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**People's Judgements About Autistic Students'  
Academic Performance Based on Brief Samples of  
Their Behaviours**

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## Abstract

The number of autistic students attending higher learning institutions is growing, but unfortunately, the majority of them do not complete their studies or are less likely to do so compared to non-autistic individuals (Ashbaugh et al., 2017). They demonstrate an increased incidence of repeating courses or dropping out (Dijkhuis et al., 2020). Studies have revealed that the intellectual demands of college do not pose substantial challenges to autistic students, but they struggle with social relationship and interpersonal competence issues, anxiety, stress, poor emotional regulation and difficulties in executive functioning (Brede et al., 2017; Dijkhuis et al., 2020). Therefore, it is critical to examine how communication and socialisation difficulties affect their academic life. In this series of studies, we investigated neurotypical perceptions about autistic university students' academic performance. In Study 1, we developed an experimental paradigm by recording brief samples of the participants' autistic and non-autistic target behaviours while they were writing about different life experiences. These videos were then shown to a group of non-autistic perceivers, who made judgements about the autistic students' academic life (success, motivation, happiness and grade). The findings suggest that autistic targets are judged more negatively in all academic aspects compared to non-autistic targets. In Study 2, we replicated these findings in a new target group and assessed the veracity of these negative judgements by comparing perceiver judgements to target self-reports. Autistic students faced more negative judgements in all aspects of academic life compared to non-autistic targets. Their motivation and happiness were underestimated, while non-autistic students were accurately perceived. However,

both groups were unaware of how they were perceived, believing that they would receive more positive judgements. In Study 3, we examined how different social contexts under high-demand (social interaction and self-presentation) and low-demand conditions (writing) could affect autistic individuals' judgements of academic success. We recorded three types of video recordings featuring both autistic and non-autistic individuals. The targets were filmed while either filling out a questionnaire and interacting with the experimenter or introducing themselves to the camera after being informed about the study's objectives to determine whether such disclosures would influence the perceptions formed about them. The findings show that negative peer judgements persist in different social contexts and do not change based on the situations.

In Study 4, we examined whether these judgements were extended to educators. The results demonstrate that academic staff hold less negative views of autistic students compared to the perceptions of non-autistic students and the general population. Overall, the findings indicate that negative peer judgements persist in higher education, although their consequences for academic attainment are still unknown.

## Dedication

To my father, whose spirit guides me still, your legacy lights my way. I dedicate this thesis in your memory, with my love.

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# Chapter 1: General Introduction

## 1.1 A Brief History of Autism

The word *autism* was first used in 1912, when Eugen Bleuler, a Swiss psychiatrist and psychologist, defined it as "an escape from reality". The term originates from the Greek word "autos," which denotes self. At first, the term was used to describe a fundamental disturbance in schizophrenia, as well as a withdrawal from social life (Frith, 2003; Holaday, 2012). In 1943, the psychiatrist Leo Kanner published the first clinical description of autism as a condition distinct from intellectual disability, schizophrenia and other disorders. Kanner observed cases of children diagnosed with a syndrome that had not been previously described. He noticed that these children typically struggled with connecting emotionally with others (Kanner, 1943). Kanner also noticed that these children presented with language delays, a tendency towards literalness, an inability to use language for communication, a preference for solitude and an ability to engage with objects in their environment solely for their own benefit. Kanner suggested that the children's disorders could be a consequence of being raised by cold, detached and rigid parents who adhered to perfectionist standards. He labelled these parents as "refrigerator mothers" (Kanner, 1949).

During that same decade, Hans Asperger, a psychiatrist from Vienna, noted similar behavioural patterns in some children from Austria (Wing, 1981). He noted that a few among them had exceptional abilities in mathematics and the natural

sciences but used idiosyncratic language and did not feel empathy for others. Asperger called this condition Asperger's syndrome (Frith, 2003).

Since its initial identification, researchers and clinicians have further refined the definition of autism over the years. In 1979, Wing and Gould introduced the notion of a triad of impairments. The first one involves difficulties with social interaction, including understanding and participating in social behaviour, such as recognising and interpreting others' feelings and intentions and forming and maintaining relationships. The second impairment encompasses issues with both verbal and non-verbal communication, such as challenges in using and understanding language, facial expressions and gestures. The third one relates to imagination, which can include repetitive and stereotyped behaviours, a strong preference for routines and resistance to change (Wing & Gould, 1979).

The DSM-5 (Diagnostic and Statistical Manual of Mental Disorders, 5th edition) currently describes autism as encompassing many impairments related to social communication skills, as well as restricted and repetitive patterns of behaviours, interests and activities (American Psychiatric Association, 2013). To be diagnosed as autistic, an individual must have significant and persistent difficulties in the following areas of social communication: initiating and responding to appropriate social interaction; using non-verbal social communication such as gestures, eye contact and body language; and developing and maintaining social relationships over time, including an interest in peers and sharing in imaginative play (American Psychiatric Association, 2013).

The neurodiversity movement, advocating the acceptance of autism as a difference rather than a deficit, represents a significant shift in the perception of the condition. This approach emphasises the unique strengths and challenges of autistic individuals and promotes their inclusion and acceptance in society (Jaarsma & Welin, 2012).

According to Walker (2021), the neurodiversity paradigm is based on the following tenets. First, all neurotypes, even those that deviate from the neurotypical norm, are inherent and typical manifestations of human variation and diversity, comparable to distinctions observed in other human phenotypes, such as height or skin tone. Second, differences in neurotypes are neutral in value, and no neurotype is necessarily correct, healthy or better than others. Lastly, accepting and embracing the diversity of human neurotypes and cognitive functioning, similar to the acceptance of and respect for the diversity of human cultures, can be beneficial to society.

Central to this movement are the recognition and inclusion of autistic voices in defining and understanding their experiences, which are crucial for developing a more comprehensive and authentic knowledge of autism (Milton, 2012). This perspective fosters greater societal integration and empowerment of autistic individuals, valuing their contributions and accommodating neurodiverse needs (Robertson & Ne'eman, 2008).

Thus, within this thesis, the terminology adopted includes "autistic" or "autism", which are preferred by most people in the autistic community when referring to themselves, according to Botha et al. (2023).

## 1.2 The Medical and Social Models of Disability

Historically, there have been a lot of contentious ideas, confusion and biases in conversations about disabilities (Waltz, 2010). Thus, in the common goal towards a more equitable, compassionate and inclusive society, it is essential to recognise and understand the various viewpoints, experiences and difficulties faced by people with disabilities. Despite numerous discussions regarding disability, the contrast between medical and social models stands out as the most fundamental.

The initial efforts to understand the syndrome, spearheaded by the medical doctors Kanner and Asperger, led to the development of the medical model of autism. This model of disability refers to impairments and deficits caused by a disorder in the individual, resulting in a deviation from what is considered normal by the majority (American Psychiatric Association, 2013). Interventions based on the medical model focus on fixing autistic persons' deficits or correcting their impairments to help them achieve what is defined as normal human functioning.

Various cognitive theories of autism, such as the theory of mind (ToM), have traditionally subscribed to a medical model (Baron-Cohen et al., 1985; Rajendran & Mitchell, 2007). According to this theory, autistic individuals have difficulties in understanding other people's thoughts and emotions (Baron-Cohen et al., 1985). Some researchers claim that autistic individuals have dysfunctional simulation

mechanisms, referring to the ability to internally mimic and understand the actions and mental states of others (e.g., Oberman & Ramachandran, 2007). Other scholars argue that autism can be best explained by a deficit in a specialised ToM module in the brain (e.g., Adams, 2011). These claims have led some autism researchers to suggest that autistic individuals lack ToM abilities and are "mind-blind" (Baron-Cohen et al., 1995). However, recent work on ToM interventions aims to improve autistic children's social perception and perspective-taking abilities. For example, video modelling techniques have been used to successfully teach recognition of emotions and intentions (Charlop-Christy et al., 2000), while social skills training shows promise for building capacities for social interaction and communication (Dotson et al., 2010). However, the effectiveness of these interventions is still uncertain, with some studies suggesting that such interventions may not lead to sustained improvements or generalisation to other settings (e.g., Fletcher-Watson et al., 2014).

The medical model has its advantages as it offers standardised diagnoses for healthcare providers. However, it overlooks the influence of systemic and interpersonal factors on disabled individuals' health, quality of life and access to resources. These factors, such as stigma and objectification by healthcare providers (Roscigno, 2013), can have a negative impact on the overall wellbeing of disabled individuals (Clare, 2019). For instance, this problem was further exacerbated during the COVID-19 pandemic when people with disabilities were discriminated against by healthcare providers and policies that prioritised treatment and resources, such as medication and respirators, for those who were deemed "healthy and functional" (Lund et al., 2020).



It is a form of marginalisation when disability models fail to take into account the various identities that an individual may have. The reason is that it ignores the intricate interplay of historical, societal and personal factors that together shape an individual's experiences in the world (Brinkman et al., 2023). For instance, Latino and Black adults with intellectual and developmental disabilities experience worse health outcomes than White adults with similar disabilities and nondisabled Latinos and Blacks (Magaña et al., 2016). This finding demonstrates how disability models that do not consider race and ethnicity fail to capture the full range of barriers and disadvantages faced by minorities with disabilities.

However, there has been a movement towards a comprehensive approach that highlights the impact of the environment on the social and communication challenges experienced by autistic individuals. The social model of disability states that disability is not a characteristic of an individual but a result of how society is structured. Society is designed to cater to a specific group of people, and anyone who does not fit into that group is considered disabled, including people who differ from the majority in terms of their cultures, beliefs and practices (Oliver, 2013). Disability is not caused by an individual's impairment but by an environment that is not accommodating to diverse ways of being. When society fails to adapt to variations and exclude those who are different, disability is created. However, disability can be mitigated or even eliminated by changing the environment to be more inclusive and adaptable to differences (Dwyer, 2022).

Indeed, autism research often fails to incorporate the perspectives of autistic individuals and their valuable insights and experiences; instead, it relies heavily on

non-autistic perspectives (Botha, 2021). Often, autistic individuals are blamed for awkward social interactions since they are misunderstood by non-autistic people (Holt et al., 2022). Although non-autistic individuals may demonstrate ToM skills with one another, they fail to read the behaviours of autistic individuals (Edey et al., 2016). Thus, the autistic scholar Milton (2012) introduced the double empathy problem (DEP) as an alternative to the ToM deficit explanation for autistic social challenges.

### 1.3 Double Empathy Problem

Damian Milton (2012) coined the term "double empathy problem" to describe the lack of mutual understanding between individuals with different social dispositions. The disconnect stems from contrasting social norms and assumptions among different groups, such as autistic versus non-autistic people, and can hinder shared understanding (Heasman & Gillespie, 2018). The disengagement may feel more jarring for neurotypical people since it is unfamiliar, whereas autistic individuals frequently face this challenging and often distressing disconnect in their interactions (Milton, 2012).

