Types and Characteristics of Challenging Sexual Behaviour Exhibited by Those with an Autism Spectrum Disorder Diagnosis: A Systematic Review

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The candidate confirms that the work submitted is his/her own and that appropriate credit has been given where reference has been made to the work of others.

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Abstract

Introduction: Previous reviews on challenging sexual behaviours (CSB) exhibited by people with an Autism Spectrum Disorder Diagnosis (ASD) highlighted numerous inappropriate, harmful and illegal sexual behaviours, but often in limited detail and without comparison to non-ASD individuals (Beddows & Brooks, 2016; Dewinter et al., 2013). For some, core difficulties and attributes of ASD, rather than deviant sexual motives, are considered primary contributors although research remains in its infancy (Clionsky & N'zi, 2020).

Method: A mixed-methods systematic review synthesised literature from eight databases to identify the types and features of CSB (atypical and harmful) and those most commonly reported in individuals with autism (or across studies) and in any comparison non-ASD samples. Additionally, reports that CSBs were influenced by the core traits of the diagnosis were reviewed.

Results: This review included eighty-five studies (n=1,955 individuals with ASD) and identified commonly reported atypical (n=6) and harmful (n=17) CSB types (i.e., inappropriate masturbation, non-consenting touching of others, exhibitionism) with some additional reports of typical (n=3) behaviours (i.e., sexual intercourse). Numerous subtypes emerged based on features of these behaviours and further synthesis of contextual information revealed various targets (including relatives, children, and professionals) and locations (including residential and public settings). Comparison to non-ASD individuals however was limited as only six studies were identified. Finally, some studies reported associations between specific CSBs and difficulties in social skills (n=21), restricted behaviours and interests (n=13) and sensory processing (n=5), however claims lacked empirical evidence.

Discussion: This review facilitates awareness of common sexual behaviours or features relevant to professionals working with this population. Robust research and comparison studies are required to better understand CSBs and the role of ASD traits upon them before definitive suggestions for intervention and risk management can be offered. Nevertheless, the review encourages holistic approaches addressing socio-sexual knowledge, skills and behaviours whilst considering ASD vulnerabilities.

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Chapter 1: Introduction

1.1 Autism Spectrum Disorder

Autism spectrum disorder (ASD) is a neurodevelopmental condition characterised by a dyad of core difficulties with; a) social communication and interaction, and b) repetitive or restrictive behaviours, patterns, and interests (RRBI; American Psychiatric Association [APA], 2013; World Health Organisation [WHO], 2019). According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) and the International Classification of Diseases (ICD-11) criteria for ASD, difficulties in the above areas must manifest in early childhood where behaviours may be identified as disproportionate (limited or excessive) in comparison to that considered appropriate for an individual's age and socio-cultural environment. Although the onset of these behaviours typically occur during early development often displayed through delayed milestones, in some instances, these difficulties may not become apparent until later life where demands of social and occupational engagement begin to reveal individual strengths and difficulties. These presenting difficulties must be persistent and pervasive in all contexts and must cause a clinically significant impact upon functioning.

Over recent years, the classification of ASD within diagnostic manuals has changed. The DSM-5 has removed and recategorised all sybtypes of autism such as Pervasive Developmental Disorder (PDD) and Asperger's Syndrome (AS) to a single diagnosis of ASD (APA, 2013). It presents ASD on a one dimensional continuum upon which individuals are placed based on levels of severity on a scale from mild (high functioning) to profound difficulties (low functioning; APA, 2013; Bill & Geschwind, 2009). The ICD-11 (2022) has since aligned with the DSM-5 where subtypes of developmental disorders have been replaced under the overall category of ASD (WHO, 2019). Subsequently, both diagnostic manuals similarly present one overall ASD criteria (comprising of two core areas; social skills and RRBI), followed by information on onset and complexity (see appendix 1 for criteria overview). It is important to note that literature in the following introductory sections utilises the terms 'autism' and 'ASD' as authors do not always clarify diagnostic information; therefore, to avoid the risk of presenting potentially misleading or misrepresentative information, the term autism is used unless further diagnostic clarification is provided. However, the description of the current review and associated results and discussion will use the diagnostic term 'ASD' (in line with the current diagnostic criteria label) as all individuals with autism included in the review have a clearly identified autism diagnosis.

Whilst there is a more streamlined approach to diagnosis, it is essential to note that many individuals may fall on the autism spectrum however may not present above the clinical

threshold of complexity to warrant a diagnosis (Livingston & Happe, 2017). The absence of diagnosis does not suggest 'neurotypicality' as individuals could still present with some neurodiversity (Doyle, 2020) without any observable or noticeable differences. Subsequently, it would be unreasonable to claim that the remaining population, are inherently 'neurotypical' or 'typical.'

So, whilst the true prevalence of autism remains unclear, particularly due to the varying diagnostic approaches, criteria and thresholds, studies have indicated a global presence of autism between 1 to 3% (Centre for Disease Control and Prevention [CDCP], 2020; Dietz et al., 2020; Roman-Urrestarazu et al., 2021). For every four males diagnosed with ASD, one female is diagnosed with ASD (CDCP, 2020) however it is recognised that females have nuanced presentations and often mask autistic behaviour, therefore going unnoticed (Horlock, 2019). Research and statistics have also demonstrated a global increase in the rates of autism diagnosis over the last decade (CDCP, 2020; Qiu et al., 2020; WHO, 2019) which is supposedly attributed to the increased awareness, changes in practice and service availability, rather than an increase in autism frequency itself (Rutter, 2007). Nevertheless, autism remains a global public health concern with significant need for further funding, research and resources to not only better understand the potential causes of ASD, but also understand behaviours and attributes related to ASD, and the impact upon functioning (CDCP, 2020). Therefore, development and implementation of informed and evidence-based health and well-being strategies for individuals with autism and those who support them is essential.

1.2 Core Attributes of ASD

Inherent to ASD are two core areas of difficulties (see section 1.1) and it is valuable to begin with briefly understanding how these may manifest in day-to-day functioning. Individuals with ASD often experience difficulties in social-emotional reciprocity, seemingly unable to understand the social and interpersonal cues (Boutot, 2016) fundamental to initiating, responding and maintaining interpersonal two-way interactions (Constantino et al., 2000). Furthermore, expressive and receptive non-verbal communication may be equally impacted (APA, 2013) with noticeable differences in level of eye contact (absent or intense), use or recognition of facial expressions (i.e., not recognising when someone is angry) and body language (i.e., unable to follow direction when pointing). Although some individuals may entirely lack interest in establishing relationships with others, others may have a desire to do so (Strunz et al., 2017), yet struggle with the social and emotional demands of these. The level of difficulty can vary amongst individuals, and many develop compensatory strategies as they progress through life such as learning set phrases to initiate conversations or consciously planning to offer eye contact at regular intervals (Livingston et al., 2019; Ray et al., 2004).

Notably, differences in cultural expectations around what constitutes as normal social communication and interaction should be acknowledged to avoid potential misinterpretation of behaviour (Freeth et al., 2013).

Some authors have proposed that delays or deficits in the development of Theory of Mind (ToM) may account for some of these difficulties (Kimhi, 2014). ToM refers to the ability to attribute subjective mental states to oneself and others; this implies an awareness and understanding of the desires, perspectives and motives of others which may differ from one's own (Baron-Cohen, 2000). It enables emotional connections, exchange of ideas and anticipation of behaviour (Kimhi, 2014). Although it is considered that ToM is not alone sufficient to explain social skill differences in those with ASD as this is likely combined with other factors such as one's ability to recognise and understand non-verbal cues, one's social motivation and the level of opportunity an individual has to practice social interaction (Rosello et al., 2020).

The second core area of difficulties are those related to RRBIs which are considered to make up a large proportion of the behavioural repertoire in individuals with autism (Rapp & Volmer, 2005). These are split into lower and higher order behaviour based on the level of cognitive skill involved (Bishop et al., 2007; Turner, 1999). Lower order behaviours may include repetitive motor movements (i.e., hand flapping and twirling), repetitive speech (i.e., echolalia), self-stimulation (i.e., self-harm) or object manipulation (Harrop et al., 2021). Higher order repetitive behaviours on the other hand are those considered to include routines and rituals, inflexibility and circumscribed or intense interests (Attwood, 2003). Blocking engagement in RRBIs can in some instances cause heightened states of anxiety, distress and possibly lead to frustration and aggression (Georgiades et al., 2011; Kanne & Mazurek, 2011).

Within the DSM-5 criteria of RRBI, reference is also made to difficulties in sensory processing (APA, 2013; Bogdashina, 2003; Kojovic et al., 2019) related to one or more of the primary senses including visual, auditory, olfactory, gustatory and tactile (APA, 2013). These may manifest in the form of hyper-reactivity where individuals experience sensory overload and subsequently may avoid certain sensations (such as particular textures or noisy settings) or alternatively, individuals may be hypo-reactive where they engage in sensation seeking behaviours (such as eating nonedible items). Thus, individuals may respond to environmental stimuli in a way which is considered 'unusual' (Lane et al., 2012; Reynolds et al., 2011).

Nevertheless, traits of ASD may manifest differently in individuals, presenting diverse and varied behaviours (APA, 2013). Furthermore, it is not unusual to witness some of these behaviours in non-ASD groups i.e., those with obsessive compulsive disorder (OCD) or social

anxiety (Ben-Sasson et al., 2009; Leekam et al., 2007) although within ASD these difficulties are evident and pervasive across both domains and are often noticeable from early childhood.

1.3 Challenging & Offending Behaviour in ASD

The reduced social and communication skills coupled with the restricted repertoire of activity and interests may predispose a relatively small proportion of individuals with ASD to engage in behaviours that are considered problematic or challenging (Clionsky & N'Zi, 2020; Hancock et al., 2017). Challenging being those which interfere with one's social, occupational, or relational functioning or are deemed inappropriate or harmful (Emerson & Bromley, 1995; Xeniditis et al., 2001). Whilst some behaviours may purely interfere with day-to-day functioning due to their intensity, frequency or duration, others may significantly pose risk to oneself (i.e., self-harm) or others (i.e., aggression; Clionsky & N'Zi, 2020) some resulting in repercussions or criminal implications (Hancock et al., 2017). However, studies have identified that the rates of offending are no higher in people with ASD than in the general population (Hippler et al., 2010; Mouridsen et al., 2008; Yu et al., 2020) with some actually highlighting lower rates of criminality (Hofvander et al., 2019; King & Murphy, 2014). Mouridsen et al (2008) found significantly lower levels of criminal behaviour in those with childhood autism (0.9%, $p<0.0001$) and PDD (9%, $p<0.0002$) in comparison to the general population (18.9%, 18% respectively) with some difference also found in those with an atypical autism diagnosis (8.1%<14.7%) when comparing a large sample of individuals (n=313 with ASD vs n=933 from the general population). Within those who do engage in criminal behaviour, the proportion of individuals also appears to vary greatly (Allen et al., 2008; Cheely et al., 2012; Rutten et al., 2017) with a recent review highlighting rates as low as 5% to 26% which were also reported to be lower than in the general population (Rutten et al., 2017).

Despite this, literature has surprisingly indicated an overrepresentation of individuals with autism in forensic psychiatric and prison populations (Cashin & Newman, 2009; King & Murphy, 2014; Rutten et al., 2017). Fazio et al (2012) found that over 4.4% of the sample explored (n=431) in a high secure prison in the USA met the criteria for an ASD diagnosis which is far greater than the rate of ASD in the general population and similarly Siponmaa et al (2001) also found a high prevalence of ASD (15% PDD, 12% PDD-NOS, 3% AS) amongst juvenile offenders (n=126). According to Rutten et al's (2017) two-part review, the rate of ASD in offender populations across such settings varied from 2.3% to 15% across seven studies, all of which being greater than that observed in the general population. Whilst it is difficult to truly establish reasons for the greater prevalence of ASD in forensic settings, it can be speculated that offence severity, misperceptions surrounding risk, and inadequate resources or knowledge to

support individuals with ASD in other provisions due to complex needs may account for some of these differences.

In addition, differences in the inclusion or exclusion of certain offence types, formal charges, non-convicted actions (i.e., cautions) and varied contact with law enforcement may also explain some variability across studies. Furthermore, it could also be accounted for by methodological or sample differences (including setting selection and recruitment criteria) as well as the changes in diagnostic criteria over time. These shortcomings alongside the lack of control groups suggests that emphasis on prevalence rates should be considered with caution.

Saying this, diversity within the ASD population should not be overlooked. For some, access to support or supervised environments, may reduce the likelihood of such behaviours occurring (Mouriseden, 2012; Sevlever et al., 2013). Furthermore, rigid thinking and fixations could for some mean abiding by rules and laws are of great importance and emphasis may be placed upon precisely and accurately following rules (Howlin, 2007; Mouridsen, 2012). An overriding sense of right and wrong could increase unwillingness to break the law (Tantam, 2000) and therefore for some, features of ASD may serve as a protective factor and reduce the chances of engaging in illegal behaviours.

Nonetheless, where claims about offending behaviours have been made, evidence has explored the types of behaviours displayed (Hofvander et al., 2019; King & Murphy, 2014). Some comparative studies have indicated that those with ASD engage in largely similar forms of offending to those without ASD (Hippler et al., 2010; Hofvander et al., 2019; Lindsay et al., 2014) where property crimes such as theft are identified as the most common types of crimes in both populations (Hippler et al., 2010; Hofvander et al., 2019). Contrasting to this, other studies reveal that individuals with autism may be more likely to engage in certain types of criminal behaviours, particularly offences against the person (Yu et al., 2020) such as sexual offences, assault and non-contact offences (i.e., stalking), more so than crimes such as driving or drug offences (Cheely et al., 2012; Kumagami & Matsuura, 2009).

King and Murphy's (2014) review explored the type of offences individuals with autism engaged in, however emphasised that conclusions can only be based on robust studies using unbiased samples, adequate sample sizes and comparison groups. The review revealed that only two studies met this standard (Cheely et al., 2012; Kumagami & Matsuura, 2009) as most literature used small or biased samples ('offender only' groups) or lacked control groups. Cheely et al (2012) demonstrated that individuals with ASD (n=32) showed higher engagement in offences against the person (38.8%, including sexual offences) and lower property offences (20.4%) in comparison to non-ASD (n=99) individuals (19.8% and 28.6% respectively).

Kumagami & Matsuura (2009) in their study (n=28 PDD vs n=298 non-ASD) also found a significantly lower rate of property crimes in individuals with ASD (14% versus 57% in non-ASD individuals) but a significantly larger difference in sexual crimes (17.8% versus 5.5% respectively). Evidently, both studies revealed a greater level of person-directed offences inclusive of sexual offending. However, further robust evidence regarding differences in offence-related behaviours is required (King & Murphy, 2014) and as studies continue to explore this area (Hofvander et al., 2019; Yu et al., 2020) they should seek to address these limitations, or at minimum, acknowledge unsupported claims.

1.4 Sexual Behaviour

As some research has indicated the greater presence of sexual offending behaviour in comparison to other offences (Cheely et al., 2012; King & Murphy, 2014; Kumagami & Matsuura, 2009; Yu et al., 202 there is growing interest in the sexual behaviour (SB) of individuals with ASD, particularly related to that which is considered challenging (Higgs & Carter, 2015; Kellaher, 2015). However, to fully understand the evidence base in relation to this, understanding terminology and key concepts within the wider literature around SB is necessary, particularly in relation to ‘typical’ and ‘atypical’ actions.

SB refers to a broad spectrum of behaviours related to the expression of one’s sexuality and often involves genital-related activities or sexual pleasures (APA Dictionary, n.d.; National Centre on the Sexual Behaviour of Youth, n.d.). It is considered to be greater than just physical expression and encompasses attitudes, experiences (solitary and partnered) and desires (APA Dictionary, n.d.). Tolman and McClelland (2011) formed a conceptual framework explaining the development of normative SB and sexuality within the 21st century based on their review of literature from the past decade. Their framework offers a multidimensional perceptive on understanding normative sexual behaviour which goes beyond merely focusing on sexual functioning or reproductive health alone. They identified three key constructs of this; SB (actions expressing sexuality), sexual selfhood (internal development) and sexual socialisation (social contexts in which sexual knowledge and experience develops). Their framework emphasised that these should be in line with the average or expected behaviours of a community or group, however as individual expectations can vary within this, ‘normative’ is considered that which does not interfere or affect the well-being of oneself and others (Tolman & McClelland, 2011). Whilst their framework encompasses different domains and acknowledges time and societal differences within this, the review of English only journals arguably excludes cultural differences in how ‘normative’ is considered and constructed. Furthermore, given that there is likely to be considerable evidence which was since published and is yet to be evaluated, an

updated insight into the growth of the area over the last decade as well as consideration of other conceptual trajectories is necessary.

As SB varies across cultures, time and social groups (Marston & King, 2006), it is difficult to provide a definitive definition or offer clear and concise distinctions between what is acceptable or unacceptable and to which degree. These are often open to subjective interpretation unless a legal definition is accessible, although these too, evolve over time and differ culturally. For example, in some instances, the 'unwanted' nature of the behaviour can be used to distinguish between inappropriate and appropriable behaviours (Ravensberg & Miller, 2003) however, individual preference may vary person to person. Likewise, matters of consent can become problematic; whilst a child under the legal age cannot provide consent, adults may not engage in overt consent processes (Willis et al., 2021) and attempts to determine whether consent was established prior to, or during sexual activity, may be unclear. Moreover, specific forms of SB considered as atypical by some, may be perceived as normal or appropriate by others such as the behaviours BDSM (bondage, domination, sadism, masochism) communities may engage in. Such ambiguity and diversity can be confusing during socio-sexual development and functioning and can raise complications when defining terms for research and literature purposes. Saying this, some distinctions in relation to problematic SB have been identified which have informed language and categories within research, intervention and practice. Whilst this is not an exhaustive list, an overview of some of the key terms and concepts have been described.

The term 'inappropriate sexual behaviour' (ISB) is generally considered 'a verbal or physical act of an explicit, or perceived sexual nature, which is unacceptable within the social context in which it is carried out' (Johnson et al., 2006, p.688). This includes behaviours such as obscene gestures, sexual remarks, exposure or masturbation in public (Beddows & Brooks, 2016) where actions may or may not be related to sexual disinhibition (Hashmi et al., 2000). The emphasis here is largely on the social context where a behaviour could be regarded as appropriate if conducted within a different setting or situation.

'Sexual deviance' on the other hand describes a sexual act which specifically involves an unusual source of sexual arousal (Feierman, 2000; Van Bommel et al., 2018) and is defined as an intense and persistent sexual fantasy or behaviour that involves unusual objects, activities or situations (APA, 2013). Within the DSM, sexual deviance is an umbrella category and includes paraphilias such as frotteurism, sexual sadism and paedophilic disorders amongst numerous others. Importantly, this can include both contact (paedophilia, sexual assault) and non-contact (object fetishism) behaviours. These are generally considered to cause distress, harm or humiliation and involve children or non-consenting adults (Gee et al., 2004).

Interestingly however, Joyal and Carpentier (2017) revealed that many SBs and interests deemed as deviant (other the those related to paedophilia) are common in the general population with approximately a third of their sample having engaged in at least one form of paraphilia. This raises the question as to how deviance is defined and against which standard. Nevertheless, it is considered that sexual deviance may predispose some individuals to committing sexual offences and therefore, should not be overlooked (Thornton et al., 2018).

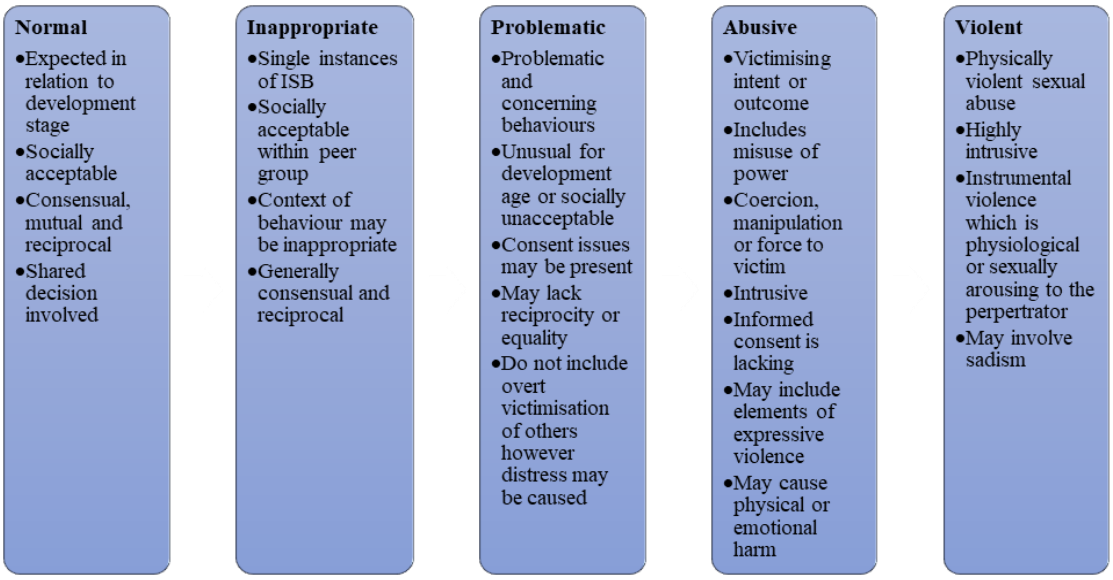
'Harmful sexual behaviour' (HSB) is also an umbrella term which is commonly used to refer to all behaviours perceived as harmful to self or others including those where coercion or force is involved or those which may be deemed as harmful if it is unsuitable for one's developmental age (National Society for the Prevention of Cruelty to Children [NSPCC], 2019). This can include a range of different behaviours such as the use of sexually offensive language to sexual activity with others (Belton & Hollis, 2016; Rich, 2011). Although this term and definition focuses on young people, this can be applied to adult populations. It places emphasis on identifying appropriateness related to one's developmental stage, context of the behaviour and the presence of force (NSPCC, 2019). Like other definitions however, this too seems subjective and poses difficulties in interpretation.

Evidently, terms related to sexual behaviour also lack clear definitions and may be applied differently within literature or practice unless informed by legal or diagnostic definitions (however, these too evolve as mentioned earlier). Additionally, there may be overlap amongst some of these terms and therefore it is important to acknowledge that these may not be mutually exclusive to one another. For example, a sexually deviant behaviour could also be accounted for as HSB such as indecent assault of a child. Alternatively, an ISB such as masturbation in public could be perceived as harmful based upon the witnessing individual's perception and distress experienced. Notably, the terms used to refer to particular behaviours and actions can vary and therefore the subjective or interpretive nature of these should not be overlooked.

A widely utilised model of SB is that proposed by Hackett (2010) which identifies a range of SBs on a continuum ranging from normative to highly violent (see figure 1). Although this model was specifically designed to understand the range of behaviour in children and young people, this can also be applied to understanding the range of behaviours in adults, whilst acknowledging matters of consent. Where behaviour falls on this continuum is largely related to the frequency, contextual appropriateness and level of harm being exhibited.

Although Hackett's categories do not provide a comprehensive list of behaviours, they provide detailed explanations and examples related to each of the areas whilst providing a

Figure 1: *Hackett's (2010) HSB Continuum Model from the HSB Framework (Hackett et al, 2019)*



representation of how SBs can vary (Johnson et al., 2006). This model presents an approach to understanding and recognising differences within SB and provides important distinctions such as those highlighting that not all problematic behaviours may be abusive. Most importantly, it recognises the importance of establishing context and motivations to understand the significance of the behaviour portrayed (Hackett, 2010; Johnson et al., 2006).

Despite attempts to conceptualise and define aspects of SB, further clarification is required as it remains difficult to establish a shared understanding of what lies within or beyond the parameters of acceptable behaviour. This may lead to inconsistencies in understandings and perceptions of sexual behaviour within research and clinical practice. Within this paper, the author uses the above descriptions to inform how SBs will be considered and categorised for the purpose of this review. These will be explained within the method section.

1.5 Sexual Behaviour in ASD

Historically, numerous misconceptions have existed regarding the sexual, romantic and marital interests and desires of those with developmental conditions, however, important advances in literature have highlighted that many individuals with ASD possess the same socio-sexual interests as the general population (Bennett et al., 2018; Byers et al., 2013; Joyal et al., 2021; Kellaher, 2015; Pecora et al., 2016). A major contribution to this evidence base was the TEACCH (Treatment and Education of Autistic and related Communication Handicapped Children) report on sexuality and autism (Autism Independent UK, n.d.). This report was based

on the principles of the TEACCH Programme (Mesibov et al., 1983: Mesibov et al., 2005; Schopler, 1998); a programme adapted and utilised worldwide (Schopler & Mesibov, 2000) and recognised by the APA (Mesibov et al., 2005), to understand, support and address the difficulties experienced by those with ASD. The TEACCH report on sexuality was central in formally recognising and highlighting that those with ASD possess the same sexual interests, urges and behaviours as the general population despite different trajectories to typical sexuality development. Due to the neurodevelopmental delays and the social difficulties, they may experience in navigating relationships, duty was placed on educators and clinicians to better understand the sexual desires, behaviours and needs of individuals with ASD. Emphasis was placed on professionals to support those with ASD to develop the necessary knowledge and skills to form safe and appropriate intimate behaviour and relationships and to fulfil their basic human need for companionship and sexual satisfaction.

Some literature has identified that individuals with ASD are able to engage in healthy relationships (Schöttle et al., 2017; Turner et al., 2017) and healthy sexual functioning with little difference to individuals without ASD (Byers et al., 2013; Dewinter et al., 2015). A study by Gilmour et al (2012) found no significant differences in sexual experience and sexual knowledge when comparing adults with (n=92) and without ASD (n=282) and similar findings by Dewinter et al (2015) found similarities in self-reported SB, interests, and attitudes in adolescent boys with ASD (n=50) in comparison to matched controls (n=90). However, Joyal et al's (2021) recent study highlighted that although individuals with ASD engaged in healthy sexual relationships, their experiences were less varied, and individuals expressed lower levels of sexual knowledge in comparison to typically developing individuals. This suggests that the ability to engage in healthy relationships does not necessarily mean intimate relationships are effortless.

1.6 Challenging Sexual Behaviour in ASD

Numerous concerns have been raised in relation to the sexual activity of those with ASD as socio-sexual knowledge can vary and individuals with ASD can sometimes struggle to implement this knowledge in real life practical situations, sometimes leading to inappropriate or harmful behaviours (Hellemans et al., 2007; Ruble & Dalrymple, 1993; Stokes et al., 2007; Stokes & Kaur, 2005), including those of an offending nature (Griffin-Shelley, 2010). These may be referred to as challenging sexual behaviours (CSB).

Growing research in the area has identified a range of behaviours in those with autism who present with CSB, from relatively innocuous behaviours such as talking about sex in socially inappropriate settings, to more deviant or harmful behaviour which could result in legal

consequences or harmful repercussions (Beddows & Brooks, 2016; Dewinter et al., 2013, 2016; Hellemans et al., 2010; Stokes & Kaur, 2005). These have included; compromising privacy (Helleman, 2007); inappropriate touching (Stokes et al., 2007; exposure of oneself (Larson et al., 2021; Schottle et al., 2017); excessive or public masturbation (Albertini et al., 2006; Hellemans, 2007; Murrie et al., 2002); non-consensual groping or touching private body parts of another (Coskun et al., 2009; Stokes et al., 2007) and possession of inappropriate child sexual exploitation material (CSEM; Allely et al., 2019; Griffin-Shelley, 2010). The presence of non-contact SB such as intrusive courtship behaviours related to stalking, sexual harassment or inappropriate verbal advances have also been reported often within this population (Stokes et al., 2007).

Dewinter et al (2013) combined information from qualitative and quantitative studies including case reports (n=55) describing the wide range of deviant and unusual SBs reported in those with ASD. The narrative review discussed the proportion of studies and samples which referred to these behaviours and highlighted that masturbation in public was one of the most reported behaviours. Other commonly reported SBs included arousal, masturbation using unusual objects, fetishism, and deviant interests (including interest in children). Although some brief information regarding the nature of SB was noted in the review (interest in feet, masturbation in public, sexual violence or assault), specific details and descriptive information (location, age and gender of other individual, object used) was only briefly noted. Therefore, whilst this review was able to identity some common forms of CSB which occur, it did not explore whether there were also common characteristics such as contextual information associated to these behaviours. If certain behaviours are displayed by those with ASD more so than others, could this too be reflected in the associated characteristics (for example, target age, gender, relationship, setting or context) and reveal common contexts in which behaviours occur or towards what or whom they are exhibited?

More importantly, the review failed to explore a comparison of these CSBs with data from non-ASD populations; behaviours mentioned within the literature are certainly not unique to those with ASD and are also prevalent in the wider population (Office for National Statistics, 2021a; 2021b), however, differences may lie in the range or extent of behaviours displayed. Some previous studies clearly demonstrate the higher prevalence of these behaviours in ASD samples than in non-ASD samples by using comparative groups (Stokes et al., 2007; Stokes & Kaur, 2005). For example, some studies have revealed that behaviours such as exposure (Cervantes & Matson, 2015) and stalking (Mogavero & Hsu, 2019) are significantly greater in those with ASD than non-ASD controls. Other studies have suggested the greater presence of behaviours involving touching others inappropriately without consent (Stokes & Kaur, 2005; Stokes et al., 2007) with contrasting evidence showing this as a non-significant difference

(Cervantes & Matson, 2015). However, differences in comparison accounts may account for some of the differences in results.

Whilst some studies explore these differences in ASD and non-ASD groups, many studies merely describe the presence of these type of sexual behaviours in small samples or case studies without consideration of similarities or differences to other populations (Griffin-Shelley, 2010; Realmuto & Ruble, 1999; Ruble & Dalrymple, 1993). Therefore, it is difficult to establish whether any particular types of challenging or offending SBs occur more in one population than the other; thus, further research or review of evidence could help to better understand this. Subsequently, if areas of greater risk are identified in either population, the development of targeted education programmes, treatment strategies, risk management and support could be directed.

1.7 Factors Associated to Challenging Sexual Behaviour

Within the literature, CSBs are considered to be influenced by numerous factors, processes and motivations (Seto & Lalumière, 2010). The Integrated Theory of Sexual Offending (ITSO) by Ward and Beech (2006, revised 2016) provides a useful and holistic framework to understand the underpinning mechanisms and aetiology of sexual offending which can potentially be applied to understand CSB in general. The framework describes that sexually acting out behaviour, like most human actions, are a consequence of complex interactions between a range of causal factors and mechanisms, internal and external. They suggest that a range of clinical difficulties and behaviours (emotional states, social difficulties, sexual deviances) are underpinned by the interaction between ones' biology (genetic disposition and brain development), neuropsychological functioning (cognitive and executive such as motivation, emotion, memory, perception and control), and ecological factors (sociocultural, environmental triggers, circumstances). The dynamic and constantly changing interaction between these can subsequently motivate or lead to sexual offending behaviours for some. The ITSO model integrates theory and research on risk factors related to sexual offending and is subsequently argued to provide a well-rounded approach to considering the operations behind such actions. It not only describes the emergence of SB but also the maintenance of this behaviour over time (which is a distinction from prior theories), where the outcome of the initial SB is considered to strengthen sexually deviant motivations, thus making them more likely to re-occur (Salerno, 2014). Given the multifactorial and integrated theoretical explanation for sexual offending the model provides, it has been widely applied in understanding such behaviours across literature (Elliot & Beech, 2009; James & Proulx, 2020). However, to date there appears to be a lack of empirical evaluation of the ITSO model, as well as a lack of evaluation of sexual offending frameworks in general (Salerno 2014).

Drawing on some components of this model, Seto (2019) developed the motivation-facilitation model which although was originally developed to explain offences against children, it can be applied to a range of sexual offence behaviours particularly those where paraphilic interests may be present. Seto explained that the primary motivation of sexual offences (contact and non-contact) is related to three motives: high sex drive, paraphilia and intense mating effort. However, these motivations are not enough to transpire into behaviour unless someone has significantly low self-control and is unable to resist from acting upon these. These motivations are controlled or aided by individual traits (antisocial tendencies) and current states (intoxication, mood, stressors), which lead to actions when tempting opportunities arise. However, further research into the pertinence of this model in explaining the diverse range of SBs involving adults and children is needed (Seto, 2019). Comparably, both models take into account similar factors and offer a holistic perspective of CSB, with both identifying self-control and personal agency as a mediator between motivations and internal and external states. However, it could be argued that Seto (2019) places greater emphasis on processes in that self-control, opportunity and current states are considered to play a fundamental role in translating motivations into behaviours, which is discussed in-depth within the theory.

Numerous studies support the notion that the primary motivators of a deviant, violent or sexual nature (Fox, 2017; Harris et al., 2009) manifest into sexual offending behaviours, when combined with inherent antisocial tendencies and exposure to particular life factors and events (Harris et al., 2009). Those may include static factors such as early childhood trauma or abuse (Babchisin et al., 2011; Fox, 2017) and previous criminal involvement (Fourie et al., 2017; Lussier et al., 2005), as well as numerous dynamic factors including lack of empathy (Fox, 2017; Geer et al., 2000; Hanson & Harris, 2000), drug and alcohol use (Lussier et al., 2005), and sexual preoccupation or sexual entitlement as well as numerous other factors (Hanson & Harris, 2000). However, it is not possible to establish whether motivations precede sexual offending behaviour and motives other than those sexually related, such as power, control or revenge could also be present (Pullman et al., 2016). More importantly, this literature largely relates to the overall population and generally refers to ‘typical’ or ‘neurotypical’ samples; however, we cannot assume a lack of neurodiversity amongst individuals unless ‘neurotypicality’ can be clearly proven or established. Factors considered to contribute to CSB or sexual offending in neurotypical populations are likely to have similar, if not greater effects on those presenting with diversity, particularly those with pre-existing psychological or neurological conditions due to their additional vulnerabilities; subsequently, the factors described above should not be viewed in isolation.

Due to the complex presentation of those with ASD, additional factors contributing to CSB may need to be considered, yet ASD specific sexual offending theories and models are

lacking. Recently, Worthington (2019) utilised Ward & Beech's (2006, 2016) theory as an underlying framework to describe sexual offending in those with comorbid ASD and intellectual disability (ID) by drawing upon related literature. Worthington suggests that in addition to pre-existing biological and neurological vulnerabilities, learned associations also play a significant role within the display of HSB. Worthington also expands on the ITSO model to highlight that 'reward' systems in atypical populations are driven by different needs and therefore SB may be underpinned by functions which go beyond those highlighted by Ward and Beech (i.e., emotional dysregulation or sexual deviance alone; 2006; 2016). Worthington sheds light on five main areas of sensory, escape, attention, physical and tangible needs, which are considered to additionally influence SB in those with ASD and comorbid ID. It is considered that the displayed act (SB) may be addressing one or more of these internal or external needs such as; rubbing oneself for a sensory release or to express frustration, touching others in attempt to initiate a relationship, or exposure to elicit attention or gain something tangible. Essentially, SB is acting as a means of fulfilling a personal need where the immediate achieved outcome acts as a reinforcer to the behaviour. Therefore, this model not only expands on an established framework by also considering atypical populations but highlights the greater significance of learned association in those with cognitive and neurological delays. To the authors knowledge, this is currently the only theory of sexual offending tailored specific for those with ASD and whilst it could be argued that ASD only models remain unavailable, the inclusion of comorbidity likely presents a more realistic representation of the population. Nevertheless, to date the Worthington model has received little inquiry and evaluation possibly due to its recent publication therefore future research should seek to explore this further to better understand the value and applicability of the proposed model.

Some evidence suggests that the core difficulties and attributes of ASD play an additional role in potentially contributing to sexually challenging and offending behaviour, in combination to other predisposing factors and motivations (Clionsky & N'Zi, 2020). Numerous studies have provided support for this hypothesis and highlighted the potential relationship between ASD traits and atypical and problematic SB (Aral et al., 2018; Beddows & Brooks, 2016; Creaby-Attwood & Allely, 2017; Dewinter et al., 2017; Early et al., 2012; Hellemans et al., 2007). Kumar et al. (2017) identified common factors across five individuals with an AS diagnosis which were considered to relate to the primary traits of ASD such as impaired ability to understand social interaction and cues, failure to conform to social norms, impaired ToM and persistent or obsessive preoccupations. Similarly, Allely and Creaby-Attwood (2016) also revealed vulnerabilities related to the core attributes of ASD in a small review of case studies involving individuals with ASD who had engaged in sexual offending. They found that 'excessive' or 'abnormal' levels of restricted interests and obsessive preoccupations (as

described by the author), and the presence of impaired ToM and social functioning were markedly present within each of the cases. However, these studies relied on small samples and limited empirical evidence (Allely & Creaby-Attwood, 2016; Kumar et al., 2017).

Nevertheless, findings specifically on socio-sexual functioning within those with ASD have described sexually acting out behaviours and difficulties in forming and maintaining healthy relationships as manifesting from limited skills in social emotional reciprocity and communication (Clionsky & N'Zi, 2020; Dewinter et al., 2017; Griffin-Shelley, 2010; Hancock et al., 2017; Higgs & Carter, 2015). Troubles in navigating interactions and acting in line with social norms and expectations could unintentionally lead to behaviours which are sexually inappropriate (Allely & Creaby-Atwood, 2016; Haskins & Silva, 2006) further exacerbated by difficulties in reading and understanding nonverbal cues (Mintah & Parlow, 2018). For example, individuals may struggle to recognise facial expressions or fear in others including in images or videos of abused children in CSEM (Woodbury-Smith et al., 2005). Desire for sexual experience and attachment coupled with the reduced social capacity, knowledge, and cognitive skills to act within social norms or relationships boundaries (including those with children) could result in feelings of isolation and loneliness (Murrie et al., 2002). Subsequently, in an attempt to seek connections to address these attachment or intimacy barriers, individuals may display behaviours towards others which may be unacceptable or harmful due to their actual (touching others in inappropriately) or perceived (following someone) sexual connotation (Murrie et al., 2002; Worthington, 2019). Alternatively, they may use unconventional or harmful ways such as the use of CSEM in order to better understand relationships, sexuality and pursue their curiosities which are unrestricted by social taboos and legal rules; thus, failing to appreciate and understand the illegality of their actions (Allely & Dubin, 2018).

In addition, due to the proposed ToM difficulties apparent in those with ASD, the reduced ability to perspective-take and understand social and mental states including emotions, desires and cognitions may further increase the risk of engaging in sexually inappropriate or harmful behaviour (Griffin-Shelley, 2010; Mintah & Parlow, 2018). In instances where intentions may be misread, misperceived, or misinterpreted, individuals with ASD may attempt to engage in undesirable sexual contact despite the display of disinterest shown or expressed by the others (Haskins & Silva, 2006; Freckelton & List, 2009). In consideration of Ward & Beech's theory (2006; 2016), neurological differences in areas of the brain which are responsible for perception may account for the problematic or hindered interpretations of social encounters. Therefore, individuals may lack the necessary skills to identify suitable partners and engage in consensual two-way relations. Whilst some individuals with ASD may understand that others have their own interests, motivations and desires which are different to their own,

they may find it difficult to apply this understanding in day-to-day situations, particularly in heightened states of arousal (Rosello et al., 2020).

According to Payne and colleagues (2020) difficulties in interaction and understanding boundaries and consent combined with a lack of awareness of the seriousness or consequences of behaviours played a central motivating role in sexual offending behaviour in individuals with autism. This is one of few studies which offered first-hand information regarding the motivations behind sexual offending in a sample of individuals with autism, although it must be noted that a period of disequilibrium (such as significant life changes or altered mental state) prior to committing the sexual offence was also reported for some. Furthermore, the identification of autistic individuals was reliant on criminal justice system (CJS) staff where training and diagnostic criteria used within the process was unknown to the authors (Payne et al., 2020). Whilst there is some support for the influential role of ASD specific social and relational vulnerabilities upon CSB, the extent and robustness of the evidence base overall supporting this hypothesis is yet to be established and of course, causal relationships cannot be determined. In fact, these attributes in some instances may reduce such risk as challenges in establishing trust and collaborative relationships, could cause a social distance therefore reducing chances for facilitating and engaging in CSB against others (Sevlever et al., 2013). Notably, social-emotional communication difficulties and problems with ToM are not unique to those with ASD and many individuals could experience similar difficulties which arguably makes them equally vulnerable to engaging in CSB.

Within the evidence base exploring CSB in those with ASD, authors have also reflected on the primary role of RRBIs upon these behaviours where obsessional and restrictive characteristics have been suggested to contribute to atypical and deviant SBs in some individuals (Kellaher, 2015). As mentioned earlier, individuals who persevere with an interest may find it difficult to refrain from this behaviour due to reduced self-control (Seto, 2019). Hence, this could become problematic or be experienced as offensive or harmful in instances where this has an actual or perceived sexual component or connotation (Allely & Creaby-Attwood, 2016; Higgs & Carter, 2015; Kellaher, 2015). Similarly, an interest directed towards a particular individual or group may turn into a sexual or deviant preoccupation (Clionsky & N'zi, 2020; Ray et al., 2004). For example, an initial interest in pornography could easily manifest into an obsession which begins to severely impact social, occupational, or romantic functioning (Education Psychology Service, 2020). Interestingly, Allely and Dubin (2018) reported that several cases of individuals with ASD were found in possession of large and excessive collections of pornographic content, including CSEM, with thousands of unopened and unviewed files reflecting the likely ritualistic nature of the behaviour rather than simply being evidence of a greater likelihood of contact offending. They suggested the role of obsessive and

restricted interests in collecting specific content as the primary motivator, rather than sexual deviancy or paraphilic interest in children.

