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Camouflaging and Mental Health: A Systematic Review & The Role of Social Identity and Camouflaging in Autism and Eating Disorders

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Doctorate in Clinical Psychology
The University of Edinburgh
May 2023
Declaration of Own Work

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Title: Camouflaging and Mental Health: A Systematic Review and the Role of Social Identity and Camouflaging on Autism and Eating Disorders

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Thesis Portfolio Abstract

**Background:** The phenomenon of camouflaging describes attempts to hide or compensate for autistic traits in social settings to help people fit in. Camouflaging has been observed within both the autistic population and the general population, with autistic females demonstrating the highest levels of camouflaging. Research has begun to highlight that higher levels of camouflaging may be associated with poorer mental health outcomes. This research has not explored the impact that camouflaging may have on eating disorders.

**Methods:** A systematic review was conducted to collate and critically examine studies that have used the Camouflaging Autistic Traits Questionnaire to measure the impact of camouflaging on mental health and wellbeing. An autistic specific evaluation tool was used to assess the quality of each study. A narrative synthesis approach was used to analyse the studies and summarise the findings in relation to the systematic review objectives. An empirical project was conducted to test predictions that camouflaging and social identity would predict increased eating disorder symptoms in autistic people. This study recruited 180 autistic participants who completed online questionnaires. Multiple regression analysis was used to analyse the data.

**Results:** The included studies were rated adequate to high quality standards. Camouflaging consistently demonstrated significant associations with a range of mental health outcomes, particularly social and generalised anxiety. The assimilation subscale of camouflaging demonstrated the strongest associations with a range of mental health outcomes. The literature suggested that thwarted belongingness may also play an important role in the relationship between camouflaging and mental health outcomes. The empirical project showed that camouflaging and eating disorder identity predicted eating disorder. Sensory processing did not uniquely predict eating disorder symptoms and autistic identity was not significantly related to eating disorder symptoms.

**Discussion:** Suggestions are made to explain the relationship between camouflaging and mental health based on the study findings. A variety of explanations are also proposed in relation to the findings that camouflaging uniquely significantly predicts eating disorder symptoms but sensory processing does not. Limitations, clinical implications and directions for future research are discussed.
Background: Camouflaging is a term used to described strategies that are used to hide or compensate for autistic traits in social settings to help people fit in. Although people with and without a diagnosis of autism have been found to camouflage, autistic females appear to show the highest levels of camouflaging. Research has shown that this may negatively impact people’s mental health, with higher levels of camouflaging leading to poorer mental health outcomes such as higher levels of depression and anxiety. However, there is no research that has examined the impact that camouflaging could have on eating disorders.

Methods: A systematic review was conducted to examine findings from studies that have investigated the relationship between camouflaging and mental health, using a specific questionnaire to measure camouflaging with adults. Data from these studies was collated and analysed to gain a deeper understanding of this relationship. Strengths and limitations of each study was considered to inform conclusions about the findings. The second journal included in this portfolio outlines a study that was conducted to address the lack of research investigating the relationship between camouflaging and mental health. This study gathered information from 180 autistic participants on levels of camouflaging, autism identity, eating disorder identity, sensory sensitivities, autism traits and eating disorder symptoms. The results were then analysed to form conclusions about these relationships.

Results: Overall, camouflaging was found to be significantly related to mental health outcomes, with a tendency for particularly stronger relationships with forms of anxiety. The empirical projected also showed that camouflaging and eating disorder identity predicted eating disorder symptoms. Sensory processing did not predict eating disorder symptoms and autistic identity was not related to eating disorder symptoms.

Discussion: Specific aspects of camouflaging, such as assimilation, which means effortfully engaging in “typical” behaviours, appeared to be more strongly related to mental health outcomes than other components of camouflaging. The empirical project showed that camouflaging and eating disorder identity play an important role in eating disorders. Limitations of the systematic review and empirical project are discussed and suggestions are made for future research and clinical settings.
The Impact of Camouflaging on Mental Health and Wellbeing: A Systematic Review

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Abstract

**Background:** The phenomenon of camouflaging describes behaviours that are used to hide or compensate for autistic traits. Research is increasingly showing the role of camouflaging on mental health, however the findings have been inconsistent, possibly due to a variety of techniques which have been employed to measure this relationship.

**Objectives:** This review aimed to gain a more comprehensive understanding of the mechanisms behind the relationship between camouflaging and mental health in autistic and non-autistic people by systematically appraising and synthesizing findings from the studies that have explored this relationship using the self-report Camouflaging Autistic Traits (CAT-Q) measure.

**Methods:** A number of databases were systematically searched for published and unpublished literature. 165 studies were screened and fourteen studies were included that met the criteria for this review. Each study was quality assessed using an instrument developed for autism research and a narrative synthesis was conducted to systematically appraise the findings.

**Results:** Camouflaging was consistently associated with mental health and wellbeing outcomes in most studies. Camouflaging appeared to be particularly associated with social anxiety and generalised anxiety, more so than depression. The assimilation subscale of camouflaging seemed to show slightly stronger associations with mental health outcomes. There was a tendency for camouflaging levels and mental health outcomes to be show stronger relationships in non-autistic people than autistic people.

**Discussion:** Findings suggest that levels of camouflaging, particularly assimilation appear to play a key role in mental health difficulties. Initial findings also suggest that thwarted belongingness may play an important role in this relationship. This review is not generalisable as the participants across studies were not representative of the heterogeneity among autistic and non-autistic populations.
1. Introduction

1.1 What is Camouflaging?
The concept of camouflaging, otherwise known as “masking” “compensating” or “Passing as Non-Autistic” is similar to impression management or self-monitoring (Ai, Cunningham & Lai, 2022; Libsack et al, 2021; Radulsk, 2022). It describes an individual’s attempts to attune to the behaviour of others to manage their own self-presentation as a means of managing others’ perception of them (Aime, Scheerer, Boucher & Iarocci, 2021). Unlike these related concepts, camouflaging specifically relates to managing autistic traits (Bargiela, Steward, Mandy, 2016; Tierney, Burns & Kilbey, 2016). Autistic traits describe preferences and behaviours characteristic of autism that affect how an individual may experience the world and relate to others (Hull et al, 2020). Higher levels of autistic traits are usually self-reported in those with autistic family members (Constantino & Todd, 2005). Those with significantly higher levels of autistic traits may have a clinical diagnosis of autism (Hull et al, 2021). The medical model of autism, understands it as a disorder with social deficits, restricted or repetitive behaviours and focuses on what an autistic person cannot do (Ferenc, Platos, Byrka & Król, 2022; Centre for Disease Control and Prevention (CDC) 2020). This model is becoming increasingly challenged and replaced with social models which focus on celebrating autistic people’s differences and individuality whilst recognising the social discrimination autistic people face as they often behave differently from the “norm” (Radulski, 2022; Anderson-Chavarria, 2022).

Camouflaging and autistic traits are positively associated and it has been proposed that the prevalence of camouflaging reflects a way of coping with the social discrimination that autistic people or people with autistic traits experience in contexts dominated by neurotypical norms (Hull et al, 2019; Radulski, 2022). Camouflaging and autistic traits are believed to occur on a continuum which extends to the general population as individuals appear to display these characteristics or behaviours to varying degrees (Hull et al, 2020; Baron-Cohen, Wheelwright, Skinner, Martin, Clubley, 2001) with autistic people displaying the higher levels of both autistic traits and camouflaging than non-autistic people (Dell’Osso et al 2022; Hull et al, 2019). People of all genders have displayed levels of camouflaging, dismissing explanations of camouflaging being a product of the female autism phenotype and sex specific neurodevelopmental factors (Rynkiewicz et al, 2016). Females and non-binary autistic people have displayed higher levels of camouflaging than males (Cook, Hull, Crane & Mandy, 2021; Cage & Troxell-
Whitman, 2019; Hull et al, 2017). Increased levels of camouflaging among autistic females may be related to greater social gender expectations placed on women (Bargiela et al, 2016; Kreiser & White, 2014). This is supported by autistic females reporting more pressure to camouflage autistic traits (Milner, Mandy, Happé & Colvert, 2019) and demonstrating increased social motivation and desire to fit in with peers than males (Sedgewick, Hill, Yates, Pickering, 2016).

Many social theories and concepts can be applied to understand some of the increased challenges that autistic females or non-binary autistic people face which could contribute to increased levels of camouflaging (Cage & Troxell-Whitman, 2019; Cooper, Cooper, Russell & Smith, 2021; Radulksi, 2022). Autistic people are already a member of a stigmatised minority group within a neurotypical majority world (Botha & Frost, 2020). However, autistic females and non-binary people may experience an additional sense of exclusion, as autism discourse has historically been dominated by research with males, leading to diagnostic assessments and societal expectations of autism to be based on male presentations (Saxe, 2017). Therefore, these groups may experience issues of intersectionality, a term often used in feminist literature, referring to having to navigate multiple identities (Davis, 2008). The Minority Stress Model (Meyer, 2003) suggests that people who belong to more than one minority group, face multiple the amount of stressors, leading to poorer mental and physical health. As Shefcky (2015 p.132) stated “to be a female with an ASC [autism spectrum condition] is to be twice excluded: once from the neurotypical female population, and once again from the [autism] community.” This sense of increased exclusion may lead to thwarted belongingness which is a term used to describe the unmet psychological need of belonging (Van Orden et al, 2010).

The Social Identity Theory (SIT) (Tajfel & Yurner, 1979) outlines how people in stigmatised minority groups, cope with these challenges and unmet needs by attempting to dissociate from the minority group and associate with more socially accepted groups, which may explain why people engage in increased levels of camouflaging. However, the SIT and the Minority Stress Model both suggest that an alternative coping technique is to promote the minority group status and demonstrate more resilience and cohesiveness with other members of the minority group (Meyer 2015; Tajfel & Turner 197). This cohesiveness or “autism acceptance” has been associated with mental health benefits (Cooper et al, 2021)
1.2 Benefits of Camouflaging
Motivation for camouflaging has been found to include gaining acceptance by fitting in and avoiding exclusion (Cage & Troxell-Whitman, 2019; Cage, Di Monaco & Newell, 2018). Subsequently, autistic people have shared their experience of camouflaging providing benefits such as securing jobs and making friends (Hull et al, 2017). For example, in a neurotypical world, if someone makes eye contact and mirrors facial expressions in an interview this may help them succeed in gaining employment and avoiding excessively focusing on topics of special interest may help someone make friends (Beck, Gabrielsen, Cox, South, 2020). One autistic woman stated how it can be rewarding as it shows “that autistic people can have people skills and be good role models” (Hull et al, 2017).

Camouflaging may serve as a protective strategy to avoid experiences of bullying or negative perceptions (Cage & Troxell-Whitman, 2019). Research has shown how autistic people may be four times more likely to be bullied than non-autistic people (Sterzing, Shattuck, Narendorf, Wagner & Cooper, 2021) and autistic people have reported that engaging in camouflaging reduces the risk of bullying and harassment (Cage & Troxell-Whitman, 2019). Sasson et al’s (2017) experiment with neurotypical “observers” revealed how autistic people were judged as less attractive and less likeable and neurotypical participants were less likely to socially engage with autistic people in comparison to non-autistic people. These initial perceptual judgements can shape behaviours and attitude towards autistic individuals, contributing towards autism stigma (Botha & Frost, 2020). Stigma towards autistic people can be observed across various fields such as the media (Holton, Farrell & Fudge, 2014) and research (Nicoladis, 2012) and positive associations have been reported between stigma and camouflaging (Perry, Mandy, Hull & Cage, 2022; Cage et al, 2018). This may indicate that people engage in more camouflaging behaviours as a way to cope with increased stigma towards autism or autistic traits. Indeed, autistic people have reported camouflaging because they feel a sense of shame surrounding their identity (Cage & Troxell-Whitman, 2019)

1.3 Consequences of Camouflaging
A growing body of evidence has begun to display the costs of camouflaging for autistic and non-autistic people, which may outweigh the benefits in many cases (Beck et al, 2020; Cage & Troxell-Whitman, 2019; Cassidy et al, 2020). One commonly cited consequence is the impact of camouflaging on receiving a diagnosis of autism as people
who mask autistic characteristics, particularly females, may not appear to meet the required male-based diagnostic criteria (Ratto et al., 2018; Cook et al., 2021). The subsequent consequences of a late or no diagnosis include restricted access to adequate or timely support services (Tubio Fungueiri, Cruz, Sampaio, Carracedo & Fernández-Prieto, 2017) and autistic characteristics being described by others as laziness or defiant rather than understanding characteristics within a neurodevelopmental context (Bargiela et al. 2016).

Whilst some people have reported being unaware that they are camouflaging until it is pointed out (Hull et al., 2017), many have described it as a taxing process since it demands large amounts of physical and emotional exertion (Oakley et al., 2021), requiring high levels of self-control, concentration and management of discomfort (Hull et al., 2017). This process has been described as exhausting and disorientating (Hull et al., 2017; Radulski, 2022) and contributes to loss or confusion of identity (Bargiela et al., 2016). People have also reported how this prioritisation of fitting in led to increased chances of abuse or manipulation by others (Bargiela et al., 2016). Furthermore, Ragin’s (2008) Disconnect Theory outlines how the effort of camouflaging in some contexts but not in others has been found to lead to identity fragmentation, depression, stress and anxiety (Ragin et al., 2008) as people focus on using context-specific information to inform how they behave and present themselves. This is supported by a growing amount of qualitative and quantitative research highlighting the relationship between camouflaging and a range of mental health difficulties such as low self-esteem, anxiety, exhaustion, and depression (Cage & Troxwell-Whiteman, 2019; Milner et al., 2019).

It is imperative to understand the relationship between camouflaging and mental health difficulties given the pandemic of mental health problems reported across the general population, with autistic people consistently showing poorer mental health and quality of life outcomes (World Health Organisation (WHO), 2022; Lai et al., 2019; Ameis & Szatmari, 2015). A number of autism stakeholder groups and researchers have highlighted the need for research into quality of life and mental health difficulties among autistic people to be a priority (Roche, Adams & Clark, 2021). A major issue across autism research is the lack of inclusion of people of all abilities for example those with autism and an intellectual disability or those from ethnic minority groups (Pellicano, Dinsmore & Charman,., 2014). This issue means that experiences of those who may face the highest levels of societal and mental health challenges, are not captured by research. From the research exploring the relationship between
camouflaging and mental health difficulties thus far, mixed findings have been reported, perhaps depending on the measurement tool that is used to assess camouflaging (Cook et al, 2021). There is some scepticism around whether camouflaging represents a theoretically distinct phenomena from well-established constructs such as social anxiety due to the overlap found between these constructs (Fombonne, 2020).

1.4 How is Camouflaging Measured?
The main methods that have been developed to attempt to operationalise and measure camouflaging include internal-external discrepancy method (Lai et al, 2017), observational/reflective methods (Dean et al, 2017) and self-report methods (Hull et al, 2019). The internal-external discrepancy method, developed by Lai and colleagues (2017) uses standard autism assessment tools such as the Autism Quotient (AQ) to measure autistic traits to give an indication of an individual’s “internal autistic status” or “true autistic state.” An individual’s observable behavioural presentation or “external autistic presentation” is then measured using gold-standard assessments such as the Autism Diagnostic Observation Scale (ADOS) with the “gap” or discrepancy between an individual’s “internal” and “external” score used to indicate the level of camouflaging the individual is engaging in. This method’s key strength is that it can capture an individual’s experience of being autistic in comparison to what is portrayed to the outside world.

In studies that have employed this method, significant relationships have not been found between camouflaging and anxiety (Schuck, Flores & Fung, 2019; Lai et al 2017) whilst a significant relationship between camouflaging and depression has only been found among autistic male participants (Lai et al, 2017). It should be noted that neither of these included non-binary people and both had small sample sizes (n=60; Lai et al, 2017; n=28; Schuck et al, 2019) which may have been too small to detect smaller significant effects. The validity of this technique has also been challenged due to the measurement tools used which have been developed and validated on male-based autistic presentations, and therefore may not fully capture autistic traits that females appear more likely to camouflage (Ratto et al, 2018). This suggestion infers that females’ “internal autistic status” may not be accurately represented, which will subsequently impact their internal-external discrepancy score.

Alternatively, self-report measures can capture levels of camouflaging intentions as conceptualised from the person who is engaging in camouflaging themselves,
independent of external behavioural presentations (Hull et al, 2019). Cook et al’s (2021) systematic review highlighted a variety of self-report methods utilised to measure camouflaging such as reported time spent engaging in camouflaging across various contexts or spontaneous accounts of camouflaging in response to open ended questions. It appears that depending on the self-report method used, various outcomes are reported. For example, qualitatively, many participants reported camouflaging having an impact on their mental health and wellbeing (Cage et al, 2018) and this was supported by quantitative accounts with significant relationships found for some presentations such as suicide and depression in some studies but not others (Cage et al, 2018; Cassidy, Bradley, Shaw & Baron-Cohen, 2018). Many of these self-reported camouflaging measures were not validated. The most frequently used self-report measure appears to be the Camouflaging Autistic Traits Questionnaire (CAT-Q) (Cook et al, 2021). The CAT-Q appears more likely to find significant associations between camouflaging and mental health than other self-report or internal-external discrepancy methods (Lu, Pang, Peng, Lui & Wang, 2023; Lundin Remnélius & Bolte, 2022; Hull et al 2019; Hull et al 2021).

1.5 Development and Properties of CAT-Q
The CAT-Q is a 25-item questionnaire that was developed by Hull and colleagues (2019), validated on autistic and non-autistic populations and has shown validity and excellent total scale reliability $\alpha = .908$ and subscale reliability; Assimilation: $\alpha = .9$, Compensation: $\alpha = .864$ and Masking $\alpha = .772$ (Hull et al, 2019).

The items of this questionnaire were constructed from previous qualitative responses which concluded that camouflaging comprised of a combination of two constructs; masking and camouflaging (Hull et al, 2017). However, a third construct, assimilation, was identified by Hull and colleagues (2019) through exploratory factor analysis; assimilation. The CAT-Q aims to capture the levels to which people engage in the three key components of camouflaging; Compensation, Masking and Assimilation (Hull et al, 2019). Compensation: describes an attempt to overcome social and communication autism related difficulties in social situations by employing techniques such as observing and copying others behaviour or facial expressions or rehearsing social scripts. An example of a question from this subscale is, “When I am interacting with someone, I deliberately copy their body language or facial expressions.” Masking involves hiding autism related characteristics such as suppressing self-stimulating behaviours (for example repetitive movements or sounds) and attempting to portray a
non-autistic persona by constantly monitoring one’s own behaviours such as gestures, eye contact, facial expressions. An example question from this subscale would include, “I monitor my body language or facial expression so that I appear relaxed.” Lastly Assimilation: relates to effortfully engaging in “typical” social behaviours to fit in with others, example questions include, “In social situations, I feel like I am pretending to be normal” and “in social situations, I feel like I’m “performing” rather than being myself” (Hull et al, 2019).

Benefits of employing validated self-report measures of camouflaging ensures that the attempt or intention to camouflage autistic traits is measured, despite whether this results in any observable external change, in other words, unlike the internal-external discrepancy method, it can capture “unsuccessful” camouflaging attempts (Hull et al, 2019). Another benefit of the self-report method is that camouflaging can be described in different contexts and this method reduces the risk of clinician or researcher bias in perception of autistic behaviours or abilities (Cook et al, 2021; Hull et al, 2019). However, the CAT-Q requires a certain degree of self-reflection and therefore may only be appropriate among those without language or cognitive difficulties.

Research into the impact on camouflaging and mental health is still within it’s infancy and the variety of techniques used by studies to measure camouflaging along with small or exclusive samples recruited makes it difficult to directly compare findings or draw valid conclusions about presence of this relationship. Despite this, the development of the validated CAT-Q questionnaire in recent years has given rise to more consistent methodology and findings of a significant relationship between these concepts (Beck et al. 2020; Hull et al 2021; Lundin Remnélius & Bolte, 2023). However, an analysis of this research is required to identify key mechanisms of this relationship as this may highlight risk or protective factors that can be used to inform mental health assessments and interventions. This rationale is supported by Hull et al (2021) who called for future research to explore the association between individual subscales of the CAT-Q and mental health conditions.

1.6 Objectives
The current review aims to gain a more in-depth understanding of the presence and key mechanisms of the relationship between camouflaging and mental health outcomes among autistic and non-autistic people. This review will specifically focus on research that has used the CAT-Q to measure camouflaging since this is a self-reported scale
that will measure the person’s true camouflaging attempts (as opposed to relying on observers’ perceptions).

2. Methods

This review was registered online with PROSPERO, an international prospective register of systematic reviews (registration number: CRD42023422083) (see Appendix 7 for protocol). This review process followed the guidelines outlined in the most current version of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist (Page et al, 2021)

2.1 Search Strategy
In consultation with an academic support librarian, the following electronic databases were searched from 1805 to March 2023 for studies published on camouflaging: APAPsychINFO (Ovid), Medline (OVID), Embase (OVID), ProQuest, Web of Science, Scopus and ERIC. Scopus and ERIC were not outlined in the protocol but were used, whilst Pubmed and Cumulative Index of Nursing and Allied Health Literature (CINAHL) were not searched as outlined in the protocol as it was agreed that the search had been exhausted with the most relevant databases used. No filters were applied at this stage of the search process. The following search terms/ combinations were used: (“camouflag* OR masking”) AND (“autis* OR ASD OR asperger*”). To identify additional relevant unpublished literature, Google Scholar was searched using keywords in January 2023 and again in March 2023. The Cochrane Library and ProQuest Dissertation databases were also searched. Previous systematic reviews and reference lists of included studies were manually checked for additional relevant research. An additional search was conducted in March 2023 using the same databases with the search term “CAT-Q” to ensure that no relevant studies had been missed.

