother's stress (Hammen, 2009; Pavuluri et al., 1996; Verhulst & van der Ende, 1997; Zimmerman, 2005; Zwaanswijk et al., 2005). As these factors have been frequently examined in the TD literature, they will be used as a framework in the current study to determine if they also affect parent help-seeking behaviour for adolescents with ASD and co-occurring depressive symptoms. Thus the current investigation will examine family history of mental health disorder, age of the adolescent and mother's stress as predictors of help-seeking behaviour for adolescent's with ASD.

Family history of mental health disorder. Research regarding the TD population has indicated that having a parent with a mental health disorder will have an influence on the help-seeking process for mental health services (Verhulst & van der Ende, 1997). That is, the probability of adolescents being diagnosed with a mental health disorder increases when a parent suffers from a mental health disorder (Rutter, 1999). Verhulst and Van der Ende (1997) found that a number of variables including family history of mental health issues and access to mental health services were associated with increased likelihood of parents reporting a need for professional help for youths' mental health problems.

A family history of mental health disorders has been shown to predict the use of recognition of child problems and subsequent access to mental health services. Zwaanswijk and colleagues (2005) examined the pathways to informal and professional services in the Netherlands. As predicted, they found that the presence of a relative who had used mental health services increased the likelihood of parents perceiving problems in their child without directly increasing service need. Having a family member with a mental health disorder was also found to increase the chance of parents using support of family members and friends (see Rickwood and Braithwaite, 1994). Zwaanswijk (2005) suggested that the presence of a relative who has consulted mental health services may indicate a certain willingness to discuss mental health matters in the family system, which may facilitate help-seeking for the child's mental health difficulties.

A family history of mental health disorders has been shown to predict the use of mental health services for children in the family (Zimmerman, 2005). Research has indicated that mothers who have used mental health care services for themselves are more likely to seek mental health care services for their children, despite the child's presenting symptomatology (Cunningham & Freiman, 1996; Dulcan et al., 1990). It is not clear whether this effect, where it exists, is because of the mother's experience of mental health treatment, or to her experience of the mental health problem itself. Experience with help-seeking may also act as a form of knowledge or mental health literacy, which has been deemed important in the help-seeking process (Jorm & Wright, 2007; Rickwood et al., 2005; Rickwood et al., 2007). However, it may be that the perceived helpfulness of this care is more important (e.g., Deane, Skogstad & Williams, 1999) and that context and source of prior help may determine the relationship with future help-seeking (e.g., Skogstad, Deane & Spicer, 2005). Research by Cometto (2014) has found parents whose families had previously sought professional help were more likely to recognize adolescent mental health problems, decide to seek professional

help for their adolescents' mental health problem, and actually seek out professional help. Overall, Cometto's findings suggest that individuals may struggle most to seek professional help upon first becoming involved with services; however, once a pattern of professional help seeking has been established, individuals seem more likely to consider professional help for subsequent problems.

Researchers have found that mothers who had accessed professional help for their own depressive symptoms were more likely to think that their own child with depression may need help compared to mothers who did not receive help themselves (Wu et al., 2001). Further, it has also been argued that parents with mental health disorders may also be "too quick to recognise" symptoms of mental health, in theory, in adolescents that are, in reality, projections of their own difficulties (Logan & King, 2001). Research has also indicated that some adolescents could be less likely to respond to any help-seeking attempts by their parents with significant mental health disorder, given possible mistrust of the parent's decision-making skills (Logan & King, 2001).

Other research has indicated that families with mental health issues are likely to be characterised by the inability to recognise symptoms of a mental health disorder in an adolescent as a result of impoverished parent-child relationships (e.g., Chiarello & Orvaschel, 1995). Research further indicates that women with depression are more likely to engage in negative parenting behaviours such as being neglectful, coercive, or unpredictable (Goodman & Brand, 2011; Shaw, Connell, Dishion, Wilson, & Gardner, 2009) resulting in an inability to recognise mental health symptoms and therefore do not seek help.

In summary, TD research has found that if families have sought help in the past they may find it easier to seek help again (Cometto, 2014; Lake et al., 2014). Unlike the TD research, it remains unknown if mothers seek help for their adolescent with ASD and co-occurring mental health disorder in the context of mother's family history of mental health

disorder. One may speculate that for families who have an adolescent with ASD, mothers may have been engaged in the medical and health system for long periods of time regarding their adolescent, and many of which have been under the care of a paediatrician and/or psychiatrist since initial ASD diagnosis. This initial service use may have made mothers aware of mental health services available to their child as well as sensitised the mother to using mental health services making it easier for them to seek out these services again.

Mother's stress. In general, mothers of children with ASD often report high levels of stress and mental health problems associated with the challenges of caring for individuals with unique complex needs and with navigating multiple service sectors across their life time (Gray, 2006; Schieve, Blumberg, Rive, Visser, & Boyle, 2007). Mothers usually have the major obligation of caring for their child (including management of problematic behaviours) and balancing associated stress while overseeing the well-being of the rest of their family (Shieve et al., 2007; Seltzer, Shattuck, Abbeduto, & Greenberg, 2004). Mothers of children with ASD report greater emotional problems compared to mothers of children with ID without ASD and mothers of TD children (Montes and Halterman, 2008; Totsika, Hastings, Emerson, Lancaster, & Berridge, 2011). Similarly, mothers of adolescents and adults with ASD experience higher levels of stress and emotional problems compared to other parents (Abbeduto et al., 2004), and more frequently endorse experiences of fatigue, arguments, and stressful events (Smith et al., 2010).

In addition to ASD symptomatology, other variables unique to ASD have been identified that impact on mother's stress. In unpublished findings by the Interactive Autism Network USA (April 2009) it was reported that a large sample of mothers ($N=3690$) felt most stressed about their child's future. Other stresses included the child behaviours, setbacks (e.g., a new stimming behaviour; the onset of seizures; an increase in melt-downs or aggression), getting treatments, exhaustion, and treatment disappointment. Hence a number

of variables related to symptoms of ASD have been identified as causing stress when parenting individuals with ASD however what remains unknown is if mothers subsequently seek help as a result.

Parenting an adolescent with mental health disorders is considered a stressful time for parents as evidenced in the TD adolescent population research (see Hammen, 2009). Findings from the TD literature (e.g., Briggs-Gowan & Cater, 2008 Griggs-Gowan et al., 1996; De Los Reyes & Kazdin, 2005; Horwitz et al., 2003; Naiman et al., 2000; Richters, 1992) have indicated that increased levels of parent stress and depression are positively associated with the latent parent appraisal construct (i.e., perceptions of the child's behaviour above and beyond frequency ratings) and, subsequently, seeking help. These findings may be due to parents holding a more negative outlook (i.e., depressed parents), and / or being more likely to perceive their children's behaviour as problematic, especially if the parent is easily overwhelmed or stressed by their child's behaviour.

As highlighted in previous chapters of the current research project, depressive symptoms may exacerbate symptoms of ASD for some adolescents. For example, depression may exacerbate obsessions and rituals. Lecavalier et al. (2006) found that self-isolated/ritualistic behaviours were associated with poorer parent outcomes, leading the researchers to posit that severity of the core features of autism may additionally contribute to caregiver stress (Lecavalier et al., 2006). This increase in ASD symptoms as a result of depressive symptoms may cause additional stress for mothers, and subsequently result in a mother seeking help for her adolescent.

There is a vast amount of research regarding mother's stress as a result of parenting an adolescent with ASD. However, there is minimal research to date examining how mother's elevated stress levels impacts on their help-seeking behaviour regarding their adolescent's (with ASD) depressive symptoms. Taking into account research from the TD

population as well as emerging research by the Interactive Autism Network (2009) and Lecavalier et al. (2006) it is anticipated that adolescent's (with ASD) behaviours, both internalizing and externalising, would result in a stressful relationship between mother and adolescents prompting mothers to seek professional help. For example, it is suggested that externalising symptoms of depression including risk taking, aggressive behaviours and irritable behaviours of an adolescent diagnosed with ASD would amplify the stress between mother and adolescent, and subsequently prompt mothers to seek help for their adolescent in an effort to reduce mother's level of stress (Gray, 1994, 2006; Montes & Halterman, 2007; Pastor-Cerezuela, Fernández-Andrés, Tárraga-Mínguez, & Navarro-Peña, 2016). Yet, knowledge of the stressful relationship between a mother and her adolescent and how this factor may prompt mothers to seek help remains unknown.

ASD symptoms. Zwaanswijk et al. (2003) conducted a review of 47 empirical studies on parental help-seeking for children and adolescents with mental health problems. Findings indicated that perceived parental burden was found to be a more consistent predictor of parental problem recognition and help-seeking than the mere presence of child symptoms of mental health disorders (Angold et al., 1998; Farmer, Burns, Angold, & Costello, 1997; Farmer et al., 1999; Logan & King, 2001; Wu et al., 1999, 2001). In keeping with Zwaanswijk's review, it could be anticipated that an adolescents' symptoms of ASD as well as symptoms of depression would result in a burden for mothers and therefore prompt them to seek help.

One of the first qualitative survey study of parents of children with ASD ($N=35$) documented the severity of ASD behaviours and its impact on mothers and family members (Gray, 1994). Primary diagnostic criteria were based on the DSM-III Revised Edition (APA, 1987). Children's ASD symptoms ranged from mild to severe with the majority experiencing moderate to severe degrees of impairment. Their ages ranged from 4 to 19, with

approximately three-quarters of the children between the ages of 6 and 12. ASD symptoms that were described in the study as problematic included the following: children and adolescents' violence and aggression, problems communicating, eating, toileting and inappropriate sexual behaviour. Parents reported not going out in public due to their child's behaviour and would become socially reclusive rather than risk possible embarrassment from their child's problem behaviour. Parents' coping strategies in response to the severity of their child's symptoms have included accessing treatment services as well as respite care settings and family support. They also reported other coping strategies including accessing religion, socially withdrawing and individualism (e.g., employment and recreation). Despite Gray identifying that parents were concerned by their child's ASD problem behaviours and the significant impact they had on mothers and the family, little was examined and discussed with respect to parent help-seeking behaviour and whether a child's ASD behaviours prompted parents to seek help from professional sources. However, it would be anticipated that if the adolescent's ASD symptomatology increased in severity resulting in a significant impact on the family, mothers would be more likely to seek help from formal services.

Following Gray's (1994) research, case reports and prospective studies have indicated that both the intensification of and decrease in ASD symptomatology have been reported with the onset of depression. The severity of ASD symptoms including the intensification of symptoms and decrease in ASD symptomatology is important to consider as the presentation of these symptoms may prompt mother's to seek help for their adolescent. Atypical affective changes, such as increased aggression, irritability, agitation, and labile moods have been found to be present in adolescents with depressive symptoms (Lainhard & Folstein, 1994; Perry, Marston, Hinder, Munden, and Roy, 2001; Pollard & Prendergast, 2004; Skinner, Ng, McDonald, & Walters, 2005). For instance, case reports and prospective studies discuss children with ASD and depressive symptoms demonstrating exacerbated compulsiveness or

increased stereotypic behaviour (Lainhard & Folstein, 1994; Perry et al., 2001; Skinner et al., 2005; Stewart et al., 2006). Intensification of ASD symptoms includes increases in ritualistic behaviour or obsessions, often coupled with irritability and hyperactivity. For example, an adolescent who has always been particular about his cleanliness may start washing his hands excessively. At times this may be accompanied by feelings of distress and sadness (Ghaziuddin et al., 2002 p. 132). Again, it is anticipated that an increase in these symptoms would positively predict mother's help-seeking behaviour.

Less frequently associated with depression but reported through anecdotal reports or case studies is the loss of interest in repetitive behaviours and autistic preoccupations accompanying more social withdrawal and decreased adaptive functioning (Ghaziuddin, Ghaziuddin & Greden, 2002; Stewart et al., 2006). No studies to date have identified and specifically investigated the manner in which ASD symptomatology fluctuate with episodes of depression; however, many studies in the literature demonstrate that deviation of ASD symptomatology from baseline may indicate a depressive episode (Ghaziuddin et al., 2002; Janowsky & Davis, 2005; Leyfer et al., 2006; Pollard & Prendergast, 2004). For example, Pollard and Prendergast (2004) described a 6-year-old girl with an ASD who presented with a regression of developmental skills, a depressed mood and disturbed sleep and appetite who responded to a course of antidepressants. Ghaziuddin, Ghaziuddin and Greden (2002) suggest that depression can manifest differently in children and youth with high functioning versus low functioning autism (Ghaziuddin, Ghaziuddin & Greden, 2002). Thus the current investigation would examine only adolescents with ASD without an intellectual disability.

In summary, research has indicated that depressive symptoms can affect the presentation of ASD symptoms in children and adolescents often resulting in an increase in ASD symptoms (Ghaziuddin et al., 2002; Gray, 1994; Pollard & Prendergast, 2004). The presentation of ASD symptoms and its effect on mother's help seeking behaviour is an

important factor that warrants attention because a change in presentation of symptoms may enable earlier identification of an adolescents' difficulties and subsequently access to treatment. Whilst no study to date has examined how ASD symptoms affect depressive symptoms and subsequently mother's help-seeking behaviour, it is anticipated that an increase in severity of ASD symptoms are viewed as a burden by mother and subsequently they seek help for depressive symptoms.

Age. While there is substantial unmet mental health need among all age groups, higher rates of unmet need in early childhood (Kataoka et al. 2002) suggest that parents of younger children are less likely to recognize problems and seek help. Indeed, parental concerns about social-emotional and behavioural development increase during preschool (Blanchard et al. 2006) and elementary school (US Department of Health and Human Services, 2005) and many parents of young children exhibiting high levels of problem behaviours report low or non-existent levels of worry (Ellingson, Briggs-Gowan, Carter & Horwitz, 2004). Problem recognition and help-seeking may be less likely among parents of younger children because parents may be unfamiliar with, or sceptical about the idea that young children can experience mental health problems, assuming that problems are normative or something the child will "grow out of" (Pavuluri et al. 1996). Additionally, with fewer contexts, such as school, in which to observe their child amongst same-age peers, to receive input about their child's functioning, and to evaluate impairment, parents of young children may be less likely to have an adequate group to which they can compare their own child's behaviour, and they may have difficulty recognizing impairment (Carter et al., 2009; US Department of Health and Human Services, 2005).

When examining the research in TD adolescents, child's age has been found to be positively associated with professional help seeking, although debate remains concerning the nature of this association. In a sample of TD children and adolescents age 4 to 18, Verhulst

and Van der Ende (1997) found that age was associated with increased likelihood of parents of older children reporting a need for professional help for adolescents' mental health problems. The most potent factors associated with service need and utilization were the child's problem behaviours (both internalizing and externalizing) and academic problems and family stress.

Regarding the ASD literature, as individuals with ASD enter adolescence, they may become more aware of their social difficulties, compared to when they were younger. As adolescents, their awareness of their difficulties in social situations can be discouraging for them which in turn makes them vulnerable to isolation and/or rejection, along with higher risk for mental health issues including depression (Fung, Lunskey & Weiss, 2015; Mayes et al., 2011; Tse et al., 2007).

Nagaraju and Wilson (2013) found that there is less burden and stress having a younger child with ASD than older child with ASD. They suggested that as the age of the child increased, support from service providers and agencies decreased, which resulted in an increase in maternal responsibilities. Taking together research indicating that mental health disorder is prominent in adolescents with ASD, and the increased stress mother's experience raising an adolescent with ASD (Nagaraju & Wilson, 2013; Stewart et al., 2006) it could be assumed that this would result in a positive association between age of an adolescent and mother's help-seeking behaviour.

Reasons why mothers do not seek help for their adolescent

When changes in an adolescents' behaviour becomes apparent and after parents recognise their child's psychopathology, parents must consider getting help for these problems (Douma et al., 2006; Pavuluri, 1996) and as such move through a process of help-seeking (Logan & King, 2001; Shanley et al., 2008). Part of this process of help-seeking includes parents choosing not to seek out help for formal services despite recognising a

problem or recognising their child's psychopathology (Douma et al., 2006; Logan & King, 2002). Mother's not seeking out help may affect their adolescent's experience of depressive symptoms and possibly duration and course of depressive symptoms as treatment is not accessed (Reardon et al., 2017).

Understanding reasons why mother's do not seek help for their adolescent when they recognise depressive symptoms is an important step towards facilitating early access to mental health services and improving mental health and wellbeing for their adolescent with depressive symptoms. Thus, the following section of this review pertains to examining the reasons why mothers do not seek help for their adolescent's depressive symptoms after identifying symptoms. However, in the ASD literature minimal research exists regarding reasons why mothers do not seek help for their adolescent's depressive symptoms after symptom recognition and identification. Hence, research regarding the TD adolescent population and clinical populations (i.e., intellectual disability research) will be reviewed first. This research will provide a framework and context for the current investigation prior to discussion and examination of the ASD literature.

Literature regarding the TD adolescent population, and youth with mild ID have provided numerous reasons to explain the gap between those that need help and those that do not receive help and reasons why mothers do not seek help for their child. For example, Douma et al. (2006) studied the help-seeking process of parents for emotional or behavioural problems in their child with borderline to moderate intellectual disabilities. In a special education-based sample of 522 children and adolescents (ages 10-18years), the authors in retrospect followed parents on their way to seeking help for their child's psychopathology in the past year and investigated their ability to perceive their child's psychopathology, if they needed professional help, and if they sought professional help. Results indicated that when parents perceived psychopathology this did not automatically imply seeking professional

help. Moreover, even when parents indicated a need for professional help, just a little over half actually sought professional help. Of those 213 parents who perceived child psychopathology, 70.6% had felt a need for professional help. Parents more often needed (and also sought) professional help when their child still had or also had experienced these problems before the past year. Help-seeking was done by only half of the parents whose child needed professional help (55.2%). The authors noted that parents of children and adolescents with ID may be more inclined to consider deviant behavioural functioning as part of the general behavioural repertoire of their child and not as a reason to seek help.

The authors also asked 109 of the 149 parents (59.63%) who had a professional need for help-seeking to select from a list of 24 most often reported barriers of seeking professional help. Parents could indicate more than one reason for not seeking professional help. Parents most commonly reported that they did not seek help because they considered the problems to be not so serious, wanted to handle the problems themselves, or considered them to be temporary. Financial, religious, language, and practical barriers (parking space, public transport, fear of waiting lists) were the least-often reported. This may have been because in The Netherlands there were fewer financial constraints to receiving professional help (Zwaanswijk et al., 2003).

In a similar study, Weiss and Lunsy (2010) conducted research regarding service utilisation patterns in parents of adolescents and adults with ID who experienced behavioural crisis. Results indicated that a greater proportion of parents of youth endorsed reasons similar to those found by Douma, Dekker, and Koot (2006) related to evaluations of the problem, including believing that the problem was not so serious or was temporary, and feeling overwhelmed in finding help.