Where behaviours are embedded with rigidity, altering or intervening can become difficult. Interruption or disruption may lead to frustration or heightened states of distress which could in turn increase the risk of sexual aggression or violence (Silva et al., 2002). Furthermore, rigidity could also interfere with established relationships where the lack of flexibility becomes problematic for the partner, not only reducing the naturalness and playfulness of interactions (Maria et al., 2013) but possibly in some instances, sexual contact may become extremely prescriptive and uncompromising.

Likewise, sensory needs could also manifest in unusual or problematic sexualised behaviour (Beddows & Brooks, 2016; Higgs & Carter, 2015) where the over- or under-reaction to sensory stimuli during sexual encounters may impact physical interaction with partners and self-gratification (Aston, 2012; Henault, 2005). For example, individuals who are hypersensitive to physical touch may find some sensations as unpleasant or distressing and could struggle to tolerate the internal states caused by physical intimacy hence resulting in negative, extreme or aggressive reactions (Urbano et al., 2013). On the other hand, those who are hyposensitive may have problems reaching orgasm or getting aroused and therefore may seek pleasure in unusual or extreme manners or become frustrated as a result (Henault, 2005). Such intense sensory desires could contribute to paraphilic or sexual offending behaviours (Dozier et al., 2011; Hellemans et al., 2007) such as in those who may seek individuals based on appealing sensory preferences such as scents, colours, or textures (Al-Attar, 2019). Therefore, desires to fulfil sensory needs could increase the likelihood of individuals impulsively displaying sexual offending or challenging behaviour (Seto, 2019; Ward & Beech, 2006; Worthington, 2019).

Overall, whilst there are likely numerous explanations for CSB, some evidence supports the suggestion that CSBs in individuals with ASD may to some degree be influenced and exacerbated by underlying traits of their neurodevelopmental condition due to differences in how they process information and make sense of the world (Woodbury-Smith et al., 2010). The inherent traits of ASD combined with limited socio-sexual knowledge, reduced opportunities to learn from experiences and limited recognition of harmful, immoral or illegal behaviours may make individuals vulnerable to engaging in sexually inappropriate, deviant or offending behaviours (Beddows & Brooks, 2016; Mehzabin & Stokes, 2011; Mogavero, 2016; Stokes et al., 2007; Woodbury-Smith et al., 2010). Subsequently, some of these actions are a consequence of reduced or limited capacity as opposed to actions resulting from malice (Griffiths et al., 2013; Ruble & Dalrymple, 1993; Sperry & Mesibov, 2005) which may be referred to as ‘counterfeit deviance’ (Griffiths et al., 2013). However, this is not to imply that deviant or sexual motives

are not present at all amongst this population and subsequently further research looking at risk factors and motives would be beneficial.

Despite numerous studies supporting a relationship of CSB with ASD core characteristics to some extent, research and practice remains in its infancy. Research is largely based on small samples or single case studies (Mouridsen, 2012), thus, generalisable conclusions regarding the influence of ASD attributes upon CSB cannot be drawn from results, nor can causal relationships be established. Furthermore, the extent to which the evidence base supports this proposed relationship between ASD traits and problematic or sexual offending behaviour, and the strength or robustness of these claims, is yet to be established. Therefore, literature should be interpreted with caution to avoid stigmatisation of an already vulnerable group.

1.8 The Current Study

The current review aims to collate and explore the existing evidence surrounding CSB in those with ASD to explore this proposed relationship in further detail. Beddows and Brooks (2016) conducted a similar but brief review describing ISB in adolescents with autism to suggest reasons for these behaviours and to make recommendations for suitable education programmes. A total of 43 papers were selected from three databases. Findings indicated that SBs displayed, included hyper-masturbation, public masturbation, inappropriate arousal, inappropriate romantic gestures, sexual abuse and exhibitionism. It was considered that these were due to the combined impact of limited understanding about puberty, the absence of sex education and the presence of autism characteristics. However, this review presents with numerous limitations due to the focus on adolescents only, limited databases explored, and the limited access to relevant publications. Furthermore, discussion and explanation regarding specific characteristics and details of SB displayed was lacking, whilst explanations and proposed reasons (ASD severity, societal issues, sensory needs, curiosity, medications, lack of sex education) behind ISBs also appeared vague and ambiguous. It is unclear how the information was synthesised, and the links between SB and proposed reasons were established. Furthermore, similar to previous reviews, they also fail to reflect upon comparison data (ASD and non-ASD samples) to identify whether particular SBs and potential risk factors are unique to, or more prevalent in autism. Without distinguishing such information, it is difficult to form firm inferences and conclusions regarding SB in the ASD population based on these findings alone. Therefore, the relationship between sexual offending, sexually deviant behaviours and ASD remains unclear.

This review seeks to overcome some of these limitations and expand on existing reviews by systematically summarising the evidence base to identify the range and 'types' of CSB exhibited by those with ASD, as well as the associated 'features and characteristics' of these behaviours. These may be important to help recognise potential risk factors such as setting, victimology, type of contact (online, direct, non-contact) amongst other less noticeable factors not examined in previous reviews (Beddows & Brooks, 2016; Dewinter et al., 2013). A unique aspect of this review will be to further distinguish whether these behaviours are 'atypical' or 'harmful' in nature. Where possible, comparison data provided for non-ASD individuals offered within the reviewed papers will also be collated to identify any similarities or differences in CSBs presented.

It is hoped that collation of this data will allow the identification of any commonalities or patterns within the 'types', 'features and characteristics' of SB which if present, may reveal specific behavioural and contextual patterns within CSB profiles. Based on the claim that core traits of ASD are somewhat associated to CSB, one may assume that the SB characteristics (type, features, context, victimology) may present a pattern or commonality due to these being influenced by similar motives and core attributes. However, if a lack of homogeneity is observed, where no pattern or commonality in the characteristics is reported, this may highlight that CSBs in individuals with autism are varied, as they are in non-ASD individuals; for some, CSBs may be entirely motivated by ASD vulnerabilities whereas for others, not at all. Instead, other factors may play a more important role in mediating this relationship. In light of this, the current review also seeks to identify the extent and strength of the evidence base which supports the proposed relationship between ASD traits and CSBs.

From this, if specific behavioural patterns or features of SB (i.e., common situations or victims) are recognised, this may reveal areas of heightened risk which could act as warning signs in some instances and professionals could target these areas within tailored interventions and education programmes, improving the chance of reducing future risky or harmful behaviours from occurring. This, combined with the improved understanding around the influence (or lack of influence) of ASD traits on CSB reduces the potential misinterpretation of actions, and encourages the implementation of careful assessment processes which encompass the exploration of SB, ASD vulnerabilities, support needs and risk, to guide person-centred care. Failure to provide evidence-based psychological intervention and sexual education for the population will continue to exacerbate the risk of HSBs occurring and will reduce opportunities to intervene and divert individuals from involvement in the CJS.

Ultimately, this review presents value as it can support the development of well-rounded systems for individuals with autism and those who support them through not only

informing direct interventions but also informing training and education programmes targeted at other stakeholders. Improving the knowledge and awareness of professionals working with those with ASD will enable informed and timely responses and a more confident workforce in meeting the needs of individuals (Gardner & Campbell, 2020; Morris et al., 2019). This is in line with the five-year national strategy for those with autism (2021 to 2026) which emphasises the need for CJS professionals to develop and enhance their knowledge to improve the experiences and outcomes when supporting ASD individuals. Promisingly, a detailed review of literature may highlight areas where efforts can be placed for rehabilitation, prevention work and reduction of recidivism as well as inform the development CJS processes and guidelines to ensure CSB is effectively managed. This could also potentially inform the need for an ASD-specific offender programme and guide how this should be tailored to ensure that support is developed to account for ASD specific needs and difficulties (such as cognitive inflexibility, perspective taking, social functioning) in addition to risk management (Gardner & Campbell, 2020; Griffin-Shelley, 2010). Until this can be done, mainstream programmes may not be able to fully achieve desired outcomes or deliver ultimate effectiveness in supporting those with ASD.

Chapter 2: Method

2.1 Design

A mixed methods systematic review (MMSR) was conducted to review published literature related to autism and CSB (including that which is considered inappropriate, harmful, or illegal). As primary research is expanding in the field of autism and CSB, value was noted in systematically identifying, synthesising, and appraising the evidence base to provide an unbiased summary of knowledge and key findings. Systematic reviews (without meta-analyses) have developed attention and evaluation over recent years and are widely considered an essential and valuable source of information within their own right (Melendez-Torres, 2017). They are also deemed to be of greater value than other review formats such as literature or narrative reviews which apply a less robust methodological strategy and are therefore more difficult to reproduce due to their flexible and iterative nature (Ferrari, 2015). Therefore, the current review was deemed to offer a rigorous, reliable, and replicable approach (Hochrein & Glock, 2012) to synthesising evidence in the area and with the application of informed guidelines (i.e., PRISMA; Page et al., 2021) ensured effective delivery and reporting of the systematic review methodology (see section 2.12).

Furthermore, it was anticipated that whilst details required to address the aims of this review would be widely available in qualitative studies (i.e., descriptions regarding CSB type, or explanations regarding the possible influence of ASD upon behaviour), data from quantitative studies may also capture some of this information possibly in greater samples. Hence, the aggregation of both qualitative and quantitative data within the MMSR was considered necessary to address the aims and allow a comprehensive understanding of the breadth of evidence and overall strength of the claims and findings, in comparison to that offered by a single method review (Dixon-Woods et al., 2005). Most importantly, drawing upon data which encompasses both interpretive and empirical paradigms was deemed invaluable to better informing future practice, research, and policy (Aromataris & Munn, 2020; Dixon-Woods et al., 2005). Notably however, this presented a degree of complexity in synthesising and interpreting a large and diverse data set as well as requiring greater time and resources to complete (Dixon-Woods et al., 2005).

The review adopted traditional ‘realist’ principles with the aim of identifying common findings within the literature (i.e., common types, features and characteristics of typical or harmful SB observed in individuals with ASD) whilst testing existing theories and claims (i.e., those related to the notion that SB is influenced by attributes of autism or that CSB is different in individuals with ASD than non-ASD individuals). Subsequently, the review sought to

identify the proportion of evidence confirming or disputing these claims reflecting on the level of confidence associated to these as opposed to an 'idealist' approach which largely seeks to generate entirely new theories based on the summary of information (Gough et al., 2012).

Furthermore, a MMSR can vary in structure; this MMSR adopted a 'convergent integrated approach' described within the Joanna Briggs Institute (JBI) methodology framework (Aromataris & Munn, 2020) in line with the 'data-based convergent' design (Hong et al., 2017) and 'integrated approach' (Sandelowski et al., 2006). This is where quantitative or qualitative information is transformed into one type of data and is then synthesised and analysed during the same phase of analysis rather than separate phases (Aromataris & Munn, 2020; Hong et al., 2017; Sandelowski et al., 2006). Further detail regarding this is provided in the data synthesis section.

2.2 Aims

The primary aim of this systematic review was to explore the types, features, and characteristics of CSB in individuals with an ASD diagnosis. This was achieved through the following sub aims:

- To identify the 'types' of SB individuals with ASD were reported to present with and use any available comparison data from non-ASD groups within reviewed papers to reflect on similarities or differences between groups.
- To distinguish between atypical and harmful behaviours within the 'types' of SB reported. This involved acknowledgement of any typical behaviours that may be described in studies reporting on CSB. Further explanation and associated definitions are provided in the following section.
- To identify 'features and characteristics' of these SBs with details related to target, setting and frequency of incidents, as well as other relevant factors.
- To identify any commonalities or patterns present within the types, features or characteristics of SB presented by individuals with ASD.
- To identify and reflect on the evidence provided which suggests that the reported SBs are associated to core attributes and traits of ASD.

Essentially, through these aims, the review sought to identify and synthesise the range of SBs and collate details which go beyond the description of the behaviour type itself, but capture contextual information (features and characteristics) related to these. Based on this, the review will reveal how often these behaviours or features were reported, as well as consider data on behaviours exhibited by non-ASD samples within these studies (dependant on the level of

comparison data available) to offer insight into whether these vary (in nature or frequency). Collating data on CSBs and features reported could also allow identification of those reported most commonly in those with ASD and reveal any patterns within this; however, what constitutes a 'pattern' was not established until data was synthesised as the variability of this information could not be anticipated (explained further in the procedure). As mentioned, if patterns or commonalities were to exist, they may somewhat be explained by the influence of similar underlying factors (i.e., ASD vulnerabilities) and by further exploring the proportion of evidence reporting an association between ASD traits and specific CSBs this could assist in better understanding this proposed relationship.

2.3 Terminology

As this review focused on the CSBs, two categories were used to identify the gravity of the challenging behaviour described. These categories were informed based on existing definitions explained in the background literature.

- Atypical SBs were those described as 'inappropriate' by Hackett (2010). These generally involve behaviours which occur in a context which is deemed to be unsuitable or where the frequency is considered challenging.
- HSBs were those described as 'abusive' or 'violent' by Hackett (2010). This combined all behaviours which were considered to cause distress or harm to self (i.e., sexual self-asphyxiation) or others (i.e., involving consent issues, coercion, aggression, or violence). This also largely included 'problematic' behaviours (Hackett, 2010) as these account for those where there is a lack of reciprocity or consent; in instances where developmentally unusual behaviours were reported, those which indicate the presence of distress would be accounted for in this category. Others would be placed under atypical to ensure clear distinguishing between behaviours that do and do not cause harm.

As the nature of SB demonstrated by those with ASD varies greatly (Byers et al., 2013) this review attempted to consider whether the behaviours described were in fact 'challenging' or rather 'typical' in nature. Therefore, although the primary focus of this review focused on CSBs in an attempt to distinguish between the above categories, attention was also given to any 'typical' behaviours described within the context of studies reporting on atypical or harmful behaviours (in line with the primary aim) to inform any supplementary findings.

- ‘Typical’ was defined as SB which is expected both socially and developmentally and does not interfere with the well-being of the individual or the well-being of others (Hackett, 2010; Tolman & Mcclelland, 2011).

The search strategy for this review did not include terms for typical SBs as this was not a primary focus; however, it was considered that reference to such behaviours was likely to be published in the context of CSB as typical behaviour is frequently less reported.

2.4 Background Process of Establishing Search Terms and Strategy

Development of the search strategy began through identification of search terms for the three constructs of “autism”, “CSB” and “characteristics”; these evolved as new search terms and keywords were identified from related literature and as preliminary searches took place. The initial strategy was created and tested on Medline and was mirrored on two other databases in the first instance to determine the scope of literature identified (PsycInfo and Web of Science [WOS]). The results of the preliminary search were explored to, 1) establish the appropriateness of search terms and identify further terms, and 2) to check whether the use of the third construct (characteristics) was beneficial in capturing the type of literature required without excessively restricting results due to the precision it added.

A brief screening of the preliminary results (n=1193 hits) was conducted by selecting every 10th paper on one of the largest databases (PsycInfo) to check the relevance of papers retrieved. Relevant papers through this preliminary process were identified as those which met requirements regarding publication type, presence of autism and indicated details related to CSB. The inclusion of the third construct (characteristics) was deemed necessary as results were successful in capturing relevant papers for this review but appeared too broad and diverse when this was removed. For example, in Medline, results increased from 949 to 1,350 when the third construct was removed but relevant papers identified from screening every 10th paper appeared less applicable in the latter.

Secondly, the use of adjacencies (‘adj’) was tested to identify whether this helped retrieve relevant results and refine the scope of hits produced. Adjacency operators allow the implementation of rules of proximity within the search strategy to search for words appearing close to one another. For example, ‘ajd2’ would allow retrieval of phrases where the word ‘feature’ for example is within two words of ‘sexual behaviour’ i.e., feature of sexual behaviour - within the current search this rule was applied to text in the title and abstract. Adjacency rules were initially constructed and tested on Medline to allow replication on other databases. The search was tested without the adjacency rule followed by application of adjacency rule 2, 3 and

4 to compare results. Without the use of an adjacency the overall number of hits considerably increased; for example, in Medline this went from 649 (adj2), 671 (adj3) and to 686 (adj4) with hits increasing to 949 when no adjacency rule was applied. Once again, upon retrieving the results, a brief screening took place (every 5th paper) to allow a comparison of results. It was identified that adjacency 2 excluded some potentially relevant papers which met the inclusion criteria from the search hits. Between the use of adjacency 3 and 4, approximately 10 to 30 additional hits (on different databases) were identified. Results for adjacency rule 3 (n=671 on Medline) retrieved numerous relevant papers during the screening process, however adjacency rule 4 did not retrieve any additional relevant papers. Based on this, adjacency 3 was considered most appropriate given the results it produced during these preliminary searches.

Search terms, subject headings and the proposed strategy was also extensively peer reviewed at numerous stages during this process by an information specialist within Leeds Institute of Health Sciences, University of Leeds. The search was refined and adapted according to feedback provided at numerous stages to ensure a robust strategy.

The search strategy was then piloted on different databases providing a range of between 100 and 1200 papers each, indicating a total of around 3-4000 papers (pre-deduplication) across all eight databases. Preliminary screening (every 10th paper) of two larger databases (Medline and PsycInfo) indicated over 40 relevant papers identified based on the abstract and titles. To ensure that this search strategy was thorough, results from these two databases were combined and checked to identify whether 12 key papers were evident within the search results; these 12 papers had been identified as relevant and meeting the overall inclusion criteria (with clear ASD diagnosis, and clear details regarding CSB type) over the course of the search development process and were originally retrieved from different databases. All 12 of these papers were found to be present. For further reassurance, 12 additional papers previously identified as 'possibly relevant' (based on abstract only but requiring full text analysis) were cross referenced; 11 out of 12 of these papers were also identified within the results from the Medline and PsycInfo databases. Evidently, the search strategy was successful in retrieving relevant papers required for this review. Furthermore, the use of several databases (listed below) significantly reduced the likelihood of any essential papers being overlooked.

2.5 Search Terms

The search strategy was developed around the constructs of "autism", "CSB" and "characteristics" using medical subject headings and keywords. The strategy comprised of keyword searches across title and abstract fields. Once the initial search was developed on

Medline, the strategy was refined to include the syntax, adjacency rule and subject headings required by each subsequent database; this was kept consistent across all databases. No date or language restrictions were included within the search strategy itself (language restrictions were later added to the exclusion criteria during screening). Search strategies for the included databases are provided in appendix 2.

Keywords related to autism:

- (Autis* or Asperger* or “Pervasive Developmental Dis*” or ASD or ASC)

Keywords related to SB:

- (Sexual* or Harmful* or Offen* or HSB or Online* or Devian*)
- (Paraphili* or Voyeur* or Exhibitionis* or Frotteur* or Masochis* or Sadis* or Pedophil* or Paedophil* or Fetish* or Psychosexual or Hypersexual* or Sociosexual*)
- (Cybersex or Rape or “Sexual Harassment” or Sexting or Stalking)
- ("Child* Sex*" or Porn*)

Keywords related to features:

- (Behav* or Featur* or Characteristic* or Description* or Profil* or Nature* or Typ* or Pattern* or Attribute* or Psychopathology)

The range of terms were selected to offer an inclusive and comprehensive search which could retrieve all papers of possible relevance. As this review was not limited based on diagnostic type and aimed to include all those with an autism related diagnosis, historical diagnostic labels such as PDD and AS were also used in attempt to capture all relevant samples. Furthermore, whilst terms such as ‘paraphilia’ or ‘paedophilia’ may be considered as diagnostic terms and do not refer directly to a ‘type’ of SB, these could help retrieve literature which goes on to describe the specific CSBs related to these.

Although keywords related to the first two terms (autism and SB) were easier to establish, selecting terms related to the third construct proved difficult. The way the term ‘features’ is defined and applied may vary across literature. Furthermore, it was also recognised that authors may not always label descriptions of SB using terms such as ‘features’ ‘profile’ ‘attribute’ or ‘nature’ for example or may instead apply different terminology. To ensure the relevance of including this construct and to address the complexity associated to this, the search strategy was thoroughly piloted (as described in section 2.4), and terms were selected by

drawing upon language from existing literature deemed to suitably encompass 'features and characteristics' of behaviour.

2.6 Search Databases

A total of eight databases were included to enable a comprehensive search; Medline (1946 onwards), PsycInfo (1806 onwards), Embase Classic (1947 onwards), Cumulative Index to Nursing and Allied Health Professionals (CINAHL: 1981 onwards), Web of Science (WOS: 1999 onwards), Education Resources Information Centre (ERIC: 1966 onwards), Criminal Justice Abstracts (CJA) and Child Development and Adolescent Studies (CDAAS).

Databases were selected based on relevance and those offering a range of content including health, criminal and education related literature. Preliminary searches were conducted to test duplication of results and relevance of databases. For example, between PsycInfo, Medline and WOS (n=1900 hits) only 300 duplicates were identified. Therefore, it was decided that the above databases should be included to ensure comprehensive results.

Table 1: *Inclusion and Exclusion Criteria*

Inclusion Criteria	Exclusion Criteria
• Human study populations • Confirmed autism diagnosis only: non-diagnosed samples are likely to present with greater variability in presentation and may not allow adequate judgment on the role of ASD vulnerabilities on CSB • Samples with comorbid diagnosis • Samples of all ages • Qualitative and quantitative studies • Publication type: all studies with primary data including case studies, dissertations, and thesis papers • All countries of origin • Detailing a specific 'type' of CSB (contact or non-contact) including cyber-related SBs allowing identification of the action which took place • Studies that compare types of SBs in ASD and non-ASD samples • First-hand and second-hand accounts of SB in autistic individuals to capture a thorough and comprehensive insight into behaviours	• Non-human populations • Studies on individuals with ASD traits only or no clear formal diagnosis • Publication type: books/chapters, review papers, editorials without primary evidence, and conference listings and abstracts • Grey literature: preliminary search of seven relevant online platforms for health and care bodies revealed no added value for inclusion due to the lack of primary evidence within them. • Foreign languages (exclusion applied during full text screening): limited resources for translation could not account for diverse languages • Studies only describing typical SB (i.e., romantic relationships) not in the context of other CSB • Studies mentioning sexual offending, sexual coercion, or ISB without specification or description of the 'type' of SB. This would account as insufficient information • Studies only describing sexual fantasies, thoughts, or desires where observable behaviours not reported • Literature on sexuality rather than SB

2.7 Service User Involvement

Due to the topic of interest and focus on atypical and HSB within the literature review, service user involvement did not seem appropriate and therefore was not involved in the construction of this project.

This decision was informed through contact with several professionals with extensive experience and expertise working with individuals with autism in an inpatient and community capacity. A copy of the research proposal was provided to them with a request for their thoughts on service user involvement. Four professionals were contacted from an NHS Trust in which the lead researcher had historically worked – A Consultant Clinical Psychologist, Research Practitioner and two Evidence Reviewers. Two of the four professionals contacted had no prior relationship or contact with any member of the research term and therefore a varied and objective perspective was provided.

According to responses, it was advised that due to the sensitive nature of the topic and the propensity of the target group to be impacted by its content, it would not be ethical to have service user involvement. Furthermore, it was indicated that this is likely to pose ethical issues in line with the National Research Ethics Service requirements where the risk would outweigh the benefit of their input. Transparency regarding the aims of the review with those getting involved could cause distress, due to its particular focus on understanding the nature of the challenging or offending SBs. It was considered that the capacity in which service user involvement would be safe and acceptable, a shared opinion by all four professionals, was to engage with service users through contact with charitable organisations in the write up stage of the project to possibly consider terminology used within the review. However, this too, would require appropriate safeguards to be in place and could still pose some risk. Subsequently, based on this, the research and clinical decision made by the team was that service user involvement was deemed unsuitable.

2.8 Costs

For the purpose of this MMSR, a fraction of the funding (£145) was used for participation in a four, half-day MMSR course (Jan-Feb 2021) offered by Leeds Institute of Health Sciences, University of Leeds. This provided the lead researcher with relevant skills and knowledge through webinars and discussions around conducting and writing up a MMSR.

An additional total cost of £70 was utilised to access full text papers which were required for the review, through document supply within the library service.

2.9 Ethical Considerations

The method for this study involved reviewing previous literature relating to individuals with ASD and SB. Thus, no participants were directly involved in the development of this research project, nor was any confidential information used and consequently ethical approval was not required. A data management plan was put into place for general storage and management of the project data.

2.10 Prospero

This review was accepted and registered (27th September 2021) with Prospero International Prospective Register of Systematic Reviews under the National Institute for Health Research (ID: CRD42021226245).

2.11 Procedure

2.11.1 Primary Search

In line with the realist approach of conducting a MMSR, an *a priori* exhaustive search took place for the purpose of this review. Electronic searches were conducted (8th of December 2020) on eight databases using the search terms listed above (see appendix 2) resulting in a total of 3,378 hits during the primary search.

2.11.2 Screening and Study Selection

Once initial database searches were conducted and duplicates were removed from the results (using Endnote), primary screening (n=1869) of the title and abstract took place to identify relevant papers using the inclusion and exclusion criteria. Based on PRISMA guidance (Preferred Reporting Items for Systematic Reviews and Meta-analyses; Moher et al., 2009), a screening flowchart was used to assist with this process of selection which clearly outlined the criteria for screening (see appendix 3). Title and abstracts were screened based on the flowchart using a specialist online software named Rayyan which allowed sorting and categorising of references between one or more reviewers and offered efficiency as well as tracking of decisions. Decisions for each reference were assigned (include or exclude) alongside labelled reasons (i.e., wrong publication type or not regarding SB). In instances where the abstract was unclear or inaccessible, the full text was obtained to inform decisions. Two co-screeners (fellow trainees also conducting reviews) were also involved in this process and reviewed a total of 15% of abstract and titles (n=282) which were randomly selected using an Excel spreadsheet. This process was also conducted using Rayyan, where co-reviewers were blind to any decisions

assigned by myself and vice versa. Any inconsistencies in decisions (n=17) regarding whether to include/exclude for the next stage were reviewed and triangulated to come to a final decision. Several discrepancies in decisions were due to the lack of clarity or insufficient detail regarding whether the paper included SB; these were discussed and where required, full texts were briefly scanned to guide the decision. A total of 154 papers were selected to undergo the following processes.

The next stage involved secondary full text screening of remaining papers (n=154), once again applying the inclusion and exclusion criteria to identify whether these papers were appropriate for inclusion in the review. Full texts of selected studies were retrieved and assessed in detail against the criteria. With the aim to have at least 15% of papers co-screened, a total of 26 references were randomly selected and split amongst the two co-screeners; as two full text documents could not be located at the time, a total of 24 papers were co-screened meeting the 15% target. Only four out of the 24 papers co-screened differed in decision. This appeared to be largely due to the lack of clarity in descriptions surrounding SB; however, these papers were discussed collectively, and decisions were formulated. For example, where the paper offered no further detail other than 'coerced another to do sexual things' (Dewinter et al., 2016) or 'sexual offending towards young people' (Caveney et al., 2017), these were excluded as they did not offer sufficient detail regarding the behaviour itself. Similarly, papers which lacked clarity around 'harassment' or 'stalking' behaviours where a clear 'pursual of interest' (romantic, social, or sexual) or reports of it being perceived as such by others was not evident, this raised some discussion (Haw et al., 2013). Unless there was adequate information to indicate an actual or perceived sexual connotation to the behaviours, these were not included to avoid misrepresentation of CSB in those with ASD. In instances where further clarity regarding decisions was required, the thesis supervisor was also consulted, and a collaborative decision was made. A total of 78 studies at this stage were selected for inclusion in the review.

2.11.3 Data Extraction

During full text screening, a data extraction sheet (DES) was used to record a detailed account of necessary information which may be valuable for analysis (see appendix 4 presenting a copy of a completed example). This involved the extraction of quantitative and qualitative data including specific details about the sample(s), study methods, details regarding SB and contextual information, amongst other key areas relevant to the aims of the review. The DES was piloted on a sample of twenty papers and amended accordingly. Initially, a table listing various types of CSBs, and context specifics was included with the aim for reviewers to identify, categorise and record frequency of behaviours simultaneously when completing the DES. However, this proved challenging due to the diversity of behaviours being reported and

the need to update the list to cover additional and evolving behaviours; subsequently, this table was removed with the aim to produce behavioural and contextual categories retrospectively during data synthesis.

Within the DES, first-hand (reported by individuals exhibiting the behaviour or recipients/observers of the behaviour) and second-hand data (reported by someone with knowledge of the behaviour occurring who did not experience it directly) on SBs was extracted and recorded. For example, data could be included from those who reported on being subjected to sexually inappropriate acts as well as data from parents reporting on a behaviour (not directly witnessed) which occurred in school in the presence of professionals. Reports of all behaviours which were described to occur were included and data from those who directly witnessed the behaviour were not given privilege over other reports.

Co-reviewers also completed the DESs for the 15% of papers they reviewed at full text screening stage. The extracted content of these was cross referenced and any discrepancy in extracted information was reviewed by re-referring to the publications and ensuring details were accurate.

2.11.4 Assessment of Methodological Quality

Quality appraisal was undertaken to provide insight into the quality of available literature rather than as a means of exclusion for studies. Studies were reviewed using the Mixed Methods Appraisal Tool (MMAT; Hong et al., 2018) a previously validated tool which utilises a checklist approach and provides a consistent method to evaluate studies of quantitative, qualitative, and mixed methods. The MMAT comprises of separate sections; 1) qualitative studies, 2) quantitative randomised controlled trials, 3) quantitative non-randomised trials, 4) quantitative descriptive studies and 5) mixed method studies, each involving five quality appraisal questions. The study design flowchart outlined within the MMAT tool to assist in the categorisation of studies within these five sections was revised to provide clarification and consistency around study designs and associated categories, as authors may assign different and varying definitions (see appendix 5 for MMAT study design flowchart): these same study design labels were used consistently through this MMSR.

Following a pilot of the MMAT on ten studies, the tool was adapted for the purpose of this review to provide clearer descriptions and specifications for each of the questions as well as to suit the diversity of studies being considered, particularly case studies and case series (see appendix 6 for modified version of the MMAT). For example, the pre-set questions related to qualitative studies were largely unapplicable to case studies as the MMAT is tailored to

‘research’; therefore, some supplementary questions were listed under existing questions to allow quality of case studies and case series to also be judged within the five-point criteria using the same measure. These questions explored areas such as whether clear justification was provided for case selection (MMAT question 1.2 under appraisal of data collection method) and whether descriptions of the case study findings were in line with the data provided (MMAT question 1.3 for appraisal of analysis). Furthermore, other pre-set appraisal questions within the remainder of the MMAT were also clarified and explained, clearly outlining areas to consider and information to review to inform judgement and to ensure consistency within application and interpretation. For example, in addition to the existing explanation for the question ‘are participants representative of the target population?’ (MMAT question 3.1 outlined to examine whether a clear description of the target population and sample are provided alongside reasons why any eligible participants may have not participated), additional guidance was offered to prompt reviewers to think about whether the recruitment strategy adequately captured the target group and whether justification was provided if this could not be achieved. Similarly, associated indicators and cut off scores within appraisal questions were also clearly established and where possible, thresholds were informed by literature i.e., Cronbach Alpha of minimum 0.7 or over was assigned as an indicator of good reliability. Overall, the ‘yes’, ‘no’ and ‘can’t tell’ responses for questions were based on the level of sufficient information and suitability of method presented and an additional option to select ‘not applicable’ was added to ensure fair evaluation and comparison. Percentage scores on study quality were then established based upon the number of ‘yes’ responses from the number of questions applicable.

Importantly as the MMAT relies on individual judgment and therefore subjectivity is likely to play a role within this process, it is advised that at least two reviewers are independently involved in quality appraisal (Hong et al, 2018). Subsequently, co-screeners also took part in assessing quality of studies by reviewing a random sample of papers (n=14). Any differences in decisions were reviewed by referring to the content of the study and having a collaborative discussion to re-assess the decision. Limited resources did not permit co-reviewers to be involved in appraisal of all included papers.

Whilst the MMAT was chosen for the purpose of this MMSR, alternative approaches such as the Strengthening the Reporting of Observation Studies in Epidemiology (STROBE) checklist or the Critical Appraisal Skills Programme (CASP) checklist were considered. Although these provide comprehensive quality appraisal for individual study designs, they failed to offer a comparative approach for different study methods which could be utilised. Subsequently as papers were not excluded merely based on quality, the MMAT provided adequate appraisal as it enabled sufficient evaluation of quality and rigour for various methodological approaches which could be discussed.

2.11.5 Secondary Updated Search

Prior to the commencement of data synthesis, the search was re-run (January 2022) to identify and include additional relevant research which may have been published since the initial search (see appendix 2). This was to ensure comprehensiveness and to provide the most accurate representation of available evidence. Firstly, the initial search strategy was reviewed, and subject headings were updated to include any new headings released by the individual databases since the original search. Out of the eight databases, two were updated to include new subject headings (all changes are identified in appendix 2). The search was re-run without any date restrictions and a total of 3,733 hits were produced across all databases. When cross referenced to the original search results using Endnote to de-duplicate results and separate those already reviewed, a total of 217 remaining new references were identified. Out of these, 12 were dated 2019 and earlier; it is likely that the new subject headings facilitated the retrieval of these papers and whilst these were not identified in the initial search, the new search without date limits provided confidence in that any missing papers were accessed. These 217 papers were subject to abstract and title screening from which 182 were excluded and 34 underwent full text review. From this, only 7 met the inclusion criteria and were subsequently added to the review for data extraction and quality appraisal.

Additionally, a soft search was also performed; based on the final list of relevant studies identified from the systematic searches, common authors and journals (referenced five or more times) were identified to inform the additional soft search. Only one journal (Journal of Autism and Developmental Disorders) met this requirement and was subsequently manually scoped and reviewed for the last 5 years (January 2017 – January 2022) to detect any additional literature. This ensured a thorough process and established any further literature valuable for the review. Through abstract and title screening, a total of 11 papers were selected although when cross referenced from the results of the systematic searches, only two papers were not previously identified and screened. Full text review of these two papers highlighted that neither met the inclusion criteria as one did not include a diagnosis of ASD (Yu et al., 2021) and the other did not describe the nature of sexual offending (Slaughter et al., 2019)

Results from the updated search were added to the final review and figures were updated and reflected within the PRISMA flowchart in the results section (figure 2).

2.11.6 Data Transformation and Synthesis

In line with the convergent integrated design (Aromataris & Munn, 2020; Hong et al., 2017; Sandelowski et al., 2006), data can be transformed into the same mutually compatible format either by converting qualitative data into quantitative data by assigning numerical values

(quantized), or by converting quantitative data into qualitative data using descriptions (qualitized). For the purpose of this review, information was quantized based on some descriptive categories where numerical values were assigned to data (retrieved from data extraction sheets) to record how many individuals within the study reported a particular behaviour or context. For example, if a qualitative study involved parents describing accounts of exhibitionism, some of which were towards them and others towards strangers, this qualitative data was quantized in the form of 'exhibitionism towards parents n=x', 'exhibitionism towards strangers n=x'. Likewise, if a case series identified several individuals who engaged in a particular CSB whilst in a school setting, each describing different scenarios, this was quantized by assigning a numerical value 'exhibited within education setting n=x'. This process was conducted for all 85 papers included in this review.

Following this, synthesis occurred 'simultaneously' as outlined by JBI (Aromataris & Munn, 2020) and Hong et al's (2017) convergent framework where data from all 85 studies was collated within one stage. This differs from other MMSR approaches (sequential or segregated) where synthesis occurs consecutively; synthesis of one type of data, qualitative or quantitative, informs synthesis of the other set of data which is then combined during a follow up stage (Aromataris & Munn, 2020). In this instance, once data transformation was complete, all quantitative and quantized data was combined and synthesised to produce a tabulation of frequency counts to address the various aims (Dixon-Woods et al., 2005). This involved collating the frequency of CSB types, features and characteristics across studies and across the number of ASD individuals reviewed in total. For example, the total number of individuals (n=x) across a total number of studies (n=x) displaying a particular behaviour was accumulated. Behaviours or features reported most commonly were identified from this accumulated data with the attempt to further explore the presence of any patterns. At which point a common behaviour counts as a 'pattern' could not be pre-established until data was collated and explored, as it was difficult to anticipate how varied the content and presentation of the data may be. Results guided how patterns were determined and therefore this is explained further in the following section.

Furthermore, the proportion of studies offering a comparison of behaviours in non-ASD individuals as well as accumulation of studies (or number of individuals) claiming an association between specific ASD traits and CSB types could also be established.

2.12 PRISMA Strategy

"PRISMA is an evidence-based minimum set of items for reporting in systematic reviews and meta-analyses" (Moher et al., 2015, p. 2) and therefore aims to facilitate good

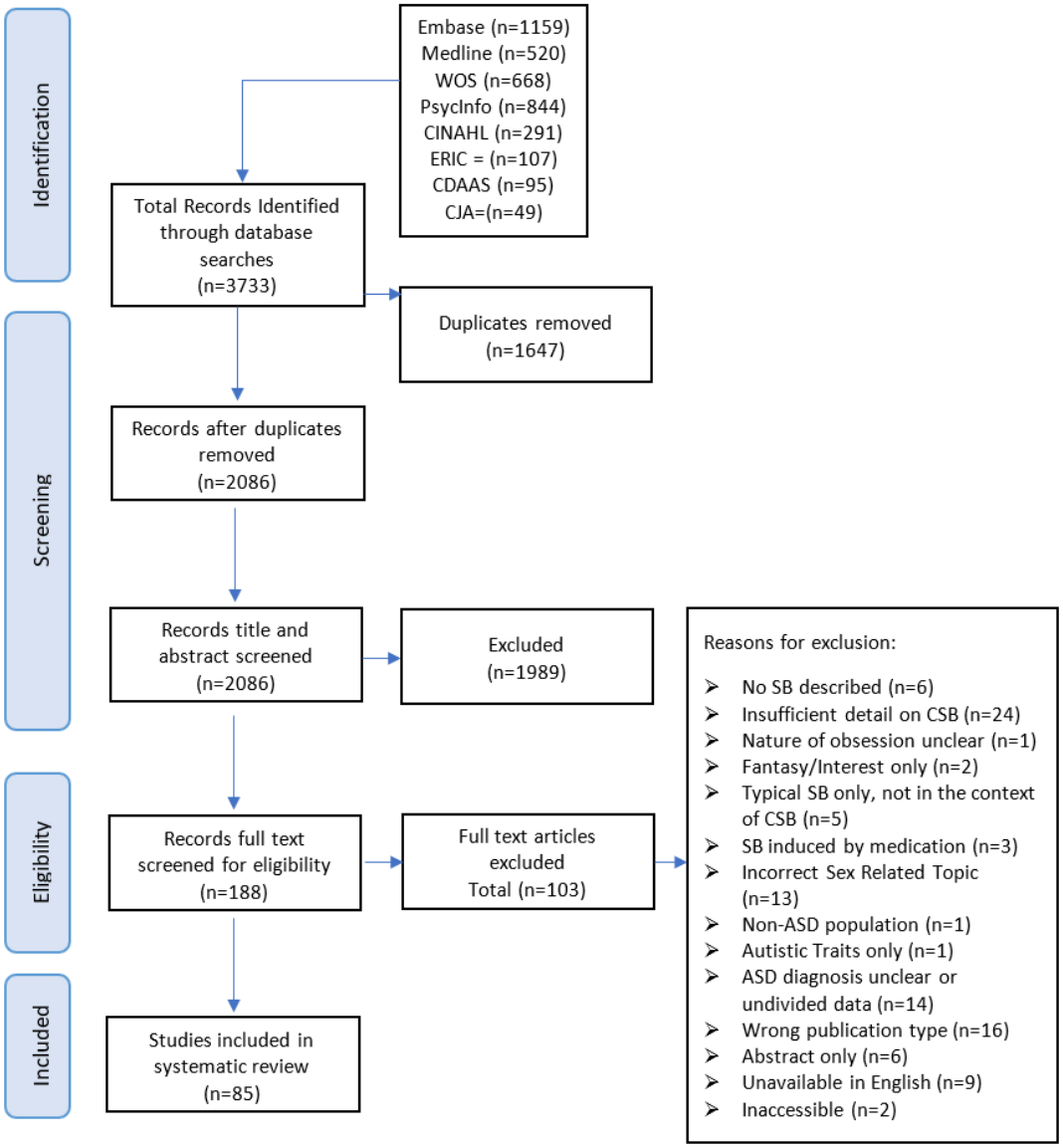
quality and detailed reporting. The findings of this review were presented in line with guidelines from the PRISMA-P protocol structure (Moher et al., 2015) and the PRISMA reporting system (Moher et al., 2011) which were recently updated in the 2020 PRISMA statement (see, Page et al., 2021).

Chapter 3: Results

3.1 Overview of Search Results

Electronic searches were conducted on eight databases. The initial search took place on the 18th of December 2020 and was updated on 26th of January 2022. Once the duplicate references were removed using Endnote, the two-stage screening process (as identified in the method) took place using Rayyan to identify studies describing CSB in those with an ASD diagnosis. The PRISMA flowchart below (figure 2) presents the updated final figures from each phase of study selection, presenting a remaining total of 85 studies meeting the inclusion criteria.

Figure 2: *PRISMA Flowchart*



3.2 Studies Included in the Review

A final 85 studies (organised by reference ID in table 2 below) were identified as eligible for inclusion (full reference details can be found in appendix 7). Across the 85 studies, a total of n=1,955 individuals with an ASD diagnosis were reviewed and their data contributed to the results of this review. Individuals with ASD identified within the reviewed studies (meeting the inclusion criteria) were also assigned Person IDs within the summary table (Table 2) where possible (Person A, B, C etc) detailing their demographic information; this can enable clear identification of data which is related to each individual as well as allow cross-referencing to original studies (if required) through the associated details.