2.2 Selection Criteria
Studies were screened and excluded if they were duplicates, unrelated to the topic or not published in English, which may exclude important findings published in other languages. However, the CAT-Q is an English language measure so there is an assumption that most of the research conducted using the CAT-Q will be in the English language or translated back into the English language for wider dissemination as conducted by Lundin Remnélius & Bolte (2023) study. A further screening process included a review of each abstract to identify studies that met the exclusion criteria. Studies were further excluded if they did not employ a quantitative analysis or were not
in empirical study format (i.e., book chapters, systematic reviews, meta-analysis, letters). Hence, the following inclusion criteria was applied to select the studies used in this review (a) studies that used the self-report CAT-Q to measure camouflaging (b) studies that explore the relationship between camouflaging and aspects of mental health and/or wellbeing outcomes (c) quantitative analyses (d) autistic and/or non-autistic people and/or people with autistic traits (e) above the age of 15.

The British Psychological Society (BPS) (2021) guidelines state that children over the age of 16 are able to consent to participate in research therefore, 16 is a common inclusion cut-off age. However, in Sweden, where Remnélius & Bolte’s (2023) study was conducted, children are allowed to consent to participate in research from age 15. Therefore, age 15 was the cut off for this review so that studies such as findings from Lundin Remnélius & Bolte (2023) study could be included particularly as it reduced participant bias by adding data to the review from a country where English is not the dominant or first language. The reviewers also concluded that there would not be a significant difference in the findings between 15- and 16-year-olds.

Mental health difficulties which are commonly found among autistic people such as depression, stress, anxiety, suicidality, eating difficulties were the primary focus of this review (Lai et al, 2019; Christensen, Bentz, Standberg-Larsen & Olsen 2019; Huke, Turk, Saeidi, Kent & Morgan, 2013). However, to maintain consistency with previously conducted autism research, studies were also included which explored mental wellbeing and quality of life (Cook et al, 2021; Tubio-Fungueiri et al, 2021). This approach is in line with the two-continua model of mental health which outlines that rather than being at opposite ends of the spectrum, mental health difficulties and mental wellbeing are separate but related factors (Shochet et al, 2016). This review took a consistent approach, including studies which demonstrated the inclusion of outcomes from a wide array of mental health indicators. The inclusion and exclusion criteria is demonstrated in Table 1. References were managed using EndNote and Covidence.

**Table 1**

<table>
<thead>
<tr>
<th>Inclusion and exclusion criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
</tr>
<tr>
<td>Age 15 and older. Male, female, non-binary and prefer not to say. Autistic,</td>
</tr>
</tbody>
</table>
general population and those with autistic traits.

**Measures**
Studies which used a version of self-report CAT-Q measure

**Outcomes**
Studies which included outcome measures of: mental health difficulties, wellbeing or quality of life.

**Study Design**
Cross-sectional quantitative studies published in English.

### 2.3 Quality Assessment
Many evaluation tools are designed to evaluate intervention or randomised control trials. This review selected a quality evaluation tool from Glod, Riby, Honey & Rodgers, (2015) (Appendix 2) which was designed specifically to evaluate overall quality, strengths and weaknesses and potential sources of bias in studies recruiting from autistic populations. Glod et al (2015) have recommended that this tool can be used with other developmental conditions or neurotypical populations (Glod et al, 2015) and was assessed as the most appropriate tool for this review. This tool followed the principles of Scottish Intercollegiate Guidelines Network (SIGN) (2008) in terms of the recommended number of criteria and quality ratings, containing 26 criteria items and three levels of quality ratings available for most questions (yes, partially or no) which is equivalent to levels recommended by SIGN (high, acceptable and low quality). The criteria items follow the IMRaD (Introduction, Method, Results and Discussion) structure (Sollaci & Perira, 2004) as it is divided into four main sections; introduction, methods, results and discussion. Items 10-13 are related to the quality of sensory processing measures used and were therefore still included, but deemed less relevant for this review as most studies did not include measures of sensory processing.

Each study was assessed for quality by one reviewer and inter-rater reliability was ensured by another reviewer who also used the tool to appraise the quality of a random selection of studies within this review. The same process was conducted for the data extraction procedure. A meta-analysis was not conducted for this systematic review due to time constraints. Therefore, this study employed a narrative synthesis and is mainly descriptive, with more weight given to studies deemed better quality.
3. Results
3.1 Search Strategy
The database search resulted in 571 records identified. An additional 4 unpublished studies were identified through google scholar searches. After duplicates were removed, 165 records remained and were screened based on their title and abstract. Records were excluded if they were irrelevant to this review’s objectives, used quantitative methodology or were not in an empirical review format. Following the review process, 29 studies remained. The full text of these 29 articles were assessed with 15 excluded as they did not meet the inclusion criteria as can be seen in Figure 1, for reasons such as: used qualitative analyses (N=5), did not use the CAT-Q self-report measure to assess camouflaging (N=4), upon further inspection, the study was a systematic or literature review or a registered protocol (N=4) or the sample was younger than 15 (N=2). Therefore, 14 studies met the inclusion criteria and were included in the final assessment.
3.2 Study Characteristics
Table 2 outlines a detailed overview of included studies’ characteristics. All 14 of the included studies had a cross-sectional design. Most studies recruited from a combination of autistic and non-autistic populations (Lundin Remnélius & Bolte, 2023), Milner et al, 2022; Cassidy, Bradley, Cogger-Ward, Rodgers, 2021; Janicki-Menzi 2021, Trundle, 2021, Hull et al 2019) or an autistic only population only (Bradley et al 2023; Perry et al 2022; Hull et al 2021; Beck et al 2020; Cage & Troxell-Whitman, 2019). Three studies recruited non-autistic people from the general population (Lu et al, 2023; Aime et al, 2021; Cassidy et al 2020). Two studies grouped participants into high autistic trait group and low autistic trait group (Milner et al 2022; Lu et al 2023). The studies that included autistic people varied on whether they were recruited within
a clinical and/or a self-diagnosis and four studies included measures or methods to confirm an autism diagnosis (e.g. recruitment from an official autism database or use of screening measures with thresholds such as Ritvo Autism and Aspergers Diagnostic Scale-14 or Social Responsiveness Scale) (Perry et al, 2022; Cage & Troxell-Whitman, 2019; Milner et al 2022; Janicki-Menzi, 2021). Despite participatory research guidelines recommending greater autism community participation and leadership is warranted in autism research, (Fletcher-Watson et al, 2019), only five of the included studies included co-participation from the autistic community in some form in their study (Bradley et al 2023; Perry et al 2022; Cassidy et al 2020; Cage & Troxell-Whitman, 2019; Hull et al 2019).

All of the studies that were included in this review were published between 2019 and 2023, which reflects the development of the CAT-Q in 2019 (Hull et al, 2019). The studies were conducted in five developed countries; the USA, UK, Canada, Sweden and China. Most of the studies were published in Journal of Autism and Developmental Disorder (n=6), followed by Autism (n=2) and Molecular Autism (n=2). There were four unpublished studies that were thesis papers written for the purpose of doctorate or undergraduate degree fulfilment. As outlined by the inclusion criteria, the majority of studies used the original version of the 25-item CAT-Q. However, studies also used adapted versions such as the Chinese CAT-Q (Lu et al, 2023) or a translated Swedish CAT-Q (Lundin Remnélius & Bolte, 2023) and one study used a 32-item version of the CAT-Q (Milner et al, 2022).

Mental health and wellbeing outcomes were all measured using self-report questionnaires to produce continuous data. There was heterogeneity in the questionnaires selected to measure a broad range of mental health outcomes. Most studies assessed depression (n=10) and/ or anxiety (n=10). The most frequently used depression measure was the Patient Health Questionnaire – 9 items (PHQ-9) (n=7), whilst the Generalised Anxiety Questionnaire – 7 items (GAD-7) was the most frequently used measure of anxiety (n=5). Studies also included stress (n=3) (Beck et al, 2020; Cage et al & Troxell-Whitman, 2019, Lundin Remnélius & Bolte, 2023), wellbeing (n=4) (Lundin Remnélius & Bolte, 2023; Milner et al, 2022; Perry, 2022; Hull et al, 2019), suicidal behaviour (n=3) (Beck et al, 2020; Cassidy et al, 2020; Cassidy et al 2021), social anxiety (n=2) (Hull et al, 2021; Hull et al 2019) and eating disorder behaviours and attitudes (n=1) (Bradley et al, 2023). Additional relevant outcomes from this review included non-suicidal self-injury (n=1) (Cassidy et al, 2021),
offending behaviour (n=1) (Trundle et al, 2021), emotional difficulties (n=1) (Milner et al, 2022), substance misuse (n=1) (Janicki-Menzi, 2021), daily functioning (n=2) (Lundin Remnélius & Bolte, 2023; Beck et al 2020) and thwarted belongingness and perceived burden (n=1) (Cassidy et al, 2020).

Data related to the current review question was gathered from a range of statistical analyses including regression or correlational analyses, mediation analyses and Multivariate Analysis of Co-Variance (MANOVA).

3.3 Participant Characteristics
In total, data collected from 5791 people was included in this review. The number of participants in included studies ranged from 58 to 1215. Apriori power calculations were calculated for six studies (Beck et al, 2020; Bradley et al, 2023; Hull et al 2021; Janicki-Menzi, 2021; Perry et al, 2022; Trundle, 2021). The mean age across the studies was 30.95 with an age range of 15-87, one study contained participants from age 10 however results were only extracted for participants age 15 and older to ensure the study met the inclusion criteria for this review. The majority of studies asked participants to identify their gender, with only one study using sex (Milner et al, 2022). Cassidy et al (2021) asked participants to detail both their sex and gender and conducted analysis on both variables. Overall, most participants were female (n=3760), followed by male (1817), then by non-binary/ transgender or other (n=143) and lastly those who preferred not to say (n=69). Most participants across all studies were white and university educated, however a few studies did not report on ethnicity or education (Milner et al 2022; Aime et al; 2021).

Table 2
Participant and study characteristics and results

<table>
<thead>
<tr>
<th>First Author &amp; Year</th>
<th>Country</th>
<th>Sample size (mean age)</th>
<th>Sample characteristics</th>
<th>ASD Diagnosis</th>
<th>Outcome measure</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bradley 2023</td>
<td>UK</td>
<td>180 (38)</td>
<td>Female: 116, Male: 36</td>
<td>Autistic clinical or</td>
<td>EDE-QS</td>
<td>Camouflaging predicted</td>
</tr>
<tr>
<td>Study</td>
<td>Country</td>
<td>Sample Size</td>
<td>Sex Distribution</td>
<td>Measures</td>
<td>Findings</td>
<td></td>
</tr>
<tr>
<td>--------------</td>
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<td>--------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Lu 2023</td>
<td>China</td>
<td>1215</td>
<td>Female: 864, Male: 351</td>
<td>PHQ-9, EQ-15</td>
<td>Camouflaging predicted and was related to depressive symptoms. It mediated the relationship between autistic traits and depressive symptoms.</td>
<td></td>
</tr>
<tr>
<td>Lundin Remnélius 2023</td>
<td>Sweden</td>
<td>523</td>
<td>Female: 318, Male: 201, Other: 4</td>
<td>PHQ-9, GAD-7, EUROHIS-QOL, PSS-14</td>
<td>Camouflaging (particularly assimilation) was associated with symptoms of depression, anxiety, stress and poorer quality of life.</td>
<td></td>
</tr>
<tr>
<td>Authors</td>
<td>Location</td>
<td>N</td>
<td>Female: Male:</td>
<td>Autistic</td>
<td>Scale</td>
<td>Findings</td>
</tr>
<tr>
<td>---------</td>
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</tr>
<tr>
<td>Perry</td>
<td>UK</td>
<td>223</td>
<td>130: 53</td>
<td>WEM-WBS</td>
<td>Camouflaging was not related to wellbeing nor did it mediate the relationship between stigma and wellbeing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milner</td>
<td>UK</td>
<td>435</td>
<td>262: 173</td>
<td>WHO-Qol Bref SDQ</td>
<td>Camouflaging predicted QoL outcomes and was associated with emotional difficulties in the autistic group.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aime</td>
<td>Canada</td>
<td>315</td>
<td>234: 81</td>
<td>BASC-2SRP-COL</td>
<td>Camouflaging predicted internalising behaviours and partially mediated the relationship between social competence and</td>
<td></td>
</tr>
<tr>
<td>Author</td>
<td>Country</td>
<td>N</td>
<td>Gender</td>
<td>Diagnosis</td>
<td>Psychological Measures</td>
<td>Camouflage Predicted Symptoms</td>
</tr>
<tr>
<td>-------------</td>
<td>---------</td>
<td>-------</td>
<td>----------</td>
<td>----------------------------</td>
<td>------------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>Cassidy</td>
<td>UK</td>
<td>689</td>
<td>Female: 490 Male: 199</td>
<td>Autistic (diagnosed), possibly autistic (self) and non-autistic</td>
<td>SBQ-ASC PHQ-9 ASA-A INQ-15 NSSI</td>
<td>internalising behaviours was associated with suicidality, self-injury, anxiety, depression, thwarted belongingness (only in non-autistic group) and perceived burden</td>
</tr>
<tr>
<td>Hull</td>
<td>UK</td>
<td>305</td>
<td>Female: 181 Male: 104 Non-binary: 18</td>
<td>Autistic</td>
<td>PHQ-9 GAD-7 LSAS</td>
<td>Camouflage predicted depression, anxiety and social anxiety</td>
</tr>
<tr>
<td>Janicki-Menzi</td>
<td>USA</td>
<td>374</td>
<td>Female: 232 Male: 142</td>
<td>Autistic &amp; non-autistic</td>
<td>BDI BAI ASSIST</td>
<td>Camouflage predicted anxiety and depression but not substance misuse</td>
</tr>
<tr>
<td>Study</td>
<td>Location</td>
<td>Sample Size</td>
<td>Mean Age</td>
<td>Gender Distribution</td>
<td>Autism &amp; Non-Autistic</td>
<td>Depression &amp; Anxiety Measures</td>
</tr>
<tr>
<td>-----------</td>
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<td>-------------</td>
<td>----------</td>
<td>---------------------</td>
<td>-----------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>Trundle</td>
<td>UK</td>
<td>220</td>
<td>(32.14)</td>
<td>Female: 167, Male: 45, Other: 5, Did not say: 3</td>
<td>Autistic &amp; non-autistic</td>
<td>GAD-7, PHQ-9, NVOBS</td>
</tr>
<tr>
<td>Beck</td>
<td>USA</td>
<td>58</td>
<td>(25.2)</td>
<td>Female: 58</td>
<td>Autistic &amp; scored &gt;3</td>
<td>DASS, BAPQ, SBQ-R, WHODAS</td>
</tr>
<tr>
<td>Cassidy</td>
<td>UK</td>
<td>160</td>
<td>(19.54)</td>
<td>Female: 139, Male: 21</td>
<td>Non-Autistic</td>
<td>INQ-15, PHQ-9, GAD-7, SBQ-R</td>
</tr>
</tbody>
</table>
Camouflaging was associated with anxiety and stress but not depression. Stronger associations found in “high” and “switching” camouflaging groups as opposed to “low” camouflaging group.

Camouflaging (particularly assimilation) was associated with social anxiety & wellbeing. Camouflaging (particularly
assimilation) was associated with depression and anxiety in autistic group.

* This study included an age range of 10-87 but this review only extracted data from those aged 15 and older


3.4 Quality Assessment

Overall, the quality of the included studies ranged from acceptable to high based on the evaluation tool (Glod et al, 2015), (see Appendix 3 for full detail). The inter-rater reliability on the Glod assessment was 90.32%. All disagreements in ratings were resolved through discussion. All studies had specific areas which were suboptimal, indicating caution with interpreting the credibility of some results. General strengths across all studies included strong rationales for study objectives with clear hypotheses and descriptions of each construct. The studies demonstrated use of standardised and reliable questionnaires to gather outcome measures, however only half of the studies (n=7) reported the reliability of each scale for their own data. Studies used appropriate analyses to interpret the data and the vast majority provided a good quality discussion section with comprehensive conclusions which acknowledged limitations. All studies except one (Cassidy et al, 2020) provided clear information on the gender or sex of
participants however studies varied on whether they collected sex and/or gender identity information and only half of the studies reported data on the number of non-binary, other or those who preferred not to say.

Some common methodological issues across papers included the lack of apriori power analyses conducted or reported to justify sample sizes (missing from n=8 studies), however all studies except for one (Milner et al, 2022) appeared to have sufficient sample sizes for the chosen analyses. Less than half of the studies included detail regarding participant response rates. Only three studies explicitly reported effect sizes (Cassidy et al, 2021; Trundle, 2021; Cage et al, 2019) and less than half reported on missing data. Some studies that recruited autistic participants showed evidence of selecting autistic specific scales to measure outcomes, such as the SBQ-ASC and ASA-A (Cassidy et al, 2021; Cassidy et al 2020) but most studies failed to report if scales were appropriate for the autistic population. Despite this, studies generally used scales that are widely used in autism research and previously shown reliability and validity.

Studies were largely non-representative of the heterogeneous autistic and non-autistic population, with most participants comprising of white, English speaking, educated females with access to online questionnaires. However, despite the female, English speaking majority, there was a high number of male participation and this review included two studies that were conducted in languages other than English, with one study having exclusion criteria as Chinese nationality and Chinese as a first language (Lu et al 2023; Lundin Remnélius & Bolte, 2023). Although all studies gathered demographic information, only two studies included measures to assess cognitive ability (Aime et al, 2021; Beck et al, 2020). Eight studies gathered information on mental health comorbidities of participants. Most studies explicitly or partially stated inclusion and exclusion criteria. Overall, eight studies were assessed as adequately describing participants, five were assessed as partially describing the participants and one was deemed as not adequately meeting this criterion (Milner et al, 2022).

3.5 CAT-Q Reliability
Among autistic and non-autistic populations, the CAT-Q showed good internal consistency which ranged from $a=0.79$ (Hull et al, 2021) to $a=0.94$ (Hull et al, 2019) across the 11 studies. Each subscale also showed good internal consistency across the three studies which reported this; compensation ranged from $a=0.864$ (Cassidy et al, 2020) to $a=0.92$ (Lundin Remnélius & Bolte, 2023), masking ranged from $a=0.712$ (Cassidy et al, 2020) to $a=0.85$ (Hull et al, 2019) and assimilation ranged from $a=0.85$
(Lundin Remnélius & Bolte, 2023) to 0.92 (Hull et al, 2019). These values were across the autistic and non-autistic populations, however Cassidy et al (2021) showed higher internal consistency values in the non-autistic (a=0.931) participants compared to the autistic (a=0.94) and possibly autistic (a=0.9) participants.

The total CAT-Q demonstrated good test-retest reliability of ICC=0.77 across autistic and non-autistics participants (Hull et al, 2019; Aime et al, 2021) as did each of the subscales: Compensation ICC=0.77, Masking ICC=0.70 and Assimilation ICC=0.73 (Hull et al, 2019). The total CAT-Q/SE demonstrated higher test-retest values than the original CAT-Q (ICC= 0.85) as did each of the subscales: Compensation ICC=0.82, Masking ICC=0.78 and Assimilation ICC=0.85 (Lundin Remnélius & Bolte, 2023). Lundin Remnélius & Bolte (2023) found higher test-retest values among the autistic group than the non-autistic group for the total CAT-Q/SE and each of the subscales. The CAT-Q/SE also demonstrated construct validity as autistic participants scored higher than non-autistic participants and females scored higher than males. There were no reliability or validity reports provided for the 32-item scale used in Milner et al (2022).

3.6 Study findings
Table 2 contains a summary of key findings from the studies. An overall description of study findings is detailed below.

3.7 Impact of Camouflaging on Mental Health
3.7.1 Depression
Nine studies assessed the relationship between camouflaging and depressive symptoms using the PHQ-9, DASS or BDI and all but one (Cage & Troxell-Whitman, 2019) found medium to weak significant positive relationships between these two concepts. The assimilation and total CAT-Q scale appeared to show a slightly stronger correlation with depressive symptoms and were significant at p<.001 in comparison to the masking and compensation scales which were significant at a level of p<.01 (Hull et al, 2019). This appeared to also be supported in the CAT-Q/SE version, however all subscales and the total CAT-Q/SE were related to depressive symptoms at p<.001 level of significance. (Lundin Remélius & Bolte, 2023). Cage & Troxell-Whitman (2019) study with autistic male and females, did not find an association between camouflaging and depressive symptoms and this was consistent across those in the “high camouflaging” “low camouflaging” and “switchers” group (those who switched between camouflaging in some but not all contexts) as there was no significant difference between these groups
and their relationship with depression. In Beck et al’s (2020) study, with female participants only, post hoc analysis revealed that a significant relationship between depressive symptoms and camouflaging, only occurred in the “high” camouflaging group and was not present in the “low” camouflaging group. Both of these studies controlled for age, gender and time since autism diagnosis.

