Risk factors for sibling bullying in families with an autistic child

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February 2023

Abstract

Autistic children experience sibling bullying at an increased rate compared to the general population. Despite the negative outcomes associated with being both a victim and a perpetrator of sibling bullying in childhood, there is a paucity of research investigating why this form of bullying occurs in families with an autistic child. This thesis aimed to examine and identify risk factors associated with sibling bullying in these families. In the first study, secondary data from the Millennium Cohort Study was used to assess the relationships between parent- and child-level factors and sibling bullying involvement of autistic children. The second study employed an online survey, completed by parents of autistic children, and aimed to model the relationships between sibling bullying and child-level factors. Both studies identified factors at the child-, parent-, and family-level that are significantly associated with sibling bullying; in line with prior research, it was identified that use of harsh parenting tactics, the gender of the victim, child challenging behaviour and specific special educational needs or disabilities (SENDs) were related to the likelihood of sibling bullying. On the contrary, factors such as parental mental health, gender of the perpetrator, and household income were shown to not be associated with sibling bullying rates. The nature of the relationships between these factors and sibling bullying are discussed, and theories are suggested as to the nature of their interactions. Finally, a summary of the research described is discussed, and implications for future research and interventions in sibling bullying are considered.

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Acknowledgements

Firstly, I would like to thank my supervisors, Dr Umar Toseeb and Dr Robert Klassen. Umar, you have been a great guide and mentor. I've learned so much from your work ethic and your relentless curiosity. I don't think I could have asked for a better supervisor – our mutual love of stata and gossip go hand in hand. Thank you for always knowing when I needed to be pushed, and also when I needed to be told to go and have a lie down. Rob, thank you for being the rock that I needed, and for bringing me back to earth while I was busy planning studies 3, 4, 5 and 6 for this thesis.

Secondly, I am incredibly grateful to the autistic community for their participation in this research. I am thankful to all those who take the time to complete questionnaires, participate in interviews, or make their voices heard in other ways. I also recognise that there are some voices which we are yet to hear, and it is my hope that as a researcher I can strive to continuously improve the field of autism research and leave it a better, more collaborative, community-focused place than I found it.

To my husband, Sanjit, who was crazy enough to say "I do" mid-PhD – are you sure you don't want to take it back yet?! Thank you for being unreservedly supportive of my work and looking after me even when I was too deep into writing that I forgot to eat sometimes. Thank you for also being wild enough to pursue a career in academia so we can talk about regression models and literature searches over dinner. Another cliché – I couldn't have done this without you.

Thank you also to Theo. Thank you for dragging me outside when I was stuck at my desk, and for your unconditional love and support. The same goes for my best man, Sam. Your friendship has always encouraged me to thrive. Theo and Sam; without our long walks and chats in the woods or over fields, I most likely would have given up at some point.

To my incredible mother, Lesley, and to Josephine, my beautiful sister; thank you both for being an unwavering support network. Thank you for the phone calls at odd hours, the pub quizzes during COVID lockdowns, and the never-ending laughs.

Finally, to all the other people who are far too many to mention – the CANDY group, who have pushed me to think in ways I'd never have considered before; Glenn, Rupert, Kathryn, and Tim, who entertained me through the pandemic so that we could all keep going; and to Tom and Elysia, without whose friendship life would be considerably duller. I know cliches and academic works don't mix, but I hope that I will be forgiven for saying that it truly has taken a village to make this thesis a reality. I am endlessly thankful to my village, and hope that they know it.

Author's Declaration

I declare that this thesis is a presentation of original work, and I am the sole author. This work has not previously been presented for a degree or other qualification at this University or elsewhere. All sources are acknowledged as references.

1. Introduction

When it comes to peer bullying, parents and teachers are often quick to notice behaviours that a child exhibits or is a victim of at school. However, this is not always the case at home. Bullying between siblings is frequently described by parents as "normal" (Khan & Rogers, 2015) or "character building" (Dunn & Kendrick, 1982). A study by Caspi (2012) reported that many laypeople view violence or bullying behaviour as symptomatic of sibling relationships.

However, researchers of the field do not share this view. Sibling bullying is a relatively modern focus of study, but research investigating sibling bullying has become more common in recent years. Studies of sibling bullying have allowed researchers to explore the experiences, outcomes, and precursors associated with sibling bullying, and to understand this phenomenon more deeply. With time, sibling bullying has come to be viewed by many researchers as being as important and impactful as bullying between peers.

Nevertheless, sibling bullying research as a field is young and sparse. This area of study emerged from investigations into peer bullying research, for which Olweus (1986) is popularly credited. The study of sibling bullying followed, and arguably began in the late nineties and early noughties with publications by Duncan (1999) and Wolke and Samara (2004) as notable spearheads. As such, there are still significant gaps in research. Theories are being debated, for example, as to why sibling bullying occurs: researchers have argued that this form of bullying is distinct from peer bullying and has unique precursors (Skinner & Kowalski, 2013). Furthermore, investigations are still needed to identify the short- and long-term impacts of sibling bullying on involved children. Additionally, many instances of sibling bullying research do not involve diverse samples. For example, much of this research has been conducted without regard to neurodiversity.

Neurodiversity is an umbrella term which is used to refer to the variance or diversity between individuals' cognitive functioning and behaviour. The term was coined by Judy Singer, an autistic sociologist, in 1998 (Singer, 1998). Neurodiversity, as a concept, differentiates between neurotypical and neurodivergent people as subsets of the general population. Neurotypical individuals are defined as having little variation in their cognitive development and functioning. Other individuals, who may show more marked diversity in their development and functioning, are often labelled as being "neurodiverse" (Shah et al., 2022). People who are diagnosed with neurodevelopmental disorders such as autism, ADHD, or dyslexia, among other diagnoses, are typically identified as being neurodiverse. Importantly, the language surrounding neurodiversity does not reference normality or abnormality, but merely reflects the differences between neurotypical and neurodiverse individuals, and highlights the variation within the neurodiverse population (Walker, 2021).

The focus of this thesis is on one subgroup of the neurodivergent population: those with a diagnosis of autism spectrum disorder. Autism is a pervasive developmental disorder which impacts on social communication and interactions, amongst other traits (Diagnostic and Statistical Manual of Mental Disorders, 5th Edition; DSM-5, American Psychiatric Association, 2013). Autistic individuals, as described in the DSM-5, may have difficulties in developing and maintaining social relationships, and their interactions with others may involve atypical verbal and non-verbal communication. Further to this, autistic people may also demonstrate strong, restricted interests or preoccupations with particular interests or hobbies; adherence to routines, and distress at changes or transitions; and behaviours which are described as "stimming", which refer to repetitive motor movements, speech, or use of objects.

Before continuing to discuss autism, it is important first to clarify the language that this thesis shall adopt. Within the autism and neurodivergence research community, debate

around appropriate language use is ongoing. Many researchers and clinical practitioners have, in the past, advocated for use of the person-first term “person with autism”. This is reportedly due to a wish not to give autism, as a disability, prominence over a person’s humanity, or to equate a person with their disability. However, research indicates that this is not the preference for many autistic people or people in the autism community, such as parents, friends, and wider support networks. A study by Kenny et al. (2016) surveyed 3470 members of the autism community, and found that laypeople who were autistic or close to autistic people prefer or advocate for the use of disability- or identity-first terms such as “autistic person”. Monk et al. (2022) argue that the lack of agreement on language used to refer to autism comes from historical research, which has traditionally been conducted without community input, and with a focus on pathologizing autism. Monk et al. conclude that it is important for research to adopt terminology which is preferred by the autism community, and that research should reflect the wishes and perspective of autistic individuals. Going forward, therefore, this thesis makes use of the disability- or identity-first terminology.

When it comes to sibling bullying, there is evidence to show that autistic children have markedly different experiences to their neurotypical peers. As will be addressed in more depth later in this chapter, autistic children are reportedly more likely to be involved in sibling bullying compared to the general population (Toseeb et al., 2018; Toseeb et al., 2020a). Furthermore, one study by Toseeb et al. (2020b) investigated sibling bullying in a general population sample, which included a sub-sample of autistic children. This study identified that precursive risk factors for sibling bullying in the general population had different roles and impacts in families with autistic children.

This thesis will expand on this emerging field of research by further exploring the risk factors associated with sibling bullying in families with an autistic child. To provide an introduction to this topic, this chapter will present an overview of the definition of sibling

bullying as it presently stands. In addition, the prevalence of sibling bullying between autistic children and their non-autistic siblings will be discussed. Finally, this chapter will briefly review the outcomes of sibling bullying and review the evidence that has been presented in the literature thus far.

1.1 Defining Sibling Bullying

As mentioned above, parents and other laypeople are often quick to dismiss sibling bullying as a normal and natural component of sibling dynamics. Within the scientific community, however, researchers are beginning to deviate from the narrative that portrays sibling bullying as a typical component of family dynamics. Researchers have begun to investigate the causes of this phenomenon, as well as the prevalence of sibling bullying behaviour and the impact that it may have.

A first, crucial step for research is to agree on a definition for sibling bullying. Having a universal and consistent understanding of bullying would benefit research and practice. For one, this would allow researchers to make meaningful comparisons of bullying prevalence between groups, such as at a national or local level (Younan, 2019). In addition, a constant definition would allow for the formation of more reliable and consistent intervention strategies (O'Moore & Minton, 2004).

To establish a definition for sibling bullying, many have looked to the established and older field of research on peer bullying. Bullying between peers is a phenomenon that has been studied for decades and, compared to the much younger field of sibling bullying research, has seen a great deal of discourse and debate around definitions of bullying behaviour.

The first broadly accepted definition for bullying behaviour came from Olweus (1994). Olweus proposed that "a student is bullied or victimised when he or she is exposed, repeatedly and over time, to negative actions on the part of one or more other students"

(p.1173). Olweus elaborated that in order for a behaviour to be identified as bullying, the following three criteria must be met: the behaviour is always intentional; the behaviour must be carried out repeatedly and over time; and the interpersonal relationship between bully and victim must be characterised by an imbalance of power, which means that the victim finds it difficult to defend themselves.

A systematic review by Younan (2019) indicated that many researchers continue to use the three criteria outlined by Olweus (1994) to identify peer bullying behaviour. The popular definition for sibling bullying is not vastly different from the definition for peer bullying, despite the two phenomena taking place in different contexts and for different reasons (Skinner & Kowalski, 2013). Like the definition for peer bullying, sibling bullying continues to be defined as behaviour which is intentional, repeated, and involves a power imbalance between those involved (Wolke et al., 2015). This definition is consistently adopted within sibling bullying research, including where autistic children are involved (Deniz & Toseeb, 2022).

This criteria help to distinguish bullying from other behaviours or events that children may be involved in. For example, Farrington (1993) wrote that it can be difficult to determine where friendly teasing ends, and bullying begins. The definition adopted by sibling bullying researchers helps to make this distinction. If sibling bullying is to be understood as activity causing intentional harm, then teasing which is carried out to intentionally humiliate a victim and cause distress can be identified as bullying (Pearce, 1991; Roland, 1989).

Additionally, the criteria that there must be an imbalance of power is crucial in understanding bullying. When bullying takes place, there must always be one party playing the role of "victim", whilst the other is the "bully" (Guerin & Hennessy, 2002). A series of interactions that involved two or more individuals of equal power, one of whom wished to cause the other intentional harm, would be described as fighting or aggression rather than

bullying. Olweus (1997) describes that this "asymmetric power imbalance" is crucial in defining bullying, and argues that bullying can only take place when one party is incapable of defending themselves.

The final criteria states that for behaviour to be labelled as bullying, it must be repeated, happening on multiple occasions. As above, this is the same in defining both peer and sibling bullying. This helps bullying to be distinguished from rare, one-off events of marked violence or abuse. Such singular events must be understood as distinct from persistent instances of abuse between individuals. Olweus (1999) wrote that this criteria, which "emphasises negative actions that are carried out 'repeatedly and overtime'" (p. 11), is important as it excludes infrequent, non-serious behaviours between individuals. Additionally, this criteria also separates bullying from singular occurrences of interpersonal violence or conflict. Such behaviour may be described as interpersonal conflict, which is crucially distinct from bullying (Burger, 2022).

1.2 Sibling Bullying Behaviours

Having defined that sibling bullying is intentional, repetitive harm-doing that involves a power imbalance, it is next important to understand the behaviours that may be considered bullying. Researchers have identified that bullying can be physical, verbal, or social (Monks & Coyne, 2011).

Physical bullying includes behaviour that the perpetrator carries out in order to cause their victim physical harm, such as hitting, kicking, or other means. Verbal bullying includes name-calling or making threats and insults. Social bullying, sometimes referred to as relational bullying, involves forms of manipulation that are intended to harm an individual's social standing. This may include behaviours such as spreading rumours about an individual or excluding a person from social activities. Besag (1989) suggests that social bullying may

also take the form of socially acceptable behaviours, such as competitiveness in sporting events or social settings, but stresses that it is intended to make others feel inferior.

Much like the way in which sibling bullying is defined, the types of behaviours which constitute sibling bullying are also guided by peer bullying research. This is seen most clearly in the ways that research is conducted. A frequently used method of identifying sibling bullying is a revised version of a peer-bullying scale developed by Olweus (1991), titled the Sibling Bullying Questionnaire (Wolke & Samara, 2004; SBQ). The scale includes physical, social, and verbal bullying behaviours. This scale is administered to children, who are asked to indicate how frequently they perpetrate or are a victim of bullying behaviour. Researchers investigating sibling bullying make use of this scale to identify sub-types of bullying behaviours that occur within households.

It is also possible to categorise bullying activity not just based on the types of bullying that take place, but also on the roles that each person takes. There are four categories that siblings who are involved in bullying may be identified as belonging to (Dantchev & Wolke, 2019). Some children are determined, through self-report or other means, to be "victims". These children are targets of a sibling's bullying perpetration, and do not engage in bullying behaviour themselves (Olweus, 1994). On the other hand, other children may be identified as bullies, who perpetrate aggressive acts towards a sibling or siblings (Olweus, 1994). A third category of children who are involved in sibling bullying is that of the bully-victim. Bully-victims are children who are both engaged in perpetrating bullying towards a sibling, and are also victims of bullying (Olweus, 2010). Finally, some children are categorised as "uninvolved" or "neither", as they are not involved in bullying, either as bully or victim.

Being able to differentiate between categories of individuals who are involved in bullying is useful for two reasons. For one, this allows researchers to investigate whether different profiles of bullying are associated with different risk factors or precursors. For

instance, a study by Toseeb et al. (2020b) investigated the precursors for sibling bullying behaviours. It was reported that the impact of precursors for sibling bullying differed by group, with different child-, parent- and family-level characteristics predicting sibling bullying per group. Similarly, researchers are also able to explore whether being in a particular sibling bullying group is associated with different outcomes when compared to other groups. This was demonstrated by Dantchev and Wolke (2018), whose study of the general population identified that children who were bullies or bully-victims in adolescence were at increased risk of developing antisocial behaviour in adulthood compared to victims or those uninvolved in sibling bullying.

1.3 Prevalence

A number of researchers have sought to estimate the prevalence of this behaviour in the UK. Several studies have reported that sibling bullying is more prevalent than peer bullying. For example, in a study of children in Northern Ireland, it was reported that 13.2% of children reported being victims of sibling bullying, 3.2% reported bullying their siblings, and 15.4% of children were both perpetrators and victims of sibling bullying. The same study found that 14.7% of children were victims of peer bullying, 1.2% bullies, and 1.7% both bullied and were bullied by peers (Foody et al., 2020). Further to this, Dantchev and Wolke (2019) surveyed over 6000 children, of whom 28.1% reported being involved in sibling bullying.

Although prevalence estimates for sibling bullying in the general population have been calculated, estimates for the same behaviour in families with autistic children are less widely investigated. It has been reported that autistic children are more likely than non-autistic children to be involved in some form of sibling bullying at age 11. Toseeb et al.'s (2020a) study found autistic children are more likely to be in the victim-only (20%) group compared to non-autistic children (16%), and are also more likely to be in the bully-only

group (8%) compared to their non-autistic peers (4%). Finally, autistic children were also more likely to be in the bully-victim group (40%) compared to non-autistic children (29%).

There may be a number of explanations for this disparity. It is possible that autistic children are simply more likely to be involved in sibling bullying. Autistic children often have markedly different social interactions than their peers, and it has been reported that autistic children experience peer bullying at a higher rate. Research has reported the rates of victimisation of autistic children in general education settings to be between 63-75% (Zablotsky et al., 2013; Little, 2001). This is much higher compared to the general population, where it is reported that only 11% of youth are victims of peer bullying (Tippett et al., 2013). Although these findings are not directly applicable to the experiences of sibling bullying within populations of autistic children, this may suggest that autistic children are more likely targets for bullying, whether by a sibling or a peer.

It is beyond the scope of this introductory chapter to provide a description of the research which has investigated why autistic children may be so heavily involved in sibling bullying, and a full review of this work will follow in Chapter 2. However, two key conclusions must be drawn from the evidence presented here. One is that, regardless of the reasons for this finding, research has indicated a disparity between rates of sibling bullying in non-autistic families versus families where a child is autistic. The other is that this discrepancy has not been well researched, with very few recent studies providing prevalence estimates of sibling bullying involving autistic children. This reflects a serious research gap, which this thesis shall address. As shall be discussed further below, sibling bullying is a serious phenomenon with implications in the short- and long-term for the wellbeing of those involved.

1.4 Outcomes

As is demonstrated above, sibling bullying is an important area of research focus. Understanding the risk factors associated with this phenomenon could assist in the development of targeted interventions to decrease rates of sibling bullying occurring. The need for such interventions is reinforced by research which has identified that sibling bullying is associated with poor mental health outcomes for involved children. In the general population, Bowes et al. (2014) reported associations between sibling bullying in childhood and increased risk of experiencing anxiety, clinical depression, and self-harm by mid-to-late adolescence.

Additionally, Toseeb and Wolke (2021) investigated mental health outcomes for 17 year olds in the general population who had been involved in sibling bullying at age 11. This study found that outcomes differed according to the sibling bullying behaviours that participants had engaged in: specifically, whether participants were in the bully-only, victim-only, or bully-victim group. For example, adolescents in the victim-only group at age 11 were found to have more psychological distress, internalising and externalising problems, and self-harm than participants who had not been involved in sibling bullying at all. Additionally, the victim-only group had lower self-esteem and wellbeing scores at age 17. Interestingly, the bully-only group were also compared to the uninvolved participant group, and different outcomes were noted. Although the bully-only group also showed more psychological distress and externalising problems than the uninvolved group, this group did not share any other mental health outcomes with the victim-only group. Finally, the bully-victim group was compared to uninvolved participants. This group was found to have more internalising and externalising problems, psychological distress, self-harm, lower wellbeing scores, and reduced self-esteem by comparison.

Interestingly, autistic children who are victimised by their siblings are reportedly significantly more likely to have externalising symptoms when compared to non-autistic

victims of sibling bullying (Toseeb et al., 2018). Toseeb et al. suggest that this is due to autistic children having lower prosocial skills, internalizing and externalizing problems, which are then exacerbated by sibling bullying in a manner that eclipses the impact of sibling bullying alone. However, despite evidence indicating the negativity of sibling bullying outcomes for autistic children, it remains an under-researched phenomenon. This once again reinforces the need for further investigation into why bullying occurs between autistic children and their siblings.

1.6 Summary and Conclusions

Sibling bullying is still an under-researched field. Much of this work, such as its definition and classifications of sub-types, is guided by the discourse and study of peer bullying. Within this, research investigating sibling bullying as experienced by autistic children is even more novel. However, studies which have examined sibling bullying experienced by autistic children have indicated that these children have unique experiences compared to the general population. For example, prevalence estimates are much higher for autistic children, and this subgroup also encounters different mental health outcomes as a result of sibling bullying involvement. It is clear that it is important to continue to study sibling bullying, especially within the context of families with an autistic child. This thesis aims to address the gaps in research as outlined above, and to shed light on the prevalence, precursors, and types of sibling bullying that occur within such families.

2. Literature Review

In recent decades, researchers have formulated theories in the attempt to understand why sibling bullying occurs. Although research validating these theories in families with autistic children is still incredibly sparse, studies have started to be conducted in the last several years to begin to test these hypotheses in this specific population.

In the effort to understand why sibling bullying occurs, many researchers argue that it is crucial to view the sibling relationship within the broader context of the family. Family systems theory (Kerr & Bowen, 1988) is an approach which emphasises this context, describing family members as individuals who are interconnected in a complex social network. This network has been described as "a spiral of recursive feedback loops" (Minchin, 1985, p. 290), within which family members may influence one another's' behaviours through their interactions (Pfeiffer & In-Albon, 2022).

Family systems theory suggests that in order to understand behaviours like sibling bullying, one must examine them within the context of the family system (Watson, 2012). This chapter aims to do so by discussing theoretical perspectives and evidence-based hypotheses that attempt to explain why sibling bullying occurs, using the lens of how each factor may impact on the family unit as a whole, and in turn lead to bullying behaviours between autistic children and their siblings.

First, this chapter will explore evidence and theories which suggest associations between sibling bullying involvement and family-level factors. For example, how sibling perceptions of the family structure and preferential treatment may lead to increased conflict; how socioeconomic status of the whole family may influence behaviours of children; and how traits of family members such as parents and siblings of the autistic child may increase the likelihood of sibling bullying. Next, child-level factors shall be examined. These include child gender and autistic traits in the child who has received an autism diagnosis, and how

these may increase a child's likelihood of becoming involved in sibling bullying, either as a bully, victim, or both. Finally, following this, the chapter shall review how parental modelling of harsh or aggressive behaviours may relate to sibling bullying. This is a parent-level factor which has been suggested by prior research to be related to levels of child aggression. Evidence will be critically reviewed, and the question of how well the research represents the population of families with autistic children shall be addressed.

2.1 Family-Level Factors

2.1.1 Resource Control Theory

To explain the occurrence of bullying between peers and siblings, some researchers adopt the perspective that such behaviour is driven by evolutionary factors. Hawley (1999) was among the first to suggest this when she introduced the term Resource Control Theory (RCT). This theory posits that social interaction is, rather simply, a means to an end. Hawley argued that humans are social to achieve the acquisition and control of resources that are made available through socialisation. These resources may be social, such as popularity or reputation gains, or material things which are only accessible through group membership.

Hawley describes that there are two distinct strategies that an individual may adopt to achieve resource control. One of these strategies is prosocial resource control. Importantly, this is different from prosocial behaviour, which has the aim of benefitting the recipient of the actions. Prosocial resource control strategies, which includes cooperation and reciprocal social interaction, only serve to benefit the actor, and any gains made by the recipient are coincidental. Prosocial resource control takes this form because being a well-liked member of the group allows individuals more access and control over group resources. This therefore requires good social skills, as prosocial resource controllers attempt to climb the social ladder by making friends. On the other hand, coercive resource control strategies are far less subtle. These strategies include aggression, taking control or resources by force, deception, and

sometimes threats. Under the RCT framework, the aggressive mannerisms of coercive strategists are seen as purposeful and useful to the actor, as these behaviours enable them to acquire dominant positions within a group (Olthof et al., 2011).

Some of the behaviours that may be identified as coercive resource control may also be labelled as bullying behaviours. Research has shown that children who are ringleaders of school bullying often make use of coercive resource control strategies such as manipulation and intimidation (Clark et al., 2019; Olthof et al., 2011). These strategies also appear to be successful methods of resource control: Olthof et al. (2011) found that coercive controllers engaging in bullying are more likely to be perceived as popular and have more control over social resources.

Currently, no studies have investigated whether sibling bullies are also making use of coercive resource control strategies. However, it is possible that RCT could explain why bullying occurs between siblings. Researchers suggest that family resources, such as parental time or affection, or more tangible things, like money or food, are finite. When there are multiple siblings in the household, they may resort to coercive resource control strategies in order to access and defend resources. This has been supported by research which has found that increasing the pool of sibling competitors increases the risk of bullying behaviour. Research has shown that when there are more siblings in a household, there is a greater risk of sibling bullying occurring (Dantchev & Wolke, 2019). Toseeb et al. (2020b) analysed data from a UK based cohort study and found that being first born was strongly associated with sibling bullying involvement. These researchers theorise that first born children are more likely to become involved in sibling bullying because the pool of parental resources available to them decreases as the number of children in the household increases. This is in line with RCT and furthers the argument that sibling bullying is underlined by competition for a limited pool of resources.

Theoretically, there is reason to believe that sibling bullying in the families of autistic children may be due to coercive resource control strategies. Within such families, parents may have additional caregiver demands for their autistic child, resulting in the non-autistic sibling feeling a loss of parental attention (Macks & Reeve, 2007). This is supported by research by Howlin (1988), where it was reported that siblings of autistic children reported a feeling of imbalance in parental attention. This may be an illustration of the decrease in the pool of resources available to the child's non-autistic siblings. If resource control strategies were utilised by siblings in such families, one may expect that there could be increased bullying in comparison to families with no autistic children or children with other special educational needs or disabilities (SEND). If this theory were valid, both autistic and non-autistic children may become involved in sibling bullying, as both bullies and victims: non-autistic children may perpetrate bullying, attempting to gain access to the parental resources that they feel they do not have an equal share in; and autistic children may also perpetrate bullying to maintain resource control. Indeed, it has been found that autistic children report more sibling bullying involvement than non-autistic children (Toseeb et al., 2020a), adding credence to this supposition.

In summary, RCT proposes that bullying between siblings may be due to children being competitors for resources, and that bullying is an expression of children using coercive resource control strategies to acquire these resources. This may be particularly relevant when applied to families with autistic children, where the competition for parental resources may be even more acute. RCT may therefore be a useful framework within which to investigate sibling bullying, particularly in families with autistic children. However, although evidence could indicate a link between resource control and sibling bullying in families with autistic children, investigations into this area involving this specific population have not yet been conducted.

2.1.2 Socioeconomic Status

Researchers have also suggested that family-level characteristics such as socioeconomic status (SES) may be related to the likelihood of sibling bullying occurring. Family SES is here defined as a family's position on the socioeconomic scale. This position is influenced by economic factors, such as household income, educational background, and occupation. In addition, social factors also contribute to SES, including a family's ethnic or religious background (American Psychological Association, 2022). Individuals may be determined to have a high or low SES, dependent on a combination of these factors.

It is suggested that low SES is linked to sibling bullying because of the adversities that individuals from such households may experience. For example, research shows that children from low SES families are more likely to be exposed to harsh or punitive parenting practices (Straus & Stewart, 1999) and domestic violence between adults in the home (Cunradi, Caetano & Schafer, 2002). This suggestion is consistent with social learning theory (SLT), a full discussion of which shall follow later in this chapter. To be brief, this theory proposes that individuals, such as children, who are exposed to violent behaviours modelled by individuals who they identify with, such as their parents, are likely to imitate such behaviours.

Some research has supported that low SES is associated with bullying behaviours. As is frequently the case in this field, sibling bullying research investigating the precursive role of SES was preceded by studies examining the links between family status and child peer bullying rates. Researchers have reported that children of lower SES families have a higher risk of peer bullying involvement, and that increasing the number of socioeconomic adversities faced by a family is related to an increasing likelihood of bullying occurring (Jansen et al., 2011). However, the research on this is somewhat mixed. A literature review conducted by Tippett and Wolke (2014) found that the associations between socioeconomic

status and involvement in peer bullying were weak, and argued that socioeconomic status does not represent a good predictor of peer bullying. Reports about the associations between family SES and peer bullying involvement, therefore, appear conflicting.

With regards to sibling bullying, some studies have also found associations between family financial difficulties and sibling bullying involvement (Dantchev & Wolke, 2019). It has been suggested that financial difficulties, and the associated stress, have a negative impact on the family unit, causing increased levels of conflict between family members (Conger et al., 1993). However, Toseeb et al. (2018) report that sociodemographic factors such as low incomes are linked to decreased risk of sibling bullying in families both with non-autistic and autistic children.

To summarise, the current status of research investigating the link between sibling bullying and SES is mixed at best. Clashing evidence means that any relationship between these factors is currently unclear. In addition, the study by Toseeb et al. (2018) is the only one so far to investigate SES as a factor in bullying between autistic children and their siblings. This represents a large research gap which requires investigation. At present, it is impossible to tell whether SES and sibling bullying are related, or to speculate as to why or how any association – or lack thereof – is apparent.

Further work is needed to investigate this, especially since this may have implications for the manner in which interventions are targeted. Socioeconomic status indicators, such as income level or level of deprivation in a geographical area, could be an easy and convenient way to target interventions. However, if socioeconomic status is not a useful predictor of sibling bullying in families with autistic children, as work by Toseeb, McChesney, and Wolke (2018) would suggest, then it is important to keep this in mind when devising interventions that can be applied and delivered to families regardless of their income level.

2.1.3 Broad Autism Phenotype

Further to family structure and SES, research has identified that specific traits of family members may be related to sibling bullying. Specifically, traits of autism may be present in those without an autism diagnosis and may be linked to bullying behaviour. Autism is often considered as existing on a spectrum. Researchers have suggested that autistic individuals fall on the "extreme" end of a normal distribution curve for traits such as social communication and interaction (Lundstrom et al., 2012). Within the autism community, autistic people may have traits that put them at different points on these distributions, meaning that no two autistic individuals are identical. This is the key reason that autism is termed Autism Spectrum Disorder in the DSM-5 (APA, 2013).

There is evidence to suggest that non-diagnosed family members of autistic children may also express autistic traits. Autism has been found to be highly heritable. Xie et al. (2020), for example, analysed diagnosis data from over 500,000 individuals and found that children who had at least one parent with an autism diagnosis had increased odds of also being diagnosed autistic. In addition, they report that the more genetically close that an individual is to an autistic family member, the higher odds of also receiving an autism diagnosis. Xie et al. report heritability rates for autism at 64%. An even higher estimate for heritability was reported by Sandin et al. (2017), who studied twin pairs, sibling pairs, and half-sibling pairs, and concluded that the heritability of autism was 83%.

Studies investigating shared traits of autism between family members have also shown that less severe expressions of autistic behaviours and characteristics, such as difficulties in social communication and repetitive behaviours, manifest even in those who do not meet diagnostic criteria (Bailey et al, 1995; Folstein & Rutter, 1977; Losh et al., 2008). Studies investigating the BAP often compare family members of autistic individuals to family members of non-autistic, control subjects, and have found significant differences in measures

of autistic traits between family members of autistic children and controls (Bishop et al., 2006; Wheelright et al., 2010).

Some researchers propose that family members with shared genetic material may share what has been referred to in the literature as the broad autistic phenotype (BAP). Simply put, it has been suggested that autistic traits may be shared by family members, even those who do not meet diagnostic criteria for autism. Although there is not currently a widely accepted standardised criteria for the BAP (Kellerman et al., 2019), many studies have investigated the phenotypic expression of shared autistic traits in undiagnosed family members. Hartley et al. (2019) suggested several broad key features of the BAP, which largely capture the features found in research into BAP components. These were: a socially and emotionally aloof personality, which involved little interest in social interaction; impairments in pragmatic language, including deficits in switching conversation topics and turn taking; and a rigid personality, which includes difficulties in dealing with change.

Studies have supported that individuals in families with multiple autistic members score significantly higher on ratings of aloof personality traits, rigidity, and pragmatic speech errors (Losh et al., 2008). Additionally, parents from multiple-incidence families reported lower quality friendships than both parents from families with no autism diagnoses and parents of children with Downs Syndrome. These findings were replicated by Bernier et al. (2011), who reported that parents who had multiple autistic children showed significantly more autism phenotype characteristics, with more impaired non-verbal social communication, interpersonal communication, interest in social interaction, and having more restricted and repetitive interests and routines compared to control families with no autistic children.

Further to this, there is generally a wide array of research with findings supporting the existence of BAP traits in siblings of affected individuals. Folstein and Rutter's (1977) study

showed high rates of shared language and cognitive impairments in MZ twin pairs where only one twin reached diagnostic criteria for autism. In a study of 600 children, Ozonoff et al. (2011) reportedly found sub-clinical traits of autism in approximately 19% of children whose siblings were autistic. Finally, in Pisula and Ziegart-Sadowska's (2015) systematic review of studies investigating presence of the BAP in sibling groups, studies were found to report impairments in emotion recognition, social skills development, and social language use in unaffected siblings of a child with an autism diagnosis.

It is arguable that BAP traits may be related to conflict within families. Social cognition difficulties, which have been demonstrated in both parents and children in families where with an autistic child, may theoretically lead to increased antisocial behaviour. Research has found that BAP traits in typically developing siblings of autistic children is associated with a significant increase in problem behaviours and decreased prosocial behaviours (Mohammadi & Zarafshan, 2014). Finally, Jamil et al. (2017) found individuals who scored highly on measures of BAP traits also had weaker empathy and were less interested in, and derived less pleasure from, friendships. To summarise, BAP traits in undiagnosed family members appear to be associated with fewer friendships, impaired social cognition, and problem behaviours. Theoretically, one may argue that a combination of deficits in emotion recognition and less interest in developing friendships may result in colder relationships between family members.

There may be, therefore, a link between BAP traits in undiagnosed family members and conflict. However, at present this argument remains purely theoretical, as no studies thus far have examined the link between BAP and sibling bullying directly. Additionally, there are a number of issues with this theory. Firstly, although it has been found that family members with high BAP traits may have fewer high-quality friendships and impaired social cognition, it seems a stretch to argue that the natural predilection of such individuals would be to engage

in bullying behaviour towards family members. Even if the pattern of being less interested in friendship relationships and appearing aloof did extend to the familial context, which has not been examined in the literature at present, this would not necessarily automatically translate to relationships characterised by aggression or hostility.

Additionally, the finding presented by Jamil et al. (2017) that individuals scoring highly on measures of BAP traits are less interested in friendships is contradictory to other research involving autistic individuals. Many autistic individuals report a desire to build friendships but finding it difficult to form and maintain them (National Autistic Society, 2018). Therefore, findings that present individuals with BAP traits as having fewer friendships may not conclusively represent a lack of interest in forming relationships. It may therefore be misleading to argue that individuals with BAP report fewer friendships due to a lack of interest in them, and thus difficult to argue that such individuals would, by extension, not be invested in forming warm familial bonds.