Throughout history and in current events, society's lack of empathy towards groups and individuals, based on differences such as religion, class, ethnicity and politics, has been observed. As a result of this empathy deficit, discrimination and prejudice have occurred, sometimes leading to violent confrontations (Imbs, 1996; Talbot, 2009; Tarrow, 2011; J. Turner & Tajfel, 1979). As for autistic and non-autistic communities, their different social cultures may cause conflicts. According to Milton (2012), what constitutes normal and acceptable social behaviour is a product of

social construction and is determined by cultural standards at any given time. Being the majority, the non-autistic community has the upper hand in establishing social norms, which often puts those who are autistic at a disadvantage. Furthermore, these social norms are constantly shifting, leaving the autistic community struggling to keep up (Chown, 2014). The non-autistic majority then assumes the responsibility of defining the criteria for evaluating the social competence of autistic individuals, while placing the blame for poor social interactions, misunderstandings and communication difficulties on the autistic individuals and their perceived deficits in social skills (Holt et al., 2022). Chown (2014) argues that if 99% of the world's population were autistic, non-autistic individuals would experience challenges similar to those faced by autistic people in today's society. This means that just like how autistic individuals use strategies such as camouflaging to cope and blend in, non-autistic people in the majority autistic world would also need to find ways to understand and relate to the different patterns of the majority culture. Therefore, they would become the neuro-minority struggling to meet social expectations.

Connecting with others may depend on one's ability to interpret their actions and emotions (Behrends et al., 2012; Halberstadt et al., 2001). However, previous research has reported that during in-person interactions, autistic individuals tend to make facial expressions less frequently and for shorter durations (Czapinski & Bryson, 2003; Trevisan et al., 2018). These differences might affect social interactions due to the distinct behavioural characteristics of both groups (Edey et al., 2016).

In the past, the main causes of autistic individuals' poor social skills were believed to be their ToM deficits. Non-autistic individuals are expected to have the

most competent ToM skills and social interactions. However, studies have revealed that this assumption may not always be true. Researchers have investigated whether people can accurately infer others' emotions and intentions. For example, Edey et al. (2016) designed an experiment to test this "mind-reading" ability objectively. Their study's participants, known as targets, were recorded while they were moving abstract shapes to represent social emotions and interactions such as teasing, flirting, shocking and enticing. These videos were then shown to a separate group, the "perceivers", who had to guess the depicted emotions using only the shape movements, without viewing the actual target manipulating the shapes. It was found that neurotypical perceivers were better at predicting intended emotions when neurotypical persons manipulated shapes compared to autistic individuals. The authors concluded that neurotypical individuals found it more difficult to infer the inner states of autistic individuals compared to other neurotypical individuals.

Moreover, autistic adults have reported that being with other autistic individuals provides them with comfort and relief from the stress of socialising, in contrast to being in the company of their non-autistic friends and families. They feel a sense of belonging and freedom to be their autistic selves when they are with other autistic people. Autistic individuals also report feeling accepted, understood and emotionally supported by other autistic individuals (Crompton, Hallett, et al., 2020). In 2020, Crompton and her team studied the observed and self-reported social rapport between autistic and non-autistic individuals. They matched autistic individuals with other autistic individuals, non-autistic individuals with other non-autistic individuals, as well as created mismatched pairs of autistic and non-autistic

individuals. They found that non-autistic individuals rated themselves the highest in social rapport. However, autistic individuals who were matched with each other had the next highest ratings in social rapport. The mismatched pairs of autistic and non-autistic individuals rated themselves the lowest in social rapport. Interestingly, third-party observers who were unaware of the individuals' diagnosis rated the matched autistic pairs as having the highest social rapport (Crompton, Sharp, et al., 2020). These findings support the DEP theory, which posits that social communication difficulties exist in both directions between autistic and non-autistic people. Specifically, the weaker rapport and connectivity reported in the mismatched pairs align with the idea that both autistic and non-autistic individuals struggle to interpret each other's social cues, intentions and mental states during interactions. Meanwhile, the stronger rapport in matched autistic pairs suggests that autistic people may better empathise and connect with the perspectives of those who share similar dispositions and experiences.

In another study, Crompton, Ropar, et al. (2020) examined "diffuse chains", a method of communication similar to the childhood game of "telephone". In this study, a story was read to the first participant in a group with eight adult members. That participant then verbally recounted the story to the second participant, who passed it to the third, and so on, until the last (eighth) group member retold the story. The groups were categorised into three types: all autistic participants, all non-autistic participants and mismatched groups with four each of autistic and non-autistic participants. The authors found that both autistic-only and non-autistic only groups were equally good at recalling the story details when told by the final

participant. However, the mixed non-autistic/autistic group had significantly poorer story recall by the final participant and also reported less social rapport compared to the other groups (Crompton, Ropar, et al., 2020).

To conclude, based on the presented evidence, it appears that autistic individuals have a distinct way of interacting that is comparatively easier for other autistic people to understand than for those who are non-autistic. This finding contradicts the assumptions of the medical model, supports the DEP theory and questions the notion that non-autistic people always excel in social skills while autistic people always have poor social skills.

## 1.4 Empirical Research Testing the DEP

Current research indicates limited but growing evidence that endorses the idea of a DEP between autistic and non-autistic individuals. This notion is supported by studies showing that (a) non-autistic people tend to misunderstand the behaviours of autistic individuals and (b) non-autistic people often have negative perceptions of autistic individuals, even with minimal information. Each line of evidence is discussed further in the following subsections.

### *1.4.1 Readability of Autistic and Non-Autistic People*

Several studies indicate that non-autistic people have more difficulty in accurately recognising and interpreting the mental and emotional states of autistic people compared to non-autistic individuals, based on their behaviours. (Loveland et al., 1994; Macdonald et al., 1989; Sheppard et al., 2016).

Macdonald et al. (1989) conducted one of the earliest studies that explored the disparities in how autistic and non-autistic people's emotional expressions were interpreted. The researchers employed four tasks assessing both recognition and expression of emotions in facial and vocal modalities. In one task, participants were asked to express five emotions (happiness, anger, sadness, fear, and neutral) after being read short descriptive situations, and their facial expressions were photographed. These photographs, along with audio recordings of vocal expressions, were then evaluated by a separate group of observers. The observers better recognized negative emotions (anger, sadness, and fear) from the non-autistic participants' facial expressions. However, there were no significant differences in identifying happy and neutral facial expressions between the autistic and non-autistic groups. Interestingly, in vocal expressions, autistic individuals were more often perceived as sounding sad. The study also found that autistic adults performed worse on recognizing emotions in both speech and facial expressions. (Macdonald et al., 1989).

Moreover, the facial expressions of autistic individuals were perceived as more enigmatic and mechanistic compared to those with Down syndrome. Loveland et al. (1994) examined the accurate expression of emotions by autistic people and individuals with Down syndrome. The study sample comprised 18 autistic participants and 24 participants diagnosed with Down syndrome, matched on chronological age, verbal mental age, nonverbal mental age, and nonverbal IQ. The procedure involved two tasks: 1) an Imitation task where participants were asked to imitate five modelled facial expressions (happy, angry, sad, surprised, and neutral),

and 2) an Expression task where participants were asked to produce these same expressions when given a verbal label. Three researchers videotaped the expressions and subsequently analysed them using a rigorous coding system. The initial phase of analysis involved identifying the emotion that each expression most closely resembled. In the second phase, the researchers evaluated the presence of predefined "unusual behaviours," including those categorized as bizarre, mechanical, or atypical based on neurotypical norms. The results revealed that while both groups produced recognizable expressions above chance levels, the autism group exhibited significant differences in their performance. Specifically, autistic individuals produced fewer recognizable expressions than those with Down syndrome in the Expression task, though not in the Imitation task. Moreover, the facial expressions of autistic participants were more frequently coded as bizarre or mechanical compared to those of participants with Down syndrome. These findings suggest potential difficulties in connecting verbal emotion concepts to facial expressions or in the motor planning and execution of expressions in autistic people. (Loveland et al., 1994).

Sheppard and colleagues (2016) examined how well people could identify the emotions and scenarios experienced by autistic people compared to neurotypical people. The researchers told the participants beforehand that they would be filmed while posing certain facial expressions. However, upon the participants' arrival, the experimenter proceeded to perform one of these four scenarios: telling a joke, giving a compliment, recounting a story or engaging in irrelevant activities. To capture their natural reactions, the participants were filmed without being told. These reaction



videos were then shown to a new group of observers who had to guess which scenario was being experienced by the individual featured in each video. The findings indicated that the observers exhibited lower accuracy in detecting scenarios involving autistic people compared to neurotypical people, with the exception of reacting to jokes, which was equally well recognised between the groups. Another group of observers also rated the expressiveness of the individuals in the videos. Autistic individuals were rated as equally expressive in most scenarios, except receiving compliments. Overall, the results show that non-autistic people may have difficulty in understanding the internal states of autistic individuals, supporting the idea of a DEP between autistic and non-autistic persons. However, context plays an important role since autistic individuals may appear more or less expressive, depending on the situation (Sheppard et al., 2016).

In a related study, Faso et al., (2015) examined how facial emotional expressions produced by autistic adults were perceived by others. Six autistic adults and six typically developing adults had their photographs taken, with both posed and naturalistically evoked facial expressions depicting different emotions at mild and extreme intensities. Thirty-eight female undergraduate raters judged the photos based on emotional category, intensity and naturalness. The results showed that while autistic expressions were better recognised overall, primarily driven by better recognition of autistic expressions of anger, they were also evaluated as significantly more intensified and less naturalistic than typically developing expressions. The judgements of naturalness showed a positive correlation with the accuracy of recognition of evoked expressions, but not for posed expressions, only in the

typically developing group. The findings indicate that autistic individuals may have variations in facial affect but not necessarily impairments. These variations may not hinder emotion recognition but can have a negative impact on the quality of their social interactions. This outcome contrasts predictions and prior research (Loveland et al., 1994; Macdonald et al., 1989; Sheppard et al., 2016) indicating non-autistic people's difficulty in interpreting autistic facial expressions. As the authors note, this surprising result seems to have been driven primarily by the autistic group's angry expressions, which were identified with significantly higher accuracy than those of the typically developing group. The researchers suggest that the exaggerated intensity of the autistic expressions, also found in this study, may have facilitated their recognition. Indeed, intensity ratings were positively associated with accuracy for the autistic group across conditions. As Riggio (1986) found, expressive quality issues can impair social functioning even when emotion recognition is intact. Autistic people's emotional expressions may appear less typical or congruent with social situations compared to non-autistic people's expressions. This difference in expression could potentially impact the effectiveness of their social interactions (Halberstadt et al., 2001).

The above studies under review used different methods to examine emotional expressions in presented by autistic people. This variation matters because it can change what the researchers find and how they explain it. One major difference was having people make faces on purpose versus catching their real, unplanned reactions. For example, Faso et al. (2015) and Macdonald et al. (1989) told their participants to show emotions, which can sometimes lead to extreme or odd

expressions compared to those in everyday life. However, Sheppard et al. (2016) let people react naturally to situations, revealing authentic emotional responses. Faso and colleagues' attempt at eliciting expressions instead of posing them could be closer to natural emotions but still might not capture genuine, spontaneous feelings. The stimuli themselves also differed in how real-life they were. Loveland et al. (1994) and Faso et al. (2015) used straightforward instructions about expressions. In contrast, Sheppard et al. (2016) created scenarios more capable of triggering reactions, arguably giving a more believable context for emotions. Thus, these research design choices affect both how expressive the individuals appear and how accurately observers can decode and interact with the emotions. Posed expressions might miss the subtle, shifting essence of natural feelings, possibly interfering with understanding them properly. The fact that the studies approached this issue so differently highlights how complicated emotional expressions are to autism research. It also emphasises the need for diverse research to fully grasp the spectrum of emotional communication patterns in autism.