3.7.2 Anxiety
Eight studies explored the relationship between camouflaging and anxiety using GAD-7, DASS, BAI, the autism specific measure ASA-A (Rodgers et al, 2020) which measures social anxiety, uncertainty and anxious arousal (Cassidy et al, 2021) and a social anxiety measure LSAS (Hull et al, 2021). Most of the included studies demonstrated significant strong-medium positive relationships between camouflaging and anxiety, and strong positive and significant relationships between camouflaging and social anxiety.

There appeared to be a tendency for stronger correlations between anxiety and camouflaging than depression and camouflaging (Hull et al, 2021). This tendency appeared to be supported in multiple papers (Cassidy et al, 2021; Janicki Menzi, 2021; Trundle, 2021; Cassidy et al, 2020; Cage & Troxell-Whitman, 2019). Lundin Remnélius & Bolte (2021) paper appeared to show a slightly stronger correlation between depression and camouflaging than anxiety and camouflaging however both associations were significant at p<.001. This study shared similar characteristics to the other studies such as the outcome measures used (PHQ-9 and GAD-7) and it outlined a rigorous process to ensure accurate translation of the CAT-Q to the CAT-Q/SE. Beck et al’s (2020) post hoc analysis showed only the “high” camouflaging group was associated with anxiety, whilst the “low” camouflaging group was not. Similarly, to depression symptom associations, the assimilation subscale and CAT-Q total score appeared to have a slightly stronger correlation with anxiety symptoms than the other subscales, however all associations were significant at the same level (Cassidy et al, 2020; Hull et al 2019), except for masking and social anxiety which displayed a weaker level of significance (Hull et al, 2019). Hull et al’s (2021) study found a positive linear relationship between camouflaging and anxiety, however identified specific camouflaging scores that put people at greatest risk of developing social anxiety (75 or higher) or generalised anxiety and depression (125 or above). Cage & Troxell-Whitman (2019) found that those in the “low” “switcher” and “high” camouflaging group had significant associations with anxiety. The “high” and “switcher” group had comparably
high scores and there was a significant difference found between anxiety levels between the “high” and “low” camouflaging group.

3.7.3 Stress
Camouflaging and stress were found to be significantly positively associated with and predictive of stress symptoms (Cage & Troxell-Whitman 2019; Lundin Remnélius & Bolte, 2023; Beck et al, 2020) with relationships of strong to medium strength. The assimilation subscale appeared to be slightly stronger correlated with stress symptoms however all subscales the the total CAT-Q score were significantly associated with stress symptoms at p<.001 (Lundin Remnélius & Bolte, 2023). Cage & Troxell-Whitman (2019) found that those in the “high” and “switcher” camouflaging groups showed significantly higher levels of stress than the “low” camouflaging group, however a significant relationship between camouflaging and stress was evident across all groups.

3.7.4 Suicidal Behaviour
Three studies found positive significant relationships between camouflaging and suicidal behaviour (including ideation, threats and attempts) (Cassidy et al, 2021, Beck et al, 2020; Cassidy et al, 2020). Beck et al’s (2020) study showed that this relationship was only significant in the “high” camouflaging group but not the “switcher” or “low” groups. Cassidy et al (2020) regression analysis with non-autistic people showed that total camouflaging score was not predictive of suicidal behaviour, but the assimilation subscale was. Camouflaging was found to be related to suicidal behaviour through correlational analysis. However, further analysis of this relationship through a mediation analysis revealed that this was not a direct relationship, instead, camouflaging was indirectly related to suicidal behaviour through thwarted belongingness (the unmet need of belonging). Again, the assimilation subscale reflected a tendency to have a slightly stronger correlation to thwarted belongingness however all subscales and the total CAT-Q score were significant at p=.05. Cassidy et al (2021) also demonstrated a significant relationship between camouflaging and suicidality, and thwarted belongingness and suicidality, however the latter relationship was only found among the non-autistic group, not the autistic group. The autistic group demonstrated higher levels of camouflaging, thwarted belongingness and suicidality. There were no significant differences between the groups characteristics.
3.7.5 Wellbeing
Five studies explored areas of wellbeing or quality of life in relation to camouflaging levels (Lundin Remnéius & Bolte, 2023; Perry et al 2022; Milner et al 2022; Beck et al 2020; Hull et al, 2019). Camouflaging, particularly the assimilation subscale was shown to be negatively associated with quality of life (Lundin Remnélius & Bolte, 2023) and predictive of quality of life (Milner et al, 2022). Milner et al (2022) study showed that camouflaging was predictive of psychological quality of life in autistic participants and social quality of life in non-autistic participants. Despite using the same measurement tool (WEMWBS) Perry et al (2022) did not find a significant association between camouflaging and wellbeing in autistic people whilst Hull et al (2019) did between the total CAT-Q and assimilation subscale but not the masking or compensating subscales. However, Hull et al (2019) found that for non-autistic people, all subscales and the total camouflaging score significantly related to wellbeing. Both studies controlled for autistic traits/ diagnosis however Perry et al (2022) also controlled for time since diagnosis and age. Perry et al (2022) also had a smaller sample size with less males and included non-binary participants in their analysis which Hull et al (2019) did not.

3.7.6 Additional Mental Health Outcomes
Camouflaging was also found to be significantly predictive of eating disorder behaviours and attitudes (Bradley et al, 2023) and associated with emotional difficulties (Milner et al, 2022) in autistic participants. Both autistic and non-autistic participants had significant associations between camouflaging levels and perceived burden (e.g. feeling like a burden on society) (Cassidy et al, 2020; Cassidy et al, 2021), self-injury behaviour (Cassidy et al, 2021) and victimisation (Trundle et al, 2023). Despite a significant relationship between camouflaging and victimisation, this was not a significant predictive relationship as highlighted by a regression analysis (Trundle, 2023). Camouflaging significantly predicted offending behaviour (Trundle, 2023) and internalising behaviours (Aime et al, 2022). Camouflaging also did not predict substance misuse, however there was a very low level of substance misuse among the sample in the study that explored this association (Janicki-Menzi, 2021). Camouflaging was found to predict internalising behaviours, even when social competence (social skills) was controlled for in non-autistic people, camouflaging also partially mediated the relationship between social competence and internalising behaviours (Aime et al, 2022).
3.8 Autistic and Non-Autistic Participants
Despite associations being significant at the same level, there appeared to be a tendency for slightly stronger correlations between camouflaging and mental health difficulties in non-autistic than autistic participants. (Cassidy et al, 2021; Hull et al, 2019) with no significant differences between participant characteristics. This finding was also evident when comparing individual studies which recruited either all autistic participants (Hull et al, 2021; Cage & Troxell-Whitman, 2019) or non-autistic participants from the general population (Cassidy et al, 2020).

3.9 Confounding variables
Studies varied on whether they controlled for one, multiple or no potentially confounding. Some studies controlled for factors such as age, gender, time since diagnosis, mental health diagnoses and COVID (Perry et al, 2022; Cassidy et al 2020; Aime et al 2022; Trundle, 2021; Cage & Troxell-Whitman, 2019; Bradley et al; 2023; Hull et al 2021; Lu et al 2023). Perry et al, 2022 which controlled for the most factors (ASD diagnosis, time since diagnosis, age and gender) found no significant relationship with camouflaging and wellbeing. Cage & Troxell-Whitman (2019) also controlled for time since diagnosis, age and gender and only found a significant relationship between camouflaging and depression in the “high” camouflaging group, however found significant relationships in all camouflaging groups with stress and anxiety. Trundle (2021) and Aime (2022) controlled for factors such as age, gender, IQ and social competence and did find significant relationships between camouflaging and depression, anxiety and internalising behaviours.

4. Discussion
4.1 The Impact of Camouflaging on Mental Health and Wellbeing
The current review found that camouflaging attempts, as measured by the self-report CAT-Q scale, are associated with a range of mental health outcomes among autistic and non-autistic people. All studies investigating anxiety, depression, stress and suicidality found that higher levels of camouflaging was significantly related to worse mental health outcomes, except for one study that did not find a significant relationship between camouflaging and depression (Cage & Troxell-Whitman, 2019). However, this study controlled for time since diagnosis whilst the others did not.

Although statements can not be made conclusively on the strength of relationships, there did appear to be a tendency for social anxiety and general anxiety to have slightly stronger correlations with camouflaging than other mental health difficulties such as
depression. The extent of this difference varied between studies and most relationships were evident at the same level of significance. This contrasts with Cook et al’s (2021) systematic review which mostly found that correlations between camouflaging and depression outcomes were stronger than correlations between camouflaging and anxiety outcomes. However, Cook et al’s (2021) review included a range of techniques for measuring camouflaging whereas the current review focused exclusively on studies using the CAT-Q. This implies that different camouflaging measurement tools may assess different components of camouflaging, for example, whilst the CAT-Q captures the intention to camouflage, it does not capture the level of unconscious camouflaging an individual engages in. Furthermore, internal-external discrepancy methods may only capture successful camouflaging efforts and be biased by observer ratings (who are usually neurotypical individuals). One study in this review did find that depression was slightly stronger correlated to camouflaging slightly more than anxiety (Lundin Remnélius & Bolte, 2023) however the difference was extremely slight and both were significant at the same level. This study was conducted in Sweden, using the Swedish version of the CAT-Q, which may indicate slight cultural differences in the relationship between camouflaging and mental health outcomes.

Camouflaging was significantly associated with suicidality for autistic and non-autistic people. The correlation appeared to be stronger when suicidality was measured by the SBQ-ASC which was adapted to measure suicidality in autistic people however both the SBQ and SBQ-ASC were significantly associated with camouflaging at a significance level of p<.001 (Cassidy et al, 2021).

Camouflaging was significantly related to well-being and measures of quality of life, except for Perry et al’s (2022) study which found no significant relationship. Similarly to Cage & Troxell’s (2019), Perry et al (2022) also controlled for time since diagnosis among other factors. Previous research has suggested that autistic people may experience and define constructs such as quality of life differently to the general population (McConachie et al, 2018) and this difference was prevalent in this review. Camouflaging predicted lower psychological quality of life (body image and appearance, negative feelings, self-esteem, thinking, learning, memory and concentration) for autistic people only, whilst camouflaging predicted lower social quality of life (personal relationships and social support) for non-autistic males (not females) only (Milner et al, 2022). This study did not state if the measurement used (WHO-QOL-Bref) was valid for autistic participants. Perhaps these findings reflect
autistic peoples’ accounts that camouflaging can bring social benefits such as maintaining friendships and “fitting in” whilst also having a damaging impact upon their mental health (Hull et al, 2017). Furthermore, the impact of social quality of life for non-autistic males but not females may suggest that females are more successful at camouflaging and therefore their social needs are more likely to be met in comparison to males.

Aspects of psychological quality of life such as body image and appearance are corroborated by findings in this review from Bradley et al (2023) which reported that camouflaging significantly predicted eating disorder among autistic people.

4.2 Levels of Camouflaging and Mental Health

Further exploration of the relationship between camouflaging and mental health outcomes appears to indicate that the level of camouflaging a person engages in may be more detrimental to mental health than the level of self-reported autistic traits, as Beck et al’s (2020) study initially suggested. This review found that, in line with previous findings (Lai et al, 2019), autistic people or people with higher levels of autistic traits reported higher levels of camouflaging and mental health difficulties and lower ratings of wellbeing. However, the correlations between camouflaging and mental health outcomes appeared to show a tendency to be slightly stronger among non-autistic people than autistic people in this review (Hull et al 2019; Cassidy et al 2021). This may suggest that the level of autistic traits may not explain the relationship between camouflaging and mental health. This was also supported by studies that controlled for autistic traits and still found significant relationships between camouflaging and mental health outcomes.

When the intricacies of the relationship between camouflaging and mental health was explored through post-hoc analysis by separating groups of people into “high” or “low” camouflaging groups, results showed that only the “high” camouflaging group retained a significant relationship with depression, anxiety, stress and suicidality. However, Cage & Troxell-Whitman (2019) found that those in the “low” camouflaging group did have significant associations with stress and anxiety, but these correlations appeared to be slightly weaker than those in the “high” and “switcher” camouflaging group which showed comparable levels of stress and anxiety. These findings also support Ragin’s (2008) Disconnect Theory that having to switch from camouflaging in some contexts but not others can be just as stressful and anxiety provoking as camouflaging constantly across all contexts. Hull et al’s (2021) findings supported a linear relationship between
camouflaging and mental health outcomes but highlighted that camouflaging above a certain cut-off point results in increased risk of a person meeting the clinical cut-off point for social anxiety, anxiety and depression.

4.3 CAT-Q Subscales and Mental Health
This review collated findings from three studies which reported relationships between the subscales of the CAT-Q (Masking, Compensation and Assimilation) and mental health outcomes (Lundin Remnélius & Bolte, 2023; Hull et al, 2019; Cassidy et al, 2020). In all three studies, the total CAT-Q score and the three subscale scores were significantly related to depression, anxiety, stress, social anxiety, suicidal behaviours, wellbeing and thwarted belongingness. However, Hull et al (2019) did not find a significant relationship between masking or compensating with wellbeing. Interestingly, the assimilation subscale of the CAT-Q appeared to consistently have a slightly stronger correlation with each of these mental health outcomes than the other subscales and the total CAT-Q score among both autistic and non-autistic participants. These findings may imply that the assimilation component of camouflaging is the most detrimental component of camouflaging to autistic and non-autistic people’s mental health, even more so than the three subscales together (total CAT-Q scores).

Inspection of mean scores for each subscale did not appear to indicate significant differences between the levels of masking, compensation or assimilation that people engaged in, although Hull et al (2019) data collection appeared to find that autistic participants did engage in a higher level of assimilation in comparison to the other subscales and in comparison to non-autistic participants. The definition of assimilation describes effortfully engaging in typical behaviours to “fit in” with the neurotypical world (Hull et al, 2019). Perhaps this process is more taxing or distressing than the other components of camouflaging which have more of a focus on hiding or compensating for autistic traits. It is tentatively proposed from this review that this may be related to concepts such as cognitive dissonance, which describes conflicting attitudes, beliefs or behaviours which leads to mental discomfort (Festinger, 1957), as autistic people try to assimilate more “typical” behaviours that conflict with their “true” internal state. Perhaps people who engage in more masking and compensation than assimilation, experience less mental health consequences and this may explain why people describe experiencing camouflaging as more beneficial than harmful (Hull et al, 2017). However, more research should be conducted to gain a deeper understanding of the
findings from this review in terms of the relationship between assimilation and mental health outcomes.

4.4 Mediation Analysis Findings
A number of mediation analyses in this review have drawn attention to concepts that may require further attention for understanding the relationship between camouflaging and mental health outcomes. Cassidy et al’s (2020) findings that the total camouflaging score and assimilation score were only related to suicidality through thwarted belongingness suggest that despite camouflaging motivations to “fit in,” the act of camouflaging may further increase feelings of exclusion by distancing someone further from their “true” self or the autistic community. Therefore, it is the perceived exclusion and sense of not belonging that directly links to suicidality rather than the act of camouflaging itself. However, these findings cannot be generalised as participants were non-autistic people recruited from an undergraduate sample. Furthermore, the directionality of this relationship cannot be determined as this was a cross-sectional study design.

Aime et al’s (2022) study highlighted the unique relationship that camouflaging has with internalising behaviours (depression and anxiety) which is independent of social competence (social skills). This weakens Fombonne’s (2020) suggestion that camouflaging may not be a distinct phenomenon separate from other well-established social constructs such as social anxiety or impression management.

4.5 Current Review Bias
Various points of bias are acknowledged in the current review which may impact the generalisability of findings. Autism research has previously been criticised for it’s lack of representation (Pellicano et al, 2014) and this review is subject to the same criticism as the participants were comprised of mostly white, female, educated, English speaking women from high-income countries. However, the review did include two studies conducted in other languages, with one from a non-western culture (Lu et al, 2023; Lundin Remnélius & Bolte, 2023). The mental health measures used were tools which have been mostly validated on people from white ethnic backgrounds. The nature of online recruitment and participation is likely to exclude those without online access, perhaps from lower socioeconomic backgrounds and may exclude those who have learning difficulties or disabilities who are at increased risk of experiencing mental health difficulties (National Institute for Health and Care Excellence (NICE), 2016). Despite this, only one of the included studies controlled for cognitive abilities (Aime et
An additional source of recruitment bias may be that most of the studies included the word “camouflaging” or “mental health” in the title, therefore, those who participated may be more self-aware or anxious about these concepts and want to seek more information. Additionally, those who lack motivation due to mental health problems such as depression may have avoided completing these oftenlengthy questionnaires.

There was a lack of consistency between whether studies asked people to state their biological sex or their gender identity, with some gathering responses for both and one study conducting analysis on both sex and gender (Hull et al, 2021). The lack of representation from people who identify as non-binary was another issue throughout this review. Some studies did include non-binary people in the analysis however many did not due to an inadequate sample whilst others made no reference to non-binary people. As outlined by the Minority Stress Model (Meyer, 2003), people who belong to multiple minority groups are likely to face increased levels of stress impacting upon their mental health. Therefore, it is imperative to make autism research more inclusive to those from additional minority groups such as ethnic minority and gender identification minority groups.

The measures used to gather mental health information mostly consisted of frequently used mental health screening measures, rather than diagnostic measures, used in research and clinical practise. This must be acknowledged when drawing conclusions about the mental health outcomes found in this review. Many studies failed to report reliability values or state if measures were valid for autistic people. However, most of the measures included were measures frequently used in autism research. Some studies did use measures specifically adapted for autistic people such as the ASA-A and the SBQ-ASC (Cassidy et al, 2021). The quality rating tool used in this review has been recommended but not validated for use with non-autistic populations (Glod et al, 2015). However, this tool was agreed upon among the reviewers as it appeared to be the most relevant and valuable tool for conducting a critical quality assessment on all of the papers. Furthermore, all of the measures assessing mental health were self-report which may impact reliability as many autistic people struggle with alexithymia which is difficulty identifying and distinguishing emotions and bodily sensations (Kinnaird, Stewart & Tchanturia, 2019). Studies may benefit from a combination of self-report and informant report measures to ensure validity.
The reliability of findings may be impacted as studies varied in terms of how they reported missing data or handled other possibly confounding variables. Mixed findings have been reported for the impact of factors such as age of autism diagnosis, age, gender and the COVID-19 upon mental health. The results from this review indicated that time since diagnosis may play an important role in the relationship between camouflaging and mental health as the two studies that controlled for this factor (Perry et al, 2022; Cage & Troxell, 2019) found that camouflaging was not related to wellbeing or depression. However, in Cage & Troxell’s (2019) study camouflaging was related to depression in the high camouflaging groups and was related to stress and anxiety across all groups. Therefore, perhaps certain mental health outcomes such as wellbeing and depression are more impacted by time since diagnosis rather than camouflaging levels. Overall, studies that controlled for variables such as age, gender, other mental health diagnoses, IQ and social competence, found similar results for mental health outcomes than those that did not control for these variables.

4.6 Implications for Practice and Research

Future research should focus on consistency in the measures used to assess mental health and camouflaging. This review provided support for use of the CAT-Q measure which demonstrated good total scale and subscale reliability. Studies with autistic people should also use measures that have been adapted and validated for autistic people or consistently use frequently used measures, ensuring to report on their reliability. Researchers should be more mindful of capturing the experiences of those from minority backgrounds such as non-binary people, non-western cultures and people with learning difficulties or disabilities. Researchers should also adopt a more consistent approach on whether they gather participants sex and or gender identification information.

Nevertheless, these results highlight the importance of further exploration of the CAT-Q subscales and suggest a particular focus on the role of assimilation and the concept of thwarted belongingness on mental health outcomes. Future studies should conduct further mediation analyses with camouflaging and thwarted belongingness with a range of other mental health outcomes in addition to suicidality. However, as these studies were cross sectional, the results can not conclude the directionality of the results and therefore, longitudinal studies would be required to confirm the directionality of these relationships. Understanding the key mechanisms underlying the relationship between
camouflaging and mental health is essential for informing interventions for people who present with mental health difficulties such as anxiety, depression and suicidality.

This review suggests that clinicians should screen for camouflaging levels to inform the risk of people developing mental health difficulties. Clinicians should also take caution when conducting interventions that may indirectly promote camouflaging such as social skills training with autistic and non-autistic people as this may perpetuate mental health difficulties. Perhaps, most importantly, this review highlights the necessity of public initiatives being directed towards reducing autism stigma and increasing autism acceptance so that autistic people and those with autistic traits don’t feel compelled to have to hide these traits. The onus should not be on autistic people to try and fit in to a neurotypical world. Gillespie-Lynch et al’s (2015) study showed how people demonstrated more autism knowledge and less stigmatising opinions after completing online training about autism. This provides rationale and a template for conducting autism training across a range of far-reaching contexts.