Recent Australian research by Lawrence and colleagues (2015) reported that the most commonly identified reason parents did not seek help for their TD children were because

they were unsure of where to get help (39.6%), they were unable to afford help (37.0%) and parents preferring to handle the problem by themselves or with help from family or friends (31.1%). Being concerned with what other people might think was identified as a reason by 5.3% of parents and carers. These factors affecting help-seeking have also been identified in research conducted in the UK indicating that similar barriers regarding TD child and adolescent population are reported worldwide. Specifically, Sayal and colleagues (2010) identified that parents who were concerned about their child's mental health did not know where to go for help or whether any help was available (Sayal et al., 2010). Reasons identified by Sayal et al. also included difficulties getting an appointment, short duration of appointments, and the potential impact of a stigma and labelling their child (Sayal et al., 2010).

“Barriers to services” are widely cited as the primary reasons that prevent individuals with ASD from appropriate and timely treatment. However, what is less clear is what form these barriers actually take due to limited research conducted to date in the ASD population (Weiss et al., 2016). Emerging research has begun to address parents' access to services for their offspring. For example, an Australian mixed methods study by Aspect (2013) surveyed parents and their adolescents with ASD in relation to accessing services and supports. The research highlighted that adolescents with ASD were often prevented from accessing support facilities (i.e., education services, health services, social and community activities) due to a shortage of professional services. These services were reported to be frequently uncoordinated and typically expensive. Further identified was the lack of understanding about ASD amongst many support service providers. Whilst this research by Aspect (2013) presented rich results regarding parents' access to services, it did not examine reasons why parents did not seek help specifically for depressive symptoms. Based on this research, it is anticipated in the current investigation that mothers of adolescents with ASD would present

with similar reasons as to why they do not seek help for their adolescent's mental health issues, specifically depressive symptoms.

In a study by Weiss et al (2016), authors examined barriers to services in an effort to understand predictors of parent self-efficacy. Parents in this study had adolescent and adult children with ASD (age 12-25). Weiss et al (2016) used the same list of reasons parents did not access services as used in research by Douma et al (2006) and Weiss and Lunsky (2010). All parents were asked about reasons they did not seek services regardless of whether they received support. Given the overall aims of their study, the authors presented little information regarding the different type of barriers parents experienced to accessing services. However, the authors did highlight that parents noted between 0 and 11 barriers (median = 3 barriers), with a mean of 3.2 ($SD = 2.20$) that were presented when they were trying to access service. Of note, Weiss did not define the types of services under examination, thus it was not known if services related to medical, employment or mental health services. While this study provided rich results about adolescents and young adults with ASD, it is unknown if results would generalise specifically to adolescents accessing mental health services for depressive symptoms.

In summary, research has indicated that when parents perceive psychopathology in their children with ID they do not automatically seek professional help (Douma et al., 2006). Reasons for not seeking help for their child's psychopathology may include that parents do not consider the problem as serious or they want to handle the problem themselves or feel overwhelmed in finding help (Douma et al, 2006; Weiss & Lunsky, 2010). Research regarding TD children and adolescents has found similar results to the ID research, that is, mothers do not seek help because they are unsure where to get help, are unable to afford help and preferring to handle the problem by themselves (Lawrence et al., 2015; Sayal et al., 2010).

Reasons why mothers do not seek mental health services for their children with ASD and co-occurring mental health disorders has not been as thoroughly investigated as it has been in relation to adolescents with ID (Douma et al., 2006; Weiss & Lunskey, 2010) or those in the TD adolescent population (e.g., Lawrence et al., 2015; Sayal et al., 2010). Research regarding individuals with ASD has indicated that reasons that mothers do not access education, medical, social and community services for their children are due to the expense and the lack of coordination between services (Aspect, 2013). Research has also indicated that there are often multiple reasons mothers do not seek out professional help (e.g., Weiss et al., 2016). However, research to date has not specifically examined reasons that mothers do not seek professional help for their adolescent's (with ASD) depressive symptoms or other psychopathology. It remains unclear if mothers do not seek formal help for their adolescent's (with ASD) depressive symptoms, similar to the TD and ID populations.

For the current investigation, research by Lawrence et al. (2015) and Douma et al. (2006) will serve as a framework for examining reasons why parents do not seek help for adolescents with ASD and co-occurring depressive symptoms. The research by Lawrence et al. was selected because it is current Australian research that focuses specifically on the mental health needs (i.e., depressive symptoms) of children and adolescents. Research by Douma et al. (2006) was selected because it focuses on access to services for parents who have adolescents with special needs. Reasons for not accessing services listed in Douma's research have also been used as a framework in more recent research with adolescents and adults with ASD (i.e., Weiss et al., 2016). Lawrence and Douma's barriers to services also informed the design of the Depression and Services Questionnaire used in study 2. Reasons why mother's did not seek help for their adolescents' depressive symptoms were selected based on the research by Lawrence and Douma and include the following: (1) mothers did not think that their child was depressed; (2) mothers felt that they had the skills to help their

adolescents, (3) mothers were unsure what services to access; (4) mothers did not know how to access relevant services; (5) mothers were told that professional services were not required; and (6) adolescents refused to go with mother to seek help. It is anticipated that parents in the current investigation would present with similar reasons to those found in the research by Lawrence et al. (2015) and Douma et al. (2006). It is also anticipated that costs of services would be a factor for why parents do not seek services for their adolescents, similar to the Australian research by Lawrence but in contrast to the Dutch research by Douma due to differences in financial constraints receiving professional help (Douma et al., 2006; Lawrence et al., 2015; Zwaanswijk et al., 2003).

Service Satisfaction

For children and adolescents with mental health disorders, parents are often the first to identify problems, open the gate to services, are usually responsible for obtaining mental health services and ensure continued receipt of services (Costello et al., 1998; Gerkenmeyer & Austin, 2005). In addition, research has indicated that parents are one of the best sources of information about the effects of caring for a child with mental health problems, are considered integral to the success of treatment through their own participation and are often the main caregivers after services have completed. Therefore, examining parents' satisfaction as a factor that influences their decision to seek and continue to obtain help for children's mental health problems can aid in clarifying and addressing underlying unmet needs.

Parent experiences of professional services for their child might influence their expectations of and involvement in future care, which may ultimately impact on their child's recovery (Balder, 2007); low satisfaction of services has been identified as one of the reasons parents do not seek help (Balder, 2007; Rey et al., 1999). As such, measuring parent satisfaction is an important component of the help-seeking process for adolescents with depressive symptoms.

Engagement in services arises in part from the belief that treatment is valuable and effective (Goplan et al., 2010). Satisfaction and comfort with the child's health and behaviour is directly correlated to the likelihood of continuing services (Bjorngaard, Andersson, Ose, & Hanssen-Bauer, 2008; Forrest, Riley, Viver, Gordon, & Starfield, 2004; Hoagwood, 2005). Patient satisfaction and experiences are increasingly used as indicators of quality in health care (Holmboe, Iversen, Hanssen-Bauer, 2011). Parent satisfaction regarding perspectives on treatment process, perceived effectiveness, and specific impacts of treatment are particularly important with this population given that parents and parent advocacy groups play a critical role in service access and policy regarding service provision and funding (Stadnick, Drahota, & Brookman-Frazee, 2014).

Studies are limited in the ASD field, and as such research regarding the TD adolescent population and clinical populations will be reviewed first to give context to parent satisfaction for mental health services. This literature will then be followed by research regarding the ASD population. In the context of TD children, a number of studies have examined mothers' level of satisfaction with services during service provision and at discharge. For example, a study by Blader (2010) examined trends over time in parents' satisfaction with 107 children (age range 5.1-13.6 years) prior to psychiatric hospitalisation and whether such trends were related to post discharge outcomes. Informants included biological parents, adoptive parents, grandparents and foster parents. A disruptive behaviour disorder along with attention-deficit hyperactivity disorder was the most common principal diagnostic combination co-occurring with mood disorders, anxiety disorders and pervasive developmental disorders. Results of this study indicated that parents reported high rates of satisfaction toward care providers after a service that resulted when their child's condition improved. However, for a large number of parents, they changed their appraisal from satisfied at discharge to not satisfied at follow-up.

A review of the mental health services in Western Australia (Stokes, 2012) examined many issues regarding TD patient satisfaction with the WA health system including long waitlist for services, difficulties accessing services, service satisfaction, and patient care for TD samples. Direct feedback from parents regarding their experience of mental health services in Western Australia was obtained. Stokes found an increase in mental health services was required to meet the needs of Western Australian children, adolescents and adults. Parents reported dissatisfaction, anger and frustration with the mental health services of Western Australia primarily due to lack of services available for treatment, poor interagency collaboration as well as under skilled clinicians.

Notably, current quantitative research, including Australian and international research regarding parent's satisfaction of mental health services for their TD children and adolescents is also limited (Stadnick et al., 2013; Adib et al., 2019). Despite this interest in TD children, few studies have examined service satisfaction of parents during service provision and after discharge. In the context of parents of children with ASD there is research regarding service satisfaction and parents perception of services that their children access. However, this research relates mostly to satisfaction of parents during the process of receiving an initial ASD diagnosis (Mockett, Khan & Theodosiou, 2011), early intervention services after diagnosis (McIntyre & Zemantic, 2017) or have focused exclusively on parents' perspectives and satisfaction with receiving school services (see Spann et al., 2003; Starr et al., 2001; Whitaker, 2002), or both school and community services (see Fong et al., 1993; Kohler, 1999; Little, 2003; Sperry et al., 1999). In the context of parents' satisfaction of mental health services for their children, there is also research regarding the high rate of service use for adolescents with ASD (e.g., Narendorf et al., 2011). However, regarding this research by Narendorf, it remains unknown if parents were satisfied with psychological services, mental

health services or counselling services accessed and if this impacted future help seeking of parents.

The research in this field has indicated that largely parents' perceptions of services for their child have been poor with parents often expressing low levels of satisfaction with the services their child received. For example, parents reported the need to be extremely persistent in order to ensure they receive the services and the provisions that were necessary for their child (Kalyva, 2013); they also reported that many mental health professionals failed to communicate with each other and that parents reported that services they received did not suffice to address their children's multiple and complex needs (Kalyva). However, these services were related to receiving diagnosis of ASD and community and education supports, not receiving mental health supports.

Only a few studies to date have examined parents' satisfaction regarding mental health services access by their children and adolescents with ASD. A study by the National Autistic Society (2010) designed a quantitative questionnaire to find out more about the experiences of children and young people with ASD using Child and Adolescent Mental Health Services (CAMHS) via their parents and carers. The sample represented groups of children and adolescents with ASD (age 1-21) who diagnosed with learning difficulties as well as one or more mental health issues, for example: anxiety, depression, Attention Deficit Hyperactive Disorder, Obsessive Compulsive Disorder (OCD), Post-Traumatic Stress Disorder (PTSD), psychosis, self-harm, suicidal thoughts and attempted suicide. The questionnaire, completed by 455 parents and carers, covered experience of mental health issues, access to and interaction with mental health services, treatments received, impact on and support for the wider family and transition into adult mental health services. Results indicated that 32% of parents believed that the service provided by CAMHS improved their child's mental health, less than 46% of parents thought that staff knew how to communicate

with their child; and parents were most likely to say that their child's mental health symptoms had improved when they had an autism specialist involved in their care which was reported to not be a frequent occurrence. Whilst this study has been considered informative with rich results regarding mother's experience of government mental health services, it is difficult to know if the same experiences would be shared by mothers of adolescents with ASD (i.e. not children and young adults) presenting only with a mood disorder and not additional co-occurring psychopathology.

In another study, Brookman-Franze et al. (2011a) recently examined the experiences of 23 parents in accessing and receiving routine mental health services for their primarily high functioning, school-aged children and teens with ASD (Brookman-Frazee et al. 2011a). Themes related to parents' experiences receiving care for their children with ASD provided in clinical mental health settings indicated that the primary targets of therapy were challenging behaviours, and mental health service providers' lack of specialized ASD knowledge and "tools" to work with this population greatly impacted parents' perceptions of the process of receiving therapy in this setting. Parent's perceptions of the therapy process and limited provider ASD knowledge led to dissatisfaction with therapy and perceptions of slow child progress, minimal child gains and high levels of parent and family stress. Findings from Brookman-Frazee et al. (2011a) is consistent with other research that has examined service satisfaction of parents of children with ASD who have received a variety of community and education services for their child. These results have indicated that parents describe dissatisfaction, limited parent-provider collaboration, and the need for improvement in access and receipt of effective care within community service settings (Dymond et al. 2007; Kohler, 1999; Montes, Halterman & Magyar, 2009; Renty and Roeyers, 2005; Sperry et al., 1999).

Parents of children with ASD struggled particularly with finding providers with the necessary skills to deliver therapy and mental health services to their children. This finding is not surprising if one considers that a survey of a random sample of US physicians in both primary care and specialty fields revealed that most physicians believed their medical training to treat chronic conditions was unsatisfactory. Physicians in this study reported that their clinical training was not adequate to diagnose and treat complex conditions and thus felt ill-equipped to meet the demand of their current practice (Darer, Hwang, Pham, et al., 2004).

In summary, although important characteristics and trends in unmet health care needs, health care utilisation, access to community and education supports have been identified for individuals with ASD, the satisfaction of specific mental health care services parents access for their adolescent with ASD is lacking and an understanding of mothers' satisfaction levels during and after receipt of mental health services are unclear. The research examined above has sought to explain the frequency of mental health services used by adolescents with ASD (Narendorf et al., 2011) as well as the low level of dissatisfaction of services accessed by parents for their adolescent regarding school and community supports. This research has indicated that parents are generally dissatisfied with services, however satisfaction of mental health services for depression such as psychological services and psychiatric services are rarely examined.

In the TD population, satisfaction with services is directly correlated to the likelihood of individuals continuing services for treatment engagement and support (Bjorngaard, Andersson, Ose, & Hanssen-Bauer, 2008; Forrest, Riley, Viver, Gordon, & Starfield, 2004; Hoagwood, 2005). Subsequently, patient satisfaction and experiences are increasingly used as indicators of quality in health care (Holmboe et al., 2011). Despite the knowledge of the importance of parent satisfaction, there is little research exploring mother's satisfaction with mental health services for adolescents with ASD, specifically for depressive symptoms. It is

anticipated that given research to date has indicated that mothers show low levels of satisfaction during receipt of services (Brookman-Frazee et al., 2011a; Darer, Hwang, Pham, et al., 2004; National Autistic Society (2010), and mothers present with low levels of satisfaction after services have ceased (Brookman-Frazee et al., 2011a; National Autistic Society, 2010), mother's in the current investigation will show low levels of satisfaction on both occasions.

The Current Investigation

Based on the ASD adolescent literature to date and the important role of mothers in the help seeking process, there is a need to advance research regarding parental recognition of mental health disorders in adolescents with ASD as very little is known of the factors that impact mother's help-seeking behaviour regarding adolescent's depressive symptoms. Issues of importance includes mother's ability to recognise depressive symptoms and access formal services for their adolescent and subsequently mother's satisfaction with these services. Understanding those specific factors that affect parent help-seeking may assist in supporting parents to access services for their adolescents' mental health needs. Subsequently, continued efforts to understand mother's help-seeking behaviours may be successful in benefitting the overall care for adolescents with ASD and co-occurring depressive symptoms and their families.

Despite identification of help-seeking issues in the ASD literature, previous studies on adolescents' (with ASD) experiences of depression, help-seeking for depression, and utilisation of professional mental health services have not addressed the broader help-seeking process by mothers as identified in the TD and ID literature (Douma et al., 2006; Lawrence et al., 2015; Sawyer et al., 2015). The current investigation will examine the help-seeking behaviour of mothers at various steps in the process. This includes if mothers can identify depressive symptoms in their adolescent (with ASD); if mothers are more likely to seek help

when they perceive depressive symptoms; reasons that mothers do seek help for their adolescent's depressive symptoms; factors associated with mother's help-seeking behaviour for their adolescent's depressive symptoms; and mothers' satisfaction with the services their adolescent with ASD and co-occurring depressive symptoms access.

The current investigation will use frameworks based on existing research examining TD and ID populations (e.g., Douma et al., 2006; Sawyer et al., 2015; Weiss et al., 2016) to examine reasons why mothers do not seek help for their adolescent's depressive symptoms. Few studies have examined reasons why mothers do not seek help in the context of existing help-seeking frameworks.

The current investigation will also examine reasons why mothers do not seek help for their adolescents with ASD and co-occurring depressive symptoms. The current sample will recruit only adolescents which is in contrast to existing research that has examined help-seeking behaviours of mothers of adolescents with ID (e.g. Douma et al., 2006), mothers of TD children and adolescents (e.g. Sawyer et al., 2015) and mothers with adolescents and adults in a combined sample with ASD (e.g. Weiss et al., 2016).

Furthermore, multiple factors associated with predictors of mother's help-seeking behaviour, such as mother's level of stress and family history of mental health disorder will be examined together. This is in contrast to existing ASD research where factors associated with mother's help-seeking are often examined in isolation. As researchers have identified that multiple factors influence parent help-seeking in the TD adolescent population, it is important to examine multiple factors with an ASD adolescent population (Turchik, Demireva, & Ogles, 2010).

The current investigation will examine mother's satisfaction levels with the formal mental health services accessed by their child with ASD and co-occurring depressive symptoms, during the period of service use and after services have ceased. This focus is in

contrast to previous research that often examines mother's satisfaction levels regarding early intervention services, or educational and community services for their children and adolescents with ASD without a co-occurring mental health disorder.

Whilst informal sources such as friends and family play an important role in supporting an adolescent through a period of depression, there is some evidence that informal help prevents access to formal help, such that evidence-based treatments are not utilised (Lamb et al. 2012). In many cases young people will require the help from a mental health professional, such as a psychologist, to treat the depression particularly if the depression is moderate or severe (Purcell et al., 2013). Hence the current investigation will focus on formal help-seeking by examining mother's experiences of accessing formal mental health services such as those provided by an allied health or medical professional in the private or public health sector.

As well as building on the current knowledge base regarding mother's help-seeking behaviour for adolescent's with ASD and co-occurring depressive symptoms, the current investigation will address existing methodological limitations identified in the research to date. Specifically, the current investigation will use a larger sample size of adolescents with ASD and co-occurring depressive symptoms without the inclusion of adults and children in the sample.

Research Aims and Hypothesis

Aim 1: To examine the agreement between mothers' and adolescents' reporting of adolescent depressive symptoms and the likelihood of mothers' over reporting these symptoms.

Hypothesis: Based on the ASD and TD research to date indicating a low to medium agreement between mothers and their children regarding mental health issues (e.g. Angold, 1987; Lopata et al., 2010; Meyer et al., 2006; Salbach-Andrae et al., 2009), it was anticipated

that a low to medium association between mother's report of adolescent's depressive symptoms and adolescent's self-report will be observed. In addition, it was expected that the mother's will report significantly higher mean scores of depressive symptoms than adolescent's self-report.