Collectively, these findings indicate non-autistic people's lower accuracy in inferring inner states and interpreting social cues from autistic as opposed to non-autistic individuals. These results support the double empathy account that interpersonal understanding is a two-way street.

#### *1.4.2 First Impressions of Autistic Individuals*

Recent research indicates that neurotypical persons generally have less favourable first impressions of autistic adults compared to other neurotypical individuals. This trend has been observed in both recorded video interactions

(Alkhalidi et al., 2019, 2021; Sasson et al., 2017) and in-person interactions (Lipson et al., 2020; Morrison et al., 2020). These unfavourable impressions are associated with social exclusion and greater reluctance to engage in further interactions.

In a series of three studies conducted by Sasson and colleagues in 2017, they examined first impressions and judgements about autistic individuals in terms of social favourability. In the first study, the researchers recorded autistic and non-autistic adults, matched on demographic variables, participating in a short 60-second mock audition for a reality show. The recordings were converted into five different formats: audiovisual, video only, audio only, a still image and a transcript. 214 undergraduate raters evaluated the stimuli on traits like attractiveness, awkwardness, and intelligence, as well as their willingness to interact socially with the person. The results revealed that across the audiovisual, visual-only, audio-only and still image formats, autistic adults received less favourable evaluations than non-autistic adults on both trait judgements and intentions to interact with the former. However, when the ratings were based solely on a transcript of what the person said, without any audio or visual cues, there was no significant difference in how autistic and non-autistic adults were perceived. This finding suggests that the presentation style rather than the conversational content drives more negative first impressions of autistic individuals.

The second experiment included 12 autistic adults, and 16 neurotypical controls engaged in casual conversations with an experimenter. The experimenter posed open-ended questions about any recent enjoyable films they had watched. A static image of the targets was extracted from the video recordings and shown to 37

undergraduate raters, who evaluated the subjects' perceived social awkwardness, approachability, and the likelihood of friendship. Each image was rated ten times to assess consistency. Results showed that autistic individuals were consistently rated as more socially awkward, less approachable, and less likely to be befriended across repeated exposures. Study 3 involved 14 participants (seven autistic, seven neurotypical) recounting stories expressing various emotions, such as delight, surprise, fear and wrath. The participants were recorded during the activity, and the resulting video clips were edited and presented to observers. The observers were then asked to assess the videos based on five criteria, which included the individual's social circle, compatibility with others, time spent alone, awkwardness and willingness to initiate a conversation. The results indicated that autistic individuals were viewed less positively across all five questions. In all three studies, autistic individuals received significantly more negative impressions and judgements across these rating dimensions compared to the control groups. These perceptions were consistent for both adults and children, regardless of whether the stimuli were static images or dynamic videos capturing their social behaviours. The negative impressions held true for both brief 2–4-second clips and 10-second video glimpses and did not change even with repeated exposures to images of the same autistic individual. Various non-verbal aspects, including body language, vocal prosody and facial expressiveness, appeared to drive the negative perceptions. How the information was presented also influenced the impressions. Negative initial impressions were linked to video or audio information that included non-verbal cues but not with written transcripts of the actual conversational content. These findings suggest that the social presentation style and physical appearance, rather than

substantive speech content, play a key role in forming negative first impressions of autistic individuals.

Grossman (2015) reported similar findings when examining whether typical adults, after their brief exposures to images or recordings of autistic children, would judge the latter as more socially awkward than neurotypical children. The researcher used video and audio clips of autistic children who were recorded while they were retelling a story. The typical adults were shown 1-second and 3-second clips of these children and still images. Subsequently, they were inquired about whether the children appeared socially awkward or not. The results showed that even with brief exposures (as short as 1 second) to visuals, audio clips or both, the adults judged autistic children as socially awkward at a much higher rate than neurotypical children. This pattern held true for still images as well. These findings suggest that typical adults very quickly pick up subtle non-verbal and non-linguistic signals from autistic children and use those signals to form judgements about the latter's social awkwardness.

Other studies mentioned that the readability of the targets correlated with a more positive impression. Alkhaldi et al. (2019) conducted a study to determine whether there would be a correlation between readability and first impressions. They used the same video clips from Sheppard and colleagues' (2016) research, which showcased both autistic and non-autistic participants as they reacted to four distinct scenarios. A cohort of neurotypical individuals (perceivers) observed these video clips and evaluated the targets based on seven social favourability metrics derived from a prior investigation by Sasson et al. (2017). Additionally, the perceivers

responded to two supplementary inquiries regarding the targets' perceived self-esteem and empathy. Importantly, the observers were unaware of the targets' diagnoses or reactions during the activities. The findings showed that autistic participants were viewed as less readable and less socially desirable in comparison to non-autistic participants. Notably, there was a strong correlation between how easy to understand the targets were and how much people liked them. This connection remained even when taking into account the targets' diagnoses. In other words, less readable targets, whether autistic or neurotypical, tended to be viewed less favourably. This finding suggests that neurotypical individuals' difficulty in reading the minds of autistic people could be an important factor underlying their tendency to perceive the latter unfavourably.

Another study (Alkhaldi, 2021) demonstrated explicit negative bias against autistic individuals. Alkhaldi examined whether neurotypical students would be more likely to express dislike towards autistic individuals as opposed to those perceived to be neurotypical. The participants (neurotypical students) were shown videos of both autistic and neurotypical individuals and were subsequently asked if they liked each person, as well as the reasons for their judgements. The results indicated that the participants were more inclined to 'like' neurotypical targets compared to autistic ones. The frequency of 'likes' received by a target was closely correlated with the participants' ratings of the target's social favourability. The perceived awkwardness and lack of empathy of the target were commonly cited reasons for the participants' unfavourable judgements.

Researchers have also investigated how autistic and neurotypical people communicate and interact with each other in everyday, real-life situations. Their findings indicate notable differences in the ways that these two groups interact and socialise with each other. For instance, Lipson et al. (2020) examined how neurotypical college students perceived and behaved towards peers whom they believed were autistic. The research involved participants interacting with confederates who displayed either stereotypical autistic or neurotypical behaviours. The confederates were also identified as being either members or non-members of an autism student organisation. The researchers assessed the participants' perceptions of the confederates, as well as their verbal and non-verbal behaviours during the interaction. They also evaluated the participants' explicit and implicit attitudes towards autistic individuals. The results showed that confederates displaying autism behaviours were perceived more negatively than those exhibiting neurotypical behaviours, regardless of labelling. The participants' explicit attitudes towards autistic individuals were also not associated with verbal or non-verbal behaviours.

Morrison et al. (2020) investigated potential differences in the quality of social interaction experienced by autistic individuals when engaging with typically developing individuals compared to autistic partners. The study included 67 autistic and 58 non-autistic participants, who were divided into three types of partnerships: autistic–autistic ( $n = 22$ ), neurotypical–neurotypical ( $n = 23$ ) and autistic–neurotypical ( $n = 25$ ). Each participant engaged in a 5-minute spontaneous conversation with an unfamiliar person. Afterwards, the participants assessed the



quality of the interaction and their impressions of their partners. The non-autistic participants perceived the autistic adults as less attractive and more awkward than the non-autistic participants. Nevertheless, in contrast to prior research results, the autistic participants were not perceived as less likeable than their neurotypical counterparts. These findings intimate that neurotypical individuals may have enhanced their perceptions of autistic individuals through real-world interactions. However, neurotypical individuals were more interested in future contacts with neurotypical than autistic partners. In contrast, autistic individuals showed a strong preference for engaging with other autistic individuals and reported sharing more personal information with autistic partners than with neurotypical partners (Morrison et al., 2020).

It is possible to change a person's initial perception through diagnostic disclosure. A study by Sasson and Morrison (2019) delved into this very topic. They wanted to see if revealing someone's autism diagnosis could change how others initially perceive them. To make the study as realistic as possible, they used a "high-risk social challenge task" (Gibson et al., 2010) ) where participants had to do a 60-second audition for a reality game show. They carefully selected 20 autistic and 20 typically developing participants, making sure they were matched in terms of gender, age, and IQ score. The participants were recorded doing the task, and then 215 observers watched the videos under four different conditions. In one condition, no extra information was given. In another, the correct diagnostic status was provided. In the third, the opposite diagnostic information was given, and in the fourth, a schizophrenia label was used. The observers rated the participants on 10 different

attributes, like how clumsy they seemed, how appealing they were, and how likely they would be to start a conversation with them. The results showed that initially, the autistic adults were perceived less positively than the typically developing ones. But, when the correct diagnostic information was given, the impressions improved. This suggests that the diagnosis helped explain any social or stylistic differences the evaluators noticed. However, even with the improvement, the ratings of the autistic individuals still weren't as high as those of the typically developing participants who were incorrectly labelled as autistic. Interestingly, the study found that the observers' familiarity with autism, rather than their age, gender, or IQ score, was linked to more positive initial perceptions of the autistic individuals (Sasson & Morrison, 2019).

Thus, providing education and exposure to promote an understanding of autistic behaviours could be beneficial in improving non-autistic individuals' perceptions of autistic peers and willingness to interact with them. Scheerer et al. (2022) conducted a study to determine whether an educational presentation about autism could enhance high school students' perceptions and judgements of autistic adults. In the study, before or after viewing a 50-minute autism presentation and attending a Q&A session, 151 students rated 20 autistic, and 20 non-autistic adults featured in video clips. The results showed that the students who watched the autism presentation rated the autistic adults as more attractive and likeable and expressed a greater interest in interacting with them compared to those who had not seen the presentation yet. This finding suggests that education about autism might result in more positive perceptions.

The studies cited above have consistently shown non-autistic people's tendency to have more negative first impressions of autistic adults compared to non-autistic adults. This pattern emerges after exposures as brief as a few seconds of looking at still images (Sasson et al., 2017) up to several minutes of real-world interactions (Morrison et al., 2020).

A common thread across these multiple studies is that autistic people are perceived as more awkward, less attractive, less empathetic and less socially warm, based solely on their non-verbal cues and presentation style (Alkhaldi et al., 2019; Lipson et al., 2020; Sasson et al., 2017). For example, Sasson and colleagues (2017) found that factors such as body language, facial expressions and vocal prosody contribute to unfavourable first impressions, which are not overcome even with repeated viewing.

These negative evaluations by non-autistic perceivers appear to translate into real-world social consequences. Both Sasson et al. (2017) and Alkhaldi et al. (2019) found that neurotypical participants were less willing to interact with autistic versus neurotypical targets after watching short video clips. Similarly, in an in-person interaction study, non-autistic college students showed less verbal engagement with and disclosure to peers displaying autistic mannerisms, regardless of whether the latter were labelled as autistic (Lipson et al., 2020).

Interestingly, though, a few studies hint that revealing an autism diagnosis could soften some of those unfavourable first impressions. Sasson and Morrison (2019) observed raters' improved perceptions of autistic adults when the raters

knew about the diagnosis, suggesting that the label helps explain the autistic individuals' atypical social style. Autistic adults interacted less smoothly with neurotypical versus autistic partners and expressed a preference for building relationships with other autistic individuals who may understand them better (Morrison et al., 2020).

In summary, the body of research on this topic now demonstrates that many non-autistic people form more negative first impressions of autistic adults based on the latter's brief non-verbal presentation styles. These snap judgements contribute to social reciprocity difficulties even in real-world encounters. However, emerging evidence suggests that increasing public understanding of an autism diagnosis may help foster more positive initial perceptions.