5. Conclusion
The current review has corroborated the existing evidence base showing a significant relationship between camouflaging and mental health outcomes, particularly for difficulties such as social anxiety, generalised anxiety and depression. The assimilation subscale of the CAT-Q may play an important role in this relationship as it had a tendency to show slightly stronger correlations with mental health outcomes than the total CAT-Q score and other subscale scores. There is also promising evidence that thwarted belongingness plays a mediating role in the relationship between camouflaging and mental health outcomes such as suicidality.

However, this research was cross-sectional and investigated correlational relationships rather than causation. Longitudinal research is needed to understand the directionality of these relationships, for example does increased levels of camouflaging lead to higher levels of anxiety or do higher levels of anxiety lead to more conscious camouflaging behaviours? Furthermore, given the findings that papers that controlled for time since diagnosis appeared to result in less significant findings, this factor should be controlled for in future settings. The findings of this systematic review should be interpreted in light of these limitations.

This research should focus on including minority groups that are often excluded from autism research. This review reiterates the importance of reducing the autism stigma
and promoting autism acceptance to reduce the damaging impact that camouflaging may have which appears to outweigh the reported benefits

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Journal Article 2: Empirical Project

The Role of Camouflaging and Social Identity on Autism and Eating Disorders

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Abstract

Background: Previous research has focused on cognitive and sensory factors to explain the association between autism and eating disorders, but the roles of social identity and camouflaging are yet to be explored.

Objectives: The objective of this study was to explore the role that social identity, sensory processing and camouflaging have on eating disorder symptomology in autism.

Methods: Autistic participants (n=180) were recruited from NHS settings and community groups. The participants completed online questionnaires measuring autistic identity, eating disorder identity, camouflaging behaviours, sensory processing, autism traits and eating disorder symptomology.

Results: Multiple regression revealed that camouflaging and eating disorder identity significantly predicted 28.3% of eating disorder symptomology. Camouflaging and eating disorder identity predicted unique variance to eating disorder symptomology but sensory processing did not. Autistic identity was not related to eating disorder symptomology.

Discussion: This study highlights the impact that camouflaging behaviours and eating disorder identity can have on eating disorder symptomology in autism and may indicate important considerations for the treatment of eating disorders in autistic people.

Keywords: Autism, camouflaging, social identity, sensory processing, eating disorders

Conflict of interest: None

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1 Introduction
1.1 Autism and Eating Disorders
Autism is a lifelong neurodevelopmental disorder characterised by difficulties with communication, social functioning, repetitive patterns of behaviour and restricted interests (American Psychiatric Association [APA], 2013). A recent systematic review reported the global prevalence of autism to be around 1% of the population, with a male to female ratio of 4:2 (Zeidan et al., 2022). These figures must be interpreted with caution however, given the issues associated with autism assessment cost, as well as the under diagnosis of autistic females (Adamson, Kinnaird, Glennon, Oakley & Tchanturia., 2020; Hull & Mandy, 2017; Milner, McIntosh, Colvert & Happe 2019).

Research has consistently shown that autistic people have higher rates of mental health difficulties and neurodevelopmental comorbidities than non-autistic people (Lai et al., 2019). However, larger scale research such as Lai et al’s (2019) systematic review which examine the co-occurrence of mental health difficulties in autism, have failed to include Eating Disorder (ED) statistics. This is despite the fact that an association between EDs and autism was first highlighted by Gillberg in 1983 and many individual studies have since drawn attention to this relationship (Huke, Turk, Saeidi, Kent & Morgan, 2013; Brede et al, 2020; Solmi et al, 2020). ED are defined as “persistent disturbance of eating or eating-related behaviour which leads to altered intake or absorption of food and causes significant impairment to health and psychosocial functioning” (National Institute for Clinical Excellence, (NICE), 2019). This is different to ‘disordered eating’ which describes similar behaviours and consequences that are not significant enough to meet ED diagnostic criteria (Thorne, 2022). In contrast to the reported sex ratio prevalence of autism, EDs are reported to be more common among females (Striegel-Moore, & Bulik, 2007), specifically Anorexia Nervosa (AN) and Bulimia Nervosa (BN). NICE (2019) report an overall estimate of
700,000 in the UK with a diagnosis of EDs, 90% of whom are female. However, it is recognised that ED in males is significantly under researched and under-diagnosed, with only 1% of ED research being conducted with males (Lavender, Brown & Murray 2017; Murray et al., 2017).

The growing evidence base supporting the prevalence of the relationship between ED and autism has resulted in some researchers suggesting that EDs such as AN may be an expression of autism in some females (Odent, 2010; Westwood, Mandy & Tchanturia, 2017). Systematic reviews have reported autism prevalence rates within clinical populations of AN and BN to range between 4.7 – 22.9% (Huke, Turk, Saeidi, Kent & Morgan, 2013; Nickel et al., 2019). In non-clinical populations of those without a formal diagnosis of autism or ED, significant positive relationships have been found between Autistic traits and disordered eating behaviours (Barnett et al., 2021; Christensen et al., 2019). Westwood et al., (2017) found rates of 20-35% of women with AN scored above clinical cut off levels on the Autism Diagnostic Observation Schedule (ADOS) assessment. However, the nature of this association remains a topic of debate. It has been highlighted that autistic characteristics such as cognitive rigidity could be evident due to the impact of starvation of the brain (Hiller & Pellicano, 2013). Contrastingly, there has been evidence showing high levels of autism characteristics in women who have recovered from EDs (Bentz et al, 2017; Nazar et al. 2018). Furthermore, there is growing evidence to suggest that autistic traits from childhood such as social communication difficulties may increase vulnerability for developing EDs (Westwood, Mandy, Simic & Tchanturia, 2018). Solmi et al’s (2021) longitudinal research demonstrated that autistic traits in 7-year-olds, predicted their disordered eating at age 14. This research taken together suggests that there is an interplay between autistic traits and ED behaviours.
Those with dual diagnoses of autism and ED have been found to experience longer stays in inpatient settings, with more severe presentations of ED and poorer outcomes (Nielsen et al., 2015; Nielsen et al., 2022). A crucial point to consider is that clinicians have shared that they feel under-confident treating autistic people with an ED (Kinnaird, Norton & Tchanturia, 2017). This is somewhat unsurprising as there have been a lack of Randomised Control Trials (RCTs) conducted in this area. Therefore, there is no guidance within NICE guidelines for treating autistic people with ED, despite promising recommendations for adapting treatments for the autistic population (Tchanturia, Dandil, Li, Smith, Leslie & Byford, 2021). Autistic people who have had ED treatment have reported their treatment experiences as being characterised by a lack of understanding and a lack of adaptations for their autism, which has impacted their recovery and relationships with clinicians (Kinnaird, Norton, Stewart & Tchanturia, 2019). As far as the authors are aware, to date, there has only been one clinical pathway designed with adaptations for treating autistic people with AN, taking into account sensory and cognitive difficulties common to autistic people, called the PEACE (Pathway for Eating Disorders and Autism developed from Clinical Experience) Pathway (Tchanturia et al, 2021). This has shown extremely promising results including reduced length of inpatient stay and increased clinician confidence in working with autistic people with AN. Furthermore, this pathway resulted in National Health Service (NHS) savings equating to approximately £22,837 per person and £275,000 per year for the ED service where this pathway was introduced (Tchanturia et al., 2021).

1.2 Explanations for Eating Disorder and Autism Associations
Up until now, both quantitative and qualitative research has focused on cognitive, social and sensory aspects of autism that may contribute to the development and maintenance of EDs among autistic people (Christensen, Bentz, Clemmensen, Strandberg-Larson & Olsen, 2019; Kinnaird et al., 2019). Significant levels of cognitive factors associated
with autism such as inflexible thinking, rigidity and theory of mind difficulties have been reported among ED populations, particularly those with AN (Christensen et al., 2019; Kinnaird et al., 2019). However, there is less evidence to support the prevalence of these cognitive factors in other types of EDs such as Binge Eating Disorder (BED) (Kelly, Bulik & Mazzeo, 2013; Manasse et al., 2015).

1.3 Sensory Processing
The relationship between sensory processing issues and common eating behaviours in autism has recently been highlighted by in a systematic review (Nimbley, Golds, Sharpe, Gillespie-Smith & Duffy 2022). Sensory issues have also been reported among autistic people with AN (Brede et al., 2020; Kinnaird et al, 2020). Altered sensory processing has been reported by 95% of autistic people (Crane, Goddard & Pring, 2009) and it has been proposed that hyper- and hypo-sensitivities can contribute to EDs. For example, food restriction may be a coping mechanism for distressing hypersensory experiences (Brand-Gothelf, 2016; Kinnaird et al., 2020), whilst hyposensitivity to internal sensations may result in difficulty interpreting hunger cues (Brede et al., 2020). Brede et al’s (2020) qualitative study with parents, healthcare workers and autistic women with AN, extracted themes of sensory overload, food-specific sensory sensitivities and internal bodily sensations as contributing to autistic women’s EDs. Autistic women have also reported how treatment settings such as loud or bright inpatient wards and meal plans with foods of certain textures, smells and tastes can make their recovery particularly challenging (Kinnaird et al., 2019).

1.4 Social Identity
Identity has emerged as a key challenge for people in the general population with EDs who have reported that AN is part of their identity and to receive treatment for AN would feel threatening towards their sense of identity (Espíndola & Blay, 2009). This highlights that having a strong ED identity may make ED treatment more difficult to
engage in and be related to higher ED symptomology. Autistic people with EDs have repeatedly stated the role that social identity has played in both the development and maintenance of EDs (Brede et al., 2020; Dandil, Baillie & Tchanturia, 2019). It has been proposed, therefore, that the development of an ED could be related to identity issues specific to a pre-existing or a late diagnosis of autism. Many autistic people, particularly females, receive a late diagnosis of autism (Tubio-Fungueiri, Cruz, Sampaio, Carracedo & Fernández-Prieto, 2017). This late diagnosis has been reported to contribute to worse outcomes such as increased feelings of identity confusion or loneliness as people may struggle to make sense of or navigate their social differences without the context of an autism diagnosis or support from the autistic community (Bargiela, Steward & Mandy, 2016). Accounts of autistic people with EDs have suggested that AN may be a way of coping with feelings of not fitting in or providing them with a sense of identity that they had been lacking (Brede et al, 2020). Identity has also been found to play a role in disordered eating attitudes in other minority groups such as Black women in America with evidence that restrictive EDs are related to the extent to which black women assimilate to white culture (Abrams, Allen & Gray, 1993). This highlights the need to investigate the role that identity plays in the development of EDs, particularly in minority groups.

Autistic people are part of a minority group that is often stigmatised (Botha & Frost 2020; MacLeod, Lewis & Roberston, 2013). The Social Identity Theory (SIT) framework suggests that if people are a member of a stigmatised group, they engage in attempts to regain a positive identity (Tajfel, Turner, Austin & Worchel, 1979). They do this by either promoting the in-group status (e.g. joining support groups or autism rights organisations) or dissociating from this group and identifying with a more socially accepted group. Many people are proud of their autistic identity and appreciate the associated strengths (Cooper, Cooper, Russell & Smith, 2021). Positive social
identification with autism has been associated with mental health benefits such as better collective self-esteem and lower levels of anxiety and depression (Cage, DiMonaco & Newell, 2018; Cooper, Smith & Russell, 2017; Cooper et al., 2021). However, this has not been explored as a potential protective factor against ED in autistic people.

1.5 Camouflaging
Camouflaging has been proposed as a response to autism stigma (Perry, Mandy, Hull & Cage, 2022). It describes attempts to hide autistic traits and “fit in” to a majority neurotypical society by engaging in behaviours that appear non-autistic (Hull et al., 2017). These behaviours include; maintaining eye contact, rehearsing facial expressions, learning social scripts and copying others’ behaviours (Beck, Lundwall, Gabrielsen, Cox & South, 2020; Bargiela et al., 2016). People who engage in camouflaging have reported that it can lead to social benefits such as maintaining friendships or securing jobs and reduce the risk of being bullied for their autistic traits (Hull et al., 2019; 2017). However, emerging evidence has highlighted the relationship between camouflaging and a range of negative mental and physical health outcomes for both males and females (Cook, Hull, Crane & Mandy, 2021). This includes exhaustion, burn out, depression, anxiety, stress, suicidality, and poorer well-being (Beck et al., 2020; Bargiela et al., 2016; Cook et al., 2021).

Similarly, to ED prevalence, camouflaging appears to be more prevalent among autistic females than males (Lai et al., 2017) which may evoke speculation that ED and camouflaging could be interlinked. This has been corroborated by autistic females’ accounts in ED inpatient settings where they often report to engage in camouflaging behaviours (e.g. copying others and adopting their anorexic values) as a way of fitting in to a neurotypical world (Brede et al., 2020). Further evidence has been provided by caregivers who highlight that AN may emerge from a reduced ability to cope in more complex social situations as autistic young people get older (Adamson et al., 2020).
1.6 Rationale
The current evidence base has suggested that autistic people face social challenges such as autism stigma, social communication differences and issues with identity (Perry et al, 2022; Hull et al, 2017). This can lead to motivations to engage in behaviours that hide or compensate for their autistic traits in an attempt to fit in with others (Hull et al, 2019). In particular for those who are diagnosed with autism later in life, they may identify with EDs as a way of coping with confusion about their differences to those in a neurotypical world. Therefore, ED identity and autism identity need to be explored separately as one identity may compensate for another and impact upon ED symptomology. Higher levels of camouflaging have been significantly related to a range of mental and physical health outcomes (Cook et al, 2021). However, research has not yet explored or quantified the impact that camouflaging has on EDs in autistic people. Given the high prevalence of autistic people in ED populations (Huke et al, 2013), higher rates of camouflaging among autistic people and reports that EDs have provided autistic people with a sense of identity (Brede et al, 2020), it seems imperative to provide quantitative findings on the potential role of camouflaging and social identity in EDs for autistic people.

1.7 Study Aims
The aim of the current study is to explore the role of autistic identity, ED identity, camouflaging behaviours and sensory processing in ED symptomology. The purpose of this is to better understand the development and maintenance of ED in autism, and to provide information to inform treatment pathways for autistic people with ED and prevent poor outcomes.

1.8 Study Predictions
It is predicted that (1) a strong autistic identity will predict lower levels of ED symptomology, (2) a strong ED identity will predict higher levels of ED symptomology, (3) higher levels of camouflaging will predict higher levels of ED
behaviours, and (4) high levels of sensory processing will predict high levels of ED behaviours whilst controlling for levels of autistic traits.

2. Methods
2.1 Participants
The inclusion criteria outlined that participants must be able to read English, be 18 years old and over and have either a clinical or self-diagnosis of autism. There were no exclusion criteria for this study. A priori power calculations using the G*Power calculator (Faul, Erdfelder & Buchner, 2009) indicated an adequate sample size for a regression analysis with five predictor variables to be 92 participants. The calculation was based on a statistical power of 0.80 (Cohen, 1988), an alpha level of 0.05 (Green, 1991) with a medium effect size of $F^2=.15$. The current study initially recruited 265 participants, of which 85 were removed due to missing or incomplete data (see section 2.4 Data Analysis for more information), leaving a final sample of 180.

The age range of participants was 18-70 with an average age of 38 years (SD=13.6). Over three quarters of participants had a clinical diagnosis (80.6%, $n=145$) of autism (19.4%, $n=35$, were self-diagnosed). Participants were mostly female (64.4%, $n=116$), followed by males (20%, $N=36$), transgender (10.6%, $n=19$) and those who preferred not to say (5%, $N=9$). Most participants were from a White ethnic background (87.2%, $n=157$), followed by Mixed or Multiple ethnicities (6.7%, $n=12$), Black or African American or Caribbean (2.8%, $n=5$), Asian (2.8%, $n=5$) and Other (0.6%, $n=1$). The majority of participants (63.9%, $N=108$) did not have an ED diagnosis, however 19.4% ($N=35$) did. Table 1 presents the types of diagnosis that were present as well as the frequency of other mental health diagnoses within the study sample.

Table 1

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>N (%)</th>
</tr>
</thead>
</table>

Participant Demographic Information
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age in years ((n=8) missing)</td>
<td>38 (SD: 13.6)</td>
</tr>
<tr>
<td>Gender ((n=0) missing)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>116 (64.4)</td>
</tr>
<tr>
<td>Male</td>
<td>36 (20)</td>
</tr>
<tr>
<td>Transgender</td>
<td>19 (10.6)</td>
</tr>
<tr>
<td>Prefer not to say</td>
<td>9 (5)</td>
</tr>
<tr>
<td>Ethnicity ((n=0) missing)</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>157 (87.2)</td>
</tr>
<tr>
<td>Mixed or multiple ethnicities</td>
<td>12 (6.7)</td>
</tr>
<tr>
<td>Black or African American or Caribbean</td>
<td>5 (2.8)</td>
</tr>
<tr>
<td>Asian</td>
<td>5 (2.8)</td>
</tr>
<tr>
<td>Other</td>
<td>1 (0.6)</td>
</tr>
<tr>
<td>Autism Diagnosis ((n=0) missing)</td>
<td></td>
</tr>
<tr>
<td>Clinical diagnosis</td>
<td>145 (80.6)</td>
</tr>
<tr>
<td>Self-diagnosis</td>
<td>35 (19.4)</td>
</tr>
<tr>
<td>Eating Disorder Diagnosis ((n=0) missing)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>115 (63.9)</td>
</tr>
<tr>
<td>Yes</td>
<td>65 (36.1)</td>
</tr>
<tr>
<td>Frequency of Eating Disorder Types (including some without official diagnosis)</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>108 (60)</td>
</tr>
<tr>
<td>Multiple</td>
<td>24 (13.3)</td>
</tr>
<tr>
<td>Anorexia Nervosa</td>
<td>22 (12.2)</td>
</tr>
<tr>
<td>Other</td>
<td>9 (5)</td>
</tr>
<tr>
<td>Binge Disorder</td>
<td>6 (3.3)</td>
</tr>
<tr>
<td>Bulimia Nervosa</td>
<td>6 (3.3)</td>
</tr>
<tr>
<td>OSFED (Other Specified Feeding and Eating Disorder)</td>
<td>3 (1.7)</td>
</tr>
<tr>
<td>ARFID (Avoidant/ Restrictive Food Intake Disorder)</td>
<td>2 (1.1)</td>
</tr>
<tr>
<td>Other Mental Health Diagnosis ((n=0) missing)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>64 (36)</td>
</tr>
<tr>
<td>Yes</td>
<td>116 (64.4)</td>
</tr>
</tbody>
</table>

Note: This table demonstrates the mean age and standard deviation of participants. It also demonstrates the number, total percentage and amount of missing data for each characteristic.

2.2 Recruitment
This study received ethical approval from the NHS West Midlands Solihull Research Ethics Committee (see Appendix 4) and NHS Tayside to act as a Participant Identification Centre (See Appendix 5).

Participants completed questionnaires online via the Qualtrics Survey platform from May 2022 to October 2022. Online recruitment was chosen for this study due to
possible disruptions that COVID-19 imposed and because previous research highlighted that Autistic people often prefer online platforms as it reduces social demands (Cooper et al., 2017; Hendrckx, 2015) (see Appendix 8-12).

Clinicians within NHS Tayside Eating Disorder service (TEDS) and Autism service (TAACT) informed eligible patients about the study. Advertisements containing the link to the online Qualtrics platform were placed on Social Media platforms such as Twitter, Facebook, Instagram and autism forums. The University and participating organisations also shared the advertisement on their webpages (all appropriate permissions were sought prior to posting).

2.3 Measures
The study contained six questionnaires to gather information on autistic traits, sensory processing, camouflaging, autism identity, ED identity, and ED symptomology. It took participants approximately 30 minutes to complete the study.

2.3.1 Autistic Traits
The Autism Spectrum Quotient (AQ-10) is a shortened 10-item version of the 50-item Autism Quotient scale used to indicate the level of autistic traits with higher scores indicating more autism characteristics. The maximum score for the AQ-10 is 10. The AQ-10 is a screening tool and is not used as a diagnostic tool for autism, with recent research suggesting that it has poor reliability (Taylor, Livingston, Clutterbuck, Shah & Payne, 2020). However, the AQ-10 was used in this study for more descriptive purposes to indicate participant’s level of autistic traits, which was included as a covariate in this study. The shortened AQ-10 also reduces participant burden, is used widely in existing autism research and is recommended by NICE (2012) for autism screening. Critically, it has demonstrated sensitivity of 0.88, specificity of 0.91 and positive predictive value of 0.85 and internal consistency of (α > .85) among autistic
male and female samples (Allison, Auyeung & Baron Cohen, 2012). The AQ-10 displayed moderate reliability in this study ($\alpha = .63$).

2.3.2 Camouflaging
Levels of Camouflaging were measured using the Camouflaging Autistic Traits Questionnaire (CAT-Q). This questionnaire contains 25 statements which participants respond to using a Likert scale to indicate how much they agree or disagree with each statement. The total scores range from 25-175, with higher scores indicating greater camouflaging behaviours. The CAT-Q is comprised of three subscales; Masking, Assimilation and Compensation. The CAT-Q has demonstrated good test-retest reliability ($r = .77$) and high internal consistency for camouflaging ($\alpha = .94$) (Hull et al, 2019). The CAT-Q displayed robust internal consistency in this study ($\alpha = .82$).