Aim 2: To examine the influence of mother's perception of adolescents' depressive symptoms on their current or past history of help-seeking behaviour.

Hypothesis: Based on the TD research examined in the above literature review (e.g. Thurston et al., 2015), it was hypothesised that mothers with a history of help-seeking for their adolescent would report higher levels of depressive symptoms in their adolescent with ASD than mothers with no history of help seeking for their adolescent diagnosed with ASD.

Aim 3: To examine the role of factors such as family history of mental health disorder, mother's level of stress associated with parenting her adolescent with ASD, adolescents' severity of ASD symptoms and the age of the adolescent on mother's history of help-seeking behaviour.

Hypothesis: Based on the TD research and the ASD literature regarding factors that predict mother's help-seeking behaviour, it was hypothesised that age of the adolescent, levels of mother's stress, a family history positive for mental health disorder and increased severity of ASD symptoms will be associated with higher help-seeking behaviour of mothers.

Aim 4: To examine reasons mothers do not seek help for their adolescent's depressive symptoms. These factors include mothers not thinking that their child was depressed; mother's thinking that they had the skills to help their adolescent if they identified depressive symptoms; mothers being unsure of services to access or not knowing how to access services; mothers believing they were not required to access services and adolescents refusing to access services.

Hypothesis: Based on the research to date from the ASD population, TD population and populations with learning difficulties (Douma et al., 2006; Lawrence et al., 2015; Weiss et al., 2016), it was anticipated that of the barriers examined in the research by Douma et al., Lawrence et al. and Weiss et al., parents in the current investigation would frequently endorse the following reasons for not seeking help: mothers were not sure where to get help; not being able to afford help and preferring to handle the problem by themselves.

Aim 5: To examine the level of satisfaction, mothers' report regarding the mental health services they accessed for their adolescents' depressive symptoms during service provision and after services had ceased.

Hypothesis: Based on the research in the TD population and the ASD population, it was anticipated that the majority of mothers would report low levels of satisfaction with mental health services on the Depression and Services Questionnaire during and after services provision.

Summary of Chapter

The current chapter presented the literature review for Investigation 2. The literature review referenced research from the TD population as a framework for the current investigation due to the minimal ASD research available. The literature reviewed included parents perceptions of adolescent's psychopathology and mother's help-seeking behaviour, factors associated with mother's help-seeking behaviour for adolescents with ASD and depressive symptoms, reasons why mothers don't seek help for their adolescents and service satisfaction. The current chapter presented the five aims and hypothesis of Investigation 2. This chapter is followed by the methods section for Investigation 2.

Chapter 7

Investigation 2

Method

Aims of Chapter

The current chapter presents information related to the method section for Investigation 2. Participant characteristics for mothers are presented in the current chapter and measures specific to this investigation are listed and discussed. The design of the current investigation is only briefly presented in this chapter, as a detailed procedure and data collection process of Investigation 2 is presented in Investigation 1.

Design

Investigation 2 formed an additional investigation as part of the larger research project. Investigation 2 incorporated the parents of the adolescents with ASD. Data collected for this investigation was conducted at the same time as Investigation 1. The design of the current Investigation was discussed Chapter 3 and consisted of a cross-sectional quantitative design.

Participants

Participant Characteristics: Mothers. The mean age of the 102 mothers in the sample was 44.50 ($SD=5.61$). The age of the mothers ranged from 31.00 to 67.01 years. Table 12 summarises the frequencies and percentages for the relationship status, race/ethnicity and occupation of the mothers in the sample. The majority of mothers' self-reported ethnicity was Australian / New Zealand (79.40%). The most common occupations held by mothers were in professional and business services (26.50%) and in health services (23.50%).

Table 12

Frequency and Percentages of Demographic Data Distribution for Mother Participants

Mother's Demographic	Frequency (N=102)	Percent (%)
Relationship Status		
Married	77	75.50
Single	6	5.90
De-facto	2	2.00
Separated/Divorced	17	16.70
Ethnicity		
Australian and New Zealand	81	79.40
North West European	19	18.60
North East Asian	1	1.00
Southern and Central Asian	1	1.00
Occupation		
Home Maker	20	19.60
Retail Trade	9	8.80
Educational Services	17	16.70
Health Services	24	23.50
Professional & Business Services	27	26.50
Building & Construction	2	2.00
Student/Studying	3	2.90

Measures

A number of measures used in the current investigation had also been used in Investigation 1. Other measures used in the current study were not used in Investigation 1. For the current investigation the following measures were used: details of the Intake Interview were utilised, as described in Investigation 1; a treatment seeking measure, titled, “Depression and Services Questionnaire” (DSQ; see Appendix 3); the parent report component of the CDI (Kovacs, 2011); the CDI 2-SR (Kovacs, 2011) completed by the adolescents, as described in Investigation 1; the Stress Index for Parents of Adolescents (SIPA; Sheras & Abidin, 1998); and the Childhood Autism Rating Scale, Second Edition High Functioning Version (CARS 2-HF; Schopler, Van Bourgondien, Wellman, & Love, 2010).

Intake Interview. See Investigation 1 for description of this interview.

The Children’s Depression Inventory 2: Self-Report (CDI 2: SR; Kovacs, 2011).

See Investigation 1 for description of this measure.

The Children’s Depression Inventory 2: Parent Report (CDI 2: P; Kovacs, 2011).

The CDI Parent report assesses parents’ perceptions of their child’s depressive symptomatology. Parents respond to 17 items of the CDI 2: P on a 4-point Likert-type scale from 0 (not at all) to 3 (much or most of the time). For example, “My child is cranky or irritable. Not at all (0), Some of the time (1) Often (3) or Much or most of the time (3).” The total raw scores on the CDI 2: P range from 0-42 with higher scores on the CDI 2:P indicating that the parent perceives that their child with higher levels of depressive symptoms. The CDI-2 manual recommends 17 as a cut-off raw score for the CDI: P to differentiate between youth with and without a depressive disorder for the purposes of early detection and determining adequate treatments and as such this cut off score will be used in the current study.

Research examining the temporal stability of the original CDI:P has found it to be reliable over time. Kovacs (2010) examined parent rated CDIs of at-risk children (i.e., parental history of depressive disorders) and control children. Findings showed parent rated CDI scores had excellent short-term and acceptable long-term temporal stability. For the at-risk cases, the test-retest reliability of the CDI:P was 0.92 over a 1-week interval and 0.56 up to a 3-month interval. For control children, the test-retest reliability of the CDI:P as 0.75 over a 1-week interval and .86 for an interval of up to 3 months. Cronbach's alpha ranged from 0.79 to 0.89 for the subscales of the CDI:P.

Parent Treatment Seeking Measure. To better understand mother's help-seeking behaviour for their adolescent's depressive symptoms, I designed the Depression and Services Questionnaire (DSQ; see Appendix 3) specifically for the current study. The DSQ was based on the work of Lawrence et al. (2015) regarding TD adolescents and Douma et al. (2006) regarding adolescents with ID.

The DSQ was designed to explore mothers' perceptions of their adolescents' mental health and their help-seeking behaviour. Mothers were instructed by the researchers to answer questions regarding their adolescent in the past 3-6-month time period unless stated otherwise. Upon completion of the questionnaire the results were discussed with the mother and the researcher to make sure that the answers had captured the mother's experience of help-seeking and services accessed.

The DSQ was also used to define the help-seeking and non-help seeking groups. That is question 3 of the DSQ asked, "In the past 3-6 months have you sought formal assistance/help / services for your child specifically for depression?" If mothers answered 'yes' to this question a score of 1 was awarded; if mothers answered 'no' they were scored 0.

Differentiation between groups was conducted through question 5 of the help-seeking questionnaire, “Where are you in the help-seeking process of receiving services for your child’s depression?” If mothers indicated that within the past 3-6 months they were actively seeking out appropriate services, currently on a waitlist for services, actively engaging in services or had finished services they were considered help-seekers.

Information was gained from the DSQ regarding reasons mothers did not seek help from formal services for their adolescent’s depressive symptoms. Mothers were asked to indicate their response on a seven-item multiple response format question. Reasons such as, “I never thought my child was depressed” and “I was unsure what services to access to help him/her” were included for the mother’s to endorse.

The DSQ also delineates where mothers are in the help-seeking process, such as having a willingness to engage in services (i.e., seeking out appropriate services or on a waitlist for services), if their child was actively engaging in services, and/or if they have finished service provision. Mothers could select multiple responses regarding their position in the help-seeking process. For example, a mother was able to indicate that her adolescent was engaging in a mental health service in the private sector whilst on a waitlist for a different service in the government sector. Mothers were required to state the name of the service provider to further clarify their position in the help-seeking process. A measure of satisfaction with service provision was also obtained from the Depression and Services Questionnaire. Satisfaction with these services was measured using a 5-point Likert scale (1 = Very Dissatisfied 5 = Very Satisfied).

Stress Index for Parents of Adolescents (SIPA; Sheras & Abidin, 1998). The SIPA was used in the current study to measure mother’s stress. The SIPA is a screening and diagnostic tool completed by parents of adolescents aged 11 to 19 years and is used to detect stressful sectors of parent-adolescent interactions from the perspective of the parent.

The SIPA consists of 112 items. The first 90 items are answered using a 5-point Likert-type scale (strongly disagree to strongly agree); and the remaining 22 items, comprising the Life Stressors Scale, are completed by using a 2-point scale “Yes” or “No”, to indicate if specific events (e.g., marriage) occurred in the past year. Sample items on the SIPA include, “My child is very moody”, “I often feel that my life is controlled by my adolescent needs”, and “It is easy for me to understand what my adolescent wants or needs.”

The SIPA yields scores in three domains as well as an overall score. The three domains are the: Adolescent domain, designed to measure parental stress related to the adolescent, with four subscales (Moodiness/Emotional Lability, Social Isolation/Withdrawal, Delinquency/Antisocial, and Failure to Achieve/Persevere); Parent domain, designed to assess parenting stress related specifically to parent characteristics and the role of parenting with four subscales (Life Restrictions, Relationship with Spouse/Partner, Social Alienation, and Incompetence/Guilt); and Adolescent-Parent Relationship domain, which measures the perceived quality of the relationship the parent has with the adolescent, such as the degree of communication and affection between them. The SIPA also includes a Life Stressors scale and an Index of Total Parenting Stress. The Total Parenting Stress Index score was the only score to be used in the current study.

The Total Parenting Stress Index score is defined by the manual as “a composite of all items (1-90) across all domains and indicates the total stress experienced as a function of parenting a particular adolescent; it does not represent the total stress a parent is experiencing from all sources of stress in his or her life” (p. 14, Sheras et al., 1998). The raw score of the Total Parenting Stress Index score ranges from 90-450. Interpretations will be based on raw scores with higher scores indicating higher levels of stress. Sheras et al. (1998) used the following interpretative categories to corresponding raw scores: Clinically Severe Range= 281-450; Clinically significant range= 259-280; Borderline Range= 239-258; and within

normal limits < 238, consistent with other studies (e.g., Benson & Dewey, 2008; Jarvis et al., 2004).

According to the manual, normative data were derived from 778 parents of adolescents from the general population and a clinical sample of 159 parents of adolescents who had received a DSM-IV diagnosis for Mood Disorder, Attention Deficit Hyperactive Disorder, Oppositional Defiant Disorder, Conduct Disorder and Anxiety Disorders. The SIPA has found to be highly reliable. Internal consistency for the SIPA subscales exceeds 0.80 with internal consistency for the majority of the subscales in the high 0.80s-0.90. The 4-week test-retest reliability coefficients for the subscales range from 0.74 to 0.91 and have been found to remain stable over a period of time (Sheras & Abidin, 1998).

Procedure

The procedure for the current study was identical to that used in Investigation 1. To reiterate briefly, after ethics approval was obtained from the Edith Cowan University, consent forms were distributed to parents and returned by mothers and adolescents. Upon return of the consent forms, mothers were contacted and an initial intake interview (see Appendix 2) was obtained over the phone. Participation in completing the questionnaires was scheduled with mothers and adolescents and conducted in person at the family home, at the principal researchers' private psychological practice in the Perth Metropolitan Area or via SKYPE if the family resided in other territories and states in Australia. Mothers in the current study were required to complete questionnaires (e.g., SIPA, Depression and Services Questionnaire, the CARS-HF-2 and CDI-P) at the same time the adolescents were completing their questionnaires. Regarding the DSQ, at time of interview, mothers were asked to endorse from multiple options indicating where they were in the help-seeking process. That is, whether they showed a willingness to access services, and/or were engaged in services and/or had finished services.

In addition, the DSQ was discussed with the mother to confirm that the most recent time of their help-seeking behaviour and the services she accessed for her adolescent were captured appropriately in the 3-6-month time frame stipulated at the beginning of the interview. Mother's completed the battery of questionnaires in a location separate to where the adolescent was being interviewed in approximately 45 minutes. After completion of the questionnaires, they were examined for missing items and mothers were asked to complete items they missed to minimise missing data.

Researchers

As well as the principal researcher, two research assistants were employed to interview adolescents and to provide mother participants with the questionnaire package in the current Investigation. Details of the researchers are referred to in Investigation 1, Chapter 3.

Data Analysis

Data Preparation.

Preliminary Analysis. The data set was initially examined for outliers and normality. To determine the presence of univariate outliers, box plots were examined. Univariate outliers were defined as z scores that are not between -3.29 and + 3.29 (Tabachnick and Fidell, 2007). Skewness and kurtosis values were examined to determine if the distributions were sufficiently normal. Descriptive statistics including means, standard deviations, range, skewness, kurtosis and Shapiro-Wilk's values were calculated for variables of interest. Preliminary analyses were performed to ensure there was no violation of assumptions of normality, linearity and homoscedasticity in each of the measures used in the current Investigation.

To understand the presentation of mothers' and adolescents' characteristics, a number of descriptive statistics and frequency analysis were conducted. Descriptive statistics were calculated to determine adolescents' self-report of depressive symptoms and parent ratings of adolescents' depressive symptoms using the CDI (Kovacs, 2011). A frequency analysis was conducted to identify adolescents' family history of mental health disorder using information collected from the Intake Interview. A second frequency analysis was conducted to identify mother's level of stress as measured by the Stress Index for Parents of Adolescents (SIPA; Sheras & Abidin, 1998). Mother's scores on the SIPA were grouped following the interpretive categories corresponding to raw scores as per the SIPA Manual (Sheras & Abidin, 1998).

Groupings of mothers into help-seekers or non-help-seekers.

A number of subsequent frequency analysis were conducted to determine groupings of help-seekers and non-help-seekers as well as mothers' position in the help-seeking process regarding formal services (e.g. adolescent actively engaging in services) and mothers' level of service satisfaction through use of the DSQ. Groupings of mothers responses varied for aims 2 to 5. For aim 2, when examining the influence of mother's perception of adolescent's depressive symptoms on their current or past history (3-6 months) of help-seeking behaviour, mothers were grouped into help-seeking or non-help-seeking groups via question 3 of the DSQ. That is, mothers that answered 'yes' to help-seeking in the past 3 to 6 months were grouped as help-seekers and mothers that answered 'no' to help-seeking in the past 3 to 6 months were grouped as non-help-seekers.

For aim 3, frequency analyses were conducted to group mothers as help-seekers and non-help-seekers from question 3 and 5 of the DSQ when examining the role of factors (e.g. mother's stress) on mothers' help-seeking behaviour. Mothers were grouped as help-seekers if they: (1) sought help in the past 3-6 months and showed a willingness to seek help or; (2)

their child was actively engaging in services. Mothers were grouped into non-help seekers if they: (1) had finished services and no longer showed a willingness to seek help; or (2) had not sought help in the past 3-6 months.

For aim 4, mothers were grouped into help-seekers and non-help seekers using question 3 of the DSQ prior to examining reasons why mothers did not seek help for their adolescent's depressive symptoms. Prior to analysing satisfaction levels of services for aim 5, mothers were grouped into help-seekers and non-help-seekers using question 3 and 5 from the DSQ (i.e. "In the past 3-6 months have you sought formal assistance/ help / services) for your child specifically for depressive symptoms?" and "If yes, where are you in the process of receiving services for your child's depression?" help within the past 3-6 months. Of those that sought help, mothers were grouped into two groups: (1) mothers whose children who were receiving services (i.e. actively engaging in services); and (2) mothers of adolescents who had finished service provision.

Main Analysis. For the first aim, a correlational design was used to examine the relationship between mother's perception of their adolescent's depressive symptoms and adolescent's self-report of depressive symptoms. For between group differences such as t-tests, Cohen's d (Cohen, 1988) was reported to determine effect size and effect sizes were interpreted as small ($d = 0.20$), medium ($d = 0.50$), and large ($d = 0.80$) based on commonly referred to benchmarks suggested by Cohen (1988). In addition, a paired samples t-test was used to compare mother's reports of adolescent's depressive symptoms to adolescent's self-report of depressive symptoms.

For the second aim, an independent samples t-test was conducted in order to examine the influence of mother's perception of adolescents' depressive symptoms on their current (past 3-6 months) help-seeking behaviour (i.e., help-seekers or non-help-seekers). For the third aim, a logistic regression analysis was conducted to examine the influence of age,

mother's stress, family history of mental health disorder and severity of ASD symptoms on mother's help-seeking behaviour.

Regarding the fourth aim, using results from the DSQ, the focus of the statistical analysis was to determine, using a chi square analysis, the most frequently endorsed reasons why mothers did not access formal services for their adolescents' depressive symptoms and if specific reasons were endorsed more than other reasons. Mothers were required to endorse multiple responses on the DSQ regarding reasons why they did not seek mental health services for their adolescent's depressive symptoms.

For the fifth aim, two chi square analysis were conducted regarding mother's satisfaction levels of formal mental health services used by their child. The first chi square analysis was conducted to determine mothers most frequently endorsed level of satisfaction during service provision for their adolescent's formal mental health services. The second chi square analysis was conducted to measure mothers most frequently endorsed level of satisfaction when service provision had ceased. Satisfaction of services was measured using mothers' responses on the DSQ.

All statistical analyses for the current study were performed with Statistical Package for Social Sciences (SPSS 22.0.0.0). A power analysis was conducted using the freeware statistical software program G*Power software version 3.0.10 (Erdfelder, Faul, & Buchner, 1996) to determine if the sample size was appropriate for the logistical regression to potentially yield a statistically significant difference when such a difference actually exists. That is, the null hypothesis will be rejected when necessary and thus avoid a Type II error. Alpha was set at 0.05 (given the nature of the current study with a population that is difficult to access in large numbers and the greater concern over Type II errors relative to Type 1) (Tabachnick & Fidell, 2013). With four predictor variables an a priori power analysis

indicated that a minimum of 69 participants were required to have 80% power for detecting a medium effect size ($f^2 = .15$) as based on previous research (Hsieh, Block, and Larsen, 1998) when employing the traditional .05 criterion of statistical significance.