### 1.5 Are Autistic Individuals Aware of How They Are Perceived?

Historically, meta-perception has been considered important as it helps a person modify one's behaviour to create a more favourable impression (Anderson et al., 2008; Vazire & Carlson, 2010; Vazire & Mehl, 2008). Meta-perception, or individuals' awareness of how others perceive them, has been viewed as an important skill for managing self-presentation and social interactions (Darley & Fazio, 1980).

Several researchers have suggested that autistic people are poor at reputation management. Chevallier et al. (2012) examined how children rated pictures and then altered their ratings when informed that the experimenter was the artist. Contrary to neurotypical children, their autistic peers did not adjust their ratings to flatter the

artist. Moreover, the extent of the flattery was linked to the children's self-reported enjoyment of social interactions. These results imply that reduced social motivation is associated with a lower inclination for reputation management, suggesting impaired awareness of or motivation to guide others' impressions of them strategically.

Relatedly, Izuma et al. (2011) conducted a study on reputation management by autistic individuals. Their study involved making real charitable donations in the presence or absence of an observer. Neurotypical controls donated more when an observer was present, aligning with earlier research results. However, autistic individuals were not influenced by the presence of an observer in this task. These results suggest that autistic people may have difficulty in considering what others think of them and provide further evidence for the existence of specialised neural systems that mediate the effects of social reputation. Cage et al. (2013) investigated other reasons for this apparent inability to manage one's reputation. A group of 19 autistic and 20 typically developing adults were asked to donate to a charity and to another person under two conditions – one when alone and the other when observed. In an additional manipulation, half of the participants were told that the viewer would have the opportunity to make a donation to the charity in the future (motivation condition), which could incentivise the participants to change their approach to maximise donations. The remaining participants were informed that the observer was only there to watch (no motivation condition). The study replicated Izuma and colleagues' (2011) earlier findings that autistic adults did not donate more to charity when under observation. However, in the motivation condition, both

autistic and typical adults donated more to the charity when watched, although the autistic individuals' donations increased to a lesser extent. The results suggest autistic individuals' capability to think about their reputation, but their expectation of reciprocal behaviour from others may be reduced, which can limit their engagement with reputation management.

While some researchers have suggested that autistic individuals are unable to handle their reputation effectively (Chevallier et al., 2012; Izuma et al., 2011), other scholars (Cage et al., 2013) have shown autistic adults' ability to manage their reputation, although to a lesser extent than non-autistic adults. It is possible that autistic people's degree of concern for their reputation (and thus reputation management) varies significantly by individual.

In fact, research shows that autistic teens do have some insights into others' perceptions, but such awareness can negatively influence their social functioning. For example, using semi-structured interviews, Cage et al. (2016) examined 12 autistic adolescents' reputation concerns. A thematic analysis revealed that some autistic adolescents were concerned about their reputation and changed their behaviour to try to impress others. However, over half said they did not want to be "cool" – either because they wanted to be true to themselves or did not understand the "rules" of being cool. This variability in reputation concerns could be due to a desire for authenticity or difficulties in understanding social rules. This, in turn, may negatively affect their internalisation of problems and their self-perceptions and promote their avoidance of future social interactions (Burrows et al., 2017). This has been supported by Matthews et al. (2015), who state that during their study, autistic

students did not want to disclose their condition and only did so when they deemed it safe or could not handle the corresponding stress and required a specific need to be met. Consequently, they reported their condition to the higher education institution's disability office only when they needed specific accommodations but did not inform their peers or the academic staff. According to Matthews et al. (2015), most autistic students feared the associated negative comments, unfavourable perceptions and stigmatisation, as well as rejection, prejudice and negative evaluations. According to a fairly recent systematic review, which examined university experiences reported by 587 autistic students across 24 studies, the fear of discrimination among them was not unfounded. The review indicated that almost one-third of the studies (7 in total), which involved 286 autistic students (48.7% of the total sample), reported experiences of discrimination, marginalisation and bullying (Davis et al., 2021). These findings suggest that autistic students' awareness of how others perceive them may hinder their ability to seek support and develop social relationships (Anderson et al., 2018, 2020; Humphrey & Lewis, 2008; Van Hees et al., 2015).

Moreover, the recent phenomenon of camouflaging, which is an autism-related form of reputation management, has been well documented (Hull et al., 2017; Lai et al., 2017; Perry et al., 2022) and indicates autistic individuals' awareness of how they are perceived, as well as their motivation to attempt to influence this perception (Cage & Troxell-Whitman, 2019). However, camouflaging can have considerable negative mental health consequences for autistic individuals, including increased anxiety, depression, poorer self-image and feelings of detachment from

others (Boyd et al., 2011; Bradley et al., 2021; Chapman et al., 2022; Miller et al., 2021). Importantly, these results are connected to an increased risk of suicide (Cassidy et al., 2018; 2020). In fact, suicide has been recognised as a prominent factor contributing to early mortality in autistic populations (Cassidy, 2020), highlighting a considerably elevated risk of suicide.

The ToM is based on the idea that the thoughts and feelings of people are private and hidden from others, who can only rely on people's observable behaviours in order to understand them (Premack & Woodruff, 1978). To do so, observers use specific cognitive and neural mechanisms to infer people's intentions. Autistic people are believed to have difficulty with this process and find it challenging to understand what others are thinking or feeling (Baron-Cohen et al., 1985, 1997; Happé, 1995). It is suggested that they may lack or have a defective ToM, which is responsible for deducing the intentions of others based on their observable behaviours (Baron-Cohen et al., 1985, 1986, 1995; Goldman, 2013). However, Happe (1994) argued that it is difficult to believe that a ToM deficit is universal since 20% of autistic individuals have passed the false belief test. There are several ways to explain this finding. First, the false belief test requires multiple skills. Despite this, some autistic individuals have passed this test in ways that differ from those used by non-autistic persons. Therefore, success or failure in the test is not considered as important as the method with which the participant takes the test. The contrasting view in the ToM suggests that only individuals with a representational understanding of the mind can successfully pass false belief tests. This view becomes problematic in the context of autism since it fails to account for autistic individuals who are able to pass these tests.



Third, between these two viewpoints, it can be argued that the ToM may explain some of the challenges in autism but does not comprehensively account for all aspects of the condition. Moreover, Gernsbacher and Yergeau (2019) claim that more recent studies have failed to replicate the original findings of the ToM deficits in autism. This outcome challenges the notion that ToM deficits are universally characteristic of autism.

Despite varying evidence regarding the extent to which autistic people engage in reputation management behaviours, direct attempts to measure the accuracy of meta-perceptions of autistic people are limited. Sasson et al. (2018) examined whether autistic adults were less accurate than the neurotypical control group in predicting how unfamiliar observers would perceive their personality traits. The method involved 11 autistic adults and 11 neurotypical adults in the control group being video recorded when giving a 1-minute pitch to be selected for a reality TV show. Then, 412 undergraduate observers rated the videos on 20 different personality traits. Prior to being rated, the autistic and neurotypical participants also provided self-ratings of their personalities (self-perception) and predictions of how the observers would rate them (expected perceptions of others). The results showed that while the autistic and control groups did not significantly differ in their self-perceptions or expected perceptions of others regarding their personality traits, the observers rated the autistic group much less favourably than the controls on 19 out of 20 traits. More critically, compared to the control group, the autistic group demonstrated significantly lower accuracy in predicting how the observers would rate their personalities across nearly all traits. Although both autistic and control

groups overestimated how favourably the observers would rate them, this discrepancy was much larger for the autistic group, indicating differences in meta-accuracy. In summary, despite having typical self-perceptions, autistic adults showed difficulties in gauging how unfamiliar observers would perceive their personality traits. This finding suggests that reduced meta-perception may be an important contributor to social difficulties in the autism spectrum disorder.

Locke and Mitchell (2016) argue that compared to neurotypical people, autistic people tend to perform poorly on meta-cognitive tasks and on mind-reading tasks, which involve representing other people's states of mind or perspectives. The authors contend that as meta-perceptions are meta-representations of other people's perceptions, autistic people may experience difficulties in forming accurate meta-perceptions of others and find it challenging to separate these from their own. Locke and Mitchell's (2016) study involved 22 autistic and 22 neurotypical adolescents, along with one parent for each adolescent. They used the Circumplex Scales of Interpersonal Efficacy (CSIE) to assess self-perceptions, parent perceptions and meta-perceptions of efficacy for a range of social behaviours across different regions of the interpersonal circumplex model. The methodology involved having the adolescents rate their own efficacy (self-perceptions) and then predict how their parents rated them (meta-perceptions). The parents also rated the adolescents' efficacy (parent perceptions) and predicted the adolescents' self-ratings (meta-perceptions). Their findings revealed that autistic adolescents overvalued their interpersonal skills compared to their parents' assessments and were not as accurate in perceiving how negatively their parents rated their skills (i.e., lower meta-

accuracy). However, in a related study by Heasman and Gillespie (2018), 22 autistic individuals and their family members completed an Interpersonal Perception Method interview assessing their perspectives on 12 social skill topics. The autistic participants correctly predicted that their family members would rate their abilities lower than they rated themselves, showing their perspective-taking ability. However, the family members tended to underestimate the perspective-taking capacity of their autistic relatives and to over-rely on the stereotype about autistic people's lack of self-awareness. This study illuminates how misunderstandings can transpire bidirectionally in these relationships, implicating representations of autism in shaping assumptions that truncate efforts at a mutual understanding. The research highlights the need to situate social difficulties interactionally between autistic and neurotypical communication, avoiding the sole emphasis on impairments in the former.

## 1.6 Autistic Students in Higher Education

Many autistic students pursue college- and university-level education (Dijkhuis et al., 2020). A significant number of these students possess self-assurance in their academic capabilities yet encounter difficulties in meeting the social communication requirements in higher education. The autistic students' social interaction in the classroom remains one of the most significant challenges that they encounter, despite being cognitively capable or even gifted (Gobbo & Shmulsky, 2014). Social isolation, anxiety and depression are common among this population (Ashbaugh et al., 2017; Irvine & Macleod, 2022; Jackson et al., 2018). Moreover, autistic students pursuing university education demonstrate an increased incidence of dropouts and

retake courses in comparison to the typically developing students (Brede et al., 2017; Dijkhuis et al., 2020). Thus, there is a growing need to examine the ways in which autistic students may be supported in achieving academic success (Bakker et al., 2023; Irvine & Macleod, 2022).

One primary difficulty for college and university students who are autistic is that their peers, professors and the college staff might not fully understand autism (Cage & Howes, 2020; Goddard & Cook, 2022; Gómez-Marí et al., 2021; Gurbuz et al., 2019). This lack of understanding can result in their being bullied or left out, making the college setting less welcoming for them (Gelbar et al., 2014). For instance, an autistic college student, who participated in a mentorship programme designed by Gillespie-Lynch et al. (2015), mentioned that a major hurdle for him during his transition to college was making sure that the staff and his peers knew about and comprehended his disability. In their study, Van Hees et al. (2015) sought to identify the challenges associated with the college and university experiences of autistic students, including education, student life and daily living. The students disclosed their autism mainly when feeling overwhelmed by stress, when feeling safe to do so or when having a specific need for assistance. The students often did not divulge their autism to peers or the academic staff, despite informing the disability office about their condition in order to obtain "reasonable accommodations" (Matthews et al., 2015). Prior negative perceptions and comments, as well as fears of stigmatisation, prejudice, rejection and adverse feedback, largely contributed to this hesitancy. As discussed previously, studies by Alkhalidi et al. (2021), Grossman (2015), Sasson et al. (2017) and Sasson and Morrison (2019) have indicated that neurotypical adults tend to

perceive autistic individuals in a more negative light (e.g., viewing them as more awkward and less likeable) and are less inclined to interact with them based on first impressions.