Table 2 also outlines key data extracted from the reviewed papers regarding study characteristics and provides overviews and key findings of each study. It is important to note that study designs reported in the summary table were assigned to each study based on the MMAT study design flowchart (see appendix 5) to ensure consistency in the way these are classified and to allow appropriate categorisation for the application of quality appraisal questions (see method section). The final column also reports the overall quality appraisal score for each study. This was not dependent upon the rank a study would be assigned on the hierarchy of research design, but rather the quality of the study itself based on appraisal questions regarding delivery and reporting of the research. As explained in 2.11.4 of the method, scores were calculated based on the number of questions scoring a 'yes' response (is the method/information appropriate/sufficient?) out of the number of questions applicable for each individual study. Essentially however, these scores should not be considered in isolation (Hong et al., 2018); the detailed narrative description provided in section 3.8 of the results offers an in-depth explanation of the overall strengths and limitations of the evidence base which were identified through this quality appraisal process.

3.3 Identification of Sexual Behaviour Types

According to the results, a range of CSBs were identified across studies and participants, which included harmful and atypical SB as well as some additional accounts of typical SB. Definitions provided in the terminology section of the method were used to categorise behaviour types under these three groups. Overall SB types were identified and labelled by the primary researcher (higher order categories, i.e., exposure, unconsented touching of others) which encompassed numerous subtypes guided by the unique descriptions provided by authors on the specific features and characteristics of these overall behaviours (i.e., exposure in school setting, unconsented touching of younger sibling). As some behaviours and associated

features were unique and distinct to individual cases, these were listed separately (under ‘other’); importantly, these do not imply common occurrence, nor do they suggest uniqueness to

Table 2: *Summary Table of Studies (n=85) Included in Systematic Review*

Ref ID	Author	Study Design	Sample, Source & Population	Reviewed Participants: Demographic Info	Reviewed Participants : Diagnosis Info	Setting of ASD Sample	Measures	Study Description	Analysis	Overall Findings or Conclusions	MMAT Score
1001	Demb & Pincus, 1993	Case study (single or multiple case)	Population = ASD individuals (source = author)	2/5 cases meet criteria for inclusion in review: Person A (male aged 14), Person B (male aged 14)	Person A - PDD Person B - PDD & mild mental retardation (MR)	Adolescent rehab unit (inpatient Service)	N/A	Fives cases with difficulties in language development, social interaction, communication and behavioural difficulties.	N/A	Social skills + communication deficits result in social ostracism, externalising or disruptive behaviours.	4/4 (100%)
1002	Schottle et al., 2017	Cross sectional study	Sample & source = ASD individuals vs HCs	96 ASD individuals (mean age 39.2, 56 males). 96 non-ASD individuals (mean age 37.9, 57 males)	AS (n=90), typical autism (n=6)	Community	1) Autism Spectrum Quotient Short Form, 2) Hypersexual Inventory, 3) Questionnaire on sexual experiences + behaviours	Literature review assessing aspects of sexuality in HFA adults. Follow up: investigates hypersexual + paraphilic fantasies + behaviours in ASD vs HCs.	Multiple statistical tests	Comparison: ASD individuals show more hypersexual ($p<0.001$) + paraphilic fantasies + behaviours than HCs. Literature review highlights importance of sexuality.	4/5 (80%)
1003	Shier, 2015	Survey	Sample & source = parents of individuals with ASD	227 parents reporting on 227 individuals with ASD (192 males, 35 females, 8-25 years of age)	HFA (n=91), Moderate (n=45), Severe (n=46), PDD-NOS (n=23)	Unspecified	SB Scale (SBS)	Examines parental attitudes (N=227) towards ISB in ASD adolescents associated with verbal proficiency, ASD severity, gender + pubescent stage.	Statistical analysis - chi square	1) Undressing in public related to ASD severity $p<0.01$, verbal proficiency $p<0.05$, + puberty stage $p<0.01$. 2) ASD severity, verbal proficiency + puberty stage related to touching self publicly $p<0.05$. 3) No significant relationship for public masturbation or seeking physical contact	3/5 (60%)

1004	Stokes & Kaur, 2005	Cross sectional study	Sample & source = parents of individuals with ASD vs HC's	Parents of typical adolescents (n=50) and adolescents with autism (n=23) 17 males (mean 12.6 years) and 6 females (mean = 13.0 years)	AS and HFA. 6 with HFA also had ADHD.	Unspecified	Sexual Behaviour Scale (SBS)	Compared SBs + experiences (autism vs no autism) from a parental perspective using SBS.	Statistical analysis - MANOVA	Groups significantly different on all 5 SBS domains; social behaviour, privacy, sex education, SB + parental concerns at $p<0.01$. Following 'covariation' with age + level of social behaviour, parental concerns significant, privacy non-significant.	3/5 (60%)
1005	Silva et al., 2003	Case study	Population = ASD individuals (source = author)	Person A - male aged 39	Person A - AS	Unclear - referred for a psychiatric assessment, possibly community	N/A	Neuropsychiatric developmental model (NDM) of paraphilic behaviour introduced and applied to case presenting paraphilic psychopathology.	N/A	Utility of NDM considered beneficial in understanding paraphilic behaviour.	3/4 (75%)
1006	White et al., 2017	Case study (single or multiple case)	Population = ASD individuals (source = author)	1/5 cases meet the criteria for this review - Person A male age 21	Person A - PDD NOS	Forensic	N/A	Literature review on factors contributing to violence risk. 5 cases discussing characteristics of ASD, comorbidities + associations to violence + aggression.	N/A	ASD (interpersonal reciprocity, understanding effects of actions on others) + non-ASD factors influence violence risk. Risk assessors to consider developmental history, social communication deficits, naivete, intense interests, tolerance to frustration, stressors, provocative contexts, comorbidities + planned violence.	3/4 (75%)
1007	Albertini et al.,	Case report	Population = ASD	Person A – male aged 5	AS	Inpatient - paediatric	Childhood Autism Rating	Case describing child presenting hypersexual	Descriptive statistics	Masturbation ended following mirtazapine	1/3 (33%)

	2006		individuals (source = author)			unit	Scale & Schema of Appraisal of Emotional Development	behaviour (compulsive masturbatory activity)		(5mg per/day) = promising effects of selective serotonin reuptake inhibitors. Post 6-month treatment improvement in attention deficits, motor + verbal stereotypes, irritability + aggressiveness, social + communication.	
1008	Allely, 2020	Qualitative description	Population = ASD individuals (source = author)	Person A – male aged 31 (when charged)	Person A – ASD and HFA	Forensic	34-item questionnaire	Case exploring role of ASD symptomology on viewing indecent images of children (IIOC) + self-report questionnaire surrounding experience of CJS + post-release experiences.	Unspecified – quotes listed	ASD can present vulnerability to viewing IIOC. Early recognition + ASD assessment/diagnosis important for fair trial: to be considered at all stages of CJS (inc. sentencing decisions).	0/4 (0%)
1009	Allely et al., 2019	Case study (single or multiple case)	Population = ASD individuals (source = author)	9/10 meet the criteria for this review. Person A-I all male (ages unspecified)	ASD diagnosis. Person B (considered to have depression and anxiety), Person F (AS), Person H (anti-social PD)	Forensic	N/A	Nine cases: online sexual offences. Examines how Symptomology is considered during legal proceedings + use of expert reports to outline relationship between offending + psychiatric disorders inc. ASD	N/A	Courts to consider numerous factors for ASD defendants charged with online sexual offences / CSEM. Possession of extreme sexual material not always deviant sexuality but form of counterfeit deviance in offenders.	4/4 (100%)
1010	Allen et al., 2008	Convergent design	Population, sample & source = ASD individuals	16 People – males (mean age 34.8)	AS	Mixture - forensic and community	Two questionnaires: 1) personal and service data. 2) 24-item	Quantitative survey exploring prevalence of offending behaviour + qualitative interviews to gather participant views.	Descriptive data analysis.	Violent behaviour (81%) + threatening conduct (75%) most common. Destructive behaviour (50%), drug offences (25%) + theft	4/7 (57%)

							questionnaire on offending, risk, legal factors Followed by a semi-structured interview.			(25%), sexual offending (19%). Common predisposing factors: lack of concern for outcome (94%), obsessional interests, social naivety (88%), + misunderstanding rules (63%). Precipitating factors: family stress (50%), relationship problems, + deterioration in psychological health (31%).	
1011	Anckarsäter et al., 2008	Case series	Sample & source = ASD individuals	42 adolescents: (31 male, 11 female)	Atypical autism (n=26), Asperger's (n=8), autism (n=8)	Forensic and Inpatient	Structured Clinical Interview for DSM-IV. AS Diagnostic Interview. Data from medical + social files, structured interviews, WAIS R, assessments + police/court reports.	7 aims; 1) Prevalence of ASD in settings, 2) distribution of diagnostic criteria 3) degree of comorbidity, 4) neuropsychological test profiles, 5) types of crimes + offences, 6) mental health care needs, and 7) special clinical features	Descriptive statistics and percentages	1) Autism prevalence 2.4% - 5.3% Swedish forensic cohorts, 2) social interaction + non-verbal problems (n=90%), 3) ADHD not diagnosed in connection with ASD. Comorbidities (n=80%), 4) varied neuropsychological dysfunctions, 5) various offending, 6) supervision required due to risk (n=11) + previous psychotropic medication (n=18), 7) RRBIs common.	4/5 (80%)
1012	Aral et al., 2018	Case study (single or multiple	Population = ASD individuals (source = author)	Person A – female aged 15	Person A - AS	Forensic sample but residence unclear (community	N/A	Case demonstrating assessment of criminal responsibility of adolescent girl charged with	N/A	Individual lacked understanding regarding judicial significance + consequence	4/4 (100%)

		case)				or custody)		possession + sharing of child pornography on social media.		of action due AS. Incapable of governing behaviour + reduced capacity to evaluate from social + moral angle. Occupied circumscribed interest. Not considered criminally responsible.	
1013	Ayaydin & Ulgar, 2018	Case report	Population = ASD individuals (source = author)	Person A – female aged 30 months	Person A - ASD and global developmental delay	Community	Ankara Development Screening Inventory; Autism Behaviour Checklist (Turkish); Childhood Autism Rating Scale. Frequency + Symptoms measured (measure unclear).	Case child with ASD: started masturbating aged 15 months + was treated with escitalopram at 30 months following special education + behavioural recommendations.	Score differences	Masturbatory behaviour resolved after 3 weeks of medical treatment. Drug administration maintained for 3 months + well-tolerated. No reoccurrence of masturbation occurred in following 3-months.	2/3 (66%)
1014	Ballan, 2012	Qualitative description	Sample & source = parents of individuals with ASD	18 parents of 20 children aged 6-13. 19 male 1 female	ASD	Community	Semi structured interviews	Explored communication about sexuality between parents + ASD children through parent interviews. Aim to inform development of educational intervention.	Content analysis & ethnographic summary	Four themes: misperceptions of sexual + non-SB, challenges discussing sexuality (children + professionals), content of sexuality information, + future perceptions. Parents recognise risks; sexual victimization + misperceptions of child's behaviours.	5/5 (100%)

1015	Van Bourgondien et al., 1997	Survey	Sample & source = service caregivers of individuals with ASD	Caregivers (n=89) of 72 males and 17 females. Mean age 28 years, 16-59.	Autism	Residential homes and supervised settings	1) demographic form, 2) sexuality questionnaire, 3) survey of group homes sexuality policy + training procedures, 4) Aberrant Behaviour Checklist	SB survey on adults with autism living in group homes completed by caregivers.	Statistical analysis – t-tests, chi square and logistic regression procedures	Most individuals engaging in some form of SB (i.e., masturbation with/without objects, most common n=68%) + gaining sexual arousal through visual stimulation or direct interpersonal behaviours. Person-oriented SBs with obvious signs of arousal present in 1/3 of sample.	4/5 (80%)
1016	Cambridge, 2012	Case study (single or multiple case)	Population = ASD individuals (source = author)	Person A – male (age unspecified)	Person A - autism and mild to moderate LD	Residential service for individuals with ASD	N/A	Case reporting psychoeducational intervention used with man with autism + LD to address sexual fetish of nappies + baby paraphernalia.	N/A	Person-centred plan + psychoeducational approach contributed to changes; increased autonomy and control, improved self-esteem + improved ability to discuss fetish + assumptions about risk.	3/4 (100%)
1017	Celikkol & Bilgic, 2018	Case report	Population = ASD individuals (source = author)	Person A – male aged 16	Person A - ASD and ID	Community	Clinical Global Impressions-Severity subscale	Case of boy with ASD + ID presenting with aggressive + self-destructive behaviours, irritability, crying episodes + excessive masturbation.	N/A	Following first week of treatment, masturbatory activity decreased on clinical global impression from severity subscale 5 to improvement subscale 2. Other behaviours also decreased.	0/2 (0%)
1018	Cervantes & Matson, 2015	Case control studies	Population, source & sample = individuals with ASD	149 People with ASD + LD (mean age 48.9, 52.3% male), 158 LD	ASD and/or severe or profound LD	Inpatient services	Diagnostic Assessment for the Severely Handicapped-	Explored the effects co-occurring ASD on comorbid Symptoms exhibited by adults with ID using DASH-	Multiple statistical analysis	Participants with ASD + ID displayed distinct patterns of symptom presentation + significantly more	3/5 (60%)

			+ ID vs individuals with ID only	only (mean age 53.7, 49.3% male).			II	II.		symptomology on anxiety (p\0.001), schizophrenia (p\0.004), stereotype/tics (p\0.001), SIB (p\0.001), eating disorders (p\0.001), + impulse control (p\0.001) subscales. Higher rate of sexual disorder symptoms also found (p\0.004).	
1019	Chen et al., 2016	Case study (single or multiple case)	Population = ASD individuals (source = author)	Person A – male aged 14	Person A - ASD diagnosis	Community and psychiatric inpatient unit	N/A	Case describing treatment of ISB in adolescent boy with autistic disorder + review of literature on pharmacological management.	N/A	Treatment by amisulpride increased to 300mg: decrease in anxious-depressive symptoms observed + no further ISB noticed during hospitalisation. Review revealed limited literature on pharmacological treatment of ISB in ASD children/youth.	1/4 (25%)
1020	Clionsky & Nzi, 2019	Case study (single or multiple case)	Population = ASD individuals (source = author)	Person A – male aged 17	Person A - Mild ASD	Community	N/A	Case describing adolescent male with ASD presenting problematic SBs. Literature discussion around treatment approaches is presented.	N/A	Problematic SB in individuals with ASD could be due to a combination of factors: lack of sexuality education sexuality, deficits in social communication + understanding social norms + cues, RRBIs + sensory needs. Lack of concrete treatment approaches addressing	3/4 (75%)

										problematic SB within population.	
1021	Coshway et al., 2016	Case study (single or multiple case)	Population = ASD individuals (source = author)	Person A – male aged 12	Person A - ASD and cognitive impairment	Community	N/A	Case presenting teenager whose parents requested hormone supressing treatment to address SBs (public exposure, masturbation, inappropriate touching of sibling's genitals) following previous ineffective medications. Professional + ethical opinions discussed.	N/A	Professionals responding to case were less favourable of hormonal treatment due to risk on overall development. However, identify importance of a shared + informed decision-making process + staged interventions.	0/0
1022	Coskun & Mukaddes, 2008	Case study (single or multiple case)	Population = ASD individuals (source = author)	Person A – male aged 13	Person A - autistic disorder	Community	N/A	Case report of male with fetishist behaviours involving sexual arousal + sexual inappropriate behaviours stimulated by particular clothes.	N/A	Fetishist behaviour treated successfully using mirtazapine 15 mg/day during 10 weeks of treatment. When medication discontinued, behaviours remerged subsequently restarted.	4/4 (100%)
1023	Coskun et al., 2009	Before and after study	Population = ASD individuals (source = author + parents' contributions)	N=10; Person A (female age 5), Person B (male aged 12), Person C (male aged 14), Person D (male aged 12), Person E (female aged 7), Person F (male aged 13), Person G	Person A (autism & ADHD), Person B (autism and major depression), Person C (autism and ADHD), Person D E F G H I (autism),	Community	Clinical Global Impressions–Severity and Clinical Global Impressions–Improvement scales	Investigated efficacy + safety of mirtazapine treatment of excessive masturbation (with or without other ISB) in individuals with autistic disorder. Mirtazapine administered for 8 weeks - started at 7.5–15 mg/day and titrated up to 15–30 mg/day.	Statistical analysis - Wilcoxon non-parametric t-test for baseline and end point assessment	Significant difference in severity scores found between baseline + end point assessment ($p<0.01$). 5 subjects showed 'very much improvement', 3 showed 'much improvement', + 1 showed 'moderate improvement' in excessive masturbation.	2/5 (40%)

				(male aged 15), Person H (male aged 16) Person I (male aged 14), Person J (male aged 13)	Person J (autism and major depression)					Improvement in other ISB noticed (n=6).	
1024	Creaby-Attwood & Allely, 2017	Case study (single or multiple case)	Population = ASD individuals (source = author)	Person A (male), Person B (male), Person C (male). Ages unspecified	Person A (AS), Person B (ASD and LD), Person C (ASD)	Forensic	N/A	Demonstrates omissions in legal cases highlighting defendants ASD diagnosis + offering jury explanations around effects upon thoughts + behaviour during legal proceedings.	N/A	Necessary to prove sexual motivation in actions + recognition of social impairments + interpersonal skills, including capacity to develop appropriate consenting relationships.	4/4 (100%)
1025	De Tilio, 2017	Qualitative description	Sample & source = carer/Sister of individual with ASD	Caregiver (sister) of Person A (male aged 25)	Person A - ASD	Institution	Semi structured interview	Case + analysis of an interview conducted with caregiver to explore carers perspective on individuals experience of sexuality.	Thematic content analysis	Caregiver accepted sexuality (respect for privacy + masturbation) however experienced challenges (shame, fear of ISB in public). Key themes: perceptions, experience of ASD diagnosis; concerns + experiences around individuals' sexuality; family concerns + experiences related to personal hygiene, privacy + SB of ASD individual; institutional actions inc. interventions + caregiver training.	3/5 (60%)
1026	Deepmala &	Case report	Population = ASD	Person A – male aged 13	Person A - severe	Community	Behaviour frequency	Case of boy with autism presenting	Frequency recorded at	Low-dose propranolol, 0.3 mg/kg/d (10 mg	2/3 (66%)

	Agrawal, 2014		individuals (source = author)		autism		recorded (by parent & school staff)	hypersexual behaviour (inc. touching genitals in public, masturbation, undressing, exposure): started at onset of puberty affecting home + school functioning.	baseline and following treatment	twice daily), targeting hypersexual behaviour led to clinical improvement. Behaviours remained stable on dose for 1 year.	
1027	Dozier et al., 2011	Before and after study	Population = ASD individual (source = author)	Person A – male aged 36	Person A - ASD	Community	Trained observers collected data on ISB during continuous 10 second interval.	Functional analysis (FA) examining sexual fetish behaviour (gyrating near other's feet) to design least intrusive + effective intervention. FA: antecedent (footwear + gender) manipulated + consequences held constant + 2 interventions evaluated.	FA	FA: treatment + generalization sessions conducted 3-5 times daily, 5 days per week. ISB triggered by female feet, especially in sandals. Response-interruption/time out procedure successful in eliminating behaviour in multiple settings.	4/4 (100%)
1028	Eyuboglu et al., 2018	Case study (single or multiple case)	Population = ASD individual (source = author)	Person A - male 13 years	Person A - ASD and moderate MR	Community	N/A	Case describing treatment of ISB using gonadotropin-releasing hormone (GnRH).	N/A	Decrease in SB observed after 3rd dose of 3.75mg leuprolide acetate (GnRH) administered once every 28 days. Aggressive behaviours also decreased.	4/4 (100%)
1029	Fernandes et al., 2016	Cohort studies	Sample & source = ASD individual (study 1 & 2). Parents & carers also contribute	Total n=184. Study 1 (n=108, 25 mean age, 78 male, 30 female), follow up 95 parents or carers. Study 2 (n=76,	Study 1 = ASD / PDD diagnosis. Study 2= AS diagnosis	Residential home and child neuropsychiatry clinic	Study 1: Clinical interview, Diagnostic Interview for Social and Communication Disorders (DISCO), Weschler	Data collected from two longitudinal follow-up studies. Examined prevalence of sexual interest + sexual orientation, sexual activity, sexuality problems, ISB + paraphilias in ASD. Relationship	Statistical analysis - man-whitney U test and pearson's chi squared	Sexual interest + ISB reported greater in individuals with ASD + no ID, compared to individuals ASD + ID. No relationships between ISB + background variables (age, verbal ability, symptom severity,	1/4 (25%)

				mean age 22, 76 male)			Adult or Child Scale (WAIS or WISC), Vineland. Study 2: DISCO, AS diagnostic interview, Weschler Abbreviated Scale of Intelligence-3.	between ISB + demographic variables studied.		intellectual ability, adaptive functioning). Associations between paraphilias + ASD symptom severity, intellectual ability, + adaptive functioning.	
1030	Fisher et al., 2000	Nonrandomised trial	Population = inpatients (source = author)	1/3 meet criteria for this review. Person A - male aged 19	Person A - ASD and profound MR	Inpatient unit	Trained observers recorded the frequency and duration of targeted behaviours	3 individuals presenting challenging behaviour. Treated using functional communication training plus extinction. Procedures on delayed reinforcement + self-control added to functional training to improve toleration.	Pre and post measures – descriptive statistics.	1) Reinforcer delay fading effective at maintaining low rates of destructive behaviour while introducing delayed reinforcement. 2) Additional punishment component reduced destructive behaviour. Case 3) reinforcer delay fading associated with increased masturbation + head rolling but prompting + praising in delay interval reduced problem behaviours.	3/5 (60%)
1031	Gkogkos et al., 2021	Case report	Population = ASD individuals (source = author, Person A, and parent)	Person A – male aged 15	Person A - PDD-NOS	Community	WISC-III (Greek version), Vineland, Childhood autism rating scale. General	Case describing behaviour analytic intervention in helping improve SB + minimize inappropriate behaviour. Self-report by participant + participant's father	Baseline, intervention, and follow up score analysis	Participant improved in 1) learning information around puberty + sexuality, 2) learning safe + functional steps that facilitate self-satisfaction, 3) maintenance of learnt	1/3 (33%)

							Sexual Knowledge Scale, Eyberg Child Behaviour Inventory + State trait Anxiety Inventory			skills three weeks after treatment ended. However, not maintained across time.	
1032	Gougeon, 2013	Convergent design	Source & sample = parents of individuals with ASD and youths with ASD	6 youths in survey (5 male, 1 female, mean age 15) Interviews, 9 youths (all boys, mean age 14), 11 caregivers.	HFA, AS and ASD	Community	Semi structured interview. Adapted Parenting and Sexuality Scale. Adapted Youth Sexuality Development Scale + Youth Version	In-depth interviews, surveys, and literature review to develop a conceptual framework of sexuality education, defined by youth with HFA and caregivers.	Descriptive statistics, qualitative analysis through emergent coding, and extant text analysis	Conceptual framework of sexuality education developed. Identified personal + societal strengths + barriers that impact sexuality education youth.	6/7 (85%)
1033	Griffin-Shelley, 2010	Case study (single or multiple case)	Population = ASD individuals (source = author)	Person A – male aged 14	Person A - AS	Varied through case timeline	N/A	Case describing treatment issues related to adolescent sex offender.	N/A	Treatment lacking recognition of sexual addiction + contributing factors (psycho developmental, AS, relationship difficulties, anxiety, early sexual exposure etc). Better integration of treatments required.	3/4 (75%)
1034	Hannah & Stagg, 2016	Convergent design	Source & sample = individuals with ASD vs TCs	20 ASD individuals (12 male, 8 female) vs 20 TCs (7 male	ASD	Community	Sexual knowledge, experiences, feelings and needs	Semi-structured interviews conducted following administration of questionnaires to	Thematic analysis and independent t-tests	Neither group felt more sex education required. ASD groups scored significantly lower than TCs on all SAQ	4/5 (78%)

				13 female) aged 18-25			questionnaire. Sexual awareness questionnaire (SAQ). Semi structured interview.	identify how sexual awareness may manifest into behaviours + beliefs.		subscales. Negative experiences of sex education + issues of vulnerability, social anxiety, + confused sexuality prominent in ASD interviews.	
1035	Hansen, 2018	Phenomenological	Sample & source = parents of individuals with ASD	3 mothers of Person A (male aged 12), Person B (female aged 10), Person C (male aged 17)	ASD	Community	Semi structured interview	Explored parents' views on child's sexuality + sex education needs + on how they want mental health professionals to support them + their child for sex education.	Coding and themes analysis	Recognised child's need for sexuality/sex education. Parents request guidance + support from clinicians + therapists. 6 themes across participants: knowledge + comprehension, important topics, seeing big picture, safety concerns, benefits of intervention, guidance.	5/5 (100%)
1036	Hartmann et al., 2019	Survey	Sample & source = individuals with ASD and their parents	100 youth (aged 18-30, mean age 22) and 100 parents.	ASD	Community	Demographic & background questionnaire. Autism Quotient-10. SB Scale. Sexual Experiences Survey. General Sexual Knowledge Questionnaire (GSKQ). Klein Sexual Orientation	Explores self-reports + parent-reports of young adults with ASD regarding their perspectives of sexuality, sexual knowledge, + sexual experiences in ASD youth.	Descriptive statistics and independent samples t-tests	Parents + youth reported moderately high sexuality functioning (GSKQ), high typical behaviour for privacy, sex education + SB but more atypical behaviour on SBS. Youth reported significantly higher scores on SBS privacy + SB subscales, + Sexual Experience survey victimization subscale compared to	3/5 (60%)

							Grid. Family Sex Communication Quotient.			parents. Both groups: FSCQ score does not show 'strong communication' on sexuality between youth + parents.	
1037	Hellemans et al., 2007	Convergent design	Sample & source = service caregivers of ASD individuals	24 caregivers of 24 males aged 15-21	Autistic disorder (n=14), PDD-NOS (n=4), AS (n=6)	Institution	Interview Sexuality Autism	Examined knowledge + application of self-care + socio sexual skills in behaviours + sexual problems in individuals with ASD by interviewing caregivers	Scores analysed from Likert dichotomous scales. Qualitative exploration (analysis approach unclear).	23/34 interested in sexuality. 1/2 experienced a relationship. Socio-sexual + self-care knowledge adequate, but practical use inadequate in some. Masturbation (n=10) and caressing/cuddling others (n=11) most common + sexual problems (n=7). Ritual-sexual use of objects + sensory fascinations sometimes + paraphilia in n=2. 1/3 required sexual development + behaviour intervention.	2/5 (40%)
1038	Hellemans et al., 2010	Convergent design	Sample & source = service caregivers of ASD individuals and no ASD	Caregivers (n=35), of ASD individuals (12 female, 5 male, mean age 35) vs MR group (6 female 12 male, mean age 38)	ASD + MR vs non-ASD + MR	Institution	The Interview Sexuality Autism Revised	Caregivers interviewed to examine knowledge + application of self-care + socio-sexual skills + explore range of sexual behaviours or sexual problems in individuals with and without autistic disorder and MR.	Multiple statistical tests	MR group not significantly more sexually active than ASD+MR group however significantly more relationship experiences. No difference in sexual orientation, ISB + masturbation. Deviant SBs in ASD+MR (stereotyped interests, sensory fascinations,	1/3 (35%)

										paraphilia), not in MR. Sexual problems in ASD more related to obsessive SB quality.	
1039	Herguner et al., 2012	Case study (single or multiple case)	Population = ASD individuals (source = author)	Person A – male aged 17	Person A - autistic disorder	Community	N/A	Case of an adolescent with autistic disorder + MR who developed severe ISBs (inappropriate touching of others, masturbating/rubbing himself) treated using a risperidone-paroxetine.	N/A	Risperidone-paroxetine combination successfully treated the individuals' hypersexual behaviour two weeks after initiation. Maintained during a six-month period.	3/4 (75%)
1040	Hodges et al., 2020	Before and after study	Population = ASD individuals (source = author)	Person A – male aged 12	Person A - autism	Children's hospital	A-B FA	Identified specific features of feet that evoked problematic behaviour in an adolescent who exhibited ISB. Evaluated a rule/reprimand treatment + environmental enrichment treatment to decrease ISB.	Descriptive statistics and pre-post measures	FA revealed feet evoked ISB, but this occurred most in presence of females (100% compared to 85% in male). Treatment of a rule describing appropriate and inappropriate behaviour in presence of bare feet + a verbal reprimand contingent on ISB was effective. Environmental enrichment treatment also reduced ISB.	4/4 (100%)
1041	Holmes et al., 2020	Survey	Sample & source = parents of ASD individuals	298 parents of 298 youth (mean age 14, 157 males)	Autism	Unclear – recruited via autism network services	50-item survey with SB inventory, parent action inventory and Social Responsiveness Scale – 2nd edition	Survey 1) examining sexual interests, behaviours + abuse experiences, 2) explored parent actions in support of healthy sexual development + 3) Identified parent-reported factors in	Multiple statistical tests	Youth experienced sexual attraction (68%) + interested in relationships (58%). Greater romantic relationships in girls + less school or legal consequences for SB. 1/5 engaged in ISB,	2/5 (40%)

								sexual + reproductive health.		6.4% sexual abuse history +14.5% bullied for lack of sexual knowledge. Approx. 40% no formal sex education. Some parents consulted school staff (36.4%) or health care providers (55.9%) of sexuality issues, 19.5% reported no action but sexuality talk with child.	
1042	Huwaidi & Daghustani, 2013	Cross sectional study	Sample & source = parents and teachers of ASD individuals	34 teachers and 48 parents reported on 61 males aged 12-21	AS, LHA, HFA	Community	Screening questionnaire for Asperger syndrome + other HFA. Social Skills Scale. SBS.	Explored common SB by interviewing parents + teachers to differentiate between perspectives regarding socio-sexual skills + SBs whilst considering adolescent functioning level.	Frequency measures. Statistical tests – pearson correlation and two-sample independent t-tests.	Parents + teachers reported ISB. Significant correlations between social-sexual skills + reported SBs in all subtests + total scores. Adolescents with HFA displayed significantly less ISB + significantly more social-sexual skills compared to those with LFA.	3/5 (60%)
1043	Kelbrick & Radley, 2013	Case study (single or multiple case)	Population = ASD individuals (source = author)	Person A – male aged 26	Perso A - AS	Inpatient secure hospital	N/A	Describes man with AS presenting violent + aggressive behaviour + sexual offending. Described process of forensic rehabilitation + offers patient perspective.	N/A	Illustrates core features of AS: social skills, difficulties understanding social rule, impaired communication, limited self-awareness + understanding others contributing to behaviours. Interventions addressing these + risk	3/4 (75%)

										+ offence related factors most effective.	
1044	Kohn et al., 1998	Case study (single or multiple case)	Population = ASD individuals (source = author)	Person A – male aged 16	Person A - AS	Inpatient	N/A	Describes adolescent who presents with violent + sexual offences + considers role of AS.	N/A	Behaviours considered as manifestation of difficulties with ToM. Trial of propanol + cyproterone acetate found to improve aggressive + SB.	3/4 (75%)
1045	Chan & Saluja, 2011	Case study (single or multiple case)	Population = ASD individuals (source = author)	Person A – male (age develops through case study, below 16)	Person A - autism and mild LD	Forensic	N/A	Case describes improvement in certain autistic characteristics (i.e., increased social communication) after acquired brain injury. Describes presence of coexistence of sexual offending behaviours.	N/A	Preoccupation with young girls persisted after the brain injury + preoccupation with 'parts of objects' + private parts of young girls, escalated from peeping to touching. Interaction between autism + traumatic brain injury remains unclear.	1/4 (25%)
1046	Mann, 2021	Converg ent design	Source = parents of individuals with ASD	Parents (n=6) reported on ASD individuals (n=6): Person A (male aged 7), Person B (male aged 10), Person C (male aged 11), Person D (male age 11), Person E (female aged 12), Person F (male aged 16)	Person A (ASD, MDD, Mood dysregulatio n, expressive speech disorder), Person B (ASD), Person C (ASD & LD), Person D (ASD & previously ADHD), Person E	Community	Data extracted from patient chart data, diagnostic and screening measures, patient files and parent reports.	A retrospective chart design to identify potentially relevant individual characteristics + experiences associated with ASD and PSB.	Nonparam etric statistics	Individuals with ASD at increased risk of engaging in PSB due to characteristics of condition, individual demographics, experience, comorbidities + environmental factors. Parents described experiences of anxiety in child + reported apprehensions around misunderstanding of child's nonsexual behaviours (sensory seeking touch) as PSB.	8/9 (95%)

					(ASD & ADHD) Person F (ASD, ADHD, OCD & severe impulse control)						
1047	Ruble & Dalrymple., 1993	Survey	Sample & source = family members of ASD individuals	Caregivers (n=100) reported on 100 ASD individuals (68 males, 32 females, aged 9-38)	Autism	Community	Sexuality Awareness Survey	Surveys conducted with parents addressing social sexual awareness, sex education + SBs of individuals with autism.	Statistical test not specified.	No relationship between exhibiting ISB + gender, or concern about misinterpretations of behaviours + gender, however parents of males want information about controlling masturbation + rules. Concerns about child victimisations but sexuality concerns varied. Level of verbal ability was related to parents' beliefs about sex relations ($p<.0.05$) and sex education ($p<0.001$) but not to the display of ISB.	3/5 (60%)
1048	Fourie et al., 2017	Survey	Sample & source = parents and grandparents of ASD individuals	Caregivers (n=24) of 24 children aged 3-18: Person A, B, C, D, F (aged 12-18), Person E (<12 age)	ASD (n=21), AS (n=1), PDD (n=2). Comorbidities: OCD (n=1), mood disorder (n=1), ID (n=1),	Community	Demographic questionnaire. Questions from Child SB Inventory + Interview of Sexuality in Autism (Revised).	Explores associations of clinical + demographic factors (such as self-care, socioeconomic and family environments) in a sample of children with autism, + their reported SBs.	Statistical analysis - fishers exact test	No association between demographic + clinical factors + SB. Those from less stable socioeconomic and family environments did not exhibit significantly more abnormal SBs.	1/5 (20%)

					ADHD (n=1)		Data from retrospective school records.				
1049	Stokes et al., 2007	Cross sectional study	Sample & source = parents of individuals with and without ASD	Parents (n=25) of 25 ASD individuals (mean age 22, 16 males 9 females) vs 38 parents of 38 TD adolescents (mean age 20, 32 males, 6 females)	HFA or AS	Community	Courting Behaviour Scale	Examined nature + predictors of social + romantic functioning in adolescents + adults with ASD based on parental reports.	Multiple statistical tests	ASD group relied less upon peers + friends for social ($p < .01$) + romantic learning ($p<.01$) than TCs. Groups differed significantly on level of social functioning ($p<.001$) but not level of romantic functioning ($p>.05$). ASD more likely to engage in inappropriate courting ($p < .001$), focus attention on celebrities, strangers, colleagues, ex-partners ($p<.001$), + pursue targets longer ($p<.05$).	4/5 (80%)
1050	Nguyen & Murphy, 2001	Case study (single or multiple case)	Population = ASD individuals (source = author)	Person A – male aged 13	Autism	Inpatient unit	N/A	Describes use of mirtazapine in a young boy with autism presenting with excessive masturbation.	N/A	Balanced dose of mirtazapine can have beneficial effects in minimizing SBs.	3/4 (75%)
1051	Melvin et al., 2019	Grounde d theory	Sample & source = ASD individuals	9/13 males meet the criteria for this review: Person A (aged 36), Person B (aged 29), Person C (aged 47),	Person A, C, D (ASD), Person B, G, L (atypical autism) Person H (autism), Person I (AS), Person	Community & secure services	ADOS-2 for diagnostic confirmation & semi structured interview	Interviews conducted with 13 men with autism + ID who had completed an adapted sex offender treatment programme to explore views and experience about treatment effectivity.	Grounded theory	Perceptions of sexual risk were linked to constructs of identity + shaped opinions of treatment effectiveness. Key themes: sense of self was influenced by motivators + experiences,	5/5 (100%)