2.3.3 Autism Identity
The Social Identification Scale (SIS) (Leach, 2008) is a 14-item scale which has shown good reliability ($\alpha = .87$) across a range of identities. It can be adapted to measure autism social identification by putting the phrase “autistic person/people” at the start of each question and has shown good internal consistency ($\alpha = .91$) (Cooper et al, 2017). Participants rate on a 7-point Likert scale how much they agree or disagree with each statement. It has two dimensions; self-investment which is made up of solidarity ($\alpha = .82$), satisfaction ($\alpha = .84$) and centrality ($\alpha = .78$) and self-definition which is comprised of self-stereotyping ($\alpha = .86$) and in-group homogeneity ($\alpha = .66$). It takes around 2-3 minutes to complete. The SIS demonstrated strong internal consistency in this study ($\alpha = .90$).

2.3.4 Eating Disorder Identity
The single item social identity (SISI) measured how much participant’s identified with others who have an ED by using a Likert scale to measure how much participants agree with the statement “I identify with people with eating disorders.” Scores range from between one and seven with higher scores indicating that the participant feels stronger
levels of social identification to people with ED. Although a single item scale may raise concerns around validity, sensitivity and reliability, other scales measuring identity such as Leach et al’s 14-item scale (2008) were deemed inappropriate for this particular variable as many participants in this study did not have an ED, therefore the questions would have been inapplicable. Crucially, the SISI has demonstrated good reliability and validity for measuring social identification, with strong correlations to the SIS ($r = .84$) (Postmes, Haslam & Jans, 2013). A reliability value could not be conducted for this single item scale in this study.

2.3.5 Sensory Processing
The Sensory Processing Quotient (10 item) (Greenberg, Warrier, Allison, & Baron-Cohen, 2018) was used to measure participant’s levels of sensory sensitivity across the five senses. It is a shortened version of the 92-item and 35-item SPQ questionnaire, therefore reduces participant burden. Participants respond to 10 statements using a Likert Scale to indicate how strongly they agree or disagree with each statement. The maximum score that can be obtained is 30, with higher scores indicating greater sensory sensitivities. The SPQ demonstrated good internal consistency in this study ($a= .85$)

2.3.6 Eating Disorder Symptomology
The Eating Disorder Examination Questionnaire Short (EDE-QS) was used to measure ED behaviours and attitudes by asking participants to consider the preceding seven days when responding to 12 items on a 4-point response scale. It is a shortened version of the Eating Disorder Examination Questionnaire (EDE-Q) 28-item scale often used in autism research to measure ED (Kerr-Gaffney, Halls, Harrison & Tchanturia 2020, Westwood et al, 2017) and has been proposed as more clinically useful as it can provide information on the severity of ED without the additional burden of more questions (Prnjack et al, 2020). A maximum score of 36 can be obtained with higher scores
indicating more ED symptomology and scores of 15 or above indicating potential ED cases in clinical settings (Prnjack et al, 2020).

The EDE-QS is strongly correlated with the EDE-Q, \( r = .91 \) for people without ED; \( r = .82 \) for people with ED) and displayed high internal consistency in previous studies \( (\alpha = .91) \) (Gideon, Hawkes, Mond, Saunders, Tchanturia & Serpell, 2016). It has showed good levels of specificity (.85), sensitivity (.83) and positive predictive value (.37) (Prnjack et al, 2020). The EDE-QS demonstrated strong internal consistency in this study \( (\alpha = .91) \).

2.4 Data analyses
The data was exported from Qualtrics to a password protected excel file that only the research team had access to. The data was analysed using IBM SPSS V22. Data cleaning removed erroneous data before analyses occurred. That is, participants’ data were removed if the participant did not consent to take part \( (n=32) \) or if they were less than 85% completed \( (n=48) \), completed in less than 260 seconds as this may have implied automated or streamlining through responses \( (n=3) \), or if they were completed as part of a preview or mock response \( (N=2) \). All items in the predictor and outcome variable questionnaires were required to be completed. There were low levels of missing data among the remaining data, with 161 participants completing 100% of the questionnaires and the remaining 19 participants completing 95%, therefore no further action was required at the pre-analysis stage. Missing data for demographic variables are shown in Table 1.

Assumptions for parametric analyses were explored. The Variance Inflation Factor (VIF) for each variable was below two, indicating that the data were not vulnerable to multicollinearity. Assumptions of normality of residuals were checked through viewing Histogram and Q-Q plots, and scatterplots of the standardised residuals and predicted values indicated that the assumptions of homoscedasticity and linearity were also met.
Bivariate correlations were conducted to establish which predictor (sensory processing, autism identity, camouflaging and ED identity) and covariate (autism traits) variables showed a significant relationship with the outcome variable of ED symptomology, so that only significant results would be entered into regression models. A stepwise hierarchical multiple regression was then performed to test predictions. Bivariate correlations were conducted to establish which predictor and covariate variables showed a significant relationship with the outcome variable of ED symptomology and only significant results from this were entered into regression models. A stepwise multiple regression was then performed to test predictions. Significant covariates were entered into the first level of the model, followed by the predictor variables based on the strength of their relationship with the outcome variable of ED symptomology. The regression co-efficients produced from the multiple regression were then explored to examine the unique variance that each predictor variable contributed to the ED symptomology outcome.

2.5 Community Involvement
This study was co-produced by members from the autistic community with lived experience following participatory research guidelines (Fletcher-Watson et al., 2019). A peer autistic researcher with lived experience of ED helped with the initial conceptualisation of the project, ensuring relevance to the autistic community. Two autistic mentors also aided selection of appropriate measures, looked over participant documents and were involved in the writing (and co-authorship) of the current manuscript.

3. Results
3.1 Means and Standard Deviations
Table 2 presents the means and standard deviations for each of the predictor and outcome variables (see Table 2).
Table 2

*Mean Score and Standard Deviation of Each Variable*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDE-Q</td>
<td>6.86</td>
<td>4.86</td>
</tr>
<tr>
<td>AQ</td>
<td>7.87</td>
<td>1.90</td>
</tr>
<tr>
<td>SPQ</td>
<td>19.74</td>
<td>6.37</td>
</tr>
<tr>
<td>CATQ</td>
<td>115.48</td>
<td>17.99</td>
</tr>
<tr>
<td>SISI</td>
<td>4.17</td>
<td>2.02</td>
</tr>
</tbody>
</table>

3.2 Correlations

Table 3 presents Pearson’s correlation coefficients between the variables that were significant with the outcome variable of ED symptomology (see Table 3).

Pearson’s correlation tests were performed with a Bonferroni adjusted alpha level of .008 (.05/6) to explore the presence and strength of relationships between the variables. Weak to moderate positive and significant correlations were found between ED symptomology and; ED identity ($r = .52$, $p < .001$), camouflaging behaviours ($r = .31$, $p < .001$) and sensory processing ($r = .21$, $p = .002$). A weak positive correlation was found between autism ED symptomology and autism traits ($r = .19$, $p = .012$), at significance level of .05, but not at the bonferroni corrected level of .008.

Although it was not related to the study’s predictions, interesting relationships were found between variables as shown in Table 3. Camouflaging and social identity with autism showed a significant weak and positive relationship ($r = .19$, $p = .012$). Camouflaging behaviours showed significant, weak and positive relationships with; autistic traits ($r = .30$, $p < .001$), social identity with EDs ($r = .21$, $p = .005$) and sensory processing ($r = .33$, $p < .001$). Sensory processing displayed significant, weak and
positive relationships with social identity with EDs ($r = .21, p = .005$) and autistic traits ($r = .24, p = .002$).

There was no significant relationship found between ED symptomology and social identity with autism. Therefore, this variable was not included as a predictor variable for ED symptomology in further regression analyses.

**Table 3**

*Correlations Between Variables*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>AQ: Autistic</td>
<td>-</td>
<td>.360*</td>
<td>.182* (0.16)</td>
<td>.293** (&lt;.001)</td>
<td>.238** (.002)</td>
<td>.190* (0.012)</td>
</tr>
<tr>
<td>Traits</td>
<td></td>
<td>*&lt;.001</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIS: Autism</td>
<td></td>
<td>-</td>
<td>.109 (0.155)</td>
<td>.363** (&lt;.001)</td>
<td>.190* (.012)</td>
<td>-.023 (-.761)</td>
</tr>
<tr>
<td>Identity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SISI: Social</td>
<td></td>
<td></td>
<td>-</td>
<td>.256** (&lt;.001)</td>
<td>.214** (.005)</td>
<td>.515** (&lt;.001)</td>
</tr>
<tr>
<td>Identity with</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eating Disorders</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CATQ: Camouflaging Behaviours</td>
<td>-</td>
<td></td>
<td>.328** (&lt;.001)</td>
<td>.308** (&lt;.001)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPQ: Sensory Processing</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td>.213* (.002)</td>
<td></td>
</tr>
<tr>
<td>EDE-Q: Eating Disorder Symptomology</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3.3 Stepwise hierarchical Multiple Regression

A stepwise hierarchical multiple regression was conducted to further analyse the significant relationships that were found between ED behaviours and the predictor variables of sensory processing, camouflaging and social identity with ED. Autistic traits was treated as a covariate and entered into the first level. Model 1, with autistic traits as the only predictor, explained 3.1% of the variance and was significant \( F (1,178) = 6.64, p = .011 \). Model 2, in which Sensory processing was added, explained significantly more variance \( R^2 \text{change} = .035, F (1,177) = 6.61, p = .01 \). The model significantly predicted 6% of the variance in ED symptomology (Adjusted \( R^2 = .060 \) \( F (2, 177) = 6.73, p = .002 \)). Model 3, in which camouflaging was added, explained more variance, and this increase was significant \( R^2 \text{change} = .047, F(1, 176) = 9.39, p = .003 \). Model 3 significantly predicted 10.3% of the variance in ED symptomology (Adjusted \( R^2 = .103 \) and was significant \( F (3, 176) = 7.83, p < .001 \)). Model 4, in which ED identity was added to the model, explained significantly more of the variance \( R^2 \text{change} = .181, F (1, 175) = 45.32, p < .001 \). Model 4 with all four predictor variables, significantly predicted 28.3% of the variance in ED symptomology [Adjusted \( R^2 = .283 \) \( F (4, 175) = 18.68, p < .001 \)].

The regression coefficients showed the unique variance that each predictor variable contributed to ED symptomology outcomes. Model 4 shows that camouflaging \( (\beta = .15, p = .031) \) and ED identity \( (\beta = .448, p < .001) \) contributed unique variance to ED symptomology. Autistic traits \( (\beta = .06, p = .372) \) and sensory processing \( (\beta = .06, p = .396) \) did not contribute unique significant variance to ED symptomology, see Table 4.
Table 4

Regression Co-efficient

<table>
<thead>
<tr>
<th>Model 1</th>
<th>B</th>
<th>SE B</th>
<th>B</th>
<th>P</th>
<th>95%CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>3.305</td>
<td>1.528</td>
<td>.049</td>
<td>[.020, 6.049]</td>
<td></td>
</tr>
<tr>
<td>AQ Total</td>
<td>.486</td>
<td>.189</td>
<td>.190</td>
<td>.011</td>
<td>[.114, .859]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
</tr>
<tr>
<td>AQ Total</td>
</tr>
<tr>
<td>SPQ Total</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
</tr>
<tr>
<td>AQ Total</td>
</tr>
<tr>
<td>SPQ Total</td>
</tr>
<tr>
<td>CATQ Total</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
</tr>
<tr>
<td>AQ Total</td>
</tr>
<tr>
<td>SPQ Total</td>
</tr>
<tr>
<td>CATQ Total</td>
</tr>
<tr>
<td>SISI Total</td>
</tr>
</tbody>
</table>

4. Discussion

4.1 Findings
This study explored the role that autism identity, ED identity, sensory processing and camouflaging have on ED symptomology in autistic people. Most of the predictions were supported and the results indicated that high levels of camouflaging behaviours,
sensory processing issues and strong ED identity predicted ED symptomology in autistic people. However, confounding factors such as age, sex and age of diagnosis, were not controlled for in this study which may play a role in this relationship. Additionally, this relationship reflects correlation rather than causation and does not provide information on the directionality of the relationship between the predictor and outcome variable. A longitudinal study would be required to identify the directionality. However, from the variables included in this study, ED symptomology was most strongly predicted by camouflaging behaviours and ED identity in combination. However, there was no evidence to support the prediction that strong autistic identity predicted lower ED behaviours.

4.2 Camouflaging and Eating Disorders
This is the first study that quantitatively explored the role of camouflaging on disordered eating in autism. The findings suggest that accounts of autistic people and their parents that EDs are related to camouflaging behaviours as a way of coping with not feelings of not fitting in can be corroborated (Brede, et al 2020; Adamson et al, 2020). Camouflaging may contribute to the development of EDs in autistic people if people are motivated by thoughts that looking a certain way may help them connect with others as suggested in Brede et al’s (2020) study. This may hold particular truth for those who receive a late diagnosis of autism and are therefore, more likely to make sense of not fitting by attributing this to their appearance (Brede et al, 2020).

People in the general population have reported that AN is used as a way to cope with mental health difficulties (Espíndola & Blay, 2009), which autistic people experience higher levels of (Lai et al, 2019). Perhaps the relationship between camouflaging and ED symptomology reflect autistic people’s coping strategies for mental health difficulties. Alternatively, ED symptomology may be a way of coping with the reported consequences of camouflaging such as stress or anxiety. This may contribute to
treatment difficulty of EDs in autism if high levels of camouflaging persist. However, more research should be conducted to explore the mechanisms of the relationship between camouflaging and disordered eating or EDs. Nevertheless, this research adds to existing research that has shown high levels of camouflaging behaviours lead to poor mental health outcomes (Beck et al, 2020; Bargiela et al, 2016) by suggesting that this may extend to ED outcomes.

4.3 Social Identity and Eating Disorders
The strongest relationship was found between ED identity and ED symptomology, which supports existing evidence that EDs are strongly related to identity in the general population (Espíndola & Blay, 2009) and replicates these findings to the autistic community. In Brede et al’s (2020) study, autistic participants reported that EDs provided a sense of identity that they did not previously have. Therefore, the current study predicted that a stronger autism identity may be a protective factor and therefore, be related to less ED symptomology, this prediction was influenced by findings that stronger autism identity was associated with better mental health outcomes (Cooper et al. 2021; 2017) A negative relationship was found between autism identity and ED symptomology, however this was not significant therefore, this prediction was not supported.

This suggests that having a stronger autistic identity does not have the same protective effect for EDs as it does for other mental health difficulties. Cooper et al’s (2021; 2017) studies had higher percentages of male participants than the current study which may suggest the significance and impact of autism identity also differs between males and females and perhaps this study did not recruit enough males to detect small significant effects. Furthermore, only 36% of this study had an ED diagnosis at some point in their life and it is likely that this study attracted people who have a stronger autism identity. Therefore, participant bias may have played a role in these results and the relationship
between autism identity and ED should be further explored among clinical ED populations.

The positive relationship between ED identity and ED symptomology along with the negative relationship (although non-significant) between autism identity and ED symptomatology highlight the need to explore how ED identity and autism identity may interact to influence ED symptomology in autistic people. As literature seems to suggest, autistic people who are diagnosed later in life may identify less with autism but identify more with ED as it gives them a sense of identity. This may have the consequence of increasing the likelihood of ED symptomology.

4.4 Sensory Processing and Eating Disorders
Although sensory processing and ED symptomology was significantly correlated, and sensory processing significantly explained some variance in ED symptomology outcomes, it did not explain a large amount. It also did not significantly explain unique variance, indicating that although these concepts are related, sensory processing does not appear to strongly predict ED symptomology in autism when camouflaging and ED identity are controlled for.

This was a surprising finding as it contrasts with existing evidence about the relationship between EDs, disordered eating and sensory issues (Nimbley et al, 2022; Kinnaird et al, 2020; Brede et al, 2020). However, research to date has focused on this relationship with AN or ARFID and the few studies that have explored this relationship in other EDs, such as BED have provided less evidence for this relationship (Kelly et al, 2013). Participants in the current study reported a mixture of either having no diagnosed ED or various types of ED such as AN, BED, BN, OSFED, ARFID which may explain the weaker predictive value of sensory processing that was found. However, it is worth noting that autistic people experience other types of ED (Huke et
and more research is needed to better understand the distinct contributing factors to each of these EDs.

The EDE-QS provides an indication of ED symptoms across a range of EDs such as AN, BED and BN and is less likely to capture ARFID behaviours. Perhaps sensory processing plays more of a significant or direct role in EDs such as AN and ARFID due to food related sensitivities (Nimbley et al, 2022) or difficulties with interpreting hunger cues (Brede et al, 2020) and play less of a substantial role EDs such as BN or BED. However, this should be further explored in clinical samples of autistic people with a diagnosis of ED.

Perhaps sensory processing is related to EDs in autism through camouflaging as camouflaging can include suppressing behaviours such as “stimming” (self-stimulatory behaviour) which may help autistic people cope with sensory issues, anxiety and pain reduction (Hull et al, 2017; Baldwin & Costly, 2016). Therefore, removal of this coping mechanism may increase feelings of distress or anxiety which is known to contribute to EDs (Espindola & Blay, 2009). Future research could explore this proposed relationship through mediation analyses of sensory processing, camouflaging and ED symptomology.

4.5 Camouflaging and Identity

Although it was not a hypothesis within this study, attention must be drawn to the significant relationships that were found between camouflaging and identity. A positive significant relationship was found between autism identity and camouflaging. Camouflaging has been described as an attempt to dissociate from autism and lead to worse mental health outcomes, whilst a positive autism identity has been suggested as a protective factor against poorer mental health outcomes (Cooper et al, 2017). Previous studies have found that lower levels of camouflaging are associated with high autistic identification and disclosure of autism diagnosis to others (Cage & Troxell-Whitman,
Therefore, it is surprising that this study indicates that the more positive connotations one associates with being autistic, the more they engage in camouflaging behaviours.

Some tentative suggestions are made in this study that perhaps those who have a stronger autistic identity are more aware of consciously camouflaging autistic traits therefore score higher on the CAT-Q which does not capture levels of unconscious camouflaging. Alternatively, it could be postulated that people who are more aware of camouflaging may camouflage more successfully and experience more social benefits, therefore camouflaging and positive autism identity can exist simultaneously. This suggestion supports the autistic person’s account from Hull et al (2017) that camouflaging can benefit autism identification by showing that autistic people can have “people skills” and be “good role models” (Hull et al, 2017).

It is likely that those who were drawn to participate in this study are people who are more aware of camouflaging behaviours which may impact the interpretation of these results. Previous studies have tried to overcome this potential recruitment bias by excluding the word camouflaging from study advertisements (Trundle, 2021).

4.6 Strengths and Limitations
It is essential to investigate the various factors that contribute to all types of ED and disordered eating behaviours among autistic people. This study has added to the research base by exploring sensory processing, identity and camouflaging factors for the first time in terms of ED symptomology in autistic people. The study has also suggested a number of promising findings that require further exploration. Despite these strengths there are limitations associated with the study. This includes the limited availability of existing measures to capture autistic identity. The SIS was not originally developed for measuring autistic identity, however it was the only appropriate tool available that had previously been adapted and used to measure autistic social identity
(Cooper et al, 2017; 2021) and demonstrated strong internal consistency within this study. However, more research should focus on ensuring valid measures are available to capture this concept, given the impact that this may have on autistic people’s mental health. The use of a single item measure (SISI) may raise concerns for reasons of validity and reliability however it was selected as the most appropriate tool for this study which recruited people with and without an ED.

The study design was cross-sectional rather than longitudinal, therefore no causal inferences can be made from these findings on the directionality of the relationship between the predictor variables and ED symptomology. Furthermore, confounding variables that may play a role the relationships found were not controlled for. For example, concept such as self-esteem, thwarted belongingness, age, sex or time since diagnosis may play influential roles in this relationship but were not controlled for.

This study employed online recruitment to ensure that participants from various geographical locations and demographics could take part. However, this sample was not representative of the heterogeneity among the autistic population as the majority of this study were white (87.2%) and female (64.4%). This implies that caution should be taken when applying the findings of these results to all autistic people (i.e. those who have high support needs, trans and non-binary, children etc).

It could be argued that including self-diagnosed autistic participants could yield unreliable results however there was recognition from the autistic mentors and researchers that without this inclusion, many autistic people could have been excluded from the study due to issues around timely autism diagnoses.

4.7 Future Research
Future research needs to explore the significant relationship that was found between camouflaging and ED symptomology to understand the directionality and key
mechanisms underlying this relationship. More research is needed to investigate the role that sensory issues may have in EDs other than AN and ARFID. Although autism identity was not related to ED symptomology in this study, related concepts should be explored such as autism acceptance or collective self-esteem (group self-esteem; Cooper et al, 2021) to investigate whether these factors predict or protect against ED symptomology. In addition to this, more under-represented autistic groups need to be included in ED research to better understand the underpinning mechanisms that contribute to ED diagnoses. These groups include those who have non-white ethnicity, non-cis gender and those who have high support needs.