Consequently, several factors explain why autistic students may find university life and education more challenging than non-autistic students. Dijkhuis et al. (2020) argue that many autistic students can cope with the intellectual demands of college but may struggle with other factors, such as limited interpersonal competence, social relationship issues, poor emotional regulation, challenges with executive functioning and high levels of anxiety and stress. They also face difficulties in communicating and socialising, which create significant barriers to their successful transition through life (Ashbaugh et al., 2017). The social differences among autistic young adults affect their quality of life, self-confidence, personal skill building and future employment. Gurbuz et al. (2019) state that because of these challenges, autistic university students experience heightened loneliness, social isolation, stigmatisation and bullying compared to non-autistic students, and these are also thought to be the factors underlying the anxiety and depression common among young autistic adults.

Ward and Webster (2018) describe the factors impacting the success of autistic students in universities. Autistic students identified perseverance, passion and determination as critical drivers of their achievements. However, the levels at which they experience depression, anxiety and isolation were also recognised as crucial factors inhibiting their accomplishments in the university. Autistic university students' anxiety was mainly due to the emotional and/or social demands of

university life. As such, autistic students were reported as requiring support in many aspects of their social, emotional and academic lives.

Saggers (2015) found several factors affecting students' motivation, study behaviours and enthusiasm about their studies. Saggers (2015) considered the experiences of nine autistic adolescents attending an Australian urban secondary school offering inclusive education. The study was mapped into themes similar to those by Humphrey and Lewis (2008), which showed the autistic students experiencing some positive factors, which helped them achieve better academic outcomes. However, anxiety, depression and isolation were found to occur among the autistic students, which led to them to withdraw from social situations. Having friends and families who understood them was found to be critical in helping autistic students work through their depression. The respondents indicated avoiding seeking support from the academic staff and fellow students for fear of being rejected or misjudged, which might prevent them from requesting or accessing the support they would need to help them refocus on their goals and develop their determination to succeed. Most of the students in the study reported their difficulties in navigating the "hidden curriculum" of the social demands of the university setting. They found it challenging to maintain social relationships with peers because for them, building friendship was draining as it required a lot of work (Saggers, 2015). The autistic students also feared what others would think of them, worried that they were "bothering" busy faculty members and were concerned that seeking help would imply their lack of the necessary skills to achieve success in their programmes (Humphrey & Lewis, 2008). These findings suggest that the autistic students'

perceptions that seeking help would lead others to view them as a nuisance or as incompetent might hinder their ability to request support and develop social relationships.

White et al. (2016) established and analysed the issues faced by autistic adolescents in post-secondary education. The authors used a mixed-method approach to examine the needs of autistic college students. Their study revealed that despite the increasing number of autistic students in college, their social and academic challenges constrain their success. The study reiterates that the perspectives of the teachers, parents and autistic students are critical in creating support programmes that can bolster the academic and social experiences of autistic students (White et al., 2016).

With this social environment context in mind, Ashbaugh et al. (2017) conducted a study aimed at improving university life for autistic students through increased social integration. They held weekly meetings for the participants to make plans around shared interests and receive support connected to campus activities. The intervention was highly successful; all students reported increased social engagement, expanded peer connections, greater satisfaction with the university experience, and consequently, improved academic performance (Ashbaugh et al., 2017).

In the aforementioned studies, it is evident that some autistic students' academic performance is constrained by their problematic social experiences, which directly creates a myriad challenge affecting their academic lives.

## 1.7 The Aims of the Thesis

Prior research indicates typical adults' tendency to regard autistic individuals more unfavourably, such as perceiving them as more socially uncomfortable and less likeable; typical adults are also less interested in interacting with them based on first impressions (Alkhaldi et al., 2019, 2021; Grossman, 2015; Sasson et al., 2017). It has also been reported that perceivers make more negative judgements about targets who are autistic, especially when their diagnosis is not disclosed (Matthews et al., 2015; Morrison et al., 2019; Sasson et al., 2017). Nevertheless, there are still knowledge gaps that have formed the aims for this research, as discussed below.

### **1.7.1 Aim 1: Perceptions of autistic students in higher education**

It is noteworthy that no research has been carried out on how autistic students in higher education are perceived. However, one of the main challenges encountered by autistic students in higher education settings is the lack of awareness and comprehensive understanding of autism among their peers, instructors and university personnel (Cage & Howes, 2020; Goddard & Cook, 2022; Gómez-Marí et al., 2021; Gurbuz et al., 2019). This can lead to their being bullied or left out, making the college setting less welcoming for autistic individuals (Cage & Howes, 2020; Gelbar et al., 2014). Autistic students are less likely to finish higher education (Newman et al., 2011), and they receive lower grades on average than their non-autistic counterparts (McLeod et al., 2019). The lower success of autistic students in higher education may be due to their social exclusion and the lack of understanding and acceptance of autism by other students (Gillespie-Lynch et al., 2015). Additionally, despite the high-functioning autistic individuals' intellectual capacity to



meet college or university requirements, their anxiety and social communication difficulties may be the greatest barriers to academic success (White et al., 2011). It has also been reported that many autistic adults, especially females, adopt "camouflaging" tactics to avoid negative impressions, which require significant effort to conceal their social differences and behave more like neurotypical individuals (Hull et al., 2017; Lai et al., 2017; Perry et al., 2022). Recent research has shown that engaging in camouflaging and compensating can be both physically and mentally draining, as well as harmful to one's overall wellbeing (Gates, 2022; Hull et al., 2017). When autistic learners expend their energy on masking tactics, this could negatively affect their cognitive ability (Major & O'Brien, 2005). Stigmatisation can hinder autistic students from experiencing acceptance in the college community and a sense of belonging to it (Corrigan & Rao, 2012). Autistic students have reported their difficulties with working in groups at university (Gurbuz et al., 2019), and evidence shows that non-autistic students believe that it is acceptable to exclude autistic students in the classroom, especially when grades are at stake (Bottema-Beutel et al., 2019). Thus, negative non-autistic attitudes could contribute to difficulties faced by autistic students at university. If autistic people are perceived as less academically capable, this could result in their exclusion from activities such as groupwork or study group sessions by their peers.

### **1.7.2 Aim 2: Influence of different social contexts on perceptions about the academic success of autistic individuals.**

Multiple studies have shown that autistic people are regarded as more awkward, less attractive, less empathetic and less socially warm, based solely on

their non-verbal cues and presentation styles (Alkhaldi et al., 2019; Lipson et al., 2020; Sasson et al., 2017). For example, neurotypical individuals tend to perceive autistic individuals as less attractive, more submissive and more awkward than their matched neurotypical counterparts when assessing first impressions through video clips. Factors such as body language, facial expressions and vocal prosody contribute to unfavourable first impressions, which are not overcome even with repeated viewing. However, these negative first impressions are absent when the speech transcript is presented without visual stimuli. This suggests that physical appearance and expressive differences influence the bias (Sasson et al., 2017). However, it is unclear whether the context influences the type of judgement made, whether autistic people are negatively perceived universally or whether this bias is limited to specific contexts.

### **1.7.3 Aim 3: Meta-perceptions and Academic experience**

Interpersonal relationships and self-appraisal in the social context are critical in shaping self-understanding (Humphrey & Hebron, 2015). Among autistic students, serious concerns arise due to their social and emotional exclusions and how such experiences may have adverse impacts on their sense-making about themselves (Winstone et al., 2014). Some research has explored whether meta-perception differs in autism, given the social cognitive differences that characterise the condition (e.g., Sasson et al., 2011). These studies' results have been equivocal, with some reporting reduced meta-perceptive accuracy in autism (e.g., Sasson et al., 2018) and others noting that these abilities are intact and even enhanced in some cases (e.g., Usher et al., 2018). Nevertheless, an inadequate number of studies link

meta-perceptions with autistic students pursuing higher education. Aside from a few studies e.g., Usher et al., (2018), there has been little focus on autistic individuals' degree of accuracy in perceiving how their peers actually evaluate them. Furthermore, limited attention has been paid to how these meta-perceptions affect autistic students' university experiences. Thus, it is important to understand whether autistic adult students are aware of how their potential social partners perceive them, as this could have additional implications for their academic performance especially if those perceptions are negative.

#### **1.7.4 Aim 4: Educators perceptions on academic success of autistic students**

Research has shown that teachers' assumptions about and views of students can influence how the latter are treated in the classroom. Specifically, multiple studies indicate that teachers interact differently with certain students, based on their preconceived beliefs or stereotypes about these students' abilities and potentials (Hughes et al., 2005; Tenenbaum & Ruck, 2007). This finding suggests that teachers' assumptions and views regarding students play an important role in shaping the latter's educational experience and treatment, potentially leading to differential treatment based on these biases. Furthermore, research has demonstrated that students with disabilities who are instructed by teachers with positive attitudes towards their academic potentials perform better academically than those whose teachers hold low expectations (Klehm, 2014). Due to the primary role that teachers play in the students' learning process, those negative perceptions about autistic students may become more complicated if teachers have similar views.

Based on the knowledge gaps identified in prior research, this thesis aims to address the following key research questions: 1. How are autistic students perceived in higher education settings? 2. How accurate are perceivers' judgements of autistic and non-autistic students' academic performance? 3. Are autistic students aware of these perceptions? 4. How are autistic students perceived in different contexts? 5. How do university academic staff perceive autistic students?

To answer all questions, autistic and non-autistic targets were secretly videotaped in various scenarios (conditions). This small deception was necessary to record their natural behaviours. However, after participating, participants provided written, informed consent to use the videos in future research. This study obtained ethical approval from Nottingham University Ethical Review Board. The resulting videos were then presented to various groups of perceivers in a succession of studies (detailed below).

As discussed in **Chapter 2**, the videos of autistic and non-autistic targets (see Jaffrani et al., (2022) when they were engaged in typing descriptions of their emotional experiences were shown to non-autistic participants who were instructed to rate different aspects of the targets' academic lives. The aim was to investigate the non-autistic individuals' judgements about the academic lives of autistic and non-autistic students, focusing on the observers' perceptions of the targets' motivation to study, academic success, grades and happiness at university.

A new set of videos we developed was first piloted (**Chapter 3**). First, we aimed to replicate the findings of Study 1 in a different target group while measuring the

validity of these unfavourable assessments by contrasting the judgements of perceivers with target self-reports. Second, we sought to investigate the accuracy of the perceivers' judgements about the academic performance of both autistic and non-autistic students. We also aimed to explore whether autistic targets demonstrated accurate self-awareness regarding their academic achievements. We captured the responses of both autistic and non-autistic individuals while they were engaged in filling out a questionnaire. Subsequently, the recorded videos were shown to the observers who were tasked with evaluating the academic performance of both groups, focusing on the same academic aspects (success, motivation, happiness and grade) as in Study 1.

As presented in **Chapter 4**, we investigated how different social contexts (writing, social interaction and self-presentation) could affect judgements about the academic success of autistic individuals. We recorded three types of video recordings featuring both autistic and non-autistic individuals. The targets were filmed while either filling out a questionnaire and interacting with the experimenter or introducing themselves in front of the camera after being informed about the study's objectives to determine whether such disclosures would have an influence on the perceptions formed about them.