Summary of Chapter

The current chapter discussed the demographics of the mother participants as well as the measures used in the current investigation which included the treatment seeking measures and measurement of parental stress. The procedure used in the current Investigation 2, was identical to that used in Investigation 1. Preliminary data preparation including the preliminary analysis and groupings of others into help-seekers or non-help-seekers was also reported. This chapter is followed by the results section of Investigation 2.

Chapter 8

Investigation 2: Results

Data Analysis

Data Preparation

Missing Data. Missing data was avoided in the current investigation as mothers who completed the questionnaires in person had their questionnaires reviewed by the researchers directly after they had been completed. If a question was not completed, mothers were asked to complete the missing entry at that time. For mothers who completed their questionnaires via SKYPE, mothers were asked to take time to scan their questionnaires for missing or incomplete answers. If missing answers were identified, mothers were asked to amend these prior to returning the questionnaires to the researcher.

Outliers. Box plots were examined, yielding 6 outliers within one variable. The six outliers identified on box plots as extreme values were related to the adolescent report of the depression, the CDI-2-SR, where adolescents rated themselves as having high levels of depressive symptoms. The outliers were retained as they were viewed as being representative of the current sample.

Normality. Skewness and kurtosis are presented in Table 13. As can be seen in Table 13, most of the skewness and kurtosis values indicated these distributions were normal. Only parent report of adolescent depressive symptoms and adolescent report of depressive symptoms were identified as having z scores greater than 3.29 (Field, 2013). In the current investigation, results of the Shapiro-Wilk test (see Table 13) indicated that data was non-normally distributed for all measures other than anxiety symptomatology. However, it was decided that these variables would not be transformed for the following reasons: (1) the current study had a large sample size ($N=102$) and therefore the violation of the normality assumption should not cause any issues (Pallant, 2007); (2) many of the skew and kurtosis

values were within Tabachnick and Fidell's (2007) conventional Z skewness value of 3.30 with $\alpha = .001$; and (3) the scales used were meaningful, widely used, and standardised. Further, Tabachnick and Fiddell (2007) recommend against transformation of such scales as it often hinders interpretation.

Table 13

Means, Standard Deviations, Range, Skewness, Kurtosis and Shapiro-Wilk's Values for Variables of Interest

Measure	<i>M</i>	<i>SD</i>	Possible Range	Observed Range	Skewness	Kurtosis	<i>z</i> Skewness	<i>z</i> Kurtosis	Shapiro- Wilk	Shapiro- Wilk <i>p</i>
ASD Symptoms	24.26	6.12	15-60	15-42	0.73	0.12	3.04	0.25	0.95	<.01
Depressive Symptoms (Self)	13.26	9.74	0-56	2-46	1.45	1.78	6.08	3.75	0.85	<.01
Depressive Symptoms (Parent)	21.27	.96	0-63	4-44	.39	-.56	1.62	4.13	.97	.02
Parental Stress	228.30	44.23	9-450	107-332	.06	.58	0.26	1.22	.97	.03
Mental Health Disorder	.43	.50	0-1	0-1	.28	-1.9	1.17	4.13	.63	.00
Help-seeking	.47	.50	0-1	0-1	.12	-2.0	0.5	4.27	.64	.00

Note. *N*=102; *df*=102. *M* = Mean. *SD* =Standard Deviation. CARS 2HF: Childhood Autism Rating Scale-2nd Edition High Functioning; CSEQ-SR-OVS: Children Self-Experience Questionnaire-Self Report-Overt Victimisation Scale; CSEQ-SR-RVS: Children Self Experience Questionnaire-Self Report-Relational Victimisation Scale; CSEQ-SR-RPB: Children Self Experience Questionnaire-Self Report-Recipient of Pro-social Behaviour; CLES-3 MONTH: Coddington Life Event Scale-3 month interval; CLES-6 MONTH; CLES-9MONTH; Coddington Life Event Scale – 9 month interval; CLES-12 MONTH: Coddington Life Event Scale-12 month interval; CDI 2:SR: Children's Depression Inventory 2nd Edition: Self-Report; CDI -P : Children's Depression Inventor P: Children's Depression Inventory 2nd Edition: Parent Report; MASC: Multidimensional Anxiety Scale for Children; CASQ: Children's Attributional Style Questionnaire. Possible Range is presented in raw scores.

Preliminary Analysis

Mother's Report and Adolescent Report of Adolescent's Depressive Symptoms.

As previously reported in Chapter 4, 60.08% of adolescents self-reported symptoms of depression in the average range; 20.60% of adolescents reported their depressive symptoms to be in the high average to elevated range and 18.60% of adolescents self-reported depressive symptoms in the very elevated range.

Descriptive statistics, as presented in Table 14, indicated that mothers rated their adolescents as having more depressive symptoms than the adolescents self-report of depressive symptoms.

Table 14

Descriptive Statistics for Mother and Adolescents Regarding Levels of Depressive Symptoms

Participants	<i>N</i>	<i>M</i>	<i>SD</i>
Mothers	102	21.27	9.67
Adolescents	102	13.26	9.74
Total Group	204	17.26	10.48

Note. *N*= 102. *M* = Mean. *SD*= Standard Deviation.

Family History of Mental Health Disorder. Eighty-two (80.39%) mothers reported though use of the Intake Questionnaire that a member in their adolescents' immediate or extended family (1st^t generation) had been diagnosed with a mental health disorder including mood and anxiety disorder.

Mother's Severity of Stress. A frequency analysis indicated that nearly 55% of mothers experienced stress in the 'Borderline to Clinically Severe' range from parenting their adolescent with ASD and co-occurring depressive symptoms (see Table 15).

Table 15

Mother's Stress Levels from Parenting their Adolescent with ASD

SIPA Range	n (%)
Normal Range	46 (45%)
Borderline Range	35 (34.3%)
Clinically Significant Range	13 (12.74%)
Clinically Severe Range	8 (7.8%)

Note: N= 102. Stress Index for Parents of Adolescents (SIPA; Sheras & Abidin, 1998). The raw score of the Total Parenting Stress Index score ranges from 90-450.

Mother's Stage in the Help-Seeking Process. At time of interview, mothers were asked to endorse item 3 from the Depression and Services Questionnaire to indicate if they were currently seeking help (i.e. seeking help within the last 3-6 months) or not seeking help (i.e. had never sought help or sought help more than 6 months ago). A score of 1 was awarded to mothers who had sought help in the last 3 to 6 months; and a score of 0 was awarded to those mothers who had not sought help in the last 3 to 6 months. Data collected from question 3 indicated that 48 mothers were currently seeking help and 54 mothers were not seeking help.

If mothers were considered help-seekers they were asked to endorse Question 5 from the Depression and Services Questionnaire (DSQ) to indicate from multiple options where they were in the help-seeking process. That is, whether they showed a willingness to access services, and/or were engaged in services and/or had finished services. As seen in Table 16,

the 48 help-seeking mothers were at different stages of the help-seeking process at any given time.

Table 16

Frequency Analysis for a Multiple Response Question Regarding Mother's Help-Seeking Stage for Mental Health Services for their Adolescent with Depressive Symptoms

Stage in the Process of Receiving Help	Reponses <i>N</i> (%)	Percentage of Cases
Willingness to access services	21 (29.60%)	43.80%
Actively engaging in services	30 (42.30%)	62.50%
Have finished service provision	20 (28.20%)	41.7%
Total	71 (100%)	147.90%

Note: help-seekers $n=48$

Regarding mother's help-seeking behaviour, analyses using data from question five of the DSQ indicated that of the 48 mothers that sought help, 20 had indicated that they had finished service provision. As question 5 of the DSQ was a multiple response question, further analyses revealed that of these 20 adolescents whose mothers indicated that they had finished services, 13 had completely finished service provision and mothers no longer showed a willingness to access services. The remaining seven mothers reported that whilst their adolescent had finished services with a specific mental health service provider they continued to receive formal services from a different provider. In addition, these seven mothers continued to show a willingness to access additional services by actively seeking out other services, learning about other services and being waitlist for additional services.

Groupings of mothers into help-seekers and non-help-seekers. Prior to addressing the main analyses, mothers were grouped according to help-seekers and non-help-seekers for

aims 2 to 5. There was some variations in grouping which were dependent on the statistical analysis employed and the aim to examine.

The influence of mother's perceptions of adolescent's depressive symptoms on their current history of help-seeking behaviour. For the second aim, mothers were grouped into help-seekers and non-help-seekers using data collected via question 3 and 5 of the DSQ. For current help-seeking behaviour (i.e., help-seeking behaviour in past 3-6 months), thirty-five (39.32%) mothers showed a willingness to access services (i.e., seeking out services and on a waitlist for services) and/ or their adolescent was actively engaging in services for depressive symptoms. Thirteen mothers whose adolescents had finished services in the past 3 to 6 months and were not engaging in other services nor were their mothers willing to access other services were not included in the current analyses as they were no longer considered help-seeking ($n=13$). Thus, of the remaining 89 mothers, total current help-seekers (i.e., help-seeking behaviour in past 3-6 months) for this analysis was $n = 35$ and non-help-seekers was $n = 54$.

The role of family history of mental health disorder, mother's level of stress, severity of ASD symptoms and adolescent's age on mother's help-seeking behaviour. Mothers were grouped according to help-seekers and non-help-seekers for the purpose of the logistic regression when examining factors that may predict mother's help-seeking behaviour. A total of fifty-four (60.67%) mothers reported that they had not sought out services in the past 3 to 6 months and these mothers were grouped as non-help seekers ($n = 54$). Of the initial 48 mothers that reported to seek help, 20 had indicated that their adolescent had finished service provision. Of those 20 mothers, 13 had adolescents who completely finished service provision and no longer showed a willingness to access services and therefore were excluded from the logistic analysis as they were considered to have completed the help-seeking process at that time. The remaining seven mothers reported that whilst their

adolescent had finished services with a specific mental health service provider they continued to receive formal services from a different provider. Those seven mothers that continued to show a willingness to access additional services by actively seeking out other services, learning about other services and being waitlisted for additional services were considered to be help-seeking and therefore were included in the logistic regression of the main analysis. Therefore, of the remaining 89 mothers, total current help-seekers (i.e., help-seeking behaviour in past 3-6 months) for the logistic regression analysis was $n = 35$ and non-help-seekers was $n = 54$.

Factors impacting on mother's help-seeking behaviour. Mothers were grouped into non help-seekers to determine the most frequently endorsed reasons why mothers did not seek help for their adolescents' depressive symptoms. Mothers who reported to not have sought help in the past 3-6 months on the DSQ, were grouped as non-help seekers ($n = 54$).

Mother's satisfaction levels regarding mental health services. Of the 48 mothers who were grouped as help-seekers, 20 mothers reported that their adolescent had finished a mental health service for depressive symptoms. The chi-square analysis was conducted with this sample of mothers ($n = 20$) to determine their level of satisfaction regarding mental health services their adolescent had accessed.

To examine mother's level of satisfaction with services during service provision, analysis was conducted with 30 mothers from the initial 48 help-seekers. This sample of 30 mothers reported that their adolescent was actively engaging in formal services and were therefore included in the analysis.

The role of family history of mental health disorder, mother's level of stress, severity of ASD symptoms and adolescent's age on mother's help-seeking behaviour. Prior to the logistic analyses data was checked for potential problems of multicollinearity

between the IVs in order to provide valid and reliable data analysis (Saunders et al., 2016). The measures of the collinearity statistics (tolerance scores and variation inflation factor/VIF) for age of adolescent, history of mental health disorder, ASD symptoms and parental stress from parenting adolescent (IVs) on help seeking behaviour (DV) appear in Table 17. Neither the tolerance nor the VIF values indicated a significant presence of multicollinearity based on a VIF with a value over 5, and the tolerance as a proportion of the regression variance not accounted for by other regressors in the model with a value under .20 (Green & Salkind, 2014; Grégoire, 2014; Tabachnick & Fidell, 2012).

Table 17

Table of Tolerance and VIF Values for Independent Variables used in Logistic Regression Analysis

Independent Variables	Collinearity Statistics	
	Tolerance	VIF
Age of Adolescent	.98	1.0
History of Mental Health Disorder	.91	1.1
ASD Symptoms	1.0	1.0
Parental Stress	.91	1.1

Note: $n=89$

Another way to check for multicollinearity is to ensure no correlations between IVs are more than .80. As seen in Table 18, the relationship between the IV's are not above .80 and therefore do not indicate the presence of multicollinearity.

Main Analysis

Mother's report of adolescent's depressive symptoms and adolescent's self-report. As seen in Table 18, results indicated a significant medium positive correlation between mothers' ratings of depressive symptoms and adolescents' self-reported depressive

symptoms, ($r=.37, p=.001$). That is, when there was an increase in how mothers rated adolescents' depressive symptoms, there was an increase in adolescent's self-report of depressive symptoms.

Table 18

Age of the Adolescent, Family History of Mental Health Disorder, ASD Symptom and Parent Stress as Predictors of Mother's Help-Seeking Behaviour: Correlations and Descriptive Statistics

Variable	1	2	3	4	5	6	7
Age	-						
Mental Health Disorder	.12	-					
ASD Symptoms	.00	-.02	-				
Help-Seeking	.14	.53**	.02	-			
Depressive Symptoms (Self-Rated)	.12	.09	.07	.02	-.1		
Depressive Symptoms (Parent-Rated)	.05	.28**	.02	.36**	.40**	-	
Parent Stress	.12	.29**	-.00	.36**	.17	.62**	-
<i>M</i>	14.0	.37	24.15	.39	13.57	21.36	226.60
<i>SD</i>	1.64	.49	6.07	.49	10.22	10.08	10.22

Note. $N = 102$. M = Mean. SD = Standard Deviation. *Correlation is significant at the .05 level. **Correlation is significant at the .01 level. *** Correlation is significant at the .001 level.

The descriptive statistics for the paired-samples t -test appears in Table 14. There was a statistically significant difference between mothers ($M = 21.27, SD = 9.67$) and adolescent ($M = 13.26, SD = 9.74$) groups, $t(101) = -7.45, p < .01$. That is, the mothers rated their adolescents as having more depressive symptoms than the adolescents self-report of

depressive symptoms. The size of the observed difference regarding higher mean scores between mothers' ratings of depressive symptoms and adolescents' ratings of depressive symptoms was -8.01 with a 95% confidence interval ranging from -10.14 to -5.88 . The effect size for this analysis ($d = .83$) was found to exceed Cohen's (1988) convention for a large effect ($d = .80$).

The influence of mother's perceptions of adolescent's depressive symptoms on their current history of help-seeking behaviour. An independent samples t -test was conducted to examine help-seeking behaviour based on how mothers rated their adolescents' depressive symptoms. First, inspection of Q-Q Plots revealed that depressive symptoms were normally distributed for both groups and that there was homogeneity of variance as assessed by Levene's Test for Equality of Variances $t(87) = -3.59, p = .01$. Thirty-five help-seekers ($M=25.83, SD = 9.97$) rated their adolescent as having more depressive symptoms than the fifty-four non-help-seekers ($M = 18.46, SD = 9.12$), $t(87) = 3.58, p = <.01$, two-tailed). The effect size for this analysis was a large effect ($d = 0.77$).

The role of family history of mental health disorder, mother's level of stress associated with parenting her adolescent with ASD, adolescents' severity of ASD symptoms and the age of the adolescent on mother's help-seeking behaviour. Direct logistic regression was performed to assess the impact of age of the adolescent, mother's stress as a result of parenting her adolescent, family history of mental health disorder and severity of ASD symptoms on mother's help-seeking behaviour for adolescents with ASD and depressive symptoms. Correlations between these variables are presented in Table 18. The model could distinguish between respondents who sought or did not seek formal assistance/help/services for their adolescent's depressive symptoms, $\chi^2(5, n=89) = 31.86, p < .001$. The model explained 30.1% (Cox and Snell R square) and 40.8% (Nagelkerke R Squared) of the variance in help-seeking status, and correctly classified 79.8% of cases. As

presented in Table 19, only family history of mental health disorder and mother's stress parenting her adolescent made a unique statistically significant contribution to the model. That is, having a family history of mental health disorder and greater levels of stress for mothers was associated with a greater likelihood of help-seeking behaviour for treatment of depressive symptoms after controlling for other variables.

Table 19

Logistic Regression Predicting Likelihood of Mother's Help-Seeking for Adolescents with ASD for Depressive Symptomatology

	<i>B</i>	<i>SE</i>	<i>Wald</i>	<i>df</i>	<i>p</i>	Odds Ratio	95.0% CI for Odds Ratio	
							Lower	Upper
Age of Adolescent	0.09	0.16	0.32	1	.57	1.09	0.80	1.50
Mother's Stress	.015	0.01	5.22	1	.02*	1.02	1.00	1.03
Family History of Mental Health Disorder	2.18	0.54	16.38	1	.01**	8.84	3.08	25.37
ASD Symptom Severity	0.02	0.04	0.19	1	.67	1.02	0.93	1.11
Constant	-6.64	2.89	5.28	1	.02	0.01		

Note. *n* = 89. *df* = Degrees of Freedom. *CI* = Confidence Interval. Age = Age of adolescents. **p* <.05; ***p* <.01;

****p* <.001.

The strongest predictor of mother's help-seeking behaviour was a family history of mental health disorder recording an odds ratio of 8.84. This finding indicated that mothers who had a family history of mental health disorder were 8 times more likely to seek help than those who did not have a history of a mental health disorder. The odds ratio for mother's stress from parenting her adolescent was 1.02. Results indicated that mothers who experienced elevated levels of stress from parenting her adolescent were more likely to seek

help for their adolescent. Results also indicated that age of the adolescent and severity of ASD symptoms had limited impact mother's help-seeking behaviour.

Factors impacting on mother's help-seeking behaviour. Fifty-four (52.9%) mothers who did not seek help for their adolescent's depressive symptoms were asked to endorse multiple responses, where applicable, regarding factors that impacted on their help-seeking behaviour. A chi-square goodness of fit test indicated that there was a significant difference between the factors that impacted on mother's help-seeking behaviour $\chi^2 (6, n = 54) = 90.54, p < .01$. As presented in Table 20, some reasons that mothers did not seek help had greater frequency over others. The results indicated that 70.4% of mothers did not seek help for their adolescents' depressive symptoms because they did not think their adolescent had depressive symptoms. A further 29.60% of cases indicated that they did not seek services for their adolescents' depressive symptoms because they thought they had the skills to help their adolescent. Over 20% of mothers selected 'other' when indicating reasons for not seeking help for their child's depressive symptoms. Reasons mothers noted when selecting this category for not seeking professional help included the cost of professional help, the waitlist for services and negative experiences of seeking help in the past.