4.8 Recommendations
Following the valuable work of the PEACE pathway, it is imperative that all ED services are adapted for Autistic people, with Autistic people at the centre to increase the likelihood of treatment success. The current findings suggest that camouflaging is an important factor to consider in the adaptation of clinical assessment and intervention for EDs in autistic people. Camouflaging and ED may be ways of coping with underlying distress or anxiety, as well as providing autistic people with a sense of identity. Therefore, it is essential to consider alternative strategies that can be used to cope with these difficulties,

However, the onus must not be on autistic people to develop strategies to cope with neurodevelopmental differences in a neurotypical world. Research has demonstrated that autism stigma is positively significantly related to camouflaging (Perry et al, 2022). Therefore, investment in creating a more autistic-friendly environment where autistic people feel more accepted and less pressure to hide autistic traits may have significant mental health benefits for the autistic population.
5. Conclusion
This study has uniquely added to understanding the relationship between autism and disordered eating by highlighting the impact that camouflaging behaviours, sensory processing and autism identity with ED have on disordered eating in autistic people. This emphasises the need to reduce the stigma of autism and increase awareness of camouflaging behaviours and their impact on disordered eating in autistic groups. More quantitative and qualitative research should be conducted to extend the findings of this study and provide a more in-depth understanding of the role of autistic identity, sensory processing and camouflaging in autistic groups who have EDs.

References
Abrams, K. K., Allen, L. R., & Gray, J. J. (1993). Disordered Eating Attitudes and Behaviours, Psychological Adjustment, and Ethnic-Identity – A Comparison of


Christensen, S. S., Bentz, M., Clemmensen, L., Strandberg-Larsen, K., & Olsen, E. M. (2019). Disordered eating behaviours and autistic traits-Are there any


Solmi, F., Bentivegna, F., Bould, H., Mandy, W., Kothari, R., Rai, D., . . . Lewis, G. (2021). Trajectories of autistic social traits in childhood and adolescence and


Thesis Portfolio References

Abrams, K. K., Allen, L. R., & Gray, J. J. (1993). Disordered Eating Attituded and Behaviours, Psychological Adjustment, and Ethnic-Identity – A Comparison of Black-


Botha, M., & Frost, D. M. (2020). Extending the minority stress model to understand mental health problems experienced by the autistic population. Society and mental health, 10(1), 20-34


Christensen, S. S., Bentz, M., Clemmensen, L., Strandberg-Larsen, K., & Olsen, E. M. (2019). Disordered eating behaviours and autistic traits-Are there any associations in


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traits and adaptive skills. Journal of autism and developmental disorders, 48, 1698-1711.


(Autism CRC) conceptual model to promote mental health for adolescents with ASD. Clinical Child and Family Psychology Review, 19, 94-116.


Appendices

Appendix 1
Autism Journal Guidelines for Preparing Manuscript
4. Preparing your manuscript for submission

4.1 Formatting

Autism asks that authors use the APA style for formatting. The APA Guide for New Authors can be found on the APA website, as can more general advice for authors.

4.2 Artwork, figures and other graphics
For guidance on the preparation of illustrations, pictures and graphs in electronic format, please visit SAGE’s Manuscript Submission Guidelines.

Figures supplied in colour will appear in colour online regardless of whether or not these illustrations are reproduced in colour in the printed version. For specifically requested colour reproduction in print, you will receive information regarding the costs from SAGE after receipt of your accepted article.

### 4.3 Supplementary material

This journal is able to host additional materials online (e.g. datasets, podcasts, videos, images etc) alongside the full-text of the article. For more information please refer to our guidelines on submitting supplementary files.

### 4.4 Terminology

#### 4.4.1 Terminology about autism and autistic people

*Autism* has researched and produced its own guidance on terminology and language used in autism research. Please consult the guide here: autism terminology guidelines.

#### 4.4.2 Language used to discuss race and ethnicity

Likewise, *Autism* has also produced the following guidance to be considered when writing about race and ethnicity. Please consult the guide here: race and ethnicity language guidelines.

### 4.5 Reference style

*Autism* adheres to the APA reference style. View the APA guidelines to ensure your manuscript conforms to this reference style.

### 4.6 English language editing services

Authors seeking assistance with English language editing, translation, or figure and manuscript formatting to fit the journal’s specifications should consider using SAGE Language Services. Visit SAGE Language Services on our Journal Author Gateway for further information.

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# Appendix 2

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<td>The constructs of interest are adequately defined or described</td>
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<td>The research question of the study is clearly formulated</td>
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<td>Yes</td>
<td>A population-based sample was targeted</td>
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<td>A convenience sample was used with an attempt to use multiple recruitment sources</td>
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<td>A highly selective recruitment method was used (e.g. selectively referred patients already taking part in another study) or recruitment sources are not reported</td>
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<td>Domain</td>
<td>Criterion</td>
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<tr>
<td>Item 5</td>
<td>Is the sample used in the study homogenous and recruited at the same time point?</td>
<td>Yes</td>
<td>The sample is recruited for the study at the same time point. (sample deliberately targeting female autism)</td>
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<td>The sample is recruited for the study, but the participants are assessed at different time points</td>
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<td>The sample consists of pooled samples from different studies and the data is collected at different time points</td>
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<td>Item 6*</td>
<td>Was ASD diagnosis confirmed for the study?</td>
<td>Yes</td>
<td>Diagnoses have been confirmed for this study by use of a ‘gold-standard’ diagnostic tool (i.e. ADOS or ADI-R)</td>
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<td>Diagnoses have been confirmed for this study, but not by use of a gold-standard tool</td>
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<td>Item 7</td>
<td>Are inclusion and exclusion criteria described?</td>
<td>Yes</td>
<td>Inclusion and exclusion criteria are explicitly reported</td>
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<td>Inclusion and exclusion criteria are not explicitly reported</td>
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<td>Item 8</td>
<td>Was level of cognitive functioning of participants assessed?</td>
<td>Yes</td>
<td>Level of cognitive functioning is reported and based on assessment using a standardised instrument and was assessed either for the study or within the preceding 3 months</td>
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<td>Partially</td>
<td>Level of cognitive functioning is reported but is based on previous (non-recent) assessment or on method other than standardised instrument (e.g. position in school system) or cognitive function was assessed but very broadly reported</td>
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<td>Are sample characteristics</td>
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<td>Other demographic variables</td>
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<td>Other demographic variables are reported (e.g. location, ethnicity, race)</td>
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<td>Other demographic variables are not reported</td>
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<td>Based on the above, is the sample</td>
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<td>Sensory measures</td>
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<td>Item 10*</td>
<td>Are sensory processing patterns measured using standardised measures of sensory processing?</td>
<td>Yes</td>
<td>Standardised measures are used in this study</td>
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<td>Item 11*</td>
<td>Are sensory processing patterns measured using valid measures of sensory processing?</td>
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<td></td>
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<td>Non-standardised measures are used</td>
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<td>Yes</td>
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<td>Evidence of good validity of the measures is provided in this study (e.g. 50% of the variance explained by factors, correlations with 'gold' standard measures ≥0.70)</td>
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<td>using reliable measures of the construct?</td>
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<td>Yes</td>
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<td>Validity and reliability are not reported in the current sample</td>
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<td>Are the missing values reported and how they were handled?</td>
<td>Yes</td>
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<td>Percentage of missing items not described and not reported how missing items were handled</td>
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<td>Is the statistical analysis appropriate to the design?</td>
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<td>The analytic strategy is appropriate to the design</td>
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**Discussion**

| Item 25 | Do the conclusions follow adequately from results? | Yes | Main findings are clearly described and follow appropriately from the results and analyses |
|         |                                                   | Partially | Some limitations in the clarity of description of main findings and their relation to results |
|         |                                                   | No/NR | Lack of appropriate description of findings and/or findings are over/understated and do not follow clearly from results |

| Item 26 | Are limitations acknowledged? | Yes | Clear acknowledgement of main limitations of the study and consideration given to the impact of these on interpretation |
|         |                                | Partially | Some limitations are acknowledged but not all, or no consideration given to the impact of limitations on interpretation |
|         |                                | No/NR | No acknowledgement of limitations |

**Appendix 3**

*Quality Assessment of Included Studies*

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Measures
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Appendix 4
NHS IRAS Ethical Approval

West Midlands - Solihull Research Ethics Committee
Equinox House
City Link
Nottingham
NG2 4LA

30 March 2022
Miss Siolfa Bradley
BF1
6 Brighton Street
Edinburgh
EH1 1HD

Dear Miss Bradley

Study title: The Role of Social Identity and Camouflaging in Autism and Eating Disorders
REC reference: 22/WM/0040
Protocol number: CAHSS2110/04
IRAS project ID: 303117

Thank you for your email of 28 March 2022, responding to the Proportionate Review Sub-Committee’s request for changes to the documentation for the above study.

The revised documentation has been reviewed and approved on behalf of the PR sub-committee.

Confirmation of ethical opinion

On behalf of the Research Ethics Committee (REC), I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised.

Good practice principles and responsibilities

The UK Policy Framework for Health and Social Care Research sets out principles of good practice in the management and conduct of health and social care research. It also outlines the responsibilities of individuals and organisations, including those related to the four elements of research transparency:

1. registering research studies
2. reporting results
3. informing participants

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4. **sharing study data and tissue**

**Conditions of the favourable opinion**

The REC favourable opinion is subject to the following conditions being met prior to the start of the study.

**Confirmation of Capacity and Capability (in England, Northern Ireland and Wales) or NHS management permission (in Scotland) should be sought from all NHS organisations involved in the study in accordance with NHS research governance arrangements.** Each NHS organisation must confirm through the signing of agreements and/or other documents that it has given permission for the research to proceed (except where explicitly specified otherwise).

Guidance on applying for HRA and HCRW Approval (England and Wales)/ NHS permission for research is available in the Integrated Research Application System.

For non-NHS sites, site management permission should be obtained in accordance with the procedures of the relevant host organisation.

Sponsors are not required to notify the Committee of management permissions from host organisations.

**Registration of Clinical Trials**

All research should be registered in a publicly accessible database and we expect all researchers, research sponsors and others to meet this fundamental best practice standard.

It is a condition of the REC favourable opinion that all **clinical trials are registered** on a publicly accessible database within six weeks of recruiting the first research participant. For this purpose, ‘clinical trials’ are defined as:

- clinical trial of an investigational medicinal product
- clinical investigation or other study of a medical device
- combined trial of an investigational medicinal product and an investigational medical device
- other clinical trial to study a novel intervention or randomised clinical trial to compare interventions in clinical practice.

Failure to register a clinical trial is a breach of these approval conditions, unless a deferral has been agreed by the HRA (for more information on registration and requesting a deferral see: [Research registration and research project identifiers](#)).

If you have not already included registration details in your IRAS application form you should notify the REC of the registration details as soon as possible.

**Publication of Your Research Summary**

We will publish your research summary for the above study on the research summaries section of our website, together with your contact details, no earlier than three months from the date of this favourable opinion opinion letter.
Should you wish to provide a substitute contact point, make a request to defer, or require further information, please visit: https://www.hra.nhs.uk/planning-and-improving-research/application-summaries/research-summaries/

N.B. If your study is related to COVID-19 we will aim to publish your research summary within 3 days rather than three months.

During this public health emergency, it is vital that everyone can promptly identify all relevant research related to COVID-19 that is taking place globally. If you haven’t already done so, please register your study on a public registry as soon as possible and provide the REC with the registration detail, which will be posted alongside other information relating to your project. We are also asking sponsors not to request deferral of publication of research summary for any projects relating to COVID-19. In addition, to facilitate finding and extracting studies related to COVID-19 from public databases, please enter the WHO official acronym for the coronavirus disease (COVID-19) in the full title of your study. Approved COVID-19 studies can be found at: https://www.hra.nhs.uk/covid-19-research/approved-covid-19-research/

It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).

After ethical review: Reporting requirements

The attached document “After ethical review – guidance for researchers” gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators
- Notification of serious breaches of the protocol
- Progress and safety reports
- Notifying the end of the study, including early termination of the study
- Final report
- Reporting results

The latest guidance on these topics can be found at https://www.hra.nhs.uk/approvals-amendments/managing-your-approval/.

Ethical review of research sites

The favourable opinion applies to all NHS/HSC sites taking part in the study, subject to management permission being obtained from the NHS/HSC R&D office prior to the start of the study (see “Conditions of the favourable opinion” above).

Approved documents

The documents reviewed and approved by the Committee are:
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**Statement of compliance**

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

**User Feedback**

The Health Research Authority is continually striving to provide a high quality service to all applicants and sponsors. You are invited to give your view of the service you have received and the application procedure. If you wish to make your views known please use the feedback form available on the HRA website:

http://www.hra.nhs.uk/about-the-hra/governance/quality-assurance/

**HRA Learning**

We are pleased to welcome researchers and research staff to our HRA Learning Events and online learning opportunities– see details at:

https://www.hra.nhs.uk/planning-and-improving-research/learning/
IRAS project ID: 303117
Please quote this number on all correspondence

With the Committee's best wishes for the success of this project.

Yours sincerely

Dr Rex J Polson
Chair

Email: solihull.rec@hra.nhs.uk

Enclosures: “After ethical review – guidance for researchers” [SL-AR2]

After ethical review guidance for sponsors and investigators –
Non CTIMP Standard Conditions of Approval]
Appendix 5
NHS Tayside Ethical Approval

14 June 2022

Ms Siofra Bradley
Trainee Clinical Psychologist
15 Dudhope Terrace
Dundee
DD3 6HH

Dear Ms Bradley,

PIC APPROVAL LETTER – NHS TAYSIDE

Title: The Role of Social Identity and Camouflaging in Autism and Eating Disorders
Chief Investigator: Ms Siofra Bradley
Local Collaborator: Ms Siofra Bradley
Tayside Ref: 2022PZ01 NRS Ref: NRS22/303117
REC Ref: 22/WM/0040
Sponsor: University of Edinburgh
Funder: Unfunded

Many thanks for your request for NHS Tayside to act as a Participant Identification Centre (PIC) for the above study. I am pleased to confirm that the project documentation (as outlined below) has been reviewed, registered and Management Approval has been granted for NHS Tayside to act as a PIC in this case.

Approval is granted on the following conditions:-

- **NHS Tayside is a Participant Identification Centre (PIC) only and is not a Research Site for this study.**

- **ALL Research must be carried out in compliance with the Research Governance Framework for Health & Community Care, Health & Safety Regulations, data protection principles, statutory legislation and in accordance with Good Clinical Practice (GCP).**

- **As custodian of the information collated during this research project you are responsible for ensuring the security of all personal information collected in line with NHS Scotland IT Security Policies, until destruction of this data.**

- **Notification of early termination within 15 days or End of Trial within 90 days followed by End of Trial Report within 1 year to TASC R&D Office.**

Please note you are required to adhere to the conditions, if not, NHS Tayside PIC approval may be withdrawn for the study.

**Approved Documents**

Version 7.0 – 15/02/2021

- 1 -
May I take this opportunity to wish you every success with this project.

Please do not hesitate to contact TASC R&D Office should you require further assistance.

Yours sincerely

Elizabeth Coote
Head of Non-Commercial Research Services

TAYSIDE medical Science Centre (TASC)
Ninewells Hospital & Medical School
TASC Research & Development Office
Residency Block, Level 3
George Pirie Way
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Email: liz.coote@nhs.scot
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c.c. Ms Karri Gillespie-Smith (Academic Supervisor, University of Edinburgh)
Dr Amy Kilbane (Clinical Supervisor, NHS Tayside)
Ms Charlotte Smith (Sponsor Representative, University of Edinburgh)
TASC Portfolio Team
TASC Feasibility Team
Appendix 6  
Empirical Project Protocol

Social Identity and Camouflaging in Autism and Eating Disorders, Version 2, 8 March 2022  
303117

Non-CTIMP Study Protocol  
*The Role of Social Identity and Camouflaging in Autism and Eating Disorders*

| | The University of Edinburgh and Lothian Health Board  
| | ACCORD  
| | The Queen’s Medical Research Institute  
| | 47 Little France Crescent  
| | Edinburgh  
| | EH16 4TJ |

<table>
<thead>
<tr>
<th>Protocol authors</th>
<th>Siofra Bradley</th>
</tr>
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<tbody>
<tr>
<td>Chief Investigator</td>
<td>Siofra Bradley, Trainee Clinical Psychologist</td>
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<tr>
<td>Sponsor number</td>
<td>CAHSS2110/04</td>
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# LIST OF ABBREVIATIONS

## Insert Abbreviations as Required

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<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tr>
<td>ACCORD</td>
<td>Academic and Clinical Central Office for Research &amp; Development - Joint office for The University of Edinburgh and Lothian Health Board</td>
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<td>CI</td>
<td>Chief Investigator</td>
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<td>CRF</td>
<td>Case Report Form</td>
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<td>GCP</td>
<td>Good Clinical Practice</td>
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<td>Principal Investigator</td>
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<td>Quality Assurance</td>
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<td>REC</td>
<td>Research Ethics Committee</td>
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<td>SOP</td>
<td>Standard Operating Procedure</td>
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1. INTRODUCTION

1.1 BACKGROUND
Eating disorders have the highest mortality rate than any other mental illness (Arcelus, Mitchell, Wales, Nielsen, 2011). Research has shown that autistic people, who already have a lower life expectancy than non-autistic people, (Autistica, 2019) are over-represented in the population of people who have an eating disorder (Huke, Turk, Saeidi, Kent & Morgan, 2013).

A dual diagnosis of autism and eating disorders has been reported at 4.7% prevalence, whilst one in five people with anorexia in eating disorder services are found to be autistic (Nickel et al, 2019; Autistica, 2019). Yet, there is no mention of autism in the treatment guidelines from NICE for eating disorders. It is therefore unsurprising that given little guidance, clinicians have reported not feeling confident treating people with a dual diagnosis of both autism and an eating disorder (Kinnaird, Norton, Tchanturia, 2017).

Research has shown that autistic people with an eating disorder have poorer outcomes, longer length of stay in inpatient settings and more severe presentations of eating disorders than non-autistic people with an eating disorder (Nielsen et al, 2015). These findings highlight the need for investigating the link between autism and eating disorders further, to enable eating disorder treatment to be adapted for autistic people. Existing research that has investigated links between autism and eating disorders has focused on cognitive and sensory factors (Kinnaird, Norton, Stewart, & Tchanturia, 2019; Adamson, Kinnaird, Glennon, Oakley, 2020; Brede et al, 2020) but have failed to investigate the role of social identity in relation to these comorbidities.

For non-autistic people with an eating disorder, social identity has been reported to play a role in the development and maintenance of their eating disorder (Espíndola & Blay 2009). However, this has never been explored in autistic people with an eating disorder. Research has however found that there is a significant link between the role that social identity in autism plays on other mental health difficulties such as depression and anxiety (Cooper, Smith, Russel, 2017; Cooper, Cooper, Russel, Smith, 2021; Cage, Monaco & Newell, 2018). Given these facts, it is surprising that little research has been done to explore social identity in relation to the link found between autism and eating disorders.

The need for research to explore the role of social identity in autism and eating disorders is further supported by information provided in interviews of autistic women with an eating disorder. They reported that having the label of an eating disorder, provided them with an identity that they felt they had always been lacking (Brede et al, 2020; Kinnaird et al 2019). This may explain why poorer treatment outcomes are reported in autistic people as removing the identity of the eating disorder that provides security, control and power could be extremely distressing. The proposed research project may indicate the importance of treatment which focuses on creating a new, more positive identity for autism.

1.2 RATIONALE FOR STUDY
This research aims to identify risk and protective factors for the association between eating disorders and autism. It is predicted that the more positively a person socially identifies with having autism, the less disordered eating behaviours they will display. Autistic people, carers, clinicians and organizations have stated the critical need for more research within this domain, to increase knowledge which will enable treatments to be adapted for people with autism and eating disorders (Autistica, 2019)

Initial steps have been taken to adapt treatments specifically for autism and anorexia and have evidenced reduced length of inpatient stays, increased clinician confidence and cost savings of approximately £275,000 per year (PEACE project) (Tchanturia, Dandil, Li, Smith, Byford, 2021). The current study will not be limited to anorexia, but instead will investigate eating disordered behaviour and attitudes more generally in autism. Findings from this study may provide invaluable information about how eating disorders develop, are maintained and are more resistant to treatment in autistic people. This could have implications for improving care for autistic people and improving their quality of life. It may also have practical benefits for the NHS, in terms of reducing the costs associated with longer term treatment with poorer outcomes that are currently found among autistic people with an eating disorder.
Findings may also emphasize the need for more of a focus on reducing the stigma around autism and promotion towards a positive social identification of autism. As this is the first quantitative project for this research question, the data will be stored on DataShare, the university's open data repository, so that it can be discovered and reused for future research to contribute more knowledge to this area.

The main objective of the study is to explore factors that may contribute to eating disordered behaviour and attitudes in autistic people. These factors will include social identification with autism, social identification with eating disorders, camouflaging, sensory sensitivities, and autism severity. It is predicted that the more positively a person socially identifies with having autism, the less disordered eating behaviours they will display.

2 STUDY OBJECTIVES

Existing literature on this topic is scant, therefore, exploratory analyses may be conducted on the data to provide additional information. However, further analyses will not be considered as hypothesis testing.