Finally, as explained in **Chapter 5**, we explored how university academic staff perceived autistic students by using the same set of target videos that were used in Study 3 when the targets were presenting themselves in front of the camera. Through Prolific, we showed those videos to different groups of perceivers (students,

educators and the general population) and asked them to rate the academic success of both groups of autistic and non-autistic targets.

## Chapter 2: How Do Peers Perceive the Academic Performance of Autistic Students Based on Brief Samples of Their Behaviours ?<sup>1</sup>

### 2.1 Introduction

Research on social disability in autism has been dominated by the medical model, which positions the disability within autistic individuals themselves. Recently, there is growing appreciation amongst non-autistic academics of the impact of contextual factors on outcomes for autistic people. An important theory in this area is the DEP (Milton, 2012; Mitchell et al., 2021), which reconceptualises social disability in autism as being relational in nature. It proposes that, due to fundamental differences in perceptions and experiences of the world, there is a “disjuncture in reciprocity” between autistic and non-autistic people, which makes cross-neurotype interactions problematic for both parties, with failures in mutual understanding and empathy being common. While both autistic and non-autistic interactional partners contribute to these difficulties, it is suggested that the impact is disproportionately negative for the autistic partners due to their being the minority group within society.

There is a small but growing body of empirical evidence that is consistent with predictions of the DEP. Non-autistic people find it more difficult to interpret behaviour of autistic than non-autistic others (Edey et al., 2016; Sheppard et al., 2016a), while information transfer is superior between same-neurotype than mixed-neurotype pairs (Crompton, Ropar, et al., 2020).

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<sup>1</sup> This work has been accepted for publication at *Autism in Adulthood*

More generally, non-autistic people rate autistic others more negatively than non-autistic others on a range of social favourability traits (e.g. likeability), and report having less intention to interact with them (Sasson et al., 2017).

These negative perceptions and misperceptions might have adverse impacts on outcomes in multiple spheres of life for autistic people. One context where relatively poor outcomes for autistic individuals have been highlighted is Higher Education. Autistic students are less likely to finish Higher Education (Newman et al., 2011), and receive lower grades on average than their non-autistic counterparts (McLeod et al., 2019). Autistic students also report feeling stressed, isolated, anxious and depressed at university (Volkmar et al., 2017). Research also highlights that autism stigma exists among some non-autistic university students (Gillespie-Lynch et al., 2015) and that autistic individuals are "othered" and dehumanised, including within university contexts (Nachman & Brown, 2020). Thus, negative peer attitudes could contribute to difficulties faced by autistic students at university.

While previous research has provided evidence of negative attitudes towards autism as well as generally poor first impressions of autistic individuals, it is not clear whether these negative impressions extend to impressions of autistic people's academic abilities. This question is important within an academic setting because if autistic students are perceived as being less academically competent (regardless of the reality), peers may be less likely to want to collaborate with them on group work or include them in shared learning activities such as study groups. This discrimination could then result in autistic students have lower academic achievement because they miss out on opportunities to learn with and from others. Friendships with peers at school have been found to be positively related to academic motivation and



performance (Altermatt & Pomerantz, 2003; Wentzel et al., 2004) ·A study by Altermatt and Pomerantz, (2003) found that students' academic beliefs and motivations are shaped by their peer relationships, as friends tend to share similar perspectives and influence each other's views of competence and the importance of achievement. In addition, another study on 242 middle school students over two years by Wentzel et al., (2004) demonstrated that reciprocated friendships, where both children consider each other friends, play a vital role in social and academic adjustment. Students without mutual friends showed less prosocial behaviour, lower achievement, and more emotional problems compared to those with reciprocal friendships. Beyond just having a friend, the quality of the relationships also impacted adjustment. Social exclusion is negatively associated with grades at secondary school (Raabe, 2019). At University, great importance is placed on peer learning as “students learn a great deal by explaining their ideas to others and by participating in activities in which they can learn from their peers” (Boud et al., 2014). Furthermore, the structure and size of study groups formed are linked to academic achievement (Berthelon et al., 2019). Thus, examining other students’ judgments of the academic experience of autistic students will help us understand whether this may be a barrier to success.

While judgments of academic performance of autistic people have not been previously investigated, evidence regarding whether non-autistic perceivers judge autistic individuals to be less intelligent based on brief samples of behaviour is mixed. Some studies have found autistic individuals to be judged as less intelligent than their non-autistic peers, but others have found no group difference (Morrison et al., 2019; Sasson et al., 2017). On the other hand, research suggests that based on “thin slices”

of behaviour, autistic people's performance on cognitive tasks is underestimated to a greater extent than non-autistic people's. Therefore, further research is warranted to understand whether autistic individuals are judged more negatively in relation to academic achievement and success (Kilee DeBrabander et al., 2022).

In this study, we examined the peer judgements received by autistic and non-autistic people in the university context. Our main objective was to ascertain whether negative peer judgements posed a social barrier to autistic students at university. Brief videos of autistic and non-autistic people (herein described as models) were presented to 25 non-autistic participants, who were asked to make judgments about the models' academic experience at university. Participants made judgments about the model's future academic success, motivation to study, happiness at university, and average grades, based on brief video samples of behaviour. We chose to focus on these aspects of academic life as previous research suggests that autistic university students may experience difficulties in each of these domains (Gurbuz et al., 2019), but we do not know whether a negative bias persists and/or contributes to these difficulties. We hypothesised that autistic models would be judged more negatively than non-autistic models on each of these dimensions of academic experience. We further explore whether any negative bias is domain-general, or whether it is specific to judgements about academic attainment (success and grades) or academic experience (motivation and happiness).

## 2.2 Method

### 2.2.1 Participants

Twenty-five non-autistic university students (4 males and 21 females), aged between 18 and 34 ( $M = 23.84$  years,  $SD = 5.30$ ), comprised this study's participants. They were recruited through the participant recruitment system (PRS) and advertisements at the University of Nottingham. To be eligible, the candidates should be current university students and self-report no diagnosis of autism. A sensitivity analysis revealed that with this sample size, a medium effect size (Cohen's  $d = 0.5$ ) at 80% power (critical  $t = 2.06$ ) could be detected for a paired sample  $t$ -test. The recruits gave their written consent to participate in the study and were compensated with course credits. Specific data on race, ethnicity and socioeconomic status were not recorded for ethical reasons. The study received ethical approval from the School of Psychology Ethics Committee, University of Nottingham (Ethics Approval Number: S1224).

## *2.2.2 Materials and Measures*

### *2.2.2.1 Stimuli*

Pre-existing stimuli from a previous study were used in this experiment (Jaffrani, 2022). Eighteen stimuli models (9 autistic, 9 non-autistic) each provided four candid video clips to give a global impression of their behaviours. The participants were recorded while alone in a room and were asked to think about their life experiences in which they felt stress, guilt, pride or love. All stimuli were therefore silent and non-interactive. The targets were unaware of being recorded, but after the task, they were debriefed and asked if they allowed their recordings to be used in future research studies. They had the opportunity to withdraw their recordings after the experiment was completed by emailing the experimenter, but

they did not do so. This procedure was approved by the School of Psychology Ethics Board, University of Nottingham (S1057). The recordings averaged 21.25 seconds in length. The final stimulus set consisted of a total of 72 video clips (18 targets x 4 emotional experiences).

The original study (including 20 targets) reported that autistic and non-autistic targets were matched by gender (6 males and 4 females in each group), age (autistic:  $M = 23.5$ ,  $SD = 4.8$ ; non-autistic:  $M = 22.4$ ,  $SD = 2.9$ ;  $t(18) = .62$ ,  $p > .05$ ), full-scale IQ, as measured by the WASI (autistic:  $M = 117.30$ ,  $SD = 10.40$ ; non-autistic:  $M = 111.10$ ,  $SD = 6.03$ ;  $t(18) = 1.63$ ,  $p = .12$ ,  $d = 0.79$ ), and emotional intensity while being filmed (autistic:  $M = 5.05$ ,  $SD = 1.45$ ; non-autistic:  $M = 5.70$ ,  $SD = 1.98$ ;  $t(18) = 0.84$ ,  $p = .207$ ,  $d = 0.40$ ). All targets were British, apart from one non-autistic Italian participant. All participants reported speaking English as their first language. The autistic group verbally confirmed their formal diagnosis of autism, and they scored significantly higher on the Autism Quotient (AQ) (Baron-Cohen et al., 2001) compared to the non-autistic group (autistic:  $M = 30.00$ ,  $SD = 6.77$ ; non-autistic:  $M = 22.10$ ,  $SD = 5.41$ ;  $t(18) = 3.62$ ,  $p = .002$ ,  $d = 2.18$ ). Notably, the AQ scores for the non-autistic group are relatively high. This could suggest that some individuals in the non-autistic group show traits associated with autism, albeit not to the extent that would warrant a formal diagnosis. Alternatively, it could indicate a high level of trait variability within the population sampled. Two of the original targets did not permit the use of their videos for future studies (1 autistic, 1 non-autistic).

### **2.2.2.2 Measures**

The participants responded to the following questions regarding each target: Do you think this person will be successful in their academic life? (yes/no). Do you think this person is motivated to study? (yes/no). What average grade do you think this person has? (1st/high 2.1/mid 2.1/low 2.1/high 2.2/mid 2.2/ low 2.2/ 3rd). Do you think this person is happy at university? (yes/no). The participants were asked to select the most appropriate response from the given options. The success, motivation and happiness questions were subjective judgements that allowed the participants to operationalise the concepts for themselves. The grade question was designed to be an objective assessment of academic performance. The response options for the grade question refer to the possible degree outcomes that can be attained in the UK degree classification system. The 1st corresponds to the highest possible award, and the 3rd corresponds to the lowest passing grade. All participants were UK students who were familiar with this system.

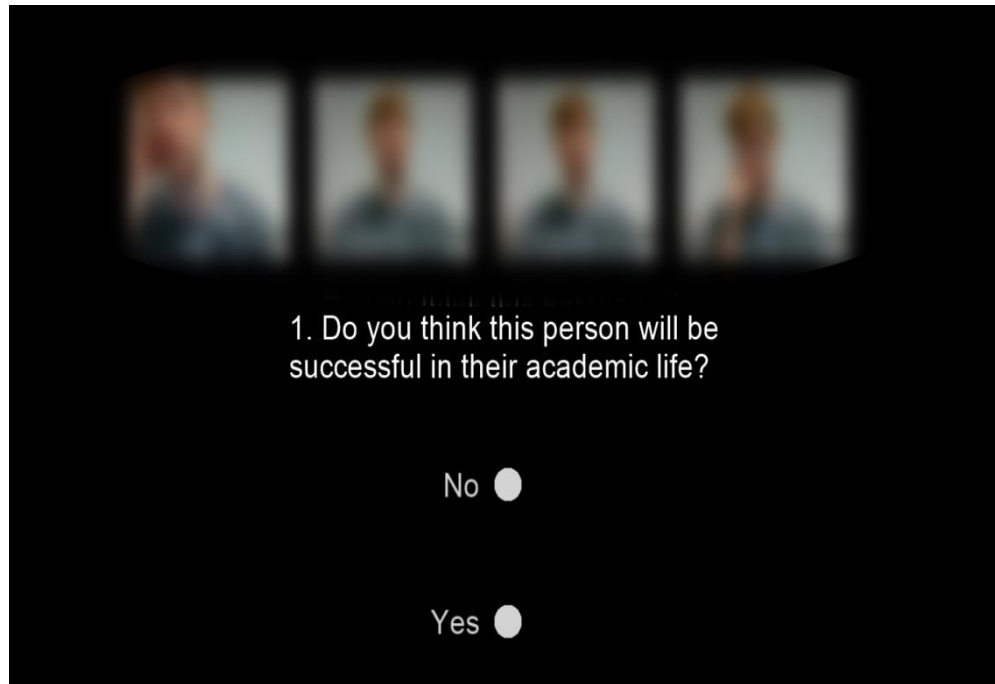
### *2.2.3 Procedure*

The participants were not told that this was a study about autism and remained naïve to this aspect of the experiment until the debrief. They were asked to view the short video clips and rate each target on different facets of their academic experiences. The task was presented on PsychoPy3 software with the trial order randomised across the participants. On each trial, four video clips of a single target simultaneously played in a loop (see **Figure 2.1**). While the videos were playing, the participants responded to the questions in a fixed order. Once all models were rated, the participants were debriefed about the purpose of the study and

asked whether they had a diagnosis of autism. The entire study took approximately 25 minutes.