In short, many studies have identified that family members of autistic individuals may share elements of their traits without also being identified as autistic. Studies have shown that these characteristics may present in parents of an autistic child as well as their siblings. One may argue that since some individuals scoring highly on measures of BAP exhibit lower performance on social cognition tests and report fewer high-quality friendships, they may have low quality relationships with family members such as siblings. However, this has not been demonstrated empirically at the present time, and even if the relationships between family members were observed to be less warm and close, this would not necessarily be associated with bullying behaviour.

2.2 Child-Level Factors

2.2.1 Gender

Research has also identified child-level factors that may be associated with bullying. As is typical of sibling bullying research, investigations into how this factor may be associated with sibling bullying was inspired by research on bullying between peers. This research has shown a relationship between child gender identity and peer bullying behaviour, with boys being more likely to be perpetrators of bullying than girls (Olweus, 1994). Dantchev and Wolke (2019) replicated this, reporting that being male increased the odds of perpetrating sibling bullying, whilst being female increased the odds of being a victim or bully-victim. In contrast, being male protected against being a victim of sibling bullying. Similarly, Menesini et al. (2010) conducted a study of 195 children and found that boys were more frequently bullies to their siblings compared to female children.

Toseeb et al. (2018)'s study of both autistic and non-autistic children further reproduced this finding. Their study showed that being female was associated with a higher risk of victimisation, whilst male children were more likely to perpetrate sibling bullying and not be victimised. However, the study by Toseeb et al. (2018) is the only investigation thus far into gender differences in sibling bullying within families with autistic children. This means that further work is certainly required to corroborate the findings of research indicating a gender difference in sibling bullying in the general population.

Such work is particularly important now, as research is only just beginning to uncover the unexplored depths of gender differences in the autistic community. For many decades, studies have been primarily conducted with male participants, and it has become a popular myth that only males are diagnosed autistic (Shefcyk, 2015). This has manifested in study, meaning that within research "girls and women are nearly an invisible population" (Shefcyk, 2015, p.131). However, the growing evidence base suggests that gender differences are an important research focus, as the female experience has been shown to be significantly different (Kourti & MacLeod, 2019). This is a source of frustration to many in the autism

community, who identify the lack of knowledge about gender differences in autism as something that needs to be addressed (Pelicano et al., 2014).

In short, gender differences in sibling bullying are apparent, but have only recently been explored in families with an autistic child. Evolving perspectives and research focus indicate that gender is a crucial area of study in the autism community, which further contributes to the importance of studying gender differences in sibling bullying in this population.

2.2.2 Autism

Autism and Victimisation. A further factor that has been identified as being associated with sibling bullying in autistic children is autistic traits and characteristics. Autistic individuals may have traits that identify them as "different" from other people of their own age (Haq & Le Couteur, 2004). As discussed in Chapter 1, the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5) describes that autistic people may sometimes have highly focused interests and hobbies, and may also demonstrate repetitive behaviours. Autism is also associated with strong adherence to routines, and distress when these routines are altered or otherwise disrupted. Autistic individuals may also have difficulty with interpreting some aspects of social communication, such as facial expressions (American Psychiatric Association, 2013).

These traits may identify them as "different" from other people of their own age (Haq & Le Couteur, 2004). Unfortunately, as neurotypical children who are perceived as deviating from social norms are often victims of bullying (Horowitz et al., 2004), the uniqueness of autistic traits may place autistic children at risk of being targets of bullying by peers. Zablotsky et al. (2014) found that, amongst other risk factors, children scoring higher on measures pertaining to autistic traits were more likely to be involved in peer bullying. Specifically, difficulties in interpreting social communication have been identified as being a

risk factor for being victimised by peers: Rowley et al. (2012) argue that a propensity to interpret social interaction literally may make it difficult for autistic children to understand social motives, potentially making them an "easy target for derision and mockery" (Rowley et al., 2012, p.1127).

Within the context of the family setting, autistic traits may also be a risk factor for victimisation by a sibling. Research has shown that siblings of autistic children may experience feelings of embarrassment and shame due to their sibling's difficulties or expressed behaviours (Corsano et al., 2017; Guidotti et al., 2020). Corsano et al.'s (2017) study with child and adolescent siblings of autistic children found that many siblings, particularly adolescents, shared feeling embarrassment and annoyance towards their autistic sibling. This is not a modern phenomenon; Wilson et al. (1992) found that siblings of a child with a developmental disorder reported feelings of embarrassment: one interviewed sibling expressed that they had wished that their sibling wasn't around, as this would make it easier to bring their friends to the home without risk of being embarrassed by their sibling's unpredictable behaviour.

Such embarrassment and shame may lead to an increase in sibling bullying. No studies have examined the relationship between such feelings and sibling bullying. However, some investigations have indicated that autistic children who exhibit more problem behaviours have worse sibling relationships. Seltzer et al. (2009) found that problem behaviours of autistic children negatively impacted the relationship between the child and their siblings. Similarly, Petalas et al. (2012), in their study of a large sample of families with one autistic and one non-autistic child, found that the behaviour problems of the autistic child were linked to an increase in conflict and rivalry between siblings.

However, recent research has found that siblings of autistic children are more likely to avoid their sibling with increased levels of problem behaviour rather than to initiate

aggressive interactions (Greenberg et al., 1999; Seltzer et al,, 2009). It is possible, therefore, that although siblings of autistic individuals may report feelings of embarrassment, this is not a conclusive explanation for sibling conflict. In fact, in a study by Mohammadi and Zarafshan (2014), it was reported that levels of severity of autistic traits expressed by a child was not significantly related to the levels of problem or prosocial behaviour of a sibling.

Autism and bullying perpetration. The traits of autism that are posited to place autistic children at risk of victimisation have also been argued to be involved in the manifestation of bullying behaviours. Autistic young people have been reported to be more aggressive than their non-autistic peers. Studies report that approximately half of autistic people exhibit co-occurring challenging behaviours such as aggression (Mazurek et al., 2013), with at least 56% of aggressive behaviours directed towards caregivers (Kanne & Mazurek, 2011).

One possible explanation for this is described under the theory of mind (ToM) model. This model posits that autistic individuals may find it harder to comprehend the perspectives of other people and to understand what another person may be thinking or feeling (Baron-Cohen et al.,1985). Theoretically, an individual who find it harder to "read" other people may thus struggle to interpret the impact of their own actions on others' thoughts or feelings, and may unknowingly initiate behaviour that is harmful to others.

This was the focus of research by van Roekel et al. (2010), who investigated the link between ToM and the ability to accurately identify bullying behaviour. Autistic children were shown videos of bullying and positive social interactions. Overall, the autistic children were able to identify bullying behaviour successfully. Interestingly, however, children who scored lower on ToM tasks were less proficient at identifying bullying situations. These children were also those identified as engaging in bullying behaviour by their teachers and peers. This finding could be explained by the relatively low ToM scores demonstrated by this subgroup:

perhaps children with decreased ability to understand the impact of their actions on others' emotions may be less likely to inhibit bullying behaviour. In support of this is the finding that autistic children are much less likely to report being involved in bullying, whether as a victim or as a bully, whilst teachers make more frequent reports that autistic children are involved in peer bullying (van Roekel et al, 2010; Rowley et al, 2012). One may argue that being less able to comprehend the intentions of others is linked to a decreased ability to identify bullying behaviour, which may mean that one is likely to become involved in it. Since autistic children are reportedly poor at identifying when bullying is taking place, it is possible that they may become involved in bullying as a perpetrator, without intending to or anticipating that their actions may cause harm.

Theoretically, one may argue that as any difficulties in social interaction or in interpreting one's own behaviour transcend the setting of the school classroom, they may impact on sibling relationships as well as those between peers (Kaminsky & Dewey, 2001). However, the research discussed above was conducted in school settings with an emphasis on bullying between peers. This makes it difficult to apply the findings of research into peer bullying to sibling bullying in this population, particularly because it is unclear whether children who are intimately familiar with an autistic family member would respond in the same way to an autistic child as a peer would. The siblings of an autistic child may be able to compensate and adjust for their family member's social and communicative uniqueness. As stated by Horowitz et al. (2004), children who are identified as deviating from norms are at risk of being bullied by their peers, but it is unclear whether or not this extends to a familial context. The classroom and the familial home may represent significantly different settings with regards to bullying in this regard.

Additionally, it may be unreasonable to argue that autistic individuals may exhibit bullying behaviour simply because they are less able to identify the consequences of negative

behaviour for others. The evidence investigating the ToM hypothesis, outlined above, suggests that autistic individuals struggle to understand the motivations and thoughts of others. As is discussed above, this may in turn contribute to autistic children being less able to identify bullying behaviour or the motivations of people perpetrating it. They themselves may then perpetrate bullying behaviour, having not identified the association between physical, verbal, or social bullying and the intent to cause harm. However, this suggests that no mediating processes take place when autistic children perpetrate bullying behaviours, and that they do so without thought for the consequences of such actions. Although it is accepted that autistic individuals struggle to understand the intentions and perspectives of others, recent research has argued that autistic individuals are not unresponsive to other's emotions (Shirayama et al., 2022). This distinction is between cognitive empathy and affective empathy. Cognitive empathy is described as the ability to put oneself in another's shoes, and to comprehend that person's point of view (Piaget, 1932), whilst affective empathy is defined as the ability to respond to another's emotional state (Davis, 1983). Historically, research has identified that although autistic children do show reduced levels of cognitive empathy compared to non-autistic controls, they are able to respond empathically to the feelings of others (Yirmiya et al., 1992). More recent studies have also reported no differences between autistic children and non-autistic controls on measures of affective empathy (McKenzie et al., 2022; Rogers et al., 2007; Shiriyama et al., 2022). This suggests that although autistic children may struggle to identify other people's perspectives and motivations, they are still sensitive to the emotions of others. If this is the case, then autistic children would be aware of the emotional distress caused by bullying. It is overly simplistic, therefore, to suggest that autistic children may perpetrate sibling bullying simply because they are less able connect the motivations with the behaviours.

To summarise, the individual differences that set autistic children apart from their neurotypical peers have been found to be associated with increased risk of experiencing victimisation. These differences have also been identified as placing children at risk of initiating bullying behaviour as well as being bullied: however, there is mixed evidence to support this finding. Additionally, it is unclear whether the individual characteristics of autistic children would be similarly associated with victimisation in the familial context, as many of the studies investigating this have not been replicated outside of an educational setting.

On a final note, the argument that autistic traits may be a risk factor for bullying behaviour is one that must be approached cautiously, particularly as this has not been demonstrated conclusively in the literature. Autism is, by definition, a condition that exists on a spectrum of neurodiversity, and each autistic individual is unique in both their traits and their situation. It may, therefore, be harmful to single out autistic traits as a predictor of an autistic child perpetrating or being a victim of sibling bullying behaviour.

2.2.3 Other Special Educational Needs and Disabilities

In addition to an autism diagnosis, many autistic children are diagnosed with additional special educational needs and disabilities (SENDs). Research has indicated that autistic children are at risk of being diagnosed with additional SENDs at a higher rate than the general population (Pavelka, 2013). In studies on co-occurring SENDs in autistic children, research has shown that 29.4% of autistic children meet diagnostic criteria for a mild to moderate learning disability, and that 41.9% meet criteria for a severe to profound learning disability (Fombonne, 1999). By comparison, prevalence rates of learning disabilities in children in the general population are much lower: the Department for Education reports that 13% of pupils are receiving support for SEND (gov.uk, 2023).

Children with SEND such as learning difficulties and physical disabilities are at increased risk of experiencing victimisation in a school setting (Morrison et al., 1994; Estell et al., 2009). Researchers argue that children with autism or other SENDs may be seen as easy targets for peer bullying, as they are identified as being "different" from their peers (Haq & Le Couteur, 2004; Horowitz et al., 2004). Autistic children may already have noticeable differences to their peers, and so the presence of additional SENDs may increase this gap.

Theoretically, autistic children diagnosed with additional SENDs may also be at increased risk of experiencing sibling bullying. For one, as has been previously discussed, siblings of autistic children report feelings of shame and embarrassment (Wilson et al., 1992). This is reportedly related to how siblings fear that their autistic sibling's behaviour will be perceived by peers, who may judge the child's behaviour as "different" (Macks & Reeve, 2007). The presence of additional SENDs may exacerbate these concerns, as they may further identify the autistic child as unique, which has been shown to be a risk factor for peer judgement and subsequent bullying (Horowitz et al., 2004). Non-autistic siblings may have their feelings of embarrassment or fear of peer reactions intensified by the presence of additional SENDs, which may thus contribute to sibling bullying rates.

Furthermore, autistic children with additional SEND diagnoses may require even more caregiver support compared to those without. There is evidence to suggest that even in families where the autistic child does not have additional SENDs, non-autistic siblings are aware of the imbalance of parental attention (Felson, 1983; Macks & Reeve, 2007). Resource control theory (RCT; Hawley, 1999) would suggest that, in families where parental resources are spread between children, sibling bullying is a natural consequence as children become competitors for these resources. Research has suggested that in families with autistic children, the unevenness with which parental resources are allocated is a precursor for sibling bullying (Tanskanen et al., 2017). Therefore, autistic children who have additional SENDs, who may

require further support from parents, may be at increased risk of experiencing sibling bullying.

In summary, autistic children are at increased risk of being diagnosed with additional SENDs. This may increase their risk of being involved in sibling bullying, as non-autistic siblings may be ashamed or embarrassed of these additional difficulties. Additionally, as the level of care needs of autistic children increase, parental attention may be unequally allocated between children, thus leading to competition in the form of sibling bullying.

2.3 Parent-Level Factor

2.3.1 Social Learning Theory

Another theory which may provide framework for understanding sibling bullying is Social Learning Theory (SLT). Broadly speaking, this theory helps to outline a way in which parental behaviour may influence the likelihood of the occurrence of child sibling bullying behaviour. To begin, this section shall include a brief overview of SLT and its background, as well as evidence for how the behaviour of role models such as parents may be linked to child behaviours. Then, a discussion of how this theory can be applied to help understand sibling bullying perpetration will follow.

This theory was conceptualised by Bandura (1977) and is an extension of the behaviourist principles of classical and operant conditioning. Conditioning is the process by which an individual may be "trained" or conditioned into responding in a specific way to a stimulus. This was famously illustrated by Pavlov (1902), who demonstrated this phenomenon by conditioning dogs to salivate upon hearing a bell ring.

Bandura (1977), in specifying SLT, added two notable components to this principle. Firstly, SLT posits that behaviour is learned from the environment through observational learning. This means that individuals, for example children, observe "models" such as parents, teachers, or friends. Children may then choose to imitate the observed behaviour.

One famous example of this is Bandura's famous Bobo Doll experiment. This study, conducted in 1961, involved children witnessing models interact with toys, which included a bobo doll. In one condition, children observed a model aggressively hitting and kicking the bobo doll toy. Bandura et al. (1961) reported that children who witnessed the aggressive modelling were significantly more likely to also attack the toy aggressively.

A second amendment was made as Bandura suggested that humans, unlike Pavlov's dogs, do engage in some thought between stimuli and response. Bandura suggested that mediational processes occur between observation of a behaviour and imitation. These processes were attention (for a behaviour to be imitated, the observer must pay attention to it); retention (the behaviour must be remembered by the observer); reproduction (the observer must have the ability to reproduce the observed behaviour) and motivation (the perceived rewards of imitating the behaviour must outweigh any perceived costs). As such, children are less likely to imitate a behaviour for which the model is punished, and more likely to imitate the behaviour if it is rewarded in some way.

SLT has often been used to explain why some children engage in aggressive behaviour. Researchers suggest that children who observe aggressive or bullying behaviour are likely to imitate it (Dantchev & Wolke, 2019). Researchers have proposed that this may be best identified within a family setting, and if the bullying modelling is carried out by parents or caregivers, this will be imitated by child observers. This is firstly because these figures, often being at the head of the household, are less likely to be punished or to face consequences for these behaviours. Secondly, Bandura suggested that children are more likely to imitate behaviour which is modelled by an actor which they perceive to be similar to themselves, which is a requirement that parents or caregivers will likely meet.

Indeed, research appears to have consistently supported this, with studies showing that children who are engaged in peer bullying are more likely to have parents who are

violent or abusive, or who use harsh punishment tactics with their children (Bowes et al., 1994; Georgiou, 2013; Sternberg et al., 1993). These findings have been replicated with regards to sibling bullying behaviour. Research has found that in families where parents utilise harsh parenting tactics, such as verbal or physical aggression, sibling bullying is more likely (Dantchev & Wolke, 2019; Eriksen & Jensen, 2009; Tippett & Wolke, 2014). In many circles, this has contributed to the belief that bullying "has its roots at home" (Georgiou, 2013, p.123).

Some work has studied the relationship between parenting tactics and sibling bullying rates in families with autistic children as well as families with non-autistic children. These studies have consistently found that sibling bullying rates are higher in households where parents use harsh parenting techniques (Toseeb et al., 2018) or that sibling relationships are more negative in families where levels of maternal criticism are increased (Petalas et al., 2012).

In short, SLT provides a viable framework to explain why sibling bullying occurs. Research has shown that bullying rates are increased in families where parents "model" aggressive or abusive behaviours. However, the study by Toseeb et al. (2018) remains the only study at present which has investigated the impact of harsh parenting on sibling bullying in autistic children's families. Replication of these findings is important for several reasons. Firstly, if parental behaviour is found to be associated with sibling bullying, this could provide a useful manner of targeting interventions to improve not only relationships between parents and other members of the household, but also the relationship between siblings. Secondly, families with autistic children represent an exceptional sub-set of the general population. Parents of autistic children often adopt different parenting tactics compared to parents of non-autistic children in the general population (Hutchison et al., 2016; Riany et al., 2017; Ueda et al., 2020), or have unique carer demands compared to parents of non-autistic

children. It is therefore essential to test theories such as SLT in this population specifically, rather than relying on work conducted using the general population.

Furthermore, although this theory and associated research provides a framework for how sibling bullying may begin, this does not provide an explanation for why aggressive or abusive behaviours may be modelled by parents in the first place. In understanding the core of this issue, some researchers have investigated whether parental mental health is related to child maltreatment, abuse, or harsh parenting tactics. Studies have found that parental depression, for example, is associated with overt and covert displays of hostility, aggression, conflict and abuse (Field, 1989; Merikangas et al., 1985; O'Donnell et al., 2015; Sidebotham & Heron, 2006;). Parental depression may, therefore, be a cause of aggressive or abusive behaviours that are modelled by parents, which children then observe and imitate. Although this may not be the only explanation for parental modelling of aggressive behaviours, this may be important to explore, which current research has yet not investigated.

2.7 Conclusion

To conclude, there have been many possible factors discussed in the literature that may help to explain why sibling bullying occurs in families of an autistic child. Be that as it may, none of the hypotheses explored above are backed by sufficient empirical evidence. Some of the evidence reviewed above has shown to be a strong and significant predictor of peer bullying or sibling bullying in the general population, but has not been explored sufficiently within the population of families with autistic children. Further to this, some evidence, such as that showing an association between SES and bullying, is simply contradictory at the current time. These theories and factors require further study in order to replicate or explore the findings from peer bullying or general population research.

Even theories that are specific to the autistic community should be subject to further examination. For example, the proposal that sibling bullying behaviour is linked to the

presence of autistic traits should be cautiously investigated. Such arguments risk placing blame on the victims of bullying behaviour, which is unhelpful and harmful. Additionally, although traits such as social communication deficits, impaired ToM, repetitive behaviour, and restricted interests have all been linked to peer bullying, very little research has investigated whether or not these findings extend to a sibling relationship. Furthermore, although the BAP has been argued to predict colder or fewer close relationships, this hypothesis has not been tested with relation to familial relationships.

Autistic children and their families are very different to the general population, and research should reflect this. Traits of autism, both in the diagnosed child and family members with BAP traits, are two significant distinctions that separate these families from the general population. Furthermore, some of the research reviewed above shows that individuals in these families may interact in very different ways compared to other families. Researchers must therefore extend study of sibling bullying to include autistic children and their families as a unique population.

An additional reason to extend and improve on current research is that investigations into the type of bullying is lacking. Findings indicate that subtypes of peer bullying behaviour between autistic adolescents have differing risk factors (Volk et al., 2006). These authors argue that understanding the type of bullying will also have implications for the clinical intervention delivered. They propose each sub-type of bullying has its own patterns of risk and protective factors and the different forms of bullying are best understood as unique. Since the types of sibling bullying present in families with autistic children has not yet been investigated, clinical interventions may lack the evidence background required.

In summary, sibling bullying in families with an autistic child is a topic of research that is, as yet, largely unexplored. Although the theoretical risk factors discussed in this essay are currently insufficiently investigated to be regarded conclusively as explanations for the

prevalence of sibling bullying in this population, they represent effective theoretical starting points on which future research may build.

3. Research Questions

As discussed in the previous chapter, numerous explanations for sibling bullying behaviours have been proposed. Although precursive factors and their relation to sibling bullying have been investigated in the general population, there are issues which prevent the findings of these studies being generalised to families with an autistic child. For one, a lot of research has either not been replicated specifically with autistic children. For example, research into how gender, socioeconomic status, social learning theory and resource control theory can explain sibling bullying has been conducted almost exclusively with general population samples. In addition, on rare occasions where research has involved autistic children, findings are sometimes contradictory to those presented from general population studies. Replication of study which has involved autistic children is paramount in order to verify these results. In addition, although autism research "lags behind" that of other conditions (Thurm & Swedo, 2012, p.219), and certainly research involving the general population, studies have so far identified that autistic children are highly heterogenous in their experiences, support needs and presentation (National Autistic Society, n.d.). Families with autistic children should be involved in further research, therefore, not just to replicate prior findings, but to reflect the experiences of a very diverse community. There is therefore a substantial need for replication of the aforementioned research with families with an autistic child.

In addition, much of prior sibling bullying research has included mixed participant groups, comprising of autistic children within the general population. These sampling methods, although not necessarily methodologically flawed, imply that autistic individuals are a sub-sample of the population. By grouping autistic children and their families in with the general population, researchers investigating sibling bullying may attempt to use the same theories and precursors to explain why this phenomenon occurs, applying the same logic to

both autistic and non-autistic children. In actuality, autistic individuals and their families are not simply a sub-sample of the general population, and it is inappropriate to treat them as such. Autistic individuals and the autism community are a distinct group in many ways, and may engage with the same environment as non-autistic people in very different ways. As such, if one attempts to use broad, widely applicable explanations for behaviours such as sibling bullying, the distinctiveness of this group may go ignored.

For example, resource control theory (RCT) suggests that sibling bullying occurs due to competition for parental resources. Research by Toseeb et al (2020b) has supported this with evidence that increasing the number of children in a household is associated with increased reports of sibling bullying. This finding applies to both families with and without autistic children. In research which treats autistic children as a sub-sample of the general population, it may be easy to explain this relationship by arguing that more children in the household means that there are more competitors for a finite pool of resources, which in turn leads to increased conflict. This description is straightforward and attractive, as it helps to explain this finding in families with and without autistic children. However, to do so is an oversimplification. This explanation fails to take into account family dynamics, which are disparate in families with an autistic child due to communication differences, imbalances in care needs, and other factors. It is important, therefore, that studies investigating sibling bullying in families with autistic children treat these families as separate from those with non-autistic children. This will allow researchers to investigate how established precursors to sibling bullying manifest in these families, as well as to identify the risk factors that are unique to families with autistic children,

In addition to replication of previous findings, the previous chapter highlights that variables such as autistic traits and the broad autism phenotype have not been investigated at present. Despite evidence indicating that these variables are associated with differences in

inter-personal interaction, no research has yet explored whether they are associated with sibling bullying. Given that investigations have highlighted that individuals exhibiting autistic traits are likely to have more conflict or fewer close, quality relationships, it is important to explore whether this is valid within the family setting, and whether it is associated with sibling bullying.

Finally, this doctoral project aimed to replicate studies which had reported the prevalence of sibling bullying in families with an autistic child, and the prevalence rates of different roles in sibling bullying: bully-only, victim-only, bully-victim, and uninvolved. Replication of this research not only serves to potentially verify the findings from prior study, but also to shed light on how risk factors are associated with different types of sibling bullying involvement.

3.1 Study 1: Investigating the associations between parental mental health, harsh parenting tactics, and autistic children's involvement in sibling bullying.

The first study of this doctoral project involves secondary analysis of existing data from a large-scale, UK-based cohort study, the Millennium Cohort Study (MCS). The MCS is a research project which followed children born around the time of the millennium, collecting data on a number of subjects ranging from family socioeconomic status to sibling bullying behaviours (Centre for Longitudinal Studies, n.d). The primary objective of this investigation is to explore the associations between some of the factors mentioned above and sibling bullying behaviour. Analysis was conducted to investigate the relationships between variables experienced at timepoints throughout childhood and sibling bullying in middle childhood.

An additional aim of the first study was to investigate whether there is a reciprocal, longitudinal relationship between use of harsh parenting tactics and parental mental health. Research shows that there is an association between parental mental health difficulties such

as stress, depression, and low self-esteem, and harsh parenting behaviours (Chung et al., 2020; Vafaeenejad et al., 2021). However, such evidence does not allow extrapolation of the directionality of this association. Harsh parenting behaviours may, for example, influence parental mental health, or vice versa. Additionally, harsh parenting and parental mental health may be reciprocally related. Research has shown harsh parenting behaviours to be associated with sibling bullying (Toseeb et al., 2018). The directionality and potentially reciprocal relationship between harsh parenting and parental mental health is therefore worthy of exploration to further develop understanding of the factors involved in sibling bullying behaviour. Even in the case that parental mental health is not directly associated with sibling bullying behaviours, it may be associated with use of harsh parenting tactics. If this is found to be the case, and parental mental health is indirectly associated with sibling bullying in this way, then parental mental health may be identified as a useful target for interventions that aim to address sibling bullying behaviours.

The research questions addressed by the first study are therefore as follows:

1. Is harsh parenting experienced by autistic children during early childhood associated with the frequency of sibling bullying involvement in middle childhood?
2. Is harsh parenting experienced by autistic children during early childhood associated with the role that autistic children take in sibling bullying in middle childhood?
3. Is the mental health of autistic children's parents, during the autistic child's early childhood, associated with the frequency and types of sibling bullying involvement in middle childhood?
4. Are there reciprocal relationships between harsh parenting and parental mental health during early childhood, and do these predict sibling bullying in middle childhood?

5. Which child- and family-level characteristics are associated with sibling bullying of autistic children?

3.2 Study 2: Autistic traits and sibling bullying: an investigation of the broad autism phenotype, autistic traits in diagnosed children, and their association with sibling bullying behaviour.

The first study aims primarily to replicate research studying associations between variables and sibling bullying behaviour in families. However, the aim of the second study was to continue to explore associations that had not yet been tested in this population. The second thesis study therefore aimed to investigate the relationship between sibling bullying in families with an autistic child and autistic traits.

The research questions addressed by the second study are therefore as follows:

1. Is there a relationship between autistic traits in a diagnosed child and the occurrence or subtype of sibling bullying?
    a. Do autistic children's autistic traits predict their own sibling bullying perpetration?
    b. Do autistic children's autistic traits predict their non-autistic siblings' sibling bullying perpetration?
2. Is there a relationship between autistic traits in a non-autistic sibling of an autistic child and the occurrence or subtype of sibling bullying?
    a. Do non-autistic children's autistic traits predict their autistic siblings' sibling bullying perpetration?
    b. Do non-autistic children's autistic traits predict their own sibling bullying perpetration?
3. Is there a relationship between additional SEND diagnoses of an autistic child and the occurrence or subtype of sibling bullying?

a. Do specific SEND diagnoses predict autistic children's sibling bullying perpetration?
b. Do specific SEND diagnoses predict non-autistic children's sibling bullying perpetration?

4. Study 1: Investigating the associations between parental mental health, harsh parenting tactics, and autistic children's involvement in sibling bullying

4.1 Introduction

As discussed in previous chapters, several explanations for sibling bullying in families with autistic children have been posited. These range from parent-level to family- and child-level characteristics. The aim of the present study, as outlined in Chapter 3, is to investigate some of the risk factors that may be associated with sibling bullying in families with an autistic child. In particular, this study was conducted to explore the patterns of associations between sibling bullying and parental mental health, harsh parenting, and family-level characteristics such as birth order, socioeconomic status, gender, and ethnicity.

In part, this study acts as a replication of prior research. For example, it is a well-established theory within this field that use of harsh parenting tactics is related to increased rates of sibling bullying. Proponents of social learning theory (SLT) explain this association by suggesting that children who are exposed to aggressive or harsh parental behaviours are more likely to imitate these behaviours (Dantchev & Wolke, 2019; Bowlby, 1969; Straus, 1973) because they are observing and imitating the behaviours of influential models (Bandura, 1977). The process of observational learning in this context is supported by the findings that harsher and more punitive parenting techniques have been linked to increased aggression between siblings (Eriksen & Jensen, 2009). Similar findings have been reported by research into sibling bullying involving autistic children: Toseeb et al. (2018) reported that sibling bullying rates were significantly associated with use of harsh parenting techniques, and Petalas et al. (2012) found conflict between an autistic child and their non-autistic sibling to be increased in households with higher levels of maternal criticism. One aim of this study, therefore, was to replicate this work and investigations into a relationship between harsh parenting and sibling bullying in families with an autistic child. Replication is required because of the scarcity of research addressing this potential risk factor for sibling bullying: only two

studies thus far have shown harsh parenting to be associated with sibling bullying behaviours in this population. If it were further substantiated that parenting behaviours were related to sibling bullying, this could have clear implications for intervention work.

In addition to replicating previous work showing an association between harsh parenting and sibling bullying in autistic children, this study also aimed to investigate factors which have not yet been explored. For example, research indicates that parental mental health may be related to child conduct problems and anti-social behaviour (Kim-Cohen et al., 2005) as well as peer bullying behaviours (Shetgiri et al., 2012). If parental mental health impacts on child behaviour in this way, it seems logical that children whose parents have poor mental health may be more likely to engage in bullying their siblings, as well as their peers. However, no studies have explored whether poor parental mental health is associated with sibling bullying, either in families with or without autistic children. An aim of the present study, therefore, was to address this research gap.

Finally, this study aimed to expand on prior research by exploring something which has been suggested within previous research, but not yet investigated. It has been proposed that parental mental health and harsh parenting tactics may be covariates. As discussed in Chapter 2, research shows that poor parental mental health is associated with harsh parenting behaviours, such as aggression, conflict, and abuse (Shay & Knutson, 2008; Sidebotham & Heron, 2006; Merikangas et al., 1985). Since harsh parenting tactics have been indicated as factors associated with autistic children's sibling bullying involvement, and since poor parental mental health is shown to be related to use of harsh parenting tactics, this study aimed to investigate whether these two factors may be covariates in predicting sibling bullying behaviour in families with an autistic child.

The research questions addressed by this study, as outlined in Chapter 3, were therefore as follows:

1. Is harsh parenting experienced by autistic children during early childhood associated with the frequency of sibling bullying involvement in middle childhood?
2. Is harsh parenting experienced by autistic children during early childhood associated with the role that autistic children take in sibling bullying in middle childhood?
3. Is the mental health of autistic children's parents, during the autistic child's early childhood, associated with the frequency and types of sibling bullying involvement in middle childhood?
4. Are there reciprocal relationships between harsh parenting and parental mental health during early childhood, and do these predict sibling bullying in middle childhood?
5. Which child- and family-level characteristics are associated with sibling bullying of autistic children?

To address these research questions, this study used secondary data from the Millennium Cohort Study (MCS). The MCS is a large scale research project, which follows a birth cohort of individuals born in the United Kingdom around the turn of the millennium. A full description of the project can be found in section 4.2.1. In short, data pertaining to parental mental health, use of harsh parenting tactics, sibling bullying behaviours and the aforementioned family-level characteristics were taken from this available dataset for use in the current study.

Firstly, ordered logistic regression models were conducted to examine the relationships between the factors outlined above and sibling bullying perpetration and victimisation. Secondly, path models were run to explore the interactions between factors present in early childhood and their impact on sibling bullying behaviour at age 11. It was

intended that by using data from across childhood to investigate the aforementioned risk factors, a greater level of understanding of each relationship and its development over time could be obtained.

Alongside an account of the findings from the aforementioned models, rates of sibling bullying perpetration and victimisation were calculated for the sample and are reported below. How the present study's findings deviate from previous literature is discussed, and possible explanations for the results observed here are considered. Finally, strengths and limitations of the study are reviewed, and directions for further research are suggested.

4.2 Methodology

4.2.1 Millennium Cohort Study

This study utilised data from the Millennium Cohort Study (MCS). The MCS is a large scale and longitudinal birth cohort study involving participants born in the United Kingdom (UK) around the beginning of the millennium. The study includes data collection on the daily lives and experiences, as well as the physical, emotional, cognitive and behavioural development of roughly 19,000 participants. Methods of data collection include use of validated measures of cognitive or behavioural development, observation schedules, and interviews or questionnaires derived by the researchers. Data has been collected from participants themselves, as well as from caregivers, teachers, and other family members.

Data collection is ongoing, but currently data is available from several time points, ranging from the first wave, when the participants were around 9 months old, to the seventh, when participants were around 17 years of age. All data from previous sweeps has been made available online (UK Data Archive, 2022). This includes data when participants were 9 months old, 3 years old, 5 years old, 7 years old, 11 years old, 14 years old, and 17 years old.

For the purposes of this study, data from when participants were 5 years old, 7 years old, 11 years old, and 14 years old were used. Only data provided by the participants and their primary caregiver were used in the current study.

4.2.2 Participants

The MCS has a sample of 19,243 participating children who were involved in data collection between the ages of 9 months and 14 years of age. Not all of these participants met the inclusion criteria for the present study. For example, the first step was to exclude participating children who did not have at least one sibling during the timeframe of data collection.

Secondly, the current study focused on a subsample of children with a diagnosis of autism. As such, inclusion criteria were applied to ensure that the sample of participants within the study were only those with an autism diagnosis. Children were identified as autistic using parent reports. When participants were aged 5, 7, 11 and 14 years, parents were asked "Has a doctor or health professional ever told you that [child] had Autism, Asperger's syndrome or autistic spectrum disorder?". Within the present study, participants were identified as being autistic if parental responses met either of two conditions. For one, if parents consistently responded "yes" to this question. Alternatively, participants were identified as autistic if their parents initially responded "no", but later responded "yes" to this question. This was done to reflect that not all autistic children have a formal diagnosis by age 5, and that parents' responses may change to reflect the results of an autism assessment that a child undergoes later in life. Importantly, if parents consistently responded "no" to this question, or initially responded "yes" but then changed their responses to "no" at later timepoints, their children were not included in the study.