				Person D (aged 57), Person G, (aged 52), Person H (aged 37), Person I (aged 26), Person L (aged 35), Person M (aged 36)	M (classic autism) All with ID					relationship + social + cultural factors. Perceptions about groups + therapy, attitudes. Beliefs about offending behaviour + beliefs about change were key themes surrounding risk.	
1052	Miyahara et al., 2008	Survey	Source & sample = parents of ASD individuals	Mothers (n=71) of 71 males aged 6-25	Autism with different IQ levels. 41 (IQ<35), 30 (IQ35-70)	Community	Questionnaire	Questionnaire administered to mothers of individuals with severe and non-severe autism to explore SB + sexual development.	Statistical test – Wilcoxon rank-sum test and fishers exact tests	Severe autism group displayed interest in opposite sex at earlier age (p=0.031). No significant difference in frequency of problematic SB however talking about sex in public reported more in non-severe group. Among 58 children aged >10 half masturbated. 80% of mothers positively regarding masturbation practices but positive views towards romance significantly lower in severe group (p<0.0001).	2/5 (40%)
1053	Chandrasa & Champika, 2017	Case study (single or multiple case)	Population = ASD individuals (source = author)	Person A – males aged 17	ASD, HFA + paraphilic disorder	Community	N/A	Case describing adolescent with HFA presenting with features of zoophilia.	N/A	Combination of CBT + a selective serotonin reuptake inhibitor for sexual urges and behaviours towards cattle. At three-month follow-up urges were	4/4 (100%)

									better controlled an no deviant SB observed.	
1054	Mogaver o & Hsu, 2019	Converg ent design	Sample & Source = Individuals with ASD vs those without	46 ASD individual (21males, mean age 33) vs 88 non-ASD (26 males, mean age 26)	ASD	Community	Modified Courting Behaviour Scale	Describes romantic experiences of a small sample of individuals with and without ASD and explores presence of inappropriate courtship behaviours in pursuing a romantic interest.	Descriptiv e statistics and statistical analysis. Qualitative analysis method unspecifie d.	Awareness on initiating relationships significantly higher in non-ASD group p<0.001. Fewer individuals with ASD in current relationships. ASD had significantly lower romantic functioning (p<0.05) + engaged in more stalking type behaviours (p<0.001). Inappropriate courting higher but significant. Qualitative data: lack of knowledge, fewer learning resources + difficulties understanding social communication factors.	4/7 (57%)
1055	Muller, 2011	Case study (single or multiple case)	Population = ASD individuals (source = author)	Person A – male aged 16	Person A - Autistic Disorder and Foetal Alcohol Syndrome	Forensic	N/A	Case on adolescent boy with amygdalohippocampal abnormalities who committed murder + presents with sadomasochistic tendencies.	N/A	Links autism + sadomasochism to amygdalohippocampal pathologies + highlights impact of abnormalities in the temporal lobe upon sexually + socially deviant + harmful behaviours.	0/5 (0%)
1056	Murphy et al., 2011	Cohort studies	Sample = individuals with LD however some also	6/8 Males (ages unspecified)	ASD	Community	1) Sexual Attitudes and Knowledge Scale, 2) Questionnaire	Pilot exploring effectiveness of a CBT programme for eight men with ID presenting with sexually abusive	Statistical analysis - Wilcoxon X	Victim empathy scores (p<0.05) + sexual knowledge + attitudes (p<0.03) improved significantly post	3/5 (60%)

			had ASD				on Attitudes Consistent with Sexual Offending, 3) Sexual Offenders Self Appraisal Scale, 4) Victim Empathy Scale-Adapted	behaviour. Explored changes in sexual knowledge, victim empathy + cognitive distortions + engagement in further SBs.		treatment whereas cognitive disorders (measure 3) remained non-significant. When data from ASD individuals was excluded measure 3 scores showed significant change. One ASD individual engaged in further non-contact SBs during CBT programme. 3/8 men (with ASD) engaged in sexually abusive behaviour in 6 month follow up.	
1057	Palermo & Bogaerts, 2017	Case series	Sample & source = ASD individuals with contributions from parents	Person A (aged 18), Person B (aged 21), Person C (aged 20), Person D (aged 18), Person E (aged 19), All male	AS	Community	Centre for epidemiologic studies depression scale & self-report aggression questionnaire.	Five cases of recurrent and extremely violent femicide fantasies are presented to identify common variables. Parent contributions are included as 'collateral informants'.	Unspecified – summary provided	All endorsed violent ideation towards women + presented common characteristics including experienced bullying, romantic rejecting and consumers of violent games + pornography.	1/2 (50%)
1058	Payne et al., 2020	Qualitative description	Sample & source = ASD individuals	9 males (mean age 29)	ASD	Forensic	Semi structured interview	Semi-structured interviews conducted with nine sexual offenders with autism in prisons + probation services to explore motivations for sexual offending behaviour.	Thematic analysis	Five themes: 1) sex and relationship deficits, 2) social difficulties, 3) misunderstandings, 4) inadequate control, 5) disequilibrium. Main motivators for offending: social skills difficulties, lack of perspective or weak	5/5 (100%)

									central coherence, misunderstanding seriousness of behaviours + lack of appropriate relationships.	
1059	Peixoto et al., 2017	Case study (single or multiple case)	Population = ASD individuals (source = author)	Person A - male aged 30	Person A - ASD	Community	N/A	Describes a man whose social inability played a potential role in the sexual abuse of his partner within his marital relationship.	N/A	Individuals social and communicative inability to recognise and address the subtleties of language involved in intimate relationship contributed to wife feeling sexually abused.	4/5 (80%)
1060	Prasher & Clarke, 1996	Case study (single or multiple case)	Population = ASD individuals (source = author)	Person A – male aged 17	Person A - childhood autism, Down syndrome and severe LD	Varied through case timeline	N/A	Case of severe challenging behaviour (including stripping, head banging, smearing, throwing objects, aggression and sexually disinhibited behaviours) in a young adult with Down's syndrome + autism.	N/A	Structured behavioural programme + carbamazepine (100mg) showed reduction in most challenging behaviours. After a short period, behaviour deteriorated again and further psychopharmacological treatment to be considered highlighting complexity in treating individual.	3/4 (75%)
1061	Pritchard et al., 2016	Case report	Population = ASD individuals (source = author)	Person A - male aged 17	Person A - ASD	Residential special school	Frequency data on behaviours	Case describes implementation of a multi-component behavioural intervention (over 115 weeks) to treat serious problem behaviour including aggression,	Pre and post data analysis	Multi component model successful in reduction of behaviour. Involving monitoring of behaviour, systematic reinforcement for pro-social behaviour,	2/3 (66%)

								absconding + sexual + harmful behaviours.		delivery of appropriate consequences + support + guidance when required.	
1062	Pryde & Jahoda, 2018	Interpretative description	Sample & source = parents of individuals with ASD	Mothers (n=5) of 5 males. Person A (aged 24), Person B (aged 16), Person C (aged 16), Person D (aged 16), Person E (aged 24)	ASD and LD	Community and residential	Semi structured interviews	Explored views + perspectives of mothers on sexual development + sexuality of their young adult sons.	Interpretative phenomenological analysis	Four themes: 1) emerging sexuality + associated challenges, 2) providing sex education with challenges + concerns regarding material, 3) concerns around abuse (victimisation and perpetration), 4) future love + relationships. Required sensitive + timely support from services.	5/5 (100%)
1063	Ray et al., 2004	Case study (single or multiple case)	Population = ASD individuals (source = author)	Person A (male aged 15), Person B (male aged 17), Person C (male aged 16), Person D (male aged 14)	Person A & C (AS), Person B (PDD), Person D, (autism)	Inpatient service	N/A	Series of case studies reporting sexually abusive behaviours displayed by individuals with ASD outlining associated treatments offered + usefulness of these.	N/A	Helpful treatment areas + intervention priorities: adapting communication + information delivery styles, expanding social + emotional skills + awareness, developing self-soothing skills to address sensory impulses or frustrations + understanding sexual decisions + sexuality education.	3/4 (75%)
1064	Realmuto & Ruble, 1999	Case report	Population = ASD individuals (source = author)	Person A - male aged 6	Person A - autism	Community	Frequency of behaviour measured	Case of young boy presenting with CSBs including public masturbation.	Analysis of frequency	Leuprolide effective treatment in addressing public masturbatory behaviour + subsiding other ISBs.	2/3 (66%)
1065	Moskowi	Case	Population	Person A –	Person A -	Community	N/A	Case of autistic boy	N/A	Prescription of	3/4

	tz, 2009	study (single or multiple case)	= ASD individuals (source = author)	male aged 12	ASD			presenting with disruptive behaviours, loquacity + some sexually acting out behaviours.		Hyoscyamus initially effective however effects subsided. MMR nosode administered + reduction of behaviours noted + improved receptivity to later doses of Hyoscyamus.	(75%)
1066	Shahani, 2012	Case study (single or multiple case)	Population = ASD individuals (source = author)	Person A – male aged 17	Person A - AS	Community	N/A	Case of adolescent presenting with intrusive sexual thoughts + urges. Engaged in excessive masturbation 25-30 times a day resulting in penile ulcers.	N/A	Significant improvement after trial of lithium following previous failed trials on citalopram, fluvoxamine, fluoxetine clonazepam, quetiapine + risperidone.	0/4 (0%)
1067	Shenk & Brown, 2007	Case report	Population = ASD individuals (source = author)	Person A – male aged 14	Person A - autistic disorder and low, borderline ID	Residential treatment service	Frequency scores using self-report data sheets. Clinical interview. Juvenile Sexual Offender Assessment Protocol-II. Vineland Extended Form. WISC-III	Case describing CBT based treatment programme (Hand up Homes for Youth) completed by a sex offender with autism + ID. Three measures supported adaptation of relevant strategies to assist in establishing control of behaviours that increased arousal.	Pre and post treatment comparison in frequency scores	Exposure and response prevention as part of traditional CBT, may be useful. Changes were observed in behaviour from pre-treatment to 6-month follow-up with no known reports of sexually offensive or deviant behaviour.	1/3 (33%)
1068	Singh & Coffey, 2012	Case study	Population = ASD individuals (source = author)	Person A – male aged 17	Person A - PDD and OCD, Bipolar, MR & medication	Inpatient	N/A	Case describing an adolescent with comorbid diagnosis presenting with a complicated history of aggressive,	N/A	Case illustrates challenges + complexity of diagnosis + treatment due to overlapping clinical features.	3/4 (75%)

					induced movement disorder			hypersexual + disruptive behaviours including suicidal + homicidal thoughts.		Behaviours considered a manifestation of bipolar disorder.	
1069	Teti et al., 2019	Qualitative description	Sample & source = individuals with ASD & Parents	27 caregiver youth dyads (20 males, 7 females, 15 aged 16-18 and 12 aged 19-25)	AS, PDD, autism, ASD. Some had more than 1 diagnostic label	Community	Semi structured interview	Explores + compares perspectives of caregivers + their youth regarding sexual + intimate relationships of the youth. Interviews conducted with youth + focus groups with caregivers.	Thematic analysis	Three themes: companionship, sexual interest/experience, and access to sexual information. Caregivers had more future related concerns + overestimated own knowledge regarding's youths' sexual interests and experiences. Youth reported relationships, experiences + information sources unknown to caregivers.	5/5 (100%)
1070	Thompson & Beail, 2002	Case report	Population = ASD individuals (source = author)	Person A – male aged 18	Person A - autistic & severe LD	Community	Target and process measures monitored and recorded	Case of individual presenting with auto-erotic asphyxiation. Behavioural techniques implemented to reduce auto-erotic asphyxiation by interruption + replacement + use of desensitisation + psychoeducation.	FA and A-B methods (baseline – treatment) Linear regression analysis.	Intervention did not eliminate auto-erotic asphyxiation however significantly diminished dangerousness of behaviour as formation of ligatures ceased.	2/3 (66%)
1071	Tissot, 2009	Qualitative description	Population = ASD individuals (source = author)	Person A (male age 11), Person B (male aged 12), Person C (female aged 12),	Autism and moderate to severe LD	Residential school	Note analysis, interviews, observation & progress notes	Reviewed six-step programme teaching sexual identity to children with autism + LD. Cases presented + progress reviewed through qualitative methods.	Qualitative analysis of notes & interviews	Programme offered to individuals showed some improvements and positive changes in knowledge + behaviour. 4/6 cases showed largely successful outcomes.	5/5 (100%)

				Person D (male aged 16), Person E & F (males aged 19), Person G (male aged 11)							
1072	Van Son-Schoones & Van Bilsen, 1995	Sequential explanatory design	Sample & source = individuals with ASD, parents & healthcare workers	Parents (n=14), health workers (n=4), parent-couples (n=37), reporting on total ASD individuals unclear, 4 individuals with ASD (males 12-30 y/o)	Autistic	Community	Questionnaire followed by interviews	Explored sexual development in individuals with autism through written questions to parent-couples + parents' interviews, health care workers + males with autism.	Not specified	Main presenting issues; socially unacceptable behaviour, obsessive preoccupation with sex, difficulties in intimacy, experience of sexual abuse by others, difficulties with sex education + individual differences. Relationship + sexual problems reported as a consequence of social functioning, language + speech disorder + atypical rigidity.	1/7 (13%)
1073	Katz & Zemishlany, 2006	Case study (single or multiple case)	Population = ASD individuals (source = author)	2/3 cases meet the criteria for the review. Person A (male aged 30), Person B (male aged 38)	Person A (AS and ADD), Person B (AS)	Inpatient	N/A	Three cases describing contributory role of AS on violent behaviour + criminal offences. Impact upon psychiatric opinions + legal pretends discussed.	N/A	Cases highlighted role of AS traits upon criminal behaviour: criminal intent considered lacking within cases.	4/4 (100%)
1074	Cividini-Motta, et al., 2020	Nonrandomised trial	Population = ASD individual (source = author)	4 ASD individuals (aged 6-20) 1 female, 3 males.	ASD	Community and residential	Data recorded on duration of behaviour and frequency of procedures	Evaluated efficacy of Response Interruption and Redirection through physical activities requiring both hands + Response	Baseline data compared at different phases of interventio	Both procedures decreased duration of public masturbation but response interruption only process required fewer resources + less	2/5 (40%)

							Interruption involving physical and vocal prompts, on decreasing public masturbation in four individuals.	n.	time.	
1075	Jones & Okere, 2008	Case study (single or multiple case)	Population = ASD individual (source = author)	Person A – male aged 23	Autism	Community	N/A	Case described young male presenting with escalating hypersexual behaviour towards female strangers with subsequent masturbation.	N/A	Oral oestrogen (0.625 mg daily) led to significant reduction in hypersexual behaviour after two months of therapy.	1/4 (25%)
1076	Milton et al., 2002	Case report	Population = ASD individuals (source = author)	Person A - male in 30's	AS	Inpatient unit	Multiphasic Sex Inventory, Behavioural Status Index, FA	Case describing an individual with AS syndrome who presents with paraphilic behaviour and convictions of sexual offences.	Frequency data	The case demonstrated difficulty in reducing CSB and ineffective interventions despite a combination of psychosocial interventions and medication (fluoxetine) with subsequent risk remaining high.	1/5 (25%)
1077	Murrie et al., 2002	Case study (single or multiple case)	Population = ASD individuals (source = author)	4/6 cases meet the criteria for this review Person A (male aged 27), Person B (male aged 33), Person C (male aged 22), Person D (male aged 21)	Person A, B, C, D - AS	Forensic	N/A	Series of case studies described of individuals with AS syndrome in forensic contexts + common factors discussed.	N/A	Numerous commonalities identified: including lacking empathy, impairments in social interaction, interpersonal naivete + preoccupation. Sexual frustrations were also presented across cases.	3/4 (75%)
1078	Ormerod, 2006	Case study	Population = ASD	Person A – male aged 20	ASD - initially	Forensic	N/A	Describes individual with autism convicted	N/A	Presenting mental health needs +	3/4 (75%)

		(single or multiple case)	individuals (source = author)		diagnosed with PDD			for a series of sexual offences including rape + offences involving weapons.		complexity of individual led courts to conclude that a hospital order under Mental Health Act is best suited + appropriate.	
1079	Burns et al., 2021	Case report	Population = ASD individuals (source = author)	Person A (male aged 18), Person B (male aged 17)	Person A (HFA), Person B, (ASD & intellectual language impairment)	Inpatient	Frequency of behaviour recorded	Described two cases of catatonia in men diagnosed with autism where unprovoked aggression, incontinence, compulsive masturbation, stereotypic + OCD behaviours displayed.	Frequency data	Both underwent a range of interventions combining + medication. Both demonstrated a reduction in behaviours during intervention.	1/3 (33%)
1080	Ferahkaya & Bilgic, 2021	Case report	Population = ASD individuals (source = author)	Person A (male aged 6)	Person A - ASD &ADHD	Outpatient clinic	Clinical Global Impression Scale-Severity	Case of child presenting with excessive masturbatory behaviour.	Pre and post data score	Methylphenidate treatment (10 mg/day) was effective in treating masturbatory behaviour.	3/3 (100%)
1081	Sablaban & Sivananthan, 2020	Case study (single or multiple case)	Population = ASD individuals (source = author)	Person A – male aged 17	Person A - ASD and mild LD	Inpatient	N/A	Case involving an individual with ASD presenting with compulsive SBs.	N/A	Naltrexone (50 mg) started with a reported 90% reduction of compulsive SBs in 2 weeks.	3/4 (75%)
1082	Larson et al., 2021	Survey	Sample & source = OT staff	71 OT practitioners reporting on ASD individuals – total number unclear but minimum 71 (aged 8-16)	ASD	Unclear	Autism and Puberty Survey	Survey with 71 occupational practitioners regarding challenges experienced by adolescents with ASD.	Descriptive statistics and z-tests	Practitioners addressed emotional regulation + personal hygiene using various interventions: social learning + behavioural approaches. Range of training + education reported. Significantly more individuals used behavioural skills	3/5 (60%)

										training incorporating applied behaviour analysis ($p < .001$), parent training ($p = .002$) + tech ($p = .003$).	
1083	Higham et al., 2021	Cross sectional study	Population = ASD individuals (source = professional records)	24 males, (median age at admission 26 years)	ASD	Secure unit	WAIS IV, Health of the Nation Outcome Scale, Historical Clinical and Risk Management 20v3	Service evaluation describing demographic, clinical + criminal characteristics of a small sample of internet offenders with ASD + discussed using retrospective data from three assessments.	Summary statistics	High rates of comorbidities, histories of violence, traumatic experiences, mood disorders + difficulties with relationships. 18/24 committed an offence of a sexual nature involving children.	4/4 (100%)
1084	Holloway, 2021	Case study (single or multiple case)	Population = ASD individual (source = author)	Person A – male aged 23	Person A - HFA	Community	N/A	Describes psychotherapy over 14 years for ASD individual. Focuses on psychosexual development (age 11-24) + autistic rituals which occurred during treatment.	N/A	Psychosexual development + interests, + powerful castration + annihilation anxieties described. Autistic rituals common in early treatment, subsided as years progressed.	1/2 (50%)
1085	Subhi, 2021	Case study (single or multiple case)	Population = ASD individual (source = author)	Person A – male aged 36	Person A - ASD and impaired cognition	Forensic	N/A	Legal case study of man with risk to vulnerable women. Highlights concerns raised by local authority. Considers case law regarding capacity + consent.	N/A	Relevant information on individuals and partners consent in sexual engagement should be considered.	3/4 (75%)

Note. AS: Asperger's Syndrome, CBT: Cognitive Behaviour Therapy, CJS: Criminal Justice System, DISCO: Diagnostic Interview for Social and Communication Disorders, FA: Functional Analysis, HC: Healthy Control, HFA: High Functioning Autism, IIOC: Indecent Images of Children, ID: Intellectual Disability, LD: Learning Disability, LFA: Low Functioning Autism, MR: Mental Retardation, NDM: Neuropsychiatric developmental model, OCD: Obsessive Compulsive Disorder, PDD: Pervasive Development Disorder, PSB: Problematic Sexual Behaviour, SAQ: Sexual Awareness Questionnaire, SBS: Sexual Behaviour Scale, TC: Typical Control, TOM: Theory of Mind, WAIS: Wechsler Adult Intelligence Scale, WASI: Wechsler Abbreviated Scale of Intelligence, WISC: Wechsler Intelligence Scale for Children

N/A: Not applicable within this study

those with ASD, however, are included for the comprehensive nature of this review to capture the range of behaviours displayed.

The results are divided into sections on atypical, harmful, and typical SB with associated tables which demonstrate not only the number of studies which reported a particular SB type and feature, but also the range of these behaviours across the individuals Although some studies clearly identified when a participant had engaged in more than one behaviour, others were less clear and therefore figures for individual behaviours were reported separately to avoid inaccurate duplication within counts. However, not all studies were clear about the number of individuals within the sample displaying a particular behaviour and therefore these could not be accounted for in the 'exhibited by n=x individuals' column and were subsequently labelled as 'unclear' within the tables.

Based on these figures (number of individuals or number of studies), behaviours or characteristics which were most commonly reported were identified in line with the aims. To identify how meaningful these commonalities were and to establish the extent of these findings, it was decided that identifying whether particular behaviours or characteristics appeared over an assigned threshold would be beneficial. Due to the heterogeneity and diversity of descriptive categories upon which frequency counts were distributed, small arbitrary thresholds of 10% (*) and 20% (**) were assigned which were identified in the table using a single or double asterisk (table 3-7). This enabled differentiating of behaviour types, features or contexts which appeared in more than 10% or 20% of the studies, or more than 10% or 20% of individuals within studies reporting that information. Regarding the latter, where the total sample within those studies was less than 5, this threshold was not applied as all would account as greater than 10%. Finally in the few instances where it was recognised that a SB type or feature was reported in a larger sample (i.e., 30 or 40 percent), these were clearly highlighted in the description of the results provided in each section however within the table these were distinguished using the same greater than 20% (**) symbol as this was the highest of the pre-assigned thresholds put in place.

Furthermore, although the results captured some details regarding the number of incidents in relation to how often a behaviour was exhibited by a particular individual (last column within tables 3-5), information was sparse, and reporting was inconsistent; therefore, results could not be synthesised regarding this.

3.3.1 Atypical Sexual Behaviour

Results identified a range of atypical SBs exhibited by those with ASD. Table 3 demonstrates the number of individuals clearly identified as exhibiting a behaviour across the

Table 3: *Reported Frequency of Atypical SB*

Atypical Behaviour *Overall SB type followed by subtypes based on features*	**Exhibited by n=X individuals with ASD**	**Reported in n=X studies (total sample size of)**	**Study – Person ID**	**Number of incidents**
Compulsive, excessive or intense masturbation		19** (226)		
Compulsive, excessive or intense masturbation-location unspecified	28*	16*	1002 – 9 people	Multiple times a day
			1013 - Person A	7 - 8 times a day lasting approx. 30min
			1017 - Person A	
			1025 - Person A	
			1033 - Person A	1033 - 14 times a day
			1037 - 4 people	1037 - 1 Person masturbated several times a day
			1038 - 1 Person	1038 - daily regardless of circumstance
			1039 - Person A	1039 - up to 2 hours
			1050 - Person A	1050 - up to 2-3 hours every night
			1055 - Person A	
			1065 - Person A	
			1066 - Person A	1066 - 25-30 times per day
			1068 - Person A	1068 - 25-30 times per day
			1077 - Person A, Person D	1077 - Person A 5 times a day, Person D four times every evening
			1079 - Person A, Person B	1079 - Person A up to 5 hours
			1082 - Unclear	
Compulsive masturbation in public/community	1	1	1007 - Person A	
Compulsive masturbation at home (without privacy)	1	1	1019 - Person A	
Masturbation using atypical objects		12* (275)		
Masturbation using atypical objects (unspecified)	18	5	1015 - 14 People	
			1037 - 2 people	
			1047 - Unclear	
			1055 - Person A	
			1071 - Person E	
Masturbation	2	2	1027 - 1 Person	

involving shoes			1037 - 1 Person
Masturbation using rubber items	1	1	1016 - Person A
Masturbation using bedding or pillows	2	3	1015 -Unclear
			1016 - Person A
			1037 - 1 Person
Masturbation using plastics		1	1015 -Unclear
Masturbation using condiments		1	1015 - Unclear
Masturbation using magazines/books		1	1015 - Unclear
Masturbation using items of clothing	1	1	1063 - Person B
Masturbation using leather items	1	1	1037 - 1 Person
Masturbation using stuffed animals		1	1015 -Unclear
Masturbation using nappies	1	1	1016 - Person A
Masturbation using paper dolls	1	1	1077 - Person B
Masturbation by friction on floor/furniture	2	2	1031 - Person A
			1040 - Person A
Masturbation slashing tyres		1	1011 - Unclear
Inappropriate masturbation (self-stimulation)		31** (1412)	
Masturbation in presence of others without privacy	10	13*	1004 - Unclear
			1013 - Person A
			1014 - Unclear
			1031 - Person A
			1035 - Person A, Person B
			1036 - Unclear
			1037 - 3 people
			1038 - 2 people
			1041 - Unclear
			1062 - Unclear
			1064 - Person A
			1074 - Unclear
			1082 - Unclear
Masturbation in public/community setting (location unspecified)	59	16*	1003 - 22 people
			1015 - 4 people
			1018 - Unclear
			1029 - 18 people (from study 1)
			1036 - Unclear
			1047 - Unclear
			1050 - Person A
			1051 - Person A

			1052 - 8 people	
			1056 - Unclear	
			1064 - Person A	1064 - 12 incidents in 1 month, approx. 2 times per week
			1067 - Person A	
			1071 - Person A, Person D	
			1072 - Unclear	
			1074 - Unclear	
			1081 - Person A	
Masturbation in residence without privacy	20	4	1015 - 17 People	
			1025 - Person A	
			1067 - Person A	1067 - approx. 3 times a day
			1071 - Person A	
Masturbation around professionals and /or during sessions	12	2	1001 - Person B	
			1015 - 11 People	
Masturbation in swimming baths	1	1	1037 - 1 Person	
Masturbation whenever undressed	1	1	1037 - 1 Person	
Masturbation in school	4	4	1035 - Person A	
			1046 - Person E	
			1071 - Person A	
			1080 – Person A	
Masturbation in the shower	1	1	1037 - 1 Person	1037 – during every single shower
Masturbating towards animals	1	1	1053 - Person A	
Masturbation violent pornography evidencing probable suffering		1	1057 - Unclear	
Touching or rubbing genitalia		15* (600)		
Touching or rubbing genitals in public/community	109*	7	1003 - 106 people	
			1004 - Unclear	
			1026 - Person A	
			1030 - Person A	
			1036 - Unclear	
			1040 - Person A	
			1047 - Unclear	
			1082 - Unclear	
Touching or rubbing genitals at home without privacy	1	1	1026 - Person A	
Touching or rubbing genitals in school	5	3	1026 - Person A	
			1035 - Person A, Person B	
			1048- 2 people (inc. Person E)	
Touching or rubbing	6	4	1014 - Unclear	

genitals in presence of others			1032 - 2 Person
			1046 - Person C
			1048 - 3 people (Inc. Person A, C & F)
Touching or rubbing genitals - with soft object	1	1	1080 - Person A
Touching or rubbing genitals - exhibited by child < 12	1	1	1048- 2 people (inc. Person E)
Undressing or revealing undergarments		18** (1144)	
Undresses in public / community	94	11*	1003 - 78 people
			1018 - Unclear
			1023 - Person F, Person G
			1036 - Unclear
			1041 - Unclear
			1042 - Unclear
			1047 - Unclear
			1048 - 7 people (inc. Person A, Person D)
			1052 - 6 people
			1071 - Person D
			1072 - Unclear
Undresses in presence of others/without privacy	3	5	1004 - Unclear
			1014 - Unclear
			1036 - Unclear
			1038 - 2 people
			1062 - Person B
Undresses at school	2	2	1060 - Person A
			1069 - Person A
Unclothed on grounds of residence/garden	1	1	1079 - Person B
Undressing/naked around the house	5	2	1048 - Person B, Person C, Person E, Person F
			1069 - Person A
Exposes Undergarments	5	1	1048 - 5 people (inc. Person D, Person E, Person F)
Inappropriate speech/gestures, or sexualising of objects		14* (631)	
Makes sexual sounds/sexual speech	3	3	1022 - Person A
			1025 - Person A
			1048 - 1 Person (Person E)
Repeats sexual words/comments gestures	3	4	1046 - Person A
			1049 - Unclear
			1061 - Person A
			1063 - Person D
Imitates sexual	3	2	1031 - Person A

actions			1048 - Person C, Person F	
Talks about sexual topics in public / inappropriate settings	8	5	1041 - Unclear	
			1047 - Unclear	
			1052 - 8 people	
			1072 - Unclear	
			1082 - Unclear	
Focus on sexually suggestive objects	1	1	1063 - Person D	
Other atypical SB				
Excessive collection of entire pornography series stored	1	1	1008 – Person A	
Not concealing pornographic items	2	1	1037 - 2 people	
Display private/sexual pictures in public		1	1047 - Unclear	
Collecting sexual videos/images of ISB (not involving children)	1	1	1084 - Person A	
Showing ISB content from internet to professionals	1	1	1084 - Person A	
Collecting artificial genitalia	1	1	1077 – Person A	
Collecting dolls for sexual games	1	1	1077 – Person B	
Disclosing sexual interests to another (not consented or socially appropriate)	1	1	1016 - Person A	
Collecting & annotating images of babies in nappies in sexual manner	1	1	1016 - Person A	
Derogatory sexualised comments written on female images	1	1	1033 - Person A	
Europhilic behaviours with sex partners	1	1	1005 - Person A	
Klismaphilic behaviours by self	1	1	1005 - Person A	1005 -'infrequent engagement'

Note. Greater than 10% (*). Greater than 20% (**).

total number of studies reporting that behaviour type (highlighted rows) or subtype (following rows). It provides details of the six overall behaviour types and includes additional details surrounding the features and characteristics of these behaviours within subtypes.

3.3.1.1 Number of Studies Reporting Atypical SB. A total of six atypical SB types were identified. Inappropriate masturbation was reported across 31 studies which was equivalent to over 30% of the studies reviewed. Compulsive or excessive masturbation and inappropriate undressing was also reported in over 20% of studies (n=19 and n=18 respectively). Inappropriate touching of genitalia was identified in 16 studies, masturbation

using atypical objects in 12 and inappropriate speech, gestures or sexualising of objects reported in 14 studies; these were all reported in over ten percent of the studies reviewed.

Results revealed that some subtypes (based on the features and characteristics of behaviours) were also reported more so than others. Compulsive or excessive masturbation (location unspecified n=16), inappropriate masturbation (location unspecified n=16 or without privacy n=13) and undressing (in public/community n=11) were reported in over 10% of studies.

3.3.1.2 Number of Individuals Reporting Atypical SB. Related to this, it was found that some subtypes were reported in a greater number of individuals than other subtypes. In relation to the behaviour of inappropriate masturbation (from a total sample of n=1412 within studies reporting upon it), subtypes featuring public and community settings where location was unspecified (n=59), in places of residence without privacy (n=20), in the presence of others without privacy (n=10), or in the presence of professionals or in professional settings (n=10) were exhibited the most. Results also showed undressing which occurred in community settings (n=94/1144), masturbation using unspecified atypical objects (n=18/275) and talking about sexual topics in public (n=8/631) were most common within the associated overall behaviour. However, it was found that only compulsive masturbation where location was unspecified (n=28/226) or touching or rubbing genitals in public or community settings (n=109/600) was reported in over 10% of individuals from the studies reporting that behaviour. All other subtypes were reported in a smaller number of individuals (seven or less) or in lower than 10% of individuals from the studies reporting upon them.

3.3.1.3 Supplementary Findings Surrounding Atypical SB. Results revealed numerous other accounts of potentially atypical SB however due to the lack of specificity and clarity surrounding the nature and type of these behaviours, these actions were not included in the results of the review. For example, studies reported ISB, sexual misconduct, deviant SB or ‘paraphilias’ without specifying details to allow clear classification. Some studies also reported on ‘arousal’ and ‘fantasies’ towards atypical interests however as these did not involve the display of observable behaviour, these too were not included in the above results. A few behaviours were also noted that did not explicitly demonstrate an inappropriate nature such as entering a communal toilet without knocking or removing pants fully at a urinal rather than unzipping only. Whilst these behaviours are arguably atypical, it seemed unreasonable to include these within the results due to ambiguity. Importantly, only SBs which were clearly described and could be considered or perceived to have a sexual or romantic connotation were included.

3.3.2 Harmful Sexual Behaviour

Table four provides an indication of the number of studies reporting particular types of HSB whilst also identifying details surrounding the features and characteristics of these by listing subtypes.

3.3.2.1 Number of Studies Reporting HSB. According to the results, the range of HSBs reported in those with ASD appeared to be much more varied (see table 4). A total of 17 HSB types were identified. However, the most common HSB type reported across studies was unconsented touching of others (n=29, greater than 30% of studies). Other common HSBs included sexual or romantic stalking or harassment (n=13), CSEM (n=10), exposure (n=8) and unconsented kissing and hugging (n=8) were all reported in 10% or more of studies. Unconsented watching of others (n=7), watching others nude or undress (n=6), rape (n=5), inappropriate means of stimulation or arousal (n=5) and attempting to undress others (n=5) were also reported numerous times across studies however these were not greater than 10%. Other HSB types were reported noticeably less frequently.

According to further analysis on the features and characteristics of these overall behaviours, unconsented touching of others 'inappropriately' where the target was unspecified was the only subtype reported in greater than 10% of studies (n=15).

3.3.2.2 Number of Individuals Reporting HSB. Related to this, it was found that some subtypes were reported in a greater number of individuals than others. Exposure of genitals (n=9/418), unconsented hugging or kissing directed towards strangers (n=7/138), stalking through following girls (n=13/764), and stimulating arousal by rubbing on a non-consenting person where relationship was unspecified (n=10/168) were most common within the associated overall behaviour types. Unconsented touching of others (n=19), and unconsented touching of others inappropriately (n=64) particularly towards intimate areas of women (n=11) was most reported within this behaviour type (with a total sample size of n=1139). Additionally, downloading CSEM (n=11/98) as well as producing, distributing, or inciting (n=19/98) was commonly reported under CSEM with the former reported in over 10% and latter in over 20% of individuals from studies reporting upon it.

Whilst rape was reported in a smaller number of studies overall (n=5), rape where the victim was unspecified and rape of a child under 16 were both identified in over 10% of individuals when compared to the total sample of individuals (n=15) within studies reporting on rape.

Table 4: *Reported Frequency of HSB*

HSB *Overall SB type followed by subtypes based on features*	**Exhibited by n=X individuals with ASD**	**Reported in n=X studies (total sample size of)**	**Study – Person ID**	**Number of incidents**
Exposure		8* (418)		
Exposure to non-consenting person (exhibitionistic)	2	2	1002 - 2 people	
			1082 - Unclear	
Exposure in public (location unspecified)	1	3	1018 - Unclear	
			1021 - Person A	
			1062 - Unclear	
Exposure of genitals/private areas	9	3	1026 - Person A	
			1029 - 6 from study 1, 1 from study 2	
			1056 - 1 Person	
CSEM		10* (98)		
Downloading or possession indecent child images/videos (CSEM)	11*	3	1008 - Person A	
			1009 - Person A, Person B, Person D, Person E, Person I, Person M	
			1058 - 4 people	
CSEM for masturbation	2	2	1005 - Person A	
			1037 - 1 Person	
CSEM - inclusive of inciting, producing, or distributing	19**	7	1009 - Person F, Person G, Person H	
			1010 -Unclear	
			1012 - Person A	
			1051 - Person B	
			1058 - 1 Person	
			1077 - Person B	
			1083 - 12 people	
Unconsented touching		29** (1139)		
Touching others	19	2	1052 - 18 people	
			1062 - Person C	
Touching others inappropriately (relationship unspecified)	64	15*	1003 - 53 people	
			1004 - Unclear	
			1018 - Unclear	
			1023 - Person D, Person J	
			1028 - Person A	
			1036 - Unclear	
			1038 - 4 people	
			1041 - Unclear	
			1047 - Unclear	
			1049 - Unclear	

			1051 - Person D
			1061 - Person A
			1062 - Unclear
			1076 - Person A
			1085 - Person A
Touching women/girls in inappropriate area (breasts, buttock) - relationship unknown	11	5	1001 - Person B
			1023 - Person F
			1044 - Person A
			1048 - 7 people (Inc. Person B, Person D, Person F)
			1076 - Person A
Touching/rubbing female family members	1	1	1071 - Person B
Touching intimate area of parent	1	1	1028 - Person A
Touching mother in inappropriate area (breasts, buttock)	1	2	1039 - Person A
			1047 - Unclear
Touching female sibling in inappropriate area (breasts, buttock)	1	1	1033 - Person A
Touching sibling inappropriately	2	2	1021 -1 Person
			1028 - Person A
Touching teacher / staff	4	4	1014 - 1 Person
			1039 - Person A
			1056 - 1 Person
			1071 - Person B
Touching peers / other service users	2	2	1051 - Person B
			1056 - 1 Person
Touching peers / service users in genital area	2	2	1071 - Person B 1019 - Person A
Touching genitals of young boys whilst bathing	1	1	1024 - Person C
Touching/rubbing a child's genitals above clothing	1	1	1024 - Person C
Touches peers inappropriately during game playing	1	1	1048 - 1 Person
Stroking hair	2	2	1014- 1 Person
			1037 - 1 Person
Inappropriate touching ex-partner	1	1	1024 - Person A
Seeking physical body contact from opposite gender	3	3	1033 - Person A
			1044 - Person A
			1084 - Person A
Unconsented kissing and hugging		8* (138)	
Hugging opposite gender in school	1	1	1014 - 1 Person

Requesting hugs/kiss from professionals	1	1	1020 - Person A	1020 - 'repeatedly' requested
Requesting hugs/kisses from child living in area/building	1	1	1020 - Person A	1020 - 'repeatedly' requested
Kisses and hugs strangers	7	2	1046 - Person B	
			1048 - 6 people	
Kisses others	1	3	1037 - Unclear	
			1042 - Unclear	
			1043 - Person A	
Kisses others on mouth	3	2	1039 - Person A	
			1048 - 2 people (Inc, Person D)	
Sexual comments to others		3 (18)		
Making sexually inappropriate comments to/about school peers	2	2	1032 - 1 Person	
			1065 - Person A	
Making sexually inappropriate comments to girls - of ethnic minority	1	1	1001- Person A	
Stimulating arousal		5 (168)		
Arousing self through rubbing on non-consenting Person (frotteuristic)	10	3	1002 - 9 people	
			1042 - Unclear	
			1062 - Person C	
Arousing self through rubbing on parent wearing item/colour/texture	1	1	1022 - Person A	
Arousing self through rubbing on non-consenting person wearing item/colour/texture	2	2	1022 - Person A	
			1027 - Person A	
Arousal by touching feet sexually aggressive behaviour	1	1	1063 - Person C	
Masturbation involving nonconsenting others		3 (3)		
Masturbation Towards female strangers	1	1	1075 - Person A	
Masturbatory behaviour involving other's feet	1	1	1027 - Person A	
Masturbating during phone calls to women	1	1	1076 - Person A	
Masturbation with life threatening risk		2 (2)		
Self-Asphyxiation during masturbation	2	2	1055 - Person A	
			1070 - Person A	1070 - at least once a day
Initiating intercourse (unconsented)		3 (101)		

Attempting intercourse with others		1	1036 - Unclear
Attempting intercourse with person wearing item/colour/texture at home	1	1	1022 - Person A
Attempting intercourse with stranger wearing item/colour/texture in public	1	1	1022 - Person A
Rape		5 (15)	
Rape	2*	2	1051 - Person D
			1078 - Person A
Rape of previous partner in residence	1	1	1024 - Person A
Rape (+ sexual murder) of adult female stranger in public carpark	1	1	1006 - Person A
Rape of child <16	2*	2	1051 - Person L
			1078 - Person A
Partner 'feeling' raped	1	1	1059 - Person A
Forced/coerced sexual activity		3 (101)	
Partner forced to engage in sexual activities		1	1036 - Unclear
Sexual molestation of child victim in neighbourhood	1	1	1067 - Person A
Initiating oral sex with child age <10	1	1	1033 - Person A
Requesting sexual activity from others		2 (27)	
Requests sexual acts from others (unspecified)	1	1	1048 - 1 Person
Requesting child (<10) to engage perform masturbation	1	1	1024 - Person C
Watching others (unconsented)		7 (208)	
Monitoring stepchild sexual activity with hidden camera	1	1	1010 - 1 Person
Watching women in public toilets	1	1	1076 - Person A
Watching children in a toilet	1	1	1045 - Person A
Entering staff toilets	1	1	1061 - Person A
Staring inappropriately at others/private area	3	4	1025 - Person A
			1041 - Unclear
			1061 - Person A

			1062 - Person E
Watching others undress/nude (unconsented)		6 (439)	
Watching female peers undress in university changing room	1	1	1077 - Person C
Watching children undress in community changing room	1	1	1024 - Person B
Watching others getting undressed/nude	3	4	1023 - 1 Person
			1041 - Unclear
			1048 - 1 Person
			1077 - Person C
Attempting to look under clothes of others		1	1047 - Unclear
Attempting to undress others (unconsented)		5 (158)	
Attempt to undress others	3	3	1042 - Unclear
			1044 - Person A
			1048 - 2 people (Inc. Person F
Attempting to undress child	3	2	1045 - Person A
			1052 - 2 people
Stalking/harassment with sexual/romantic interest		13* (764)	
Stalking/following (sexual interest)	6	6	1034 - 2 people
			1049 - Unclear
			1051 - Person D, Person G
			1054 - Unclear
			1073 - Person A
			1077 - Person D
Stalking/following with intent to sexually assault	2	2	1061 - Person A
			1077 - Person D
Following female peer in school (sexual interest)	2	2	1032 - 1 Person
			1045 - Person A
Persistent texting/phoning (pursuing interest)	4	3	1032 - 1 Person
			1073 - Person A, Person B
			1085 - Person A
Threats to harm/kill following romantic, sexual rejection	1	1	1073 - Person A
Sexual threats	1	1	1061 - Person A
Verbal sexual harassment	1	1	1056 - 1 Person
Obscene phone calls	2	2	1051 - Person C
			1076 - Person A

Chasing/following girls perceived as predatory	13	1	1052 - 13 people
Sexual activity with animal		3 (3)	
Allowing pet animal to touch/lick genitals	1	1	1065 - Person A
Intercourse with animal	2	2	1053 - Person A
			1067 - Person A
Other HSBs			
Contacting or approaching children/ teens: sexual/predatory	3	3	1038 - 1 Person
			1051 - Person D
			1064 - Person A
'Employing' teen girls (12-16) for nude photos	1	1	1005 - Person A
Inviting peers, children to toilets	2	2	1045 - Person A
			1061 - Person A
Aggression towards prostitutes	1	1	1076 - Person A
Urethral eroticism from contact with female peers in education setting	1	1	1084 - Person A
Necrophilia	1	1	1051 - Person G
Smelling siblings in inappropriate places	1	1	1033 - Person A
Stealing items for sexual paraphernalia	3	3	1063 - Person B
			1064 - Person A
			1081 - Person A
Explicit conversations with young boys	1	1	1009 - Person C
Expressing sexual desires regarding staff	1	1	1033 - Person A
Viewing violent pornography evidencing probable physical/emotional suffering	5	1	1057 - 5 people
Sending indecent material to child <16	1	1	1009 - Person C

Note. Greater than 10% (*). Greater than 20% (**).

3.3.2.3 Supplementary Information Regarding HSB. Numerous studies reported on sexual abuse or sexual offences, yet again without specifying the nature and type of this behaviour. This also included accounts of sexually coercive behaviour, sexually threatening behaviour, or ISB towards others, including children. In total, 18 studies included in the review also clearly reported at least one additional account of HSB which was underspecified; subsequently due to the lack of details these individual underspecified accounts of HSB could not be recorded in the list of behaviours.

Similarly, paraphilic or deviant interests, thoughts, and arousal where a behaviour did not take place were not added to the results, despite the potential of these being harmful if acted upon. Furthermore, some studies identified SBs such as those occurring between two children, however the consensual or mutual nature of these was queried with few studies also reporting behaviours such as invading personal space and monitoring activities. Due to ambiguity of these reports, this information was not included or accounted for in the frequency counts provided in the results tables.

3.3.3 Typical Sexual Behaviour

Whilst typical behaviours were not the focus of this review, in instances where these were reported in the context of other CSB, these were also recorded. Table 5 provides details regarding the range of these behaviours and associated features and characteristics listing numerous subtypes.

3.3.3.1 Number of Studies Reporting Typical Behaviours. According to the synthesis on typical behaviours, masturbation (n=16), observing sexual or nude content (n=9) and sexual intercourse (n=7) were three commonly reported typical behaviours, with the former two reported in over 10% of studies reviewed.

In relation to subtypes based on the features and characteristics of these behaviours, no subtypes were reported in greater than 10% of studies based on the data collated.

3.3.3.2 Number of Individuals Reporting Typical Behaviours. In relation to the number of individuals displaying a particular feature of these behaviours, some subtypes were reported in a greater number of individuals than others, including, attempting sexual intercourse (n=7/625), watching pornography (n=8/148), masturbation exhibited by an individual aged 12 to 18 (n=15/614) and experiencing sexual intercourse (n=55/625). However, masturbation ‘exhibited by an adult or individual aged over 16’ (n=62/614), masturbation with ‘regular frequency’ (n=98/614) and masturbation exhibited in a ‘bedroom or bathroom’ (n=72/614) were individually identified in greater than 10% of the sample of individuals within studies reporting on typical masturbation.

All other behaviours were reported in a smaller number of individuals (less than seven) and no other subtypes were reported in over 10% of studies or over 10% of individuals from studies reporting on them.

Table 5: *Reported Frequency of Typical SB*

Typical SB *Overall SB type followed by subtypes based on features*	**Exhibited by n=X individuals with ASD**	**Reported in n=X studies (total sample size of)**	**Study – Person ID**	**Number of incidents**
Masturbation		16* (614)		
Masturbates - exhibited by < 12 years of age	4	3	1005 - Person A	
			1023 - Person A, Person E	
			1048 - 1 Person	
Masturbates - exhibited by > 12-18 years of age	15	5	1023 - Person B, C, D, F, G, H, I, J	
			1026 - Person A	
			1032 - 1 Person	
			1035 - Person C	
			1048 - 4 Person (Inc, Person D)	
Masturbation (adult) or above 16years	62*	4	1005 - Person A	
			1015 - 58 People	
			1021 - Person A	
			1062 - Person D, Person E	
Masturbation (regular – frequency not concerning)	98*	7	1002 - 79 people	1002 – 53 2-6 times per week, 4 once a week, 11 2-3 times a month, 2 once a month, 9 less than once a month
			1014 - unclear	
			1037 - 10 people	
			1038 - 8 people	
			1041 - Unclear	
			1046 - Person E	1046 – daily
			1072 - Unclear	
Masturbation using sexual object/item (i.e., lingerie)	2	2	1037 - Unclear	
			1038 - 2 people	
Masturbation in bedroom or bathroom	72*	2	1015 - 72 people	
			1038 - Unclear	
Sexual intercourse		7 (625)		
Experience of sexual intercourse	55	6	1002 – 49 people	1002 – 4 2-6 times per week, 6 once a week, 8 2-3 times a month, 31 less than once a month
			1005 - Person A	
			1036 - Unclear	
			1037 - 3 people	
			1038 - 2 people	

			1041 – Unclear
Attempting sexual intercourse	7	2	1015 - 4 People
			1037 - 3 people
Sexual or nude content		9* (148)	
Watching pornography in general (no atypical nature/context described)	8	7	1032 - Unclear
			1052 - 3 people
			1053 - Person A
			1061 - Person A
			1069 - Person A
			1072 - Person A
			1077 - Person C
Watching pornography when under the age of 12	1	1	1033 - Person A
Looks at nude images - exhibited by < 12 years of age	1	1	1048 - 1 Person
Looks at nude images	6	2	1048 - 3 people (Inc. Person C, Person F)
			1052 - 3 people
Reads sexual content	1	1	1052 - 1 Person
Watches programmes with nudity, exhibited by < 12 years of age	2	1	1048 - 2 people
Watches programmes with nudity, exhibited by aged > 12-18 years	1	1	1048 - 1 Person (Person F)
Other typical SB		5	
Collecting women's underwear	3	1	1052 - 3 people
Activity with prostitutes		1	1072 - Unclear
Using internet to find a partner/relationship	1	2	1032 - Unclear
			1052 - 1 Person

Note. Greater than 10% (*). Greater than 20% (**).