**Figure 2.1**

*Illustration of a Single Trial with the Success Question and the Response Options*



*Note.* Blurring was not present in the stimuli viewed by participants.

#### **2.2.4 Data Scoring and Analysis**

The data are available on the Open Science Framework (OSF) ([https://osf.io/mzjgc/?view\\_only=3bbc16de0a874d80a90e30a8bfc566d2](https://osf.io/mzjgc/?view_only=3bbc16de0a874d80a90e30a8bfc566d2)).

Academic success, motivation to study and happiness at university were coded as 0 (no) or 1 (yes). For each participant, the proportion of 'yes' responses was calculated for autistic and non-autistic targets separately. The scores could range from 0 to 1, with higher scores indicating more positive judgements. The grade judgements were also numerically coded, ranging from 1 to 8; a higher score indicated higher

perceived performance. We calculated the mean grade judgement for each participant, again separately for autistic and non-autistic models.

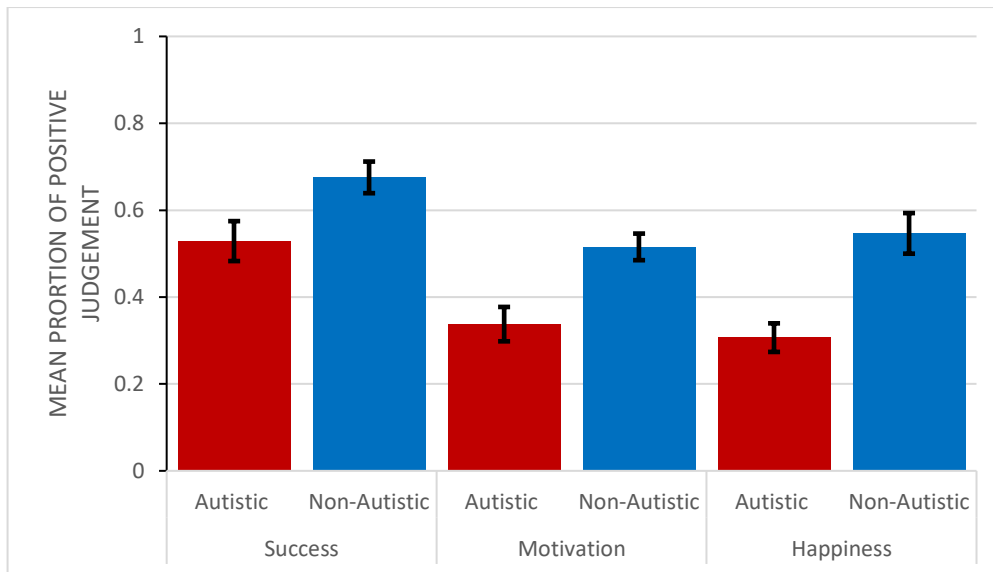
To compare judgments between autistic and non-autistic models, we conducted paired samples t-tests for each measure (academic success, motivation to study, happiness at university, and grade judgements). Each t-test compared the mean scores for autistic models to the mean scores for non-autistic targets across all participants.

## 2.3 Results

The subjective judgements of academic experiences are presented in **Figure 2.2**. Paired samples t-tests revealed significant differences in judgments between autistic and non-autistic models across all measures. The participants judged the non-autistic models as more successful at university than the autistic models ( $t(24) = 3.15, p = .004, d = 0.72$ ). The non-autistic models were judged as more motivated to study than the autistic models ( $t(24) = 3.70, p = .001, d = 1$ ). The non-autistic models were perceived as happier at university than the autistic models ( $t(24) = 5.73, p < .001, d = 1.2$ ). Finally, the non-autistic models were perceived as having higher grades ( $M = 5.49, SD = 0.11$ ) than the autistic models ( $M = 4.88, SD = 0.17, t(24) = 3.89, p = .001, d = 0.83$ ). See **Figure 2.3**.

### **Figure 2.2**

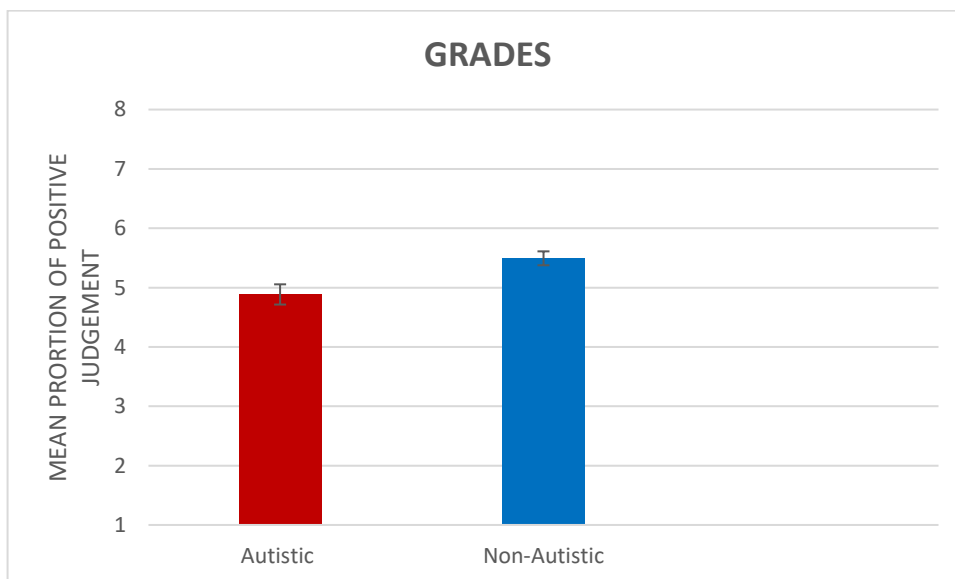
*Proportions of Positive Judgements About Autistic and Non-Autistic Targets' Academic Success, Motivation and Happiness at University*



Note. Error bars represent +/-1 S.E.M.

**Figure 2.3**

*Proportion of Positive Judgements About Autistic and Non-Autistic Targets' Academic Grades at University*



Note. Error bars represent +/-1 S.E.M.



## 2.4 Discussion

As hypothesised, the autistic targets were perceived less favourably than the non-autistic targets in all aspects of their academic experiences. Specifically, autistic people were judged as having lower academic success and less motivation and being less happy at university. They were judged as having lower grades on average than their non-autistic peers. Therefore, based on brief samples of the targets' behaviours, the non-autistic students' judgements differentiated between their autistic and non-autistic peers, despite having no knowledge of the targets' diagnostic status. These findings are consistent with the DEP and resonate with previous research demonstrating that non-autistic participants make less favourable judgements about autistic people compared to non-autistic people on a range of traits and behavioural intentions (Sasson et al., 2017). However, the results of **Study 1** expand previous research findings by demonstrating that negative judgements extend to perceptions of autistic people's success in an academic setting, even to a measure as concrete as their academic grades.

These less favourable impressions could have specific consequences in the academic setting. Being perceived negatively may result in peer exclusion from activities such as group work or study group sessions. Indeed, autistic students have previously reported difficulties with working in groups at university (Gurbuz et al., 2019). Evidence also shows that non-autistic students believe that it is acceptable to exclude autistic students in the classroom, especially when grades are at stake (Bottema-Beutel et al., 2019). Given that peer learning is heralded as a successful way to learn (Boud et al., 2014) and is promoted and used increasingly in university

settings (Stigmar, 2016), our findings expose a potential mechanism through which autistic students may be disadvantaged, relative to their peers. We acknowledge the need for further research to determine whether there are causal links between negative peer judgements and autistic student achievement, but this work highlights the need for educators to exercise caution when embedding peer learning in their curricula and to carefully review the inclusivity of their teaching practices.

While this study provides striking preliminary evidence of autistic people being perceived as less academically motivated, less successful and less happy by their non-autistic peers, we have no knowledge about the factors contributing to these judgements. Previous research suggests that autistic students do perform more poorly on average than neurotypical students (McLeod et al., 2019) and self-report their low motivation to study (Gurbuz et al., 2019), so it is possible that the participants detected genuine differences between the groups. As this study used pre-existing stimuli and we lacked information about the targets' real academic experiences, we cannot determine whether the negative perceptions are accurate or biased. If they are accurate, then this raises the question of whether the participants' judgements are accurate because the targets' academic abilities are revealed in their behaviours or whether poor impressions of peers actually contribute to lower academic performance. To begin to tackle these issues, future research should measure the actual academic status of the targets by obtaining their self-reported data. Future research should ideally use a prospective design to determine whether current negative impressions predict future academic outcomes.

To conclude, this study shows non-autistic university students' striking tendency to negatively judge autistic students' academic experiences. While the consequences of these judgements are not fully understood, it is important to raise awareness of this issue since there are several routes through which these negative judgements may have detrimental impacts on autistic university students, making higher education environments less inclusive and more difficult to navigate.

## Chapter 3: Do Autistic Targets Have Accurate Meta-Perceptions About Their Academic Performance?

### 3.1 Introduction

In the previous study (**Study 1**), we aimed to explore neurotypical individuals' (21 females and 4 males) judgements on the academic performance of autistic students. Short video clips of both autistic and non-autistic targets were shown to perceivers who were asked to rate specific aspects of the targets' academic performance. The results showed that the perceivers gave the autistic students lower ratings than the typically developing students on a scale of four academic dimensions (success, motivation, grade and happiness). Although the study yielded important results, it has certain limitations that should be acknowledged. First, the actual academic performance of the targets was not measured, making it uncertain whether the perceivers' judgements were accurate. Second, it is unclear whether negative perceptions of peers contribute to poorer academic performance. Although the academic performance of some autistic students was found to be constrained by their social experiences, leading to myriad challenges affecting their academic lives (Ashbaugh et al., 2017; Cage et al., 2016; Saggars, 2015). Some questions that need to be addressed in further research include the following: (a) Are autistic university students perceived to be academically inferior to their neurotypical peers? (b) Are autistic students aware of this perception?