This method of identifying autistic participants was chosen as it was convenient, appropriate for the sample, and had been validated by its use in other studies. Ideally, professional assessment data would be used to determine diagnostic status. However, this was not available from the MCS data. The alternative method, as described above, was therefore adopted. This method has been used by other studies that use the MCS data to research autistic children, including an autism prevalence study (Russell et al., 2014). Some such studies have used parental responses to the question "Has a doctor or health professional ever told you that [child] had Autism, Asperger's syndrome or autistic spectrum disorder?" (Hosozawa et al., 2020) at only one timepoint. However, it was felt that this was not sufficiently robust to determine diagnostic status, and so the present study used responses from multiple timepoints to make identification of autistic children more reliable. This was because of cases within the dataset where parents had initially responded "yes" to this question, but then went on to respond "no". As autism is a lifelong, neurodevelopmental disorder, it is impossible for an individual to have autism early in life and then to not have it later on. This pattern of responses therefore possibly represents either an early misdiagnosis, which has since been identified and corrected, or an error on the part of investigator or participant.

Finally, only one autistic child was included per household. If there were multiple children who met criteria for being identified as autistic and who participated in the MCS between the ages of 9 months and 14 years, only the first child who had been recorded in the MCS data was included, and all others were excluded. This was to eliminate cases of repeated data, as data from the same parents would be used for both participating children.

After the exclusion and inclusion criteria described above had been applied, the available sample of autistic participants who had at least one sibling and had participated in the MCS between the ages of 9 months and 14 years of age was $n = 348$. The majority of eligible

participants were male (*n* = 268, 77%), with a smaller proportion of female participants (*n* = 73, 21%) and participants with no gender data available (*n* = 7, 2%).

4.2.3 Measures

To address the research questions, data from measures that had been administered as part of the MCS were used to identify sibling bullying behaviour, parental mental health difficulties, use of harsh parenting tactics, and demographic data about participating households. A full description of each measure is below. Table 1 indicates the timepoint from which each measure was available.

Measure	5	7	11
Sibling bullying			X
Parental mental health difficulties	X	X	
Use of harsh parenting tactics	X	X	

Table 1. *Age of participants when each measure was administered to them, or their parents/caregivers.*

Sibling bullying. When participants were 11 years old, they completed a questionnaire. Two items from this questionnaire were included in the analysis. These were a victimisation item, which was worded "How often do your brothers or sisters hurt you or pick on you on purpose?" and a perpetration item, which read "How often do you hurt or pick on your brothers or sisters on purpose?". Response options allowed the children to indicate how frequently these behaviours had occurred, with higher scores indicating that the bullying occurred more frequently (1 = *never*, 2 = *less often*, 3 = *every few months*, 4 = *about once a month*, 5 = *about once a week*, 6 = *most days*).

Self-report is an appropriate method of measuring sibling bullying involvement. This is because parents are likely unaware of all sibling bullying, possibly leading to an underestimation of prevalence (Wolke et al., 2015). Additionally, since parents frequently describe sibling bullying as "normal" (Khan & Rogers, 2015) and typical of sibling

relationships (Caspi, 2012), this may exacerbate under-reporting by parents. Therefore, in the present study, child self-reports of sibling bullying were utilised.

Debate is ongoing with regards to the best way to assess the prevalence and frequency of bullying behaviours. Some researchers advocate for a more complex, multi-item measure of sibling bullying. An example of such a measure was used in the Avon Longitudinal Study of Parents and Children (ALSPAC; Boyd et al., 2013). Within this study, child participants were asked to report the frequency with which they perpetrated or were victims of different kinds of sibling bullying behaviour, such as hitting or kicking. This measure allows for more in-depth investigation of the subtypes of bullying behaviour that occur within a sibling relationship, and the frequency of each. However, it was not the aim of the present study to examine the subtypes of sibling bullying behaviours, but rather to investigate the frequency of perpetration and victimisation, and whether this was associated with factors such as parental harshness and mental health. Therefore, a one-item scale is more appropriate. Additionally, in a study by Toseeb et al. (2020), it was found that there was high correlation between the one-item scale used here to assess frequency of sibling bullying perpetration and victimisation and the multi-item scale used in the ALSPAC study. This further validates the use of this shorter scale.

Although initially 348 participants' responses were included, only 240 participants had responded to the perpetration item and 239 responded to the victimisation item. Participants who had failed to provide responses to both items were excluded from the analysis.

Parental Mental Health. The Kessler Psychological Distress Scale (Kessler et al., 2003; K6) was administered to parents or caregivers of the child when they were 5 and 7 years old. This scale is a short, six item, self-report questionnaire used to screen for symptoms of mental illness, including anxiety and mood disorders. Parents were asked to indicate how often they had experienced feeling a certain way during the past 30 days (0 = *none of the time,* 1 =

little of the time, 2 = *some of the time*, 3 = *most of the time*, 4 = *all the time).* The list of feelings included hopelessness, restlessness, and depression, among others. The range of possible scores is between 0 and 24, with higher scores indicating more severe mental health difficulties. Scores of ≥ 13 are indicative of severe mental health difficulties (Kessler et al., 2002).

The K6 tool has been compared against recognised assessment schedules and scales, and has consistently been found to be an efficient and accurate method of identifying mental health difficulties. In one study, the K6 scale was compared with the General Health Questionnaire-12 (GHQ-12) and was found to be more sensitive in identifying mood and anxiety disorders (Furukawa et al., 2003). The K6 tool has also been validated in cross-cultural samples. Researchers administered this measure alongside the Composite International Diagnostic Interview 3.1 (CIDI-3.1) and found that the K6 was consistent with this measure in its ability to identify severe mental illness in a population of Chinese undergraduates. Within the present study, the internal reliability of the scale was excellent at both timepoints (age 5, $\alpha = 0.89$, age 7, $\alpha = 0.89$).

Harsh Parenting. Data from the Conflict Tactics Scale, which was completed by parents, was included in the analysis. This measure is frequently used in child maltreatment research, and is one of the most widely used methods of identifying punitive behaviours by a parent (Zhai et al., 2013).

Although this scale was completed at multiple timepoints, only data from when participants were aged 5 and 7 years were included in the present study. A modified version of this scale, the Parent-Child Conflict Tactics Scale (CTSPC), was used in the MCS. This was designed to ascertain levels of physical or psychological maltreatment between parent and child, and to assess the disciplinary tactics being used by parents or caregivers. The prompt for this questionnaire was “How often do you do the following when your child is naughty?”. This

was followed by a list of behaviours, and parents were asked to indicate their frequency of use of this parenting tactic using a 5-point Likert scale (1 = *Never,* 2 = *Rarely,* 3 = *Once a month,* 4 = *Once a week or more,* 5 = *Daily*). The behaviours listed included ignoring their child, smacking them, shouting at them, sending them to their room, taking away treats, and telling them off.

Scores ranged from 6 to 30, with higher scores indicating that respondents employed harsh parenting tactics more frequently. The internal reliability of the scale was acceptable at both timepoints ($\alpha = 0.74$, age 7 $\alpha = 0.76$).

Demographic Information. Child self-reports of gender were provided. Data from when the children were aged 5, 7 and 14 years old were used and coded as a dummy variable for the present study. In 7 cases, no gender information was provided. As this was such a small group, those without identified genders were grouped with the second smallest group, which was those identified as female. This was done to avoid excluding children based on their non-disclosure of their gender.

In addition, parents provided demographic information about their participating child, which was also included in the analysis. Parents indicated their child's ethnicity. The researchers of the MCS provided three levels of detail when recording reports of ethnicity: 6 classes, 8 classes, and 11 classes of ethnicities. Increasing the number of classes of ethnicity allowed for more specificity in the recording. However, children who were reported to be of ethnic minority backgrounds such as mixed race, Indian, Pakistani and Bangladeshi, Black or Black British, or other ethnic groups, made up only 12% (n=41) of the participants in this study. As there were so few children in each ethnic minority category, children who were identified as being from an ethnic minority background were grouped together. Ethnicity has therefore been transformed into a dummy variable (ethnic minority or white) for the purpose of the

current study.

Additionally, parents provided information about the number of siblings of the participating child in the home at time of birth, which was used to determine the participant's birth order (1st, 2nd, 3rd, 4th, or later). Parent reports of the number of siblings that the participating child had at age 11 were also included in the analysis.

Household Income. Parents also provided their total income from all sources. However, direct comparison of households based on income level alone provides very little information about the socioeconomic status and financial wellbeing of a family. For example, one person living alone with an income of £50,000 may be considered financially stable, whilst a family of five on the same income may be struggling financially to make ends meet.

Equivalisation scales account for the make-up of a household, and can produce a standardised measurement of socioeconomic status by determining whether income levels are sufficient to meet the financial needs of individual households. The OECD-modified scale (Hagenaars et al., 1994) was used here to identify the needs of each household, as determined by the number and type of individuals within the household. Each member of the household is assigned a number proportional to their financial needs, with higher numbers indicating higher needs. A table showing how these financial needs are calculated per household may be seen below in Table 2. As an example, a couple with one child who is aged between 14 and 18 years old would be identified as having a scale of 1.33. However, a single parent with one child under the age of 14 would have a scale of 0.87.

Equivalence scales (as applied to respondents in the MCS)	**OECD-modified scale**
First adult (main respondent)	0.67

Second adult	0.33
Dependent child aged between 14 and 18 years	0.33
Dependent child aged under 14 years	0.20

Table 2. *Demonstrating how each household member is assigned a number proportional to their financial needs, allowing for calculation of equivalised household needs. Higher numbers indicate a higher level of financial need.*

The scale for each family, calculated using the OECD-modified scale, was used to inform weighting of the reported income by each household. This equivalisation method "adjusts household income to account for the different financial resource requirements of different household types" (Office for National Statistics, 2015). Once equivalisation has been applied, it is more appropriate to compare income levels: households with the same equivalised income are likely equal in their standard of living.

Once equivalisation had been applied, it was calculated whether households fell above or below the 60% median income level. This marker was chosen because the Government and many organisations working alongside it use this as "an indicator of the income at which those below are likely to be suffering hardship" (Mack, 2016). A dummy variable was created to categorise families as those above or below the median income level.

4.2.4 Statistical Analyses

Missing data analysis. Several variables were observed to have missing values. These were the parental mental health variable, which had missing values when participants were aged 5 and 7 years; harsh parenting data also had missing data when participants were aged 5 and 7 years; data on household income, which was collected at age 5; and the participating child's place in the birth order. Table 3 indicates the proportions of missing data at each timepoint of data collection.

Variable	Age 9 months	Age 5	Age 7

Parental Mental Health	-	32 (16%)	44 (23%)
Harsh Parenting	-	41 (21%)	52 (28%)
Household income	-	23 (11%)	
Place in birth order	12 (5%)	-	-

Table 3. *Demonstrating the proportion of missing data at each timepoint.*

When data is missing, this can impact on the validity of any statistical analyses: certain sub-populations within the dataset may now be under-represented, leading to bias in the results, and issues of generalisability (Kang, 2013). The severity of this issue depends, however, on the reason that data is missing. For example, if data is missing not at random (MNAR), this may introduce bias to analyses. Variables which are MNAR are said to be missing from the dataset for reasons which relate to the values themselves. As an example, in a study about depression severity, participants experiencing severe depression may not complete a measure of depressive symptoms, because it may be triggering or otherwise upsetting to complete (Mack et al., 2018). This type of missing data influences the validity of statistical analyses because the data which is missing may reflect an unobserved sub-sample of participants. If statistical analyses proceed without accounting for this unobserved sub-sample, any results will be biased and will not be truly representative.

Data may also be missing completely at random (MCAR). Although missing data is never desirable, as it results in a loss of power, this type of missingness is less problematic than data which is MNAR. If data is missing completely at random (MCAR), this is said to be because of other, unrelated factors. There is no observable relationship between the data that is missing and any values, whether they are observed or not. For example, data may be MCAR due to a participant accidentally skipping a question in a survey, or experimenter or equipment error. Data which is MCAR causes fewer issues because it is missing for reasons which do not relate to underlying factors in the dataset. The records that have been obtained therefore

arguably represent a sub-sample of the population being investigated.

Since it is important to investigate why data is missing, Little's test of Missing Completely at Random was conducted to identify whether the aforementioned missing data was missing completely at random (MCAR). This method tests the null hypothesis that missing data is MCAR. The analysis showed all missing data to be MCAR, and that missingness was not associated with the observed values of any non-missing variables: X^2 (48, N =240) = 58.0840, p = .151. As such, the subsequent analyses were conducted as planned using the available records.

Ordinal Logistic Regression Models. The first research questions to be addressed, as discussed in Chapter 3, were as follows:

1. Is harsh parenting experienced by autistic children during early childhood associated with the frequency and types of sibling bullying involvement in middle childhood?
2. Is parental mental health, specifically during the early childhood of autistic children, associated with the frequency and types of sibling bullying involvement in middle childhood?
3. Which child- and family-level characteristics are associated with sibling bullying of autistic children?

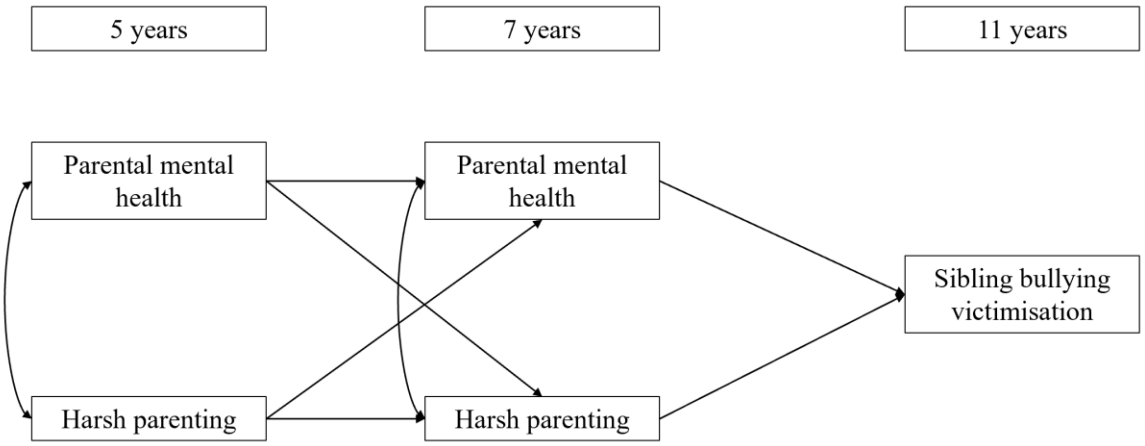
To address these research questions, two generalised ordinal logistic regression models were fitted. Included in each model was an ordinal dependent variable, as well as several predictor variables. The dependent variable in the first model was sibling bullying perpetration, and the second was sibling bullying victimisation. Both the perpetration and victimisation data included ordinal responses on six levels ranging from "most days", indicating very frequent sibling bullying, to "never", indicating no sibling bullying.

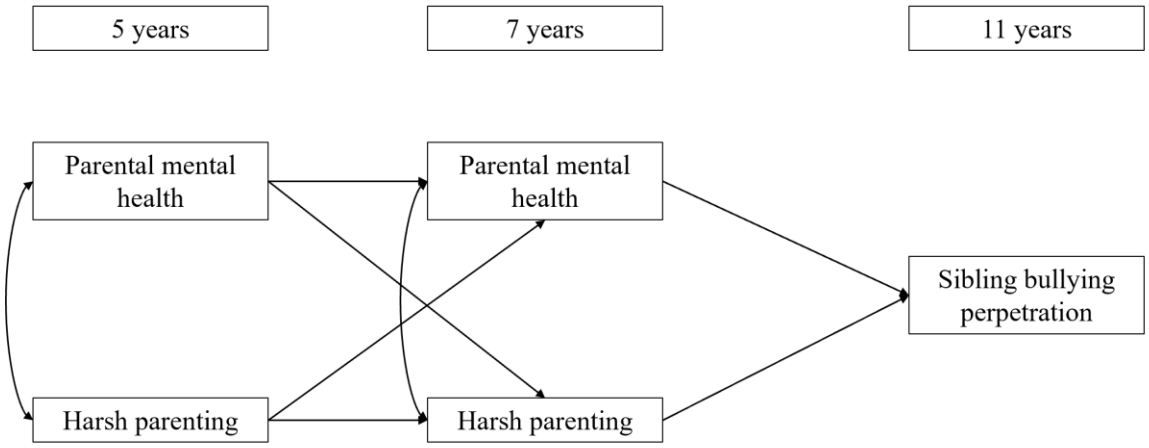
The predictor variables in the models included: total harsh parenting measure scores, total parental mental health measure scores, ethnicity and gender of the participant, the number of siblings that the participant had, the birth order of the participant, and the aforementioned OECD variable, which indicated whether families had an income that was above or below the 60% median level.

Path Models. A second method of analysis was carried out to address the fourth research question for this study, which was:

4. Are there reciprocal relationships between harsh parenting and parental mental health during early childhood, and do these predict sibling bullying in middle childhood?

Three path models were fitted to investigate the relationship between parental mental health and harsh parenting at ages 5 and 7, and the relationships between these variables as measured at age 7 and sibling bullying involvement at age 11. Figure 1, below, depicts how each path model was fitted in the present study. Path models are normally read from left to right, with independent variables on the left predicting the outcome variable on the right. Each path model was identical, with the exception of the outcome variable, which may be seen at the far right-hand side of the model. Path model 1 (PM1) included sibling bullying victimisation, PM2 included perpetration, and PM3 included overall sibling bullying involvement (combined victimisation and perpetration).


5 years
7 years
11 years
Parental mental health
Parental mental health
Sibling bullying victimisation
Harsh parenting
Harsh parenting


5 years
7 years
11 years
Parental mental health
Parental mental health
Sibling bullying perpetration
Harsh parenting
Harsh parenting

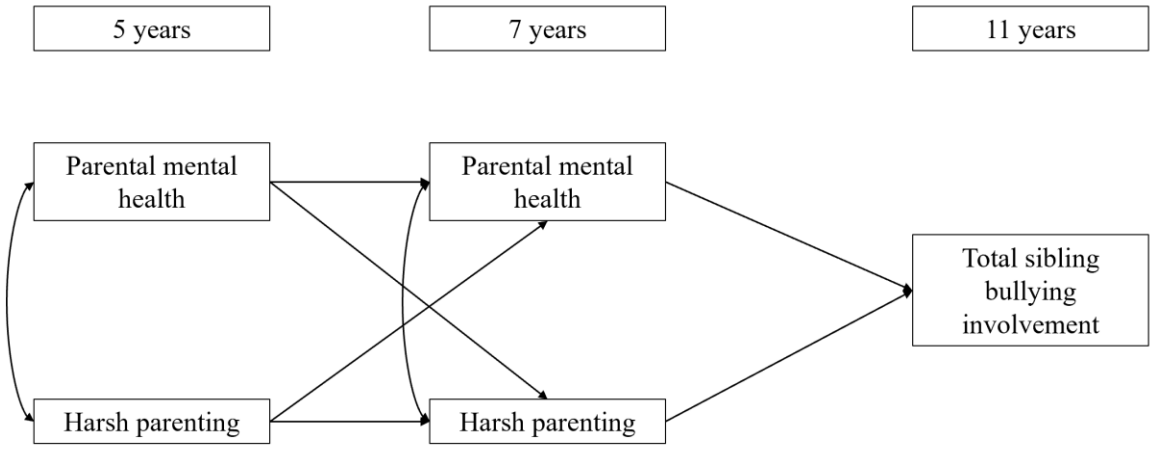

5 years
7 years
11 years
Parental mental health
Parental mental health
Total sibling bullying involvement
Harsh parenting
Harsh parenting

Figure 1. *Path model specification.*

Once path models had been specified, structural equation modelling (SEM) was carried out to investigate the strength and directionality of the relationships between the variables, as depicted in Figure 1. This was all done using Stata, a statistical software (StataCorp, 2021). Prior to this, each variable was tested against the assumptions for SEM. The full list of these assumptions can be found in Appendix A. Variables were tested for independence of observations using a Durbin-Watson test, which indicated no autocorrelation. A scatterplot was created to allow for visual confirmation of linearity between the parental mental health and harsh parenting variables. Checks were also run to check for multicollinearity and homoscedasticity. Finally, a Shapiro-Wilk test was run to confirm that the parental mental health and harsh parenting variables were normally distributed. The parental mental health variable was found to deviate from a normal distribution. To correct for this, the parental mental health variable was transformed to its square root, and the square root of the variable was the one included in the path models.

4.3 Results

4.3.1 Descriptive statistics

Prevalence of Sibling Bullying. In total, 240 participants provided responses to the question "How often do you hurt or pick on your brothers or sisters on purpose?" Responses to this perpetration item indicated that 42% (n = 100) of participants reported bullying their sibling (hurting or picking on their siblings once a week or more frequently).

There were 239 responses to the victimisation item "How often do your brothers or sisters hurt you or pick on you on purpose?". Responses to this item showed that 35% (n = 84) children were bullied by their sibling (hurt or picked on by their sibling once a week or more frequently).

Sibling bullying and gender. The majority of the sample identified as male (*n* = 185, 77%), with a much smaller proportion (*n* = 55, 23%) identifying as female or not disclosing their gender. Of this sample, 77 (42%) of participants who identified as male reported bullying their sibling once a week or more frequently. Bullying perpetration at the same rate was reported by 23 (43%) participants who were female or did not disclose their gender. With regards to sibling bullying victimisation, 68 (37%) of those identifying as male reported that they were bullied by their siblings once a week or more frequently. Sixteen (30%) of female or gender nondisclosure participants reported being a victim of sibling bullying at the same frequency.

Sibling bullying and ethnicity. The sample of autistic children was made up of 213 (89%) white autistic children and 27 (11%) autistic children of ethnic minority backgrounds. Ninety (42%) white autistic children reported perpetrating sibling bullying once a week or more frequently. By comparison, 10 (37%) autistic children of ethnic minority backgrounds reported perpetrating bullying at the same frequency. In response to the victimisation item, 71 (34%) of white autistic children reported being bullied by a sibling once a week or more frequently; the same was true for 13 (48%) autistic children of ethnic minority backgrounds.

Sibling bullying and household income. Of the 138 (67%) autistic children whose household income was above the 60% median income level, 68 (49%) reported bullying their sibling once a week or more frequently. In the group whose household income was below the 60% median income level (*n* = 78, 33%), 24 (30%) perpetrated bullying at this rate. Reporting on sibling bullying victimisation, 53 (38%) children whose households were above the 60% median income level indicated that their siblings bullied them once a week or more often, whilst 25 (33%) of those with household incomes below the 60% median level reported being a victim of sibling bullying at this frequency.

Sibling bullying and number of siblings. There were 114 (48%) autistic children who had only one sibling. Of these, 52 (46%) perpetrated sibling bullying once a week or more frequently. Of the 67 (28%) children who had two siblings, 29 (43%) perpetrated sibling bullying at the same rate. Forty-four (18%) children in the sample had three siblings and 16 (37%) of these bullied their siblings once a week or m\ore often. Finally, of the 15 (6%) children who had four or more siblings, 3 (20%) reported bullying their siblings at this frequency.

Forty-six (41%) of children with only one sibling reported being victims of sibling bullying once a week or more frequently. Of those with two siblings, 26 (39%) reported victimisation at this rate. Ten (21%) children with three siblings also reported being victims of sibling bullying at this frequency, as did 2 (13%) children with four or more siblings.

Sibling bullying and birth order. Firstborn children made up 38% (n = 90) of the sample who provided responses to the sibling bullying items. Of the group of firstborn children, 31 (35%) reported bullying their siblings once a week or more often. Ninety-two children were second born, and of these 40 (43%) reported also perpetrating sibling bullying at the same rate. Twenty-nine children were born third in the birth order, and 14 (48%) of these children bullied their siblings once a week or more frequently. Finally, of the 17 children born to their families fourth or later, 9 (53%) also reported bullying their siblings at this rate.

Twenty-five (27%) firstborn children indicated being bullied by a sibling once a week or more frequently. This is in comparison to 35 (38%) second-born children and 14 (47%) children born third in the birth order. Of the children born fourth in the birth order, 6 (38%) reported being a victim of sibling bullying at the same rate.

Table 4a. *Prevalence of sibling bullying perpetration.*

		Most days	Once a week	Once a month	Every few months	Less frequently	Never
Total	**240 (100%)**	**59 (25%)**	**41 (17%)**	**18 (7.5%)**	**18 (7.5%)**	**52 (22%)**	**50 (21%)**
Gender							
Male	185 (77%)	50 (27%)	27 (15%)	13 (7%)	14 (8%)	40 (22%)	41 (23%)
Non-male	55 (23%)	9 (17%)	14 (26%)	5 (9%)	4 (7%)	13 (24%)	10 (18%)
Ethnicity							
Non-white	27 (11%)	7 (26%)	3 (11%)	2 (7%)	2 (7%)	7 (26%)	6 (22%)
White	213 (89%)	52 (24%)	38 (18%)	16 (8%)	16 (8%)	46 (22%)	45 (21%)
Household Income at age 5							
Low	78 (33%)	12 (15%)	12 (15%)	6 (8%)	6 (8%)	22 (28%)	20 (26%)
High	138 (67%)	39 (28%)	29 (21%)	11 (8%)	9 (7%)	28 (20%)	22 (16%)
Number of siblings							
1	114 (48%)	34 (30%)	18 (16%)	10 (9%)	12 (11%)	14 (12%)	25 (22%)
2	67 (28%)	14 (21%)	15 (22%)	4 (6%)	3 (5%)	18 (27%)	13 (19%)
3	44 (18%)	10 (23%)	6 (14%)	4 (9%)	3 (7%)	12 (27%)	9 (20%)
4 or more	15 (6%)	1 (7%)	2 (13%)	0 (0%)	0 (0%)	9 (60%)	3 (20%)
Birth order							
1st	90 (38%)	16 (18%)	15 (17%)	9 (10%)	10 (11%)	17 (19%)	23 (26%)
2nd	92 (48%)	24 (26%)	16 (17%)	7 (8%)	6 (7%)	23 (25%)	16 (17%)
3rd	29 (12%)	10 (34%)	4 (14%)	1 (3%)	0 (0%)	7 (24%)	7 (24%)
4th or later	17 (7%)	5 (29%)	4 (24%)	1 (6%)	0 (0%)	3 (18%)	4 (24%)

Table 4b. *Prevalence of sibling bullying victimisation.*

		Most days	Once a week	Once a month	Every few months	Less frequently	Never
Total	**239 (100%)**	**47 (20%)**	**37 (15%)**	**11 (5%)**	**15 (6%)**	**46 (19%)**	**83 (35%)**
Gender							
Male	184 (77%)	39 (21%)	29 (16%)	8 (4%)	13 (7%)	31 (17%)	64 (35%)
Non-male	55 (23%)	8 (15%)	8 (15%)	3 (5%)	2 (4%)	15 (27%)	19 (35%)
Ethnicity							
Non-white	27 (11%)	7 (26%)	6 (22%)	2 (7%)	2 (7%)	4 (15%)	6 (22%)
White	212 (89%)	40 (19%)	31 (15%)	9 (4%)	13 (6%)	42 (20%)	77 (36%)
Household Income at age 5							
Low	78 (36%)	13 (17%)	12 (16%)	4 (5%)	4 (5%)	15 (20%)	30 (40%)
High	138 (64%)	29 (21%)	24 (17%)	7 (5%)	9 (6%)	26 (19%)	43 (31%)
Number of siblings							
1	113 (48%)	27 (24%)	19 (17%)	5 (4%)	11 (10%)	14 (12%)	37 (33%)
2	67 (28%)	12 (18%)	14 (21%)	2 (3%)	2 (3%)	19 (28%)	18 (27%)
3	43 (18%)	6 (14%)	4 (9%)	4 (9%)	2 (5%)	8 (19%)	19 (44%)
4 or more	16 (6%)	2 (13%)	0 (0%)	0 (0%)	0 (0%)	5 (31%)	9 (56%)
Birth order							
1st	89 (39%)	17 (19%)	8 (9%)	6 (7%)	6 (7%)	16 (18%)	36 (40%)
2nd	92 (41%)	15 (16%)	20 (22%)	4 (4%)	7 (8%)	19 (21%)	27 (29%)
3rd	30 (13%)	9 (30%)	5 (17%)	0 (0%)	0 (0%)	5 (17%)	11 (37%)
4th or later	16 (7%)	3 (19%)	3 (19%)	1 (6%)	0 (0%)	4 (25%)	5 (31%)

4.3.2 Harsh parenting and sibling bullying

Two Ordinal Logistic Regression Models were fitted to address the research questions as described above and in Chapter 3. Firstly, the association between harsh parenting and sibling bullying involvement was investigated. There was a significant positive effect of harsh parenting on sibling bullying perpetration (*OR* = 1.14, $p < .001$) and victimisation (*OR* = 1.08, $p < .05$). This indicates that, for autistic children, experiencing harsh parenting in early childhood is significantly associated to sibling bullying involvement at age 11.

4.3.3 Parental mental health and sibling bullying

The analysis also served to address the research question of whether parental mental health in early childhood was associated with sibling bullying involvement in middle childhood. There was no significant effect of parental mental health on sibling bullying perpetration (*OR* = .99, $p = .649$) or victimisation (*OR* = 1.03, $p = .233$). This finding demonstrates no relationship between parental mental health during early childhood and sibling bullying involvement in middle childhood within a population of autistic children.

4.3.4 Family-level factors and sibling bullying

Family-level factors such as income levels, the number of siblings that the participating child had, child gender, and their place in the birth order were also included in the ordinal logistic regression models described above. These variables were included to investigate whether family-level characteristics were associated with sibling bullying involvement.

Neither model showed a significant effect of income levels (perpetration: *OR* = 1.47, $p = .09$; victimisation: *OR* = .89, $p = .603$). This indicates that in this sample of autistic children, there was no difference in the level of sibling bullying involvement between children whose families had incomes above or below the 60% median income marker.

Additionally, there was no significant effect of birth order on sibling bullying perpetration (*OR* = .83, *p* =.097). This effect was echoed when examining the relationship between birth order and sibling bullying victimisation (*OR* = .85, *p* = .161). This indicates that birth order is not related to an individual's likelihood of bullying their sibling, or being bullied by a sibling.

However, a number of other characteristics were found to be associated with sibling bullying perpetration and victimisation. For example, both sibling bullying victimisation (*OR* = 1.44, *p* =.001) and perpetration (*OR* = 1.32, *p* < .05) were positively associated with the number of siblings, indicating that having more siblings increases the likelihood of autistic children being involved in sibling bullying perpetration and victimisation.

There was a significant effect of ethnicity on sibling bullying perpetration, suggesting that the white autistic children in this sample were significantly more likely to engage in perpetration than autistic children of an ethnic minority background (*OR* = .81, *p* < .001). There was no significant effect of ethnicity on sibling bullying victimisation (*OR* = .88, *p* = .697), indicating that white and ethnic minority participants were equally likely to be bullied by siblings.

Finally, gender was not significantly associated with sibling bullying perpetration (*OR* = .87, *p* = .545), which suggests that boys and girls are equally likely to perpetrate sibling bullying. There was also no effect of gender on victimisation (*OR* = .69, *p* =.106).

To summarise, participants who perpetrated sibling bullying were more likely to have more siblings, and to be from a white ethnic background. Victims of sibling bullying were more likely to have more siblings than those who did not experience victimisation. Table 5 (Appendix B) depicts the results from the ordinal regression models in full.

4.3.5 Harsh parenting and parental mental health

The final aim for this study was to investigate whether there are reciprocal relationships between harsh parenting and parental mental health during early childhood, and whether these are associated with sibling bullying in middle childhood. Path models, which are a form of structural equation modelling, allow the user to examine the relationships between variables. These models indicate whether there are relationships between variables, and the strength of these associations, and so are uniquely suited to answer this research question, as they allow inference of the direction of influence between one variable and another.

4.3.6 Harsh parenting and sibling bullying

The first path model (PM1), as depicted above in Figure 1, identified a significant positive relationship between use of harsh parenting tactics at age 7 and sibling bullying victimisation at age 11. A similar finding was identified from PM2, where it was shown that there was a significant positive relationship between harsh parenting tactics at age 7 and sibling bullying perpetration. Finally, PM3 indicated a significant positive relationship between harsh parenting at age 7 and total sibling bullying involvement at age 11. This indicates that when parents engage in more harsh parenting behaviours when a child is aged 11 years, sibling bullying involvement at age 11 years becomes more likely, both as a perpetrator and a victim.

4.3.7 Parental mental health and sibling bullying

None of the three path models identified a significant association between parental mental health at age 7 and sibling bullying victimisation, perpetration, or total sibling bullying involvement. This indicates an absence of a relationship between parental mental health when a child is 7 years old and sibling bullying behaviour when the child is 11.