Suggestions of this further exploratory analysis may include investigating relationships between:
1. Camouflaging and autism social identification
2. Time since diagnosis of autism and autism social identification
3. Autism social identification and eating disorder identification

Or significant differences between:
4. those with an eating disorder diagnosis and those without an eating disorder diagnosis on their social identification with autism
5. those with a clinical diagnosis and those with a self-diagnosis of autism on their autism social identity.

3 STUDY DESIGN

This is a quantitative study with a between group design which will use questionnaires to gather information. The questionnaires will be available online through the Qualtrics platform. Participants can gain access to the set of questionnaires by clicking on a link that will be advertised on the researcher’s social media sites, autism charities, eating disorder charities and provided by clinicians. Participants will only have to complete the questionnaires on one occasion and it is estimated that this will take 30-45 minutes. The period of data collection will be 9 months, estimated to start from January 2022 and therefore closing in October 2022.

4 STUDY POPULATION

4.1 NUMBER OF PARTICIPANTS

A G*Power calculator (Faul, Erdfelder & Buchner, 2009) was used to compute the number of participants that would be recruited for a regression analysis and the exploratory analysis. This study will aim to recruit at least 128 people over the duration of 9 months. Recruitment will occur online and by clinicians within the Tayside Eating Disorder Service (TEDS) and Tayside Adult Autism Consultancy Team (TAACT) identifying eligible participants for the study. It is expected that the bulk of recruitment will be online through advertisements of the study on the researcher’s social media profiles and on organisations websites such as Scottish Autism, BEAT Eating Disorder Service, Beyond Autism, Autism Initiatives and Scottish Women’s Autism Network (SWAN).

4.2 INCLUSION CRITERIA

- Females and males.
  Although literature shows that more females have eating disorders, males are often excluded from studies. It would be useful to gather data on both males and females and this will also help with recruitment.
- Clinical or self-diagnosis of autism
Those who have self-diagnosed themselves as having autism should be included even if they do not have an official diagnosis. Participants will be asked to state whether they have a clinical or self-diagnosis.

- People with and without an eating disorder.

This study will measure eating disordered behaviour on a continuum therefore it is not a requirement for participants to have an eating disorder.

- Age 18+
- English speaking
- Capacity to consent

4.3 EXCLUSION CRITERIA

There is no explicit exclusion criteria

5 PARTICIPANT SELECTIONS AND ENROLLMENT

5.1 IDENTIFYING PARTICIPANTS

The study will be advertised online through the partaking organisation’s websites (Scottish Autism, BEAT Eating Disorder Service, Beyond Autism, Autism Initiatives, Scottish Women) and the researcher’s social media accounts such as Facebook, Twitter and Instagram. This advertisement will present as a brief description of the study and the link to the study on the Qualtrics platform where the information form and questionnaires will be available.

In clinical settings in NHS Tayside, clinicians from Tayside Adult Autism Consultancy Team (TAACT) and Tayside Eating Disorder Services (TEDS) can direct eligible individuals within the service to where they can access the link to the study which will have an information sheet on the purpose of the study and what participation will involve. To identify these clients, clinicians may review their file to ensure they are eligible to participate. Potential participants will only be identified and informed about the research by clinicians who work with them who work under the NHS Code of Confidentiality. It is completely optional whether these clients decide whether to participate in the research or not. If they decide not to, their care provided from these services will not be impacted in any way.

5.1 CONSENTING PARTICIPANTS

An information page will be provided online giving a description of what the study is about and what participation will involve. Participants have as long as they would like to consider the information before consenting, as long as this is within the 9 month window of recruitment. The information sheet will explicitly state how participants data will be anonymous, participation is voluntary and participants can withdraw at any time however their anonymous data may still be used. As participation is entirely voluntary, participants will indicate their consent to participation by clicking on a box on the consent form.

5.2.1 Withdrawal of Study Participants

The information sheet will inform participants that they are free to withdraw at any time however, as their data is anonymous, if they decide to withdraw, their data cannot be withdrawn and may possibly be used in the analyses.

6 DATA COLLECTION

Participation will include a completing a set of questionnaires through the Qualtrics online platform. Participants will only have to do this once and it is estimated that this will take 30-45 minutes. These measures have been selected based on their evidenced reliability and validity.

The Autism Spectrum Quotient-10 (AQ-10) (Allison, Auyeung, Baren-Cohen, 2012) has ten items and will be used to indicate symptom severity of autism. The Social Identification Scale (SIS) (Leach, 2008) is a 14-item scale that will be used to measure identification with Autism. The Single Item Social Identity measure (SISI) (Postmes, Hasam & Jan, 2013) is a single item measure that will be used to measure social identification with
eating disorders, participants will rate on a Likert scale how much they agree with the statement "I identify with people with eating disorders." The Camouflaging Autistic Traits Questionnaire (CAT-Q) (Hull et al, 2019) is a 25-item scale which will measure social camouflaging in autistic adults. The Sensory Perception Quotient (SPQ) (Tavassoli, Hoekstra & Baron-Cohen, 2014) is a 35-item questionnaire that will be used to measure sensory sensitivities related to taste, smell, touch, hearing and vision.

A demographic questionnaire will be included to gather information on age, gender, ethnicity, length of time since autism diagnosis, if this is a clinical or self-diagnosis and whether participants have an eating disorder or other mental health illness. An information sheet will inform participants about the nature of the study, that their data will be anonymous and that they are free to withdraw at any time. The information sheet will also inform participants that as their data is anonymous, if they decide to withdraw, their data cannot be withdrawn and may possibly be used in the analyses.

Participants will indicate their consent for taking part in the study by clicking a button to indicate whether they would like to proceed to the study. The debrief sheet will thank participants for their time and provide signposting information to relevant services such as Scottish Autism or BEAT.

Questionnaires will be stored on an encrypted one drive university account in line with Research Data Management (RDM) frameworks. The researcher, clinical and academic supervisors will have access to this data throughout the project. A data management plan will be completed by the researcher before the data is collected, with the aim to store the anonymised data in the university repository for future research. As each participant's data is anonymous, their data will be labelled with a number.

7 DATA MANAGEMENT

7.1.1 Transfer of Data

No personal data will be collected for this study. The anonymous data that is collected by the study will not be transferred to any external individuals or organisations outside of the Sponsoring organisation(s).

7.1.2 Data Breaches

Any data breaches will be reported to the University of Edinburgh and NHS Lothian Data Protection Officers who will onward report to the relevant authority according to the appropriate timelines if required.

8 STATISTICS AND DATA ANALYSIS

8.1 SAMPLE SIZE CALCULATION

A G*Power calculator (Faul, Erdfelder & Buchner, 2009) was used to compute an adequate sample size for a regression analysis including five predictor variables. The calculation was based on a statistical power of 0.80 (Cohen, 1988), an alpha level of 0.5 (Green, 1991) and a medium effect size of F2=.15 which is equivalent to Cohen’s (1992) effect size of R=.30. The outcome of this calculation was that a sample of 92 participants would be required for this study. This process was repeated using a second online calculator (Soper, 2012) for increased accuracy, with an outcome of 91 participants required.

These results support those found from Cohen’s (1992) power table which suggests that for a study to have an adequate sample size to achieve a medium effect with an alpha level of 0.05, a power of 80% and five predictor variables, a sample size of at least 91 is required.

To enable exploratory analysis of the data within this study to be conducted, further calculations were preformed using the GPower calculator and the same alpha and power values to calculate the desired number of participants. The G* Power calculator indicates that a sample size of at least 43 participants would be required to achieve a medium effect size of F2=.15 with a simple regression analysis for the first three sub questions. The
remaining two sub questions would require an independent t test analysis and a population of at least 128 people (64 people in each group) to achieve a medium effect size of $d=.50$.

In summary, although the main research question only requires around 92 participants, this study will aim to recruit at least 128 people to enable exploratory analysis to be conducted on the data to inform the direction of future studies within this novel area. Achieving an adequate sample size of 128 participants may present a risk as there is a degree of reliance on others to help with recruitment. The researcher acknowledges that certain times of the year can be more challenging for autistic people and clinicians to participate, for example during Christmas and summer holidays. However, to reduce these risks, this study will have a long recruitment period of 9 months and will use various recruitment sources.

8.2 PROPOSED ANALYSES

This quantitative study will be analysed using IBM SPSS V22. After the data is checked for normality to ensure the use of parametric tests are appropriate, a regression analysis will be used for the main research question to investigate the relationship between the predictor variables and the outcome variable. The five predictor variables are; social identification with autism and social identification with eating disorders, camouflaging, autism severity and sensory sensitivities. All of the data is continuous data.

Simple regression analysis will be used for the first three sub questions investigating relationships between; Camouflaging and autism social identification, Time since diagnosis of autism and autism social identification and Autism social identification and eating disorder identification. Tests will be used to explore significant differences between groups for sub questions investigating differences between: those with an eating disorder diagnosis and those without an eating disorder diagnosis on their social identification with autism and those with a clinical diagnosis and those with a self-diagnosis of autism on their autism social identity.

Data from those who partially complete the study or withdraw may still be analysed.

9 RISKS

This study carries a low level of risk due to its design, methodology and voluntary nature. However, as this study is investigating the association between autism and disordered eating, some participants may find completion of the questionnaires distressing. The option to withdraw at any point will be made explicit from the beginning. Support services will also be signposted upon completion of the questionnaires.

10 OVERSIGHT ARRANGEMENTS

10.1 INSPECTION OF RECORDS

Investigators and institutions involved in the study will permit trial related monitoring and audits on behalf of the sponsor, REC review, and regulatory inspection(s). In the event of audit or monitoring, the Investigator agrees to allow the representatives of the sponsor direct access to all study records and source documentation. In the event of regulatory inspection, the Investigator agrees to allow inspectors direct access to all study records and source documentation.

10.2 STUDY MONITORING AND AUDIT

The ACCORD Sponsor Representative will assess the study to determine if an independent risk assessment is required. If required, the independent risk assessment will be carried out by the ACCORD Quality Assurance Group to determine if an audit should be performed before/during/after the study and, if so, at what frequency.

Risk assessment, if required, will determine if audit by the ACCORD QA group is required. Should audit be required, details will be captured in an audit plan. Audit of Investigator sites, study management activities and study collaborative units, facilities and 3rd parties may be performed.

11 GOOD CLINICAL PRACTICE

11.1 ETHICAL CONDUCT
The study will be conducted in accordance with the principles of the International Conference on Harmonisation Tripartite Guideline for Good Clinical Practice (ICH GCP).

Before the study can commence, all required approvals will be obtained and any conditions of approvals will be met.

**INVESTIGATOR RESPONSIBILITIES**

The Investigator is responsible for the overall conduct of the study at the site and compliance with the protocol and any protocol amendments. In accordance with the principles of ICH GCP, the following areas listed in this section are also the responsibility of the Investigator. Responsibilities may be delegated to an appropriate member of study site staff.

**Informed Consent**

Informed consent will be obtained before participants commence the questionnaires after they have read the information and consent sheet and have a clear understanding of what participation involves. Participants will be given sufficient time to consider the information provided as there will be a recruitment window of 9 months. Participants may withdraw their consent to participate at any time without loss of benefits to which they otherwise would be entitled.

**Research identification centre staff**

The Investigator will attend service team meetings where possible to ensure that all members of research identification centers who are assisting in the recruitment of this study will be adequately informed about the protocol and the study requirements.

**Data Recording**

When participants complete the questionnaires, their data will be automatically recorded from the Qualtrics platform and stored on an encrypted drive in the Qualtrics platform.

**GCP Training**

The primary investigator has completed the mandatory data protection training modules required by the sponsor, the MANTRA research data management training and NIHR (National Institute of Research for Health Research) Good Clinical Practice training. Both the academic and clinical supervisors involved in this study will have completed training for safe handling and management of data through their PhD and Doctorate courses and in their roles as lecturer in Applied Psychology and as a Principal Clinical Psychologist.

**Confidentiality**

No personal identifiable information will be collected. The information that is provided by participants will remain confidential throughout the entirety of the study. Only the researcher and supervisors will have access to the anonymous data which will be securely stored on a university one drive.

**Data Protection**

All Investigators within this study will comply with the requirements of the appropriate data protection legislation (including the General Data Protection Regulation and Data Protection Act) with regards to the collection, storage, processing and disclosure of personal information.

**STUDY CONDUCT RESPONSIBILITIES**

12.1 **PROTOCOL AMENDMENTS**

Any changes in research activity will be reviewed and approved by the CI. Amendments will be submitted to a sponsor representative for review and authorisation before being submitted in writing to the appropriate REC, and local R&D for approval prior to participants being enrolled into an amended protocol.
MANAGEMENT OF PROTOCOL NON COMPLIANCE

Prospective protocol deviations, i.e. protocol waivers, will not be approved by the sponsors and therefore will not be implemented, except where necessary to eliminate an immediate hazard to study participants. If this necessitates a subsequent protocol amendment, this should be submitted to the REC, and local R&D for review and approval if appropriate.

Protocol deviations will be recorded in a protocol deviation log and logs will be submitted to the sponsors every 3 months. Each protocol violation will be reported to the sponsor within 3 days of becoming aware of the violation. All protocol deviation logs and violation forms should be emailed to QA@accord.scot

SERIOUS BREACH REQUIREMENTS

A serious breach is a breach which is likely to effect to a significant degree:

(a) the safety or physical or mental integrity of the participants of the trial; or

(b) the scientific value of the trial.

If a potential serious breach is identified by the CI, PI or delegates, the co-sponsors (seriousbreach@accord.scot) will be notified within 24 hours who will assess the impact of the breach on the scientific value of the trial, to determine whether the incident constitutes a serious breach and report to research ethics committees as necessary.

STUDY RECORD RETENTION

All study documentation will be kept for a minimum of 3 years from the protocol defined end of study point. When the minimum retention period has elapsed, study documentation will not be destroyed without permission from the sponsor.

END OF STUDY

The end of study will be 9 months after the recruitment period has begun. It is estimated that this will be in October or November 2022. The end of the study will be reported to the REC, and R+D Office(s) and co-sponsors within 90 days, or 15 days if the study is terminated prematurely. End of study notification will be reported to the co-sponsors via email to resgov@accord.scot

A summary report of the study will be provided to the REC within 1 year of the end of the study.

INSURANCE AND INDEMNITY

The following arrangements are in place to fulfil the co-sponsors' responsibilities for ensuring proper provision for insurance and indemnity to cover their liability and the liability of the CI and staff:

- The Protocol has been designed by the CI and researchers employed by the University and collaborators. The University has insurance in place (which includes no-fault compensation) for negligent harm caused by poor protocol design by the CI and researchers employed by the University.
- The University of Edinburgh has policies in place that provides indemnity against legal liability for non-negligent harm caused to a research subject, arising from the management and the conduct of the research.

REPORTING, PUBLICATIONS AND NOTIFICATION OF RESULTS

AUTHORSHIP POLICY

Ownership of the data arising from this study resides with the study team.
References


1. Title

The Impact of Camouflaging on Mental Health and Wellbeing: A Systematic Review

1a. Identification: This report outlines the protocol for this current systematic review

1b. Update: This protocol does not represent an update of a previous review.

2. Registration

PROSPERO (registration number will be included once registered).

3. Authors

3a. Contact

Name: Síofra Bradley
Institutional affiliation: The University of Edinburgh
Email:
Address: C/O Síofra Bradley, School of Health in Social Science, 8-9 Hope Park Square, University of Edinburgh, EH8 9NW.

Name: Dr Karri Gillespie-Smith
Institutional affiliation: The University of Edinburgh
Email:

Name: Dr Fhionna Mhoore
Institutional Affiliation: NHS Tayside
Email:
3b. Contributions

Síofra Bradley: This review forms part of Síofra Bradley’s doctoral research as partial fulfilment of the Doctorate of Clinical Psychology at University of Edinburgh. Síofra is the lead author and guarantor for this review. Síofra is responsible for the research design, data collection, analysis and final report writing.

Dr Karri Gillespie-Smith: Dr Gillespie-Smith is the academic supervisor for Síofra Bradley and helped to design and guide the review.

Dr Fhionna Mhoore: Dr Mhoore is the clinical supervisor for Síofra Bradley and helped to design and guide the review.

4. Amendments

This protocol is not an amendment of a previously completed or published protocol. Should amendments occur to this protocol, they will be documented using this framework and added to Prospero to be reviewed.

5. Support

5a. Sources: This review forms part of the lead author’s doctoral thesis project in partial fulfilment of the degree of Doctor of Clinical Psychology, University of Edinburgh. No financial support has been sought for this review.

5b. Funder: This review forms part of the lead researcher’s Doctorate in Clinical Psychology degree. This degree is funded by NHS Education for Scotland (NES).

5c. Role of Funder: The funder did not make contributions to the development of the protocol for this review.

Introduction

6. Rationale

Mental health difficulties among autistic people is a major concern, with some studies reporting 79% of autistic adults have a diagnosable mental health condition. Camouflaging is a concept that is frequently associated with mental health difficulties (Beck et al, 2020). Camouflaging refers to an attempt to appear non-autistic in social situations but employing a range of strategies such as masking
(hiding autistic characteristics for example, supressing stimming behaviour), compensation (learning and displaying new behaviours to compensate for autistic-related difficulties for example developing social scripts) or assimilation (behavioural strategies used to “fit in” with peers for example, feeling like you are preforming rather than being genuine). Autistic people have reported that camouflaging is often experienced as mentally, emotionally and physically draining (Hull et al 2017). This may help explain the high levels of mental health difficulties such as stress, anxiety and depression found in people who camouflage (Cage et al, 2018; Cage & Troxell-Whiteman, 2019).

There are two main methods that have been utilized to measure the concept of camouflaging; the internal-external discrepancy method and the self-report method. The internal-external discrepancy method aims to quantify the difference between an individuals observable behavioural presentation and their “true” autistic state (Lai et al, 2017), however this only captures camouflaging methods which are successful (Lundin, 2023). Whereas the 25-tiem Camouflaging Autistic Traits Questionnaire (CAT-Q) (Hull et al, 2017) can capture self-reported attempts of camouflaging, whether they are successful or not and also reduces the observer bias.

The CAT-Q was developed and validated with autistic and non-autistic participants and contains 3 subscales measuring assimilation, compensation and masking (Hull, 2017). Although camouflaging is often associated with autism, due to the higher rates of camouflaging found among the autistic population (Cook et al, 2021), camouflaging has also been associated with poorer mental health outcomes such as suicidality among non-autistic people (Cassidy 2020).

The relationship between camouflaging and mental health outcomes is a developing area of research but initial findings have suggested that some subscales of the CAT-Q such as assimilation, may be more related to mental health outcomes than others (Lundin, 2023). Research has also shown implied that camouflaging may be more strongly related to certain mental health outcomes such as generalised or social anxiety more than others such as depression or self-harm (Hull, 2021; Cassidy, 2021). There is a need for a more research to exploration the relationship between camouflaging and mental health outcomes such as longitudinal research to explore the direction of this relationship and a more indepth analyses of the association between individual subscales of the CAT-Q and specific mental health conditions. Further understanding of this relationship could inform mental health screening and interventions for both autistic and non-autistic people.

7. Objectives

This review will aim to collate the existing evidence on camouflaging and mental health outcomes for autistic and non-autistic individuals to gain a deeper understanding of the relationship between how camouflaging is related to mental health outcomes.

Population: Autistic and non-autistic adults
Measures: Camouflaging Autistic Traits Questionnaire
Outcome: Measures used to capture mental health outcomes

Methods
8. Eligibility Criteria

- Studies that are quantitative in nature.
- Participants must be 16 or over
- Studies must use the CAT-Q to measure camouflaging attempts
- Studies that are published and unpublished (i.e. doctoral dissertations) will be included.

Exclusion criteria

- Studies which are qualitative in nature.
- Studies which only investigate the prevalence of camouflaging using alternative methods such as the internal-external discrepancy method
- Studies that are not published in English or have been translated into English.

9. Information sources

To identify studies for use in this review, electronic databases will be searched by the lead researcher. Using the OVID search interface, the following databases will be searched: Medline, PsychInfo, EMBASE, Cumulative Index of Nursing and Allied Health Literature (CINAHL), PubMed and Web of Science. Google scholar will also be searched to identify grey literature such as unpublished dissertations.

10. Search Strategy

(Camouflag* OR Pass* OR Mask* OR compensate* OR CAT-Q) AND (mental OR distress* OR depress* OR anxiety) AND (aut* OR Asperger*)

11. Study Records

11.a Data Management: Covidence software will be used for the data search, selection and extraction. EndNote will also be employed for the storage of studies and reference list.

11.b Selection Process: All studies will be screened using Covidence systematic review software, using the above filters for eligibility requirements. The remaining studies will then be screened via the eligibility requirements based on their titles. The abstracts of the remaining studies will then be read individually by the lead researcher and screened against the eligibility criteria. A second independent reviewer will also complete the steps outlined above. Any discrepancies between reviewers will be discussed and resolved using a collaborative process i.e. reviewing individual notes and comparing findings.
The selection process will be outlined using the PRISMA flow diagram, as recommended within PRISMA-P Explanation and Elaboration (2020) guide.

11.c. Data Collection Process: Data will be extracted using Covidence software and verified by an independent reviewer. The papers will be placed into EndNote to produce a reference list.