3.4 Comparison Studies

According to the results of the review, only six studies compared types of SBs between ASD and non-ASD individuals. Although other studies may have included comparison groups (Ref ID 1034, Hannah & Stagg, 2016), the difference in the type of CSB was not explored. Data from these six comparison studies is provided in appendix 8 which outlines the list of reported SBs referenced within these studies. Due to the diversity across studies and the variability in reporting styles, establishing conclusions regarding the comparison between groups was limited.

According to the data, those with ASD reported or scored higher in the atypical or HSB categories across most behaviour types identified in the comparison table, other than 'masturbation without privacy' in which those with MR scored higher in one study (Ref ID

1038, Hellemans et al., 2010). There was also no difference found in 'exposure to non-consenting people' in another study (Ref ID 1002, Schöttle et al., 2017).

From the six comparison studies, only a few comparison studies reported on significance and significant differences were only found in some behaviours. 'Sexual disorder symptoms' reporting undressing or exposure in public were statistically significant in the ASD group in comparison to the non-ASD LD only group in study 1018 (Cervantes & Matson, 2015). A significant difference in frequency of masturbation and frequency of sexual intercourse was found between ASD and non-ASD males, however statistical significance was only found in frequency of sexual intercourse when comparing ASD and non-ASD females in study 1002 (Schöttle et al., 2017). Finally, a significant difference in the number of stalking behaviours displayed by ASD individuals was higher than those displayed by non-ASD individuals in study 1054 (Mogavero & Hsu, 2019). Due to the lack of comparative studies, it is difficult to truly establish whether certain types of SBs significantly differ between populations.

Within the studies, variations in comparison samples which may influence findings must also be considered. Comparison samples included those labelled 'typical' or 'healthy' as well as those with intellectual or learning disabilities and those with mental health diagnosis. Four out of six comparison studies acknowledged differences in samples between ASD and non-ASD groups, but details were often limited. Factors upon which groups were matched were also diverse which raised further difficulties in establishing informed comparisons.

- Ref ID 1002 (Schottle et al., 2017) – ASD (Asperger's or typical autism) vs 'healthy controls' matched for gender, age and years of education
- Ref ID 1004 (Stokes & Kaur, 2005) – ASD (Asperger's or HFA) vs 'healthy controls' involved no purposeful matching of groups but reported that there was no significant difference in age between groups
- Ref ID 1038 (Hellemans et al., 2010) – ASD (and MR) vs MR only comparison group matched according to age and full-scale IQ
- Ref ID 1049 (Stokes et al., 2007) – ASD (HFA or Asperger's) vs 'typical controls' involved no purposeful matching of groups but reported that there was no significant difference in gender between groups

3.5 Features and Characteristics: Identification of Context Information

Based on the data, features and characteristics specifically related to target and location information was also synthesised separately. This captured the frequency of specific locations or target information reported across studies and within those with ASD, regardless of CSB type.

As previously mentioned, only contexts in which observable behaviours occurred were included. The following sections (divided into target and location characteristics) provide tables which present the number of studies and individuals reporting particular characteristics. The same 10% (*) and 20% (**) threshold was applied.

3.5.1 Context Information: Target characteristics

3.5.1.1 Number of Studies Reporting Targets. Data extracted from the reviewed studies revealed CSBs occurring towards, involving or in front of a range of various targets or victims (including individuals, content, or objects; see table 6).

Results found that behaviours involving inanimate objects were reported most commonly in over 20% of studies (n=18) included in this review. Targets reported in more than 10% of studies included behaviours towards children/teenagers (male n=9 and female n=11), females in general (n=8), specifically female professionals (n=9) and involved CSEM (n=10).

A smaller number of studies reported behaviours towards/involving parents (n=7), female peers (n=6) and female strangers (n=7) with fewer reports of behaviours towards/involving partners or ex-partners (n=4), younger siblings (n=5), strangers (gender/age unspecified n=5), peers or friends (gender/age unspecified n=5) and non-sexual body parts (n=5). These however were not reported in greater than 10% of studies and all other targets identified were reported in an even smaller number.

3.5.1.2 Number of Individuals Reporting Targets. Based on the number of ASD individuals reported upon rather than number of studies, SBs were reported noticeably more towards children (n=28), inanimate objects (n=32) or involved CSEM (n=25).

When compared to the total number of individuals within studies reporting the target, the following was found. Targets involving partners or ex-partner (n=3/30), children within the family (n=2/20) or female peers (n=7/34) were all reported in over 10% of individuals from studies referring to these specific targets with female professionals (n=9/40), female strangers (n=7/34), service users (n=2/7), or male children/teens (n=11/49) reported in 20% or more. Additionally, numerous targets were found to be reported in greater than 30% of individuals from studies reporting the specific target, including CSEM (n=25/89, >60%), younger siblings (n=5/9, >50%), female children/teens (n=13/33, > 40%), children in general (n=28/95, >30%) and involving nonsexual body parts (n=8/24, >30%).

Table 6: *Context Information: Reported Frequency of Target characteristics*

Context: Target	Exhibited by n=X individuals with ASD	Reported in n=X studies (total sample size of)	Study – Person ID	
Professional (gender unspecified)	2	3 (92)	1001 - Person B 1015 - Unclear	1061 - Person A
Female professional	9 **	9* (40)	1014 - 1 Person 1020 - Person A 1033 - Person A 1039 - Person A 1043 - Person A	1056 - 1 Person 1071 - Person B 1073 - Person A 1076 - Person A
Male professional	1	1 (1)	1084 - Person A	
Adult (unspecified)	2	1 (24)	1083 - 2 people	
Partner/ ex-partner	3*	4 (30)	1019 - Person A (perceived they were a couple) 1024 - Person A (estranged wife)	1049 - Unclear 1059 - Person A
Parent	5	7 (134)	1022 - Person A 1028 - Person A 1037 - Unclear 1039 - Person A	1047 - Unclear 1062 - Person C 1073 - Person A
Adult male relative	1	1 (1)	1064 - Person A	
Female relative	1	1 (7)	1071 - Person B	
Child (unspecified)	28**	7 (95)	1005 -Person A 1009 - Person C Person E 1011 - 4 people	1038 - 1 Person 1061 - Person A 1067 - Person A 1083 - 18 people
Child - younger sibling	5 **	5 (9)	1021 - Person A 1028 - Person A 1033 - Person A	1061 - Person A 1062 - Person B
Child in family	2*	3 (20)	1010 – Unclear 1033 - Person A	1077 - Person B
Child/young teens – male	11 **	9 * (49)	1009 - Person C 1024- Person B, Person C 1033 - Person A 1078 - Person A 1061 - Person A	1062 - Person B, Person C 1063 - Person C 1067 - Person A 1077 - Person A
Child/young teens – female	13 **	11*(33)	1005 -Person A 1009 - Person A 1020 - Person A 1028 - Person A 1033 - Person A 1045 - Person A	1051 - Person D, L, M 1061 - Person A 1063 - Person C 1067 - Person A 1077 - Person B
Girls / females – (relationship/age unspecified)	7	8*(111)	1001 - Person A 1019 - Person A 1027 - Person A 1048 - Unclear	1051 - Person G. Person M 1052 - Unclear 1073 - Person B 1085 - Person A
Boys / male - unspecified	1	1 (1)	1078 - Person A	
Other residents	1	2 (90)	1015 - Unclear	1061 - Person A
Strangers	2	5 (146)	1015 - Unclear 1022 - Person A	1046 - Person B 1048 - Unclear 1049 - Unclear
Female stranger	7**	7 (34)	1006 - Person A	1076 - Person A

			1025 - Person A 1044 - Person A 1049 Unclear	1075 - Person A 1077 - Person D
Male stranger	1	1 (5)	1062 - Person E	
Other service user	2**	2 (7)	1056 - 1 Person	1061 - Person A
Peer, acquaintance or friends (unspecified)	3	5 (134)	1015 - Unclear 1049 - Unclear 1051 - Person B	1063 - Person D 1071 - Person B
Male peer	2	2 (2)	1061 - Person A	1068 - Person A
Female peer	7*	6 (50)	1014 - 1 Person 1032 - 2 Person 1051 - Person M	1065 - Person A 1077 - Person C 1084 - Person A
Work colleagues	2	2 (26)	1043 - Person A	1049 - 1 Person
Celebrities		1	1049 - Unclear	
Involving animals	3	3 (3)	1053 - Person A 1065 - Person A	1067 - Person A
Involving CSEM	25 **	10* (89)	1005 - Person A 1008 - Person A 1009 - Person A, B, C, D, E, F, G, H, I 1010 - Unclear	1012 - Person A 1037 - 1 Person 1051 - Person B 1058 – 1 Person 1077 - Person B 1083 - 9 people
Involving nonsexual body parts	8**	5 (24)	1005 - Person A 1027 - Person A 1038 - 4 people	1040 - Person A 1063 - Person C
Involving inanimate objects	32	18** (367)	1011 - Unclear 1015 - 14 people 1016 - Person A 1022 - Person A 1027 - Person A 1037 - Unclear 1038 - 2 people 1047 - Unclear 1052 - 3 people 1055 - Person A	1063 - Person B, Person D 1064 - Person A 1067 - Person A 1071 - Person E 1076 - Person A 1077 - Person B 1080 - Person A 1081 - Person A

Note. Greater than 10% (*). Greater than 20% (**).

3.5.2 Context Information: Location Characteristics

3.5.2.1 Number of Studies Reporting Locations. Data extracted revealed a range of locations where CSBs were exhibited (table 7). SBs were often reported in public, or community setting (n=29) identified in approximately 30% of studies where a specific location was not reported. Behaviours exhibited in home or residence settings were also noted by a large number of studies (n=17, greater than 20%). Other frequently reported locations specified included educational settings (n=9, >10% of studies), in treatment or therapy sessions (n=4), in shared rooms (n=4), or in sports and fitness environments (n=4) with others reported even less.

3.5.2.2 Number of Individuals Reporting Locations. Four of these locations (public or community, home or residence, treatment or therapy, and education settings) also reported the highest number of ASD individuals; 44, 23, 14 and 12 respectively.

Table 7: *Context Information: Reported Frequency of Location Characteristics*

Context: Location	Exhibited by n=X individuals with ASD	Reported in n=X studies (total sample size of)	Study – Person ID	
Treatment or therapy session	14*	4 (93)	1001 - Person B 1015 - 11 people	1020 - Person A 1084 - Person A
Home, residence or ward	23**	17** (73)	1013 - Person A 1019 - Person A 1022 - Person A 1025 - Person A 1026 - Person A 1031 - Person A 1038 - 8 people 1044 - Person A 1046 - Person E	1048 - Unclear 1060 - Person A 1061 - Person A 1062 - Unclear 1067 - Person A 1068 - Person A 1071 - Person A 1077 - Person A, Person D
On the ground of home/residence	2*	3 (13)	1023 - Unclear 1067 - Person A	1079 - Person B
Educational setting	12*	9* (101)	1026 - Person A 1032 - 2 Person 1035 - Person A, Person B 1046 - Person D, Person E	1054 - 1 Person 1060 - Person A 1061 - Person A 1069 - Person A 1080 - Person A
Park / play area	2	2 (2)	1045 - Person A	1061 - Person A
Shared rooms	4*	4 (30)	1038 - 1 Person 1062 - Person B	1064 - Person A 1071 - Person A
Public/community - unspecified	44	29** (1490)	1003 - Unclear 1004 - Unclear 1015 - 4 people 1018 - Unclear 1021 - Person A 1022 - Person A 1023 - Unclear 1026 - Person A 1029 - 18 people (from study 1) 1030 - Person A 1032 - Person A 1036 - Unclear 1037 - Unclear 1040 - Person A 1041 – Unclear	1042 - Unclear 1047 - Unclear 1048 - 7 people 1050 - Person A 1051 - Person A 1052 - Unclear 1056 - 1 Person 1062 - Unclear 1064 - Person A 1067 - Person A 1071 - Person A, Person D 1072 – Unclear 1074 - Person A 1081 - Person A 1082 - Unclear
Car park	1	1 (1)	1006 - Person A	
Sport / fitness centre or group	4 *	4 (32)	1019 - Person A 1024 - Person B	1037 - 1 Person 1077 - Person C
Graveyard	1	1 (3)	1024 - Person C	
Party /gathering	1	1 (1)	1084 - Person A	
Neighbourhood	1	1(1)	1067 - Person A	
Public toilets	3 **	3 (7)	1045 - Person A 1062 - Person E	1076 - Person A
Shopping centre	2	2 (2)	1025 - Person A	1045 - Person A
Transport	1	1 (1)	1061 - Person A	
Public internet café	1	1(1)	1061 - Person A	
Place of worship	1	1(1)	1045 - Person A	

Note. Greater than 10% (*). Greater than 20% (**).

When the number of individuals identified as exhibiting a behaviour within a particular location was compared to the total number of individuals within studies reporting upon it, the following was found. Locations including treatment or therapy settings (n=14/93), education settings (n=12/101), grounds of home (n=2/13), sports centre (n=4/32), and shared rooms (n=4/30) were all reported in over 10% of individuals from studies referring to these specific locations. Additionally, home or residence settings (n=23/73) were reported in over 30% and public toilets in over 40% of individuals from the total sample within studies reporting them. However, the latter only referred to a few individuals (n=3/7).

3.6 Reported Associations Between Core Attributes of ASD and CSB

Numerous studies reported some form of association between vulnerabilities which align with the ASD diagnosis (social and communication difficulties, RRBI and sensory processing) and atypical or harmful SB. However, whilst some explicitly referenced ASD (marked with an * in the following tables), others mentioned the attributes and implied a relationship without explicit reference to autism. Furthermore, the way these associations were reported was extremely varied and diverse; whilst some asserted or explicitly reported that these were related, others simply implied or suggested that vulnerabilities were influencing behaviours. All of these were considered valid and were collated together to capture the extent of studies which support (to some degree) that ASD traits are associated to the display of CSB. However, in relation to these, the form of evidence was recorded (i.e., author claims, professional reports, statistical evidence). Tables eight, nine and ten report the number of individuals and the number of studies in which associations were made between ASD and specific CSB types as well as identifying where association to overall CSB was implied.

3.6.1 Association Between Social and Communication Skills and CSB

The results revealed a total of 21 studies (over 20% of studies) equating to a minimum of 22 individuals with ASD where a specific type of CSB was considered to be associated to social and communication difficulties (see table 8). Out of these, 10 studies made further associations between CSB and social skills without specifying the SB. It should be noted that only four studies out of the total 21, explicitly indicated that the social skill difficulties were a manifestation of ASD which were thought to be influencing SB.

An additional nine studies also suggested an association between difficulties in social communication and interaction skills which influenced the CSBs presented, however these did not refer to a specific SB type (or individual in some cases). Two out of nine explicitly reported the vulnerabilities in social skills to be related to ASD.

Table 8: *Association Between Social and Communication Skills and CSB*

	Reported in n=X people	Reported in n=X studies	Evidence Type	Study – Person ID	CSB Type
Association between social skills and CSB	22	21 with a total sample size of 319	Author claim: 1002, 1002, 1006, 1009 (Person H), 1012, 1059, 1019, 1020, 1025, 1037, 1062, 1072, 1073 (Person B), 1020 Self-report: 1059, 1019, 1036, 1044, 1063 (Person C) Judicial report: 1009 Person C Reported by professional: 1009 (Person I) Reported by Family/parent: 1014, 1032, 1025, 1035, 1036, 1049 'Medical evidence': 1024 Psychiatric opinion: 1073	1001 – Person B	Inappropriate masturbation. Unconsented touching. Stalking or harassment
				1002 – Unclear	Inappropriate masturbation
				1006 – Person A	Rape
				1009 – Person, C H, I	Person, C (sending/sharing explicit content), H & I (CSEM)
				1012 – Person A	CSEM
				1014 – 1 Person	Kissing & Hugging
				1059 – Person A	Rape
				1019 – Person A	Unconsented touching
				1020 – Person A	Kissing/hugging
				1024 – Person A*	Unconsented touching
				1032 – Unclear	Inappropriate touching
				1025 – Person A	Compulsive masturbation
				1035 – Person A B	Person A (Inappropriate masturbation), B (inappropriate masturbation)
				1036 – Unclear	Undressing. Inappropriate touching. Inappropriate masturbation
				1037 – Unclear	Kissing/hugging. Unconsented touching.
				1044 – Person A	Unconsented touching
				1049 – Person A	Stalking or harassment
				1062 – Person A	Inappropriate masturbation
				1063 – Person C*	Inappropriate speech, gestures or sexualising of objects
				1072 – Unclear*	Inappropriate masturbation. Undressing, Inappropriate speech, gestures or sexualising of objects

	1073 – Person A* Person B	Person A (stalking/harassment), Person B (stalking/harassment)
From the above studies, 10 further suggested an association between CSB and social skills, without specifying SB types: 1009*, 1014, 1020, 1024, 1032 1044, 1049 1062, 1063*,1073		
An additional 9 studies also suggested an association between social skills and CSB, without any reference to specific SB types: 1003, 1010, 1021, 1034, 1037, 1078, 1054, 1058, 1077*		

Note. Explicitly references ASD (*)

Reflecting upon the evidence provided for these claims, associations were largely made by the authors of the study with no further evidence to justify or support the claim. Occasionally, family members, or the individual with ASD themselves suggested these associations.

The four most common CSB types (higher order categories) supposedly related to difficulties with social and communication skills were, 1) inappropriate or 2) compulsive masturbation, 3) unconsented touching of others and 4) stalking or harassment.

3.6.1.1 Supplementary Information on Social and Communication Skills and CSB.

It is important to note that some studies also mentioned rules and knowledge around privacy (Chen et al., 2016; Stokes & Kaur, 2005). Whilst this information was not clearly referenced in relation to social skills, arguably it can be accounted for within this.

- Ref ID 1004 (Stokes & Kaur, 2005) – Individuals were found to have less knowledge surrounding privacy rules regarding touching genitals in public.
- Ref ID 1019 (Chen et al., 2016) – The author explained Person A engaged in compulsive masturbation openly at home and could not understand that ‘home’ did not account as ‘private’.

Other studies also reported a lack of knowledge around legalities of behaviours, implications, and harm (Allely, 2020 [Person A]; Allely et al., 2019 [Person A, F & I]; Aral et al., 2018, [Person A]; Payne et al., 2020 [two individuals]; Murrie et al., 2002 [Person B]) which could possibly be related to difficulties in understanding social norms or merely around lack of education. Interestingly, all but one of these reports (Gougeon, 2013 [2 individuals]) were related to CSEM.

3.6.2 Association Between RRBI and CSB

A total of 13 studies (over 10% of studies) reporting on a minimum of 10 individuals with ASD made an association between RRBI and specific type of CSB (see table 9 above). Out

of these, one study made further associations between CSB and RRBI without specifying the SB type. It should be noted that only four studies out of the total 13, explicitly indicated that the RRBIs were a manifestation of ASD which were thought to be influencing the SBs presented.

An additional three studies also suggested an association between difficulties with RRBI and the presenting CSB however did not refer to specific SB type. Two of these explicitly reported the RRBI to be related to ASD.

Table 9: *Association Between RRBIs and CSB*

	Reported in n=X people	**Reported in n=X studies**	**Evidence Type**	**Study – Person ID**	**CSB Type**
Association between RRBI and CSB	10	13 with a total sample size of 228	Author claim: 1008, 1001, 1002, 1037, 1045, 1063, 1066, 1068, 1076 Self-report: 1005 Family/parent report: 1001, 1046 Statistical significance: 1015 significant relationship between masturbation and exhibiting high levels of stereotypical SB, t(22)=2.2179, p= -0.04	1001 – Person A	Unconsented touching. Inappropriate masturbation.
				1002 – Unclear	Compulsive masturbation
				1005 – Person A	CSEM
				1008 – Person A*	CSEM
				1012 – Person A	CSEM
				1015 – Unclear*	Inappropriate masturbation
				1037 – Unclear	Inappropriate masturbation
				1045 – Person A*	Stalking or harassment
				1046 – Person A	Inappropriate speech/gestures, sexualising of objects
				1063 – Person D	Inappropriate speech or gestures or sexualising of objects
				1066 – Person A	Compulsive masturbation. Inappropriate speech or gestures, sexualising of objects
				1068 – Person A*	Compulsive masturbation
				1076 – Person A	Compulsive masturbation
From the above studies, 1 further suggested an association between CSB and RRBI, without specifying SB types: 1063					
An additional 3 studies also suggested an association between RRBI and CSB, without any reference to specific SB types: 1024, 1033*, 1051*					

Note. Explicitly references ASD (*)

Once again, findings highlighted that these associations were largely made by the authors of the study with no further evidence to justify or support the claim. However, one study reported on statistical significance (Ref 1015: Van Bourgondien et al., 1997).

Inappropriate or compulsive masturbation (higher order categories) were the most common CSB types reported as potentially related to RRBIs. The use of CSEM and inappropriate speech, gestures or sexualising of objects was also reported a few times (three times each).

3.6.3 Association Between Sensory Processing and CSB

Based on the synthesis of data, five studies clearly reporting on three individuals with ASD made an association between sensory processing difficulties and a specific type of CSB (see table 10). Two of these studies explicitly indicated that the sensory processing difficulties were a manifestation of ASD which were thought to be influencing the SBs presented.

One additional study suggested an association between difficulties with sensory processing and the presenting CSB however did not clearly identify the specific SB type being referred to.

CSBs generally involving various forms of atypical masturbation were commonly reported in relation to sensory processing.

Table 10: *Sensory Processing and CSB*

	Reported in n=X people	**Reported in n=X studies**	**Evidence Type**	**Study – Person ID**	**CSB Type**
Association Between sensory sensitivity and CSB	3	5 with a total sample size of 341	Author claim: 1002, 1018, 1046 (Person C), 1068 – Author claim Family/parent claim: 1015, 1046	1002 – Unclear	Compulsive masturbation
				1015 – Unclear	Masturbation using atypical object
				1018 – Unclear*	Undressing
				1046 – Person C & E	Person C (touching or rubbing), Person E (inappropriate masturbation)
				1068 – Person A*	Compulsive masturbation
1 additional study suggested an association between sensory sensitivities and CSB without reference to specific SB type: 1014					

Note. Explicitly references ASD (*)

3.6.4 Supplementary Findings on the Association Between ASD and CSB

Within the reviewed studies, some general associations between ASD and CSB were also suggested without reference to specific ASD traits. Within one study (Ref ID 1018, Cervantes & Matson, 2015), whilst the author had suggested associations between specific ASD traits and CSB, the author further went onto suggest a general relationship between undressing in public and autism within the sample. In an additional study (Ref ID 1079, Burns et al., 2021), a professional involved in the individuals care was reported by the author to have proposed an association between compulsive masturbation and their autism diagnosis (Person A), but no additional information regarding specific ASD vulnerabilities was noted.

Although some studies provided alternative explanations for the CSBs observed, only one out of the 85 studies offered direct explanation challenging the claim that CSB was associated to ASD. For example (Ref ID 1022, Coskun & Mukaddes, 2008, Person A), the author claims that the presenting behaviours such as arousing oneself by rubbing on non-consenting persons wearing a particular item of clothing and attempting to have intercourse, could not be a manifestation of stereotypical interest despite repetitive patterns, due to the presence of sexual arousal. Whilst other studies offered alternative explanations for the CSB, they did not make direct statements to imply that ASD is not associated to the observed behaviour and it was unreasonable to assume based on alternative explanations alone that this eliminates the role of ASD entirely. Subsequently, only studies where clear reference to this has been made were recorded.

3.7 Summary of Synthesis and Results

To summarise the results of the synthesis, the key findings are presented below with detailed discussion provided in the following chapter. The results revealed a range of harmful (n=17), atypical (n=6), and typical (n=3) SB types commonly reported across the 85 studies. Related to these behaviour types, a range of features were identified which informed a list of subtypes.

In line with the aim to identify common CSBs amongst these, it was found that some behaviours (based on higher order categories) were clearly reported more so than others according to the number of studies reporting them. All six atypical SBs were reported in more than 10% of studies (inappropriate touching of genitalia, masturbation using atypical object, inappropriate speech or sexualising of objects) with some reported in more than 20% (compulsive masturbation, inappropriate undressing) or 30% (inappropriate masturbation). Although the types of HSBs were much more diverse; results found unconsented touching of others was reported in over 30% of studies with others reported in more than 10% (stalking or

harassment, CSEM, exposure, unconsented kissing and hugging). The remaining HSBs were reported in fewer than 10% of studies reviewed. Additionally, supplementary findings regarding typical behaviours identified that masturbation and observing nude content was also reported in over 10% of the studies, although sexual intercourse was not.

As the features and characteristics of these behaviours were identified by listing subtypes to present the range of atypical and harmful behaviours, it was recognised that some subtypes were also reported more commonly. Merely based on the number of studies in relation to atypical behaviours, compulsive or excessive masturbation (location unspecified), inappropriate masturbation (location unspecified or without privacy) and undressing (in public/community) were all reported in over 10% of studies. When taking into account the number of individuals exhibiting the range of subtypes, talking about sexual topics in public, inappropriate masturbation in the presence of others, in the presence of professionals or in professional settings and masturbation using atypical objects where object was unspecified were reported in a small proportion ranging from 7 to 20 individuals. Whereas other subtypes were reported considerably more (50-100 individuals) such as undressing in community settings, and inappropriate masturbation in public and community settings. Compulsive masturbation where location was unspecified (n=28) or touching or rubbing genitals in public or community (n=109) were the only two subtypes however reported in over 10% of individuals from the studies reporting that behaviour.

In relation to harmful behaviours, unconsented touching of others inappropriately (target unspecified) was the only subtype reported in greater than 10% of studies which accounted for over 60 individuals in total. However, based on figures related to the number of individuals, some subtypes were clearly reported in a greater number of individuals than others despite numbers being fairly small. Numerous subtypes including exposure of genitals, unconsented hugging or kissing directed towards a stranger, unconsented touching of intimate areas of women, stimulating arousal by rubbing on nonconsenting individuals, and stalking in the form of following girls were reported in a range of 7-20 individuals. Results revealed however that CSEM specifically referring to downloading (n=11) or producing, distributing, or inciting CSEM (n=19) were reported in over 10% and 20% (respectively) of individuals from studies reporting that behaviour. Rape where victim was unspecified and rape of a child under 16 were also two subtypes which were identified in over 10% of individuals reporting on rape however the overall number of studies and individuals was small.

Having established the varied atypical and harmful SB types identified in those with ASD, the aim was to compare these to data from non-ASD individuals within the reviewed studies, however this could not be sufficiently addressed as only six comparison studies

reporting on SB types were identified. Diverse samples and reporting styles meant results could not be combined however it appeared that CSBs were generally reported more frequently or scored higher in those with ASD than typical behaviour which was reported upon, although only few reports involved significant differences (i.e., findings involving undressing/exposure, stalking, frequency of masturbation and sexual intercourse in individual studies).

Based on the separate synthesis of context information related to the CSBs exhibited by those with ASD, numerous features were reported in over 10% of studies both target specific (towards children/teens of both genders, females in general as well as female professionals, involving CSEM) and location specific (education settings) with some reported in over 20% (inanimate objects and home or residential settings) and 30% (public or community settings) of studies reviewed. Some targets (CSEM, inanimate objects, children where gender was unspecified) and locations (home or residential settings and in public/community settings) were noticeably reported in a greater number of individuals (n=20 and above), however when establishing those reported in over 10% of the associated samples, eight features were identified. These included partners or ex-partners, children within the family, female peers and in terms of settings included education and treatment or therapy environments, sports centres, shared rooms, and home grounds. Others were reported considerably more when compared to the total sample of individuals within the subset of studies; female professionals, female strangers, service users or male children/teens (over 20%), children (gender/age unspecified), non-sexual body parts, places of residence (over 30%), female children/teens and public toilets (over 40%), towards younger siblings (over 50%) and involving CSEM (over 60%).

Finally, in identification of the evidence base suggesting CSBs are related to ASD traits, the following results were found. A total of 21 studies (>20%) clearly reporting a minimum of 22 individuals with ASD reported that a specific type of CSB was considered associated to social and communication difficulties, with this increasing to greater than 30% if those studies which did not clarify the CSB being referred to were also included. Four common CSBs were recognised as reportedly related to this difficulty: inappropriate or compulsive masturbation, unconsented touching of others and stalking or harassment. Thirteen studies (>10%) reporting a minimum of 10 people made an association between RRBIs and specific type of CSB. Inappropriate or compulsive masturbation was the most common SB reported as potentially related to RRBIs and the use of CSEM and inappropriate speech, gestures or sexualising of objects was also reported a few times. Only five studies reporting on three individuals made an association between sensory processing difficulties and a specific type of CSB where atypical forms of masturbation appeared to be most frequently reported. Some additional claims were also made regarding these associations however clear details regarding CSB type or ASD attribute were lacking.

3.8 Quality Appraisal of the Evidence Base

Quality appraisal was conducted using an adapted MMAT as explained in the method section (further discussed in section 4.2). A series of questions were applied to assess the quality of each individual study considering how it was administered and reported (see appendix 9 for completed MMAT spreadsheet). Based on the number of applicable questions answered, an overall MMAT score, and percentage was calculated to provide insight into the overall quality of the evidence base. These scores are reported in table two along with the study summaries. Based on these scores, it was noted that the quality of studies varied considerably regardless of study design. Table 11 identifies the proportion of studies scoring within a particular percentage range.

During the data extraction and quality appraisal stage of this process, numerous limitations were recognised in the evidence base. Studies reporting information on the types of SB were largely case studies (n=33) and case report (n=12) accounting for over half of the studies included in this review. As a result, a large proportion of studies include small sample sizes which subsequently limits generalisation from individual findings.

Regarding the samples used across studies, it was recognised that a greater number of males were reported upon in comparison to females. Where studies clearly identified the gender of the sample with ASD, it is noted that approximately 1151 out of the total 1955 autistic individuals accounted for in this review were male (454 female). This is approximately 58% of the population. Whilst this may be due to the lower representation of women in the ASD population in comparison to men, this may manifest from bias's where atypical behaviours may be more likely perceived as sexual or more likely detected when exhibited by males rather than females. However, it is important to note that numerous studies failed to identify and report the gender and demographics of the samples utilised.

In relation to demographic information, although this review only included individuals with a clear ASD diagnosis, not all studies provided explanation of the diagnostic assessment criteria used and associated processes. As the ASD diagnostic criteria have evolved over the years, potential differences in samples and individuals with ASD should be recognised however judgments were difficult to make based on the information available. It could not be established how similar or different individuals presenting difficulties and ASD vulnerabilities were based on the details offered by authors.

Table 11: *Quality of the Evidence Base*

MMAT Score in Percentage Form	No of Studies (n=85)
0-25%	12
26-50%	12
51-75%	33
76-100%	28

Note. Studies were placed in the percentage range based on individual MMAT scores

Furthermore, numerous studies reported on samples from forensic services (n=13), inpatient and secure service (n=20) or some form of residential facility (n=8). Sample bias within these studies was recognised as individuals who are residing within these settings have a greater level of need and support, may be more likely to present challenging behaviours of some form and are more likely to be observed. However, over 40 studies utilised community samples which subsequently does provide a diverse sample and therefore whilst biases within samples should be considered, it appears that the evidence base draws upon a range of settings.

The potential of reporting bias with the reviewed studies was also recognised. Within over half of the studies, the primary source of information was the author (n=52). Other studies used one or more of the following sources: individuals with ASD (14 studies), parents, families or carers (n=20 studies) or professionals including OTs, teachers and service caregivers (n=6 studies), all of which can present bias and subjectivity. In some instances, behaviours may not have been directly observed by the reporting person but may be reported as second-hand information which could impact the details and information offered. Furthermore, the use of measures such as questionnaires, observations or interviews also have limitations. The lack of verifiable or factual data within the evidence base must be acknowledged with only few studies drawing upon data such as legal records or case files for example which was also the case for those studies reporting on associations between CSB types and ASD attributes.

A crucial area of information which was often under-specified was that regarding the number of ASD individuals being reported on within studies or the number individuals displaying specific behaviours or acting in a particular context. For example, a study interviewing professionals may not clearly indicate the number of ASD individuals being reported on (Larson et al., 2021). In other instances, results may describe parent reports of children with ASD undressing in the presence of others but may not specify a numerical value indicating the number of individuals this was referring to (Ballan, 2012). Therefore, although these studies were accounted for in study frequency, they were not accounted for in the frequency counts related to the number of individuals with ASD exhibiting the behaviour.

Notably, the quality of the evidence was also affected by the ambiguity and lack of clarity around some of the behaviours mentioned. Some studies failed to provide clear

definitions and explanations of SB and therefore it was sometimes difficult to accurately determine the type, features and characteristics of the behaviour reportedly exhibited by those with ASD. The lack of clear detail and description around the behaviour meant that a proportion of SB exhibited by those with ASD could not be accurately captured or described in the results and therefore the literature presented obstacles in gaining a true representation of the nature of CSB in those with autism.

The above points relating to the quality of the evidence base are further explained and discussed in section 4.2 of the following chapter.

Chapter 4: Discussion

4.1 Summary of Findings

The current MMSR attempted to synthesise the evidence base to address a series of aims. The primary goal was to explore the range of atypical and harmful CSBs exhibited by those with an ASD diagnosis and to identify the types, features and characteristics of these behaviours. Those reported most commonly (across studies or individuals) were identified in attempt to establish patterns; to determine how meaningful these commonalities were and the extent of these findings, two small arbitrary thresholds were applied (10% and 20%) to differentiate those reported in a considerably greater proportion. Expanding on these findings, the review attempted to identify any similarities or differences in these CSBs to non-ASD samples included within these studies. Finally, this review sought to explore the degree to which studies reported that the CSB displayed was related to the traits and attributes of ASD; with this in mind, the systematic review acknowledged whether any patterns in the type of behaviours associated to core ASD traits emerged as a result.

According to the systematic search and screening of the evidence base, 85 studies describing the types of CSB exhibited by those with ASD were found. A range of atypical and harmful behaviours were identified as well as some accounts of typical behaviour which were also reported across studies and individuals. It is important to note, neither results collating the number of studies or number of individuals reportedly exhibiting these behaviours were given superiority over the other as in the former, studies significantly varied in sample size and within the latter, number of individuals exhibiting behaviours was not always clear (explained further in section 4.2). Thus, results from both parts of the data were considered important to provide insight into the presence and frequency of these behaviours and both are therefore summarised and discussed below.

From the findings, it was recognised that across both atypical and HSBs, four CSB types were most common, indicating a potential greater occurrence of these specific behaviours. Inappropriate masturbation and unconsented touching of others was reported most across studies (approximately 30 studies) followed by inappropriate undressing and compulsive and excessive masturbation (almost 20 studies). Although each of these behaviour types were recognised within previous reviews (Beddows & Brooks, 2016; Dewinter et al., 2013), this review highlighted that these behaviours are exhibited considerably more than other CSBs, potentially suggesting areas for greater acknowledgement within literature and practice.

In relation to atypical behaviours specifically, six common types were identified across studies including, 1) compulsive or excessive masturbation, 2) undressing in inappropriate

settings, 3) inappropriate masturbation, (largely involving unsuitable settings, scenarios, or stimuli), 4) inappropriate touching or rubbing of genitalia, 5) masturbation using atypical (inanimate or nonsexual) objects and 6) use of inappropriate speech, gestures and sexualising of objects. The latter three were found to be reported in more than 10% studies however others were reported relatively more. Compulsive or excessive masturbation and inappropriate undressing were both reported in over 20% of studies, whilst inappropriate masturbation was reported in an even greater proportion (over 30%). It was noted that several behaviour types related to some form of atypical masturbation, however what constitutes as typical or atypical masturbation is debatable and many individuals in the general population may too, display or engage in some of these masturbatory activities (Gerressu et al., 2008; Kraus et al., 2016). Arguably, behaviours involving atypical forms of masturbation (1, 3 and 5) could be grouped together where the combined total would present a significantly greater number of studies, however the nature of these were deemed distinct (i.e., inappropriate due to either use of inanimate objects, or frequency/intensity for example) and therefore were categorised separately. Furthermore, it was also recognised that literature often referred to masturbation and touching or rubbing of genitals separately (Deepmala & Agrawal, 2014; Shier, 2015) suggesting a distinction amongst them and likewise, these too, were captured separately in this review. Whilst these distinctions mean extensive detail is provided in addition to the synthesis of information, they enabled clear recognition of the range and diversity of atypical sexual behaviours rather than compartmentalizing in a way that may not be reflective of the act itself. Most importantly, it offers an added benefit in that it allows identification of which of these distinct atypical behaviour types are reported more so than others.

Data was also gathered to distinguish the subtypes of these atypical behaviour types through collating information regarding key features and characteristics of these behaviours in line with the aims. Through synthesis, it was found that inappropriate masturbation, touching genitals, undressing and talking about sexual topics were all commonly reported in community and public settings, with the former also occurring in the presence of others without privacy in relation to the number of individuals exhibiting these. Each of these subtypes (others than touching genitals in community) were also reported in over 10% of studies. Additionally, inappropriate masturbation was also commonly reported as occurring in professional settings, occasionally when professionals were present and within places of residence without privacy. Whilst these features were more frequently reported in comparison to others, based on the number of individuals, inappropriate touching of self in community settings and compulsive masturbation where location was unspecified were the only two reported in over 10% of individuals in studies reporting them, with the latter also reported in over 10% of studies. It can be noted that the ‘presence of others’ is likely to also apply to community and public settings, although it may also encompass private settings such as places of residence where others may

be present, for which reason these were recorded separately in line with descriptions provided in individual studies. From these findings it was recognised that numerous SBs exhibited by those with ASD were deemed atypical where the sexual action itself was not always problematic, but rather the display of SB in an unsuitable setting was a common denominator; thus, possibly indicating some homogeneity in this. Individuals may lack understanding and awareness around privacy rules or appropriate and inappropriate settings (Beddows & Brooks, 2016; Coskun et al., 2009; Dewinter et al., 2013; Tissot, 2009), may have lower self-control to inhibit their urges or impulses (Seto, 2019; Ward & Beech, 2006, 2016), or may be attempting to address an internal or external need within these settings (i.e., attention from others or means of communication; Worthington, 2019). Although, in some instances the frequency of the behaviour was problematic rather than the context itself (i.e., compulsive masturbation or masturbating whenever undressed).

In relation to HSBs however, overall behaviour types were much more varied with a total of 17 types of SBs noted, with some likely causing significantly more harm than others. Commonly reported behaviours included but were not limited to, 1) unconsented touching of others (intimate and non-intimate areas), 2) exposure 3) use, possession or distribution of CSEM, 4) unconsented hugging or kissing, 5) stalking and harassment, 6) watching others without consent (whilst nude or undressing), 7) inappropriate means of self-stimulation (such as arousing self through rubbing on others), 8) attempting to undress others, and 9) accounts of rape. From the total 17, some behaviours were described across the studies as little as two (i.e., masturbation using self-asphyxiation) or three times (i.e., forced sexual activity) and others up to 30 times (unconsented touching of others) showing the variation in the extent to which these were reported. Unconsented touching of others was in fact reported in over 20% of studies with other's reported slightly less between 10 and 20% (2, 3, 4 & 5 from the 9 listed above). The greater presence of unconsented touching highlights the oversight or possible inconsideration of consent and reciprocation within social and romantic physical contact. Noticeably, numerous HSBs mirrored those behaviours identified in previous reviews including inappropriate means of arousal, exhibitionism (Beddows & Brooks, 2016), unwanted courtship, inappropriate touching of others and rape (Dewinter et al., 2013), despite previous review only targeting specific areas of literature (i.e., focus on normative behaviour or adolescents).

Synthesis of the features and characteristics of these HSBs was also found to be extremely varied and diverse and therefore more difficult to group into subtypes. Nevertheless, some noticeable behavioural characteristics were reported more so than others. Unconsented touching of others 'inappropriately' where the target was unspecified was the only subtype reported in greater than 10% of studies, accounting for a larger number of individuals (n=64/1139). When explored in relation to the number of individuals exhibiting each of the

subtypes, unconsented touching of others including generally as well as specifically touching women in inappropriate areas was reported considerably more than in other contexts. Behaviours where the author of the paper had stated an 'inappropriate' nature were grouped separately to those where unconsented touching was reported in general; whilst these are both inappropriate or unacceptable nevertheless, unconsented touching could involve behaviours such as touching one's arm whereas specifically stating it was inappropriate may be more likely to infer actions involving intimate or private areas. Whilst the interpretation of these behaviours may be subjective, the researcher attempted to distinguish and group these separately based on author information to provide some level of synthesis whilst minimising the chances of misrepresentation. Whilst behaviours across categories could have some similarities, behaviours grouped within categories could also present differently person-to-person despite the description provided by authors or participants.