4.3.8 Covariance between parental mental health and harsh parenting tactics use

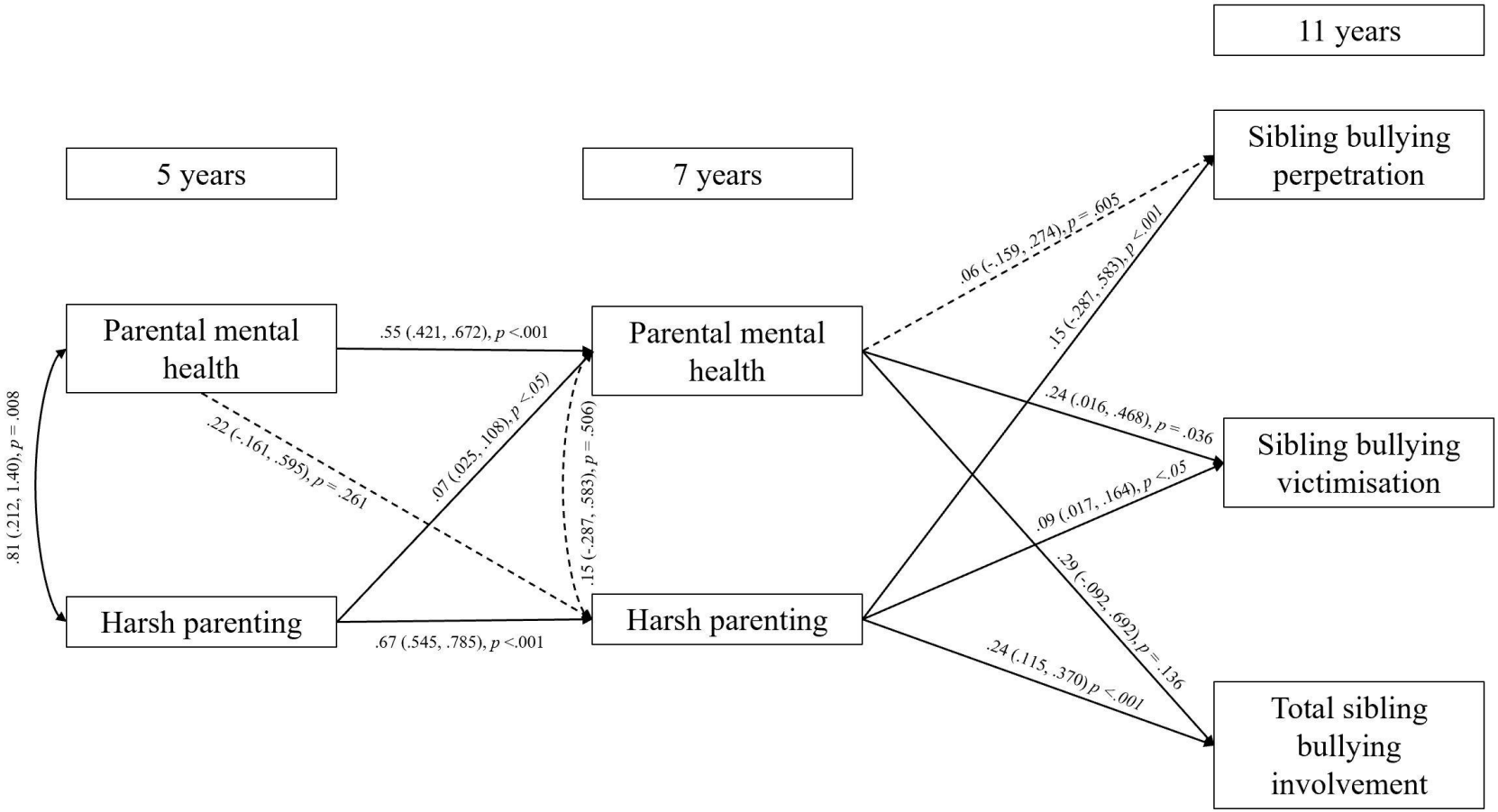
Finally, the models were used to determine whether there were relationships between parental mental health and harsh parenting tactics. This method of modelling allows for

investigation of the strength and directionality of relationships. It was found that use of harsh parenting tactics at age 5 significantly predicted parental mental health at age 7. This suggests that use of harsh parenting tactics when a participating child was 5 years old has implications for the parent's mental health as their child ages.

Additionally, there was significant covariance between use of harsh parenting tactics and parental mental health at age 5. This indicates that harsh parenting and parental mental health are reciprocally related when the participating child is aged 5. However, this effect was not replicated when children were aged 7, suggesting that as the child ages, parental mental health and use of harsh parenting tactics are independent of one another.

The results of the model are shown below in Figure 2. The coefficients for each modelled path can also be found in Appendix C.

Figure 2. *Pathways to sibling bullying perpetration, victimisation, and total bullying involvement at age 11. Dashed lines depict non-significant paths, and solid lines depict significant paths at p<0.05 or lower.*



4.4 Discussion

4.4.1 Summary of key findings

This study puts the rates of sibling bullying perpetration by autistic children at 42%. This data is broadly in agreement with findings from previous work: Toseeb et al., (2018), for example, found sibling bullying perpetration rates in an autistic sample to be at 39%. However, the prevalence of sibling bullying victimisation reported here is somewhat lower than those estimates provided by prior research. In the present study, the frequency of victimisation of autistic children by siblings was at 32%. Previous research has reported prevalence estimates of victimisation as between 50-53% (Wolke et al., 2015; Toseeb et al., 2018).

There are two reasons for these discrepancies in victimisation rate calculation. For one, Wolke et al. (2015) presented a systematic review of sibling bullying studies conducted with the general population, rather than a sample of autistic children. Additionally, although the study by Toseeb et al. (2018) also worked with data from the MCS, there are differences in the rates of sibling bullying victimisation from this study. This may be because of the methodological differences between these studies. The study by Toseeb et al., for example, was conducted with a larger sample of children. In Toseeb et al.'s study, the sample size is larger because this study employed slightly less severe methods of identifying autistic children. As discussed above, the present study identified autistic children by their parents' responses to the question "Has a doctor or health professional ever told you that [child] had Autism, Asperger's syndrome or autistic spectrum disorder?". Parents were asked this question a number of times, when the child was 5, 7, and 11 years old. In the present study, children were included if their parents responded affirmatively, and excluded if the response was negative. However, an additional exclusion criterion was also put in place: children were excluded if their parents responded "yes" at one timepoint, and then later responded "no". As discussed above, autism is a lifelong condition, and it is impossible to be autistic at one timepoint and then not be autistic

at a later timepoint, hence the reason for the adoption of this exclusionary criterion. The study by Toseeb et al., by comparison, identified children as autistic if their parent had responded positively to the question at any of the three timepoints. This less stringent method appears to have contributed to a difference in sample sizes between this study and the study by Toseeb at al.: in the present study, 348 participants in the MCS were identified as being autistic, whilst the study by Toseeb et al. had a sample of 475 autistic participants.

It is arguable, therefore, that the discrepancy in victimisation rates between these two studies are explained by this difference in samples. Perhaps by adopting a more rigid method of identifying autistic children, participants who were included in Toseeb et al. (2018)'s study who reported higher rates of victimisation were not represented within the present study.

However, this discrepancy does not invalidate the findings of the present investigation. The prevalence rates here presented are accurate for the subsample of autistic children who participated in the MCS. A more rigorous method of identifying autistic children's diagnostic status, such as diagnostic reports from clinical professionals, however, would have been more reliable and reproducible.

Harsh parenting and sibling bullying. This study also investigated the relationship between levels of harsh parenting tactics experienced during early childhood and sibling bullying involvement at age 11. Findings indicate that bullying sibling perpetration and victimisation were both associated with more frequent use of harsh parenting tactics. This is in agreement with findings from previous research, where it has been found that higher levels of harsh parenting were associated with increased risk of being a bully-victim (Toseeb et al., 2018).

One could interpret this finding as support of social learning theory. Social learning theory (SLT) would suggest that children who are exposed to harsh parenting behaviours, such

as shouting or smacking, will replicate these behaviours in their relationships with their siblings. As discussed in Chapter 2, proponents of SLT argue that if a child experiences aggressive role modelling at an early age, they are likely to demonstrate these behaviours themselves (Dantchev & Wolke, 2019). Indeed, a number of general population studies report that witnessing conflict between parents and domestic violence is a significant predictor of aggressive behaviour towards siblings (Radford et al., 2013) and use of physical punishment by parents has been found to predict aggression between siblings (Eriksen & Jensen, 2009).

Social learning theory is useful in this instance as it helps to explain why children may replicate the behaviours that they observe in their parents. In a family setting, harsh or punitive behaviours initiated by a parental model appear to fit the criteria that Bandura (1961) proposed. Harsh parenting will, for example, likely be paid attention to and remembered; a child observing the behaviour will have the ability to reproduce the observed behaviour towards a sibling; and there will likely be no perceived costs to the behaviour, as parents are unlikely to face punishment for harsh behaviour directed at children.

However, research is split on whether social learning theory applies to autistic individuals. Some researchers, such as Bushwick (2001), describe that autistic individuals are "defective" in social learning. Foti et al. (2014) argues that autistic individuals "show deficits in crucial skills to learn by observation", such as showing attention by use of eye contact, and failing to engage in joint attention. They argue that this explains why autistic children struggle to adopt social skills which are viewed as normative by neurotypicals, despite these social skills being modelled by their peers. Additionally, Bushwick (2001) argues that this explains why some autistic individuals adopt niche, highly personalised interests that are not necessarily shared by their peers. Whilst others are regulated by their observation of the normative behaviours of those around them, and therefore restricted from freely exploring things outside of socially accepted interests, autistic individuals who are not as good at observing and

imitating those behaviours may pursue interests outside of the usual for purely personal interests.

Nevertheless, other investigators do not share this perspective, and argue that autistic individuals can be excellent at observation and imitation. Research has shown that autistic people, particularly girls and women, can be skilled at observing others to identify and imitate social norms (Allely, 2018). This behaviour is known as "masking" or "camouflaging", and autistic girls have reported using observation to figure out behaviours that are considered "normal" and then imitating them to help in forming friendships (Tierney et al., 2016).

To summarise, there is a significant association between harsh parenting and sibling bullying. Proponents of social learning theory may suggest that this is because autistic children are engaged in observation and imitation of parental behaviour. However, researchers have not reached agreement as to whether autistic children engage in social learning. Some have argued that the capacity to observe and imitate is impaired in autistic people, but research also shows that autistic girls and women have a strong ability to do so. However, the strongest evidence for autistic people's capacity for social learning comes from studies involving women and girls. Whilst this research does support the theory that autistic children imitate others' behaviours, given appropriate motivation, it is not clear whether this is applicable to autistic children of other genders. This is a particularly relevant point to the present study, which had a majority male sample. In conclusion, although this study has replicated work demonstrating an association between harsh parenting tactics and sibling bullying behaviour, further work is required to investigate the underlying mechanisms of this relationship.

Parental mental health and sibling bullying. It was found that poor parental mental health did not increase the likelihood of autistic children bullying or being bullied by their siblings. Parents of autistic children are not immune to mental health difficulties. On the

contrary, parents of autistic children are more likely to experience depression and anxiety than parents of neurotypical children, or even children with other developmental disabilities (Mugno et al., 2007). Furthermore, this finding is in direct contrast to studies which have indicated associations between maternal mental health difficulties and increased rates of sibling aggression towards a sibling (Miller et al., 2012; Bowes et al., 2014).

It is interesting, therefore, that parental mental health does not appear to increase the likelihood of autistic children being perpetrators of sibling bullying. Additionally, the results of this study showed that although perpetration showed no association with parental mental health, sibling bullying victimisation at age 11 was associated with poorer parental mental health at age 7. From these results, it appears that autistic children are not more likely to perpetrate sibling bullying when parental mental health is poor. However, their non-autistic siblings do appear to be more likely to perpetrate sibling bullying when parental mental health problems increase.

A possible explanation for this discrepancy is that the autistic and non-autistic children could be having different parent-child experiences from one another. Research has indicated that autistic children and their non-autistic siblings are often treated very differently. For example, siblings of autistic children are often expected by their parents to be a part of the long-term caregiving system for the autistic child (Chan & Goh, 2013). This family dynamic has been termed as "parentification" (Bowen, 1995). Studies have also shown that autistic children's needs are likely to be prioritised above those of their non-autistic siblings, and that non-autistic siblings receive reduced care and support by comparison (Benderix & Sivberg, 2007; Mokoena & Kern, 2022).

Hypothetically, autistic children and their non-autistic siblings may be differentially affected by parental mental health because of the inequality in treatment by parents. Autistic

children may be protected from parental mental health, whereas their non-autistic siblings may be more exposed to it, as they are expected to be more resilient and to take on more of a parent-like role. This could explain why autistic children are not more likely to engage in sibling bullying when parental mental health is poor but are more likely to be victimised in these cases. Although differential treatment of autistic and non-autistic siblings has been investigated, no studies have yet examined whether parental mental health is among the things that these children may experience differently.

Associations between parental mental health, harsh parenting, and sibling bullying. The analysis showed there to be a relationship between harsh parenting behaviours at age 5 and parental mental health at age 5. This means that parents who used harsh parenting tactics when their children were age 5 had poor mental health at age 5. However, there was no concurrent association between parental mental health and use of harsh parenting tactics when children were aged 7. This suggests that although parental mental health appears to be associated with use of harsh parenting tactics in early childhood, harsh parenting tactics at age 7 are no longer related to parental mental health.

The discovery that harsh parenting at age 5 appears to be related to parental mental health in childhood is in line with past work. Previous research has reported associations between poor parental mental health and aggression or abuse in the general population (Shay & Knutson, 2008; Kotch et al., 1995). Researchers explain this by referring to the diagnostic criteria for depressive disorders in the DSM-5, which describe depression as often being associated with irritability or anger (APA, 2013). Some have suggested that parents experiencing depressed or irritable moods are more likely to respond harshly when disciplining against child behaviours (Sagami et al., 2004).

However, this is the first analysis to investigate the longitudinal nature of these reciprocal associations. As such, it is difficult to determine why, within the context of families with an autistic child, parental mental health is only associated with use of harsh parenting tactics at age 5, but that this association appears to drop off at age 7.

As discussed above, parents of autistic children are not unaffected by mental health difficulties. However, parents of autistic children in the UK have increased exposure to psychological assessment services. To receive an autism diagnosis in the UK, children must be brought to appointments with a psychologist or other professional for assessment and observation (NICE, 2011). Following this, in the case of an autism diagnosis, parents may be referred for post-diagnostic support, or given links to educational materials (NICE, 2011; NHS, 2022). It stands to reason, therefore, that parents who have spent time navigating the diagnostic assessment process, reading diagnostic reports, and seeking or being educated on appropriate post-diagnostic support may benefit from increased mental health awareness. Research has also shown that individuals with increased mental health awareness are more likely to seek support for their own mental health problems (Spagnolo et al., 2008; Strunk et al., 2014). If this were the case, this support may help parents to make changes in their behaviour, thus disrupting the relationship between parental mental health and harsh or abusive parenting behaviours. This may explain why harsh parenting at age 5 is found to be related to parental mental health, but that harsh parenting tactics use at age 7 is not similarly associated.

Finally, the analysis also indicated that there was a longitudinal effect of harsh parenting tactics on parental mental health. Harsh parenting at age 5 was associated with poor parental mental health at age 7. This suggests that the use of harsh parenting is longitudinally associated with poor parental mental health. However, parental mental health does not appear to predict harsh parenting at later time points. This appears to conflict with previous theories, which suggest that parental mental health is a predictor of harsh or abusive parenting tactics

(Shay & Knutson, 2008). As discussed above, this finding could be explained by increased mental health awareness, which could be involved in disrupting a link between mental health and harsh parenting behaviours.

Family-level characteristics and sibling bullying. As is consistent with prior research investigating precursors of sibling bullying, several family-level and child-level characteristics were found to be associated with sibling bullying.

Gender. Children who reported their gender as female or other were found to be no more likely to experience victimisation by a sibling than those identifying as male. This is in direct opposition to prior research involving both the general population and autistic samples. Studies with the general population have similarly reported that being female increases the likelihood of being a victim of sibling bullying (Dantchev & Wolke, 2019), and that being male is protective against being victimised (Menesini et al., 2010). A study of autistic and non-autistic children replicated this finding (Toseeb et al., 2018).

Previously, researchers have explained the relationship between gender and bullying by arguing that boys are "tougher" and more "aggressive" (Maccoby, 1986): stereotypes of gender roles have been heavily utilised in the discussion of gender related bullying and violence. From the present analysis, it appears that autistic children in this sample do not seem to follow these same gendered patterns of bullying behaviour. This adds to a complex discussion around gender in autism. Research around autism and gender suggests that autistic people often show atypical behaviour in relation to their gender assigned at birth (Bejerot & Eriksson, 2014). Previous research has found that within samples of autistic children, there is no gender difference in the rate of perpetration of peer bullying or aggressive behaviours (Fink et al., 2018). This may explain the lack of a relationship identified between gender and sibling

bullying behaviours in the present study. However, further research is required to determine whether this discrepancy is indeed related to atypical gender role behaviour.

Ethnicity. There were no differences between ethnic groups in sibling bullying victimisation. However, white autistic children were found to be more likely to engage in sibling bullying perpetration than those from other ethnic backgrounds. This is in agreement with the results presented by Toseeb et al., (2020a), where it was found that white children were more likely to engage in sibling bullying perpetration.

However, it is interesting to note that ethnicity was not related to rates of reported sibling bullying victimisation. Within autism research, ethnic differences in presentation and behaviour are rarely studied (Zaroff & Uhm, 2012). This makes it difficult to speculate why children of white ethnic backgrounds in this study were more likely to perpetrate sibling bullying, but that there was no difference in sibling bullying victimisation. However, research thus far does suggest that autism diagnosis is less prevalent in ethnic minority groups relative to the majority population (Zaroff & Uhm, 2012; Tromans et al., 2020). Those from within ethnic minority groups who do receive an autism diagnosis often appear to exhibit traits of increased severity (Tromans et al., 2020). The sample of autistic children from non-white ethnic backgrounds in this study, therefore, may be children whose presentation is more severe than their white peers. This may go some way to explaining the differences in bullying behaviour observed between ethnic backgrounds in this study. Further work should seek to examine the role of ethnicity in bullying behaviour between autistic children and their siblings in more depth.

Socioeconomic status. Household income was found to be unrelated to sibling bullying involvement. This conflicts with research indicating associations between socioeconomic status and sibling bullying in the general population (Dantchev & Wolke, 2019). However, it

is consistent with research with a sample of autistic children, where it has been reported that household income is not related to sibling bullying involvement (Toseeb et al., 2020a). The replication of the latter reports as presented in the present study suggests that although there may be a relationship between sibling bullying and indicators of socioeconomic status in the general population, this is not true for autistic children and their families.

This has implications for the development and delivery of interventions. Income level is an easy and convenient way to identify populations who are in need of interventions. For example, identifying individuals in low-income areas has been a strategy to target interventions to help with smoking cessation, healthy eating, and physical activity (Bull et al., 2014). However, as income is not here seen to be related to sibling bullying involvement, it is crucial that any interventions developed to tackle sibling bullying behaviours are done so in a way that is widely available and accessible, regardless of participant income level.

Number of siblings. There was a positive association between the number of siblings in a household and sibling bullying perpetration and victimisation, indicating that more sibling bullying took place when the autistic child had more siblings. This is supportive of research which has found that the risk of sibling bullying increases when there are more siblings in a household (Dantchev & Wolke, 2019), a finding which has been echoed in families of autistic children (Toseeb et al., 2020a).

These findings are supportive of the Resource Control Theory (Hawley, 1999), which posits that bullying behaviour between siblings is caused by competition for resources. The fact that sibling bullying likelihood increases with the number of children in a household supports the argument that siblings are natural competitors for familial resources. Since these resources are of finite supply, children with a higher number of competitors resort to coercive resource control strategies, or bullying, to defend their access to them. This is particularly

relevant to families with an autistic child: autistic children may have additional care needs and require more resources than their non-autistic siblings, which may lead non-autistic siblings to adopt resource control strategies such as bullying.

Birth order. Perhaps in contrast, the present study found no relationship between birth order and rates of sibling bullying perpetration or victimisation. Prior research has found that autistic children born later in the birth order are less likely to become involved in sibling bullying than those born earlier, particularly first-born children (Toseeb et al., 2020a). The findings presented by Toseeb et al. (2020a) that older siblings are more likely to become involved in sibling bullying than younger siblings is in line with the theoretical perspective of RCT. Children born earlier in the birth order may be particularly aware of the decreasing pool of parental resources available to them, and have observed that these resources – such as time, or parental affection – become less available as the number of siblings increase (Toseeb et al., 2020a). It is noteworthy, therefore, that this result is not replicated here. A potential explanation for this could be that in families with an autistic child, the birth order placement of the autistic child is not important; more important is that autistic children may require allocation of more parental resources compared to their non-autistic siblings, and that this potentially takes precedence over their place in the birth order. If autistic children require additional care and support, and parental attention is allocated in an imbalanced way as a result, then the position of each child in the birth order may become irrelevant.

4.4.2 Strengths and Limitations

This large-scale study is a replication of limited previous sibling bullying research, something which is much needed in this currently sparse field. However, this study was not only a replication – it was also the first study to research factors associated with sibling bullying in a sample of only autistic children and their families. Autistic children represent a unique sample of the population, and it was proposed in chapters 1 and 2 that research investigating

sibling bullying in the general population would not be sufficient to understand this phenomenon in families with autistic children. Indeed, the focus on autistic children has helped to identify unique relationships between sibling bullying behaviours and associated factors, which have been explored in depth above.

Additionally, the cross-sectional and repeated-measures nature of the research allowed for analysis of factors present at different points throughout childhood, and examination of how they relate to sibling bullying later in life. This adds developmental context, and is an insight into how the nature of the family setting may have a changing impact over time.

The present research also has limitations that must be considered. Firstly, as this study's focus was on the sibling bullying experiences of autistic children in middle childhood, the participants were those who were reported to have received an autism diagnosis before the age of 14. Children who receive autism diagnoses early in life are likely to exhibit more traits, or a greater level of impairment than those who are diagnosed later (Daniels & Mandell, 2014). Autistic individuals diagnosed later in life, in contrast, are more likely to present with more subtle traits, and are less likely to have severe social communication differences (Howlin & Asgharian, 1999; Loubersac et al., 2021). This calls into question whether the findings presented here are generalisable to all autistic children, or rather reflect the experiences of those whose children exhibit more severe autistic traits early in life.

Secondly, the gender of children participating was imbalanced. In total, 77% of participating children were male. Autism research has a long history of significant gender inequality, which has resulted in the experiences of autistic women and girls being often overlooked (Shefcyk, 2015). Boys have, historically, been more likely to receive an autism diagnosis and to be included in autism research (Bazelon, 2007). In the current study, no active discrimination was made on the basis of gender, and no participants were removed from the

analysis on the basis of gender. However, this highlights the need for more sensitive practices in future studies. Further work should attempt to be inclusive with regards to participant gender in order to identify findings that are representative and generalisable.

4.4.3 Directions for future research

A key result of this study is the finding that harsh parenting tactics is significantly associated with sibling bullying behaviour. This is a replication of the relationship identified in previous work, but also a novel finding for autistic children and their families. An important direction for further research, therefore, is to investigate the mechanisms of the role of harsh parenting behaviour as a precursor of sibling bullying. Researchers should seek to identify whether children who observe and then imitate bullying behaviours towards their siblings are simply mimicking a role model, or whether they are actively making inferences about the behaviour of the model. It would be important to distinguish whether children perceive their parents' behaviour as examples of normal relationships, as methods of relational problem solving, or as something which is associated with reward. Further, more in-depth understanding of the relationship between harsh parenting tactics and sibling bullying will be necessary in formulating useful and effective interventions.

Additionally, it was found that although there is a clear and strong association between harsh parenting and sibling bullying behaviour, this relationship is not underpinned by parental mental health. If harsh parenting is not causally associated with parental mental health, then further research is required in order to understand why harsh parenting occurs, thus allowing interventions to target the root cause of these parental behaviours.

Finally, as discussed above, it is possible that the participants in this study had received autism diagnoses in early childhood because they exhibited autistic traits severe or noticeable enough to warrant diagnostic assessment, and that as such the children in this study are perhaps

not representative of the autism community. Further research may address this by exploring the relationship between autism trait severity and sibling bullying. This would allow investigation of whether the findings presented in the current study are representative of autistic children's experiences, or only reflective of those with autism traits severe enough to necessitate diagnostic assessments in early childhood.

4.5 Conclusions

This was the first study to investigate the relationship between parental mental health and sibling bullying in families with an autistic child, and no association was identified in this population. This work also presents important replications of some of the key works so far in autism and sibling bullying research. The finding that sibling bullying is related to use of harsh parenting tactics was replicated, which identifies harsh parenting as a potential target for interventions aiming to address sibling bullying. However, it is yet unclear how these two phenomena are related. Further work has been suggested in order to fully understand the relationship between harsh parenting and sibling bullying behaviours.

5. Study 2: Autistic traits and sibling bullying: an investigation of the broad autism phenotype, autistic traits in diagnosed children, and their association with sibling bullying behaviour.

5.1 Introduction

Study one reiterated what has previously been established: autistic children are at increased risk of experiencing sibling bullying (Toseeb et al., 2018 & 2020a) when compared to the general population. This thesis explores two ways that can help to explain this discrepancy. One is that factors which are associated with sibling bullying in the general population are experienced differently by autistic children and their families. This was explored in the first study of the thesis. Study one identified factors shown to be predictors of sibling bullying in the general population and studied their impact on sibling bullying rates in the families of autistic children.

The second hypothesis presented and examined by this thesis is that factors unique to autistic children and their families are the reason for these higher rates of sibling bullying. It stands to reason that there is a key difference between these populations which can explain the disparity in sibling bullying rates. This is the focus of the present chapter, which aims to explore factors unique to families with autistic children, and how these may be related to sibling bullying.

5.1.1 Autistic traits and sibling bullying

One obvious distinction between the autistic population and other families is the presence of autistic traits. Autistic children will most likely possess traits of social communication, social interaction, and behavioural differences (American Psychiatric Association, 2013) that differentiate them from other individuals of their own age. These children may also frequently exhibit traits that may be regarded as challenging or "problem" behaviours. The presence of autistic traits in these families may be the key to explaining why the rates of sibling bullying are so different between groups.

There are two main arguments for the association between autistic traits and increased rates of sibling bullying. One is that the traits of the autistic child themselves may increase the likelihood of sibling bullying victimisation. Behaviours associated with autism have been linked to an increase in conflict between siblings (Petalas et al., 2012). In particular, studies have shown that some "challenging" behaviours, such as socially inappropriate behaviour or disruptive and destructive behaviours, negatively impact the sibling relationship (Seltzer et al., 2009).

Some researchers have posited that this is related to the non-autistic child's concerns about how these behaviours are perceived outside of the family unit. Adolescent siblings of autistic children frequently report embarrassment and concern about social stigma and isolation (Wilson et al., 1992). Siblings of autistic children express fears that peers may view the autistic child's behaviour as strange or negative in some way and have reported feeling shame and embarrassment because of this (Macks & Reeve, 2007). Additionally, siblings of autistic children may feel or be unable to invite peers to their home due to the behaviour or needs of the autistic child, which may cause further embarrassment or frustration (Gray, 1998). It is possible that siblings of autistic children may perpetrate sibling bullying because of their frustrations. This could help to explain why autistic children are involved in sibling bullying at an increased rate compared to the general population: autistic children exhibiting socially strange or inappropriate behaviour, resulting in siblings feeling isolated and ashamed, may increase rates of sibling bullying victimisation experienced by autistic children.

Alternatively, the challenging behaviours of autistic children may be a source of stress for their non-autistic siblings, which may in turn negatively impact on the quality of the sibling relationship. Non-autistic siblings of autistic children often take a caregiving role within their families (Nuttall et al., 2018). Many of these children also express concerns

about their autistic siblings' behaviours and for their futures (Tomeny et al., 2017). Autistic children who exhibit higher levels of "challenging" behaviours, therefore, may be a source of stress for their siblings. Indeed, Petalas et al. (2012) interviewed siblings of autistic children, of whom several commented that their siblings' challenging behaviours had a negative and stressful impact on them and their family. Even if the non-autistic children do not take the caregiver role, research indicates that having an autistic sibling, who may engage in disruptive or destructive behaviour which is challenging to a parent or other family members, increases overall family stress levels (Shivers et al., 2017). A study by Hastings and Petalas (2014) reported that higher levels of problem behaviours in autistic children predicts less warmth and closeness in sibling relationships and increased levels of sibling conflict. Higher levels of challenging behaviours exhibited by autistic children may therefore increase the likelihood of sibling bullying, whether or not their non-autistic siblings adopt a caregiver role.

Autistic traits may also increase the likelihood of autistic children being perpetrators of sibling bullying behaviour. Research thus far has heavily concentrated on the peer or sibling bullying victimisation experienced by autistic children, and as such study of autistic children's perpetration of sibling bullying is very limited. However, it is seen that autistic children often exhibit physically aggressive behaviours, with one study finding that over half of the autistic children in the sample were physically aggressive towards others (Mazurek et al., 2013). This could be related to the autistic traits that these children possess. For example, autistic individuals are likely to have difficulties with or differences in social communication compared to non-autistic individuals. These can include difficulties in turn-taking, engaging in shared interactions, and having difficulty engaging socially with peers (Bangerter et al., 2017). Autistic children's difficulties with social communication also often mean that they lack insight into social processes (Frith & Hill, 2003). Autistic individuals with social

communication difficulties may have a limited understanding of the reactions of other people and may therefore unintentionally ignore or misinterpret the way that their actions impact on other people. Therefore, autistic people with impaired social communication may perpetrate bullying behaviour without awareness of its consequences for those around them. Indeed, research has shown that autistic children who struggle to interpret social situations are less able to identify peer bullying, and are more likely to engage in peer bullying behaviour at school (van Roekel et al., 2010).

Finally, autistic children who have difficulties with social communication may struggle to express themselves verbally. Although autistic children reportedly struggle less with expressive language than their receptive language, these children are worse at expressive communication than their non-autistic peers (Kwok et al., 2015). Research has identified that aggression in autistic children is more likely where the child experiences more severe social communication deficits (Dominick et al., 2007; Kanne & Mazurek, 2010). This may be because autistic children who have difficulties in expressive language resort to conveying their frustrations or other negative emotions in another way, such as through aggression. Neuhaus et al. (2022) report that autistic children's aggression is associated with impaired applied communication skills, writing that "aggressive behavior may result from challenges in applied communication skills, either as an expression of frustration, or as a tool used instrumentally as an alternative means of communicating a need." (p.459). Therefore it is possible that autistic children's increased involvement in sibling bullying may be related to their difficulties with social communication.

To summarise, autistic children are at increased risk of both experiencing sibling bullying victimisation and perpetrating sibling bullying. This heightened risk may be at least partially explained by traits associated with autism, such as challenging behaviour or social communication difficulties. Autistic children who have difficulties in understanding or

interpreting social communication may be more likely to perpetrate sibling bullying without full understanding of the consequences for others' feelings, or act aggressively due to difficulties in expressing themselves. Furthermore, siblings of autistic children may experience feelings of shame and embarrassment which culminate in them perpetrating sibling bullying towards the autistic child, whose behaviour may be related to their emotional distress. The primary focus of this study, therefore, was to investigate any relationships between autistic children's autistic traits and sibling bullying behaviour perpetrated by the autistic child or their non-autistic sibling.

5.1.2 The Broad Autism Phenotype and Sibling Bullying

Families with autistic children are distinct from the general population not just because of the autistic child's traits, but because of the shared phenotypic expression of autistic traits within undiagnosed family members. In addition to the autistic child, family members of diagnosed individuals may also present with autistic traits. Autism is highly heritable, and researchers have found that siblings of autistic children express autistic traits themselves, even if they do not meet diagnostic criteria for an autism diagnosis (Bailey et al., 1995; Folstein & Rutter, 1977). This is known as the broad autism phenotype (BAP). The BAP is identified in family members who present sub-clinical autistic traits. There are three main features of the BAP: an aloof personality, which is defined by reduced interest in social interaction; impairments in pragmatic language, such as deficits in switching conversation topics and turn-taking in conversation; and a rigid personality, which is defined by having difficulty in dealing with change. Studies have indicated that both siblings of diagnosed autistic children and their parents may meet criteria for the BAP (Bernier et al., 2011; Ozonoff et al., 2011; Pisula & Ziegart-Sadowska, 2015).

This is important to note, especially when investigating the relationship between autistic traits and sibling bullying involvement. If, as discussed above, autistic traits such as

social communication difficulties are related to increased rates of sibling bullying perpetration, then undiagnosed family members who also experience these difficulties may be similarly likely to perpetrate aggressive bullying behaviours. Non-autistic siblings who also struggle with interpreting social communication may also engage in behaviours that are interpreted as sibling bullying. It is therefore the secondary aim of this study to investigate whether autistic traits expressed by non-autistic children are related to sibling bullying behaviours.

5.1.3 The Co-Occurrence of Special Educational Needs and Disabilities and Sibling Bullying

Finally, many autistic children also receive diagnoses of other special educational needs and disabilities (SENDs) besides autism. A child is said to have SEND, as defined by NHS England (n.d.), if they have learning difficulties or other disabilities that mean that they require specialist support within the health or education sector. A non-exhaustive list of issues requiring support include: difficulties with sustaining concentration, which may be associated with ADHD; difficulty with specific areas of education, such as reading or writing, which may be related to dyslexia; problems with understanding, possibly due to specific language impairments or learning difficulties; or physical disabilities.

Autistic children are often at risk of being diagnosed with other SENDs, sometimes at a higher rate than the general population (Russell & Pavelka, 2013). For example, Fombonne (1999) reported that 29.4% of autistic children met criteria for a mild to moderate learning disability, and 41.9% had a severe to profound learning disability. Similarly, Leyfer et al. (2006) found that 55% of a sample of autistic children also met diagnostic criteria for ADHD, whilst almost a quarter of the sample showed severe depressive symptoms. In comparison, prevalence rates of learning disabilities and ADHD in the general population are around 2.5% and 1.7% respectively (mencap, n.d.;.Russell et al., 2014).

Children with SEND such as learning difficulties and physical disabilities are at increased risk of experiencing victimisation in a school setting (Morrison et al., 1994; Estell et al., 2009). Researchers argue that children with autism or other SENDs may be seen as easy targets for peer bullying, as they are identified as being "different" from their peers (Haq & Le Couteur, 2004; Horowitz et al., 2004). Autistic children may already have noticeable differences to their peers, and so the presence of additional SENDs may increase this gap. If, as discussed above, siblings of autistic children do experience shame and embarrassment due to their autistic siblings' difficulties, this could be amplified by the presence of additional SENDs. Sibling bullying may therefore be more likely in families where an autistic child has additional SENDs.

Furthermore, an autistic child with additional SENDs may require more caregiver assistance and attention. A non-autistic child may, therefore, feel an imbalance in parental attention compared to their disabled sibling (Felson, 1983). Resource control theory (Hawley, 1999) proposes that siblings are natural competitors for the limited pool of resources that parents provide, such as time, affection, and attention. Non-autistic siblings of autistic children report awareness of inequality in the parental attention allocated between siblings (Macks & Reeve, 2007), and this has been suggested to be a precursor for sibling bullying (Tanskanen et al., 2017). Indeed, in families with a greater number of siblings, there is a greater risk of sibling bullying occurring (Dantchev & Wolke, 2019). Thus, the presence of additional SENDs, which results in an increased imbalance of parental attention allocation, could be associated with an increase in sibling bullying rates.