Table 20

Chi Square Analysis for A 7 Item Multiple Response Question for Reasons Why Mothers Did Not Seek Services for their Adolescents' Depressive Symptoms

Reason for not seeking help for formal services	Reponses <i>N (%)</i>	Percentage of Cases
Never thought child was depressed	38 (48.70)	70.40%
Mother had own skills to help	16 (20.50)	29.60%
Unsure what service to access for help	6 (7.70)	11.10%
Mother did not know how to access service for help	1 (1.30)	1.90%
Professional stated service not required	4 (5.10)	7.40%
Child refused services	2 (2.60)	3.70%
Other	11 (14.10)	20.40%
Total	78 (100.00)	144.40%

Note. $n = 54$ non-help-seekers; total response of 78 refers to the number of responses provided by the 54 mothers when answering the multiple response question.

Mother's satisfaction levels regarding mental health services. While 60% of mothers were 'very dissatisfied' to 'dissatisfied' with services their adolescent had received and no mothers reported to be 'very satisfied' with services their adolescent had accessed (see Table 21), a chi-square goodness of fit test indicated that there was no significant difference between levels of mother's satisfaction on formal services that the adolescents had engaged in, $\chi^2 (3, n = 20) = 6.0, p = .11$.

Table 21

Chi Square Analysis including Percentage of Mother's Level of Satisfaction for Depressive Symptom Related Services that were Completed by Adolescents

Satisfaction with Service After Services Completed	Frequency (%)
Very Dissatisfied	9 (45%)
Dissatisfied	3 (15%)
Neither Satisfied Nor Dissatisfied	2 (10%)
Satisfied	6 (30%)
Very Satisfied	0 (0%)
Total	20 (100%)

Note. $n=20$.

While more than half of the mothers were 'satisfied' or 'very satisfied' with the services they were currently receiving (see Table 22), a chi-square goodness of fit test indicated that there was no significant difference between the levels of satisfaction experienced by mothers whose adolescent was actively engaging in formal services, $\chi^2 (4, n = 20) = 8.33, p = .08$.

Table 22

Chi Square Analysis including Percentage of Mother's level of Satisfaction for Depressive Symptom Related Services During Service Provision

Satisfaction with Service During Service Provision	Frequency (%)
Very Dissatisfied	4 (25%)
Dissatisfied	2 (13.60%)
Neither Satisfied Nor Dissatisfied	5 (9.10%)
Satisfied	11(36.40%)
Very Satisfied	8 (15.90%)
Total	30 (100%)

Note. $n=30$.

Chapter 9

Discussion

Aim of Chapter

Chapter 9 will discuss the results of Investigation 2 in accordance with the aims of the research project. An overall discussion of Investigation 1 and 2 will follow in chapter 10.

The overall purpose of Investigation 2 was to examine mother's help-seeking behaviour and their influence on adolescent's experience of depressive symptoms. Specifically, the aims of the current investigation were to: (1) examine the agreement between mothers' and adolescents' reporting of adolescent depressive symptoms and the likelihood of mothers' over reporting these symptoms; (2) examine the influence of mother's perception of adolescents' depressive symptoms on their current or past history of help-seeking behaviour; (3) examine the role of factors such as family history of mental health disorder, mother's level of stress associated with parenting her adolescent with ASD, adolescents' severity of ASD symptoms and the age of the adolescent on mother's history of help-seeking behaviour; (4) examine reasons mothers do not seek help for their adolescent's depressive symptoms; (5) examine the level of satisfaction mothers report regarding the mental health services they accessed for their adolescents' depressive symptoms during service provision and after services had ceased.

Regarding the first aim, a significant but weak to moderate relationship between mothers' report and adolescents' self-report of depressive symptoms was identified. This finding is consistent with research by Hurtig et al. (2009) who also found a moderate association between parent and adolescent report of depressive symptoms in adolescents with ASD. In addition, the current investigation identified that mothers also over-reported their adolescents' depressive symptoms. This finding is consistent with research by Vickerstaff et

al. (2007), Lopata et al (2010) and Meyer et al (2006) who examined parent child agreement of depressive symptoms in children aged 7 to 13.

In general, discrepancies between adolescent and parent report may have occurred because of the difficulty mothers have in accurately identifying depressive symptoms in their adolescents with ASD. Thus, it is possible that mothers may have been interpreting their adolescents' ASD traits as depressive symptoms, a view consistent with other researchers (Stewart et al, 2006).

While it is possible that mothers have been interpreting their adolescent's ASD traits as depressive symptoms (Gillberg, 2002) it is also possible that adolescent's difficulties with identifying emotions as is reported in individuals with ASD are contributing to the discrepancy between mother and adolescent agreement. Even in the presence of ability to detect depressive symptoms, and similar to the research identified in the TD adolescent population, adolescents with ASD may not be accurately assessing the magnitude of their symptoms hence mother's results of over-reporting.

Regarding the second aim, results indicated mothers with a history of help-seeking behaviour identified higher levels of depressive symptoms in their adolescents with ASD than mothers with no history of help-seeking. This result supported the current hypothesis and is consistent with other research studies (e.g., Douma et al., 2006; Garralda & Bailey, 1988; Sayal et al., 2010; Wu et al., 1999) where it has been found that help-seeking is influenced by parental perception of the problem. Specifically, prior to a parent seeking help for their child, they must perceive their child to have a problem (Douma et al., 2006; Logan & King, 2001). These findings extend the existing knowledge base about help-seeking in mothers of TD and ID adolescents with depression to adolescents with ASD without ID and highlights the similarities of mother's help-seeking across these populations.

The role of factors such as family history of mental health disorder, mother's level of stress associated with parenting her adolescent, adolescents' severity of ASD symptoms and the age of the adolescent on mother's history of help-seeking behaviour were examined in the third aim. Results indicated that for mothers, only stress associated with parenting their adolescent and a family history of mental health disorder predicted the likelihood of them seeking help for their adolescents' perceived depressive symptom. These results supported the current hypothesis but only partially, as age of the adolescent and increased severity of ASD symptoms were not associated with higher help-seeking behaviour of mothers as was expected.

Consistent with the hypothesis of the current investigation, a family history of mental health disorder was found to positively impact on a mother's history of help-seeking behaviour. That is, mothers who reported a family history of depression and anxiety symptoms were more likely to seek help for their adolescent's (with ASD) depressive symptoms. This finding is consistent with research in the TD population which has found that mothers who have used mental health services are more likely to seek mental health care for their children (e.g., Cunningham & Freiman, 1996; Rickwood et al., 2007; Wu et al., 2001; Zimmerman, 2005; Zwaanswijk et al., 2005). Further, families that have sought help in the past may find it easier to seek help again (Wu et al., 2001; Zimmerman, 2005; Zwaanswijk et al., 2005). Whilst both stress and a history of mental health disorders were found to be statistically significant it is important to note that a history of mental health disorders in the family had a much stronger effect on formal help-seeking than stress when examining odds-ratios. The nature of stress responses and how they manifest is likely complex and multifaceted which may account for the significant relationship but less predictable impact on formal help seeking behaviour.

The results of the current investigation revealed that mothers with elevated stress as a result of parenting their adolescent with ASD, were more likely to seek help for their adolescents' depressive symptoms. This finding is consistent with research in the ASD population which has identified that mothers experience cumulative stresses when parenting their child through adolescence (Gray, 1994; Montes & Halterman, 2008; Schieve et al., 2007). Mothers may have concerns with respect to their adolescents' schooling, social relationships as well as future living arrangements. The finding of the current investigation is also consistent with research regarding the TD population which indicates that the impact of a child's behaviour and subsequent stress placed upon the family is a significant factor on parents' decisions to seek help (Angold et al., 1998; Farmer & Burns, 1997; Logan & King, 2001).

While family history of mental health disorder and mother's stress parenting their adolescent was found to have a positive impact on a mother's history of help-seeking behaviour as anticipated, the current investigation identified that ASD symptoms and age of the adolescent, when measured concurrently, were not found to positively impact on mother's help-seeking behaviour. Elevated ASD symptoms were not found to affect mother's help seeking behaviour for their adolescents' depressive symptoms. It was anticipated based on the literature to date that a greater number of ASD symptoms would be associated with an increase in help-seeking behaviour of mothers (Ghaziuddin et al., 2002; Gray, 1994; Pollard & Prendergast, 2004), however, this hypothesis was not supported in the current study.

There are multiple and diverse reasons that may explain why in the current investigation elevated ASD symptoms in adolescents without ID did not prompt mother's to seek help for their adolescent's depressive symptoms. It is possible that a particular type of ASD symptom prompts mother's help-seeking behaviours compared to other ASD symptoms. For example, a family that cannot easily leave the home to go about their daily

life due to an individual's increase in routines or rituals (as a result of increase in depressive symptoms) may prompt mothers to seek formal help. However, ASD symptoms such as social withdrawal may not impact the family and as such does not prompt mother's to seek help. As the current investigation used only a total measure of ASD symptoms it is unknown if different types of ASD symptoms may prompt mother's help-seeking behaviours.

Furthermore, the current result may have been different if the variable of help-seeking was quantified as a continuous rather than a categorical variable as a categorical variable reduces variance and the continuous variable may be more sensitive to change. In the current investigation, help-seeking was defined as mother's willingness to seek help as well as adolescent's being waitlisted for services and adolescent's engaging in services. It is possible that a positive relationship between adolescent's ASD symptoms and mother's help-seeking behaviour may have been found if ASD symptoms were measured during discrete help-seeking stages including mother's intention to seek help. It is also possible that a positive relationship between ASD symptoms and depressive symptoms may have been identified should a longitudinal design be used instead of a cross sectional design.

Results of Investigation 2 indicated that age of the adolescent was not strongly associated with mother's help-seeking behaviour for adolescents' depressive symptoms. It was anticipated given research to date (e.g., Nagaraju & Wilson, 2013; Smith et al., 2008; Verhulst & Van der Ende, 1997) that for individuals as they age they are required to negotiate many challenges including those associated with schooling, social life and employment. These changes and subsequent challenges may be associated with the emergence of depressive symptoms for the adolescent with ASD and subsequently result in mother's seeking help for their adolescents' depressive symptoms. In addition, for parents, the demands of raising an adolescent with ASD would increase during the adolescent period as the needs of youth increase and support from service providers and agencies decrease

prompting parents to seek help (Nagaraju & Wilson, 2013; Smith et al., 2008). However, it was found that this hypothesis was not supported in the current investigation and age did not affect mother's help-seeking behaviour. Given that results of Investigation 2 found no association between age of the adolescent and adolescent rated and/or parent rated depressive symptoms one can only conclude that depression in the current sample is unrelated to age. However, it is possible that the age range in the current investigation was too wide to detect an association between age range and mother's help-seeking behaviour. It is possible that grouping large samples of adolescents into different age groups, such as younger adolescents (e.g., ages 12-14) and older adolescents (e.g., ages 15-17) may have detected an association between age of the adolescent and mother's help-seeking behaviour due to specific psychosocial challenges for the adolescent being more prevalent in a specific age range. Despite the current results not supporting the hypothesis, this finding continues to add to the ASD literature by expanding on the help-seeking research for mental health disorder, which is an emerging area of research.

Regarding the fourth aim, mothers most commonly reported that they did not seek professional help for their adolescent's depressive symptoms because they did not think their adolescent had depressive symptoms (67.90%) and because they thought they had the skills to help their adolescent (29.60%). Over 20% of mothers selected 'other' when indicating reasons for not seeking help for their child's depressive symptoms which included the high cost of professional help, the waitlist for services and negative experiences of seeking help in the past.

These results are consistent with research regarding the TD adolescent population (Lawrence et al., 2015; Sayal et al., 2010) and clinical populations (i.e., Douma et al. 2006). Similar results were found when compared to large population-based studies on parents with ID adolescents. For example, Douma et al. (2006) found that mothers reported not seeking

help because they considered the problems not so serious (67.4%), preferring to assist their adolescent with their own strategies (58.7%) and not knowing where to find help (26.1%). However, in contrast to the study by Douma et al. (2006), yet consistent with the research by Lawrence et al. (2015), financial barriers were frequently reported in the current investigation. Given that Lawrence et al. (2015) used Western Australian population the findings in this investigation may be reflective of more financial constraints to receiving professional help in Australia compared to other countries.

These findings show commonalities amongst mothers in regard to choosing not to seek help for their adolescent with contextual factors, such as financial barriers and knowledge of services, likely playing roles. Notably, though, individual factors, such as mother's judgement in their own capacity or their own assessments of the efficacy of services are also apparent in the findings. These factors are more subjective and warrant further investigation in terms of the accuracy and implications of mothers forming these views.

While it may be positive that mothers reported that they have the skills to help with their child's depressive symptoms, it is unclear if the responses that adolescents received from their mothers were appropriate for the help they needed. Mother's reporting that they have the skills to assist their adolescents with depressive symptoms is viewed as a common reason why they do not seek help, both in the current study and existing literature regarding TD adolescents (Boulter & Rickwood, 2013) and is certainly an area requiring further exploration. It is possible that mothers chose not to access formal services as a result of a previous negative experience with services or dissatisfaction with services, hence, a decision to provide their adolescent with their own support. As a result of dissatisfaction with services, mothers may have instead accessed informal help-seeking processes, such as

accessing strategies from self-help books, the internet, and family members and friends to assist their adolescent manage their depressive symptoms.

In using informal help-seeking processes such as those listed above (i.e., self-help books, the internet and family and friends), mothers may be poorly equipped to provide helpful responses to difficult issues such as protecting their adolescent against the risks associated with depressive symptoms, the development of self-harm, and suicidal thoughts and behaviours. An individual with depression is at an increased risk for suicide and substance abuse in both the TD and adolescent with ASD population (Mayes et al., 2013).

Results regarding reasons why mothers do not seek help adds to the literature by providing detailed information about why mothers do not seek help for their adolescents with ASD and co-occurring depressive symptoms. While much of the existing literature regarding help-seeking relates to the TD populations and clinical population with adolescents (Douma et al., 2006; Lawrence et al., 2015; Sayal et al., 2010; Weiss & Lunsky, 2010) it has not been as thoroughly investigated specifically in adolescents with ASD. In addition, while other research (e.g., Aspect, 2013) has examined reasons why mothers do not seek services these are not always specific to mental health services, instead examining supported work services or educational services.

For the fifth hypothesis, regarding satisfaction of service provision, results indicated that of the 48 mothers that did seek formal mental health services for their adolescents' depressive symptoms, 20 mothers reported on satisfaction levels regarding services their adolescent had used. Results indicated no specific differences between satisfaction levels and this result did not support the hypothesis that the majority of parents were expected to be categorised as “very dissatisfied to dissatisfied” among the 5 choices on the Likert scale of the DSQ. Despite the small sample size, these results are somewhat similar to the available

literature indicating that parents of ASD and TD adolescents are generally dissatisfied and not extremely satisfied with community services including community mental health services (Brookman-Frazee et al., 2011a; Dymond et al., 2007; Kohler, 1999; Montes et al., 2009; Renty & Roeyers, 2005).

Results of the current investigation also indicated that of the 30 mothers (62.5%) who reported their adolescent to be actively engaging in services (i.e., had not finished services) 20% were categorised as “very dissatisfied to dissatisfied” regarding their satisfaction with the services their adolescent was receiving and 52.3% were categorised as “satisfied to very satisfied”. There was no specific differences between satisfaction levels and as such this result did not support the hypothesis that mothers would most frequently endorse low levels of satisfaction with services their adolescent was receiving.

Traditionally, access to mental health services has relied on matching a person to an available service, with few guidelines available as to which option provides the best likelihood of positive outcomes relative to an individual’s needs (van Straten et al., 2015). Matching a person to an available service with few guidelines has led to inequities in access, where some people receive high levels of specialised intervention, while others receive treatment that is inadequate to their needs, or no intervention at all. It is possible that satisfaction increases when adolescents commence services as mother’s are satisfied that their adolescent is actually receiving help and they may have been suitably matched to high levels of treatment. Yet, upon completion, mothers may show low levels of satisfaction as services did not meet their adolescent’s needs. In addition, the satisfaction mother’s experienced whilst their adolescent was receiving services may dissipate if the adolescent experiences significant relapse or the stress of caring for an adolescent with ASD and co-occurring depressive symptoms returns after services have ceased. These viewpoints are only speculative, as it remains unknown where exactly the adolescents with ASD and depressive

symptoms were in the treatment stage when mother's rated satisfaction levels of formal services.

Strengths, Limitations and Future Research

The current investigation had a number of strengths and limitations. This investigation adds to the literature in a number of different ways. First, it adds to the literature regarding mother's help-seeking behaviour for adolescents with ASD and co-occurring depressive symptoms using a large sample of adolescents and mothers. While much of the existing work in this area of research has focussed on mother's help seeking behaviour in relation to general services such as educational services and supports, or work opportunities for adolescents with ASD, minimal research has examined mother's help seeking behaviour specific to depressive symptoms. As previously discussed, advancing this area of research is important as recent research suggests that approximately 70% of children with ASD meet criteria for at least one psychiatric disorder (Simonoff et al., 2008). These high rates of a variety of psychiatric problems for adolescents with ASD underscore the importance of examining mental health services.

The current investigation also addressed a number of methodological limitations in existing research including the use of a relatively large sample of adolescents with ASD. In addition, the use of a co-normed measure of depressive symptoms from the same multi-method assessment system across sources (parent versus adolescent) was used in the current study.

Despite these strengths, a number of limitations warrant discussion. The first limitation relates to the cross-sectional design of the study. This limits the conclusions that can be drawn pertaining to the factors involved that lead or do not lead to mothers' seeking help for their adolescent's depressive symptoms. Large-scale longitudinal research is

required to determine whether the predictors of mother's help seeking behaviour remain stable or change over time.

While the sample was large relative to many of the other studies, it was nonetheless limited in terms of diversity. That is, the sample was predominantly male with high functioning adolescents with ASD and with nearly 40% taking prescribed medication. A sample such as this may restrict generalisation of results to other samples of adolescents with ASD, such as those adolescents that are not diagnosed as high-functioning, and not taking medication. Future research is required to determine if these results hold true for other diverse samples of adolescents.

Regarding the mother sample in the current investigation, whilst mother's stress levels were measured as well as the impact of their stress levels on help-seeking behaviour, an additional measure of mother's mental health such as depressive or anxiety symptoms could be obtained for future research. This information may advance the research regarding how mother's mood affects their help-seeking behaviours.

The grouping variable of help-seekers versus non help-seekers may be considered a limitation. When examining if mother's sought formal help for their adolescent's depressive symptoms, the grouping variable in the current investigation was defined as a mother's 3-6 month history of help-seeking. Future studies may limit the time frame to 3 months or less, to obtain a more accurate picture of mother's help-seeking behaviour in relation to her identifying adolescent's depressive symptoms. In addition, future studies may use continuous grouping variables, rather than a categorical variable used in the current study to provide additional information regarding a mother's position in the help-seeking process including mother's intention to seek help and time spent on waitlists for services.