12. Data Items

Data items sought will be quantitative studies researching the relationship between camouflaging and mental health outcomes. Therefore data from the CAT-Q and any questionnaires used to measure mental health outcomes such as depression, anxiety, self-harm, suicide will be gathered. In addition to this, study characteristics will be extracted from all papers, including: author(s), sample size, participant demographics (for example age, ethnicity, education, IQ, socioeconomic status, gender, sex), method of analysis and statistical findings.

13. Outcomes

Mental health outcomes will be extracted from studies based on the measures used in each study to capture levels of mental health outcomes such as depression, anxiety, self-harm, suicide will be gathered.

14. Risk of bias

Each paper will be evaluated for bias and quality against a review quality evaluation grid that has been developed for evaluating autism related research (Glod et al, 2015). This grid is comprised of four main sections following the IMRad structure: introduction, methods, results and discussion with a particular focus on the participant selection, characteristics, the method and tool selection. The scoring criteria contains 3 responses; Yes, Partially, No (or NR; No Response).

Any discrepancies between the lead researcher and the independent reviewer will be resolved through discussion to reach a final consensus.

15. a. Data Synthesis

This review will employ a narrative synthesis of the results, methodology and limitations of the included studies. This will include summary tables of extracted data and descriptive narrative findings such as the author, country, sample characteristics (gender & age), outcome measures and results.
16. Meta-bias(es)

An evaluation of meta-biases will not be conducted due to the chosen methodology within this review.

17. Confidence in Cumulative Evidence

The Grading of Recommendations Assessment, Development and Evaluation (GRADE) system will be used to seek a transparent and structured approach for summarising and rating the quality of evidence presented in this review. GRADE will be used to rate: the consistency of the individual study results, the precision of the effect estimates, the risk of bias, the risk of publication bias and how directly the evidence answers the proposed question.
Hello, I am doing research for my Doctorate in Clinical Psychology on the role of social identity and camouflaging in autism and eating disorders. This research has been co-created by autistic mentors and autistic researchers.

I am looking for autistic people, over the age of 18 who would be willing to take part in this study which will involve completing online anonymous questionnaires.

By taking part in this study, you will be helping to contribute to research that aims to inform the prevention and treatment of eating disorders in autistic people.

If you or anyone you know is autistic and would like to take part, you can click on the link or scan the bar code below for more information.

Please feel free to contact the lead researcher at or the supervisor for this project at

Thanks so much 😊

https://edinburgh.eu.qualtrics.com/jfe/form/SV_8nLyqishlwMhCCy
Appendix 9
Participant Information Sheet

Social Identity and Camouflaging in Autism and Eating Disorders
Version 2, 8March2022

Please take a screen shot of this screen for your records.

If you require this document in an alternative format, such as large print or a coloured background, please contact Síofra Bradley (Trainee Clinical Psychologist and Lead Researcher) at email:

Project Title: The role of social identity and camouflaging in autism and eating disorders Research type: Online questionnaires

Participants eligibility: Must be over the age of 18, be able to read the English language and have a self or clinical diagnosis of autism.

Participants time required: 30-45 minutes

PARTICIPANT INFORMATION

You are being invited to take part in research on the role of social identity and camouflaging in autism and eating disorders. Síofra Bradley, who is a trainee clinical psychologist at the University of Edinburgh is leading this research, under the supervision of Dr Karri Gillespie Smith from the University of Edinburgh and Dr Amy Kilbane from Tayside Adult Autism Consultancy Service. Before you decide to take part it is important you understand why the research is being conducted and what it will involve. Please take time to read the following information carefully.

WHAT IS THE PURPOSE OF THE STUDY?

The purpose of the study is to add to the research that has found associations between autism and eating disorders. The study aims to identify risk factors that may help explain this link. This could be important for adapting eating disorder treatment for autistic people, to improve outcomes for them. This study is interested in exploring the role that social identity and camouflaging may have on autistic people’s behaviours and attitudes related to eating disorders.

WHY HAVE I BEEN INVITED TO TAKE PART?

You are invited to participate in this study if you have a clinical or a self-diagnosis of autism and are above the age of 18 years old.

DO I HAVE TO TAKE PART?

No – it is entirely up to you. If you do decide to take part, you are still free to withdraw at any time and without giving a reason. Deciding not to take part or withdrawing from the study will not affect you or the health care you receive in any way. Please not that as participation is anonymous it will not be possible to withdraw your data collected up to that point and it may still be used in the analysis.
If you do decide to take part, please keep this Information Sheet and complete the Informed Consent Screen to show that you understand your rights in relation to the research, and that you are happy to participate.

**WHAT WILL HAPPEN IF I DECIDE TO TAKE PART?** This whole process is estimated to take around 30-45 minutes.

**Firstly:** You will be asked to provide consent for taking part.

**Secondly:** You will also be asked to complete a demographic questionnaire.

**Thirdly:** You will be asked to complete 6 questionnaires, in an online survey, in relation to: autism, sensory sensitivities, your social identity with autism, your social identity with eating disorders, camouflaging tendencies and eating disordered behaviours and attitudes.

**Lastly:** Once you have completed the questionnaires, you will be taken to the debrief screen.

**WHAT ARE THE POSSIBLE BENEFITS OF TAKING PART?**

There are no direct benefits but by sharing this information, you will be contributing to Síofra Bradley’s research which is the first project to study the role of social identity in autism and eating disorders. This information could be used to inform eating disorder services on how to adapt treatments for autistic people. It may also highlight the importance of reducing stigma around autism.

**ARE THERE ANY RISKS ASSOCIATED WITH TAKING PART?**

There are no significant risks associated with participation. However, as the questionnaires are related to eating disorders and behaviour and social identity, it is possible that you may find some of the questions upsetting or difficult to answer. Therefore, you are free to stop the questionnaires at any time without any negative repercussions.

If you do experience distress from participating in this study, information has been provided below and on the debrief page for support services that you can contact.

**WHO CAN I CONTACT FOR SUPPORT?**

If you feel affected in any way by any of the information in this research, you can find more information and/or support through the following websites. Also please remember that you can always go to your GP if you feel you need further support:

1. **BEAT helpline:** an eating disorders support and information service open to anyone over 18. Helpline number: **0808 801 0677** or email: [help@beateatingdisorders.org.uk](mailto:help@beateatingdisorders.org.uk) or visit their website at [beateatingdisorders.org.uk](http://beateatingdisorders.org.uk)

2. **Scottish Autism:** a support and information service for autistic people in Scotland. Advice line: **01259 222022** (open Tuesday 10am-7pm, Wednesday-Friday 10am-4pm) or email: [advice@scottishautism.org](mailto:advice@scottishautism.org)

3. **Autistica:** information service for autistic people website: [www.autistica.org.uk](http://www.autistica.org.uk)
4. **National Autistic Society**: information service for autistic people. Website: www.autistic.org.uk

5. **Samaritans**: confidential non-judgmental emotional support for anyone who is struggling to cope: call 116 123, text: 07725 90 90 90

6. **Breathing Space**: a free, confidential phone line service for any individual who is experiencing low mood and depression, or who is unusually worried and in need of someone to talk to: call 0800 83 85 87

7. **NHS 24**: A 24 hour health service for Scotland. Phone: 111 or visit: www.nhs24.com

8. **SHOUT**: A 24/7 free UK text messaging service for times when people feel like they need immediate support. Text: “SHOUT” to 85258. Website: https://giveusashout.org/

**WHO CAN I CONTACT FOR FURTHER INFORMATION ABOUT THIS STUDY?**

**Researcher:** If you have any further questions about the study, please contact the lead researcher Síofra Bradley: Email:

**Someone independent from the study:** If you would like to discuss this study with someone independent of the study team please contact: Dr Helen Sharpe on: +44 (0)131 651 3949 or email:

**WHO CAN I CONTACT TO MAKE A COMPLAINT?**

If you wish to make a complaint about the study, please provide the study title and detail the nature of your complaint. Please contact:

**NHS contact:**
The NHS Tayside Complaints and Feedback Team is based at:
Complaints and Feedback Team
Ninewells Hospital
Dundee
DD1 9SY
Telephone: 0800 027 5507
Email: TAY.feedback@nhs.scot

**University contact:**
Prof. Matthias Schwannauer;
University of Edinburgh
Old Medical School
Teviot Place
Edinburgh
EH8 9AG
Email: headofschool.health@ed.ac.uk

**WHAT IF I WANT TO WITHDRAW FROM THE STUDY?**
If, at any stage you longer want to participate in the study, you can stop immediately. You are free to do this without giving a reason and without your legal rights being affected. However, as all data is anonymous, the data that you have provided up to that point will still be collected, stored and analysed.

**WILL MY TAKING PART BE KEPT CONFIDENTIAL?**

We will keep all information about you safe and secure.

Once we have finished the study, we will keep some of the data so we can check the results. We will write our reports in a way that no-one can work out that you took part in the study. All anonymous electronic data will be stored securely on servers at the University of Edinburgh. Your anonymous data will also be uploaded and stored on an online data repository supported by the University of Edinburgh for a minimum of 3 years and may be used in future ethically approved research.

What are your choices about how your information is used?

- You can stop being part of the study at any time, without giving a reason, but we will keep information about you that we already have.
  - We need to manage your records in specific ways for the research to be reliable. This means that we won’t be able to let you see or change the data we hold about you.

Where can you find out more about how your information is used?

You can find out more about how we use your information

- by asking one of the research team
- by visiting [https://www.ed.ac.uk/records-management/privacy-notice-research](https://www.ed.ac.uk/records-management/privacy-notice-research)
- by sending an email to the University of Edinburgh Data Protection Officer at dpo@ed.ac.uk

**WHAT WILL HAPPEN WITH THE RESULTS OF THIS STUDY?**

After the study is completed in May 2023, a summary of the results will be shared on the University of Edinburgh Eating Disorders Research Page: [https://www.ed.ac.uk/health/subject-areas/clinical-psychology/research/research-groups/eating-disorders-and-behaviours](https://www.ed.ac.uk/health/subject-areas/clinical-psychology/research/research-groups/eating-disorders-and-behaviours)

If you would like a summary of the finding of the project, please contact Síofra Bradley, email: and this will be sent to your email address of choice.

The results of this study may be summarised in published articles, reports and presentations. Websites of partaking organisations may also share a summary of the results for those interested to read, such as Scottish Autism, BEAT Eating Disorder Service, Beyond Autism, Autism Initiatives, Scottish Women’s Autism Network (SWAN), Eating Disorder Research Group and the Centre for Applied Developmental Psychology.

**WHO IS ORGANISING AND FUNDING THE STUDY?**
The study has been organised by Síofra Bradley (Trainee Clinical Psychologist) at the University of Edinburgh as part of a Doctorate in Clinical Psychology. The study is sponsored by the University of Edinburgh.

**WHO HAS REVIEWED THE STUDY?**

The study proposal has been reviewed by the ethics team within the Clinical Psychology Programme. This research question and study design was developed through consultations with an autistic person who has had an eating disorder and is involved in research within this area.

All research in the NHS is looked at by an independent group of people called a Research Ethics Committee. A favourable ethical opinion has been obtained from West Midlands – Solihull Research Ethics Committee Rec. NHS Management Approval has also been given.

*Thank you for taking the time to read this information sheet and considering taking part in the study.*
Participant Consent Sheet

Social Identity and Camouflaging in Autism and Eating Disorders, Version 2, 8March2022

CONSENT FORM

Project Title: The role of social identity and camouflaging in autism and eating disorders

Researcher name: Síofra Bradley    Email: 

In order to partake in this study, we need to ensure that you understand the nature of the research, as outlined on the Participant Information page.

Thanking you in advance for participating in this study. We appreciate your time and contribution made towards this research.

As participant:

1. I confirm that I have read and understood the Participant Information Sheet Version 1, 30112021 for the above study
2. I have been given the opportunity to consider the information provided, ask questions and have had these questions answered to my satisfaction.
3. I understand that my participation is voluntary and that I can ask to withdraw at any time without giving a reason and without my legal rights being affected. (As the data is anonymous, if you withdraw from the study after you have begun the questionnaires, your data is unable to be pulled from the dataset and may be used in the analyses).
4. I understand that my anonymised, data will be stored for a minimum of 3 years and may be used in future ethically approved research
5. I understand that relevant sections of my anonymised data collected during the study may be looked at by individuals from the Sponsor (University of Edinburgh), or from the NHS organisation where it is relevant to my taking part in this research. I give permission for these individuals to have access to my data

Consent statement

“By selecting this box I confirm that I agree to all of the above consent points and I agree to take part in this study.”

Click here if you do not wish to proceed. You will be taken to the end of the study.
Appendix 11
Participant Debrief Sheet

Social Identity and Camouflaging in Autism and Eating Disorders
Version 2, 8 March 2022

Please take a screen shot of this screen for your records

Project Title: The role of social identity and camouflaging in autism and eating disorders

Debrief

THANK YOU FOR TAKING PART IN THIS RESEARCH! YOUR TIME IS REALLY APPRECIATED

Thank you so much for taking time to complete this research which is investigating eating disorders and autism. It is important that research is done in this area so that services can be informed about how to adapt treatment for autistic people with an eating disorder for better outcomes. It is also hoped that by providing more information on the association between autism and eating disorders, more preventative measures can be implemented by development of services and policies to address the underlying factors contributing to this association.

If you are interested in this area, you may find the following papers interesting to read:


Any more questions?

We hope that you enjoyed this research. If you have any further questions, please feel free to contact the lead researcher, Siófra Bradley Trainee Clinical Psychologist:

Email:

What next?

After the study is completed in May 2023, a summary of the results will be shared on the University of Edinburgh Eating Disorders Research Page:
To make a complaint: If you wish to make a complaint about the study, please provide the study title and detail the nature of your complaint. Please contact:

**NHS contact:**
The NHS Tayside Complaints and Feedback Team is based at:
Complaints and Feedback Team
Ninewells Hospital
Dundee
DD1 9SY
Telephone: 0800 027 5507
Email: TAY.feedback@nhs.scot

Or

**University contact:** Prof. Matthias Schwannauer;
University of Edinburgh
Old Medical School
Teviot Place
Edinburgh
EH8 9AG
Email: headofschool.health@ed.ac.uk

**Signposting information**

Because some of these scales ask some sensitive information, we want to make sure that you know where to go if you feel you would benefit from some support following your participation. If you feel affected in any way by any of the questions asked, you can find more information and/or support through the following websites. Also please remember that you can always go to your GP if you feel you need further support:

1. **BEAT Helpline:** an eating disorders support and information service open to anyone over 18. Helpline number: 0808 801 0677 or Email: help@beateatingdisorders.org.uk
   Website: beateatingdisorders.org.uk

2. **Scottish Autism:** a support and information service for autistic people in Scotland. Advice line: 01259 222022 (open Tuesday 10am-7pm, Wednesday-Friday 10am-4pm) or email: advice@scottishautism.org

3. **Autistica:** information service for autistic people website: www.autistica.org.uk

4. **National Autistic Society:** information service for autistic people. Website: www.autistic.org.uk

5. **Samaritans:** provides confidential non-judgmental emotional support for anyone who is struggling to cope: call 116 123, text 07725 90 90 90
6. **Breathing Space**: a free, confidential phoneline service for any individual who is experiencing low mood and depression, or who is unusually worried and in need of someone to talk to: call 0800 83 85 87

7. **NHS 24**: A 24 hour health service for Scotland. Phone: 111 or visit: www.nhs24.com

8. **SHOUT**: A 24/7 free UK text messaging service for times when people feel like they need immediate support. Text: “SHOUT” to 85258. Website: https://giveusashout.org/

Thank you once again for your time and participation!
Appendix 12
Questionnaires with scoring

Social Identity and Camouflaging in Autism and Eating Disorders
Version 1, 30Nov2021

Autism Quotient (AQ-10)

<table>
<thead>
<tr>
<th>Please tick one option per question only:</th>
<th>Definitely Agree</th>
<th>Slightly Agree</th>
<th>Slightly Disagree</th>
<th>Definitely Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I often notice small sounds when others do not</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>I usually concentrate more on the whole picture, rather than the small details</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>I find it easy to do more than one thing at once</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>If there is an interruption, I can switch back to what I was doing very quickly</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>I find it easy to “read between the lines” when someone is talking to me</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>I know how to tell if someone is listening to me is getting bored</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>When I’m reading a story I find it difficult to work out the characters’ intentions</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>8</td>
<td>I like to collect information about categories of things (e.g. types of car, types of bird, types of train, types of plant etc)</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>I find it easy to work out what someone is thinking or feeling just by looking at their face</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>I find it difficult to work out people’s intentions</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>
### Social Identity Scale (SIS)

<table>
<thead>
<tr>
<th></th>
<th>Please choose one option per question only:</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Disagree somewhat</th>
<th>Neutral</th>
<th>Somewhat Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I feel a bond with autistic people</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>I feel solidarity with autistic people</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>I feel committed to autistic people</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>I am glad to be an autistic person</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>5</td>
<td>I think that autistic people have a lot to be proud of</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>6</td>
<td>It is pleasant to be autistic</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>7</td>
<td>Being autistic gives me a good feeling</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>I often think about the fact that I am autistic</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>9</td>
<td>The fact that I am autistic is an important part of my identity</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>10</td>
<td>Being autistic is an important part of how I see myself</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>11</td>
<td>I have a lot in common with average autistic people</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
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<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>I am similar to the average autistic person</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>13</td>
<td>Autistic people have a lot in common with each other</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>14</td>
<td>Autistic people are very similar to each other</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>
### Single Item Social Identity Scale (SISI)

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Disagree somewhat</th>
<th>Neutral</th>
<th>Somewhat Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I identify with people with eating disorders</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>
### Eating Disorder Examination Questionnaire Short (EDE-QS)

**On how many of the past 7 days…**

<table>
<thead>
<tr>
<th></th>
<th>0 days</th>
<th>1-2 days</th>
<th>3-5 days</th>
<th>6-7 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Have you been deliberately <strong>trying</strong> to limit the amount of food you eat to influence your weight or shape (whether or not you have succeeded)?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Have you gone for long periods of time (e.g., 8 or more waking hours) without eating anything at all in order to influence your weight or shape?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Has thinking about <strong>food, eating or calories</strong> made it very difficult to concentrate on things you are interested in (such as working, following a conversation or reading)?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Has thinking about your <strong>weight or shape</strong> made it very difficult to concentrate on things you are interested in (such as working, following a conversation or reading)?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Have you had a definite fear that you might gain weight?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Have you had a strong desire to lose weight?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Have you tried to control your weight or shape by making yourself sick (vomit) or taking laxatives?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Have you had a sense of having lost control over your eating (at the time that you were eating)?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Have you had a sense of having lost control over your eating (at the time that you were eating)?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. On how many days (i.e. <strong>days on which you had a sense of having lost control over your eating</strong> at the time that you were eating) did you eat what other people would regard as an <strong>unusually large amount of food in one go</strong>?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Over the past 7 days**

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>Slightly</th>
<th>Moderately</th>
<th>Markedly</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. Has your weight or shape influenced how you think about (judge) yourself as a person?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. How dissatisfied have you been with your weight or shape?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Statement</td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>----------------</td>
<td>-------</td>
<td>----------</td>
<td>-------------------</td>
</tr>
<tr>
<td>I would be able to distinguish different people by their smell</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would be able to taste the difference between two brands of salty</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>potato chips/ crisps</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can hear electricity humming in the walls</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would notice a tiny change (for example, 1 degree) in the temperature</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>of the weather</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would be able to taste the difference between apparently identical</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pieces of candy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>would be able to tell the weight difference between two different</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>coin sizes on the palm of my hand, if my eyes were closed.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would not be able to smell the smallest gas leak from anywhere in the</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>house</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would be the first to hear if there was a fly in the room</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If I look at a pile of blue sweaters in a shop that are meant to be</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>identical, I would be able to see differences between them</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can see dust particles in the air in most environments</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Demographic Questionnaire

<table>
<thead>
<tr>
<th>Question</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What age are you?</td>
<td></td>
</tr>
<tr>
<td>2. What gender are you?</td>
<td>Man/ Woman/ Transgender/ Prefer not to say</td>
</tr>
<tr>
<td>3. What ethnicity are you?</td>
<td>White background/ Mixed or multiple ethnic background/ Asian background/ Black, African or Caribbean background any other ethnic group</td>
</tr>
<tr>
<td>4. Do you have a clinical or self-diagnosis of autism?</td>
<td>Clinical/ Self</td>
</tr>
<tr>
<td>5. When did you receive this diagnosis (in years)?</td>
<td></td>
</tr>
<tr>
<td>6. Have you ever been diagnosed with an eating disorder?</td>
<td>Yes/ No</td>
</tr>
<tr>
<td>7. If so, what type of eating disorder?</td>
<td>Anorexia Nervosa/ Bulimia Nervosa/ Binge Disorder/ AFRID/ OSFED/ PICA/ Rumination/ None (can select more than one)</td>
</tr>
<tr>
<td>8. Do you have a diagnosis of any other mental health disorder?</td>
<td>Yes/ No</td>
</tr>
<tr>
<td>9. If so, please name any mental health disorders you currently have a diagnosis of?</td>
<td></td>
</tr>
</tbody>
</table>