One study which has investigated an association between SEND diagnoses and sibling conflict was conducted by Toseeb et al. (2022). Contrary to the theories presented above, the author reported that children with severe needs were less likely to be involved in sibling conflict, either as a perpetrator or as a victim. Toseeb et al. (2022) suggests that this is

because the siblings of those affected by SENDs may take on a parent-like, caregiver role. This could, theoretically, be protective against sibling bullying. Perhaps in families where autistic children have additional SENDs, and therefore additional needs, the relationship between siblings is more likely to be 99nonymized99ed by caregiving than conflict.

To summarise, the research on the relationship between SEND diagnoses in autistic children and sibling bullying is limited. There are theoretical reasons for a link between additional SENDs and sibling bullying behaviour, but these have not been comprehensively examined. Therefore, the final aim of this study was to examine whether the number of SENDs and diagnoses of specific SENDs were associated with rates of sibling bullying.

5.2.4 Aims

The research questions addressed by this study, as outlined in Chapter 3, were therefore as follows:

1. Is there a relationship between autistic traits in a diagnosed child and the occurrence or subtype of sibling bullying?
    a. Do autistic children's autistic traits predict their own sibling bullying perpetration?
    b. Do autistic children's autistic traits predict their non-autistic siblings' sibling bullying perpetration?
2. Is there a relationship between autistic traits in a non-autistic sibling of an autistic child and the occurrence or subtype of sibling bullying?
    a. Do non-autistic children's autistic traits predict their autistic siblings' sibling bullying perpetration?
    b. Do non-autistic children's autistic traits predict their own sibling bullying perpetration?

3. Is there a relationship between additional SEND diagnoses of an autistic child and the occurrence or subtype of sibling bullying?
    a. Do specific SEND diagnoses predict autistic children's sibling bullying perpetration?
    b. Do specific SEND diagnoses predict non-autistic children's sibling bullying perpetration?

To address these research aims, parents with at least two children, one autistic and one non-autistic, were asked to complete an online questionnaire. Parents completed measures of their autistic child's autistic traits, as well as autistic traits that their non-autistic child exhibits. Participants were also asked to report on the sibling bullying behaviour that they had observed between the two children. Data was analysed using a series of multiple regression models, which were specified with the aim of identifying whether autistic traits in the autistic child or non-autistic sibling could predict sibling bullying perpetration by either child.

The findings from these models are presented. Rates of sibling bullying perpetration by each child were also calculated and are presented below, alongside a breakdown of the frequency of each subtype of sibling bullying by each child. A discussion of the study findings follows, as well as how these results may be understood given the current state of the literature. Strengths and limitations of the study are discussed, and recommendations for future research to further develop understanding of the field are presented.

Methodology

5.2.5 Recruitment

Participants were recruited online in one of three ways. Firstly, emails were sent to schools across the country. Head-teachers were contacted and provided information about the research, and asked if they would consider sharing a link to the study questionnaire with parents at their school. A second method of recruitment was via social media. The researcher

privately messaged administrators of group pages for parents of SEND children on Facebook, asking for permission to post a link to the study and a brief information poster (Appendix D).

Finally, participants were also recruited via Prolific (2023). Prolific is a website which provides researchers access to a large pool of participants for primarily online questionnaire-based studies. There were two steps in recruitment via Prolific. See Figure 3 for a depiction of recruitment tactics. The first was administration of a screening questionnaire. The website allows researchers to use filters, which restrict the type and number of participants who the questionnaire is made available to. The following filters were used to pre-screen participants who were able to take the screening questionnaire: participants must be UK based, be fluent in English, and have at least 2 children.

In the screening questionnaire, participants were asked to indicate whether they had an autistic child, and if the autistic child had any biological siblings. If they said yes to both questions, they were sent a link on Prolific to complete the full questionnaire.

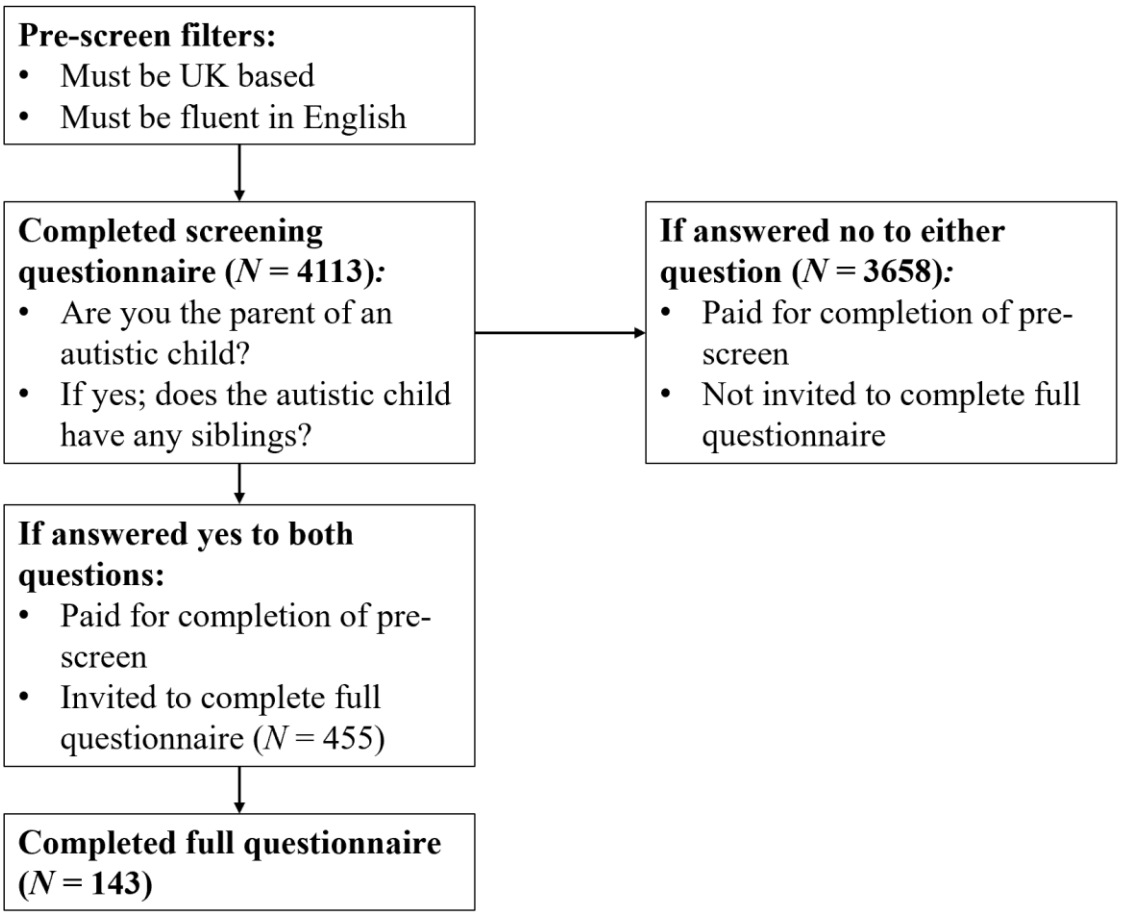


Figure 3. *The exclusion and inclusion criteria used on Prolific to identify participants to take part in the questionnaire study.*

Participants on Prolific are paid for their time. Participants were paid 13p to complete the screening questionnaire, which took on average 2.3 minutes. In total, 4113 participants completed the screening questionnaire. Of these, 455 participants were invited to complete the full questionnaire. However, only 143 participants invited to complete the full questionnaire did so. Participants were paid £1.88 for their completion of the full survey, which took on average 11.2 minutes to complete.

5.2.6 Participants

In total, 165 participants completed the full online questionnaire. Participants were excluded if they were not the biological parent of the autistic child. Responses were also

deleted if the sibling was not biologically related to the autistic child. This left 143 responses in total.

Parent Data. The parents provided information about their demographic data. The majority of participants were female (111; 78%), whilst 31 (22%) were male and one participant (1%) indicated that they preferred not to disclose their gender.

With regards to highest educational level reached, 72 (50%) parents indicated that they had received an undergraduate degree or higher level of education. Twenty-eight parents (20%) responded that their highest educational attainment had been an NVQ or equivalent qualification, and 24 (17%) indicated that they had achieved a GCSE or equivalent. A and AS Level or equivalent qualifications were the highest level of educational attainment for 16 (11%) parents, and one parent (1%) responded that they had completed an apprenticeship as their highest level of education. Two parents (1%) indicated that they had received another type of educational award as their highest level of educational attainment.

Finally, the majority of parents (133; 93%) indicated that they had never received a formal autism diagnosis. Only seven parents (5%) responded that they had been diagnosed with Autism Spectrum Disorder, and three (2%) parents preferred not to say.

Autistic children. Data on 143 autistic children was provided by parents. The ages of autistic children reported on ranged between five and 18 years of age, with a mean of 10.9 years (SD = 3.3). Of the 143 autistic children, the majority (113; 79%) were male, with 28 (20%) female and two parents (1%) indicated that their autistic child identified as non-binary or third-gender.

With regards to birth order, the majority were second born children (66; 46%), and 52 (36%) were firstborn. Third born children made up 13% of the sample (n = 19) and there were 6 (5%) children born fourth or later in the birth order.

The majority of autistic children in the sample had two siblings (88; 62%). The next most common were those with three siblings (40; 28%). Children with only one sibling made up 3% of the sample (n = 4), whilst autistic children with four or more siblings made up 7% (n = 11).

Parents were also asked to indicate which, if any, SENDs their autistic child had received a diagnosis of in addition to their autism diagnosis. The majority of autistic children (136; 95%) had at least one SEND in addition to their autism diagnosis. A depiction of the frequency of SENDs can be seen in Table 6. The most commonly occurring SENDs in the sample were Social, Emotional, or Mental Health difficulties (50; 35%), Sensory Processing Disorders (48; 34%), and ADHD (29; 20%).

Table 6. *The number of SENDs reported in addition to autism.*

Number of SENDs in addition to autism	Frequency
0	7 (5%)
1	79 (55%)
2	21 (15%)
3	21 (15%)
4	11 (8%)
5	1 (1%)
6	3 (2%)

Table 7. *The prevalence of SEND diagnoses within the sample of autistic children.*

SEND	Count
Social, Emotional, or Mental Health difficulties	50 (35%)
Sensory Processing Disorder	48 (34%)
Attention Deficit Hyperactivity Disorder	29 (20%)
Other	28 (20%)
Developmental Language Disorder	18 (13%)
Global Developmental Delay	18 (13%)
Speech Disorder or Impediment	18 (13%)
Attention Deficit Disorder	14 (10%)
Developmental Coordination Disorder	10 (7%)
Dyslexia	7 (5%)
Physical disability	6 (4%)
Visual impairments	5 (4%)

Non-Autistic Siblings. Parents also provided information about siblings of their autistic children. A total of 143 responses were included in the analysis. The age of non-autistic children ranged from 5-18 years, with a mean age of 11.2 (SD = 3.4). There was an even split of male and female non-autistic children: each group had 71 (49.5%) members. One child was recorded as identifying as non-binary or third-gender (1%).

The majority of the non-autistic siblings in the sample (65; 45%) were second-born in the birth order, with 55 (38%) being first-born, 15 (10%) third-born and 8 (6%) being born fourth or later in the birth order.

5.2.7 Procedure

Parents were invited to complete an online questionnaire, which was hosted on Qualtrics (Qualtrics, Provo, UT; Version 12.22) The questionnaire could be completed on a computer, phone, or tablet. It took on average 11.3 minutes to complete.

Before beginning the questionnaire, participants who clicked the link to the study were shown a brief and consent form, both of which can be found in Appendix E. The brief informed potential participants about what the study was about, what they would be asked to do, and the purpose of the study. This screen also included information on who to contact should they have any questions or concerns about the study. The email addresses of the primary researcher and their supervisor were provided, as well as links to organisations that participants could contact if they were distressed or concerned by the topic of the research. This included the National Bullying Helpline (National Bullying Helpline, 2022), which is an advice center for individual struggling with bullying issues, and Sibs, which is a charitable organization aiming to support people who have grown up with a disabled sibling (Sibs, 2022). Finally, participants were informed that by completing the study, they were confirming that they consented that their 105nonymized data would be included in the study, as there would be no way to identify respondents to delete data once it had been submitted.

After the questionnaire was completed, participants who had reached this point were shown a screen where they were once again reminded of links and emails to contact if they had any concerns or queries about the study or had found any of the content distressing.

5.2.8 Measures

Autism Behaviour Inventory-Short Form. A measure of each child's autistic traits, the Autism Behaviour Inventory Short-Form (ABI-S: Bangerter et al., 2017) was collected. Participants were asked to complete the ABI-S twice: once whilst reporting on their autistic child, and once in reference to their child without an autism diagnosis. This served two purposes: for one, it would allow identification of the severity of autistic traits expressed by the child with an autism diagnosis, which could then be used to determine whether the severity of autistic traits are related to sibling bullying behaviour. Secondly, this would identify whether children without an autism diagnosis also exhibited autistic traits, and could help to answer whether the broad autism phenotype expressed in siblings of autistic children is related to sibling bullying behaviour.

The Autism Behaviour Inventory-Short Form (ABI-S; Bangerter et al., 2017) is a 24-item measure of autistic behaviours. The respondent is asked to read one statement at a time and think about the behaviour of the person that they are rating over the last 7 days. For most questions, respondents are required to indicate the frequency with which they observed the target individual exhibiting the behaviour described in the statement: never, sometimes, often, or very often. For the first three questions, however, asks respondents to select a response based on the quality of the behaviour. Response options to these questions allow participants to indicate whether the child has carried out the behaviour: not at all, with support, with reminders, or without help. For all questions, participants are able to select a "don't know" response.

There are five domains to the questionnaire: two core autism symptom domains (social communication and restrictive and repetitive behaviours), and three related domains (mood and anxiety, self-regulation, and challenging behaviour). The first, social communication, asks respondents to first think about how the child has carried out social and communicative behaviours, which are often impaired in autistic individuals. An example item asks the participant to indicate how frequently, for example, the target child "Shows pleasure in shared interactions (e.g. enjoys doing things with people)". In the restrictive and repetitive behaviours domain, respondents are required to indicate how frequently the target child displays behaviours such as making repetitive movements such as hand flapping or spinning, or insisting on routine.

The remaining three domains ask about behaviours which are not symptomatic of autism, but frequently related to it. For example, in the mood and anxiety domain, items include "Is anxious in social situations" and "Has sleep problems". In the self-regulation domain, items include behaviours such as impulsivity and being excessively active. Finally, the challenging behaviour domain requires respondents to think about how frequently the child is physically aggressive towards others or has temper outbursts. A full list of items in the ABI-S may be found in Appendix F.

A score is generated for each domain of the ABI-S. Additionally, a "core" score is generated from the Social Communication and Restrictive and Repetitive Behaviour Domains. Each item is given a score from 0-3. On the first three items, where participants are asked to select a response based on the quality of the behaviour identified in the statement, the response options are scored as follows: not at all = 3; with support = 2; with some reminders = 1; without help = 0. On the remaining Frequency likert scales, responses are scored as: never = 0; sometimes = 1; often = 2; very often = 3. This is the case with the exception of two items, for which the Frequency likert scale scoring is reverse coded.

A score is generated for each domain by dividing the sum of item scores by the number of items completed. Responses of "I don't know" were ignored. If 50% or more responses in a domain were missing, or if participants had answered "I don't know" to 50% or more items in a domain, then the domain could not be scored. The Core score is calculated by totalling the item scores for the Social Communication and Restrictive and Repetitive Behaviour Domains, and then dividing this total by the sum of complete items across both domains. Higher scores are interpreted as being indicative of increased frequency of autistic traits or associated difficulties.

The ABI-S is not a diagnostic measure, but rather allows the observation and identification of traits and behaviours associated with autism, which was consistent with the study aims. A clinical validation study on this measure, conducted by Bangerter et al. (2020), found test-retest reliability to be good 3-5 days after baseline testing (0.77-0.88). A Cronbach's alpha conducted on the present data showed internal consistency to be high across all domains, both for the autistic (0.89) and non-autistic (0.87) groups.

Sibling bullying. Parents were asked to provide information about the types of sibling bullying behaviour that each child perpetrated against the other. An adapted form of the Sibling Bullying Questionnaire (SBQ; Olweus, 1991; Wolke & Samara, 2004) was used. The SBQ by Wolke & Samara (2004) is a well-known and widely used scale, which has been reliably used in studies across a number of different countries (Tippett & Wolke, 2014; Deniz et al., 2022). This questionnaire is designed for children to report sibling bullying behaviour that they perpetrate or are a victim of.

A modified version of this questionnaire, created by Wolke and Samara (2004), is broken into two self-report sections, each with 7 items. In one section, a child is asked to report "how often did your brother or sister do any of the things listed below?", allowing children to report how they are victimised. In the second section, children are asked "how

often did you do any of the things listed below?", which corresponds to sibling bullying perpetration. Responses are on a 5-point Likert scale (never = 1, only ever once or twice = 2, two or three times a month = 3, about once a week = 4, several times a week = 5), with higher scores indicating that the child bullies their sibling more frequently. The 7 items describe bullying behaviour and describe the following behaviours:

- Hitting, kicking, pushing or shoving, or threatening to do these things;
- Taking or damaging a sibling's belongings or money;
- Calling a sibling names;
- Making fun of a sibling;
- Keeping their sibling out of things on purpose, such as leaving them out of their group of friends or ignoring them;
- Telling lies or spreading rumours about their sibling.

A total score was generated to reflect the frequency with which each child perpetrated sibling bullying towards the other child in the study. Additionally, scores were generated to identify the frequency of subtypes of sibling bullying. This questionnaire allows for identification of physical, verbal, or relational sibling bullying. The first two items relate to physical sibling bullying, which involves purposefully causing or threatening physical harm to another person or their property. The second pair of items correspond to verbal bullying, which occurs when one party attempts to cause harm by verbally harassing the other. Finally, the last pair of items relate to relational bullying, which is defined as behaviour enacted with the intent to harm an individual's social standing, such as exclusion or spreading rumours.

The questionnaire was modified for use in the present study in two ways. Firstly, the language of the questionnaire was adjusted to reflect that parents, rather than children, were reporting on sibling bullying behaviour. Secondly, participants were only asked to report on sibling bullying that each child perpetrated against their sibling. Participants were asked to

complete the perpetration section twice: once whilst thinking about sibling bullying behaviours perpetrated by their autistic child towards their non-autistic sibling, and then whilst thinking about sibling bullying behaviours perpetrated by their non-autistic child towards their autistic child. Participants were not asked to disclose sibling bullying behaviours that each child was a victim of, as this was redundant in the current study, where the perpetration behaviours of both children were identified.

As is discussed in Chapter 4, debate is ongoing regarding the best way to collect data on sibling bullying rates. A child self-report measure was used in Chapter 4, as research suggests that parents may either be unaware of all of the bullying that takes place in the household (Wolke et al., 2015), or may underreport sibling bullying because it is seen as normal behaviour (Khan & Rogers, 2015). Whilst this is a valid and convincing argument for child self-reports of sibling bullying, parent-reports are more useful in other ways. For example, in situations where children may lack insight into their own perpetration of sibling bullying, perhaps being unaware of behaviours that would be labelled such, parent reports may be more appropriate. This has been notably the case in samples including autistic children, who are shown to have lower understanding of bullying scenarios (Hodgins et al., 2020). Parent report was therefore identified as the most appropriate way of assessing sibling bullying rates in the current study.

Demographic information. Participants were also asked to provide demographic information about themselves and both children that they were reporting on. Self-report information included the participants' relationship to the children that they reported on: for example, whether they were biological parents, step-parents, adoptive parents, grandparents or other biological relatives, or a non-biologically related caregiver to the autistic child or to their non-autistic sibling. Finally, they were asked to report how many children lived in their household with them.

Participants provided demographic information for the children that they reported on. They were asked to indicate both the autistic and non-autistic child's age, gender, and their position in the birth order. Participants were also requested to disclose the relationship between the autistic and non-autistic sibling: for example, whether they were full biological siblings, half-siblings, step-siblings, adopted siblings, unrelated, or had another type of relationship.

Finally, participants were asked to provide information about other diagnosed SENDs that the autistic child had. A list of SENDs was provided, and participants were asked to select all those that the autistic child had received a diagnosis of. The full list of SENDs included can be seen in Appendix G.

5.2.5 Statistical analyses

A description of the statistical analyses that were carried out to address each research question may be seen below.

Do autistic children's autistic traits predict their own sibling bullying perpetration? To address this research question, four regression models were fitted. Each regression model was specified with the dependent variable as a type of sibling bullying, perpetrated by the autistic child. The types of sibling bullying included total, physical, verbal, and relational sibling bullying behaviours, as measured by scores on the parent-report sibling bullying questionnaire described above. The predictor variables were the autistic child's traits, as assessed using the ABI-S measure. The following subdomains were included as independent variables: social communication, restrictive and repetitive behaviour, self-regulation, mood and anxiety, and challenging behaviour. Also included in the models were the autistic children's age, gender, and place in the birth order.

Before fitting each model, tests against the assumptions of linearity, normally distributed residuals, homoscedasticity and multicollinearity were run. Abnormally

distributed residuals were observed in the models which had total sibling bullying and relational sibling bullying as dependent variables. For this reason, generalised linear regression models were fitted as an alternative to multiple regression models. Linearity was checked for by plotting scatterplots, and a Cameron-Trivedi decomposition test was run to check each model for homoscedasticity, skew, and kurtosis. Each model was observed to be homoscedastic, and to have no evidence of skew or kurtosis. Finally, a Variance Inflation Factor (VIF) test was run against the predictor variables to assess for multicollinearity. The Core score on the ABI-S was observed to have a high degree of collinearity with the scores for Social Communication and the Restrictive and Repetitive Behaviour domains. This is likely because the Core score is an amalgamation of these two subdomain scores. This variable was removed from all models hereafter.

Two regression models within this group were identified as deviating from the assumption of having normally distributed residuals. For this reason, these models were fitted as generalised linear models, whilst those which did not violate this assumption were simply fitted as multiple regression models.

Do autistic children's autistic traits predict their non-autistic siblings' sibling bullying perpetration? A second group of four regression models were fitted to address this question. This group of models had identical predictors to the first group, including autistic children's scores on the ABI-S subdomains, age, gender, and place in the birth order. However, the dependent variable for each model was the type of sibling bullying perpetrated by the non-autistic child.

As is described above, diagnostic testing was run against the assumptions of linear multiple regressions prior to fitting the final models. In this case, each model was observed to deviate from the assumption of normally distributed residuals. All models in this group were, therefore, fitted as generalised linear regression models.

Do non-autistic children's autistic traits predict their autistic siblings' sibling bullying perpetration? Four generalised linear regression models were fitted to address this research question. In each model, the dependent variable was a type of sibling bullying perpetrated by an autistic child. The predictor variables were autistic traits, as observed in the non-autistic children. In addition, non-autistic children's ages, genders, and places in the birth order were included as predictors.

Do non-autistic children's autistic traits predict their own sibling bullying perpetration? As above, four generalised linear regression models were fitted. The independent variables were identical to the ones described in the previous model, but the dependent variable for each model was a type of sibling bullying behaviour as perpetrated by the non-autistic child.

Do specific SEND diagnoses predict autistic children's sibling bullying perpetration? To address this research question, four regression models were fitted. The dependent variable in each model was a type of sibling bullying perpetrated by the autistic child. The independent variables were the list of SENDs that had been provided to parents to indicate whether or not their autistic child had any additional SENDs. Responses to this question were coded as dummy variables, with a "1" indicating that a parent noted that yes, their autistic child did have a diagnosis of a specific SEND in the list, and a "0" indicating that parents had not indicated that their child had a diagnosis of a specific SEND.

Two models, with total sibling bullying and relational sibling bullying perpetrated by autistic children as dependent variables, were fitted as generalised linear models. The other two models were fitted as multiple regression models.

Do specific SEND diagnoses predict non-autistic children's sibling bullying perpetration? A final four regression models were fitted to address this. As described above, the independent variables for each of the four models were dummy variables, indicating

whether or not the autistic child had a diagnosis of each SEND in the list provided to parents. The dependent variable for each model was a type of sibling bullying perpetrated by the non-autistic child. Each model was fitted as a generalised linear regression model.

5.3 Results

5.3.1 Bullying rates

Scores on the parent-report SBQ ranged from 7-35, with higher scores indicating that the child being reported on perpetrated sibling bullying more frequently. Autistic children had a mean SBQ score of 16.7 (*SD* = 7.4), whilst non-autistic children had a mean score of 14 (*SD* = 5.9). An independent samples t-test showed that there was a significant difference in total bullying scores between autistic children and their non-autistic siblings, $t(284) = 3.47$, $p = > .001$.

A full breakdown of sibling bullying perpetration behaviours by item can be seen in Table 8a and 8b.

5.3.2 Subdomains of bullying

Scores were generated to show rates of sibling bullying perpetration across each subdomain of sibling bullying behaviour: physical, verbal, and relational bullying. The range of possible scores for each subdomain was between 2-10.

Physical sibling bullying. Autistic children had a mean physical bullying score of 5.5 (*SD* = 2.6), whilst non-autistic children's mean score was 4.1 (*SD* = 2). An independent samples t-test showed a significant difference in physical bullying scores, $t(284) = 4.94$, $p = <.001$.

Verbal sibling bullying. With regards to verbal bullying, autistic children had a mean score of 5.8 (*SD* = 2.9). Non-autistic children had a mean score of 5.2 (*SD* = 2.6). An independent samples t-test showed a significant difference in verbal bullying perpetration scores, $t(284) = 2.09$, $p = .038$.

Relational sibling bullying. Finally, autistic children had a mean relational bullying score of 3.7 (*SD* = 2.2), and non-autistic children had a mean score of 3.5 (*SD* = 2). There was no significant difference in relational bullying perpetration between groups, *t(*284) = 0.97, *p* = .332.

Summary. Autistic children were significantly more likely to be perpetrators of all types of bullying compared to their siblings.

5.3.3 ABI-S Profiles

Participants completed the ABI-S twice, reporting on the behaviour of their autistic and non-autistic child. From these responses, scores were calculated which related to five subdomains of the questionnaire: social communication, restrictive and repetitive behaviours, mood and anxiety, self-regulation, and challenging behaviour. A core score was also calculated to capture the frequency and severity of social communication difficulties and restrictive and repetitive behaviours, which are core traits of autism. Possible scores on each subdomain range from 0-3. A higher score on each domain indicated that the child being reported on had more severe autistic traits, or more frequently exhibited traits consistent with autism.

On the social communication subdomain, autistic children had a mean score of 1.7 (*SD* = 0.5), whilst the non-autistic sibling group mean scores were 0.3 (*SD* = 0.3). An independent samples t-test showed a significant difference in scores on this subdomain: *t*(284) = 22.2, *p* = <.001. Similarly, on the restrictive and repetitive behaviours domain, autistic children had a higher mean score of 1.9 (*SD* = 0.6) compared to non-autistic children, who had a mean score of 0.3 (*SD* = 0.4). An independent samples t-test also showed there to be a significant difference in scores between autistic and non-autistic children on this subdomain. *t*(284) = 25.6, *p* = <.001. These results show that autistic children showed more

frequent and severe repetitive, restrictive behaviours and social communication impairments compared to their siblings.

Finally, the core score was calculated, which encapsulated responses to both the social communication and restrictive and repetitive behaviours domain to give an overview of the frequency and severity of total autistic traits that each child exhibited. Autistic children had a mean score of 1.7 (*SD* = 0.5), whilst non-autistic children had a mean score of 0.3 (*SD* = 0.3). There was a significant difference between mean scores, $t(284) = 27.8$, $p = <.001$. This indicates that autistic children had more frequent and severe autistic traits than their non-autistic siblings overall.

The remaining three subdomains related to behaviours that were not autistic traits themselves, but rather those which were associated with autism. The first was the mood and anxiety subdomain. Autistic children's mean score on this subdomain was 2.0 (*SD* = 0.7), and non-autistic children had a mean score of 0.8 (*SD* = 0.6). An independent samples t-test was carried out and showed a significant difference between the mean scores of the two groups, $t(284) = 14.9$, $p = <.001$. Autistic children were rated as having worse traits indicative of mood and anxiety compared to their siblings.

Next was the self-regulation subdomain, on which autistic children had a mean score of 1.9 (*SD* = 0.7) and non-autistic children had a mean score of 0.7 (*SD* = 0.8). An independent samples t-test showed a significant difference in mean scores, $t(284) = 14.3$, $p = <.001$. This shows that autistic children were rated by parents as having more impaired self-regulation than their non-autistic siblings.

Finally, on the challenging behaviour subdomain, autistic children had a mean score of 1.6 (*SD* = 0.9), whilst non-autistic children had a mean score of 0.7 (*SD* = 0.7). An independent samples t-test showed again that there was a significant difference in mean

scores between groups: $t(284) = 10.6$, $p = <.001$. This final t-test indicates that autistic children scored higher on the measure of challenging behaviour compared to their siblings.

In summary, autistic children scored significantly higher on measures of all subdomains on the ABI-S compared to their non-autistic siblings. This is consistent with expectations that autistic children show more severe autistic traits compared to their non-autistic family members, even if those family members do show traits consistent with the BAP.

	Several times a week	About once a week	2 or 3 times a month	Only ever once or twice	Never
Hit, kicked, pushed or shoved a sibling, or threatened to do this	40 (28%)	25 (18%)	23 (16%)	32 (22%)	23 (16%)
Took money or other things from a sibling, or damaged their belongings	15 (10%)	17 (12%)	16 (11%)	37 (26%)	58 (41%)
Called a sibling nasty and hateful names	36 (25%)	26 (18%)	15 (10%)	31 (22%)	35 (24%)
Made fun of a sibling in other ways	28 (20%)	33 (23%)	16 (11%)	21 (15%)	45 (31%)
Kept a sibling out of things on purpose, leaving them out of my group or completely ignoring them	16 (11%)	19 (13%)	15 (10%)	13 (9%)	80 (56%)
Spread rumours about a sibling, or tried to make others dislike them	9 (6%)	7 (5%)	7 (5%)	13 (9%)	107 (75%)
Bullied a sibling in another way	18 (13%)	6 (4%)	0 (0%)	6 (4%)	113 (79%)

Table 8a. *Types and frequency of sibling bullying behaviour perpetrated by autistic children.*

	Several times a week	About once a week	2 or 3 times a month	Only ever once or twice	Never
Hit, kicked, pushed or shoved a sibling, or threatened to do this	14 (10%)	26 (18%)	22 (15%)	36 (25%)	45 (31%)
Took money or other things from a sibling, or damaged their belongings	5 (3%)	3 (2%)	12 (8%)	32 (22%)	91 (64%)
Called a sibling nasty and hateful names	19 (13%)	20 (14%)	25 (17%)	42 (29%)	37 (26%)
Made fun of a sibling in other ways	17 (12%)	25 (17%)	24 (17%)	31 (22%)	46 (32%)
Kept a sibling out of things on purpose, leaving them out of my group or completely ignoring them	12 (8%)	14 (10%)	17 (12%)	30 (21%)	70 (49%)
Spread rumours about a sibling, or tried to make others dislike them	6 (4%)	4 (3%)	3 (2%)	17 (12%)	113 (79%)
Bullied a sibling in another way	3 (2%)	3 (2%)	3 (2%)	5 (4%)	129 (90%)

Table 8b. *Types and frequency of sibling bullying behaviour perpetrated by non-autistic children.*

5.3.4 Research question one: Is there a relationship between autistic traits in a diagnosed child and the occurrence or subtype of sibling bullying?

Do autistic children's autistic traits predict their own sibling bullying perpetration? As described above in section 5.2.5, four models were fitted to address this research question. The results of each model are described below. Tables 8a to 8d also show the results of each model in full.

Model 1: Total sibling bullying perpetrated by the autistic child and autistic traits in the autistic child. A generalised linear regression model was fitted with total sibling bullying perpetrated by autistic children as a dependent variable, and autistic traits and demographic information about the autistic child as the independent variables.

The model showed that there was no significant relationship between most of the autistic traits as assessed using the ABI-S and total sibling bullying perpetration. The only exception was that challenging behaviour was shown to be significantly positively associated with total sibling bullying perpetration (*OR* 4.28, $p < .001$). This indicates that autistic children who exhibit more challenging behaviour, such as lashing out physically or having tantrums, are more likely to engage in sibling bullying towards their non-autistic sibling.

The age and gender of autistic children were not associated with total sibling bullying rates. However, the results of the model suggest that autistic children who were born second in the birth order were significantly less likely to perpetrate sibling bullying (*OR* -3.50, $p = .006$). Being born in any other place in the family birth order was not associated with sibling bullying perpetration.

Model 2: Physical sibling bullying perpetrated by the autistic child and autistic traits in the autistic child. A multiple linear regression model was fitted to model the relationships between physical sibling bullying perpetrated by the autistic child and their autistic traits, gender, age, and place in the birth order. As is noted above, a significant

positive relationship was identified between challenging behaviour and this type of sibling bullying perpetration (*OR* 1.66, *p* <.001). No other autistic traits were related to autistic children's physical sibling bullying behaviour. Additionally, age, gender, and place in the birth order showed no association with physical sibling bullying perpetration.

Model 3: Verbal sibling bullying perpetrated by the autistic child and autistic traits in the autistic child. A second multiple linear regression model was fitted to explore how autistic traits and demographic information pertaining to the autistic child were associated with verbal sibling bullying perpetration. This model once again indicated that challenging behaviour was the only subdomain of autistic traits that was significantly associated with sibling bullying perpetrated by the autistic child (*OR* 1.39, *p* <.001).

The age and gender of the autistic child was shown to be unrelated to their perpetration of verbal sibling bullying. However, being born second in the birth order was negatively associated with verbal sibling bullying perpetration (*OR* -1.25, *p* = .022), indicating that autistic children born second in the birth order were less likely to verbally bully their siblings.

Model 4: Relational sibling bullying perpetrated by the autistic child and autistic traits in the autistic child. The final model in this group was a generalised linear regression model, fitted to investigate the relationships between autistic children's autistic traits, age, gender, and place in the birth order and physical sibling bullying perpetration. As was the case in all prior models, the only autistic trait shown to be related to autistic children's bullying perpetration was challenging behaviour (*OR* 0.76, *p* = .006).

Autistic children's ages and genders were not associated with physical sibling bullying perpetration. However, being born second (*OR* -0.95, *p* = .025) and fourth (*OR* -2.35, *p* = .018) were both identified as being negatively associated with this type of sibling

bullying, suggesting that autistic children born second or fourth in the birth order were significantly less likely to perpetrate sibling bullying than those born first.