The current investigation is one of the few to examine factors that predict mother's help seeking behaviour for depressive symptoms. However, some predictors of mother's

help-seeking behaviour remain unclear due to limited research and as such additional research is required in this area to clarify factors that predict mother's help-seeking. For example, in the current study a relationship between adolescents' ASD symptoms and mothers' help-seeking behaviour was not identified. This current finding is important because it highlights an area in the research where studies are scant and predictors of mothers' help-seeking behaviour remain unclear.

The current investigation is also one of the few to examine reasons why mothers' do not seek help from formal mental health services for their adolescent with ASD and co-occurring depressive symptoms. It would be interesting to determine, based on the findings of the current investigation, the strength of the different reasons (i.e., waitlist for services, cost of services) that mother's did not seek help for their adolescents' depressive symptoms. Ranking these reasons in terms of relative importance may facilitate interpretation and ultimately help adolescents access the assessment, intervention and treatment they require and is an area for future research.

Whilst the current study was one of the few to begin to explore mothers' satisfaction with adolescent mental health services, the current investigation analysed satisfaction based on a single question measured with a 5-point Likert-type scale. This strategy did not allow for investigation regarding sub-dimensions of satisfaction, as in certain other studies that used standardized questionnaires. Yet mothers' satisfaction as analysed in the present investigation included a broad range of public and private services and professionals including psychiatrists and psychologists consulted which may have offset this limitation and provided an analysis of overall mothers' satisfaction with their adolescent's mental health services. The current investigation did not assess satisfaction within specific settings, such as community organisations or hospitals, nor were variables specifically related to adolescents' satisfaction evaluated. These issues could provide a topic for further research.

The current investigation examined mothers' satisfaction of services at the end of their adolescent's service provision identifying that during service provision mothers were more satisfied with services compared to when they ended service provision. It is not known, however, whether mothers' satisfaction with psychiatric care remains stable or changes over time. A single assessment during service provision and after formal services and treatment has been completed, may not adequately represent mothers' appraisals at that time or in the future. As such, future research may examine mothers' satisfaction of services they have accessed for their adolescent's mental health issues, using longitudinal research.

Clinical Implications

Notwithstanding the limitations of the current investigation there are some important implications of its findings. One of the findings from the current investigation was that parents had difficulties recognising depressive symptoms in their adolescents with ASD without ID, when compared to adolescent self-report of depressive symptoms. This discrepancy highlights the importance of including an adolescent's self-report of depressive symptoms rather than only relying on parent report during the mental health assessment process as untreated depressive symptoms can have serious and sometimes long-term consequences including suicide, addiction, self-injury, poor school performance, health concerns and relationship difficulties (Fletcher, 2008; Hasler et al., 2005; Keenan-Miller, Hammen & Brennan, 2007; Lewinsohn, Rode & Seeley, 1988; Williams, O'Connor, Eder & Whitlock, 2009). Furthermore, the weak to moderate association between mothers' reports and adolescents' self-reports of adolescents' depressive symptoms highlights the need for clinicians to educate parents about the presentation and prevalence of depressive symptoms in adolescents with ASD. Psychosocial education may increase a mother's awareness of the possible presence of mental health disorders and subsequently seek out formal mental health services.

Another important implication involves the finding that 11 percent of mothers did not know where to seek help for their adolescent's depressive symptoms. Of concern is that it is then possible for an adolescent with ASD and co-occurring depressive symptoms to be left untreated due to a mother not knowing where to access help. Mothers who identify depressive symptoms in their adolescents, who are not engaged in services despite their child's service needs may benefit from information on the availability and accessibility of care. Information concerning intervention and assistance for children and adolescents with ASD may be distributed to families by the adolescents' General Practitioner, or the school psychologists. This may improve a family's awareness of depressive symptoms in adolescents with ASD and expedite the process of receiving formal mental health services and supports.

Conclusion

The overall aim of the current investigation was to understand adolescents' experience of depressive symptoms by examining the role of mothers and the factors that impacted their ability to seek help for their adolescent. Results from the current investigation have indicated that symptoms of depression may be difficult for mothers to recognise in adolescents with ASD, which may be due to symptom overlap as mothers and adolescents have medium agreement when identifying depressive symptoms. Reliance on adolescent self-report of symptoms is therefore important in the diagnosis of depression in adolescents. Of those mothers who believed their child had depression, less than half sought help and those who opted not to seek help held views that their own support was sufficient in meeting their adolescents' mental health needs. Factors associated with mothers seeking help included a family history of mental health disorder and the stress associated with mother's parenting their adolescent. Over half of mothers were satisfied with the public and/or private sector

mental health service during receipt of services and more than half of mothers presented with low levels of dissatisfaction for services they had finished during their adolescent's lifetime.

It is crucial for clinicians such as GPs and treating psychologists to assess mental health as part of routine care in order to support adolescents with ASD more fully. If depressive symptoms are present it becomes equally important to support those mothers to support their child as mothers play a significant role in assisting their child with ASD due to the developmental challenges they face. Support for mothers by clinicians may mean educating parents about the advantages of accessing formal services for their adolescent's depressive symptoms rather than rely only on parental help for support and also how to receive the appropriate care including navigating alternative pathways to services and seeking other services when faced with waitlists.

Furthermore, mothers play pivotal roles in accessing the necessary mental health services but also implementing and maintaining interventions. The current research has highlighted that mothers have not been satisfied with the formal mental health services that their adolescent has received. This dissatisfaction of services may have implications for mothers accessing future treatments for their adolescents.

Chapter 10

General Discussion

Aims of the Chapter

The current chapter will present a general discussion of both Investigation 1 and 2. The contribution of this thesis to the understanding of psychosocial risk factors associated with depression and the impact of mother's help-seeking behaviour on depressive symptoms in adolescents with ASD will be discussed. Further research and clinical implications are also outlined.

The complexities of addressing mental health concerns are significant in terms of conceptualisation, diagnosis, treatment and assessment due to the challenges of identifying the clinically relevant variables shared by people, amongst the myriad of individual factors that account for psychological functioning. When one adds the complexity of atypical development, the challenges for mental health professionals become more pronounced as questions associated with generalisability of research and applicability of existing measures and conceptualisations become significant. Adding to these complexities is the limited amount of research on adolescents with ASD and co-occurring depression and the difficulty in knowing how applicable the TD literature is to this population.

Whilst a great deal is increasingly known about the causal factors associated with depression for TD adolescents that has enhanced the capacity of practitioners and carers to identify, assess and treat this condition, the same progress has not been made with ASD adolescents with co-occurring depressive symptoms. Significant gaps in the literature exist in regard to the causal factors for ASD adolescents but also how relevant these TD findings are in relation to their ASD peers. The current research project aims to improve our understanding of the role of psycho-social factors in the experience of depression for

adolescents with ASD by drawing upon what has been identified in the TD literature. This study has, therefore, not just given a greater understanding of the experience of depression for adolescents with ASD, it also take steps towards addressing the gaps in knowledge about how generalisable the findings in the TD literature are to the ASD population.

There is a significant amount of research highlighting the long-term problems associated with child and adolescent reported depression (Levy & Deykin, 1989; Lewinsohn, Klein, & Seeley, 1995). In view of these findings, the level of depressive symptomatology identified in the current research project shows there is cause for concern for adolescents with ASD. Depressive symptoms impact the lives of adolescents with ASD and their families as they can cause a variety of behavioural problems that aggravate the already present social difficulties experienced by adolescents with ASD (Ghaziuddin et al, 2002; Kim et al., 2000; Magnuson & Constantino, 2011; Stewart et al., 2006). Treatment for depressive symptoms may improve an adolescent's ability to function and the quality of life for those individuals affected by it, while helping to relieve the family burden (Lainhart & Folstein, 1994).

Research regarding ASD and co-occurring mental health disorders is in its nascent stages, as comorbidity between ASD and mental health disorders have only recently been acknowledged within the psychological community (Kerns et al. 2016; Matson & Williams, 2014). What is known, is that individuals with ASD and co-occurring mental health disorders such as depression, seem to be more the norm than the exception (Reinvall et al., 2016). Historically, it has been suggested that children and adolescents with ASD would be relatively protected from the development of depressive symptoms due to their poor social and emotional awareness. This line of thinking can be seen in, Kanner's (1943) original statement that individuals with ASD had a "powerful desire" to be alone (p. 249). However, research has now indicated that for adolescents with ASD without an Intellectual Disability (ID) this is not the case as these adolescents actively seek out company from their peers with

many reporting that they are lonely, have difficulty establishing friendships, or are bullied by peers (Humphrey & Symes, 2010; Locke, Ishijima, & Kasari, 2010). As social expectations and awareness of social-related challenges increase, symptoms of depression may develop and worsen for adolescents with ASD (Bellini, 2006). Furthermore, the current research suggests that these adolescents are likely to experience mental health concerns much like what has been reported in the TD adolescent population (Thapar et al., 2010).

Although depression is a common co-occurring mental health diagnosis in children and adolescents with ASD, it may be more difficult to identify depressive symptoms in this population. Not only do adolescents with ASD already present with the communication and social deficits that may suggest depression in TD populations, the symptoms of depression may compound the interpersonal difficulties that adolescents with ASD are already experiencing. A further complicating issue in diagnosing depression in children and adolescents with ASD is that a number of the depressive symptoms seen in the TD population are also known to be associated traits of ASD including disturbance of appetite, sleep, participation in activities and psychomotor issues (Lainhart et al., 1994; Perry et al., 2001). Consequently, accurate diagnosis of depressive symptoms may be difficult in adolescents with ASD, especially for those with limited communication skills.

In the TD population, diagnosis of depression is usually made by a general practitioner, psychiatrist or psychologist, and is based on their observations during clinical interviews, as well as the use of standardised diagnostic tools and/or screeners by clinician plus the self-reports of the individual. Observation informed diagnosis is difficult as depression in individuals with ASD has been found to present differently to those of their TD peers with behavioural changes such as an increase in repetitive or ritualistic behaviour being observed in addition to the more common expression of withdrawal and

aggression. (Ghaziuddin et al., 2002; Matson et al., 2014). Diagnosing through interview can also be difficult for individuals with ASD as they may have problems in communicating their thoughts and feelings to the clinician in a manner that allows for accurate diagnosis.

The current research aimed to address pivotal gaps in the research into the experience of depression for adolescents with ASD via two quantitative investigations. Investigation 1 examined the impact of multiple psychosocial risk factors on depressive symptoms in a large sample of adolescents with ASD using self-report measures of these factors and depressive symptoms. What was found was that when age, anxiety and medication were controlled for, adolescents who had experienced higher frequency of significant life events in the past 3 months and had experienced fewer examples of pro-social behaviour by others were more likely to develop higher levels of depressive symptoms.

Whilst many psychosocial factors have been identified as potentially playing a role in development of depressive symptoms, these findings shed some notable insights into the experience of the adolescent with ASD and co-occurring depressive symptoms. It is of interest that not all social interactions play a part but rather the quite specific lack of reciprocal prosocial interaction experienced. Consequently, adolescents with ASD were not just sensitive to social interaction but seemingly somewhat aware of whether interactions towards them are reciprocal (i.e. social interactions initiated by the adolescent with ASD) or not. Whereas the more overt forms of peer victimisation, which one would assume to be particularly harmful, are neither valued nor distressing enough to lead to depressive symptoms. This project also found that adolescents with ASD are negatively impacted by life events which indicates that despite atypical developmental processes, adolescents with ASD interpret and/or identify significant life events in much the same way as their typically developing counterparts. This latter observation is itself interesting as one would assume

differences in understanding of normative experiences by virtue of such different developmental experiences between adolescents with and without ASD.

Investigation 1 found that depressive symptoms in adolescents with ASD do not result from a single event, but from a combination of biological, psychological, social and lifestyle factors. In Investigation 1, the psychosocial risk factors of depressive symptoms were identified as frequency of life events, and peer victimisation (lack of pro-social behaviour of peers). These psychosocial factors were found to be associated with depressive symptomatology independent of biological factors such as medication use and anxiety symptoms.

The results of Investigation 1 show that the factors associated with depression for adolescents with ASD are similar to what has been identified in the TD adolescent population. Specifically, ASD and TD adolescents both demonstrate an increase in depressive symptoms when they have experienced significant life events as well as when they receive limited social and emotional reciprocity from their peers (Kendler, Karkowski, & Prescott, 1999; Ghaziuddin, Alessi, & Greden, 1995; Goodyer, Germany, Gowrusankur, & Altham, 1991).

In the past, researchers and clinicians have had good reason to believe that ASD adolescent's would differ when compared to TD adolescent regarding psychosocial variables associated with depressive symptoms due to their presenting characteristics and learning difficulties (Deweerd, 2014; Hannon & Taylor, 2013). However, the current research indicates that there are similarities in the predictors of depressive symptoms between ASD and TD adolescents and that adolescent's with ASD and co-occurring depressive symptoms are not as unique as researchers may have first thought when understanding the risk factors associated with depressive symptoms. Consequently, ASD symptomatology does not appear

to interact with or alter the impact of identified psycho-social risk factors in the established TD research.

Whilst significant similarities were found between adolescents with ASD and their TD peers in terms of risk factors for depression, some important variations were identified. Specifically, in the current investigation it was found that a lack of pro-social reciprocity was identified to be the only type of peer victimisation that was associated with depressive symptoms. This is not consistent with the research from the TD literature where a number of types of peer victimisation have been found to be associated with depressive symptoms (eg Crick & Grotpeter, 1996; Tyman et al., 2010). Another significant variation from the TD literature identified in this investigation was the role of attributional style. Whereas in the TD literature attributional style is consistently identified as a significant factor in the development and maintenance of depression (e.g. see Gladstone & Kaslow, 1995 for a review) the results of Investigation 1 found no such relationship.

Overall, the results of the current research revealed similarities between ASD and TD adolescents regarding the biopsychosocial model of depressive symptoms from an assessment and treatment point of view (Castro & Pinto, 2013; De-la-Iglesia & Olivar, 2015; Jeon, Admidfar & Kim, 2017). However, the results of Investigation 1 also revealed differences that can be used to further inform and tailor diagnosis and treatment. These similarities and differences provide a richer and more refined picture for those researching and working with adolescents with ASD. For example, whilst treatments may need to be modified to accommodate the challenges experienced by ASD adolescents during therapy sessions, the principal goals for treating depression would likely be largely the same (Keefer et al., 2016; Kerns et al., 2016). However, for purposes of treatment planning a greater focus on the role of pro-social reciprocity would be warranted whereas less focus on attributional

style would be required, This would alter therapeutic approaches to focus less on cognitive approaches designed to alter attributional thoughts and beliefs and focus more on specific interpersonal skills to teach the adolescent with ASD how to promote more pro-social reciprocal exchanges.

For the current research project, in order to more fully understand the experience of depressive symptoms for adolescents with ASD, it was also important to assess the role of mothers as help seekers as mothers are often considered a primary source for reporting depressive symptoms and have been considered the drivers for accessing supports for their adolescent with ASD (DePape & Lindsay, 2015). While Investigation 1 examined psychosocial risk factors of depressive symptoms, Investigation 2 examined a mother's capacity, as the gatekeeper to care, to recognise depressive symptoms and seek formal services, as it was not clear how or if the presence of ASD symptomatology and related factors would confound or interfere with a mother's capacity in this context of care.

To examine the agreement between mothers and adolescents identification of depressive symptoms, mothers reported on their adolescent's depressive symptoms which were then compared to their adolescent's self-report. What was found was a moderate level of agreement between mothers' and adolescents' report of adolescents' depressive symptoms with mothers' reporting greater depressive symptoms than their adolescent. These results are consistent with the research from mothers of TD adolescents with depression (e.g. Salbach-Andrae et al., 2009).

Reasons for moderate agreement remain unclear, however, a number of explanations for over-reporting can be suggested. It may be that mothers over-reported symptoms due to the difficulties they faced in identifying symptoms of depression; and/or that the burden of care-giving of the parent might cause misjudgement of their child's problems. It is also possible that the adolescent with ASD is unable to fully comprehend the impact of depressive

symptoms on his or her life and the mother is in fact making a more accurate report of their child's presenting symptoms. It is also quite possible that mother's over-rated symptoms of depression in the current investigation due to an awareness of the aims of the current research project.

This part of Investigation 2 made an original contribution to the research regarding mother's ability to recognise depressive symptoms in their adolescent by using a large sample of adolescents. As such, the evidence suggests that one can anticipate with some degree of certainty that mother's will often over-report their adolescent's depressive symptoms and that parent and adolescent agreement regarding depressive symptoms is significant and weak to moderate. Importantly, this finding is similar to what has also been observed in the TD adolescent population (Salbach-Andrae et al., 2009).

To further understand mother's help seeking behaviour, Investigation 2 also examined if mothers would seek out help through formal services after identifying depressive symptoms in their adolescent and what factors led to them taking such action. Of those mothers who believed their child had depression, less than half sought help; and those mothers who opted not to seek help held views that their own support was sufficient in meeting their adolescents' mental health needs. In regard to the factors that prompted mothers to seek help, results indicated that mothers were more likely to seek help when they had a family history of mental health disorder and when they experienced elevated levels of stress from parenting their adolescent. Significantly, these results are, again, similar to what has been identified in the TD research (Cometto, 2014; Jorm & Wright, 2007; Rickwood et al., 2007).

It is significant that mothers of adolescents with ASD with depression indicated similar reasons for seeking help as TD mothers. One could argue that ASD symptomatology and the related developmental impacts of this condition in adolescence would play a role in a

mother's help seeking behaviour in relation to mental health concerns. This would be based on the assumption that mother's would be more aware of their adolescent being expected to struggle in this period of development due to their atypical development. However, the results of Investigation 2 show that neither ASD symptomatology nor the adolescent's age played a role in influencing the mothers help seeking. Consequently, it should not be assumed that because a mother is seeking help for her adolescent with ASD that her motivation has been driven by ASD related concerns such as fears of increased vulnerability in socially demanding contexts. Instead, her concerns are driven by the same factors as mothers of TD adolescent seeking help from mental health services.

Parental satisfaction during and after adolescent's receipt of services was also examined with a view to understanding mother's help-seeking choices and experiences. Mothers reported to be satisfied during their adolescent's receipt of services, however, more than half of mothers reported low levels of satisfaction for services they had finished. This result may reflect the difficulties in treating depression in adolescents with ASD as described above as mainstream treatment and intervention will almost always needs to be adapted for the adolescent with ASD (Read & Schofield, 2010). Alternatively, one could speculate that the low level of satisfaction reported by mothers may reflect how clinicians struggle to conceptualise and address the issues the adolescent is presenting with due to questions over applicability of existing mental health models to the ASD population.