Nevertheless, further exploration of the subtypes based specifically on number of individuals highlighted some additional behaviours which were reported more so than others. Reports of non-consensual kissing or hugging of others was often identified towards strangers (without specification of gender or age), reports of self-arousal or stimulation was reported more in the form of rubbing upon a non-consenting other and stalking was also most commonly reported in terms of following girls. Within these HSB subtypes, some were likely perceived as less invasive than others (such as touching one's hair or hugging), though the unwanted nature of these contributed to these being reported by authors or participants in studies as challenging, concerning, or harmful. Moreover, whilst some CSBs identified were clearly sexual acts (such as self-arousing by rubbing on another), some did not present as directly sexual but were deemed to be by others due to their unacceptable, inappropriate, or explicit nature (i.e., exposure and non-consensual hugging). As mentioned earlier, distinctions between what is acceptable and unacceptable is blurred and the way in which behaviours are interpreted, is often largely dependent on the observer or person subjected to the behaviour (Ravensberg & Miller, 2003). Their interpretation is likely influenced by their own moral compass as well as wider cultural and societal norms which therefore impacts whether behaviours exhibited by others, in this case those with ASD, are considered challenging and subsequently reported or recorded. For example, the receiver of romantic or sexual attention determines whether this is within the realms of a 'normal' attempt to initiate a relationship, or whether this is excessive or risky unwanted attention (Ravensberg & Miller, 2003). Therefore, some behaviours reported and accounted for in this review may be deemed of a lesser or greater severity, dependent upon the individual at the receiving or witnessing end, potentially altering whether these are identified or reported. Furthermore, it must be acknowledged that some behaviours may be more likely interpreted as harmful simply because the individual exhibiting the behaviour is known to have

ASD; the general perception of their behaviours or potential sigma related to their presentations may possibly contribute to the greater negative interpretations or reporting of these behaviours.

Whilst the above HSB subtypes were reported more frequently in individuals than other subtypes, only two subtypes were identified which reported a total number of individuals as greater than 10 or 20 percent of the sample in studies reporting upon them. Although rape was mentioned in a few (five) studies, the number of individuals reporting rape (in general) or rape of someone under the age of 16 was greater than 10% of the total sample reporting upon these (two individuals reported in each). Although it is recognised that this number of individuals is extremely small and rape overall was only reported in 6 individuals in total (out of total sample size of 15 within the subset of studies), the severity of the behaviour requires acknowledgement, particularly due to the high rates of sexual assaults in England and Wales (Office of National Statistics, 2021a). CSEM was the only other behaviour type which involved subtypes mentioned in greater than 10% of individuals from studies reporting on such behaviour. This was not only related to merely downloading and viewing such content (reported in over 10%) but also involved the production or distribution (revealed in over 20%). In fact, when synthesis of target types was conducted (further results explained later in the discussion), it was found that CSEM was reported in a total of over 60% of individuals from the reported studies (over 10%) being the most commonly reported 'target'. The high level of CSEM reported in this review may imply weaker comprehension in individuals with ASD regarding such matters. Whilst the causal link between CSEM and contact behaviours continues to be explored and understood (Babchishin et al., 2014; Marshall, 2000) research argues low 'progression rates' to contact child sexual offenses (Goller et al., 2016) with only a few offenders who use CSEM going onto engage in contact offences (Osborn et al., 2010; Seto et al., 2011; Yu et al., 2020) particularly where there is greater self-control (Babchishin et al., 2011; Seto, 2019). Whereas other studies do suggest the possibility of escalation in behaviours (Dombert et al., 2016; Seto et al., 2011) where viewing such content could cause cognitive distortions whereby children are perceived as sexual beings (Howitt & Sheldon, 2007) or deviant sexual fantasies become normalised and reinforced through masturbation (Sheehan & Sullivan, 2010; Sullivan & Beech, 2004). This combined with a lack of behavioural control and increased need for intimacy may, for some, escalate into the commission of contact offences (Calder, 2004; Sullivan & Beech, 2004). Hence, greater awareness and focus on this area seems necessary.

In consideration of the findings related to HSBs overall, it was recognised that these encompass actions which may be related to self-satisfaction and self-pleasure (i.e., stimulating or masturbating by rubbing on others), as well as those which may reflect harmful means of interaction or courtship (i.e., unconsented hugging or touching, stalking). This is not to imply

motivation or drive behind the acts but merely an observation of the manner of behaviours recorded.

A unique aspect of this review was to not only distinguish key features of these behaviours in relation to subtypes, but to separately synthesise details regarding reported locations and targets to provide an indication of commonly reported contexts related to CSB as a whole. It is of course likely that reports related to target or victim are related more to harmful behaviour which by definition involves 'others', whereas 'atypical' behaviour largely emphasises the inappropriate settings or the lack of privacy rather than it being directed towards another. Nevertheless, the following findings were not restricted to either behaviour categories.

According to the synthesis numerous targets were commonly reported including, current or ex-partners, younger siblings, peers, and strangers (gender and age unspecified) with some reported across studies noticeably more such as parents, females (where relation is unspecified and including peers, professionals and strangers), children, and involving inanimate objects or CSEM (as mentioned earlier). The concluding four were reported in greater than 10% of studies. In relation to the proportion of individuals however, when compared to the overall samples present within studies reporting on these targets, it was found that female peers, service users, current or ex-partners and children within the family were reported in greater than 10% of the associated sample, however other targets substantially more. These included; CSEM (reported in over 60%), younger siblings (50%), non-sexual body parts of others (30%), children (20-40%), female strangers and female professionals (20%), all identified in larger percentages. Evidently, individuals with whom there is a relationship (i.e., family members or professionals) are equally as vulnerable to being subjected to CSB as are strangers and there was no apparent indication that there is a greater risk to one more than the other. Yet, it is not possible to establish whether this may be partly influenced by opportunity and access to individuals rather than a conscious choice to seek particular targets.

Interestingly, although it was noted that SB overall occurred less towards males, behaviours directed towards children and teenagers were similarly reported for both genders. Though we can only make tentative assertions regarding gender particularly because gender of the victim or target was often unspecified, the results highlight children both male and female are equally vulnerable to being subjected to CSB. However, this is not to suggest that children or females are any less vulnerable to CSB from the wider population as conclusions cannot be made merely from this review. It is also widely recognised that females and children are extremely vulnerable to being subject to ISB or sexual abuse, more so than other groups (Office for National Statistics, 2021a, 2021b) which suggests they may be at equal risk of CSB

regarldess of whether the indivual has a neurodevlopmental condition and therefore these findings are not unique to those with ASD.

Furthermore, data synthesis specifically regarding locations in which CSBs occurred also revealed numerous common settings. Places of residence and education settings were reported in over 10% of studies however a noticeably greater number of studies reported CSBs in public and community settings (over 30%). Saying this, it was recognised that several specified locations listed, could be placed under the umbrella term of public setting therefore indicating a potentially higher frequency of CSBs in public environments. In relation to the number of individuals within studies reporting particular locations, it was found that treatment or therapy locations, education settings, shared rooms and sports or fitness centres were all reported in greater than 10% of individuals from the studies reporting upon them, however places of residence and public toilets were reported considerably more (greater than 30 and 40% respectively); the latter however only reported in few individuals. Noticeably, the chances of being observed in some of these settings are greater than in others which could also contribute to the greater frequency of reports in some instances. Furthermore, most reported locations are easily accessible, and it cannot be determined whether these locations were actively considered or whether these were merely places of convenience. Residential settings and shared bedrooms for example provide accessible locations to engage in SB although may be occasionally misperceived to be private, irrespective of the presence of another. It could be hypothesised that some individuals with ASD may struggle to comprehend that privacy involves more than just selection of a location or setting but also involves acknowledging the potential or likelihood that others may be present and exposed to the action. In instances where HSBs have occurred, such locations may for some offer concealed environments to engage in such behaviours however alternatively these environments also reflect those where isolated interactions with others are more likely to take place, presenting situations or opportunities where individuals may exhibit such behaviours (intended or unintended). Therefore, this may be a combined matter involving the lack of recognition surrounding privacy but also understanding and management of unacceptable or harmful behaviour.

Overall, findings on the types, features, and characteristics of CSB emphasise that not all CSB exhibited by those with ASD are harmful or illegal and can include behaviours which are relatively inoffensive such as masturbation using atypical objects (Beddows & Brooks, 2016; Dewinter et al., 2013, 2016; Hellemans et al., 2010; Stokes & Kaur, 2005). More importantly, reports of typical SB which were captured within these studies reveal the varied behaviours of this population. Supplementary findings revealed common typical behaviours including typical masturbation (reported in over 10% of studies), use of sexual or nude content (reported in over 10% of studies) and sexual intercourse also present within samples displaying

CSB (Hackett, 2010; Tolman & Mcclelland, 2011) highlighting that some individuals with ASD have the desire and skills to engage in healthy sexual activity and sexual interactions also (Schöttle et al., 2017; Turner et al., 2017). Essentially, the display of CSB by someone with autism, does not suggest that all sexual interactions would subsequently be problematic or challenging as individuals may exhibit a combination of both, typical and challenging behaviour, in their repertoire of sexual activity.

A significant contribution of this review was to explore potential similarities, differences and distinctions in these SBs presented by ASD individuals in comparison to non-ASD individuals based on the available data from reviewed studies. Out of the 85 studies included in this review, only six studies reported a comparison of SB types between an ASD and non-ASD sample. Comparison samples included those labelled 'typical' or 'healthy', those with intellectual or learning disabilities or those with mental health diagnosis. Across the six studies it was found that atypical and harmful behaviours were generally reported more often, or scored higher, in those with ASD other than in relation to 'masturbation without privacy' within one study where those with MR were found to score higher (Hellemans et al., 2010). Although not all studies reported on the significance of these differences, individual accounts reported statistical significance in undressing or exposure (compared to an LD sample), stalking (compared to a non-ASD sample) as well as frequency of masturbation (males only) and sexual intercourse (compared to 'healthy controls' as described but not expanded upon by the authors of the study). Due to the diversity in reporting styles, combined with the lack of comparison studies and matched controls, it is difficult to truly establish whether certain CSB types differ between populations and therefore firm conclusions cannot be drawn. Also, those with an LD or mental health diagnosis may also be likely to display a greater number of challenges or difficulties than in the general population and therefore this makes it difficult to understand differences between groups of individuals. Additionally, as mentioned earlier, those described as 'healthy controls' or 'typical controls' within comparison studies may still present with some level of diversity and therefore we cannot assume they are entirely neurotypical. Subsequently, the importance of establishing cognitive and executive functioning profiles and matching controls strategically on other key factors such as age, comorbidity and level of education, would be important to better understand differences between groups.

The final part of this review involved accumulating data on the proportion of studies suggesting that specific CSBs were associated to primary ASD traits, with additional consideration of the evidence provided surrounding these claims. Although only a few studies made explicit reference to ASD within these claims, the traits mentioned were closely aligned with the ASD diagnostic specification and could therefore be reasonably assumed as somewhat attributable to their autism.

Synthesis of this information suggested that some individuals (although only a small proportion) may be impacted by their vulnerabilities in social communication and functioning to some extent. Almost a quarter of studies suggested an association between one or more specific type of CSB and social communication and interaction skills with inappropriate and compulsive masturbation, unconsented touching of others and stalking and harassment reported several times amongst these. It should be noted however that if this percentage was to include studies which had reported an association without specifying the specific CSB type, the total proportion of studies would increase to over 30%. According to these findings, it is possible that social naivete and difficulties with social norms or establishing socially acceptable behaviours may for some result in the presentation of behaviours which have a direct or perceived sexual nature. Where individuals find it difficult to initiate and maintain safe and appropriate relationships with others, they may exert attempts to engage in social interaction by displaying behaviours which may or may not be intended to be of romantic or sexual nature although are exhibited in potentially harmful or inappropriate ways (Ballan, 2012; Chen et al., 2016; Creaby-Attwood & Allely, 2017; Gougeon, 2013; Hancock et al., 2017; Stokes et al., 2007).

Additionally, a proportion of the literature also reported a relationship between specific CSB types and the RRBIs (reported in over 10% of studies) and sensory interests (reported in over 5% of studies) in those with ASD. It was considered that preoccupations, stereotyped behaviours and sensory needs reportedly influenced some of the behaviours that were presented, including those of an atypical, harmful or illegal nature. Inappropriate and compulsive masturbation were commonly reported in relation to RRBI and sensory processing with CSEM and inappropriate speech and gestures also reported a few times in relation to the former. According to some of these reports, sexually acting out behaviour may be serving a function of fulfilling a sensory needs or intense preoccupations which on some occasions may be reinforced as a result of the satisfaction received when engaging the behaviour (Worthington, 2019). Though difficulties in sensory processing could be considered within the category of RRBIs (according to the DSM-5), the information surrounding this was recorded separately within the results given the distinct nature of this behaviour to other stereotypic or ritualistic behaviours as well as the fact it is not explicitly referenced in the ICD-11 criteria. Of course, both of these areas combined would account for a greater proportion of studies.

According to these findings, the presence of narrow interests, sensory needs, and the desire to form social relationships, coupled with the reduced ability to understand social norms (including understanding of reciprocal behaviours and need for consent), interpret verbal or non-verbal information (i.e., fear, distress, or disapproval) and apply socio-sexual knowledge may for some contribute to engagement in deviant or SBs (Mogavero, 2016). Subsequently, behaviour may originate from counterfeit deviance rather than malice or sexually deviant

motivations (Kellaher, 2015; Mogavero, 2016). However, it must be emphasised that these associations were only reported in a proportion of studies, and only within a small proportion of individuals (less than 10% of individuals within studies reporting on these claims), with a lack of supporting empirical evidence (discussed in the next section). Essentially, only a small proportion of individuals with ASD engage in CSB (Mouridsen, 2012; Woodbury-Smith et al., 2010) and those who do as a manifestation of their ASD appears to be even smaller. Also, whilst some CSB types were reported more so than others in relation to individual ASD attributes, findings are limited and therefore insufficient to suggest any pattern or relationship at this stage.

One out of the 85 studies included in this review, directly offered explanation which challenged the claim that CSB was associated to ASD attributes within the case presented by indicating that the presence of sexual arousal suggests the behaviour could not be explained by stereotypical interest (Coskun & Mukaddes, 2008). For some, sexual arousal could be related to behaviours entirely motivated by sexual interest, or alternatively for other could manifest as a combined consequence of sexual desire and ASD vulnerabilities. Taking this into account, there may be some value in empirically investigating the presence and role of sexual arousal within the CSBs displayed by those with ASD. Furthermore, whilst some studies did not reflect on possible explanations for the observed SBs, many studies provided alternative explanations or identified other influencing factors which suggested numerous varied contributors to CSB in those with ASD. Similar to those highlighted by Beddows and Brooks (2016), these included matters such as the absence of sex education, understanding about puberty, sexual curiosity, and past trauma or adversity, however, these were not systematically recorded within the current review. Furthermore, explanations around lack of understanding or knowledge of what constitutes as illegal behaviour or causes harm to others were also suggested. Subsequently, although traits of ASD could potentially explain CSB in some individuals to some degree (Demb & Pincus, 1993; Schöttle et al., 2017), this is unlikely pertinent for everyone with ASD, as there are likely numerous complex contributing factors similar to that in the wider population (Seto & Lalumière, 2010; Ward & Beech, 2006, 2016). Therefore, establishing primary motivations or the role of ASD in CSB remains challenging.

These findings may explain the sparsity of ASD specific models and frameworks attempting to explain the functions or aetiology of CSB (including sexual offending) occasionally exhibited by those with ASD. Understandably, the lack of robust and consistent conclusions which can be drawn make it difficult to establish theories regarding the manifestation or maintenance of such behaviours. To date, Worthington's (2019) explanation remains the only framework attempting to explain sexual offending in those with ASD and comorbid ID. It not only combines the role of biological and neurological vulnerabilities,

reiterating those described by Seto (2019) and Ward & Beech (2006; 2016), but recognises that for some individuals, SB may be an attempt to fulfil needs (different to those generally presented in 'typical' individuals) which to some degree could be related to their core ASD vulnerabilities. Experiencing the desired outcome may subsequently result in reinforcement or maintenance of the initial SB through the central role of learned association. Nevertheless, whilst the model offers reasonable explanation and insight, there is an imperative need for evaluation of this model as well as further research exploring the role of ASD vulnerabilities and traits on CSB to inform theory and practice.

Overall, studies in this review highlight that the subset of individuals with an ASD diagnosis who exhibit CSB, display a range of atypical and HSBs with some commonly occurring types and associated characteristics. For some, ASD traits may play a contributory role within this behaviour to some degree yet there are a range of complex interacting factors which could influence these behaviours; it is therefore not yet possible to validly relate CSBs directly to ASD vulnerabilities based on these findings. Finally, despite the attempts of this review, it remains difficult to establish differences in CSB between ASD and non-ASD samples emphasising that existing claims regarding these differences must be considered with caution.

4.2 Quality of the Evidence Base

This review did not exclude studies based on quality but rather assessed quality using a modified version of the MMAT to offer insight into the rigour and reliability of the evidence base. It became evident that the quality of studies varied widely, with some studies demonstrating more rigour than others suggesting that conclusions from the evidence base must be carefully considered. Some studies lacked adequate processes (i.e., invalid or unreliable measurement tools), whilst others had shortfalls in reporting of methodology (i.e., how data was measured, or the sample strategy used) which made it difficult to draw clear inferences. It is important to note that study quality was not dependent upon the rank it would be assigned on the hierarchy of research designs but rather the quality of the study itself based on specifically tailored appraisal questions. Notably, case studies and case reports accounted for over half of the studies in the review and whilst this was beneficial in truly capturing the details required to address the aims, this could arguably limit generalisability of individual findings. Studies that were excluded based on insufficient details surrounding type of SB may have presented more varied study designs or larger sample sizes. Nevertheless, the use of a MMSR enabled findings to be collated and pooled into a large sample.

Across the studies involved in this review, a total of 1,955 individuals with ASD were included which were reportedly accessed through a range of settings including forensic, inpatient, residential and community settings offering a varied representation of individuals.

Both males and females of all ages were included and whilst over half of the sample were male, accounting for over twice as many females (1151 males, 454 females), many studies failed to provide specific demographic information (including that related to gender, age and other factors such as nationality, comorbidity). The greater number of males may reflect the overrepresentation of men within the autism population or alternatively may be a result of behaviours exhibited by them being perceived as sexual or challenging more so than in females. Furthermore, whilst a proportion of studies included individuals with ASD and comorbid diagnosis, they did not always consider the potential impact of co-occurring conditions on the behaviours reported. Clearly, in some instances it may be difficult to unpick whether behaviours are a manifestation of ASD or another comorbidity, however the presence and role of different vulnerabilities should not be overlooked and should be explored or discussed where possible. Nevertheless, it is crucial that the evidence base continues to include samples with and without comorbid diagnosis and presentations, as only then can a true representation of the ASD population be provided.

In relation to demographics, the lack of details around autistic profiles and diagnostic processes within the studies also made it difficult to understand the behavioural profiles of the samples involved. Due to the evolving nature of diagnostic profiles, it may have been helpful for studies to clearly acknowledge the diagnostic criteria upon which individuals were diagnosed, as individuals could significantly vary in presentation and attributes. Without such detail, it makes it difficult to establish the degree to which behaviour and functioning differs across individuals and the extent of heterogeneity present across the sample considered. Furthermore, the severity of one's ASD may also considerably influence the nature and extent of behaviours displayed and therefore information regarding ASD profiles would be beneficial to provide a better understanding of how the level of difficulty or need relates to the behaviour exhibited.

In conjunction with this, the presence of potential selection bias within samples must not be overlooked. Individuals with ASD who present with a greater level of complexity or challenging behaviour are more likely to be focused upon within research in comparison to those with ASD who have strategies to function reasonably well in social, romantic, and occupational areas of life. Additionally, studies involving samples from forensic, inpatient or residential facilities are likely to have included individuals with more acute difficulties as well as a greater likelihood of being observed and monitored for challenging behaviour. More importantly, individuals selected to participate in the studies (or contribute to the data) may not be representative of the wider ASD population particularly given that only a small proportion of individuals with ASD engage in such behaviours. Not all studies were clear about sample strategies or reasoning behind why participant groups were selected, particularly in case series

and case studies as highlighted during the MMAT quality appraisal process. This in itself may present a skewed representation of those who are reflected upon in literature.

Nevertheless, the evidence involved a mixture of reports from individuals with autism, professionals, families, and carers despite many studies involving primarily the perspective of the author. Understandably, recruitment of individuals with autism may prove more difficult due to the complexity of their presentation; however, individuals with autism were frequently included as primary sources across the studies included in this review. Input from a mixture of stakeholders provided insight and data from a range of viewpoints and offered a diverse source of information. Although, potential bias within this must not be overlooked as information from these groups was gathered through measures such as questionnaires, observations and interviews which could be largely subjective and involve potentially selective reporting. It was noted that the use of standardised tests or measures were less frequently used and data from criminal history record, case files and legal reports were rarely utilised which are likely to offer more factual records. In addition, typical behaviours are generally overlooked and have a lower likelihood of being reported, and therefore challenging behaviours are likely to have greater emphasis placed upon them. It may be that behaviours exhibited by those with ASD may also have a greater likelihood of being interpreted as atypical or harmful simply due to their diagnostic label, in comparison to if displayed by others; similarly, behaviours may be more closely monitored particularly in settings where individuals are under greater levels of observation. Related to this, potential detection and reporting bias may also be present in the reviewed comparison studies, potentially providing an over- or under-estimation of CSB within populations (i.e., biased reporting of more atypical behaviours in those with ASD with under representation of the ability to engage in typical behaviour). Consequently, the evidence is largely reliant upon information which may not be completely objective.

Data extraction and synthesis also highlighted the magnitude of under specification and absence of information within studies including that related to SB types, demographics or proportion of individuals engaging in behaviours. The lack of clear detail surrounding the number of individuals displaying specific behaviours or engaging in more than one behaviour (or contexts) proved problematic as data could not be accurately retrieved and accumulated for frequency counts. As a result of these ambiguities, many individuals could not be captured in the numbers. Subsequently, whilst some categories were identified as being present in a larger proportion of the sample size, many may not be accounted for in the figures and therefore important features, or characteristics may not be highlighted as prominent, particularly if thresholds greater than 10 or 20% had been applied. Therefore, the overall validity of the results is difficult to establish. Nevertheless, whilst this means a proportion of SB exhibited by those

with ASD is not captured in the figures, this essentially avoids misrepresentation of a vulnerable group due to the risk of overestimating CSB in those with ASD.

Furthermore, where studies failed to provide clear definitions and explanations of SB types due to the lack of clarity surrounding what the behaviour involved (i.e., merely suggesting sexual assault or sexual offence), these were not captured in the results. Similarly, behaviours which were ambiguous regarding the sexual nature of these (i.e., stalking) also raised challenges; if clear judgment could not be made from the information provided, these too were excluded. This therefore not only restricts these reports being accounted for in the existing figures around the number of individuals exhibiting behaviours, but potentially limits identification of some additional behaviours. Although this review has been successful in highlighting some common CSB types, features and characteristics, it could benefit from further clarification within the evidence base to better inform conclusions as well as guide future programmes and interventions for those with ASD.

The lack of recognition within literature regarding how appropriate and inappropriate behaviours were defined was also recognised. Fewer than ten studies (Coskun et al., 2009; Creaby-Attwood & Allely, 2017; Gougeon, 2013; Holmes et al., 2020; Mann, 2009; Murphy et al., 2007; Stokes & Kaur, 2005) provided some form of definition regarding 'healthy', 'inappropriate' or 'problematic' SBs that were focused upon within their study however these were rarely based upon SB frameworks and there was no explicit distinction or definition for those considered harmful or unharmful. In some instances, due to the lack of definition combined with the lack of detail, it was difficult to categorise behaviours for example determining behaviours such as masturbation exhibited by someone under the age of 12 as appropriate, inappropriate or harmful. Thus, literature presented numerous shortcomings due to the vague information presented.

A significant limitation of the evidence base highlighted by this review was the surprisingly small number of comparison studies (n=6) describing the types of CSB exhibited by ASD and non-ASD individuals. Due to the extremely limited information, differences in reporting styles and variability in comparison groups, the results of the review only offered preliminary findings regarding the similarities or differences in CSB amongst groups despite attempts to synthesise this data. Studies should endeavour to include more comparison data when exploring this area as currently no meaningful conclusions can be drawn regarding whether behaviours, and features of these CSBs, are distinct in any way. Where possible, comparison groups involving matched controls (based on developmental age, comorbidity, gender etc) and consideration of functioning profiles should be incorporated to offer better insight into whether SB in ASD and non-ASD individuals truly differs.

Finally, attention must be given to the strength and rigour of the claims being made regarding the association between ASD traits and CSB within the literature base. Studies which reported these associations involved claims largely made by the author and occasionally by parents, professionals and self-reported by individuals with ASD, with little supporting evidence or further justification and explanation. There was also variability in how these associations were suggested where some reports involved stronger assertions than others, yet it was not always possible to establish the nature of these due to the diversity in reporting styles and information offered. Unfortunately, attempts to empirically investigate this relationship were limited and whilst this could arguably be difficult to test, the inclusion of factual evidence such as criminal and legal reports was also lacking which makes it difficult to place confidence in the associated findings. Therefore, this association cannot be validly established at this moment in time.

Although studies were scrutinized using a thorough quality appraisal process as part of this review, it is important to consider the strengths and limitations of the quality appraisal tool itself. The MMAT was originally created specifically for MMSRs due to the lack of appraisal tools available which evaluate both qualitative and quantitative research (Pluye et al., 2009) as previous methods such as those suggested by the JBI or Cochrane involve a separate tool for each study design (i.e., the CASP checklist). As studies within this MMSR were not excluded based on quality, the tool was deemed an appropriate and efficient means of evaluating the quality of different methodologies enabling insight into the rigour and reliability of the evidence base.

Notably, the MMAT (2018) has demonstrated positive properties, both in reliability and content validity (Hong, 2018) having been updated since the original version published over a decade ago (Pluye et al., 2009). However, the modified version of this tool altered for the purpose of this review (as explained in the method) may arguably to some extent impact the reliability and validity of the tool, although this was considered essential for the diversity of studies included. Saying this, alternative questions (to include appraisal questions for case studies/series within the qualitative category) were carefully considered and discussed with the thesis supervisor to ensure these were reflective of the original focus of the question. Additional explanation of existing questions was further sought to improve clarity and consistency in application, particular across reviewers.

Furthermore, as the MMAT quality appraisal scores were calculated based on the number of questions sufficiently fulfilled out of the number of questions applicable to ensure fair rating of individuals studies, scores across studies (i.e., in comparison) should be considered with caution. A study could score 100% based on only two applicable questions (2/2) whereas

another study may score 60% (3/5) having sufficiently fulfilled a greater criterion; evidently, this score in isolation does not provide a clear indication of which study was more robust or reliable when compared. Therefore, within this review, less emphasis was placed on quality appraisal scores and comparison of studies, but rather the overall strengths and weaknesses of the evidence which came to light during the quality appraisal processes were discussed in detail. From this, the MMAT was able to offer insight into the rigour of the evidence base and allowed identification of ways in which future research can be improved and developed within the area.

4.3 Strengths and Weaknesses of the Review Method

This systematic review implemented a comprehensive and detailed search strategy involving careful selection of search terms, databases, and adjacency rules to access and retrieve relevant literature. The search strategy included a range of applicable terms associated to three constructs (autism, CSB and features) and associated subject headings which were informed and directed by related literature which ensured applicable terminology was utilised. The search was not limited by age, gender, diagnosis, or year of publication and was conducted on a mixture of databases which were recognised for health, criminal and educational literature. Evidently, the comprehensive nature of the search strategy along with a sequence of piloting processes prior to the formal search and input from co-reviewers instilled confidence that this was thorough to capture the required literature for this review. Furthermore, the additional searches based on journals or authors and the updated database search prior to synthesis offered reassurance that most studies were accessed and included.

The current review was limited to articles involving primary data (including dissertations and thesis) but excluded books and book chapters. Although a fraction of chapters or books may include some primary data of relevance, this is likely to have significantly expanded the number of records requiring screening and the level of data to be analysed. This did not appear to be feasible nor practical given the likelihood of only a small part of data being of relevance.

Whilst the initial search strategy did not intend to exclude papers of a foreign language, during the process of screening it became apparent that limited time and resources would not allow translation of several papers (n=9) in diverse languages (including French, Malay, Japanese, German and Swedish). Although it was recognised that the exclusion of these may limit the culturally diverse information available, papers of a foreign language which were not already accessible in English were excluded due to translation services and funds not being available for the required volume. The current review however did include studies where samples included those from culturally diverse backgrounds and individuals residing in various

locations. Capturing information regarding the cultural backgrounds or nationality of individuals with ASD could have offered insight into the extent of diversity within the sample however this was not commonly reported in studies, nor was this recorded for the purpose of this review. Exploring similarity or difference in CSB exhibited by those with ASD across cultures and settings may be an area of future focus however this would rely on understanding cultural norms surrounding appropriate and inappropriate SB before this can be effectively explored. Evidently, whilst this review partially captured a diverse sample, future reviews may seek to access funding and resources to enable papers published in a foreign language to be translated and explored, as well as seek to directly study culturally diverse samples, to offer information on a wider and varied population.

Similarly, it is recognised that whilst the summary table (table 2) reported the gender of individuals with ASD included in this review, gender differences in the types, features, and characteristics of CSB exhibited were not considered. Exploration of this could provide insight into the range of SBs males and females display, allowing an opportunity to reveal any unique or distinct features of these. Ultimately, this could potentially offer invaluable insight into whether support and intervention must be tailored for subgroups of ASD and what this should entail. However, due to the extent and complexity of the current aims of this review it was not possible to evaluate this and therefore exploring this in the future could be of advantage.

It must be noted that few studies included in this review directly aimed to identify CSB types within those with ASD or sought to explore motivations behind these behaviours. Although available and relevant information was retrieved to address the aims of the current review, it is acknowledged that detailed data surrounding these aims may have been rather limited therefore only offering partial insight. Saying this however, studies were screened and selected based on the presence of sufficient information where co-reviewers also participated in screening a minimum of 15% of studies at all stages to ensure sufficient information was present for study selection, inclusion criteria was adhered to, as well as data extraction and quality appraisal processes remained consistent. This also assisted in the process of identifying behaviours and features and addressing any ambiguities which required collective decision making (i.e., establishing if behaviours had adequate information to suggest sexual or romantic intention or connotations). This was in addition to input from the research supervisor who was also involved in decision making through the review process which further added to the reliability of the findings. Therefore, assurance lies in the information included and reviewed as well as the conclusions formed from the results.

The large scope and inclusive nature of this review was able to capture a wider and more varied range of behaviours due to the extensive dataset of information considered in

comparison to previous reviews (Allely & Dubin, 2018; Beddows & Brooks, 2016; Dewinter et al., 2013). Behaviour types were established although heterogeneity in details meant overarching CSB types were sometimes difficult to establish; nevertheless, details were captured to reflect the diversity and range of features and characteristics of behaviour in line with the aims. In other instances, under specificity of particular information within the descriptions of CSBs offered within studies, meant that whilst behaviours with sufficient detail were identified and captured within the results, some of them may have been extremely similar to one another with no substantial difference. For example, masturbation displayed by 12–18-year-old vs masturbation displayed by individuals over 16 could be grouped as the same behaviour if further specification was provided. Therefore, distinctions between behaviours should not be exaggerated as there may be some overlap within them. Importantly, the lack of clarity in details meant that descriptions extracted from the studies had to be utilised to list behaviours separately to avoid imposing interpretations and to provide an indication of the range and difference in behaviours where possible.

Essentially, this review allowed recognition of behaviours which were reported more across studies or individuals with an ASD diagnosis offering a more comprehensive understanding of CSBs identified in literature. Saying this, it was difficult to pre-empt how to define or establish patterns until the data was gathered. Patterns were initially determined based upon behaviours which appeared to be reported more so than others, however, to establish whether these patterns were meaningful, two small arbitrary thresholds were applied (10 and 20 percent) to suit the heterogeneity and diversity of descriptive behaviour categories upon which frequency counts were distributed. From this, the extent to which these behaviours were reported in literature could be determined rather than merely listing their presence as have previous reviews (Beddows & Brooks, 2016).

Another perceived strength of this review is that it focused on observable behaviours and did not include the presence of thoughts, fantasies or interests alone. Although there were regular reports of ISB in the form of being aroused by deviant interest or having deviant fantasies (Milton et al., 2002; Schöttle et al., 2017; Shenk & Brown, 2007), this review only accounted for reported actions. Essentially, not all sexual fantasy or interest manifests into behaviours or increases risk (Bailey et al., 2016; Harvey & Jeglic, 2020) despite some authors suggesting that deviant sexual fantasy or interests may in some instances contribute to sexual crimes if inhibitions are weak (Ward & Beech, 2006). Therefore, including such accounts could inaccurately imply that the presence of arousals or fantasies increases the risk of someone exhibiting CSB or acting upon these; thus, these were not included in the current review. What's more, it is not uncommon for individuals from the general population to also have

deviant preferences or interests and similarly, individuals may or may not choose to engage in these (Joyal & Carpentier, 2017).

Importantly, this review added further value by offering distinctions between typical, atypical, and HSBs as a way of understanding the nature of behaviours exhibited. These were guided by existing sexual development literature and theoretical frameworks to clearly define and outline how behaviours will be recognised and categorised within the current synthesis. Primary studies and previous reviews (Beddows & Brooks, 2016) largely failed to acknowledge the differences and distinguish between atypical and harmful behaviours. Essentially, CSB that does not cause direct or indirect harm to self or others should be recognised separately due to significantly different impact and consequence of such behaviour; without this information, the extent and severity of SB exhibited by those with ASD is difficult to establish and could lead to misinterpretation. Therefore, the insight this review offers is vital as it clearly demonstrates that not all CSB displayed by those with ASD is harmful.

Whilst this review attempted to distinguish between typical, atypical and harmful behaviour, this was not always straightforward due to the subtle distinctions, variations in definition, differing perspectives and potential overlaps within behaviours as mentioned earlier. The lack of definitions and ambiguity within primary literature, meant that within the review it was also difficult to establish how some behaviours should be categorised. Where actual physical or sexual harm was present within clearly identified non-consenting others, this was easier to determine but within this remained complex social and interpersonal matters including those related to consent. Similarly, some communities (such as BDSM groups) may engage in mutual and consented 'harmful' behaviours (Simula, 2019) and therefore this too presents challenges in categorisation and interpretation of SB. Ultimately, there were complex conceptual questions raised when categorising behaviours despite attempts to provide clarity and utilise support from co-reviewers to address discrepancies and inform decision making.

To our knowledge, this is one of the first reviews to acknowledge the presence of comparison data within studies comparing SB types between ASD and non-ASD individuals. Therefore, to fully understand the extent and magnitude of CSB exhibited by those with ASD, it seemed paramount to offer this comparison. Within the evidence base, only a small number of studies were identified (Cervantes & Matson, 2015; Hellemans et al., 2010; Mogavero & Hsu, 2019; Schöttle et al., 2017; Stokes et al., 2007; Stokes & Kaur, 2005) and review of these provided insight into some preliminary findings suggesting a possibly greater level of CSB in those with ASD than in other populations. The limited number of comparison studies could be a function of the inclusion criteria focusing on primarily identifying studies which report on the 'types' of SB, although even on that basis, the number of studies is surprisingly small.

Subsequently, further comparison studies (as described in the previous section) are required to better understand the nature of CSB across different groups.

Finally, the complexity of an ASD presentation and diagnosis also warrants mentioning. ASD is complex and can vary significantly across individuals despite the presence of the same diagnostic label or primary core traits. Without details surrounding individual autistic profiles, characteristics, and diagnostic criteria, it cannot be assumed that individuals were 'similar' in presentation. In addition, whilst this review is inclusive of all ASD types but only included those with a formal diagnosis to ensure consistency, the evolving diagnostic criteria and previously used ASD categories also raise questions regarding the similarity or difference between individuals due to changes in what is considered to account as autism. Due to the likely heterogeneity across individuals, generalisability from individual findings can be difficult as what is applied to or relates to one individual (including needs, difficulties, behaviours and suitable support or intervention) may not necessarily to another. Although this review collates information from a large sample of autistic individuals from which conclusions are drawn, individual difference can sometimes make it difficult to examine this population.

4.4 Research Implications

The pathway to better understand CSB in individuals with autism and the potential contributing role of ASD upon these behaviours relies heavily on improving the quality, rigour and empirical basis of the research. Studies should endeavour to provide clarification on individuals (and samples) who display particular behaviours and on what constitutes the explored SB, as well as ensure detailed descriptions regarding method, measures, and processes. Without such clarity and transparency, it poses challenges in making informed judgments about the data as well as establishing the reliability of the information and research itself.

Studies should also seek to include greater levels of factual data and reports or alternatively cross-reference information where possible (i.e., check offence details in criminal records) to improve validity and reduce potential bias as a large proportion of studies relied merely on subjective opinions or measures. Such attempts can improve the strength of conclusions established from the evidence base particularly those around the potential associations between ASD attributes and CSB to subsequently better inform clinical practice and preventative strategies (Mouridsen, 2012). However, even in instances where supposedly more factual information is available, differences in the content of what is captured, recorded and reported (i.e., details of convictions versus details of reported crimes) should be considered with caution particularly where synthesis is taking place. Evidently, research remains in its infancy and requires further robust evidence which should seek to address these limitations or at

minimum, acknowledge unsupported claims to avoid misleading conclusions regarding a vulnerable group of individuals.

As mentioned, research comparing CSB in ASD and non-ASD samples is lacking despite the critical need for this knowledge. Comparison studies are invaluable in developing an in-depth understanding of differences or similarities across factors, contexts or groups yet the sparsity of this information reveals a large gap within the evidence base. To fully understand the nature of differences across populations (those with and without ASD), if any, future research should attempt to conduct more comparison research focusing specifically on SB types, features and characteristics as well as other areas related to potential risk or protective factors. Although it may be difficult to identify, access and recruit matched controls (those strategically matched on factors such as developmental age, comorbidity and other characteristics which could influence behaviours), this could reduce variability across samples to better understand any differences or similarities in behaviour profiles. There should also be consideration of matching controls on other vulnerability or predisposing factors where feasible, such as social deprivation, trauma or neglect, which have a significant impact on functioning and behaviour (Harris et al., 2009) as only with this can a true comparison be made. Albeit, finding matched controls on a range of factors would be fundamentally challenging and the issue remains in establishing an 'appropriate control' given the heterogeneity of individuals. What is more, comparison studies involving those who are reported as typical controls from the wider population may still present neurodiversity despite the lack of formal diagnoses and therefore this too should be acknowledged. Subsequently, it cannot be established whether any differences lie in the range or extent of behaviours displayed across groups which is paramount to guide practice, policy and intervention.

Future research may also aim to expand on the current review by exploring whether those with ASD who display particular types of atypical SB go onto engage in forms of HSB. Although data synthesis in the current review captured person IDs in relation to SBs, the review did not analyse the series of behaviours presented by each individual. Some may suggest the possible escalation in behaviours from engagement in inappropriate or antisocial behaviour (including those of sexual nature) to more severe levels of SBs or offending (Lussier et al., 2005; McNally & Fremouw, 2014). By exploring the potential sequence or progression of behaviours in those with ASD, professionals may be able to better understand whether atypical behaviours act as precursors of future harmful or illegal SB. This of course could be helpful in recognising what may be early warning signs to enable proactive strategies and early intervention in attempt to reduce future risk and escalation of behaviours, however some longitudinal exploration and evidence may be required.

Ultimately, better research and systematic investigation is required to further establish the needs and SBs of those with ASD as well as recognise the degree to which clinical ASD traits have a role within these. This review provides crucial insight into the extensive limitations of the evidence base and identifies where methodological improvements can be made within future studies and research. Until this takes places, challenges remain in developing evidence-based treatment strategies to improve therapeutic outcomes alongside informing the structure and support offered by the CJS.

4.5 Clinical and Legal Implications

The findings of this review may have some value in guiding the development of multi-tiered systems for education, clinical support, and risk management for SB in those with ASD although due to limitations of the evidence base in the area, findings should be addressed with caution. If further empirical evidence was available to support these findings, programmes and strategies may benefit by placing greater focus or emphasis on the key areas of behaviours described within this review to target some of the CSBs exhibited. Saying this however, this review may still encourage support, education, and management practices to begin to recognise the most common CSB types which may arise (unconsented touching of others, inappropriate undressing, inappropriate or compulsive and excessive masturbation) based on the data to hand.

Considering the common features associated to these behaviours, particularly regarding locations and targets, strategies could consider these as areas of development and learning with extra focus on some specific contexts which were highlighted more than others. Areas such as understanding relationship boundaries (including those with professionals, peers or family members), privacy rules or rules on suitable settings for sexual expression as well as socially acceptable courting behaviours or pursual of interests (particularly with females) could be some areas of focus. Additionally, learning around appropriate or inappropriate interaction with children including education around CSEM which was commonly reported could be beneficial, given the extent to which these were both reported. Though further substantiated evidence is needed to confidently utilise this information when guiding programmes and risk management as recommendations from these findings must be treated with discretion. These areas combined with attempts to improve understanding regarding the consequences and implications of SB particularly in relation to harm or criminality would be of benefit as individuals may struggle to recognise the wrongfulness of their behaviour or harm caused (Murrie et al., 2002). These suggestions go beyond general recommendations which emphasise the need for development in sexual knowledge and socio-sexual behaviours and boundaries (Hancock et al., 2017; Koller, 2000) and importantly identify some key matters to address within education and intervention. Importantly, focused areas of practice and targeted strategies alongside modified traditional

treatment protocols which accommodate to the learning styles of individuals (involving repetition, visual learning, feedback) may improve therapeutic and risk reducing outcomes (Sutton et al., 2013).