Do autistic children's autistic traits predict their non-autistic siblings' sibling bullying perpetration? Four generalised linear regression models were fitted to answer this question. For each model, the dependent variable was a type of sibling bullying perpetrated by non-autistic children. The independent variables were identically specified as in the models described above. Tables 9a to 9d also display the results of these models in full.

Model 5: Total sibling bullying perpetrated by the non-autistic child and autistic traits in the autistic child. This model showed that none of the subtypes of autistic traits as exhibited by autistic children were associated with non-autistic children's total sibling bullying perpetration, with the exception of autistic children's challenging behaviour. Autistic children exhibiting higher rates of challenging behaviour were associated with increased rates of total sibling bullying perpetrated by their non-autistic sibling (*OR* 1.80, $p = .020$). No other variables, such as the autistic child's age, gender, or place in the birth order, was shown to impact on the likelihood of non-autistic children perpetrating total sibling bullying.

Model 6: Physical sibling bullying perpetrated by the non-autistic child and autistic traits in the autistic child. This model showed no relationships between any of the autistic traits exhibited by autistic children, including challenging behaviours, and non-autistic children's physical sibling bullying. Similarly, the autistic child's gender and place in the birth order was not related to non-autistic children's physical sibling bullying perpetration.

However, the autistic child's age was shown to be significantly negatively related to non-autistic children's physical sibling bullying (*OR* -0.16, $p = .004$), suggesting that physical sibling bullying perpetrated by non-autistic children becomes less likely as the autistic child ages.

Model 7: Verbal sibling bullying perpetrated by the non-autistic child and autistic traits in the autistic child. Autistic children's age, gender, and place in the birth order were shown to be unrelated to non-autistic children's verbal sibling bullying perpetration. Similarly, the majority of autistic traits in the autistic child were also not associated with non-autistic children's verbal sibling bullying behaviour. However, challenging behaviour exhibited by the autistic children was shown to be significantly positively related to non-autistic children's verbal sibling bullying (*OR* 0.86, $p = .012$).

Model 8: Relational sibling bullying perpetrated by the non-autistic child and autistic traits in the autistic child. The final model in this group showed no significant associations between the autistic child's autistic traits, gender, or place in the birth order and non-autistic children's relational bullying perpetration. However, the autistic child's age was negatively associated with non-autistic children's relational bullying (*OR* -0.13, $p = .015$), indicating that non-autistic children were less likely to perpetrate relational bullying as their autistic sibling grew older.

5.3.5 Research question two: Is there a relationship between autistic traits in a non-autistic and the occurrence or subtype of sibling bullying?

Do non-autistic children's autistic traits predict their autistic siblings' sibling bullying perpetration? Four generalised linear regression models were fitted to explore the relationships between non-autistic children's autistic traits, gender, age, and place in the birth order and sibling bullying perpetrated by the autistic children.

Model 9: Total sibling bullying perpetrated by the autistic child and autistic traits in the non-autistic child. This model showed no significant relationships between any autistic traits in the non-autistic child and the likelihood of autistic children perpetrating sibling bullying. Similarly, no relationship was identified between sibling bullying and non-autistic children's gender, age, or place in the birth order.

Model 10: Physical sibling bullying perpetrated by the autistic child and autistic traits in the non-autistic child. As shown by Model 9, no relationships were identified between non-autistic children's autistic traits, age, gender, or place in the birth order and autistic children's perpetration of physical sibling bullying.

Model 11: Verbal sibling bullying perpetrated by the autistic child and autistic traits in the non-autistic child. This model showed there to be a significant negative relationship between restrictive and repetitive behaviour exhibited by the non-autistic child and autistic children's perpetration of verbal sibling bullying (*OR* -1.96, $p = .040$). This suggests that non-autistic children who exhibit more restrictive and repetitive behaviours, such as adherence to routines, stimming, or sensitivity to sensory stimuli are less likely to be victims of verbal sibling bullying perpetrated by their autistic sibling.

There were no other relationships identified between any other autistic traits, non-autistic children's age, gender, or place in the birth order and verbal sibling bullying.

Model 12: Relational sibling bullying perpetrated by the autistic child and autistic traits in the non-autistic child. The final model in this group identified no significant associations between non-autistic children's autistic traits, age, gender, or place in the birth order and relational sibling bullying perpetrated by the autistic child.

Do non-autistic children's autistic traits predict their own sibling bullying perpetration? This group of four models aimed to examine the association between non-autistic children's autistic traits, age, gender, and place in the birth order and their perpetration of sibling bullying. Four generalised linear regression models were fitted, the results of which are discussed below.

Model 13: Total sibling bullying perpetrated by the non-autistic child and autistic traits in the non-autistic child. Only one independent variable was shown to be significantly associated with non-autistic children's perpetration of total sibling bullying.

This was non-autistic children's challenging behaviour, which was positively related to total sibling bullying (*OR* 4.28, *p* <.001). This indicates that non-autistic children who exhibit more challenging behaviours are more likely to engage in sibling bullying perpetration.

Model 14: Physical sibling bullying perpetrated by the non-autistic child and autistic traits in the non-autistic child. Non-autistic children's gender and place in the birth order was found not to be related to their perpetration of physical sibling bullying. However, non-autistic children's ages were shown to be negatively associated with this type of bullying behaviour (*OR* -0.11, *p* = .023), indicating that non-autistic children are less likely to engage in physical sibling bullying as they grow older. Additionally, although the majority of autistic traits were shown not to be associated with physical sibling bullying perpetration, non-autistic children's challenging behaviour was identified to be positively significantly related to their physical sibling bullying behaviour (*OR* 1.64, *p* <.001).

Model 15: Verbal sibling bullying perpetrated by the non-autistic child and autistic traits in the non-autistic child. Non-autistic children's age, gender, and place in the birth order were shown to be unrelated to their perpetration of verbal sibling bullying. However, challenging behaviour was identified as being positively associated with non-autistic children's verbal sibling bullying perpetration (*OR* 1.75, *p* <.001). This was the only autistic trait shown to be related to this form of sibling bullying.

Model 16: Relational sibling bullying perpetrated by the non-autistic child and autistic traits in the non-autistic child. As above, non-autistic children's age, gender, place in the birth order, and the majority of autistic traits were shown not to be associated with non-autistic children's relational sibling bullying. Challenging behaviour was, once again, shown to be significantly positively associated with non-autistic children's relational sibling bullying (*OR* 0.70, *p* = .018).

5.3.6 Research question 3: Is there a relationship between additional SEND diagnoses of an autistic child and the occurrence or subtype of sibling bullying?

To address the third and final research question, two groups of models were fitted. Each model was specified to examine relationships between individual SEND diagnoses and sibling bullying behaviour, either perpetrated by the autistic or non-autistic child.

Do specific SEND diagnoses predict autistic children's sibling bullying perpetration? The first group of four models had autistic children's sibling bullying behaviour as dependent variables. The aforementioned dummy variables, which denoted whether the autistic child did or did not have a diagnosis of a specific additional SEND, were included in every model as independent variables.

Model 17: Total sibling bullying perpetrated by the autistic child and SEND diagnoses. This generalised linear model showed that five of the SENDs included on the list were associated with total sibling bullying perpetrated by autistic children. Autistic children were shown to be more likely to perpetrate sibling bullying if they had a physical disability (*OR* 8.24, $p = .010$) or a speech disorder or impediment (*OR* 4.80, $p = .012$). Alternatively, autistic children who had a diagnosis of DLD (*OR* -4.86, $p = .009$), GDD (*OR* -3.70, $p = .048$) or a sensory processing disorder (*OR* -2.80, $p = .034$) were found to be less likely to perpetrate sibling bullying. No other SEND diagnosis was found to be associated with total sibling bullying perpetration rates.

Model 18: Physical sibling bullying perpetrated by the autistic child and SEND diagnoses. A multiple linear regression model indicated that autistic children who had a diagnosis of a physical disability (*OR* 2.75, $p = .017$) or a speech disorder or impediment (*OR* 1.90, $p = .006$) were more likely to perpetrate physical sibling bullying. However, a diagnosis of sensory processing disorder was significantly negatively related to autistic children's

physical sibling bullying perpetration (*OR* -1.37, $p = .004$), suggesting that autistic children with this disorder were less likely to engage in physical sibling bullying.

Model 19: Verbal sibling bullying perpetrated by the autistic child and SEND diagnoses. A second multiple linear regression model was fitted to examine the relationships between autistic children's additional SEND diagnoses and their verbal sibling bullying perpetration. Three SENDs were found to be significantly negatively associated with verbal sibling bullying perpetration. These were DLD (*OR* -2.99, $p < .001$), GDD (*OR* -2.46, $p = .001$), and sensory processing disorders (*OR* -1.67, $p = .023$). This indicates that autistic children with a diagnosis of DLD, GDD or a sensory processing disorder are less likely to engage in perpetrating verbal bullying towards a sibling.

Model 20: Relational sibling bullying perpetrated by the autistic child and SEND diagnoses. Finally, a generalised linear model was fitted to explore relationships between SEND diagnoses and relational sibling bullying perpetration. Results indicate that autistic children with a physical disability (*OR* 2.51, $p = .011$) or a speech disorder or impediment (*OR* 1.44, $p = .014$) are less likely to perpetrate relational sibling bullying.

Do specific SEND diagnoses predict non-autistic children's sibling bullying perpetration? In this final group of four generalised linear models, dependent variables were sibling bullying behaviours perpetrated by the non-autistic child. Independent variables in each model were, as described above, the dummy variables which indicated whether or not the autistic child had a diagnosis of each SEND.

Model 21: Total sibling bullying perpetrated by the non-autistic child and SEND diagnoses. This model showed no relationships between any additional SEND diagnoses and the non-autistic child's total sibling bullying perpetration. This suggests that autistic children who had additional SEND diagnoses were neither more or less likely to be bullied by their non-autistic sibling.

Model 22: Physical sibling bullying perpetrated by the non-autistic child and SEND diagnoses. As above, no SEND diagnoses were shown to be related to the non-autistic child's physical sibling bullying perpetration.

Model 23: Verbal sibling bullying perpetrated by the non-autistic child and SEND diagnoses. One SEND diagnosis was shown to be significantly negatively related to the non-autistic child's perpetration of verbal sibling bullying. This was DLD (*OR* -1.44, p = .033), which suggests that autistic children having DLD meant that they were less likely to be verbally bullied by their non-autistic sibling.

Model 24: Relational sibling bullying perpetrated by the non-autistic child and SEND diagnoses. Finally, only one SEND was associated with relational sibling bullying perpetrated by the non-autistic child. Autistic children who had a speech disorder or impediment were found to be more likely to be relationally bullied by their non-autistic sibling (*OR* 1.13, p = .043).

Model	Outcome	Predictor	Odds Ratio (95% confidence intervals)	*P*
1	**Total sibling bullying perpetrated by the autistic child**	Autistic Child Mood and Anxiety	0.72 [-1.20, 2.64]	.465
		Autistic Child Social Communication	-0.94 [-3.07, 1.18]	.385
		Autistic Child Restrictive and Repetitive Behaviour	-0.38 [-2.87, 2.10]	.763
		Autistic Child Self-Regulation	0.48 [-1.51, 2.47]	.635
		Autistic Child Challenging Behaviour	4.28 [2.64, 5.92]	.000
		Autistic Child Age	-0.13 [-0.47, 0.22]	.466
		Autistic Child Second in Birth Order	-3.50 [-6.01, -0.99]	.006
		Autistic Child Third in Birth Order	-0.45 [-3.90, 3.00]	.797
		Autistic Child Fourth in Birth Order	-5.63 [-11.54, 0.28]	.062
		Autistic Child Fifth in Birth Order	2.56 [-10.03, 15.15]	.690
		Autistic Child Female	2.20 [-0.52, 4.91]	.113

Table 9a. *Indicating the relationship between autistic children's autistic traits and their own total perpetration of sibling bullying.*

Model	Outcome	Predictor	Odds Ratio (95% confidence intervals)	*P*
2	**Physical sibling bullying perpetrated by the autistic child**	Autistic Child Mood and Anxiety	0.22 [-0.88, 0.43]	.500
		Autistic Child Social Communication	0.08 [-0.65, 0.80]	.833
		Autistic Child Restrictive and Repetitive Behaviour	0.13 [-0.72, 0.98]	.759
		Autistic Child Self-Regulation	0.23 [-0.45, 0.90]	.512
		Autistic Child Challenging Behaviour	1.66 [1.10, 2.22]	.000
		Autistic Child Age	-0.07 [-0.19, 0.05]	.241
		Autistic Child Second in Birth Order	-0.41 [-1.27, 0.44]	.339
		Autistic Child Third in Birth Order	0.51 [-0.67, 1.68]	.394
		Autistic Child Fourth in Birth Order	-1.11 [-3.12, 0.91]	.279
		Autistic Child Fifth in Birth Order	2.17 [-2.12, 6.46]	.319
		Autistic Child Female	0.55 [-0.37, 1.48]	.239

Table 9b. *Indicating the relationship between autistic children's autistic traits and their own perpetration of physical sibling bullying.*

Model	Outcome	Predictor	Odds Ratio (95% confidence intervals)	*P*
3	**Verbal sibling bullying perpetrated by the autistic child**	Autistic Child Mood and Anxiety	0.50 [-0.32, 1.32]	.229
		Autistic Child Social Communication	-0.64 [-1.54, 0.27]	.168
		Autistic Child Restrictive and Repetitive Behaviour	-0.73 [-1.79, 0.34]	.179
		Autistic Child Self-Regulation	0.10 [-0.75, 0.95]	.813
		Autistic Child Challenging Behaviour	1.39 [0.69, 2.09]	.000
		Autistic Child Age	0.04 [-0.10, 0.19]	.569
		Autistic Child Second in Birth Order	-1.25 [-2.32, 0.18]	.022
		Autistic Child Third in Birth Order	-0.74 [-2.21, 0.74]	.324
		Autistic Child Fourth in Birth Order	-1.19 [-3.72, 1.33]	.352
		Autistic Child Fifth in Birth Order	2.96 [-2.42, 8.34]	.278
		Autistic Child Female	1.10 [-0.06, 2.26]	.062

Table 9c. *Indicating the relationship between autistic children's autistic traits and their own perpetration of verbal sibling bullying.*

Model	Outcome	Predictor	Odds Ratio (95% confidence intervals)	*P*
4	**Relational sibling bullying perpetrated by the autistic child**	Autistic Child Mood and Anxiety	0.46 [-0.17, 1.10]	.153
		Autistic Child Social Communication	0.27 [-0.97, 0.43]	.452
		Autistic Child Restrictive and Repetitive Behaviour	0.01 [-0.81, 0.83]	.979
		Autistic Child Self-Regulation	0.22 [-0.44, 0.87]	.522
		Autistic Child Challenging Behaviour	0.76 [0.22, 1.30]	.006
		Autistic Child Age	0.05 [-0.16, 0.07]	.430
		Autistic Child Second in Birth Order	-0.95 [-1.78, 0.12]	.025
		Autistic Child Third in Birth Order	0.31 [-1.45, 0.83]	.594
		Autistic Child Fourth in Birth Order	-2.35 [-4.30, 0.40]	.018
		Autistic Child Fifth in Birth Order	-1.41 [-5.57, 2.75]	.507
		Autistic Child Female	0.39 [-0.51, 1.28]	.398

Table 9d. *Indicating the relationship between autistic children's autistic traits and their own perpetration of relational bullying.*

Model	Outcome	Predictor	Odds Ratio (95% confidence intervals)	*P*
5	**Total sibling bullying perpetrated by the non-autistic child**	Autistic Child Mood and Anxiety	0.47 [-1.31, 2.25]	.605
		Autistic Child Social Communication	0.57 [-1.40, 2.54]	.573
		Autistic Child Restrictive and Repetitive Behaviour	-1.58 [-3.89, 0.73]	.180
		Autistic Child Self-Regulation	-0.46 [-2.31, 1.38]	.623
		Autistic Child Challenging Behaviour	1.80 [0.28, 3.32]	.020
		Autistic Child Age	-0.31 [-0.63, 0.01]	.055
		Autistic Child Second in Birth Order	-1.02 [-3.35, 1.31]	.390
		Autistic Child Third in Birth Order	0.59 [-2.61, 3.80]	.716
		Autistic Child Fourth in Birth Order	-1.03 [-6.51, 4.45]	.712
		Autistic Child Fifth in Birth Order	-4.03 [-15.71, 7.65]	.499
		Autistic Child Female	1.37 [-1.15, 3.89]	.286

Table 10a. *Indicating the relationship between autistic children's autistic traits and non-autistic children's perpetration of total sibling bullying.*

Model	Outcome	Predictor	Odds Ratio (95% confidence intervals)	*P*
6	**Physical sibling bullying perpetrated by the non-autistic child**	Autistic Child Mood and Anxiety	0.04 [-0.58, 0.66]	.900
		Autistic Child Social Communication	0.22 [-0.47, 0.90]	.539
		Autistic Child Restrictive and Repetitive Behaviour	-0.23 [-1.03, 0.57]	.575
		Autistic Child Self-Regulation	-0.25 [-0.89, 0.39]	.447
		Autistic Child Challenging Behaviour	0.42 [-0.11, 0.95]	.121
		Autistic Child Age	-0.16 [-0.28, 0.53]	.004
		Autistic Child Second in Birth Order	0.68 [-1.49, 0.13]	.097
		Autistic Child Third in Birth Order	-0.37 [-1.48, 0.74]	.513
		Autistic Child Fourth in Birth Order	0.13 [-1.77, 2.04]	.891
		Autistic Child Fifth in Birth Order	-1.85 [-5.92, 2.21]	.371
		Autistic Child Female	0.18 [-0.69, 1.06]	.686

Table 10b. *Indicating the relationship between autistic children's autistic traits and non-autistic children's perpetration of physical sibling bullying.*

Model	Outcome	Predictor	Odds Ratio (95% confidence intervals)	*P*
7	**Verbal sibling bullying perpetrated by the non-autistic child**	Autistic Child Mood and Anxiety	0.25 [-0.54, 1.03]	.538
		Autistic Child Social Communication	-0.03 [0.90, 0.84]	.944
		Autistic Child Restrictive and Repetitive Behaviour	-0.88 [-1.90, 0.13]	.088
		Autistic Child Self-Regulation	-0.09 [-0.90, 0.72]	.822
		Autistic Child Challenging Behaviour	0.86 [0.19, 1.53]	.012
		Autistic Child Age	0.02 [-0.12, 0.16]	.791
		Autistic Child Second in Birth Order	-0.13 [-1.15, 0.89]	.803
		Autistic Child Third in Birth Order	0.32 [-1.09, 1.73]	.657
		Autistic Child Fourth in Birth Order	-1.33 [-3.74, 1.07]	.277
		Autistic Child Fifth in Birth Order	-1.32 [-6.45, 3.81]	.614
		Autistic Child Female	0.48 [-0.63, 1.58]	.400

Table 10c. *Indicating the relationship between autistic children's autistic traits and non-autistic children's perpetration of verbal sibling bullying.*

Model	Outcome	Predictor	Odds Ratio (95% confidence intervals)	*P*
8	**Relational sibling bullying perpetrated by the non-autistic child**	Autistic Child Mood and Anxiety	0.18 [-0.42, 0.79]	.553
		Autistic Child Social Communication	0.36 [-0.31, 1.02]	.296
		Autistic Child Restrictive and Repetitive Behaviour	0.51 [-1.29, 0.27]	.203
		Autistic Child Self-Regulation	0.07 [-0.55, 0.70]	.814
		Autistic Child Challenging Behaviour	0.39 [-0.13, 0.90]	.140
		Autistic Child Age	-0.13 [-0.24, 0.03]	.015
		Autistic Child Second in Birth Order	-0.15 [-0.93, 0.64]	.715
		Autistic Child Third in Birth Order	0.80 [-0.28, 1.88]	.147
		Autistic Child Fourth in Birth Order	0.34 [-1.51, 2.20]	.716
		Autistic Child Fifth in Birth Order	-0.64 [-4.59, 3.31]	.751
		Autistic Child Female	0.55 [0.30, 1.40]	.208

Table 10d. *Indicating the relationship between autistic children's autistic traits and non-autistic children's perpetration of relational sibling bullying.*

Model	Outcome	Predictor	Odds Ratio (95% confidence intervals)	*P*
9	**Total sibling bullying perpetrated by the autistic child**	Non-Autistic Child Mood and Anxiety	-0.66 [-3.27, 1.95]	.620
		Non-Autistic Child Social Communication	0.11 [-4.57, 4.79]	.964
		Non-Autistic Child Restrictive and Repetitive Behaviour	-0.19 [-4.95, 4.56]	.937
		Non-Autistic Child Self-Regulation	1.03 [-1.16, 3.21]	.359
		Non-Autistic Child Challenging Behaviour	1.62 [-0.62, 3.86]	.157
		Non-Autistic Child Age	-0.21 [-0.61, 0.18]	.283
		Non-Autistic Child Female	0.05 [-2.43, 2.53]	.971
		Non-Autistic Child Second in Birth Order	0.51 [-2.18, 3.21]	.710
		Non-Autistic Child Third in Birth Order	-1.24 [-5.43, 2.95]	.562

Table 11a. *Indicating the relationship between non-autistic children's autistic traits and autistic children's perpetration of total sibling bullying.*

Model	Outcome	Predictor	Odds Ratio (95% confidence intervals)	*P*
10	**Physical sibling bullying perpetrated by the autistic child**	Non-Autistic Child Mood and Anxiety	-0.34 [-1.26, 0.59]	.475
		Non-Autistic Child Social Communication	-0.16 [-1.81, 1.50]	.853
		Non-Autistic Child Restrictive and Repetitive Behaviour	0.38 [-1.30, 2.06]	.656
		Non-Autistic Child Self-Regulation	0.20 [-0.57, 0.97]	.612
		Non-Autistic Child Challenging Behaviour	0.37 [-0.42, 1.16]	.359
		Non-Autistic Child Age	-0.11 [-0.25, 0.31]	.129
		Non-Autistic Child Female	0.02 [-0.85, 0.90]	.961
		Non-Autistic Child Second in Birth Order	0.26 [-1.22, 0.69]	.588
		Non-Autistic Child Third in Birth Order	-0.57 [-2.05, 0.92]	.454

Table 11b. *Indicating the relationship between non-autistic children's autistic traits and autistic children's perpetration of physical sibling bullying.*

Model	Outcome	Predictor	Odds Ratio (95% confidence intervals)	*P*
11	**Verbal sibling bullying perpetrated by the autistic child**	Non-Autistic Child Mood and Anxiety	-0.04 [-1.07, 0.98]	.932
		Non-Autistic Child Social Communication	1.04 [-0.81, 2.88]	.270
		Non-Autistic Child Restrictive and Repetitive Behaviour	-1.96 [-3.83, 0.09]	.040
		Non-Autistic Child Self-Regulation	0.68 [-0.18, 1.54]	.122
		Non-Autistic Child Challenging Behaviour	0.76 [-0.13, 1.64]	.093
		Non-Autistic Child Age	-0.01 [-0.16, 0.15]	.915
		Non-Autistic Child Female	0.22 [-0.76, 1.20]	.657
		Non-Autistic Child Second in Birth Order	0.09 [-0.98, 1.15]	.875
		Non-Autistic Child Third in Birth Order	0.02 [-1.63, 1.67]	.980

Table 11c. *Indicating the relationship between non-autistic children's autistic traits and autistic children's perpetration of verbal sibling bullying.*

Model	Outcome	Predictor	Odds Ratio (95% confidence intervals)	*P*
12	**Relational sibling bullying perpetrated by the autistic child**	Non-Autistic Child Mood and Anxiety	0.10 [0.70, 0.90]	.807
		Non-Autistic Child Social Communication	-0.58 [-2.02, 0.86]	.428
		Non-Autistic Child Restrictive and Repetitive Behaviour	0.68 [-0.78, 2.15]	.361
		Non-Autistic Child Self-Regulation	0.11 [-0.57, 0.78]	.752
		Non-Autistic Child Challenging Behaviour	0.34 [-0.35, 1.03]	.334
		Non-Autistic Child Age	-0.08 [-0.20, 0.04]	.216
		Non-Autistic Child Female	-0.24 [-1.00, 0.53]	.544
		Non-Autistic Child Second in Birth Order	0.27 [-0.56, 1.10]	.525
		Non-Autistic Child Third in Birth Order	-0.54 [-1.84, 0.75]	.409

Table 11d. *Indicating the relationship between non-autistic children's autistic traits and autistic children's perpetration of relational sibling bullying.*

Model	Outcome	Predictor	Odds Ratio (95% confidence intervals)	*P*
13	**Total sibling bullying perpetrated by the non-autistic child**	Non-Autistic Child Mood and Anxiety	0.16 [-1.73, 2.05]	.867
		Non-Autistic Child Social Communication	-1.15 [-4.53, 2.24]	.507
		Non-Autistic Child Restrictive and Repetitive Behaviour	-0.43 [-3.87, 3.01]	.807
		Non-Autistic Child Self-Regulation	-0.03 [-1.61, 1.56]	.972
		Non-Autistic Child Challenging Behaviour	4.28 [2.66, 5.90]	.000
		Non-Autistic Child Age	-0.12 [-0.41, 0.16]	.396
		Non-Autistic Child Female	-0.60 [-2.39, 1.20]	.515
		Non-Autistic Child Second in Birth Order	0.85 [-2.80, 1.10]	.390
		Non-Autistic Child Third in Birth Order	-0.47 [-3.50, 2.56]	.761
		Non-Autistic Child Mood and Anxiety	0.16 [-1.73, 2.05]	.867
		Non-Autistic Child Social Communication	-1.15 [-4.53, 2.24]	.507

Table 12a. *Indicating the relationship between non-autistic children's autistic traits and non-autistic children's perpetration of total sibling bullying.*

Model	Outcome	Predictor	Odds Ratio (95% confidence intervals)	*P*
14	**Physical sibling bullying perpetrated by the non-autistic child**	Non-Autistic Child Mood and Anxiety	-0.34 [-0.95, 0.27]	.269
		Non-Autistic Child Social Communication	-0.12 [-1.21, 0.97]	.828
		Non-Autistic Child Restrictive and Repetitive Behaviour	0.50 [-0.61, 1.61]	.380
		Non-Autistic Child Self-Regulation	-0.12 [-0.63, 0.39]	.645
		Non-Autistic Child Challenging Behaviour	1.64 [1.12, 2.17]	.000
		Non-Autistic Child Age	-0.11 [-0.20, -0.01]	.023
		Non-Autistic Child Female	-0.14 [-0.72, 0.44]	.627
		Non-Autistic Child Second in Birth Order	-0.16 [-0.79, 0.47]	.625
		Non-Autistic Child Third in Birth Order	-0.33 [-1.31, 0.65]	.509

Table 12b. *Indicating the relationship between non-autistic children's autistic traits and non-autistic children's perpetration of physical sibling bullying.*

Model	Outcome	Predictor	Odds Ratio (95% confidence intervals)	*P*
15	**Verbal sibling bullying perpetrated by the non-autistic child**	Non-Autistic Child Mood and Anxiety	0.53 [0.32, 1.37]	.222
		Non-Autistic Child Social Communication	-0.61 [-2.12, 0.91]	.432
		Non-Autistic Child Restrictive and Repetitive Behaviour	-0.99 [-2.53, 0.55]	.209
		Non-Autistic Child Self-Regulation	0.07 [-0.64, 0.78]	.839
		Non-Autistic Child Challenging Behaviour	1.75 [1.03, 2.48]	.000
		Non-Autistic Child Age	0.02 [-0.11, 0.14]	.813
		Non-Autistic Child Female	-0.37 [-1.18, 0.43]	.364
		Non-Autistic Child Second in Birth Order	-0.24 [-1.11, 0.63]	.592
		Non-Autistic Child Third in Birth Order	0.85 [-0.51, 2.21]	.218

Table 12c. *Indicating the relationship between non-autistic children's autistic traits and non-autistic children's perpetration of verbal sibling bullying.*

Model	Outcome	Predictor	Odds Ratio (95% confidence intervals)	*P*
16	**Relational sibling bullying perpetrated by the non-autistic child**	Non-Autistic Child Mood and Anxiety	0.28 [0.39, 0.96]	.409
		Non-Autistic Child Social Communication	-0.40 [-1.60, -0.81]	.521
		Non-Autistic Child Restrictive and Repetitive Behaviour	0.01 [-1.22, 1.24]	.987
		Non-Autistic Child Self-Regulation	-0.03 [-0.60, 0.53]	.909
		Non-Autistic Child Challenging Behaviour	0.70 [0.12, 1.28]	.018
		Non-Autistic Child Age	-0.03 [-0.13, 0.07]	.548
		Non-Autistic Child Female	-0.05 [-0.70, -0.59]	.867
		Non-Autistic Child Second in Birth Order	0.33 [-1.03, 0.36]	.346
		Non-Autistic Child Third in Birth Order	-0.91 [-1.99, 0.17]	.100

Table 12d. *Indicating the relationship between non-autistic children's autistic traits and non-autistic children's perpetration of relational sibling bullying.*

Model	Outcome	Predictor	Odds Ratio (95% confidence intervals)	*P*
17	**Total sibling bullying perpetrated by the autistic child**	ADHD	1.26 [-1.70, 4.22]	.404
		ADD	1.84 [-2.16, 5.84]	.367
		DCD	-1.17 [-5.89, 3.55]	.628
		Dyslexia	2.19 [-3.45, 7.84]	.447
		DLD	-4.86 [-8.52, -1.19]	.009
		GDD	-3.70 [-7.37, 0.04]	.048
		Physical disability	8.24 [1.97, 14.50]	.010
		Sensory processing disorder	-2.80 [-5.39, 0.21]	.034
		Speech disorder or impediment	4.80 [1.07, 8.54]	.012
		Social, Emotional, or Mental Health Difficulties	0.65 [-3.20, 1.90]	.617
		Visual Impairments	3.85 [-2.52, 10.21]	.236
		Other SEND	0.32 [-2.79, 3.43]	.841

Table 13a. *Indicating the relationship between autistic children's additional SEND diagnoses and autistic children's perpetration of total sibling bullying.*

Model	Outcome	Predictor	Odds Ratio (95% confidence intervals)	*P*
18	**Physical sibling bullying perpetrated by the autistic child**	ADHD	0.87 [-0.19, 1.93]	.107
		ADD	0.40 [-1.03, 1.83]	.581
		DCD	0.20 [-1.49, 1.89]	.815
		Dyslexia	0.11 [-1.90, 2.13]	.911
		DLD	0.80 [-2.11, 0.51]	.229
		GDD	-0.15 [-1.46, 1.16]	.817
		Physical disability	2.75 [0.51, 4.99]	.017
		Sensory processing disorder	-1.37 [-2.30, -0.45]	.004
		Speech disorder or impediment	1.90 [0.57, 3.24]	.006
		Social, Emotional, or Mental Health Difficulties	-0.45 [-1.36, 0.47]	.336
		Visual Impairments	1.20 [-1.07, 3.48]	.298
		Other SEND	-0.11 [-1.22, 1.00]	.844

Table 13b. *Indicating the relationship between autistic children's additional SEND diagnoses and autistic children's perpetration of physical sibling bullying.*

Model	Outcome	Predictor	Odds Ratio (95% confidence intervals)	*P*
19	**Verbal sibling bullying perpetrated by the autistic child**	ADHD	0.35 [0.80, 1.49]	.551
		ADD	0.23 [-1.31, 1.78]	.767
		DCD	-0.71 [-1.89, 1.75]	.939
		Dyslexia	0.12 [-2.06, 2.30]	.916
		DLD	-2.99 [-4.41, -1.58]	.000
		GDD	-2.46 [-3.87, -1.04]	.001
		Physical disability	2.05 [-0.37, 4.47]	.096
		Sensory processing disorder	-1.17 [-2.17, -0.16]	.023
		Speech disorder or impediment	0.88 [-0.56, 2.33]	.228
		Social, Emotional, or Mental Health Difficulties	-0.15 [-1.14, 0.83]	.759
		Visual Impairments	0.84 [-1.62, 3.29]	.502
		Other SEND	-0.43 [-1.63, 0.77]	.483

Table 13c. *Indicating the relationship between autistic children's additional SEND diagnoses and autistic children's perpetration of verbal sibling bullying.*

Model	Outcome	Predictor	Odds Ratio (95% confidence intervals)	*P*
20	**Relational sibling bullying perpetrated by the autistic child**	ADHD	0.10 [-1.01, 0.81]	.822
		ADD	0.66 [-0.57, 1.89]	.291
		DCD	0.84 [-2.29, 0.61]	.256
		Dyslexia	1.68 [-0.06, 3.41]	.058
		DLD	-1.05 [-2.18, 0.08]	.068
		GDD	-1.11 [-2.24, 0.01]	.053
		Physical disability	2.51 [0.58, 4.43]	.011
		Sensory processing disorder	-0.29 [-1.09, 0.50]	.470
		Speech disorder or impediment	1.44 [0.29, 2.58]	.014
		Social, Emotional, or Mental Health Difficulties	-0.09 [-0.88, 0.69]	.821
		Visual Impairments	0.80 [-1.15, 2.76]	.420
		Other SEND	0.57 [0.38, 1.53]	.241

Table 13d. *Indicating the relationship between autistic children's additional SEND diagnoses and autistic children's perpetration of relational sibling bullying.*

Model	Outcome	Predictor	Odds Ratio (95% confidence intervals)	*P*
21	**Total sibling bullying perpetrated by the non-autistic child**	ADHD	0.94 [-1.54, 3.43]	.457
		ADD	2.30 [-1.06, 5.67]	.179
		DCD	1.38 [-2.58, 5.34]	.495
		Dyslexia	-1.51 [-6.26, 3.23]	.532
		DLD	-2.22 [-5.30, 0.86]	.157
		GDD	-0.46 [-3.54, 2.62]	.769
		Physical disability	-0.33 [-5.60, 4.93]	.901
		Sensory processing disorder	-1.59 [-3.77, 0.59]	.152
		Speech disorder or impediment	2.62 [-0.52, 5.76]	.102
		Social, Emotional, or Mental Health Difficulties	1.64 [0.50, 3.79]	.133
		Visual Impairments	2.85 [-2.50, 8.19]	.297
		Other SEND	1.66 [-0.96, 4.27]	.214

Table 14a. *Indicating the relationship between autistic children's additional SEND diagnoses and non-autistic children's perpetration of total sibling bullying.*

Model	Outcome	Predictor	Odds Ratio (95% confidence intervals)	*P*
22	**Physical sibling bullying perpetrated by the non-autistic child**	ADHD	0.13 [-0.74, 1.00]	.774
		ADD	0.59 [-0.59, 1.76]	.328
		DCD	1.03 [-0.35, 2.42]	.143
		Dyslexia	0.10 [-1.76, 1.55]	.905
		DLD	-0.65 [-1.73, 0.42]	.232
		GDD	-0.16 [-1.23, 0.92]	.775
		Physical disability	-0.66 [-2.50, 1.18]	.482
		Sensory processing disorder	-0.44 [-1.20, 0.32]	.254
		Speech disorder or impediment	0.89 [-0.21, 1.98]	.113
		Social, Emotional, or Mental Health Difficulties	0.59 [-0.16, 1.34]	.123
		Visual Impairments	0.15 [-1.71, 2.02]	.871
		Other SEND	0.61 [-0.30, 1.52]	.189

Table 14b. *Indicating the relationship between autistic children's additional SEND diagnoses and non-autistic children's perpetration of physical sibling bullying.*

Model	Outcome	Predictor	Odds Ratio (95% confidence intervals)	*P*
23	**Verbal sibling bullying perpetrated by the non-autistic child**	ADHD	0.48 [-0.59, 1.55]	.382
		ADD	0.75 [-0.69, 2.20]	.308
		DCD	0.66 [-1.04, 2.36]	.449
		Dyslexia	-1.59 [-3.63, 0.44]	.125
		DLD	-1.44 [-2.77, -0.12]	.033
		GDD	-0.41 [-1.73, 0.92]	.547
		Physical disability	-0.41 [-2.68, 1.85]	.721
		Sensory processing disorder	-0.90 [-1.84, 0.03]	.058
		Speech disorder or impediment	0.41 [-0.94, 1.76]	.552
		Social, Emotional, or Mental Health Difficulties	0.61 [-0.31, 1.54]	.192
		Visual Impairments	1.03 [-1.27, 3.33]	.380
		Other SEND	0.41 [-0.71, 1.54]	.473

Table 14c. *Indicating the relationship between autistic children's additional SEND diagnoses and non-autistic children's perpetration of verbal sibling bullying.*

Model	Outcome	Predictor	Odds Ratio (95% confidence intervals)	*P*
24	**Relational sibling bullying perpetrated by the non-autistic child**	ADHD	0.26 [-0.60, 1.13]	.555
		ADD	0.68 [-0.49, 1.85]	.256
		DCD	-0.15 [-1.53, 1.23]	.833
		Dyslexia	-0.38 [-1.69, 1.61]	.964
		DLD	0.01 [-1.06, 1.08]	.991
		GDD	0.12 [-0.95, 1.19]	.820
		Physical disability	0.67 [-1.16, 2.50]	.472
		Sensory processing disorder	0.24 [-1.00, 0.52]	.533
		Speech disorder or impediment	1.13 [0.04, 2.22]	.043
		Social, Emotional, or Mental Health Difficulties	0.53 [-0.21, 1.28]	.160
		Visual Impairments	1.13 [-0.73, 2.98]	.235
		Other SEND	0.63 [-0.28, 1.53]	.177

Table 14d. *Indicating the relationship between autistic children's additional SEND diagnoses and non-autistic children's perpetration of relational sibling bullying.*

5.4 Discussion

5.4.1 Research question one: Is there a relationship between autistic traits in a diagnosed child and the occurrence or subtype of sibling bullying?