Whilst the current project did not collect information that would readily allow for explanation of mother's low satisfaction with services a number of explanations can be theorised from the data collected. One explanation can be found in a mother's motivation and understanding for the need to seek out the mental health services in the first place. Given that mothers were found to overreport depressive symptoms it is possible that their expectations of effective treatment are therefore incorrect as only minor issues may have

actually required assistance. Another explanation for mother's lower levels of satisfaction may be due to the finding that mothers are often motivated to seek out help for the adolescent by their own experience of mental health in the family or themselves. It is possible that their expectations of treatment effects and processes are therefore also informed by their experience of therapy which may have been more tailored to TD populations. Consequently, mothers may be unsure of how to interpret the treatments their adolescent received in terms of efficacy and quality. Another explanation for mother's lower satisfaction ratings following treatment is that ASD symptoms played little to no significant role in them reaching the conclusion to seek help even though stress in the parent-child dynamic was found to be a factor for help seeking. It is therefore possible that in seeking help for depression, mothers have not considered that it is in fact the ASD symptomatology and developmental factors that have led to the parental stress that has caused to erroneously seek out treatment for depression when the appropriate treatment may be quite different.

Overall, Investigation 2 found that mothers of ASD adolescents are broadly similar to TD adolescent mothers in terms of motivation and acting to seek help and they are moderately accurate in their judgments of their adolescents needs. These findings indicate that clinicians can be confident that ASD symptoms have not factored into the mother's motivations for seeking help nor effected their judgement of symptom severity. However, it is possible that mother's expectations of what effective help will be and what success may present as will not be well informed or understood due to the reasons they have based their decision on to seek out help.

When reviewing the implications of the findings from Investigation 1 and 2 some notable implications can be identified. The most significant finding related to the similarities between ASD and TD adolescents in relation to depression symptoms. Not only do both populations share bio-psychosocial factors related to depression symptomatology, they also

experience similar help seeking responses from their mothers. Specifically, their mothers will tend to over report depressive symptoms. Notably, though, the mothers of ASD adolescents may differ in their experience of mental health services with a significant number reporting dissatisfaction. The reasons for this dissatisfaction warrant further research and consideration, and given the findings of Investigations 1 and 2 clearly indicate that there is significant overlap between TD and ASD adolescent populations in regard to depressive symptomatology and, thus, there is reason to expect services would be similarly effective.

Whilst support for the similarities between the ASD and TD populations are important for developing interventions and understanding the experience of depression for adolescents with ASD, the difference identified between these groups is also of significance. By understanding the variations between factors associated with depressive symptomatology for ASD and TD adolescents as well as the factors influencing help seeking by the mothers of adolescents with ASD, interventions and assessments can be better informed and tailored to meet their needs. The ability to refine and tailor assessment processes will also enhance the utility and validity of diagnostic tools as they can more accurately evaluate the impact of common factors associated with depression that are often confounded by ASD symptomatology. For example, social isolation is often an indicator of depression but is also consistent with ASD symptomatology. However, by looking at specific negative social experiences, mental health practitioners will be better able identify the factors of concern for adolescents with ASD.

Strengths & Limitations

For a number of the research aims this current research project had a large sample size. This allows for greater confidence in generalising the findings as the current project was not underpowered. This is a strength of the current research project and adds to the relevant literature base where many studies had small sample sizes (e.g. Barnhill, 2001;

Gotham, Bishop, Brunwasser, & Lord, 2014; Hurtig et al., 2009; Jepsen et al., 2012; Lopata et al., 2010; Meyer et al., 2006; Shtayermann, 2007; Stratis & Lecavalier, 2013; Storch et al., 2012; Taylor & Gotham, 2016; Vickerstaff et al., 2007).

In addition to the statistical robustness provided by this sample size, this study also examined multiple psycho-social risk factors consistent within the biopsychosocial framework as opposed to looking at only one factor at a time as is common in the literature. This has allowed for a closer and more detailed examination of the way existing biopsychosocial factors impact upon the development of depression in adolescents with ASD than previous studies have been able to provide. By focussing on the factors in this way this study was able to more broadly examine the biopsychosocial model but also gain insight into interactions amongst those factors.

Whilst numerous studies have examined single risk factors or a small number of risk factors associated with depressive symptomatology and other studies have examined help seeking of mothers, this is the only project to have examined multiple causal factors, their interaction and the factors effecting help seeking on the same population. This represents a strength as the help seeking findings can more readily be interpreted in view of the causal factors found to be associated with the adolescent depressive symptomatology as they are from the same population.

Another strength of the current research project is that the overall results of Investigation 2, add to the body of knowledge regarding mother's help-seeking behaviour for ASD adolescent's with depressive symptoms by examining reasons as to why mother's do not seek help for depressive symptoms for their ASD child or adolescent. The findings were a partial replication of the research by Douma et al. (2006), Lawrence et al. (2015) and Weiss et al. (2016) all of whom examined different populations samples compared to this investigation. Similar to the results of Douma et al. (2006), Lawrence et al. (2015) and Weiss

et al. (2016) mothers did not seek services for their adolescents' depressive symptoms because of a range of factors and there was no one factor that was more frequently endorsed. For example, some mothers thought that they had the skills to help their adolescent without the need for accessing professional assistance, others could not meet the high cost of professional help, whilst other mothers noted concerns for waitlists, and negative experiences of seeking help in the past negatively impacted their help seeking behaviour. These results add to the body of knowledge by showing that the factors effecting mother's help seeking behaviour is highly individualised for adolescents with ASD and co-occurring depressive symptoms which is consistent with what has already been identified in other populations.

Whilst the above outlined strengths are significant, there are a number of limitations to this research project that must be factored in when considering the applicability and generalisability of the findings. These limitations range from the profiles of the population studied through to issues around measurement and the choice of risk factors selected for investigation. These limitations will be discussed below.

The most significant limitation that impacts generalisability is that the population used in this project had ASD without intellectual disability. It is not clear if the findings can be applied to lower functioning populations where ASD symptomatology and cognitive functioning differ and there is reason to suspect that such generalisations should not be made. For example, if one considers the impact of peer victimisation and reciprocity it may be that lower functioning ASD adolescents are not as aware of these difficulties due to their lower levels of communicative capacity in general. It is also possible that because adolescents with ASD and intellectual disability present with more obvious developmental delays that mothers may also be less likely to consider mental health factors and that, unlike what was in Investigation 2, ASD symptomatology for this population would impact

mother's help seeking. Consequently, the findings from this project cannot be readily generalised to adolescents with ASD and intellectual disability.

The selection process for identifying the psychosocial risk factors examined in Investigation 1 can be considered a limitation. In Investigation 1 the factors were selected from the literature based on the frequency of reports in the literature rather than factors thought to represent a specific model or theory of depression which led to the exclusion of some factors that may have proven to have positive associations with depressive symptoms. For example, mother's mental health has been known to be associated with adolescent's mental health in the TD literature (De Los Reyes & Kazdin, 2005; Horwitz et al., 2003), and this is consistent with some developmental theories of self-regulation and mental health disorders (De Los Reyes & Kazdin, 2005; Hammen, 2009; Horwitz et al., 2003). However, mother's mental health was not examined in Investigation 1 because it was not frequently researched enough to meet the criteria for inclusion. Consequently, by selecting factors in this way, the project was not able to specifically examine common models and theories of depression which may have been found to have greater explanatory capacity. Having highlighted this limitation, it is important to note that there are currently no readily identifiable models of depression for adolescents with ASD and, as such, this project selected psychosocial factors with the intent of identifying the factors that may then indicate what models should be further or more closely examined.

Whilst this study was able to shed light on mothers' reasons for seeking services the information collected was limited in a number of ways. One limitation could be seen in how this investigation did not examine the strength of the different reasons (i.e., waitlist for services, cost of services) for why mothers did not seek help for their adolescents' depressive symptoms. Ranking these reasons in terms of relative importance may further facilitate interpretation and ultimately help adolescents access the assessment, intervention and

treatment they require. Furthermore, this study did not examine other contextual factors that may play a role on the mother seeking help such as whether she was primary caregiver and the impact of the father, or partner, in seeking to take action. In addition, this study did not investigate fathers as primary carers. Consequently, it may be that fathers, single parent households or differing care contexts may reveal different influences and factors on help seeking behaviour that this study did not address.

The last issue of relevance to this study, and research in this literature base, relates to concerns about measurement. No scales or tools designed specifically for evaluating co-occurring depressive symptoms in individual with ASD, neither by third-party reports or self-reports (Kraemer et al., 2003; Stewart et al., 2006) currently exist. Consequently, assessment scales and questionnaires designed for use in the TD population have been used in the majority of the studies examining mental health in adolescents with ASD. This brings into question the validity and utility of these measures in terms of sensitivity and applicability. For example, an assessment for depressive symptoms may evaluate an individual's interest in peers or social activities and changes in sleeping or eating habits. Responses to these questions may be confused with symptoms of depression when in fact they may be symptoms of ASD. In addition, current assessment tools used in TD populations may not account for changes that may occur in individuals with ASD when depression is present. As a consequence of the limitations in existing standardised measures of depressive symptomatology this project also shares the same limitation.

Utilising measurement tools that may not have the same validity for ASD populations leads to questions about the validity of the findings in regards to depressive symptoms. However, it also raises questions about generalisability, especially to clinical domains. The findings in this project can, in principle, be applied to other adolescents with ASD who are assessed as depressed using the same or highly correlated measurement systems. However,

in clinical practice the DSM 5 criteria would be used and as such it may be that what has been identified as depression in this study may not be by a treating clinician who would reach their conclusion about diagnosis through a range of assessment processes, including observations made across time in the therapy context (Uher et al., 2012). It is therefore possible that the results would not generalise to populations where depression is identified via clinical means.

Overall, the current research project had a number of strengths and limitations whilst offering a number directions for future research. A strength of the current research project was that Investigation 1 is one of the few studies that examined the impact of multiple psychosocial risk factors based on a bio-psychosocial framework of depressive symptoms in adolescents with ASD. A strength of Investigation 2 was it added to the understanding of the factors that impact mothers help seeking for adolescents with ASD and co-occurring symptoms.

Future Research

Based on the findings of this project, as well as the identified limitations, a number of directions for future research can be suggested. These future directions would address methodological variables of concern or build upon the theoretical and practical implications of the results of the two investigations.

From a methodological point of view a number of directions can be taken with future research. Firstly, because the current research project was limited to a homogenous group of adolescents with the majority of participants being male without an ID and taking prescribed medication (e.g. Prozac) it important this limitation be addressed by future research. It is, therefore, recommended that future research include more diverse samples that are more representative of the ASD population in terms of cognitive functioning, age and life stage,

ethnic background, genetic make-up, social-economic status, cultural context, sex and gender identity in order to represent individuals with ASD. Fundamental to recruiting large-scale heterogenous samples is advocacy for funding that encourages coordinated study designs and data merging efforts to achieve this research.

Secondly, whilst the current research project relied on cross-sectional correlations with psychosocial risk factors of depressive symptoms future researchers may consider a more powerful within subject, longitudinal design (Cohen, 2014; Verhulst & Koot, 1991). Future longitudinal studies are needed to more conclusively answer the questions surrounding changes in psychopathology of individuals with ASD across development and chronological age and the impact of psychosocial risk factors on depressive symptoms during these varying stages of development.

Lastly, different assessments of depressive symptomatology may add greater detail and validity to future analyses. Whilst the current project utilised parent and adolescent self-report, no measures from treating clinicians or third parties (e.g. teachers) were used. It may be that such measures would reveal differing views and observations that may give further clarity into the manner in which psychosocial factors interact at the individual and contextual levels. This may also serve to better inform diagnostic and assessment practices in the future as the implications of various reporting sources are better understood.

In terms of further elaborating upon the findings of the current project a number of future research directions would be of benefit. When examining the psychosocial risk factors of depressive symptoms in Investigation 1, a number of control variables were measured, including anxiety symptomatology. Anxiety symptomatology as a risk factor of depressive symptoms deserves further consideration as it was found to correlate with a number of variables such as life events and peer victimisation scales (overt and relational scales) in the current research project. Given these findings, further research is required to understand the

significant association between anxiety symptomatology and depressive symptoms and other psychosocial risk factors of depression in adolescents with ASD.

Future research would also benefit from examining how the identified psychosocial risk factors may be most effectively treated with differing therapeutic approaches for ASD populations. For example, it may be that therapy for depression is best targeted indirectly through working on social skills programs or groups that improve access to pro-social reciprocal interactions. Conversely, it may be that a more cognitive behavioural approach where perspective taking and coping skills are directly targeted would be more efficacious. It may be that different approaches are needed depending on what psychosocial risk factor is identified as playing a significant role in an individual's presentation of depression symptoms.

Whilst further exploration of the identified risk factors is warranted, it would also be appropriate to examine other psychosocial risk factors based on existing biopsychosocial models for TD adolescent populations. This would be an appropriate next step in studying the psychosocial factors as the findings in this project have shown there is reason to draw directly from the TD literature base in determining the relevant risk factors for adolescents with ASD and comorbid depressive symptomatology.

In terms of mothers help seeking future research will need to build upon the findings of Investigation 2 by collecting more information to allow for more detailed and thorough analysis. Firstly, more detailed measurement will be needed to be able to address how the various factors identified that either promote or prevent help seeking can be ranked in terms of significance. Secondly, contextual factors such as the role of mother's partners and other related family support systems needs to be included to provide a more detailed understanding of the factors that promote and/or prevent help seeking by mothers. Lastly, given that mother's sense of competence at addressing their adolescent's symptoms was identified as a

barrier to seeking assistance, it is important to identify if mothers can actually provide the support they believe they can. If research finds mothers are not accurate in their self-assessment of competence, this should lead to more considered education of parents about the importance of seeking professional assistance. Conversely, if mothers are accurate in their self-assessments of competence then, where possible, clinicians may seek to support mothers to play this role when they identify themselves as capable.

Investigation 2 identified that mothers satisfaction with services their adolescents had accessed or were accessing was neutral. Consequently, it remains unclear how their experiences of mental health services or awareness experiences of other mothers of adolescents with ASD who have accessed mental health services has impacted their help-seeking behaviour. Consequently, further research is needed to better understand the potential relationship between experiences with mental health services and motivation to seek help.

Whilst it is important to further investigate the impact of mother's experience with mental health services it is also important to better understand the factors leading to various evaluations of services in future research. Importantly, it was beyond the scope of the current research project to examine the relation between parent satisfaction and clinical outcomes so one cannot assume that experiences equate to actual service outcomes. It is possible that mothers' evaluations of the efficacy of treatment may be different to their adolescent's perspectives. It is also possible that measurements or the views of the treating clinicians may not match those of the mother. Future research such as this will lead to a better understanding of mother's perception of service outcomes so that services can be better informed and any potentially negative impact on future help seeking can be minimised.

Clinical Implications from the Current Research Project

One of the aims of the current research project was to produce results to guide both researchers and clinicians to ultimately provide quality of life for adolescents with ASD and co-occurring mental health disorders as well as their family members. Given the profound negative effects of depressive symptoms on academic skills, employment, legal, and interpersonal aspects of life, preventative efforts are imperative. Psychologists who work in schools and family health settings are strongly encouraged to educate themselves about risk factors of depressive symptoms in order to identify those in need of formal support and services.

The current research project identified that experience of significant life events and poor relationships with peers are potential precursors for depressive symptoms and psychological support should be made available before symptoms of depressive symptoms begin. For psychologists, knowledge of early signs and symptoms of depression may aid in better identification of the disorder. Although concerned and able to identify depressive symptoms, not all mothers in the current research project engaged in formal help-seeking for their adolescent. Parents and school personnel may benefit from information on depression and depressive symptoms in adolescents with ASD and the importance of accessing formal mental health services for an adolescent.

Assessment of Depression. The current research project has highlighted that it is justified to rely on the self-reports of adolescent's regarding depressive symptomatology. However, relying on adolescent self-report does not diminish the importance of relying on parent report and change from baseline behaviours when making an assessment of depression. Parent reports about adolescent depressive symptoms may be helpful if used together with adolescent reports and if discrepancy occurs then closer examination of risk factors may be warranted to assist inform diagnoses and assessment. If parent data is used

alone, parent reports may only account for the adolescents with the most severe depressive symptoms. The use of multi-informant reports (e.g., adolescents, parents and school teachers), may also prove helpful for clinicians to see the whole picture of existing symptoms in relation to these identified psychosocial factors.

Psychosocial Supports. Investigation 1 highlighted the association between adolescents receiving low levels of pro-social support from their peers and an increase in their depressive symptoms. In an effort to assist children and adolescents with ASD and minimise the possibilities of increased depressive symptoms, school psychologists and teachers may wish to work together to educate TD high-school students about the impact of pro-social support for those individuals diagnosed with an ASD and strategies they can use during these times. Given the shift to include children and adolescents with ASD in mainstream educational settings, there is importance in teaching pro-social behaviours to TD children and adolescents.

Access to Services. One of the findings in the current research project was the reason that mothers did not access mental health services for their adolescents was because they did not know where to access help from. Of the mothers not sourcing assistance, 11.10 percent of cases indicated this was the primary reason. Given the pivotal role that parents often play in the lives of their children with ASD across the lifespan, it is important that service providers including GPs, school psychologists, paediatrician, psychiatrists and allied health therapists all support the efforts of parents in seeking help for their child and assisting them to seek formal services as part of a treatment plan.

School based psychologists could provide a centralised system of education, prevention efforts, and early identification for adolescents and parents as well as a centralised referral system to school psychology supports and or services in the private or public education system supported in Australia. The results of the current research, together with

previous empirical findings in the ASD and TD population regarding help-seeking behaviour indicate an approach that may enhance early recovery and prevent relapse by engaging with services more promptly. It is an approach that recognises the importance of the mother in the help-seeking process and the impact a mother's behaviour has on the experience of an adolescent with ASD and depressive symptoms.

Service Use. To further understand service use of adolescents with ASD, data should be collected from mothers and adolescents to measure how well services are working for adolescents with ASD. Given that mothers in the current research project indicated that they did not seek services due to waitlists, relevant service waitlists should be monitored to see if a disproportionate number of adolescents with ASD and co-occurring mental health issues are waiting to be seen. Furthermore, due to mothers' reports of dissatisfaction, services may consider tracking the return of adolescents with ASD and co-occurring depressive symptoms to determine if those adolescents are presenting with recurring problems of a similar nature and or were unsatisfied by initial treatment. By monitoring outcomes for adolescents and mothers so that those adolescents and mothers have the opportunity to report how well the service has been working for them will enhance service delivery but also likely improve satisfaction for mothers and clients.

Conclusion

The current research project reminds us not to lose sight of the mental health issues for adolescents with ASD. It highlights that mothers of ASD adolescents present with similar help-seeking behaviours to mothers of TD adolescents and that similar barriers are faced during the help-seeking process. As a consequence of this similarity to mental health issues in the wider population, clinicians working in the ASD field would also benefit from being more aware of mental health concerns that may be presenting in their clients beyond the

normal concerns seen in ASD. This awareness may lead to earlier identification and intervention but also assistance for mothers and adolescents in getting the help they need.