Furthermore, targeted support and intervention for subgroups (of ASD) such as male and females, those with comorbidity, or those with higher or lower functioning levels could also be of benefit. Whilst it can be assumed that there may be some differences in the sexual behaviours exhibited and the primary functions of these behaviours, the current review is insufficient to identify or make predictions regarding this. Subsequently, primary research or future reviews could consider demographic differences may highlight areas of greater need within subgroups and open new avenues to support healthy sexual development and implement tailored and person-centred assessment, support, and intervention for individuals with ASD. Subsequently, offering an improved chance of reducing atypical and harmful sexual conduct demonstrated by the small minority of individuals with ASD who present with CSB (Mahoney, 2009).

Given that only a small proportion of studies reported vulnerabilities in line with ASD as potentially contributing to CSBs, as well as the lack of justification or evidence provided surrounding this, these findings should too be treated with caution. It remains a challenge to assess and distinguish the role of ASD as a causal or contributory factor in CSB (Ray et al., 2004) and therefore holistic approaches to supporting those with ASD should be implemented. Training and education at an early age around appropriate social and communication skills and the management of circumscribed interests and sensory difficulties could be useful for some in potentially reducing the manifestation of challenging behaviours (Beddows & Brooks, 2016; Hancock et al., 2017), although this may not be applicable or effective for all. Rather, education should be offered to families and professionals to develop awareness that CSB could be explained by a range of factors, where to some degree ASD traits may have some influence, as opposed to merely primarily sexual, abusive or antisocial motives (Beddows & Brooks, 2016; Ray et al., 2004); however further empirical evidence around this is required. Interventions and education programmes should therefore collectively address a range of prominent factors (substance use, mental health) and adversities (trauma, neglect) identified as contributing to such behaviours with the additional inclusion of recognising and addressing ASD vulnerabilities within this. Ultimately, the responsibility is on professionals to attempt to bridge the gap between sexual knowledge, SB and ASD vulnerability by appropriately adapting traditional treatment protocols to be more holistic in nature and to also address stigmas related to the SBs of those with ASD.

In respect to this, this review emphasises the importance and value of embedding and including assessment of sexual behaviour (and functioning) within clinical practice when working with individuals with ASD. Assessments should be carefully and sensitively tailored to explore and capture such information as these areas may receive less attention in generic assessment or may be overlooked when working with atypical populations. This can offer clinical and legal professionals better insight into the SBs (typical, atypical or harmful) individuals engage in and the contexts in which these occur, but more importantly providing opportunities to better understand the motives, associated risks and protective factors related to these and the role of ASD vulnerabilities within this. Through this, professionals are more likely to be able to establish informed and holistic treatment and support plans to attend to individuals with ASD and those who support them.

Lastly, this learning could further extend to judicial and legal professionals working across all pathways including those working in police and probation service. The review can support improved awareness of common types of SBs that may come to their attention when working with those with ASD, whilst also being mindful of the potential numerous influences upon these behaviours. Furthermore, it could help reduce the presence of any immediate misconceptions that are formed in instances where someone who engages in sexual offending is found to be on the autism spectrum; this may encourage legal professionals to tailor their support and interaction styles as well as explore the motives behind behaviours, including those related to ASD vulnerabilities, rather than immediately focusing upon sexual or deviant motivations. Through this, judicial systems may become more aware of 'counterfeit deviance' and the potential role of this in some instances (Griffiths et al., 2013). Ultimately, a better skilled and informed workforce within the CJS may better support the growing population of individuals diagnosed with ASD.

Whilst it was hoped that the findings from this review could also help inform the development and adaptation of a sexual offending programme, the findings reveal that more rigorous research is required to come to conclusions as to what this should entail. It should be acknowledged that existing mainstream programmes on SB or sexual offending are fairly generalised, however individuals with ASD are likely to have unique attributes and learning styles which should be considered when supporting this population to improve engagement and outcomes. Recent advances have informed new or adapted programmes directed to those with mental health (i.e., Kaizen) or intellectual difficulties (i.e., Becoming New Me+, Healthy Sex Programme); yet those targeted to those with autism are lacking (Anderson & Butt, 2018). In the UK, there are currently no ASD specific accredited programmes for sexual offending (Ministry of Justice, 2021) despite the recognition that programmes could benefit from being tailored specifically to meet the needs of this complex group of individuals. This may involve

consideration of content, delivery style and environmental measures however greater insight and research is required to provide direction for future effective risk management strategies and intervention.

Chapter 5: Conclusion

In conclusion, this large-scale systematic review has demonstrated that within the small proportion of individuals with ASD who exhibit CSBs, the range of behaviours varies widely involving both harmful and atypical behaviours. Several types, features and characteristics of behaviours were found to be reported more frequently than others however limitations of the evidence base means these findings are only partial. Furthermore, establishing whether these truly differ from those displayed by non-ASD individuals was difficult due the lack of comparison studies available. Fundamentally, the review highlighted the pressing need for more robust evidence exploring patterns of CSB in those with and without autism. Without this, programmes and strategies used to address SB in those with ASD can only partially draw upon these findings to guide and offer additional support and focus around these behaviours and features.

Furthermore, although some suggested a primary role of ASD upon SB and some CSB types were identified in relation to these, empirical evidence was sparse and numerous studies offered alternative explanations and factors which were considered to have an influence on the presenting behaviours. From this, we can only assume that there are likely various complex factors influencing these behaviours and although future research is required to better understand this relationship, current practice should seek to tailor intervention which includes both recognition of wider influencing factors and ASD vulnerabilities upon CSB.

Overall, intervention, programmes and education as well as policies and guidelines should be developed to address the varied but complex sexual needs and behaviours of those with ASD. Importantly, aspects of sexual expression and SB, privacy and legal rules, appropriate and inappropriate locations and safe relationships and boundaries, should be some of the many areas targeted within these. These should not only be targeted at those with ASD but also at other stake holders including families, professionals and legal bodies who can improve their confidence and knowledge to better support those they work with. Most importantly however, recognition of the heterogeneity of those with ASD should not be over-looked and person-centred care should be at the heart of all practice.

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List of Abbreviations

Note. Includes all abbreviations used in main body of the text as well as those used within tables.

ADHD	Attention Deficit Hyperactivity Disorder
ADOS	Autism Diagnostic Observation Schedule
APA	American Psychological Association
AS	Asperger's Syndrome
ASD	Autism Spectrum Disorder
CDCP	Centre Of Disease Control and Prevention
CJS	Criminal Justice System
CSB	Challenging Sexual Behaviour
CSEM	Child Sexual Exploitation Material
DES	Data Extraction Sheet
DISCO	Diagnostic Interview for Social and Communication Disorders
DSM	Diagnostic and Statistical Manual of Mental Disorders
FA	Functional Analysis
HC	Healthy Control
HSB	Harmful Sexual Behaviour
ICD	International Classification of Diseases
ID	Intellectual Disability
IIOC	Indecent Images of Children
ISB	Inappropriate Sexual Behaviour
ITSO	Integrated Theory of Sexual Offending
LD	Learning Disability
MMAT	Mixed Methods Appraisal Tool
MMSR	Mixed Method Systematic Review
MR	Mental Retardation
OCD	Obsessive Compulsive Disorder
PDD	Pervasive Development Disorder
PDD-NOS	Pervasive Developmental Disorder Not Otherwise Specified
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analysis
RRBI	Restricted And Repetitive Behaviours and Interests
SB	Sexual Behaviour
TC	Typical Control
ToM	Theory of Mind
WAIS	Wechsler Adult Intelligence Scale
WASI	Wechsler Abbreviated Scale of Intelligence
WISC	Wechsler Intelligence Scale for Children
WHO	World Health Organisation

Appendix 1: Diagnostic Criterias for ASD within the DSM-5 and ICD-11

	DSM-5 (APA, 2013)	ICD-11 (WHO, 2019)
Dyad of core attributes: presenting behaviours and difficulties	A. Persistent deficits in social communication and social interaction across multiple contexts manifested by the following • Deficits in social-emotional reciprocity • Deficits in nonverbal communicative behaviours used for social interaction • Deficits in developing, maintaining, and understanding relationships	Persistent deficits in the ability to initiate and to sustain reciprocal social interaction and social communication
	B. Restricted, repetitive patterns of behaviour, interests, or activities, as manifested by at least two of the following • Stereotyped or repetitive motor movements, use of objects, or speech • Insistence on sameness, inflexible adherence to routines, or ritualized patterns or verbal nonverbal behaviour • Highly restricted, fixated interests that are abnormal in intensity or focus • Hyper- or hypo-reactivity to sensory input or unusual interests in sensory aspects of the environment	A range of restricted, repetitive, and inflexible patterns of behaviour, interests or activities that are clearly atypical or excessive for the individual's age and sociocultural context
Criteria regarding the onset and level of difficulties	C. Symptom's must be present in the early developmental period (but may not become fully manifest until social demands exceed limited capacities or may be masked by learned strategies in later life).	The onset of the disorder occurs during the developmental period, typically in early childhood, but symptoms may not fully manifest until later, when social demands exceed limited capacities.
	D. Symptom's cause clinically significant impairment in social, occupational, or other important areas of current functioning	Deficits are sufficiently severe to cause impairment in personal, family, social, educational, occupational or other important areas of functioning. Are usually a pervasive feature of the individual's functioning observable in all settings, although they may vary according to social, educational, or other context.
	E. These disturbances are not better explained by intellectual disability or global developmental delay.	Individuals along the spectrum exhibit a full range of intellectual functioning and language abilities.

Appendix 2: Search Terms and Searches

Search conducted 18/12/20

EMBASE

# ▲	Searches	Results
1	(Autis* or Asperger* or Pervasive Developmental Dis* or ASC or ASD).tw.	93974
2	exp autism/	74027
3	((Sexual* or harmful* or offen* or HSB or Online* or devian*) adj3 (Behav* or Featur* or Characteristic* or Description* or Profil* or Nature* or Typ* or Pattern* or Attribute* or psychopathology)).tw.	60245
4	(Paraphili* or Voyeur* or Exhibitionis* or Frotteur* or Masochis* or Sadis* or Pedophil* or paedophil* or Fetish* or Psychosexual or hypersexual* or sociosexual*).tw.	10006
5	(Cybersex or rape or sexual harassment or sexting or stalk* or masturbat*).tw.	30714
6	(child* sex* or porn*).tw.	11361
7	psychosexual disorder/ or hypersexuality/ or exp paraphilic disorder/ or sexual addiction/	4904
8	sexual deviation/	3386
9	sexual assault/ or exp rape/ or exp sexual abuse/ or exp sexual harassment/	36330
10	sexual crime/	11981
11	sexual violence/ or sexual coercion/ or sexual exploitation/	3486
12	statutory rape/	22
13	sexual behavior/ or adolescent sexual behavior/ or incest/ or pedophilia/ or "pornography use"/ or public sex/ or sexting/ or sexual fetishism/	115321
14	exp stalking/	699
15	exp sexual practice/	37333
16	1 or 2	110247
17	3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15	238634
18	16 and 17	1043

Search Conducted 26/01/22

# ▲	Searches	Results
1	(Autis* or Asperger* or Pervasive Developmental Dis* or ASC or ASD).tw.	103605
2	exp autism/	81805
3	((Sexual* or harmful* or offen* or HSB or Online* or devian*) adj3 (Behav* or Featur* or Characteristic* or Description* or Profil* or Nature* or Typ* or Pattern* or Attribute* or psychopathology)).tw.	63093
4	(Paraphili* or Voyeur* or Exhibitionis* or Frotteur* or Masochis* or Sadis* or Pedophil* or paedophil* or Fetish* or Psychosexual or hypersexual* or sociosexual*).tw.	10142
5	(Cybersex or rape or sexual harassment or sexting or stalk* or masturbat*).tw.	32231
6	(child* sex* or porn*).tw.	12159
7	psychosexual disorder/ or hypersexuality/ or exp paraphilic disorder/ or sexual addiction/	5036
8	sexual deviation/	3357
9	sexual assault/ or exp rape/ or exp sexual abuse/ or exp sexual harassment/	38054
10	sexual crime/	12673
11	sexual violence/ or sexual coercion/ or exp sexual exploitation/	4008
12	statutory rape/	25
13	sexual behavior/ or adolescent sexual behavior/ or incest/ or pedophilia/ or "pornography use"/ or public sex/ or sexting/ or sexual fetishism/	118602
14	exp stalking/	756
15	exp sexual practice/	38156
16	child pornography/	153
17	sex with animals/	53
18	1 or 2	121636
19	3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17	248386
20	18 and 19	1159

- Added subject heading: Sex with animals
- Added subject heading: Child pornography
- Sexual exploitation expanded to ‘explode’ so narrower terms are included
- Amended search below: row 11, 16, 17, 19, 20 amended

Search conducted 18/12/20

Search Conducted 26/01/22

MEDLINE

# ▲	Searches	Results
1	(Autis* or Asperger* or Pervasive Developmental Dis* or ASC or ASD).tw.	66960
2	exp Child Development Disorders, Pervasive/	36523
3	1 or 2	70485
4	((Sexual* or harmful* or offen* or HSB or Online* or devian*) adj3 (Behav* or Featur* or Characteristic* or Description* or Profil* or Nature* or Typ* or Pattern* or Attribute* or psychopathology)).tw.	47039
5	(Paraphili* or Voyeur* or Exhibitionis* or Frotteur* or Masochis* or Sadis* or Pedophil* or paedophil* or Fetish* or Psychosexual or hypersexual* or sociosexual*).tw.	6124
6	(Cybersex or rape or sexual harassment or sexting or stalk* or masturbat*).tw.	24589
7	(child* sex* or porn*).tw.	8916
8	sexual behavior/ or masturbation/ or sexual harassment/	60117
9	exp Sex Offenses/	23966
10	Sexual Partners/	17466
11	exp Paraphilic Disorders/	5438
12	Stalking/	212
13	Incest/	1640
14	Intimate Partner Violence/	2742
15	Sex/	7658
16	4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15	157281
17	3 and 16	460

# ▲	Searches	Results
1	(Autis* or Asperger* or Pervasive Developmental Dis* or ASC or ASD).tw.	75466
2	exp Child Development Disorders, Pervasive/	41990
3	1 or 2	79163
4	((Sexual* or harmful* or offen* or HSB or Online* or devian*) adj3 (Behav* or Featur* or Characteristic* or Description* or Profil* or Nature* or Typ* or Pattern* or Attribute* or psychopathology)).tw.	50292
5	(Paraphili* or Voyeur* or Exhibitionis* or Frotteur* or Masochis* or Sadis* or Pedophil* or paedophil* or Fetish* or Psychosexual or hypersexual* or sociosexual*).tw.	6406
6	(Cybersex or rape or sexual harassment or sexting or stalk* or masturbat*).tw.	26273
7	(child* sex* or porn*).tw.	9726
8	sexual behavior/ or masturbation/ or sexual harassment/	64559
9	exp Sex Offenses/	25731
10	Sexual Partners/	19048
11	exp Paraphilic Disorders/	5570
12	Stalking/	251
13	Incest/	1655
14	Intimate Partner Violence/	4271
15	Sex/	7702
16	4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15	168421
17	3 and 16	520

- No updates for subject headings and terms to remain the same

Search conducted 18/12/20

Search Conducted 26/01/22

PSYCINFO

# ▲	Searches	Results
1	(Autis* or Asperger* or Pervasive Developmental Dis* or ASC or ASD).tw.	58348
2	autism spectrum disorders/	44952
3	1 or 2	58725
4	((Sexual* or harmful* or offen* or HSB or Online* or devian*) adj3 (Behav* or Featur* or Characteristic* or Description* or Profil* or Nature* or Typ* or Pattern* or Attribute* or psychopathology)).tw.	56464
5	(Paraphili* or Voyeur* or Exhibitionis* or Frotteur* or Masochis* or Sadis* or Pedophil* or paedophil* or Fetish* or Psychosexual or hypersexual* or sociosexual*).tw.	14929
6	(Cybersex or rape or sexual harassment or sexting or stalk* or masturbat*).tw.	17209
7	(child* sex* or porn*).tw.	17866
8	psychosexual behavior/ or autoeroticism/ or exp cybersex/ or hypersexuality/ or masturbation/ or exp paraphilias/ or pornography/ or sex/ or exp sexual arousal/ or sexual risk taking/	48836
9	exp sadism/	605
10	sex offenses/ or exp sexual abuse/	36677
11	exp harassment/	4382
12	sexual masochism/	150
13	sexual addiction/	930
14	exp Sexual Partners/	4948
15	4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14	134090
16	3 and 15	769

# ▲	Searches	Results
1	(Autis* or Asperger* or Pervasive Developmental Dis* or ASC or ASD).tw.	63220
2	autism spectrum disorders/	49074
3	1 or 2	63621
4	((Sexual* or harmful* or offen* or HSB or Online* or devian*) adj3 (Behav* or Featur* or Characteristic* or Description* or Profil* or Nature* or Typ* or Pattern* or Attribute* or psychopathology)).tw.	59168
5	(Paraphili* or Voyeur* or Exhibitionis* or Frotteur* or Masochis* or Sadis* or Pedophil* or paedophil* or Fetish* or Psychosexual or hypersexual* or sociosexual*).tw.	15409
6	(Cybersex or rape or sexual harassment or sexting or stalk* or masturbat*).tw.	18096
7	(child* sex* or porn*).tw.	18806
8	psychosexual behavior/ or autoeroticism/ or exp cybersex/ or hypersexuality/ or masturbation/ or exp paraphilias/ or pornography/ or sex/ or exp sexual arousal/ or sexual risk taking/	50552
9	exp sadism/	665
10	sex offenses/ or exp sexual abuse/	38603
11	exp harassment/	4711
12	sexual masochism/	167
13	sexual addiction/	1001
14	exp Sexual Partners/	5098
15	intimate partner violence/	13097
16	4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15	151218
17	3 and 16	844

- Added subject heading: Intimate Partner Violence
- Amended rows in search: 15, 16, 17

Search conducted 18/12/20 **Search Conducted 26/01/22**

EBSCO HOST: ERIC, CJA, CDAAS

Search ID#	Search Terms	Search Options	Actions
S7	S1 AND S6	**Search modes** - Boolean/Phrase	View Results (245)
S6	S2 OR S3 OR S4 OR S5	**Search modes** - Boolean/Phrase	View Results (49,524)
S5	TI (("child* sex*" OR porn*)) OR AB (("child* sex*" OR porn*))	**Search modes** - Boolean/Phrase	View Results (13,012)
S4	TI ((Cybersex or rape or "sexual harassment" or sexting or Stalk* or masturbat*)) OR AB ((Cybersex or rape or "sexual harassment" or sexting or Stalk* or masturbat*))	**Search modes** - Boolean/Phrase	View Results (11,500)
S3	TI ((Paraphili* or Voyeur* or Exhibitionis* or Frotteur* or Masochis* or Sadis* or Pedophil* or paedophil* or Fetish* or Psychosexual or hypersexual* or sociosexual*)) OR AB ((Paraphili* or Voyeur* or Exhibitionis* or Frotteur* or Masochis* or Sadis* or Pedophil* or paedophil* or Fetish* or Psychosexual or hypersexual* or sociosexual*))	**Search modes** - Boolean/Phrase	View Results (2,570)
S2	TI ((Sexual* or harmful* or offen* or HSB or Online* or devian*) n3 (Behav* or Featur* or Characteristic* or Description* or Profil* or Nature* or Typ* or Pattern* or Attribute* or psychopathology)) OR AB ((Sexual* or harmful* or offen* or HSB or Online* or deviant*) n3 (Behav* or Featur* or Characteristic* or Description* or Profil* or Nature* or Typ* or Pattern* or Attribute* or psychopathology))	**Search modes** - Boolean/Phrase	View Results (27,255)
S1	TI ((Autis* or Asperger* or "Pervasive Developmental Dis*" or ASC or ASD)) OR AB ((Autis* or Asperger* or "Pervasive Developmental Dis*" or ASC or ASD))	**Search modes** - Boolean/Phrase	View Results (29,793)

Search ID#	Search Terms	Search Options	Actions
S7	S1 AND S6	**Search modes** - Boolean/Phrase	View Results (251)
S6	S2 OR S3 OR S4 OR S5	**Search modes** - Boolean/Phrase	View Results (49,610)
S5	TI (("child* sex*" OR porn*)) OR AB (("child* sex*" OR porn*))	**Search modes** - Boolean/Phrase	View Results (13,017)
S4	TI ((Cybersex or rape or "sexual harassment" or sexting or Stalk* or masturbat*)) OR AB ((Cybersex or rape or "sexual harassment" or sexting or Stalk* or masturbat*))	**Search modes** - Boolean/Phrase	View Results (11,621)
S3	TI ((Paraphili* or Voyeur* or Exhibitionis* or Frotteur* or Masochis* or Sadis* or Pedophil* or paedophil* or Fetish* or Psychosexual or hypersexual* or sociosexual*)) OR AB ((Paraphili* or Voyeur* or Exhibitionis* or Frotteur* or Masochis* or Sadis* or Pedophil* or paedophil* or Fetish* or Psychosexual or hypersexual* or sociosexual*))	**Search modes** - Boolean/Phrase	View Results (2,565)
S2	TI ((Sexual* or harmful* or offen* or HSB or Online* or devian*) n3 (Behav* or Featur* or Characteristic* or Description* or Profil* or Nature* or Typ* or Pattern* or Attribute* or psychopathology)) OR AB ((Sexual* or harmful* or offen* or HSB or Online* or deviant*) n3 (Behav* or Featur* or Characteristic* or Description* or Profil* or Nature* or Typ* or Pattern* or Attribute* or psychopathology))	**Search modes** - Boolean/Phrase	View Results (27,200)
S1	TI ((Autis* or Asperger* or "Pervasive Developmental Dis*" or ASC or ASD)) OR AB ((Autis* or Asperger* or "Pervasive Developmental Dis*" or ASC or ASD))	**Search modes** - Boolean/Phrase	View Results (31,199)

- No updates for subject headings and terms to remain the same

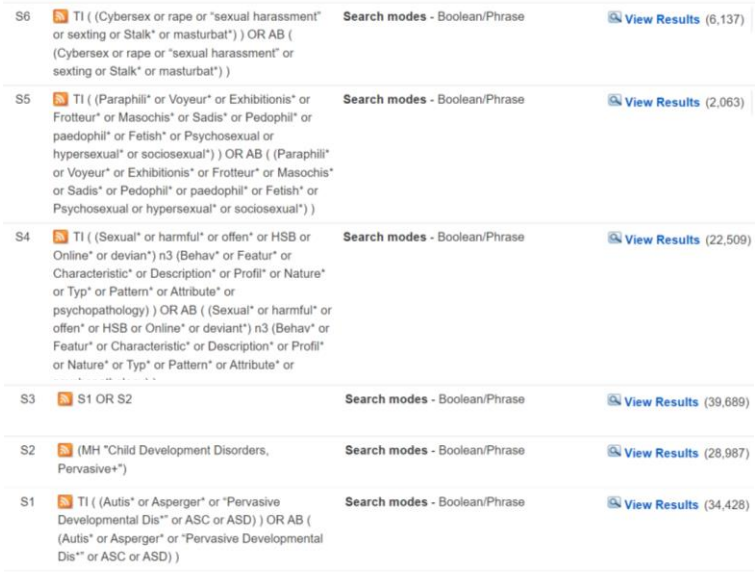
Search conducted 18/12/20

Search Conducted 26/01/22

CINAHL

Search ID#	Search Terms	Search Options	Actions
S21	S3 AND S20	**Search modes** - Boolean/Phrase	View Results (267)
S20	S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19	**Search modes** - Boolean/Phrase	View Results (46,421
S19	(MH "Sex")	**Search modes** - SmartText Searching	View Results (103)
S18	(MH "Sex")	**Search modes** - Boolean/Phrase	View Results (103)
S17	(MH "Sexting")	**Search modes** - Boolean/Phrase	View Results (74)
S16	(MH "Psychosexual Disorders")	**Search modes** - Boolean/Phrase	View Results (1,898)
S15	(MH "Paraphilias+")	**Search modes** - Boolean/Phrase	View Results (902)
S14	(MH "Sexual Behavior Analysis (Saba CCC)")	**Search modes** - Boolean/Phrase	View Results (2)
S13	(MH "Masturbation") OR (MH "Sexual Harassment")	**Search modes** - Boolean/Phrase	View Results (2,459)
S12	(MH "Sexual Addiction+")	**Search modes** - Boolean/Phrase	View Results (511)
S9	(MH "Sexual Abuse+") OR (MH "Stalking")	**Search modes** - Boolean/Phrase	View Results (17,903)
S8	(MH "Sex Offenders")	**Search modes** - Boolean/Phrase	View Results (1,842)
S7	TI (("child* sex*" OR porn*)) OR AB (("child* sex*" OR porn*))	**Search modes** - Boolean/Phrase	View Results (5,372)
S6	TI ((Cybersex or rape or "sexual harassment" or sexting or Stalk* or masturbat*)) OR AB ((Cybersex or rape or "sexual harassment" or sexting or Stalk* or masturbat*))	**Search modes** - Boolean/Phrase	View Results (5,573)
S5	TI ((Paraphili* or Voyeur* or Exhibitionis* or Frotteur* or Masochis* or Sadis* or Pedophil* or paedophil* or Fetish* or Psychosexual or hypersexual* or sociosexual*)) OR AB ((Paraphili* or Voyeur* or Exhibitionis* or Frotteur* or Masochis* or Sadis* or Pedophil* or paedophil* or Fetish* or Psychosexual or hypersexual* or sociosexual*))	**Search modes** - Boolean/Phrase	View Results (1,934)
S4	TI ((Sexual* or harmful* or offen* or HSB or Online* or devian*) n3 (Behav* or Featur* or Characteristic* or Description* or Profil* or Nature* or Typ* or Pattern* or Attribute* or psychopathology)) OR AB ((Sexual* or harmful* or offen* or HSB or Online* or deviant*) n3 (Behav* or Featur* or Characteristic* or Description* or Profil* or Nature* or Typ* or Pattern* or Attribute* or psychopathology))	**Search modes** - Boolean/Phrase	View Results (20,570)
S3	S1 OR S2	**Search modes** - Boolean/Phrase	View Results (35,835)
S2	(MH "Child Development Disorders, Pervasive+")	**Search modes** - Boolean/Phrase	View Results (26,931)
S1	TI ((Autis* or Asperger* or "Pervasive Developmental Dis*" or ASC or ASD)) OR AB ((Autis* or Asperger* or "Pervasive Developmental Dis*" or ASC or ASD))	**Search modes** - Boolean/Phrase	View Results (30,698)

Search ID#	Search Terms	Search Options	Actions
S20	S3 AND S19	**Search modes** - Boolean/Phrase	View Results (291)
S19	S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18	**Search modes** - Boolean/Phrase	View Results (48,875
S18	(MH "Sex")	**Search modes** - Boolean/Phrase	View Results (783)
S17	(MH "Sexting")	**Search modes** - Boolean/Phrase	View Results (104)
S16	(MH "Psychosexual Disorders")	**Search modes** - Boolean/Phrase	View Results (141)
S15	(MH "Paraphilias+")	**Search modes** - Boolean/Phrase	View Results (932)
S14	(MH "Sexual Behavior Analysis (Saba CCC)")	**Search modes** - Boolean/Phrase	View Results (2)
S13	(MH "Masturbation") OR (MH "Sexual Harassment")	**Search modes** - Boolean/Phrase	View Results (2,660)
S12	(MH "Sexual Addiction+")	**Search modes** - Boolean/Phrase	View Results (528)
S11	(MH "Stalking")	**Search modes** - Boolean/Phrase	View Results (449)
S10	(MH "Pornography")	**Search modes** - Boolean/Phrase	View Results (1,306)
S9	(MH "Sexual Abuse+")	**Search modes** - Boolean/Phrase	View Results (18,957)
S8	(MH "Sex Offenders")	**Search modes** - Boolean/Phrase	View Results (1,943)
S7	TI (("child* sex*" OR porn*)) OR AB (("child* sex*" OR porn*))	**Search modes** - Boolean/Phrase	View Results (5,904)



S6	TI ((Cybersex or rape or "sexual harassment" or sexting or Stalk* or masturbat*)) OR AB ((Cybersex or rape or "sexual harassment" or sexting or Stalk* or masturbat*))	**Search modes** - Boolean/Phrase	View Results (6,137)
S5	TI ((Paraphili* or Voyeur* or Exhibitionis* or Frotteur* or Masochis* or Sadis* or Pedophil* or paedophil* or Fetish* or Psychosexual or hypersexual* or sociosexual*)) OR AB ((Paraphili* or Voyeur* or Exhibitionis* or Frotteur* or Masochis* or Sadis* or Pedophil* or paedophil* or Fetish* or Psychosexual or hypersexual* or sociosexual*))	**Search modes** - Boolean/Phrase	View Results (2,063)
S4	TI ((Sexual* or harmful* or offen* or HSB or Online* or devian*) n3 (Behav* or Featur* or Characteristic* or Description* or Profil* or Nature* or Typ* or Pattern* or Attribute* or psychopathology)) OR AB ((Sexual* or harmful* or offen* or HSB or Online* or deviant*) n3 (Behav* or Featur* or Characteristic* or Description* or Profil* or Nature* or Typ* or Pattern* or Attribute* or	**Search modes** - Boolean/Phrase	View Results (22,509)
S3	S1 OR S2	**Search modes** - Boolean/Phrase	View Results (39,689)
S2	(MH "Child Development Disorders, Pervasive+")	**Search modes** - Boolean/Phrase	View Results (28,987)
S1	TI ((Autis* or Asperger* or "Pervasive Developmental Dis*" or ASC or ASD)) OR AB ((Autis* or Asperger* or "Pervasive Developmental Dis*" or ASC or ASD))	**Search modes** - Boolean/Phrase	View Results (34,428)

- No updates for subject headings and terms to remain the same

Search conducted 18/12/20

Search Conducted 26/01/22

WEB OF SCIENCE

Set	Results	Save History / Create Alert	Open Saved History
# 7	594	#6 AND #1 *Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI Timespan=All years*	
# 6	171,770	#5 OR #4 OR #3 OR #2 *Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI Timespan=All years*	
# 5	18,948	**TOPIC:** (("child* sex*" OR porn*)) *Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI Timespan=All years*	
# 4	61,233	**TOPIC:** ((Cybersex or rape or "sexual harassment" or sexting or Stalk* or masturbat*)) *Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI Timespan=All years*	
# 3	13,100	**TOPIC:** ((Paraphili* or Voyeur* or Exhibitionis* or Frotteur* or Masochis* or Sadis* or Pedophil* or paedophil* or Fetish* or Psychosexual or hypersexual* or sociosexual*)) *Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI Timespan=All years*	
# 2	87,222	TS=((Sexual* or harmful* or offen* or HSB or Online* or devian*) NEAR/3 (Behav* or Featur* or Characteristic* or Description* or Profil* or Nature* or Typ* or Pattern* or Attribute* or psychopathology)) *Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI Timespan=All years*	
# 1	103,022	**TOPIC:** ((Autis* or Asperger* or "Pervasive Developmental Dis*" or ASC or ASD)) *Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI Timespan=All years*	

#6 AND #1 ^

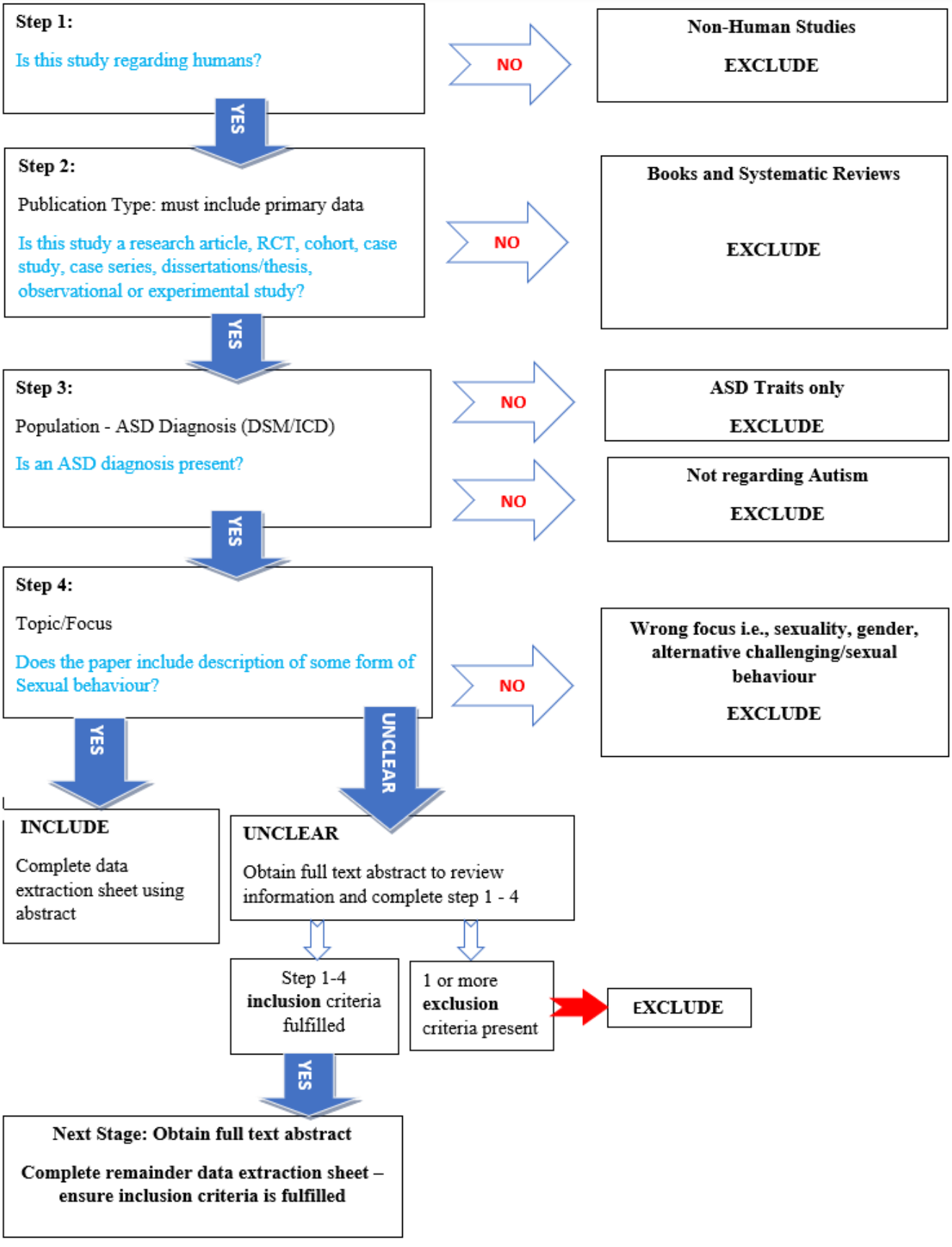
Web of Science Core Collection 668

Show editions

- **TOPIC: ((Autis* or Asperger* or "Pervasive Developmental Dis*" or ASC or ASD))** 115,524
- **TS=((Sexual* or harmful* or offen* or HSB or Online* or devian*) NEAR/3 (Behav* or Featur* or Characteristic* or Description* or Profil* or Nature* or Typ* or Pattern* or Attribute* or psychopathology))** 94,424
- **TOPIC: ((Paraphili* or Voyeur* or Exhibitionis* or Frotteur* or Masochis* or Sadis* or Pedophil* or paedophil* or Fetish* or Psychosexual or hypersexual* or sociosexual*))** 13,766
- **TOPIC: ((Cybersex or rape or "sexual harassment" or sexting or Stalk* or masturbat*))** 65,494
- **TOPIC: (("child* sex*" OR porn*))** 20,305
- **#5 OR #4 OR #3 OR #2** 184,436

- No subject headings used and terms to remain the same

Appendix 3: Screening Flowchart



Appendix 4: Example Data Extraction Sheet

To complete at the end:	
Decision (include, maybe or exclude)	**Reason**
Include	Description of SB is clear and ASD diagnosis is present i.e., kissing another

[START HERE]

Date form was completed:	16/03/21
Completed by:	ZA
Title: **Journal Name:** **Year of Publication:**	**Forensic rehabilitation in Asperger syndrome: a case report** Journal of Intellectual Disabilities and Offending Behaviour 2013
Authors:	**Kelbrick and Radley**
Timeframe of study:	Unspecified
Region/Country of Study:	England
Language if not English:	English
Publication Type:	Case Study – described by author as 'case report'
Peer Reviewed Document:	Yes

Inclusion Criteria (Tick yes if the below are identified and complete remainder of form)	**Yes**	**No**
ASD diagnosis Description of SB	**X** **X**	
Exclusion Criteria (Tick yes if ANY of the below are identified, DO NOT proceed with form)		
ASD Traits only Books / systematic reviews / Editorials Papers on sexuality not SB		**X** **X** **X**

Study Aims	**Presents a case study on individual with Asperger with comorbidities, presenting with physical violence and aggressive behaviours towards others.**
Methodology & Study Design (i.e., case series, observational)	Brief review the literature related to Asperger syndrome, offending in this population and co-morbidity. Author describes case of a young man with AS, sexual offending and process of forensic rehabilitation. Also offers insight from the patient's perspective
Analysis process / method	N/A
Outcome of results and summary of findings	• Co-morbid mental illness, when detected early, can be successfully managed. (p60) • Process of forensic rehabilitation includes a multidisciplinary approach. (p60) • Therapeutic interventions specifically aimed at addressing core features of autism, risk and offence-related factors are effective in promoting recovery amongst those with autism and offending behaviour (p60) • Illustrates several core features of autism and Asperger syndrome: impaired social skills and failure to understand social rules and boundaries, impaired communication skills with poor comprehension influenced by literal thinking, lack of self-awareness and understanding others' feelings, and finding change and unpredictability difficult to manage resulting in significant anxiety with a need for adherence to rigid routines and structure. Also presented with deficits in problem solving skills which was addressed as part of his therapeutic programme. (p63)

ASD individuals are the primary focus/sample			**ASD individuals are described by a secondary sample**	
No of P's	1		No of P's:	
Sampling Technique	N/A		Sampling Technique	

Specify ASD Diagnosis Diagnosed by	AS – diagnosed at the age of 11		Role/Relationship: carer/professionals	
			No of ASD individuals described	
Comorbidities:	Psychosis - acute psychotic symptoms of paranoid beliefs, auditory hallucinations (was this formally diagnosed?)		Specify ASD diagnosis	
Clinical setting:	Secure Psychiatric Hospital		Demographics of ASD individuals	
Gender & Age	26-year-old at time of case report		Clinical Setting of ASD individuals	
Other Demographics	His full-scale IQ is 88, low average, with a verbal IQ of 91 and performance IQ of 83 (p62)		Other relevant info	

Non-ASD Comparison Sample	
No of P's	
Sampling Technique	
Specify diagnosis / comorbidity	
Gender/Age	
Relevant Demographics	
Clinical setting/ Community/inpatient/forensic sample:	
Was group 'sufficiently' matched on characteristics? Y/N/Unclear Details	

Type & Characteristics of SB described in ASD sample Specify; action, frequency, victimology, setting, motive, context and other	
Atypical (Inappropriate within context)	**Harmful (problematic, abusive/violent)**
	• Four days later whilst on a shopping trip with the female residential home manager he attempted to kiss her, took hold of the car keys, hit her head against car door window and bit her forearm, also releasing the car hand brake at the same time a young child was walking in front of the car. After having returned to the residential home following this incident, he once again attempted to kiss her, blocking the door and brandishing a kitchen knife. She managed to escape to the garden with the patient in pursuit. He tried to restrain her, but she managed to escape unharmed. (page 61) • Placements broke down due to his challenging behaviour, including harassment of and sexually inappropriate behaviour towards female care workers (page 61)

	• Historically working in fast food chain - accused of sexual assault and harassment of a female colleague although never charged. (p61/62) • Involved in a serious incident involving a female member of staff. It occurred immediately after a social event on the ward where they were alone with the staff member. They held her arms and forced her to stand up, pinning her against the wall. They only let go when she shouted for them to stop (my note - unclear whether this was sexually motivated) (p62) • Placed in a children's home. During this time and during his stay at the children's home there were several reports of bullying others, assault and sexually inappropriate behaviour towards females. (SIB not specified) (p61) Data from above: Attempting to kiss a professional: 1 'Harassment' towards female care workers + colleague: (vague) sufficient to include as sexual? Decision (agreed by supervisor): don't include due to ambiguity. Other behaviours clearly reported as 'sexual' in report but author lacks clarity here. Sexual assault of female colleague: sexual assault unspecified 'SIB' reported: (undefined)

Type & Characteristics of SB described in Comparison sample Specify; action, frequency, victimology, setting, motive, context and other	
Atypical (Inappropriate within context)	**Harmful (problematic, abusive/violent)**
N/A	N/A

If any SBs considered as 'typical' are described within the study; provide details & context info as above

- Whilst in residential care, he only had two brief intimate relationships, one with a female staff member