Do autistic children's autistic traits predict their own sibling bullying perpetration?

Autistic traits. Findings indicate that higher rates of challenging behaviour exhibited by autistic children was a significant predictor of total, physical, verbal, and relational sibling bullying perpetrated by the autistic child. Challenging behaviour, as identified using the ABI-S subdomain, is a measure of how frequently a child exhibits aggressive behaviours. These behaviours include physical aggression towards others, reactive aggression, and having temper outbursts. This finding suggests that autistic children who frequently have outbursts of aggression or anger are more likely to bully their siblings.

The relationship between scores on this subdomain and the measure of physical or verbal bullying perpetration appears logical. The items in the questionnaire reflect behaviours that may be directly identified as sibling bullying, such as physical aggression, or perhaps lashing out when the child is upset. The measures of challenging behaviour and sibling bullying used here may, therefore, be measures of the same behaviour.

However, it is noteworthy that autistic children who scored higher on this subdomain were also more likely to perpetrate relational sibling bullying. Relational bullying includes behaviour such as spreading rumours, excluding the victim from social activities, or isolating the victimised party. It is evident from existing literature that children who express anger are more likely to bully their peers and to act aggressively (Rieffe et al., 2012). Relational bullying, however, is more exclusionary than aggressive in nature, involving behaviours such as exclusion, or attempting to harm another party's social status by spreading rumours or lies. This finding could be explained as a reflection of a general pattern of anti-social behaviour. It

may be that autistic children who are more aggressive and lash out more frequently are likely to act anti-socially: this behaviour may extend beyond physical and verbal bullying and encompass the perpetration of relational bullying.

A second point of importance is that no other autistic traits exhibited by the autistic child were associated with rates of sibling bullying perpetrated by the autistic child. This conflicts with the idea that autistic children, who may struggle to understand social processes (Frith & Hill, 2003), are likely to perpetrate bullying, perhaps even unintentionally. Previous research has shown that autistic children who experience social communication deficits are more likely to be aggressive towards peers (Dominick et al., 2007; Kanne & Mazurek, 2010; van Roekel et al., 2010). Researchers have suggested that this is because autistic children with limited understanding of social situations may have difficulty in comprehending the consequences of their bullying behaviour. However, the results of this study indicate that, unlike peer bullying, sibling bullying is not associated with an autistic child's differences in social interpretation. This suggests that the family setting is notably distinct from other settings. It may be that autistic children are better at interpreting social cues from family members, and therefore may be better at identifying the effects of bullying behaviour directed towards a sibling. This is an area of focus for further research, which should aim to investigate the role of the familial context in nullifying the impact of autistic children's social communication deficits on their sibling bullying behaviours.

To conclude, autistic children who exhibit challenging behaviours are more likely to perpetrate physical, verbal, relational, and total sibling bullying. This appears consistent with the definition of challenging behaviour used in the present study, and suggests that autistic children who exhibit aggressive behaviours are likely to direct them towards their sibling. However, no other autistic traits were shown to be associated with rates of autistic children's sibling bullying perpetration. This clashes with findings from research investigating the role

of autistic children's traits in their peer bullying perpetration. Further research should aim to study the role of the family setting in mitigating this association.

Demographic factors. No relationship was found between autistic children's gender or age and their perpetration of any type of sibling bullying. This is noteworthy, as previous research conducted with the general population has consistently identified gender differences in sibling bullying perpetration. Researchers have reported that boys in the general population are more likely to perpetrate sibling bullying than girls (Olweus, 1994; Menesini et al., 2010; Toseeb et al., 2018). This finding is explained by some as being related to inherent differences between sexes. Olweus (1994) describes that there are gender differences with "biological and social/environmental roots" (p.1177) that contribute to differential rates of bullying perpetration between boys and girls. Boys are frequently described as being more aggressive and tougher (Maccoby, 1986) than their female counterparts.

However, the results of this study echo the findings presented in Chapter 4. Both studies in this thesis have identified that there is no gender difference in autistic children's perpetration of sibling bullying behaviour. Research by Fink et al. (2018) on peer bullying rates also identified an absence of a gender difference in perpetration within samples of autistic children. Indeed, studies investigating gender roles in autistic participants have found an absence of sex differences in typically gendered behaviours in these samples (Bejerot & Eriksson, 2014). This may be further evidence, therefore, of a lack of typical gender role observation in autistic people.

Additionally, it is surprising that no association was found between autistic children's age and their perpetration of sibling bullying. Researchers have consistently reported that, for children in the general population, perpetration of both peer (Nansel et al., 2001) and sibling bullying (Eriksen & Jensen, 2006; Tippett & Wolke, 2014) decrease significantly with age. Tremblay et al. (2004) suggest that this is because younger children find it difficult to

regulate their use of aggression, and that as children age, they develop the ability to control their aggressive impulses. Another author writes that as verbal and social skills develop with age, "children are able to articulate their wants and concerns without resorting as frequently to aversive strategies" (Craig & Pepler, 2003; p.578). As discussed above, autistic children frequently show aggressive behaviours towards others (Mazurek et al., 2013). However, autism is characterised by delays in social and communicative development (American Psychiatric Association, 2013). This may explain why autistic children do not follow the pattern of a reduction in sibling bullying with age like their non-autistic peers: unlike their peers, they may be less able to find alternative methods to communicate without resorting to aggressive behaviour. It may shed light on this finding to investigate whether autistic children's use of aggressive behaviours do change or are static over time. Unfortunately, however, studies investigating autistic children's use of aggression throughout development are notably lacking (Matson & Adams, 2014; Mazurek et al., 2013), so this is difficult to establish at present.

In contrast, autistic children's place in the birth order was shown to be associated with their sibling bullying perpetration. Specifically, autistic children born second in the birth order were less likely to perpetrate total, verbal, and relational sibling bullying, whilst those born fourth were less likely to perpetrate relational sibling bullying than first-born autistic children.

The finding that fourth-born autistic children were less likely to perpetrate relational sibling bullying is consistent with research which shows that autistic children born later on in the birth order are less likely to become involved in sibling bullying compared to their first-born siblings (Toseeb et al., 2020). This is also a replication of the findings of study 1, described in Chapter 4, where it was found that autistic children born later were less likely to be involved in sibling bullying, either as a perpetrator or as a victim. As is discussed in

Chapter 2, Resource Control Theory (RCT; Hawley, 1999) helps to explain this finding. Under this theoretical framework, it is suggested that children born first in the birth order are spectators as the number of children in the household increases, and as such the available pool of parental resources decreases. Children born later in the birth order may be less aware of the decreasing pool of parental resources, being younger and therefore unable to make such comparisons.

However, the finding that children born second in the birth order are less likely to perpetrate total, verbal, and relational sibling bullying appears to be in conflict with RCT. Previous research has suggested that children born earlier in the birth order, for example first- or second-born children, are more likely to engage in sibling bullying as they are particularly aware of the decreasing pool of available parental resources as the number of children in the household increases (Toseeb et al., 2020). The results of this study cannot be explained by the framework of RCT. There are other possible explanations for this finding, however. For one, it is possible that the second-born autistic children in this sample have a more nurturing relationship with their older sibling. Siblings of autistic children often take on protective, caregiver roles (Nuttall et al., 2018). The nature of the relationship between the autistic child and their older sibling may be important in understanding why autistic children born second in the birth order are less likely to perpetrate sibling bullying behaviours. As it was not the aim of this study to investigate whether nurturing relationships between siblings are protective against the perpetration of sibling bullying, it is not possible to substantiate such claims from the presently available data. Further research should investigate whether sibling bullying in families with an autistic child may be mediated by the presence of caregiving relationships between siblings.

In summary, no relationships were identified between autistic children's perpetration and their age or gender. Although these findings are not consistent with previous research in

the general population, they can be understood within the context of autistic children's unique traits and developmental pathways. Autistic children may not display gendered behaviours in the same way as their non-autistic peers, and also develop socially in a different way compared to age-matched peers. In addition, it is important to consider the finding that second born autistic children are less likely to perpetrate certain types of sibling bullying behaviours as taking place within the context of a family system. It is possible that this finding has been identified because of the role that their siblings take in their care and treatment. However, further research is required to investigate this, as this is not possible to ascertain from the presently available data.

5.4.2 Do autistic children's autistic traits predict their non-autistic siblings' sibling bullying perpetration?

Autistic traits. Non-autistic children were more likely to perpetrate relational sibling bullying if autistic children exhibited higher levels of challenging behaviours. One could interpret this as being consistent with research showing that siblings of autistic children may feel shame or embarrassment due to their siblings' challenging behaviour, which negatively impacts on the sibling relationship (Wilson et al., 1992) and leads to an increase in conflict (Petalas et al., 2012). However, it is important to note that challenging behaviour exhibited by the autistic child was not associated with physical or verbal bullying, but rather with relational bullying. This could be explained by considering that siblings report feeling shame and embarrassment due to their autistic siblings' behaviours (Macks & Reeve, 2007). Researchers have attempted to explain this by reasoning that this is because of the threat to their social standing among their peers (Wilson et al., 1992). Children experiencing embarrassment because of their autistic siblings' behaviour may, therefore, respond to this by attempting to repair their social status with relational sibling bullying behaviours, such as spreading rumours about their sibling, or leaving them out from social activities with peers.

This is consistent with research by Greenberg et al. (1999), which has found that siblings of autistic children are likely to avoid their sibling who shows increased levels of problem behaviours.

Interestingly, no other autistic traits exhibited by the autistic child were found to be related to sibling bullying perpetration by the non-autistic child. Research has previously suggested that autistic children who exhibited more severe autistic traits could be a source of shame, embarrassment (Macks & Reeve, 2007; Gray, 1998) or stress (Petalas et al., 2012) for their non-autistic siblings, potentially leading to an increase in sibling bullying behaviour. Within the current sample, the severity of most autistic traits exhibited by the autistic children was in no way associated with the non-autistic siblings' perpetration of bullying towards them. This could suggest that siblings of the autistic children in this study did not experience shame or stress about their siblings' other autistic behaviours, no matter how severe they were. However, it is not truly possible to determine whether this was the case, as within this study children were not asked to report their feelings about their siblings' autistic behaviours.

To summarise, non-autistic children's perpetration of relational bullying was related to their autistic sibling's challenging behaviours, but no other autistic traits were identified as being associated with non-autistic children's perpetration. One explanation for this is that non-autistic children may experience shame, embarrassment, or stress related to their autistic sibling's challenging behaviour, whilst others do not elicit this response. This should be an area of focus for further research: child perceptions of their autistic siblings' behaviour may affect sibling bullying in a way that is more substantial than the severity of the traits themselves.

Demographic factors. It was found that as autistic children aged, perpetration of physical and relational sibling bullying by the non-autistic children became less likely. This is consistent with current research on peer bullying, where it is reported that younger autistic

children are more likely to be bullied (Montes & Halterman, 2007). Research with general population samples corroborates a decrease in both physical and social or relational forms of peer bullying as children age (Rivers & Smith, 1994). Physical bullying, in particular, is more commonly experienced by younger rather than older autistic children (Little, 2002). It is noteworthy that this pattern is replicated within sibling relationships, since previous studies have focused primarily on the relationship between age and peer bullying experienced by autistic children.

In contrast, neither the gender or the birth order place of the autistic child predicted their non-autistic siblings' bullying perpetration. The lack of a relationship between autistic child gender and non-autistic child bullying perpetration appears to conflict with research which finds that girls in the general population are more likely to be the target of bullying, both by peers (Solberg & Olweus, 2003) and by siblings (Dantchev & Wolke, 2019; Menesini et al., 2010). Toseeb et al.'s (2018) study of both autistic and non-autistic children replicated this, finding that being male is protective against being victimised, and that being female is a risk factor for sibling bullying. One possible explanation for this discrepancy is that the autistic children in the present sample may fail to adhere to typical presentations of gender roles. Researchers considering the relationship between gender and bullying have suggested that boys are more likely to be perpetrators, being tougher and physically more aggressive (Maccoby, 1986). The relationship between gender and victimisation therefore appears to hinge on the presence of gender stereotyped behaviours. Perhaps within the present sample, the autistic children who were reported on failed to meet these gender stereotypes. As discussed above, autistic individuals often deviate from strict gender-typed behaviours (Bejerot & Eriksson, 2014).

Finally, birth order of autistic children was also found to be unrelated to perpetration of sibling bullying by non-autistic children. This is arguably consistent with RCT, which

suggests that children are motivated to bully their siblings because of the perceived decline in available parental resources, such as parental affection or time. Under this framework, children perpetrate bullying because they are competing with their siblings for these resources. It is conceivable that the perpetrator's own place in the birth order is a more important risk factor for sibling bullying than that of the victim's. A child who is born first in the birth order, for example, may witness the reduction in attainable parental resources as more children are born into the household, which may lead them to engage in bullying behaviours towards those children. It seems logical, therefore, that the victim's birth order place would be unrelated to the levels of sibling bullying they are subjected to.

In conclusion, autistic children's age was associated with a decreased risk of physical and relational sibling bullying perpetrated by the non-autistic child, and autistic child's birth order place was not associated with non-autistic children's rates of perpetration. Although this is consistent with previous research and the RCT framework respectively, the findings that the gender of the autistic child is also not associated with sibling bullying involvement is a novel finding. As previously discussed, autistic children may vary in typical gender expression compared to their non-autistic peers, which may help to explain this finding. However, since it was not the aim of the present investigation to examine gendered behaviours and their association with bullying perpetration or victimisation, this is purely speculative. The research field would benefit from further investigations into gender-typed behaviours and sibling bullying involvement in autistic children.

5.4.3 Research question two: Is there a relationship between autistic traits in a non-autistic and the occurrence or subtype of sibling bullying?

Do non-autistic children's autistic traits predict their autistic siblings' sibling bullying perpetration?

Autistic traits. Non-autistic children's restrictive and repetitive behaviours were shown to be negatively associated with autistic children's perpetration of verbal sibling bullying. This means that non-autistic children who exhibited behaviours such as preference for adherence to routines, stimming, and sensory issues, such as reactivity to noise or touch, were less likely to be bullied by their autistic siblings. This novel finding can perhaps be explained by the fact that these traits are often shared by autistic children. Autistic children also frequently express distress when routines are altered, exhibit repetitive behaviours, and may be reactive to loud sounds or being touched. This shared trait may explain why autistic children are less likely to verbally bully siblings. Autistic children whose siblings also express a fondness for repeated routines may be calmed when others in the home also follow routines. It is reported that routinisation can be a useful tool in parenting autistic children, whose parents report that strict adherence to routines can be soothing for their child (Larson, 2006). Additionally, studies have shown that families of autistic children who have regular routines report higher whole-family quality of life (Schlebusch et al., 2016). Therefore, if autistic children's siblings share their want for predictability and routinisation, this may be beneficial not just for the autistic child but for whole family relationships.

To conclude, non-autistic children who exhibited restrictive and repetitive behaviours were less likely to be bullied by their autistic sibling. Previous evidence may help to explain this by showing that autistic children benefit when family members follow routines. Siblings sharing in a preference for routines and predictability may be soothing for autistic children, leading to reduced risk of bullying perpetration.

Demographic factors. No demographic factors, including the gender, age, or birth order place of the non-autistic children, were associated with the autistic children's sibling bullying perpetration.

The lack of association between non-autistic child's gender and autistic children's bullying perpetration is consistent with the other findings of this study, described above. This study has consistently demonstrated no association between the gender of the autistic child and their sibling bullying perpetration or victimisation. This finding seems to fit this pattern, showing no relationship between the non-autistic child's gender and the autistic child's perpetration of sibling bullying. As discussed previously, this is inconsistent with previous research involving both autistic and general population samples (Dantchev & Wolke, 2019; Menesini et al., 2010; Toseeb et al., 2018). However, as discussed previously, gender roles and stereotypes may play a key part in determining whether children are bullies or victims. This chapter has previously described that autistic children, who may fail to adhere to gender roles or stereotypical behaviours, may therefore deviate from expectations around gender specific bullying perpetration or victimisation. To elaborate, autistic boys who do not fit gender roles may not be more likely to bully, as previous research has suggested, and autistic girls may not be more likely to be victims. The finding here, which shows that the gender of the non-autistic child was not related to autistic children's level of perpetration, may be an extension of this. It is possible that autistic children, who may fail to follow gender norms, do not perceive gender in the same way that their non-autistic siblings do. These children may therefore not observe the theorised power imbalance associated with gender which has been theorised to lead girls to be more likely victims or think of boys as tougher and therefore less easy targets. This could be indicative of an important but overlooked feature of the sample of this study. Again, it was regrettably not a focus of this investigation to examine the relationship between gender roles in autistic children and their sibling bullying involvement. From the findings reviewed here, however, this appears to be an important focus for future research.

Secondly, the age of the non-autistic children was found not to be associated with autistic children's rates of sibling bullying perpetration. At first glance, this appears to be inconsistent with research which has indicated that younger children are more likely to be victimised by peers (Montes & Halterman, 2007). However, it is noteworthy that studies which have investigated age-related trends in victimisation have primarily focused on bullying in peer settings which takes place in schools. It makes sense that these studies, which primarily involve age-matched child participants, would show age-related changes in victimisation: since children in schools tend to mix predominantly with children close to their own age, and since research has also shown that bullying perpetration in these settings decreases with age. The finding here suggests that in samples with non-age matched sibling pairs, this pattern may not be observed. To the best of the author's knowledge, this study is among the first to examine age-related changes in sibling bullying involvement between non-age-matched siblings. Further research is certainly warranted to explore this.

Finally, non-autistic children's birth order was not associated with autistic children's sibling bullying perpetration. As discussed above, it seems logical that the birth order place of the perpetrator of sibling bullying is more relevant than the birth order place of the victim. Under the framework of RCT, a child's likelihood of perpetrating sibling bullying is related to their perception of the availability of parental resources. Therefore, children born earlier in the birth order, who witness the decrease in availability of these resources as more children are born, would become more likely to perpetrate sibling bullying. It appears consistent with this framework that the birth order place of the victim of sibling bullying would be unrelated to the other child's perpetration.

This study found no association between non-autistic children's gender, age, or birth order and autistic children's perpetration of sibling bullying. This is consistent with other findings in this study, and suggests that this sample of autistic children may deviate from

previously identified patterns shown in prior research, which has indicated that non-autistic children are typically more likely to bully younger, female siblings (Dantchev & Wolke, 2019). This reinforces the need for future research to study gender- and age-related differences in bullying behaviours in samples of autistic children.

Do non-autistic children's autistic traits predict their own sibling bullying perpetration?

Autistic traits. Non-autistic children's levels of challenging behaviour were significantly associated with their own perpetration of physical, verbal, relational, and total sibling bullying behaviours. As discussed above, this association is logical, since the challenging behaviour measure asks respondents to indicate behaviours such as physical or other types of aggression. The measure of challenging behaviour and the measure of sibling bullying may identify the same behaviours, thus explaining their relationship.

However, it is noteworthy that non-autistic children's challenging behaviour did not predict autistic children's perpetration of sibling bullying. This is the opposite of the effect described above, where autistic children's challenging behaviour was shown to be associated with a significant increase in their non-autistic siblings perpetrating relational bullying. This could be explained in one of two ways. For one, it could be that non-autistic children's BAP traits are simply not pronounced enough to have an effect on the sibling relationship. Since BAP traits are, by definition, sub-clinical, this could mean that they are mild enough not to impact on sibling bullying rates. A second way of interpreting this finding is that autistic traits themselves are not predictive of sibling bullying. It may be that autistic traits are not related to sibling bullying, but that perceptions of these traits are. Siblings' feelings of shame and embarrassment may be more important in predicting sibling bullying than autistic traits. Perhaps autistic children, who may have difficulties in perceiving and understanding social

norms, are not embarrassed or ashamed when their sibling behaves aggressively and are therefore not as likely to perpetrate sibling bullying.

To summarise, non-autistic children's challenging behaviours are logically associated with their perpetration of sibling bullying, since these two measures appear at face value to assess the same types of behaviours. However, no other autistic traits were shown to be related to non-autistic children's perpetration rates. This could suggest that non-autistic children's BAP traits are subtle, and therefore do not elicit a reaction from their siblings. Alternatively, this may be evidence that autistic children respond neutrally to their non-autistic sibling exhibiting autistic traits.

Demographic factors. The gender of non-autistic children was found not to be related to their sibling bullying perpetration. This conflicts with research indicating a clear gender difference in perpetration, which have shown that boys are more likely to perpetrate sibling bullying. This has been replicated in both general population (Dantchev & Wolke, 2019) studies and studies including autistic children (Toseeb et al., 2018). However, it is worth noting that the study by Toseeb et al. is the only investigation thus far to explore gender differences in sibling bullying within families of autistic children. To the best of the author's knowledge, no studies have yet examined the relationship that sibling bullying perpetration has with gender in sibling pairs where one child is autistic and the other is not. This suggests that such sibling pairs are somehow unique in this regard. As discussed above, gender typical behaviour is not as frequently observed in autistic children as it is in non-autistic individuals (Bejerot & Eriksson, 2014). Perhaps this extends to those close to autistic children, who may also show atypical gendered behaviours. Further research should examine this and seek to shed light on why non-autistic children may not show a gender difference in their perpetration of bullying towards their autistic siblings.

Additionally, birth order of the non-autistic children was also shown to be unrelated to non-autistic children's sibling bullying perpetration. This seems to be inconsistent with RCT, which would suggest that sibling bullying is more likely to be perpetrated by children born earlier in the birth order, as they have observed a reduction in available parental resources. Findings from general population studies have corroborated this, showing that firstborn children are more likely to perpetrate sibling bullying (Dantchev & Wolke, 2019). This has also been replicated in studies with autistic subjects (Toseeb et al., 2018). It is notable, therefore, that no association was found between birth order and perpetration in the non-autistic group.

To explain this finding, one may consider the nature of the relationships between siblings when one is autistic. In families with autistic children, non-autistic children are often required to take on a caregiver role, assisting their parents in the care and protection of their autistic sibling (Nuttall et al., 2018). Perhaps this more nurturing relationship, which may center on the needs of the autistic child, may influence siblings not to see their autistic sibling as a competitor. Instead, non-autistic children may view their autistic sibling as a child who is worthy and needy of parental resources. However, it is still important to note that this finding is inconsistent with those of previous, large-sample studies, which have consistently shown a relationship between birth order and sibling bullying involvement. Further study would be beneficial to explore these inconsistencies.

Finally, the results showed that physical sibling bullying perpetrated by the non-autistic child was less likely as these children grew older. As discussed above, this is consistent with prior research, where it has been reported that perpetration of bullying frequently decreases with the age of the perpetrator (Eriksen & Jensen, 2006; Tippett & Wolke, 2014). This is especially the case of physical bullying perpetration. Although the autistic children in this sample appear not to follow this pattern, it is interesting that non-

autistic children do. This could be because age-related perpetration of sibling bullying requires a level of social awareness. It is theorised that age is related to bullying because as victims grow older, they "outgrow" bullying as they transition into more complex social networks. In early adolescence, children transition into more diverse and larger peer groups, experiencing an increase in the number of opposite-sex friendships, romantic relationships, and more intimacy and conformity with peers (Hartup, 1983; Connolly et al., 1999). Children who have experienced this developmental transition report less frequent bullying involvement than younger peers. This suggests that age is related to bullying perpetration through a typical developmental pathway that autistic children do not share with their non-autistic siblings.

5.4.4 Research question 3: Is there a relationship between additional SEND diagnoses of an autistic child and the occurrence or subtype of sibling bullying?

Do specific SEND diagnoses predict autistic children's sibling bullying perpetration? Global Developmental Delay (GDD) is a SEND which is diagnosed in children who are not meeting developmental stages at the appropriate rate. Children with GDD may be slower to learn to walk or talk, intellectually develop abilities to reason and problem solve, or communicate and interact with others appropriately (Great Ormond Street Hospital for Children, 2020). Autistic children in the present sample who had a diagnosed GDD were less likely to bully their siblings verbally and in total. This appears to reflect that children with GDD may lack the necessary interpersonal or language skills to engage in behaviours that would be considered verbal or relational bullying.

Similarly, autistic children who had DLD were less likely to perpetrate verbal sibling bullying, and had significantly lower scores on the sibling bullying measure. Children with DLD have severe, persistent difficulties in receptive and expressive language (National Institute on Deafness and other Communication Disorders, 2022). It therefore seems logical that autistic children with DLD would be less likely to perpetrate verbal bullying, since

verbal bullying behaviours such as name-calling or teasing draw upon expressive language skills that children with DLD may lack.

Conversely, autistic children were found to be more likely to perpetrate physical, relational, and total sibling bullying if they had a physical disability. This echoes the findings reported by Pinquart (2017), who found that children with physical disabilities were more likely to engage in peer bullying than non-disabled children. Pinquart (2017) also found that physically disabled children were also more likely to be victims of bullying, and argued that being at increased risk of victimisation may have caused these children to perpetrate bullying as a reaction. This may help to explain why autistic children with physical disabilities engaged in bullying in the present population: autistic children are at increased risk of experiencing peer victimisation in a school setting, which may be exacerbated by the presence of a physical disability. Following the argument laid out by Pinquart (2017), these children may then engage in reactionary bullying, some or all of which may be directed at their sibling. However, additional research is required to investigate this further, as this cannot be verified by the presently available data.

Autistic children were significantly less likely to perpetrate total sibling bullying when they also had a diagnosis of a sensory processing disorder. Sensory processing disorders are an umbrella term for over- and under-sensitivity to sensory stimuli such as touch, sound, or light. These commonly occur in co-occurrence with autism, and many autistic individuals report varying levels of sensitivity to pressure, noises of different pitches, and textures, among other things (Marco et al., 2011). Sensitivity to sensory stimuli can be challenging: autistic children sometimes struggle to cope with loud noises or textures in clothing or food, leading to distress or anxiety (Jones et al., 2020).

This finding could reflect that autistic children who struggle to process sensory stimuli also often struggle to socially engage with others. Kojovic et al. (2019), in their study

comparing autistic children to age-matched non-autistic children, found that autistic children who had higher levels of sensory issues often had more prominent social impairments. They write that sensory processing difficulties were most strongly related with social motivation, and that autistic children who had sensory sensitivities were often less able to or interested in initiating or maintaining social interactions. It stands to reason, therefore, that the autistic children in the present study who had a sensory processing disorder may have socially engaged less with their siblings, leading to a lower rate of bullying perpetration.

Finally, autistic children who were reported to have a diagnosis of a speech disorder or impediment were more likely to perpetrate total, physical, and relational sibling bullying. It has previously been discussed that bullying is more commonly perpetrated by younger children (Eriksen & Jensen, 2006; Tippett & Wolke, 2014), and it is theorised that this is because younger children have not yet developed sufficiently to express frustrations or anger in other ways. Although children with speech disorders or impediments are not equivalent to young children, the same argument may apply here. It is possible that children with a speech disorder may find it difficult to express when they are frustrated or angry, thus resorting to another method of communication. In this instance, sibling bullying perpetrated by autistic children who also had a speech disorder or impediment could be seen as a result of having inadequate ways to convey one's concerns in other ways.

Do specific SEND diagnoses predict non-autistic children's sibling bullying perpetration? Two SEND diagnoses were shown to be associated with non-autistic children's sibling bullying perpetration. DLD, for example, was shown to have a negative effect on perpetration. This means that in families where the autistic child had a diagnosis of DLD, verbal bullying by the non-autistic child was less likely. This may be explained by the diagnostic features of DLD. As discussed above, children with DLD can have severe difficulties in receptive language (National Institute on Deafness and other Communication

Disorders, 2022). This finding may therefore reflect that non-autistic children, being aware of their sibling's difficulties, may be less likely to perpetrate verbal forms of bullying towards them.

Finally, autistic children with a speech disorder or impediment were more likely to be targets of relational bullying by non-autistic children. Relational bullying describes a subtle, social form of bullying. Relational bullying, as described in the version of the SBQ adopted by the present study, includes behaviours such as ignoring the child, or spreading rumours about the victim. Importantly, these behaviours are done with others, and appear to aim to isolate the victim. This could potentially be explained by the theory that siblings of non-typically developing children feel shame and embarrassment because of the difficulties and needs of their sibling (Macks & Reeve, 2007). It is possible that this finding reflects that autistic children with speech disorders or impediments have sufficiently severe difficulties that their siblings experience shame or guilt as a response. Research has indicated that siblings of children with severe needs often avoid their siblings (Seltzer et al,, 2009).

5.4.5 Strengths and Limitations, and directions for further research

This study was the first to investigate the associations between autistic traits and sibling bullying. Research thus far has primarily investigated factors associated with sibling bullying that have been identified through research involving the general population. It is important, however, to consider the distinctions that separate families with autistic children from other families, especially since rates of sibling bullying vary so much between these groups.

However, the study has limitations that must be considered. The most substantive is that this study, which is quantitative in nature, does not facilitate the identification of qualitative explanations for the associations between variables. For example, although it is possible from this study to observe a relationship between autistic children's challenging

behaviour and non-autistic children's perpetration of sibling bullying, it is not possible to establish why this is. A more in-depth, qualitative investigation would allow the researcher to examine whether autistic children's increased difficulties were related to feelings of shame and embarrassment in the non-autistic siblings, thus increasing the likelihood of sibling bullying. Future research should, therefore, aim to study the relationship between perceptions of autistic children's traits and sibling bullying behaviour in order to expand on this.

5.4.6 Conclusion

To conclude, challenging behaviours in both the autistic and non-autistic children was the only autistic trait to predict sibling bullying perpetration by each child. However, autistic children's challenging behaviours also predicted non-autistic children's perpetration, and non-autistic children who exhibited restrictive and repetitive behaviours were less likely to be bullied by their autistic siblings. These novel findings suggest that, contrary to expectations, non-autistic children's perpetration of sibling bullying may not be motivated by shame and embarrassment due to their autistic sibling's social and communicative differences. Additionally, autistic children may find comfort in having siblings who share their preference for routine and repetition. The relationships between demographic factors and sibling bullying involvement were also studied. The results presented here indicate that in many cases, both autistic children and their siblings deviate from rates of perpetration that are indicated by their age, gender, or place in the birth order. Further research is recommended to examine gender typical behaviour in autistic children and their siblings, as these findings suggest that these may be substantially different from those in the general population. Finally, specific SENDs diagnosed in addition to autism were found to be related to perpetration by both autistic and non-autistic children. Reasons for these associations may be found in the diagnostic criteria of relevant SENDs, or in the way that family systems adapt to care for an autistic child with multiple disabilities.

6. General Discussion

This chapter provides a summary of the key findings from each of the two studies, and a brief discussion of the practical and theoretical implications of this research. Strengths and limitations of the research are identified, and suggestions for future research discussed. The primary aim of this research was to investigate risk factors which are associated with sibling bullying involvement in families with autistic children. Two studies were devised to address this objective. The first, which is described in Chapter 4, examined risk factors such as parental mental health and harsh parenting tactics, and modelled the relationships between these variables and autistic children's sibling bullying involvement. The second study's goal was to explore associations between diagnoses of Special Educational Needs and Disabilities (SENDs) and autistic traits in autistic children and their siblings with sibling bullying perpetration. A brief summary of the results of each study, and how they address the research questions set out in Chapter 3, can be seen below.