The current research project has highlighted that the role that psychosocial risk factors of depressive symptoms for adolescents with ASD and help-seeking behaviour of mothers regarding depressive symptoms, is important in early detection of symptoms and subsequent intervention. Throughout the current research project, it was found that adolescents with ASD present with similar psychosocial risk factors of depressive symptoms as TD adolescents; specifically, significant life events and peer victimisation. Research to date has indicated that there is overlap between symptoms of depression and symptoms of ASD and that the presentation of depressive symptoms in adolescents with ASD is not always typical. Yet, in spite of this, mothers of adolescents with ASD responded similarly to mothers of TD adolescents as mothers of ASD adolescents also were found to over-report depressive symptoms. The reasons for this over-reporting in the ASD population continue to remain unclear and many suggestions have been made as to why mothers over-report symptoms of depression just as it does in the TD population

Regarding clinical implications, the findings of the current investigation indicate that the biopsychosocial model applied to TD adolescents appears to also apply to adolescents with ASD. Whilst assessments and interventions are required to be adapted and modified for the individual with ASD, it does not mean that assessment and treatments in the clinic and community setting (e.g., Child and Adolescent Mental Health Service) cannot be successfully applied for individuals with ASD. Basic training in ASD is recommended for all clinicians (e.g., Psychologists, GPs) working in mental health settings to assist them to understand that adolescents with ASD seek out and benefit from their services much like TD

adolescents would. Given that adaptations for treatment delivery will likely be needed, clinicians should have access to specialist advice from ASD specialists.

The findings from the current research project may encourage governments and/or relevant government agencies working with individuals with disabilities to increase funding and training for those working in mental health services to address the key challenges faced by families and adolescents with ASD and co-occurring depressive symptoms. They may also wish to examine funding in such a way as to promote better links between ASD and mental health services so as to better inform practice and support for both service domains. Links with the academic community is an important platform for continued research to inform professional practice, resources and policy for those most in need including their families. By continuing this research direction the lives of families and adolescents with ASD and co-occurring depression will likely be improved and many of the assumptions that may have incorrectly guided practice to this point can be better identified and where appropriate, corrected.

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Appendices

Appendix 1: Information and Consent Forms

Edith Cowan University
270 Joondalup Drive
JOONDALUP WA 6027
Phone: 6304 2170
Fax: +61 (08) 9300 1257



Information Sheet for Mothers

Dear Mother,

My name is Rachel Gallagher and I am a PhD student from Edith Cowan University. This letter is to invite you and your adolescent (age 12-17) to participate in a project which is investigating the link between self-esteem, school experience and mental health and depression of adolescents with Asperger's Syndrome and Autism. This study also aims to explore treatment and services your adolescent may have accessed in the past or is currently accessing. The study has been approved by the Edith Cowan University Human Ethics committee.

Your participation in this study will provide valuable information and allow us to gain a greater understanding of the mental health, depression and general wellbeing of adolescents with Asperger's Syndrome and Autism. In turn, knowing more about mental health in adolescents with Asperger's Syndrome and Autism can inform medical practitioners and mental health workers and lead to early identification and treatment in the future.

What does this study involve?

Initial Assessment:

Mother's will be asked to complete a short screening interview over the telephone to determine whether your adolescent is suitable for this study. The screening interview relates to demographic information such as age, diagnosis and developmental history. It should take no longer than 15 minutes.

Interview

If you and your adolescent meet criteria to enter the research, you will be asked to make an appointment with me. I will come to your home or arrange to meet you and your adolescent in the clinic setting to interview your adolescent and ask him/her to complete a series of questionnaires. This should take approximately 35-45 minutes. Breaks can be taken by your adolescent as required. During the time your adolescent is being interviewed, you will be asked to complete three questionnaires

in a separate room to where the interview with your adolescent is taking place. These questionnaires will tell us more about services you may have accessed for your adolescent; behaviours you have observed in your adolescent and the stress you may experience parenting your adolescent. It will take you approximately 50 minutes to complete these three questionnaires. You may experience some discomfort when completing the interviews. You may choose not to answer any questions you don't want to and are welcome to stop or withdraw at any time you wish. If questionnaire results indicate that you or your adolescent may currently be depressed, I will provide guidance as to how you can seek further assistance.

Participation in this research is purely voluntary. No explanation or justification is needed if you, your son or daughter choose not to participate. You, your son or daughter are free to withdraw consent to further involvement in the research project at any time without prejudice to any future relationship with the investigators or current practitioners.

If you and your adolescent would like to participate, please fill out the attached consent form for yourself and also a consent form for your adolescent to participate. Your adolescent will also be asked to sign their own consent form. Then return all **three** consent forms in the reply paid envelope enclosed with this letter as soon as possible. Once I receive these consent forms, I will contact you to begin the initial assessment over the telephone.

If you have any questions or require any information about the research project, please contact:

Researcher:	Rachel Gallagher	Telephone [REDACTED]
Supervisor:	Dr Elizabeth Kaczmarek	Telephone 6304 5551
Co-supervisor:	Dr Craig Harms	Telephone 6304 5551

If you have any concerns or complaints and wish to speak to an independent person about the research project, you may contact: Research Ethics Officer, Human Research Ethics Committee, Edith Cowan University, 270 Joondalup Drive, JOONDALUP WA 6027. Phone: (08) 6304 2170; Email: research.ethics@ecu.edu.au

Information Sheet for Teenager's

Dear Teenager

My name is Rachel Gallagher and I am a PhD student from Edith Cowan University. I am currently doing some research on understanding feelings and moods that teenager's experience. This letter is to invite you and your mum to participate in a project which aims to understand the feelings of teenagers and the causes of different feelings. Your participation in this project will be greatly appreciated. Knowing more about the feelings of teenagers can inform parents, doctors, teachers and other professionals and lead to early treatment when teenagers have difficulties.

What does this study involve?

- Your mum will be asked to complete a short interview over the phone to determine if you and she are able to participate in this project.
- If you and your mum can enter the project, you and your mum will be asked to make a time to meet with me. I can come to your home or you can come to my clinic to complete questionnaires. Your mum will complete questionnaires in a separate room to you and it should take her about 40 minutes. You will be asked to complete questionnaires with me and it will take about 30-40 mins. Don't worry – you can have breaks if you need them! These questionnaires will tell me more about you, how you generally feel about life, friends and if you have any worries. You don't have to answer any questions you don't want to and can stop at any time you wish. You may feel some discomfort when completing the questionnaires.
- If you feel you are having difficulty coping in life, or feel depressed I can talk to you and your mum about how to get help for this.
- If you would like to participate in this project, please sign the consent form and give it back to your mum so that she can post it to me.
- Once I receive the consent forms, I will ring your mum and talk to her about setting up a time to meet.

Participation in this research is purely voluntary. No explanation or justification is needed if you choose not to participate. You are free to withdraw consent to further involvement in the research project at any time without prejudice to any future relationship with the investigators or current therapists.

If you would like to participate in this project, please fill out the attached consent form and return to your mum who will mail this form to me. Once I receive consent forms from you and your mum, I will contact your mum to begin the initial assessment over the telephone.

If you have any questions or require any information about this project, please contact:

Researcher: Rachel Gallagher	Telephone	██████████
Supervisor: Dr Elizabeth Kaczmarek	Telephone	6304 5551
Co-supervisor: Dr Craig Harms	Telephone	6304 5551

If you have any concerns or complaints and wish to speak to an independent person about the research project, you may contact: Research Ethics Officer, Human Research Ethics Committee, Edith Cowan University, 270 Joondalup Drive, JOONDALUP WA 6027. Phone: (08) 6304 2170; Email: research.ethics@ecu.edu.au

I greatly appreciate your help in this project.

Consent Form for Mother's Participation

I, _____ (Mother's name),

of _____ (address)
have read and understand the information about this study. I understand that I have the freedom to withdraw my consent to participate and can discontinue my involvement at any time without prejudice to any future relationship with the investigators. I understand that all information provided is treated as strictly confidential and will not be released by the investigator unless (a) it is required to do so by law; and/or (b) when there is risk of imminent danger to myself, my child, the investigator or to another person. I consent to the publication of the results of the project with the understanding that anonymity will be preserved.

Parent's Name: _____

Parent's Signature: _____ Date: _____

Parent's Contact details: _____ (phone) _____ (email)

Child's Name: _____

Child's Date of Birth: _____

If you would like me to send you a summary of the findings when the study is complete,
please tick this box []

All study participants will be provided with a copy of the Information sheet and Consent form for their personal records.

Thank you very much for helping to make this study possible.

Mother's Consent Form for their Adolescent's Participation

I, _____ (parent's name),

of _____ (address)

have read and understand the information given above. I have discussed the study with my child and he/she is willing to act as a voluntary participant. I understand that he/she has the freedom to withdraw his/her consent to participate and can discontinue his/her involvement at any time without prejudice to any future relationship with the investigators. I understand that all information provided is treated as strictly confidential and will not be released by the investigator unless (a) it is required to do so by law; and/or (b) when there is risk of imminent danger to myself, my child, the investigator or to another person. I consent to the publication of the results of the project with the understanding that anonymity will be preserved.

Adolescent's Name: _____

Adolescent's Date of Birth: _____

Parent's Name: _____

Parent's Signature: _____ Date: _____

Parent's Contact details:
_____ (phone) _____ (email) _____

The Human Research Ethics Committee at Edith Cowan University requires that all participants are informed that, if they have any complaint regarding the manner in which a research project is conducted, it may be given to the researcher. Alternatively, if you wish to talk to an independent person, you may contact the Research Ethics Officer, Edith Cowan University, 270 Joondalup Drive, Joondalup, WA, 6027, (Telephone number +618 6304 2170). All study participants will be provided with a copy of the Information sheet and Consent form for their personal records.

Thank you very much for helping to make this study possible.

Consent Form for Teenager's Participation

I, _____ (Adolescent's name),

of _____ (Address)

have read the information provided with this consent form. I agree to participate in the activities associated with this research and understand that I can withdraw my consent at any time.

I understand that all information provided is treated as strictly confidential and will not be released by the investigator unless (a) it is required to do so by law; and/or (b) when there is risk of imminent danger to myself, the investigator or to another person.

I agree that the information gathered during this project may be published and I am not identified in any way.

Teenager's Name: _____

Teenager's Date of Birth: _____

Teenager's signature: _____

Mother's Name: _____

If you would like me to send you a summary of the findings when the study is complete, please tick this box []

The Human Research Ethics Committee at Edith Cowan University requires that all participants are informed that, if they have any complaint regarding the manner in which a research project is conducted, it may be given to the researcher. Alternatively, if you wish to talk to an independent person, you may contact the Research Ethics Officer, Edith Cowan University, 270 Joondalup Drive, Joondalup, WA, 6027, (Telephone number +618 6304 2170). All study participants will be provided with a copy of the Information sheet and Consent form for their personal records.

Thank you very much for helping to make this study possible.

Appendix 2: Intake Form

Intake Form

Child's First Name: _____ Middle Name: _____ Surname: _____

Date of Birth: ____/____/____ Age: _____

Sex: Male ☐ Female ☐

Home Address: _____

Suburb/Town: _____ Post Code: _____

Phone: (H) _____ Mobile Phone: _____ (W) _____

Email address: _____

Preferred Contact Number: Home /Work /Mobile/ Other: _____

Mother's name: First _____ Surname: _____

Father's name: First _____ Surname: _____

Are the parents living in the household? Yes/No

If No, who does the child live with? _____

Child's country of birth: _____

Current concerns about your child: _____

Child's current school: _____

Please estimate your child's current reading and comprehension level (e.g. year 4)

Is your child currently taking any medications? (If 'yes', please specify)

Does your child have any diagnosed medical conditions? (If 'yes', please specify)

Has your child been diagnosed with Asperger's Disorder or Autistic Disorder? (If 'yes', who made diagnosis?)

When was diagnosis made?)

Has your child been diagnosed with a mood disorder e.g. depression, anxiety? (If 'yes', who made diagnosis?

When was diagnosis made?)

Is there are history of other mood disorders or developmental disorders in your child's immediate or extended family? If yes, specific disorder and relationship to child. (E.g. Asperger's Disorder – first cousin).

Appendix 3: Depression and Services Questionnaire

Depression and Services Questionnaire

1. Have you ever felt that your child has exhibited symptoms of depression during their adolescent years (age 12-17) including: (please circle answer)

- | | |
|---|---|
| • Sadness or hopelessness Yes / No | • Restlessness and agitation Yes / No |
| • Irritability, anger, or hostility Yes / No | • Feelings of worthlessness and guilt Yes / No |
| • Tearfulness or frequent crying Yes / No | • Lack of enthusiasm and motivation Yes / No |
| • Loss of interest in activities Yes / No | • Fatigue or lack of energy Yes / No |
| • Changes in eating and sleeping habits Yes / No | • Thoughts of death or suicide Yes / No |
| • Difficulty concentrating Yes / No | • Withdrawal from friends and family Yes / No |

2. Has your teenager ever told you that they were ‘feeling down’, ‘losing interest in the world’ or ‘depressed’? **YES/ NO**

3. In the past 3 to 6 months have you ever sought formal assistance/help/services for your teenager specifically for depression? **YES (if ‘yes’ go to question 5 and continue)/ NO (if ‘no’ continue to question 4 then 8)**

4. If **not**, why have you not accessed formal services for his/her ‘depression’? (Please tick appropriate boxes)

- | | |
|--|--------------------------|
| (I) I have never thought that my child was depressed | <input type="checkbox"/> |
| (II) I felt I and/or my family had the skills to help him/her myself | <input type="checkbox"/> |
| (III) I was unsure what services to access to help him/her | <input type="checkbox"/> |
| (IV) I did not know how to access relevant services | <input type="checkbox"/> |
| (V) I was told by a professional that services were not required | <input type="checkbox"/> |
| (VI) My child refused to go with me to see someone to help them | <input type="checkbox"/> |
| (VII) Other (Please specify)_____ | <input type="checkbox"/> |

If yes, where are you in the process of receiving services for your child's depression:
(Please tick appropriate boxes and state the name of the relevant service provider e.g.
CAMHS, private psychologist etc

(I). *Willingness to access services:*

(I.I) Actively seeking our appropriate services and learning about appropriate services

☐ Service provider_____

(I.II) Currently on a waitlist for services ☐ Service provider_____

(II) Actively engaging in services ☐ Service provider_____

(III) Have finished service provision ☐ Service provider_____

5. If you have accessed services in the past, specifically for your teenager's depression,
how satisfied were you with this service?

Very Dissatisfied	Dissatisfied	Neither Satisfied Nor Dissatisfied	Satisfied	Very Satisfied
1	2	3	4	5

7. If you are currently receiving services specifically for your teenager's depression,
how satisfied are you with this service?

Very Dissatisfied	Dissatisfied	Neither Satisfied Nor Dissatisfied	Satisfied	Very Satisfied
1	2	3	4	5

8. How likely do you think it is for adolescents with Autism or Asperger's syndrome to become depressed compared to typical teenagers?

Not At All	Less likely than others	Same as everyone else	More likely than others	Very likely
1	2	3	4	5

9. Do you think adolescents with Asperger's or Autism may want to commit suicide at any point in their life? **YES/NO**

Please comment

10. **Before** you became involved with this research did you think that is was possible for an adolescent with autism or Asperger's syndrome to become depressed? **YES/NO**

Please comment

Thank you for taking the time to complete this questionnaire.

Please let me know if you have any questions about this questionnaire.

Appendix 4: Information Sources and Contacts for Services

Suicide Services Information

Where to get help

For immediate crisis intervention when life may be in danger ring the police on 000 or go to your local hospital emergency department.

24-hour crisis telephone counselling and information services

National Lifeline 13 11 14

Kids Help Line 1800 55 1800

Suicide Call Back Service 1300 659 467

Samaritans Suicide Emergency Service (country) 1800 198 313 (metro) 08 9381 5555

Crisis Care 9223 1111

Mental Health Emergency Response Line 08 92248888

If you need an interpreter call TIS on 13 14 50

Services

Youth Self-Harm Social Worker – Royal Perth Hospital 08 92242244

Web sites

www.kidshelpline.com.au

www.livingisforeveryone.com.au

www.headspace.org.au

www.relationships.com.au www.sane.org

www.lifeline.org.au www.beyondblue.org.au

www.depressionservices.org.au www.kidshelp.com.au

www.reachout.com.au www.menslineaus.org.au

www.suicidecallbackservice.org.au

Private clinicians who will make your adolescent a ‘priority client’:

Dr David Bonser (clinical Psychologist) Mount Lawley 9371 2569

Mr. Darin Cairns (Clinical Psychologist) Mount Hawthorn & Mandurah M: 0407 591 737

Please note that a GP referral is required to access Medicare rebates.

Depression Services Information

Where to get help

Your family GP

School Psychologist/Counsellor

Child & Adolescent Mental Health Services (CAMHS)

Community Health Centre Psychologists

Psychiatrists

Youth Development Officer

Private clinicians who will make your adolescent a 'priority client':

Dr David Bonser (Clinical Psychologist) Mount Lawley 9371 2569

Mr Darin Cairns (Clinical Psychologist) Mount Hawthorn & Mandurah M: 0407 591 737

Please note that a GP referral is required to access Medicare rebates.

Web sites

headspace - www.headspace.org.au

Information, support and help near you. Headspace, Australia's National Youth Mental Health Foundation, provides services, support and information for young people who are having a tough time.

Kids Help Line - www.kidshelp.com.au

If you want to communicate with someone via email or online, Kids Help Line offers confidential, non-judgemental, emotional support 24 hours a day, 7 days a week.

Tel: 1800 55 1800 (Free call from land line)

The Lifeline National Service Finder - www.lifeline.org.au/find_help/service_finder

The Lifeline National Service Finder is a comprehensive online national database of low-cost or free health and community services offered throughout Australia

Tel: 13 11 14

ReachOut.com — www.reachout.com – information and support for young people going through tough times. If you want to find a number of different community-based services available to you, try searching in the Who Cares database featured on the ReachOut.com website.

beyondblue - www.beyondblue.org.au, more information on depression, anxiety, available treatments and where to get help.

Tel: 1300 22 4636

Resources for Mothers Experiencing Parenting Stress Information

Where to get help

For immediate crisis intervention when life may be in danger ring the police on 000 or go to your local hospital emergency department.

24-hour crisis telephone counselling and information services

National Lifeline 13 11 14

Suicide Call Back Service 1300 659 467

Samaritans Suicide Emergency Service (country) 1800 198 313 (metro) 08 9381 5555

Crisis Care 9223 1111

Mental Health Emergency Response Line 08 92248888

Parenting WA Line (08) 6279 1200 or 1800 654 432

Family Helpline (08) 9223 1111 or 1800 643 000 (country free call)

If you need an interpreter call TIS on 13 14 50

Services

Family GP

Anglicare WA

<http://www.anglicarewa.org.au/>

ECU Psychological Services Centre Joondaulp

Joondalup House Tel: 9301 0011

Programs

Triple P Parenting Program

<http://www.triplepcentre.net/>