Does the author evidence/ claim that the SB presented by those with ASD is associated to ASD deficits? **Add information & evidence.**	Experience of the rehabilitation process, therapeutic interventions and what has been helpful clients' phrases: "I learned about thinking of consequences before doing something silly". "The pros and cons about doing things, you know, what to do and what not to do". "Talk to people more when you have problems, or bored or lonely instead of causing mischief" → the individual presenting with a number of aggressive and challenging behaviours and not just SB. Therefore, it is unclear whether these statements are making reference specifically to the SBs… (page 62) **The authors description:** The patient we described illustrates several core features of autism and Asperger syndrome. These include impaired social skills and failure to understand social rules and boundaries… lack of self-awareness and understanding others feelings… (page 63) These very core features underlying the condition are likely to play a role when those with Asperger syndrome engage in offending behaviour. In particular, for our patient, a lack of understanding. (Page 63) In particular, for our patient, a lack of understanding and adherence to social and professional boundaries contributed to his offending behaviour. (Page 63)

Specific DEFINITIONS of SB described by authors which need to be acknowledged.	Non specified
Other relevant findings	Three further residential home placements broke down due to his challenging behaviour, including violence, harassment of and sexually inappropriate behaviour towards female care workers.
Additional Notes & Comments	

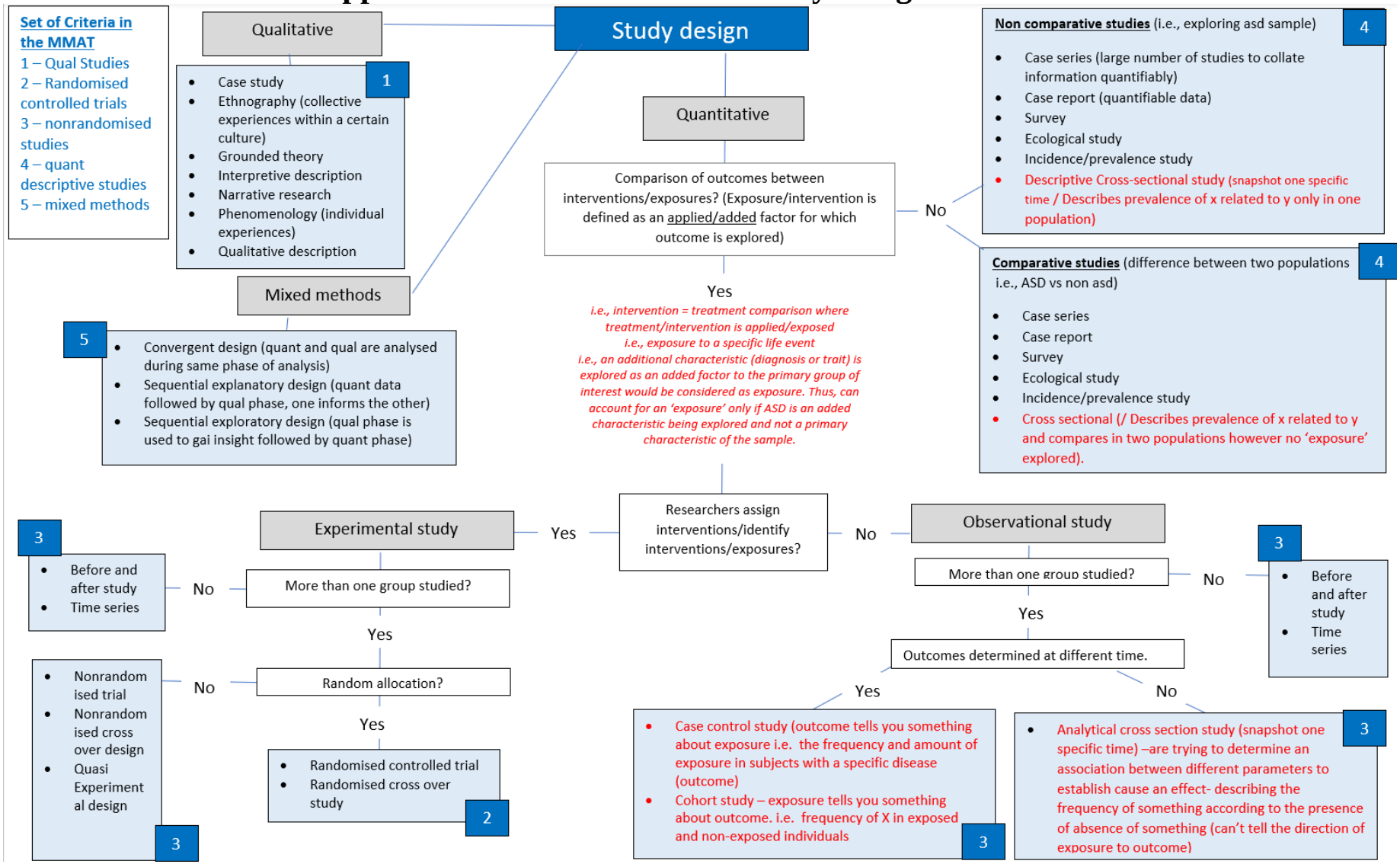
Quality: Strengths of Study	**Quality: Limitations of Study**
Clear description of case and case history described. Includes patient perspective as well as the reporting author, with some clear quotes provided in support.	Individual Case study – unique, cannot be generalised Lacking scientific rigour Researchers'/authors own subjectivity not acknowledged in discussion

		Tick the relevant areas below.
Selection Bias	Systematic differences between baseline characteristics of the groups that are compared.	**X** **Why was this case selected?**
Performance Bias	Systematic differences between groups in the care that is provided, or in exposure to factors other than the interventions of interest.	
Detection Bias	Systematic differences between groups in how outcomes are determined.	
Attrition Bias	Systematic differences between groups in withdrawals from a study.	**X Possibly**
Reporting Bias	Systematic differences between reported and unreported findings	**X Possibly**
Confirmation Bias	occurs when a researcher forms a hypothesis or belief and uses respondents' information to confirm that belief.	
Procedural Bias	Inadequate process/procedure	

Definitions: Use alongside Data Extraction Sheet

- Typical SBs are those described as socially and developmentally expected behaviours which do not interfere with the well-being of the individual or the well-being of others (Tolman & Mcclelland, 2011).
- Atypical SBs were those described as 'inappropriate' by Hackett (2010). These generally involve behaviours which occur in a context which is deemed to be unsuitable or where the frequency is considered challenging.
- HSBs were those described as 'abusive' or 'violent' by Hackett (2010). This combined all behaviours which were considered to cause distress or harm to self (i.e., sexual self-asphyxiation) or others (i.e., involving consent issues, coercion, aggression, or violence). This also largely included 'problematic' behaviours (Hackett, 2010) where there is a lack of reciprocity or consent or there is clearly distress to self or others involved.
- *Note for co-reviewers: If you are unable to place this in the above categories, please add in the box 'EXTRA' and please provide an explanation as to why this is based on your judgement.*

Appendix 5: Modified MMAT Study Design Flowchart



Appendix 6: Modified MMAT Tool & Guidance

Part 1: MMAT Guidance

How to use the MMAT

1. For each included study, choose the appropriate category of studies to appraise. Look at the description of the methods. If needed, use the study design flowchart provided.
2. Rate the criteria of the chosen category. For example, if the paper is a qualitative study, only rate the five criteria in the qualitative category. For each of the quality appraisal questions score, yes = sound, no = unsound or can't tell = unclear/ not reported. Alternatively, a 'not applicable' option is provided if the question does not apply to the study design. The 'can't tell' response category means that the paper do not report appropriate information to answer, 'Yes' or 'No', or that there is unclear information related to the criterion. Indicators are added for some criteria. The list is not exhaustive and not all indicators are necessary unless unspecified.

Additional notes for appraisers regarding specific indicators established:

- Checking if Cronbach alpha score is above 0.7 when looking at validity/reliability of a measure
- Establishing nonresponse bias using threshold of 70%/30%.
- Standard cut off value for acceptable complete data being 80%
- Mixed methods - at least 3 or more quality appraisal questions for each of the methods should be a yes for 5.5 to be a yes.

[Please move onto the next page for the modified MMAT tool]

Part 2: Modified MMAT Tool

Category of Study Design	Methodological quality criteria
Screening questions (for all types)	S1. Are there clear research questions?
	S2. Do the collected data allow to address the research questions?
1. Qualitative	1.1. Is the qualitative approach appropriate to answer the research question? **For the purpose of a case study – this is unlikely to be present. So, identify as N/A.**
	1.2. Are the qualitative data collection methods adequate to address the research question? This criterion is related to data collection method, including data sources (e.g., archives, documents), used to address the research question. To judge this criterion, consider whether the method of data collection (e.g., in depth interviews and/or group interviews, and/or observations) and the form of the data (e.g., tape recording, video material, diary, photo, and/or field notes) are adequate. **For the purpose of a case description studies, check; why was data collected from this case? Has the author identified how or why the case was selected in comparison to other cases? Why was this particular case selected, is there something unique or was it for a particular legal process, not sufficient just to say because it is an example of x behavior, that would label as can't tell). Is there consistency in the level/type of information provided for each of the cases?**
	1.3. Are the findings adequately derived from the data? This criterion is related to the data analysis used – is this clearly presented and adequate for the qualitative method used? **For a case study, there will not be a formal analysis process. However, the reviewer must determine whether the results described are consistent with the data/case description provided.**
	1.4. Is the interpretation of results sufficiently substantiated by data? The interpretation of results should be supported by the data collected. For example, the quotes provided to justify the themesshould be adequate. **For a case study, is the interpretation sound based on the data provided? Has the author gone beyond the findings of the data when making interpretations or generalizations for example?** **If 1.3 is a no, by default 1.4 would also be a no. If the findings are not driven by data, then interpretation will not be in line with data either.**
	1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation? **For the purpose of a case study, is there coherence between the source of information, the descriptive data and the interpretation and conclusions derived? Are the conclusions warranted based on data and interpretation?**
2. Quantitative	2.1. Is randomization appropriately performed?

randomized controlled trials	In a randomized controlled trial, the allocation of a participant (or a data collection unit, e.g., a school) into the intervention or control group is based solely on chance. Researchers should describe how the randomization schedule was generated. A simple statement such as 'we randomly allocated' or 'using a randomized design' is insufficient to judge if randomization was appropriately performed. Also, assignment that is predictable such as using odd and even record numbers or dates is not appropriate. It is usually achieved by referring to a published list of random numbers, or to a list of random assignments generated by a computer. Also, restricted allocation can be performed such as blocked randomization (to ensure allocation ratios to the intervention groups), stratified randomization (randomization performed separately within strata), or minimization (to make small groups closely similar with respect to several characteristics). Another important characteristic to judge if randomization was appropriately performed is allocation concealment that protects assignment sequence until allocation. Researchers and participants should be unaware of the assignment sequence up to the point of allocation. **The above two criteria must be met to meet yes criteria**
	2.2. Are the groups comparable at baseline? Baseline imbalance between groups suggests that there are problems with the randomization. Indicators from baseline imbalance include: "(1) unusually large differences between intervention group sizes; (2) a substantial excess in statistically significant differences in baseline characteristics than would be expected by chance alone; (3) imbalance in key prognostic factors (or baseline measures of outcome variables) that are unlikely to be due to chance; (4) excessive similarity in baseline characteristics that is not compatible with chance; (5) surprising absence of one or more key characteristics that would be expected to be reported
	2.3. Are there complete outcome data? Almost all the participants contributed to almost all measures. Acceptable complete outcome data = 80%, dropout must be below 20%. **This can be calculated based on figures presented however if it is unclear then rate as can't tell**
	2.4. Are outcome assessors blinded to the intervention provided?
	2.5 Did the participants adhere to the assigned intervention? To judge this criterion, consider the proportion of participants who continued with their assigned intervention throughout follow-up. "Lack of adherence includes imperfectcompliance, cessation of intervention, crossovers to the comparator intervention and switches to another active intervention." (Higgins et al., 2016, p. 25).
3. Quantitative non-randomized	3.1. Are the participants representative of the target population? Indicators of representativeness include: clear description of the target population and of the sample (inclusion and exclusion criteria), reasonswhy certain eligible individuals chose not to participate, and **sufficient** attempts to achieve a sample of participants that represents the target population. **Think about the recruitment strategy, is it likely that the sample they secured was representative or did they explain sufficiently why this may not the case/ or may not have been possible. Was their explanation considered reasonable?** **All of the above should be present and applied**
	3.2. Are measurements appropriate regarding both the outcome and intervention (**or exposure where relevant**)? Indicators of appropriate measurements include: the variables are clearly defined and accurately measured If a measurement tool was used, does the measurement reflect what it's supposed to measure? Are the measurements justified – why were these used and is it clear why these were deemed appropriate for answering the research question? Is the measurement tool validated and reliability tested and applied using a gold standard?

	All of the above should be present and applied for all tools used **If the authors use a previously validated measurement tool (e.g. they cite a publication verifying validity and reliability / use a 'gold standard' approach) then as long as this is clearly identified it is sufficient to make the judgement - but if the authors develop or use a novel tool they need to be clear about how they assessed whether it was reliable / valid.**
	3.3. Are there complete outcome data? Almost all the participants contributed to almost all measures. Acceptable complete outcome data = 80%, dropout must be below 20%. **This can be calculated based on figures presented however if it is unclear then rate as can't tell**
	3.4. Are the confounders accounted for in the design and analysis? Confounders are factors that predict both the outcome of interest and the intervention received/exposure at baseline. They can distort the interpretation of findings and need to be considered in the design and analysis of a non-randomized study. Confounding bias is low if there is no confounding expected, or appropriate methods to control for confounders are used (such as stratification, regression, matching, standardization, and inverse probability weighting).
	3.5. During the study period, is the intervention administered (or exposure occurred) as intended? **Were other exposures that could affect the results adequately managed or considered?** For intervention studies, consider whether the participants were treated in a way that is consistent with the planned intervention. Since the intervention is assigned by researchers, consider whether there was a presence of contamination (e.g., the control group may be indirectly exposed to the intervention) or whether unplanned co-interventions were present in one group (Sterne et al., 2016). For observational studies, consider whether changes occurred in the exposure status among the participants. If yes, check if these changes arelikely to influence the outcome of interest, were adjusted for, or whether unplanned co-exposures were present in one group (Morgan et al., 2017).
4. Quantitative descriptive	4.1. Is the sampling strategy relevant to address the research question? Sampling strategy refers to the way the sample was selected. There are two main categories of sampling strategies: probability sampling (involve random selection) and non-probability sampling. Depending on the research question, probability sampling might be preferable. Non-probability sampling does not provide equal chance of being selected. **To judge this criterion, consider whether the source of sample is relevant to the target population; a clear justification of the sample strategy used is provided; or the sampling procedure is adequate.** **All of the above should be present and applied** **For case reports, consider why has the author chosen to present data from his case? Why did the author select this case? There may not be 'criteria' but was the purpose of this case selection and what was significant about this case for it to be presented. Rationale?**
	4.2. Is the sample representative of the target population? There should be a match between respondents and the target population. Indicators of representativeness include: clear description of the targetpopulation and of the sample (such as respective sizes and inclusion and exclusion criteria),

reasons why certain eligible individuals chose not to participate (**Is it acknowledged that certain groups may not have participated and is this clearly identified or is this not acknowledged at all. Is there explanation of this sound or unsound?**
and any attempts to achieve a sample of participants that represents the target population.

All of the above should be present and applied

For example, if a certain gender is not part of the sample, ask whether their characteristic is a targeted characteristic of the population, as it may not be applicable. If that characteristic has unlikely relevance or influence on the results, then it does not need to be considered in sample representations however where this could influence the results, has this been acknowledged.

For case repot this would be N/A as one individual would not account as representative of the target population

4.3. Are the measurements appropriate?

Indicators of appropriate measurements include: the variables are clearly defined and accurately measured
If a measurement tool was used, does the measurement reflect what it's supposed to measure? or questionnaires are pre-tested prior to data collection.
Are the measurements justified – why were these used and is it clear why these were deemed appropriate for answering the research question?
Is the measurement tool validated and reliability tested and applied using a gold standard?

All of the above should be present and applied

If the authors use a previously validated measurement tool (e.g., they cite a publication verifying validity and reliability / use a 'gold standard' approach) then as long as this is clearly identified it is sufficient to make the judgement - but if the authors develop or use a novel tool they need to be clear about how they assessed whether it was reliable / valid.

Alpha coefficient 0.70 and above is considered acceptable and 0.80 is high. So, this would demonstrate the tool as valid/reliable. If the author choses tool with less reliability, is there clear and sound justification as to why this was? Only then would it be 'appropriate'. Have they acknowledged this within the limitations of their study to offer transparency?

4.4. Is the risk of nonresponse bias low?

Nonresponse bias consists of "an error of no observation reflecting an unsuccessful attempt to obtain the desired information from an eligibleunit." (Federal Committee on Statistical Methodology, 2001, p. 6). To judge this criterion, consider whether the respondents and non- respondents are different on the variable of interest. This information might not always be reported in a paper. Some indicators of low nonresponse bias can be considered such as a low nonresponse rate, reasons for nonresponse (e.g., noncontacts vs. refusals), and statistical compensation for nonresponse (e.g., imputation).

This is about who didn't take part in the study - is it possible that those who opt not to take part are systematically different in some way from those who did opt to take part. On variables of interest e.g., might people with less severe ASD not have taken part in a study for some reason - i.e. they didn't feel it was relevant to them. Therefore, your findings wouldn't be representative of all people on the AS - and findings would be biased towards those with more severe AS (or males, younger people etc.)

For the purpose of this appraisal, a non-response rate of below 30%, so 70% or above response rate is sufficient.

4.5. Is the statistical analysis appropriate to answer the research question?

	The statistical analyses used should be clearly stated and justified in order to judge if they are appropriate for the design and research question,and if any problems with data analysis limited the interpretation of the results. **Is it justified and is it appropriate?** **At minimum, justification for analysis should be clearly stated to account as yes but also should be in line with what is required. If you 'can't tell' whether any problems with data analysis limited the interpretation then assume there were none, unless clearly stated, which would result in a 'no'.**
5. Mixed methods	5.1. Is there an adequate rationale for using a mixed methods design to address the research question? The reasons for conducting a mixed methods study should be clearly explained. Several reasons can be invoked such as to enhance or build upon qualitative findings with quantitative results and vice versa; to provide a comprehensive and complete understanding a phenomenon or to develop and test instruments (Bryman, 2006).
	5.2. Are the different components of the study effectively integrated to answer the research question? Integration is a core component of mixed methods research and is defined as the "explicit interrelating of the quantitative and qualitative component in a mixed methods study" (Plano Clark and Ivankova, 2015, p. 40). Look for information on how qualitative and quantitative phases, results, and data were integrated (Pluye et al., 2018). How data gathered by both research methods was brought together to form a complete picture (e.g., joint displays) when integration occurred (e.g., during the data collection-analysis or/and during the interpretation of qualitative and quantitative results). **Inference about the above two must both be possible for a yes – some indication of how the types of data came together.**
	5.3. Are the outputs of the integration of qualitative and quantitative components adequately interpreted? This criterion is related to meta-inference, which is defined as the overall interpretations derived from integrating qualitative and quantitative findings (Teddlie & Tashakkori, 2009). Meta-inference occurs during the interpretation of the findings from the integration of the qualitative and quantitative components and shows the added value of conducting a mixed methods study rather than having two separate studies. **What more can be inferred by fitting together the types of analysis?**
	5.4. Are divergences and inconsistencies between quantitative and qualitative results adequately addressed? When integrating the findings from the qualitative and quantitative components, divergences and inconsistencies (also called conflicts, contradictions, discordances, discrepancies, and dissonances) can be found. It is not sufficient to only report the divergences; they need to be explained. Different strategies to address the divergences have been suggested such as reconciliation,initiation, bracketing and exclusion (Pluye et al., 2009b). **If overall synthesis qual findings contradict your quant findings in some way(s). The idea is to really explore why there might be a divergence - and provide sensible explanations as to why this might be / what this tells us. Are the divergences explained satisfactorily?**
	5.5. Do the different components of the study adhere to the quality criteria of each tradition of the methods involved? The quality of both components should be high for the mixed methods study to be considered of good quality. The premise is that the overall quality of a mixed methods study cannot exceed the quality of its weakest component. For example, if the quantitative component is rated high quality and the qualitative component nt is rated low quality, the overall rating for this criterion will be of low quality **and therefore result in a 'no'.** **MMAT does not identify what constitutes as low or high quality – so if presence of 3 or more of the individual quality areas is a yes then deem it high quality.**

Appendix 7: Included studies reference details

Ref ID	Author	Year	Title	Country	Journal	Peer Reviewed	Publication Type
1001	Demb & Pincus	1993	Pervasive Development Disorders: Hidden Disability in Adolescence.	America	Journal of Adolescent Health	Yes	Journal Article (experimental or case)
1002	Schottle et al	2017	Sexuality in Autism: Hypersexual and Paraphilic Behaviour in Women and Men with High-Functioning Autism Spectrum Disorder	Germany	Dialogues in Clinical Neuroscience	Yes	Journal Article (experimental or case)
1003	Shier	2015	Sexual Behaviour in Children, Adolescents and Young Adults with ASD	America	Unpublished	No	Thesis / Dissertation
1004	Stokes & Kaur	2005	High-Functioning Autism and Sexuality: A Parental Perspective	Australia	Autism	Yes	Journal Article (experimental or case)
1005	Silva et al	2003	Paraphilic Psychopathology in a Case of Autism Spectrum Disorder	America	American Journal of Forensic Psychiatry	Yes	Journal Article (experimental or case)
1006	White et al	2017	Autism, Spectrum Disorder and Violence: Threat Assessment Issues	America	Journal of Threat Assessment and Management	Yes	Journal Article (experimental or case)
1007	Albertini et al	2006	Compulsive Masturbation in Infantile Autism Treated Mirtazapine	Italy	Paediatric Neurology	Yes	Journal Article (experimental or case)
1008	Allely	2020	Contributory Role of Autism Spectrum Disorder Symptomology to the Viewing of Indecent Images of Children (IIOC) and the Experience of the Criminal Justice System	England	Journal of Intellectual Disabilities and Offending Behaviour	Yes	Journal Article (experimental or case)
1009	Allely et al	2019	A Legal Analysis of Australian Criminal Cases Involving Defendants with Autism Spectrum Disorder Charged with Online Sexual Offending	Australia	International Journal of Law and Psychiatry	Yes	Journal Article (experimental or case)
1010	Allen et al	2008	Offending Behaviour in Adults with Asperger Syndrome	UK	Journal of Autism and Developmental Disorders	Yes	Journal Article (experimental or case)
1011	Anckarsäter et al	2008	Autism Spectrum Disorders in Institutionalized Subjects	Sweden	Nordic Journal of Psychiatry	Yes	Journal Article (experimental or case)
1012	Aral et al	2018	Distinguishing Circumscribed Behaviour in an Adolescent with Asperger Syndrome from a	Turkey	Journal of Psychiatry and	Yes	Journal Article (experimental or case)

			Paedophilic Act: A Case Report		Neurological Science		
1013	Ayaydin & Ulgar	2018	Diagnosis and Treatment of Early Childhood Masturbation in a Case of Autism Spectrum Disorder: A Case Report	Turkey	Erciyes Medical Journal	Yes	Journal Article (experimental or case)
1014	Ballan	2012	Parental Perspectives of Communication About Sexuality in Families of Children with Autism Spectrum Disorders	America	Journal of Autism and Developmental Disorders	Yes	Journal Article (experimental or case)
1015	Van Bourgondien et al	1997	Sexual Behaviour in Adults with Autism	America	Journal of Autism and Developmental Disorders	Yes	Journal Article (experimental or case)
1016	Cambridge	2012	A Rights Approach to Supporting the Sexual Fetish of a Man with Learning Disability: Method, Process and Applied Learning	England	British Journal of Learning Disabilities	Yes	Journal Article (experimental or case)
1017	Celikkol & Bilgic	2018	Excessive Masturbation Successfully Treated with Fluoxetine in an Adolescent with Autism Spectrum Disorder and Coexisting Depression	Turkey	Journal of Child and Adolescent Psychopharmacology	Yes	Other
1018	Cervantes & Matson	2015	Comorbid Symptomology in Adults with Autism Spectrum Disorder and Intellectual Disability	America	Journal of Autism and Developmental Disorders	Yes	Journal Article (experimental or case)
1019	Chen et al	2016	Pharmacological Management of ISB in Youth with Autism Spectrum Disorder: A Case Study and Review of the Literature	Switzerland	Neuropsychiatry de L'enfance et de Adolescence	Yes	Journal Article (experimental or case)
1020	Clionsky & Nzi	2019	Addressing Sexual Acting Out Behaviours with Adolescents on the Autism Spectrum	America	Adolescent Psychiatry	Yes	Journal Article (experimental or case)
1021	Coshway et al	2016	Medical Therapy for ISB in a Teen with ASD	America	Paediatrics	Yes	Journal Article (experimental or case)
1022	Coskun & Mukaddes	2008	Mirtazapine Treatment in a Subject with Autistic Disorder and Fetishism	Turkey	Journal of Child and Adolescent Psychopharmacology	Yes	Journal Article (experimental or case)
1023	Coskun et al	2009	Effectiveness of Mirtazapine in the Treatment of ISB in Individuals with Autistic Disorder	Turkey	Journal of Child and Adolescent Psychopharmacology	Yes	Journal Article (experimental or case)
1024	Creaby-Attwood & Allely	2017	A Psycho-Legal Perspective on Sexual Offending in Individuals with Autism Spectrum Disorder	England	Journal of Law and Psychiatry	Yes	Journal Article (experimental or case)

1025	De Tilio	2017	Autistic Spectrum Disorders and Sexuality: A Case Report from the Perspective of the Caregiver	Brazil	Psychology, Knowledge and Society	Unclear	Journal Article (experimental or case)
1026	Deepmala & Agrawal	2014	Use of Propranolol for Hypersexual Behaviour in an Adolescent Autism	America	Annals of Pharmacotherapy	Yes	Journal Article (experimental or case)
1027	Dozier et al	2011	Assessment and Treatment of Foot-Show Fetish Displayed by a Man with Autism	America	Journal of Applied Behaviour Analysis	Yes	Journal Article (experimental or case)
1028	Eyuboglu et al	2018	Case Report: GNRH Treatment for Hypersexual Behaviour in a Child with Autism Spectrum Disorder	Turkey	Psychiatry and Clinical Psychopharmacology	Yes	Journal Article (experimental or case)
1029	Fernandes et al	2016	Aspects of Sexuality in Adolescents and Adults Diagnosed with Autism Spectrum Disorder in Childhood	Sweden	Journal of Autism and Developmental Disorders	Yes	Journal Article (experimental or case)
1030	Fisher et al	2000	Facilitating Tolerance of Delayed Reinforcement During Functional Communication Training	America	Behaviour Modification	Yes	Journal Article (experimental or case)
1031	Gkogkos et al	2021	Sexual Education: A Case Study of an Adolescent with a Diagnosis of PDD Not Otherwise Specified and Intellectual Disability	Greece	Sexuality and Disability	Yes	Journal Article (experimental or case)
1032	Gougeon	2013	Interest, Understanding, and Behaviour: Conceptualizations of Sexuality Education for Individuals with an Autism Spectrum Disorder using a Socially Inclusive Lens	Canada	Unpublished	N/A	Thesis / Dissertation
1033	Griffin-Shelley	2010	An as Adolescent Sex Addict, Sex Offender: A Case Study	America	Sexual Addiction and Compulsivity	Yes	Journal Article (experimental or case)
1034	Hannah & Stagg	2016	Experiences of Sex Education and Sexual Awareness in Young Adults with ASD	England	Journal of Autism and Developmental Disorders	Yes	Journal Article (experimental or case)
1035	Hansen	2018	Sex Education for All? Exploring Parental Views on the Sex Education needs of Children with Autism	America	Unpublished	No	Thesis / Dissertation
1036	Hartmann et al	2019	Sexuality in the Autism Spectrum Study (SASS): Reports from Young Adults and Parents	America	Journal of Autism and Developmental Disorders	Yes	Journal Article (experimental or case)
1037	Hellemans et al	2007	Sexual Behavior in High-Functioning Male Adolescents and Young Adults with Autism Spectrum Disorder	Belgium	Journal of Autism and Developmental Disorders	Yes	Journal Article (experimental or case)
1038	Hellemans et al	2010	Sexual Behavior in Male Adolescents and Young Adults with Autism Spectrum Disorder and Borderline/Mild Mental Retardation	Belgium	Sexual Disabilities	Yes	Journal Article (experimental or case)

1039	Herguner et al	2012	Combination of Risperidone and Paroxetine for ISB's in an Adolescent with Autism and Mental Retardation	Turkey	Archives of Neuropsychiatry	Yes	Journal Article (experimental or case)
1040	Hodges et al	2020	Assessment and Treatment of a Foot Fetish Exhibited by an Adolescent with Autism	America	Behaviour Analysis in Practice	Yes	Journal Article (experimental or case)
1041	Holmes et al	2020	Sexual and Reproductive Health Service Utilization and Sexuality for Teens on the Autism Spectrum	America	Journal of Developmental and Behavioural Paediatrics	Yes	Journal Article (experimental or case)
1042	Huwaidi & Daghustani	2013	Sexual Behaviour in Male Adolescents with Autism and its Relation to Social Sexual Skills in the Kingdom of Saudi Arabia	Bahrain	International Journal of Special Education	Yes	Journal Article (experimental or case)
1043	Kelbrick & Radley	2013	Forensic Rehabilitation in Asperger Syndrome: A Case Report	England	Journal of Intellectual Disabilities and Offending Behaviour	Yes	Journal Article (experimental or case)
1044	Kohn et al	1998	Aggression and Sexual Offense in AS Syndrome	Israel	Israel Journal of Psychiatry and Related Sciences	Yes	Journal Article (experimental or case)
1045	Chan & Saluja	2011	Sexual Offending and Improvement in Autistic Characteristics After Acquired Brain Injury: A Case Report	Singapore	Australian and New Zealand Journal of Psychiatry	Yes	Other
1046	Mann	2021	A Retrospective Chart Analysis of Problematic SB in Individuals Autism Spectrum Disorder	America	Unpublished	N/A	Thesis / Dissertation
1047	Ruble & Dalrymple	1993	Social/Sexual Awareness of Persons with Autism: A Parental Perspective	America	Archives of Sexual Behaviour	Yes	Journal Article (experimental or case)
1048	Fourie et al	2017	Clinical and Demographic Factors Associated with Sexual Behaviour in Children with ASD	South Africa	South African Journal of Psychiatry	yes	Journal Article (experimental or case)
1049	Stokes et al	2007	Stalking, and Social and Romantic Functioning Among Adolescents and Adults with Autism Spectrum Disorder	Australia	Journal of Autism and Developmental Disorders	Yes	Journal Article (experimental or case)
1050	Nguyen & Murphy	2001	Mirtazapine for Excessive Masturbation in an Adolescent with Autism	America	Journal of the American Academy of Child and Adolescent Psychiatry	Yes	Other
1051	Melvin et al	2019	"I Feel That If I Didn't Come to It Anymore, Maybe	England	Journal of Applied	Yes	Journal Article

			I Would Go Back to My Old Ways and I Don't Want That to Happen" Adapted Sex Offender Treatment Programmes: Views of Service Users with Autism Spectrum Disorders		Research in Intellectual Disability		(experimental or case)
1052	Miyahara et al	2008	Mothers' Perceptions of the Sexual Development and Behaviour of their Children and Persons with Autism in General	Japan	Acta Medica Nagasakiensia	Yes	Journal Article (experimental or case)
1053	Chandrasa & Champika	2017	Zoophilia in an Adolescent with High-Functioning Autism from Sri Lanka	Sri Lanka	Australasian Psychiatry	Yes	Journal Article (experimental or case)
1054	Mogavero & Hsu	2019	Dating and Courtship Behaviours Among those with Autism Spectrum Disorder	America	Sexuality and Disability	Yes	Journal Article (experimental or case)
1055	Muller	2011	Are Sadomasochism and Hypersexuality in Autism Linked to Amygdalohippocampal Lesion?	Germany	Journal of Sexual Medicine	Yes	Journal Article (experimental or case)
1056	Murphy et al	2007	Cognitive-Behavioural Treatment for Men with Intellectual Disabilities and Sexually Abusive Behaviour: A Pilot Study	England	Journal of Intellectual Disability Research	Yes	Journal Article (experimental or case)
1057	Palermo & Bogaerts	2017	Violent Fantasies in Young Men with Autism Spectrum Disorders: Dangerous or Miserable Misfits? Duty To Protect Whom?	Italy	International Journal of Offender Therapy & Comparative Criminology	Yes	Journal Article (experimental or case)
1058	Payne et al	2020	Self-Reported Motivations for Offending by Autistic Sexual Offenders	England	Autism	Yes	Journal Article (experimental or case)
1059	Peixoto et al	2017	High Functioning Autism Disorder: Marital Relationships and Sexual Offending	Brazil	Journal Brasileiro de Psiquiatria	Yes	Journal Article (experimental or case)
1060	Prasher & Clarke	1996	Case Report: Challenging Behaviour in a Young Adult with Down's Syndrome and Autism	England	British Journal of Learning Disabilities	Yes	Journal Article (experimental or case)
1061	Pritchard et al	2016	Multi-Component Behavioural Intervention Reduces Harmful Sexual Behaviour in a 17-Year-Old Male with Autism Spectrum Disorder: A Case Study	England	Journal of Sexual Aggression	Yes	Journal Article (experimental or case)
1062	Pryde & Jahoda	2018	A Qualitative Study of Mothers' Experiences of Supporting the Sexual Development of their Sons with Autism and an Accompanying Intellectual Disability	England	International Journal of Developmental Disabilities	Yes	Journal Article (experimental or case)
1063	Ray et al	2004	Challenges to Treating Adolescents with Asperger's Syndrome who are Sexually Abusive	America	Sexual Addiction and Compulsivity	Yes	Journal Article (experimental or case)
1064	Realmuto & Ruble	1999	Sexual Behaviours in Autism: Problems of Definition and Management	America	Journal of Autism and Developmental	Yes	Journal Article (experimental or case)

					Disorders		
1065	Moskowitz	2009	An Autistic Boy	America	American Journal of Homeopathic Medicine	Yes	Journal Article (experimental or case)
1066	Shahani	2012	Use of Lithium for Sexual Obsessions in Asperger's Disorder	America	Journal of Neuropsychiatry Clinical Neuroscience	Yes	Other
1067	Shenk & Brown	2007	Cognitive-Behavioural Treatment of an Adolescent Sexual Offender with an Intellectual Disability: A Novel Application of Exposure and Response Prevention	America	Clinical Case Studies	Yes	Journal Article (experimental or case)
1068	Singh & Coffey	2012	Sexual Obsessions, Compulsions, Suicidality and Homicidality in an Adolescent Diagnosed with Bipolar Disorder Not Otherwise Specified, Obsessive-Compulsive Disorder, PDD Not Otherwise Specified, and Mild Mental Retardation	America	Advanced Paediatric Psychopharmacology	Yes	Journal Article (experimental or case)
1069	Teti et al	2019	A Qualitative Comparison of Caregiver and Youth with Autism Perceptions of Sexuality and Relationship Experiences	America	Journal of Developmental & Behavioural Paediatrics	Yes	Journal Article (experimental or case)
1070	Thompson & Beail	2002	The Treatment of Auto-Erotic Asphyxiation in a Man with Severe Intellectual Disabilities: The Effectiveness of a Behavioural and Educational Programme	England	Journal of Applied Research in Intellectual Disability	Yes	Journal Article (experimental or case)
1071	Tissot	2009	Establishing a Sexual Identity: Case Studies of Learners with Autism and Learning Difficulties	England	Autism	Yes	Journal Article (experimental or case)
1072	Van Son-Schoones & Van Bilsen	1995	Sexuality and Autism: A Pilot Study of Parents, Health Care Workers and Autistic Persons	Netherlands	International Journal of Adolescent Medicine and Health	Yes	Journal Article (experimental or case)
1073	Katz & Zemishlany	2006	Criminal Responsibility in Asperger's Syndrome	Israel	Israel Journal of Psychiatry and Related Sciences	Yes	Journal Article (experimental or case)
1074	Cividini-Motta et al	2020	Reducing Public Masturbation with Individuals with ASD: An Assessment of Response Interruption Procedures	America	Behavior Modification	Yes	Journal Article (experimental or case)
1075	Jones & Okere	2008	Treatment Of Hypersexual Behaviour with Oral	America	Southern Medical	Yes	Journal Article

			Oestrogen in an Autistic Male		Journal		(experimental or case)
1076	Milton et al	2002	Case History of Co-Morbid Asperger's Syndrome and Paraphilic Behaviour	England	Medicine, Science and the Law	Yes	Journal Article (experimental or case)
1077	Murrie et al	2002	Asperger's Syndrome in Forensic Settings	America	International Journal of Forensic Mental Health	Yes	Journal Article (experimental or case)
1078	Ormerod	2006	Sentencing: Life Imprisonment	England	Criminal Law Review Journal	Yes	Other
1079	Burns et al	2021	Excited Catatonia in Autism Spectrum Disorder: A Case Series	America	Frontiers in Psychiatry	Yes	Journal Article (experimental or case)
1080	Ferahkaya & Bilgic	2021	Excessive Masturbation Successfully Treated with Methylphenidate in a 6-Year-Old Child with Autism Spectrum Disorder Accompanied by Attention Deficit Hyperactivity Disorder	Turkey	Clinical Neuropharmacology	Yes	Journal Article (experimental or case)
1081	Sablaban & Sivananthan	2020	Treating Autism-Associated Sexual Compulsions with Naltrexone	America	Journal of Child and Adolescent Psychopharmacology	Yes	Other
1082	Larson et al	2021	Addressing Puberty Challenges for Adolescents with Autism Spectrum Disorder: A Survey of Occupational Therapy Practice Trends	America	The American Journal of Occupational Therapy	Yes	Journal Article (experimental or case)
1083	Higham et al	2021	Clinical and Criminal Profile of Internet Offenders with ASD	UK	Journal of Intellectual Disabilities and Offending Behaviour	Yes	Journal Article (experimental or case)
1084	Holloway	2021	High-Functioning Autism: Changes over Fourteen Years of Psychoanalytic Psychotherapy: Part Two	Canada	Journal of Child Psychotherapy	Yes	Journal Article (experimental or case)
1085	Subhi	2021	A Local Authority V JB [2020] EWCA Civ 735; [2019] EWCOP 39	UK	Feminist Legal Studies	Yes	Journal Article (experimental or case)

Appendix 8: Data from Comparison Studies

	Ref ID 1002		**Ref ID 1004**		**Ref ID 1018**		**Ref ID 1038**		**Ref ID 1049**		**Ref ID 1054**	
	ASD N=96	Non-ASD (HCs) N=96	ASD N=23	Non-ASD (HCs) N=50	ASD + LD N=149	LD N=158	ASD + MR N=35	MR N=18	ASD N=25	Non-ASD (TCs) N=38	ASD N=46	Non-ASD N=88
Masturbates	Significant difference in males in masturbation frequency overall P<0.01. Non-significant difference found in females						8	9				
Masturbation: multiple times a day	9	0										
Masturbation: 2 to 6 times a week	53	31										
Masturbation: once a week	4	8										
Masturbation: 2 to 3 times a month	11	14										
Masturbation: Once a month	0	7										
Masturbation: Less than once a month	9	14										
Masturbation in public			ASD group described to display more ISB for the associated behaviour, but no numerical stats provided		A profile analysis performed and ‘sexual disorder symptoms’ reported: ASD group 0.14 mean, 0.03 SD non-ASD 0.07 mean, 0.03 SD No significant difference							
Masturbation without privacy							2	4				
Masturbates using							2	0				

sexual object											
Compulsive Masturbation						1	0				
Intercourse	Significant difference in frequency of sexual intercourse (<0.01) in males Significant difference in frequency of sexual intercourse in females (<0.05)					2	7				
Intercourse: 4-6 times per week	4	44									
Intercourse: Once a week	6	20									
Intercourse: 2-3 times a month	8	14									
Intercourse: Less than once a month	31	2									
Exposure to non-consenting person	2	2									
Arousing self through rubbing on non-consenting person	9	0									
Touching others inappropriately			ASD group described to display more ISB for in all three areas, but no numerical stats or figures provided		A profile analysis performed and 'sexual disorder symptoms' reported: ASD group 0.15 mean, 0.03 SD non-ASD group 0.06 mean, 0.03 SD, No significant diff	4	3	Relative probability score of displaying behaviour identified on graph - ASD 0.02 approximately Non-ASD 0.01 approximately			
Touching or rubbing genitals in presence of others											
Undressing or					Result from						

exposure in public				MANCOVA found a significant difference, P<0.01 'sexual disorder symptoms' reported: ASD group 0.18 mean, 0.03 SD, Non-ASD group, 0.02 mean, 0.03 SD							
Undressing in the presence of others						2	0				
Contacting children (sexual interest)						1	0				
Sexual comments								Relative probability score of displaying behaviour identified on graph – ASD 0.02 approximately non-ASD 0.005 approximately			
Stalking								Relative probability score of displaying behaviour identified on graph – followed sexual, romantic interest ASD 0.025, non-ASD 0 Pursuing sexual/romantic interest in threatening manner ASD 0.03, Non-ASD 0		Significant difference based on number of individuals displaying behaviour. p<.001, ASD 10.5 mean number of individuals, 4.9%. Non-ASD 7.8 mean number of individuals, 3.7 %	
ADDITIONAL COMMENTS						**No significant differences found in any of the above**		**Relative probability score inferred based on graph**			

Note. SD = Standard Deviation

Appendix 9: MMAT Spreadsheet

Due to the size of the completed MMAT spreadsheet, it was not possible to include the table within the thesis word document. Please double click on the icon to access and view the table.

MMAT Quality Appraisal.pdf