6.1 Summary of key findings

6.1.1 Study one

Study one examined the relationships between harsh parenting, parental mental health, and autistic children's sibling bullying involvement. The results showed significant associations between harsh parenting tactics and autistic children's sibling bullying involvement. Parents use of harsh disciplinary tactics, such as shouting or smacking, was associated with higher rates of perpetration and victimisation in autistic children. Conversely, it was identified that poor parental mental health did not increase the likelihood of autistic children's sibling bullying involvement, either as a bully or a victim. However, it was shown that poor parental mental health was related to parent's use of harsh parenting: parents with worse mental health when their child was aged 5 were more likely to use harsh parenting tactics during this time. Although this effect appeared to drop off as the child aged, with

harsh parenting and parental mental health being unrelated when the child was aged 7, it is notable that in early years of child development, there is a relationship between harsh parenting behaviours and parental mental health. This is especially important to bear in mind when one considers the association reported in study one between use of harsh parenting tactics and sibling bullying behaviours.

In addition to the study's main aims, a number of demographic and family structural factors were considered. The analysis showed that more sibling bullying took place in families with more children. White children were more likely to engage in sibling bullying perpetration, but there was no relationship between ethnicity and victimization. However, there was no relationship between gender of the autistic child and rates of perpetration or victimisation. Finally, no relationship was identified between household income and autistic children's sibling bullying involvement.

6.1.2 Study two

Study two examined reports of sibling bullying perpetration by both autistic and non-autistic children from the same families. The aims of this study were threefold. The first research question pertained to investigating a relationship between autistic traits exhibited by autistic children and their sibling bullying involvement, either as a perpetrator or as a victim. The analysis showed that higher rates of challenging behaviour were associated with a higher risk of autistic children bullying their siblings and being bullied by their sibling. However, no other autistic traits were related to the likelihood of autistic children being bullies or victims of sibling bullying.

Secondly, the study addressed whether shared autistic traits present in non-autistic siblings of autistic children were related to sibling bullying. Non-autistic children's challenging behaviour was shown to be significantly associated with their perpetration of sibling bullying. On the other hand, restrictive and repetitive traits exhibited by the non-

autistic child was associated with a reduced risk of these children being the victims of bullying perpetrated by their autistic sibling.

The final aim of this study was to investigate how additional SEND diagnoses, which often occur in autistic children, were related to their experience of sibling bullying. The study showed that autistic children who had a diagnosis of GDD, DLD, or a sensory processing disorder were significantly less likely to perpetrate sibling bullying. DLD was also negatively associated with bullying perpetrated by the non-autistic child. On the other hand, autistic children who had a physical disability or a speech disorder or impediment were significantly more likely to be perpetrators. Additionally, non-autistic children were more likely to perpetrate relational bullying if their autistic sibling had a speech disorder or impediment.

Finally, this study also allowed for examination of the relationships between demographic and family structural factors and sibling bullying involvement. The analysis explored the relationship between the gender of both the autistic and non-autistic children and rates of sibling bullying perpetration. No relationship was found between the gender of either child and their risk of being a perpetrator or a victim of sibling bullying. In addition, the association between the ages of each child and their sibling bullying involvement was included in the analysis. The results showed no relationship between the autistic child's age and their rates of perpetration. Similarly, no association was identified between the age of the non-autistic child and their risk of being victimised by the autistic child. However, the results did indicate that as non-autistic children aged, they were less likely to perpetrate physical sibling bullying. Comparably, autistic children's age was associated with a reduction in their likelihood of being bullied physically and relationally.

Lastly, the relationship between child birth order and sibling bullying involvement was investigated. No relationship was found between the birth order place of the autistic child and non-autistic children's sibling bullying perpetration. Likewise, the birth order place of the

non-autistic child did not predict autistic children's rates of perpetration. Finally, birth order of the non-autistic child was not associated with their own perpetration of sibling bullying. It was identified, however, that autistic children who were born second and fourth in the birth order were less likely to perpetrate sibling bullying.

6.2 Integrated discussion

It is important to note that, under some conditions, sibling relationships between autistic children and their siblings can be positive. For example, a study by Jones et al. (2019) reported that typically developing siblings of autistic children reported feeling positive about their relationship with their sibling when they were more knowledgeable about autism and had a support network. Additionally, research has shown that when typically developing children are involved in the care and treatment of their autistic sibling, this is associated with positive relationships spanning into adulthood (Tomeny et al., 2017; Bigby, 1998).

However, this is not always the case. Studies have also shown that relationships between autistic children and their siblings are often characterised as being less warm and close compared to relationships between siblings where one child has another disability (Kaminsky & Dewey, 2001). As has been discussed previously, research has also shown that autistic children are reportedly more likely to be involved in sibling bullying compared to the general population (Toseeb et al., 2018; Toseeb et al., 2020). Although it is important for researchers not to overlook the positive, protective impact that relationships between autistic children and their siblings can have, it is also crucial to investigate factors involved in more negative relationships where bullying takes place.

The research discussed in this thesis aimed to investigate the precursors that may help shed light on why sibling bullying takes place between autistic children and their siblings. The results of these studies, described in Chapters 4 and 5, provide useful insight into the

circumstances in which sibling bullying is more likely. There are several key takeaways from these investigations, which shall be discussed here.

For one, it is evident that no single factor can be pinpointed as being solely predictive of sibling bullying perpetration or victimisation. Study one, for example, identified parent-, child-, and family-level factors as being associated with the likelihood of autistic children's sibling bullying involvement. Similarly, study two showed that traits in both the autistic and non-autistic child, as well as demographic information about each child, was related to the increased risk of bullying perpetration and victimisation in both siblings. It is therefore apparent that researchers attempting to understand this phenomenon in families with autistic children must consider precursors which pertain to the entire family. This is reminiscent of the theoretical approach termed family systems theory (Kerr & Bowen, 1988). Family systems theory, as discussed in Chapter 2, describes families as being a network of interconnected individuals, all of whom influence each other's behaviours. As Pfeiffer & In-Albon (2022) write, "Any change in one individual within a family is likely to influence the entire system and may even lead to changes in other members." (p.186). The findings of the present study reinforce the framework of family systems theory, having shown that behaviours and factors at the parent-, child-, sibling- and family-level are all associated with sibling bullying in families where a child is autistic.

The findings of this thesis also show support for other theoretical models. Namely, social learning theory (SLT; Bandura, 1977) and resource control theory (RCT; Hawley, 1999). For example, study one (Chapter 4) showed that in families where parents used harsh parenting tactics, more sibling bullying perpetration was reported by autistic children. This is arguably supportive of SLT, which reasons that children observe and imitate behaviours that are exhibited by models, who are frequently parental figures. In this example, autistic children may be interpreted as observers of harsh parental disciplinary tactics, which they

then imitate in interactions with their siblings. This is important to acknowledge, as few studies thus far have examined autistic children's behaviours within an SLT framework. This finding suggests that SLT may be a useful context within which to explore familial relationships, including those between autistic children and their siblings.

Study one also provides support for RCT. RCT describes that parents are providers of resources, such as affection or time. Within this framework, children in the home are viewed as natural competitors for these resources. Researchers suggest that resource focused competition between children takes the form of sibling bullying. This is supported by studies which indicate that when there are more siblings in a household, sibling bullying is more likely (Dantchev & Wolke, 2019). Additionally, it has been reported that being a first-born child makes sibling bullying involvement more likely (Toseeb et al., 2020): this is because these children are aware of the decreasing pool of parental resources available to them as more children are born into the home. The findings of study one corroborate this, showing that the risk of autistic children's sibling bullying involvement increases in families with more children.

Researchers have theorised that in families with autistic children, RCT may be particularly relevant in understanding why sibling bullying takes place. Autistic children often require additional care and support from parents, which may lead to an imbalance in the distribution of parental resources (Macks & Reeve, 2007). The findings of study one appear consistent with this hypothesis, and are supportive of the inclusion of RCT as a framework within which sibling bullying in families with an autistic child can continue to be studied and understood. However, some findings from study two are perhaps contraindicative of this. In study two, which included analysis of the relationship between birth order placement of an autistic and non-autistic child and their sibling bullying involvement, it was found that the birth order place of the non-autistic child was not related to their risk of perpetrating sibling

bullying. RCT and previous research would predict that children born earlier in the birth order would be at an increased risk of sibling bullying perpetration. This may suggest that this study has identified important variation within the population of families with an autistic child. It is well established that the experiences of autistic individuals and their families are heterogenous. Perhaps although RCT is a useful framework for contextualising the experiences of some autistic children and their families, this may not be applicable to all. Other factors may explain why non-autistic children born earlier in the birth order are not more likely to bully their autistic siblings: for example, research showing that siblings of autistic children may take on a nurturing and caregiving role, which is often labelled as "parentification" (Chan & Goh, 2013; Bowen, 1995). This may explain why older siblings do not engage in bullying towards their autistic sibling. To summarise, whilst RCT may be a useful tool to guide research on sibling bullying, researchers should be aware of other factors that may be influential.

Finally, perhaps the most important conclusion that may be made from this thesis is that this research has showed the many and varied ways in which precursors of sibling bullying are different between autistic and non-autistic children. Study one, for example, showed that autistic children's rates of sibling bullying are seemingly not associated with parental mental health, whilst prior research involving the general population has reported the opposite effect (Miller et al., 2012; Bowes et al., 2014). This study also showed that household income, which is reportedly associated with sibling bullying rates in the general population (Dantchev & Wolke, 2019), is not related to autistic children's sibling bullying involvement. In addition, study two highlighted the importance of taking into account features which are specific to autistic children and their families, such as the presence of autistic traits. Study two also reports that autistic children appear not to follow the same gender- or age-related patterns of bullying behaviour that their non-autistic peers do. To

summarise, this research has continued to show that autistic children and their families represent a unique sample compared to families without autistic children. This adds to the body of literature which reports that autistic children are both more likely to be involved in sibling bullying (Toseeb et al., 2020) and to experience adverse outcomes associated with it (Toseeb et al., 2018). Further work is required and justified by these key differences.

6.3 Strengths and limitations

There are both a number of strengths and limitations to the two studies. For one, both studies adopted novel approaches to investigating the precursors of sibling bullying in families with an autistic child. The first study replicated work which had shown that family-level factors are related to rates of sibling bullying perpetration and victimisation, but used a longitudinal method of analysis to shed light on how specific family variables develop and change over time. The second study investigated that which had been suggested but not studied in this field; a hypothetical association between autistic traits and sibling bullying behaviours. Through these novel approaches, this research field has been expanded, and directions for further research have been suggested.

Secondly, a particular strength of the first study is the source of the data used in the analysis. The Millennium Cohort Study (MCS) data has been made available to researchers online via the UK Data Service (2022). It contains a large scale, longitudinal dataset, following the development of children born between 2000-2002 in England, Scotland, Wales, and Northern Ireland. At its beginning, the study had a sample of over 18,000 participating children and their families (Centre for Longitudinal Studies, n.d.). Although the sample of autistic children within this sample was obviously a smaller percentage of this number, the sample had the considerable benefits of being representative of the United Kingdom. In addition, the longitudinal nature of the study allowed for analysis of the relationships between precursors and outcomes experienced throughout child development. Finally, the diverse

range of measures and data collected were an advantage of the MCS. Researchers involved in the MCS collected data on demographics, parent-, family-, and child-level factors, among others. The breadth of data collection was of great relevance and benefit to the analysis conducted in study one and allowed for identification of precursors of sibling bullying at multiple levels and timepoints.

A third strength of the research were the measures that were included in both studies. The measures used in each study had all been previously used in research. This had the benefit of allowing for comparisons to be made with other studies, which allowed for contextualisation of the findings of each investigation. In particular, the Sibling Bullying Questionnaire (SBQ) was a key facet of the second study. This measure has previously been validated as a way of ascertaining rates of sibling bullying behaviours in multiple countries (Tippett & Wolke, 2014; Deniz et al., 2022). The SBQ is a useful tool not only to generate estimates of total sibling bullying involvement, but also different types of sibling bullying, such as physical, verbal, and relational bullying (Wolke & Samara, 2004). By using a questionnaire that facilitates the identification of different types of sibling bullying, researchers may gain important insight into the precursors that are related to specific types of sibling bullying. Study two is an example of the relevance of this, as it showed that different forms that sibling bullying can take are associated with unique predictive factors.

However, there are also limitations of the present research which should be addressed. Although the SBQ allows for identification of physical, verbal, and relational bullying which takes place between siblings, there are some forms of bullying which do not fall into these categories. These include, for example, cyberbullying. Cyberbullying is defined as bullying through use of online platforms, such as social networking websites, instant messaging, online games, email, and other forums (Kowalski & Limber, 2013). Although cyberbullying is a relatively modern research focus, a study by Hu et al. (2019) reports that autistic children

are involved in cyberbullying as both victims and perpetrators. At present, it appears that studies investigating sibling bullying in families with an autistic child have not included cyberbullying. Indeed, sibling bullying research does not appear to consider cyberbullying as much as physical, verbal, or relational forms. However, research involving the general population has indicated that sibling bullying can include elements of cyberbullying (Tanrikulu & Campbell, 2014). This is of particular concern in families with an autistic child, as autistic children use electronic devices more frequently than non-autistic children (MacMullin et al., 2016).

In addition, the use of the SBQ with parents of autistic children presents a potential limitation. To the best of the author's knowledge, the second study as described in Chapter 5 presents the first use of the SBQ to investigate sibling bullying behaviours in families with an autistic child. It is therefore impossible to judge the reliability of the measure in such a context without further investigation. Sibling bullying involving autistic children may have unknown nuances or take different forms than are currently encapsulated by the SBQ. However, it is important to note that this measure is, at present, consistent with the standing definition of sibling bullying, and its items pertain to the currently accepted subdomains of sibling bullying as identified by prior research. Without research investigating whether or not autistic children engage in sibling bullying in a different manner than neurotypical children, it is best practice to use a measure that is congruous with academia's existing understanding of this phenomenon.

A second weakness of the research described here is that each study used only one reporter to identify sibling bullying. In study one, which used data collected by the Millennium Cohort Study, autistic children were asked to report their involvement in sibling bullying. In study two, parents of autistic children reported on sibling bullying which they observed between their autistic and non-autistic child. Both of these methods have benefits

and limitations which must be considered. For example, autistic children are not always skilled at understanding when bullying is taking place. A study by Hodgins et al. (2020) showed autistic children and non-autistic children videos of scenarios where bullying was taking place. The results showed that the autistic children in the sample had more difficulties in identifying cases where physical and relational bullying were taking place. Additionally, agreement between parents, teachers, and autistic children or adolescents on bullying rates is seldom (Rowley et al, 2012). Van Roekel, Scholte, & Didden (2010) also found that teachers reported significantly higher rates of bullying within special educational needs schools than autistic adolescents: rates varied from 6% to 46% dependent on the responder. Additionally, studies making use of parent reports of sibling bullying have been criticised in recent research. Some researchers argue that parents may not be best placed to report on sibling bullying, as they may not be aware of all bullying interactions that take place between their children (Wolke et al., 2015). Further to this, parents may view sibling bullying as normal, or typical of sibling relationships (Caspi, 2012; Khan & Rogers, 2015). Both autistic child and parent reports on bullying may, therefore, be under representative of actual prevalence rates.

However, it is important to note that both of these methods do have their benefits, and may in some cases counteract one another. Parents of autistic children may arguably have a better understanding of what constitutes bullying behaviour than their child. In contrast, autistic children are debatably better placed to report on behaviours that they themselves are aware of. Additionally, using measures such as the SBQ, which lists behaviours and asks children to identify whether or not they happen, this may mitigate the issue of autistic children not being able to identify whether behaviours constitute bullying. That being said, it is arguable that making use of a multiple-respondent method may be more useful and accurate in helping researchers to identify rates of sibling bullying.

6.4 Practical Implications

Given that sibling bullying can have negative outcomes for both bullies and victims, the practical focus of the majority of sibling bullying research is to develop sufficient understanding of this phenomenon so that research-based interventions may be developed. The present thesis presents two important implications for the development of preventative interventions. Firstly, interventions that address precursive factors in the aim of preventing sibling bullying in non-autistic children will not always be applicable to autistic children. Although research involving the general population has identified precursors of sibling bullying that interventions may address, the present research shows that the experiences of autistic children and their families are often markedly different. For example, research of sibling bullying in the general population has detected associations between parental mental health and sibling bullying rates. This has not been replicated by the present research. Additionally, although household income is reportedly associated with sibling bullying rates in the general population (Dantchev & Wolke, 2019), the first study in this thesis shows this not to be the case for families with an autistic child. Finally, and perhaps most crucially, the present research has found that the presence of some autistic traits and SENDs diagnosed in addition to autism are related to the risk of sibling bullying involvement. These disparities indicate how vital it is to develop interventions specifically with autistic children and their families in mind. A catch-all approach to identify and treat those at risk of sibling bullying involvement which includes both autistic and non-autistic children is not recommended.

Furthermore, this research makes it clear that interventions should be administered holistically, considering child-, parent-, and family-level factors. Factors at all three levels were shown to be associated with increased risk of sibling bullying involvement. Interventions which are solely child- or parent-focused may have benefits but cannot address all of the precursors which research has identified. Interventions may take the form of family-wide therapies or sessions to address harsh parenting, or to learn better ways of dealing with

challenging behaviour exhibited by an autistic child. Additionally, given the breadth of evidence gathered both in Chapters 4 and 5 and in prior research supporting Resource Control Theory (RCT), family therapies may focus on methods of decreasing the inequality of resource allocation between children, or developing the understanding of non-autistic children of the autistic child's increased needs. These interventions are proposed based on the evidence outlined in this thesis, and would seek to reduce the risk of sibling bullying by targeting identified risk factors. Such interventions could potentially take place through NHS services such as CAMHS, as these organisations already work with autistic children and their families to provide diagnostic assessments and support (National Autistic Society, 2023). However, given the increase in drive for impact-based funding for interventions (Reed et al., 2021), further research into the development and efficacy of such an intervention would certainly be required.

6.5 Directions for future research

This research set out to address gaps in the sibling bullying research, but in doing so has revealed even more. For one, this thesis presents inconsistent findings on how autistic children's gender and the gender of their siblings is associated with sibling bullying involvement. This suggests that there may be variation in how autistic children view or identify with gender. This may explain why these findings differ from research which has, in the past, reported clear associations between child gender and their risk of sibling bullying involvement. Research thus far has, in a limited capacity, identified that autistic children often deviate from gender normative behaviour (Bejerot & Eriksson, 2014). However, no research has yet investigated the impact that this may have on sibling relationships, nor the prevalence of sibling bullying in families with an autistic child. Given the inconsistency reported here, this appears to be a worthy focus for future research.

An additional area for future research is how the nature of sibling relationships in families with an autistic child may impact on sibling bullying rates. The results described in Chapter 5 show that in families with an autistic child, the birth order of non-autistic siblings is not related to their risk of perpetrating sibling bullying. This is in contrast with the theoretical framework of RCT, which would suggest that first-born children are more at risk of perpetrating sibling bullying, as they are aware of the reduction in the parental resources available to them as more children are born. This has been theorised to be particularly relevant in families with an autistic child, as the autistic child may require additional care and take up a larger share of these resources. Under RCT, this would lead to sibling bullying, as the children in the household battle it out for resource control. However, this study suggests this is not the case in families with an autistic child. This could theoretically be explained by the different ways in which sibling relationships develop in such families. Research indicates that siblings of autistic children sometimes take on parent-like roles, taking a part in the care and treatment of their autistic siblings (Nuttall et al., 2018). However, no research has yet addressed whether this phenomenon is associated with decreased risk of sibling bullying occurring. The field of sibling bullying research, especially with relation to families with an autistic child, would benefit from investigation into this as a potential protective factor against sibling bullying.

A second recommendation for future research is that this field would benefit from the inclusion of more qualitative methodologies. Quantitative methods enable identification of associations between potential risk factors and sibling bullying outcomes. However, they are limited in their ability to shed light on the mechanisms underlying these associations. For example, it is reported in Chapter 5 that autistic children who exhibited higher rates of challenging behaviours were more likely to experience relational bullying perpetrated by their non-autistic sibling. It is theorised that this is because non-autistic children feel

embarrassed by their autistic siblings' problem behaviours, which thus motivates them to exclude or isolate them. However, this assumption is based on the observation of data and suggestions from prior research. Qualitative research of this hypothesis could allow more in-depth investigation of this association. It is therefore a recommendation for future research to consider use of mixed methodologies. Although quantitative studies have the benefit of being able to identify associations between precursors and outcomes, qualitative investigations are important to help explain the mechanisms which underlie these associations.

6.6 Conclusion

This thesis presents novel findings to our knowledge of sibling bullying in families with an autistic child. Some findings reported in this scarcely populated research field were replicated, whilst several novel and inconsistent results are presented. This thesis also provides strong rationale for future research to continue to consider autistic children and their families as unique. Sibling bullying research, particularly in families with autistic children, requires additional attention in order to further develop understandings of the associations identified here, and to continue to investigate how autistic children experience sibling bullying differently from the general population.

Appendices

Appendix A. Assumptions for Structural Equation Modelling (SEM).

1. Normally distributed variables: latent and observed variables are assumed to be normally distributed. This is tested for using the Shapiro-Wilk test.
2. Linearity: It is assumed that there are linear relationships between observed and latent variables, as well as between latent variables. This is tested for by generating a scatterplot.
3. Absence of outliers: outliers may negatively affect the significance of the model. This is tested for by generating a scatterplot, and checking descriptive statistics of the dataset.
4. Absence of multicollinearity: it is assumed that there is no relationship between independent variables. This is tested for by using the Durbin-Watson test.

Appendix B. Models of associations between sibling bullying perpetration and victimisation scores, age, and parental mental health.

Predictor	**Odds Ratio (95% confidence intervals)**	***P***
Perpetration Model		
Harsh Parenting	1.14 [1.08, 1.21]	<.001
Parental Mental Health	.99 [.95, 1.03]	.667
Male	.87 [.56, 1.35]	.545
Number of siblings	1.32 [1.07, 1.63]	.009
White	.42 [.22, .82]	.011
Birth order	.83 [.66, 1.03]	.097
Income below 60% median	1.47 [.95, 2.28]	.085
Victimisation Model		
Harsh Parenting	1.08 [1.02, 1.15]	.006
Parental Mental Health	1.03 [.98, 1.07]	.233
Male	.68 [.44, 1.08]	.106
Number of siblings	1.44 [1.16, 1.80]	.001
White	.88 [.46, 1.70]	.697
Birth order	.85 [.68, 1.07]	.161
Income below 60% median	.89 [.57, 1.39]	.603

Appendix C. Path model results.

Coefficients for the path models. One-directional arrows indicate that a one-way relationship was modelled. A bi-directional arrow indicates that a two-way relationship was modelled. Standardised coefficients indicate the correlation coefficient for each modelled association.

Path	**Standardised Coefficients**	***P***
PMH age 5 → PMH age 7	.55 (.421, .672)	<.001
HP age 5 → HP age 7	.67 (.545, .785)	<.001
PMH age 5 ↔ HP age 5	.81 (.212, 1.40)	.008
PMH age 5 → HP age 7	.22 (-.161, .595)	.261
HP age 5 → PMH age 7	.07 (.025, .108)	.002
HP age 7 ↔ PMH age 7	.15 (-.287, .583)	.506
HP age 7 → Perpetration age 11	.15 (.080, .222)	<.001
HP age 7 → Victimisation age 11	.09 (.017, .164)	.016
HP age 7 → Total perpetration-victimisation age 11	.24 (.115, .370)	<.001
PMH age 7 → Perpetration age 11	.06 (-.159, .274)	.605
PMH age 7 → Victimisation age 11	.24 (.016, .468)	.036
PMH age 7 → Total perpetration-victimisation age 11	.29 (-.092, .692)	.136

Appendix D. The information poster used to recruit participants to take part in study two.

Sibling Relationship Study

UNIVERSITY of York

Does your autistic child have a neurotypical sibling?

I'm a researcher from the University of York investigating the relationships between autistic children and their neurotypical siblings.

I'd be very grateful if you could spare 10-15 minutes to complete an online questionnaire.

For more information or to take part in the study, please see the link in the description.

Thank you!

Appendix E. The brief and consent form participants were asked to read before agreeing to proceed with participating in study two.

What is this study about?

The study is designed to investigate bullying behaviour between siblings, specifically in families where a child has a diagnosis of Autism Spectrum Disorder.

For the purpose of this research study, some of the behaviour we're looking at is:
When two children tease each other, maybe calling names or making fun of each other
When two children kick, hit, or push each other, or maybe hurt each other on purpose
Taking each other's belongings or breaking them on purpose

This kind of behaviour between siblings is fairly common, and we're interested in identifying what kind of behaviours take place and why. We'll ask you to tell us a bit about any "bullying" behaviour that occurs between two of your children, if any does occur at all.

What will I have to do?

We're interested in the perspectives of parents who have autistic children. This is because autistic children are often overlooked in research about sibling relationships, and we want to change that by seeking your perspective on these important topics.

Why is this study taking place?

We're interested in the perspectives of parents who have autistic children. This is because autistic children are often overlooked in research about sibling relationships, and we want to change that by seeking your perspective on these important topics.

What should I do if I have any queries or concerns?

If you are upset or worried about any of the bullying behaviours that the study asks about, there are a few organisations that you may find it helpful to contact.
National Bullying Helpline: https://www.nationalbullyinghelpline.co.uk/
Sibs: https://www.sibs.org.uk/supporting-young-siblings/parents/

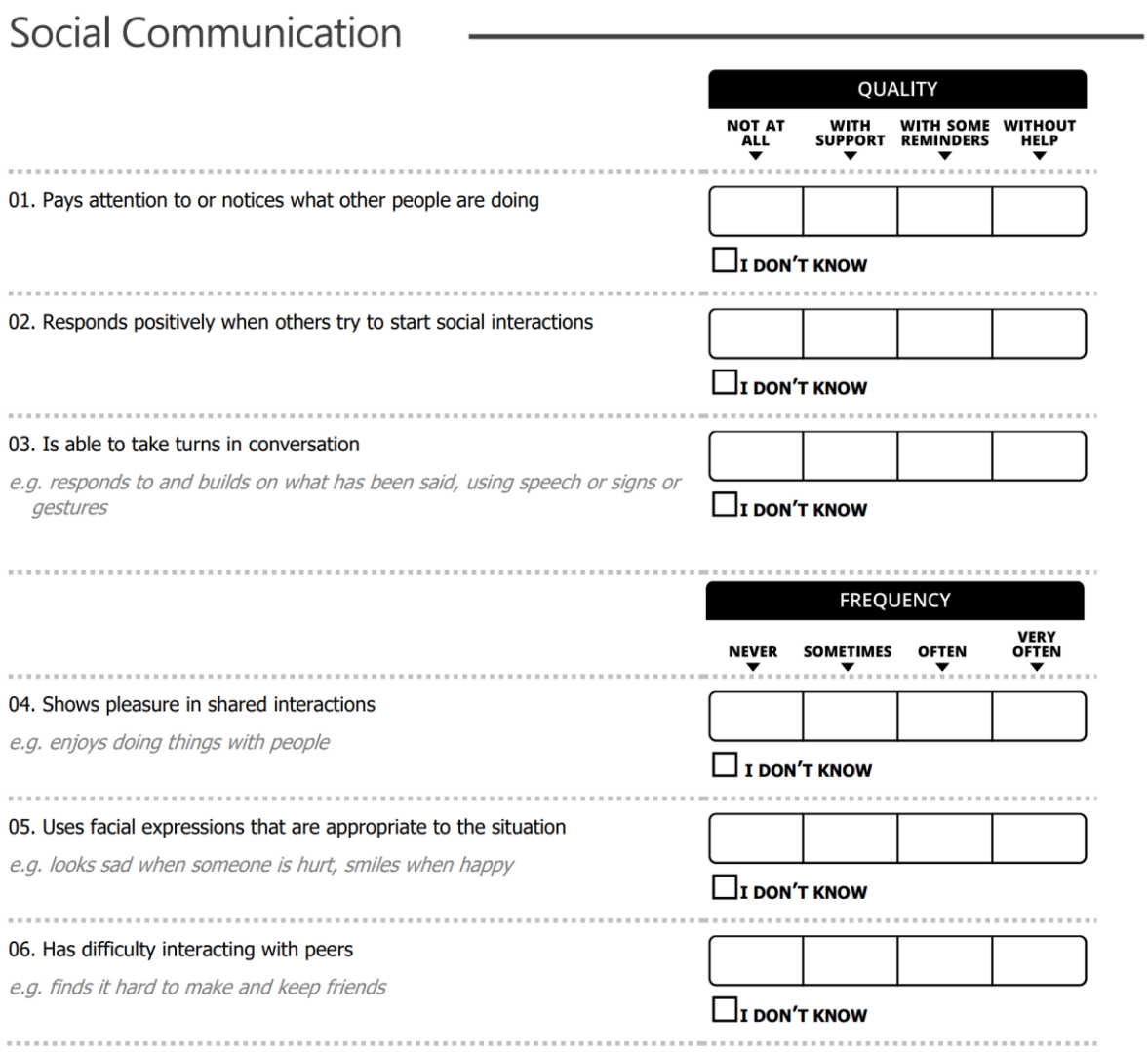
All of the data collected for this study will be anonymous. We will not ask for your name or any other identifying information. The data will be stored in a password protected file and will only be accessible to the researchers involved in the project. The anonymous data may be used in presentations, online, in research reports, in project summaries or similar. In addition the anonymous data may be used for further analysis. Your individual data will not be identifiable, but if you do not want the data to be used in this way, please do not complete the questionnaire.

If you do agree to complete the questionnaire you are free to leave any questions unanswered or to stop completing the questionnaire altogether at any point. Once the questionnaire is submitted the data cannot be withdrawn as it is anonymous so there will be no way to identify your data. We are practising Open Science and anonymised data will be managed professionally and stored indefinitely with the UK Data Service.

This research has been approved by the Dept of Education, University of York Ethics Committee. If you have any questions or complaints about this research please contact the primary researcher, Aimee Code (ac1192@york.ac.uk) or my supervisor, Dr Umar Toseeb (umar.toseeb@york.ac.uk) or Chair of the Ethics Committee (education-research-admin@york.ac.uk).

By submitting this questionnaire, you are agreeing to all of the points above.

Appendix F. The list of items in the Autism Behaviour Inventory – Short-Form.



Social Communication

	QUALITY			
	NOT AT ALL	WITH SUPPORT	WITH SOME REMINDERS	WITHOUT HELP
01. Pays attention to or notices what other people are doing				
☐ I DON'T KNOW				
02. Responds positively when others try to start social interactions				
☐ I DON'T KNOW				
03. Is able to take turns in conversation *e.g. responds to and builds on what has been said, using speech or signs or gestures*				
☐ I DON'T KNOW				

	FREQUENCY			
	NEVER	SOMETIMES	OFTEN	VERY OFTEN
04. Shows pleasure in shared interactions *e.g. enjoys doing things with people*				
☐ I DON'T KNOW				
05. Uses facial expressions that are appropriate to the situation *e.g. looks sad when someone is hurt, smiles when happy*				
☐ I DON'T KNOW				
06. Has difficulty interacting with peers *e.g. finds it hard to make and keep friends*				
☐ I DON'T KNOW				

Restrictive Behaviors

	FREQUENCY			
	NEVER	SOMETIMES	OFTEN	VERY OFTEN
07. Insists on doing things the same way each time				
☐ I DON'T KNOW				
08. Is fixated on certain topics or activities and unable to move on				
☐ I DON'T KNOW				
09. Has mannerisms or odd ways of moving his/her hands or fingers *e.g. moving fingers in front of eyes*				
☐ I DON'T KNOW				
10. Makes repetitive movements *e.g. flapping arms, rocking body, rolling head, spinning or tapping objects*				
☐ I DON'T KNOW				
11. Behaves in a way that can cause injury to self *e.g. biting self, picking skin, banging head*				
☐ I DON'T KNOW				
12. Over-reacts to noise or sounds				
☐ I DON'T KNOW				
13. Over-reacts to touch or being held				
☐ I DON'T KNOW				

Mood & Anxiety

	FREQUENCY			
	NEVER	SOMETIMES	OFTEN	VERY OFTEN
14. Worries about minor things				
☐ I DON'T KNOW				
15. Is tense or anxious *e.g. appears 'on edge'*				
☐ I DON'T KNOW				
16. Is anxious in social situations *e.g. becomes nervous or worried when in groups of people*				
☐ I DON'T KNOW				
17. Is fearful of specific objects or situations *e.g. has particular phobias*				
☐ I DON'T KNOW				
18. Has sleep problems *e.g. difficulties getting to sleep, staying asleep or waking early*				
☐ I DON'T KNOW				

Self Regulation

	FREQUENCY			
	NEVER	SOMETIMES	OFTEN	VERY OFTEN
19. Acts without thinking *e.g. is impulsive*				
	☐ I DON'T KNOW			
20. Switches quickly from one topic or activity to another *e.g. has difficulties staying focused*				
	☐ I DON'T KNOW			
21. Is excessively active				
	☐ I DON'T KNOW			

Challenging Behavior

	FREQUENCY			
	NEVER	SOMETIMES	OFTEN	VERY OFTEN
22. Is physically aggressive towards others *e.g. hits, pushes, pinches*				
	☐ I DON'T KNOW			
23. Reacts with aggression when he/she is upset or stressed *e.g. has a short fuse*				
	☐ I DON'T KNOW			
24. Has temper outbursts or tantrums				
	☐ I DON'T KNOW			

Appendix G. The full list of SENDs that participants were asked if their child had in addition to autism, as referred to in study two.

Does your **autistic child** have a diagnosis of any additional special educational needs or disabilities?
Please select all that apply from the list below.

- ☐ Attention Deficit Hyperactivity Disorder (ADHD)
- ☐ Attention Deficit Disorder (ADD)
- ☐ Developmental Coordination Disorder
- ☐ Developmental Language Disorder
- ☐ Dyslexia
- ☐ Dyscalculia
- ☐ Global Developmental Delay
- ☐ Physical Disability
- ☐ Sensory Processing Disorder
- ☐ Speech Disorder or Impediment
- ☐ Social, Emotional, or Mental Health Difficulties
- ☐ Visual Impairments
- ☐ Other

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