The issue is not just how others view autistic individuals that shapes their experiences but also how they are aware of these perceptions. Meta-perception refers to an individual's perception of others' views (Locke & Mitchell, 2016), which

is an essential cognitive skill that enables individuals to modify their behaviours in various circumstances and improve their social interactions (Darley & Fazio, 1980). For example, if they realise that they are being viewed negatively, they can modify their behaviours or speech to improve the others' perceptions. Conversely, if they perceive positive evaluations from others, they may continue their current behaviours to sustain these positive reactions (Anderson et al., 2008; Vazire & Carlson, 2010; Vazire & Mehl, 2008). As shown in Srivastava and Beer's (2005) study, admiration from others is related to more positive self-evaluations. Furthermore, accurate meta-perceptions are associated with better psychological adjustment and social functioning (Carlson, 2016). Managing one's reputation effectively is also linked to positive outcomes (Leary et al., 1995). Moreover, both adolescents' meta-perceptions (beliefs about how they are perceived) and peers' actual perceptions of them are independently associated with the adolescents' social competence (Usher et al., 2018). Specifically, more positive meta-perceptions and more favourable perceptions from peers are each linked to observed higher social competence. The authors suggest bidirectional relationships – positive meta-perceptions may facilitate more competent social behaviour, while a history of affirmative social interactions likely reinforces positive meta-perceptions (Usher et al., 2018).

While it has been found that individuals can correctly estimate how they are perceived by others, various studies indicate that this ability may be based on the assumption that others perceive them as they perceive themselves (e.g., Chambers et al., 2008; Kaplan et al., 2009). In a relatively more recent study, Carlson

et al., (2011) explored the concept of meta-insight to determine whether individuals could accurately distinguish between their self-perceptions and others' perceptions of them. The researchers conducted three experiments involving undergraduates who provided self-perceptions and meta-perceptions (their beliefs about how others viewed them). These experiments assessed a broad range of traits (the Big Five personality traits, intelligence, humour, etc.) across different social contexts (e.g., new acquaintances and friends). The study found evidence of meta-insight, suggesting that people have some genuine insights into their reputations and do not rely solely on self-perceptions.

The ToM suggests that individuals' mental states, encompassing their thoughts, beliefs and emotions, are inherently private and inaccessible to external observers. This limitation requires specific cognitive and neural mechanisms to understand their intentions. Autistic individuals are believed to struggle with this process, finding it difficult to comprehend the thoughts and emotions of others (Baron-Cohen et al., 1985; Happé, 1995; Premack & Woodruff, 1978). Some studies have mentioned that autistic adults often have challenges in inferring other people's perspectives. This shortcoming can make it harder for them to accurately evaluate how well they understand other people's thinking (Lombardo & Baron-Cohen, 2010). However, other studies have shown that multiple autistic children and adults have passed the ToM tasks; hence, "mind blindness" cannot be a universal trait of all autistic individuals e.g., Gernsbacher & Yergeau, (2019).

Several studies have suggested that autistic people may be poor at reputation management. Chevallier et al., (2012) found that autistic children did

not adjust their ratings to flatter an artist, in contrast to neurotypical children, implying that reduced social motivation limits reputation management. Similarly, Izuma et al., (2011) noted that autistic adults' charitable donations were unaffected by an observer's presence, as opposed to the effect on the control group. This suggests the autistic adults' difficulty in considering others' perceptions. However, Cage et al. (2013) reported that when autistic adults were motivated by potential reciprocal donations from an observer, they did donate more when watched, though less than typical adults. This indicates that autistic individuals have some capability for reputation management, but reduced expectations of reciprocity may limit their engagement. Thus, while some researchers have argued that autistic individuals cannot effectively manage their reputation (Chevallier et al., 2012; Izuma et al., 2011), other autistic people show repertoire management ability, albeit reduced compared to non-autistic people (Cage et al., 2013). Concern for their reputation and the associated reputation management likely vary considerably among autistic individuals.

However, the analysis of reputation management in the autism literature indicates that autistic people can understand their reputation in the eyes of others, as well as change their self-representation under evaluation (Cage et al., 2013, 2016). Scheeren et al. (2010, 2016) cited an example of autistic adolescents who were able to strategically utilise multiple positive words when they were describing themselves during an interview, although to a lesser extent than the neurotypical participants did. Cage et al. (2016) also reported that autistic adolescents were aware that their reputation was generally perceived negatively. In turn, this

knowledge may adversely affect their internalisation of problems and self-views and lead to avoidance of future social interactions (Burrows et al., 2017). Likewise, Matthews et al., (2015) and Tinklin et al., (2005) found that autistic students did not disclose their condition, unless necessary to obtain accommodations, due to their fear of negative reactions, stigma and prejudice. Gurbuz et al., (2019) also noted that discrimination and a lack of understanding of student differences may discourage disclosure and support-seeking among autistic students, increasing their exclusion from campus activities. Their difficulties with making friends and managing their reputation pose significant challenges to autistic students. Moreover, the phenomenon of camouflaging – an autism-related form of reputation management – suggests autistic people's awareness of how they are perceived and their attempt to influence these impressions (Cage & Troxell-Whitman, 2019). However, camouflaging can have considerable negative mental health consequences for autistic individuals, including increased anxiety, depression, poorer self-image and feelings of detachment from others (Boyd et al., 2011; Bradley et al., 2021; Chapman et al., 2022; Miller et al., 2021), as well as heightened suicidality linked to premature deaths in autistic populations (Cassidy, 2020; McGee et al., 2001; Orbach, 2007).

Although there is mixed evidence on the extent to which autistic people engage in reputation management behaviours, direct attempts to measure the accuracy of their meta-perceptions remain limited. Sasson (2018) found that autistic adults were less accurate than the neurotypical control group in predicting how observers would rate their personality traits despite having typical self-



perceptions. This suggests that reduced meta-perception accuracy may contribute to social difficulties. However, Locke and Mitchel (2016) argue that compared to non-autistic individuals, autistic people tend to perform poorly on meta-cognitive tasks and on mind-reading tasks, which involve representing other people's states of mind or perspectives. The authors contend that since meta-perceptions are meta-representations of other people's perceptions, autistic people may experience difficulties in forming accurate meta-perceptions of others and find it hard to separate these from their own. Locke and Mitchel's findings revealed autistic teenagers' tendency to overestimate their social abilities in comparison to the evaluations made by their parents. Additionally, they were less precise in correctly perceiving the extent to which their parents viewed their social skills negatively, indicating lower levels of meta-accuracy.

In contrast, Heasman and Gillespie, (2018) found that autistic participants correctly predicted their family members' lower ratings of their abilities than their self-ratings, showing their perspective-taking ability. However, the family members underestimated their autistic relatives' perspective-taking capacity and relied on stereotypes of autistic individuals as lacking self-awareness. These findings emphasise that misunderstandings can occur bidirectionally, situating social difficulties interactionally rather than solely as autistic impairments. According to Usher et al. (2018), even though some autistic people may have outstanding performance when measured using the ToM, they also experience difficulties with social interactions. Thus, their social skills are flexibly applied through complicated processes, whereby autistic people must multitask quickly by attending to their

social partners' cues, planning their responses and behaviours to serve as cues for others and imagining the social perspectives of their social partners, while checking their conversational content. However, due to the busy nature of social interaction, autistic adolescents may have incomplete or faulty meta-perceptions that do not align with their social partners' thinking (Usher et al., 2018).

The above analysis manifests the lack of clarity about whether autistic adult students are cognisant of how their potential social partners perceive them. These negative perceptions may have detrimental effects on their success and wellbeing, particularly if they are aware of such views. Therefore, it is crucial to investigate the accuracy of the students' perceptions of their motivation to study, academic performance, success and happiness, as well as other students' meta-perceptions of these four domains. Hence, this study has the following aims:

1. Assess the accuracy of perceivers' judgements of autistic and non-autistic students' academic performance.
2. Assess whether autistic students hold accurate meta-perceptions of their perceived academic performance.

It is important to understand autistic students' awareness of how others perceive them. Their knowledge of being viewed negatively can influence their behaviours through self-fulfilling prophecy. If they feel that others expect certain actions from them, they may unconsciously conform to those expectations. Therefore, research results on this topic have significant impacts on policies aimed at creating positive social environments and support systems for these students. In line with previous work (Alhusayni et al., 2024), we hypothesized that non-autistic

perceivers would rate the autistic stimuli participants less favourably than the non-autistic stimuli participants across all academic dimensions. With regards to accuracy, we hypothesized that the ratings would reflect a negative bias where perceiver perceptions were more negative than the autistic stimuli participants' perceptions (Sasson et al., 2018). However, given the evidence that first impressions can sometimes be remarkably accurate (Carney et al., 2007), we were open to the possibility that perceivers might genuinely be able to detect these dimensions accurately, at least in the non-autistic stimuli participants. Given the mixed evidence about meta-perceptions in autism we did not have a directional prediction about whether stimuli participants would be aware of how they were perceived. However, it was important to understand this, as awareness of such biases might have negative consequences for autistic students' self-esteem or self-efficacy. We also make no directional prediction about how autistic students believe they will be perceived, as there is some evidence to suggest that autistic individuals may hold a protective positive belief about how they will be perceived (Locke & Mitchell, 2016), but other evidence indicating that autistic individuals believe they will be perceived negatively (Heasman & Gillespie, 2018) in some contexts.

## 3.2 Method

### *3.2.1 Target Phase*

In the target phase, our primary aim was to generate video stimuli for use in the perceiver phase. However, the target phase gave us the opportunity to also

collect self-reported ratings of academic performance and meta-perceptions from the targets.

### ***3.2.1.1 Participants (Targets).***

Thirty-eight university students, aged between 18 and 34 years ( $M = 22.26$ ,  $SD = 3.64$ ; 12 males, 24 females and 2 non-binary), were recruited via email and social media. A sensitivity analysis revealed that this sample size is powered to detect a moderate effect at 80% power (critical  $t = 2.10$ ), using one-sample t-tests. All participants were fluent in English and attended a university in the UK. They were divided into two groups: 19 autistic and 19 non-autistic members. The autistic group confirmed their autism diagnosis, and each group had 16 undergraduates and 3 postgraduates. For further demographic details, see **Table 3.1**.

The participants came from various universities across the UK, including the University of Nottingham, University of Edinburgh, University of Warwick, University of York, Leeds Beckett University, Canterbury Christ Church University, King's College London, University of Strathclyde, University of Sunderland, University of Kent, Imperial College London, University College London, University of Cambridge, University of Southampton, Royal Holloway University of London, University of London and University of Central Lancashire. Diverse academic disciplines were represented in the study, including physics, English, Hispanic studies, linguistics, social anthropology, digital healthcare science, mathematical physics, psychology, graphic arts and design, neuroscience, education, veterinary medicine, chemistry, politics and international relations, biotechnology, computer science, business management, microbiology, medical science and law.

The participants were asked to complete the 10-item AQ (AQ10) questionnaire to determine their level of autistic traits. Additionally, they were instructed to self-report their success, motivation, grades and happiness at university, as well as their meta-perceptions of these dimensions. The two groups had a significant difference in their AQ scores ( $t(36) = 10.36, p < .001$ ). However, there was no evidence of any significant differences between their self-reported academic experiences and their meta-perceptions on the same aspects (see **Table 3.1**). The PhD students and those who did not consent to video recordings were excluded.

**Table 3.1**

*Participants' Demographics*

	<b>Autistic Mean (SD)</b>	<b>Non-Autistic Mean (SD)</b>	<b>Difference</b>
<b>N</b>	19	19	
<b>Gender</b>	12 females, 5 males, 2 non-binary	12 females, 7 males	
<b>Degree level</b>	16 undergraduates, 3 postgraduates	16 undergraduates, 3 postgraduates	
<b>Age</b>	21.89 (4.21)	22.36 (3)	$p = .54$
<b>10-item Autism Quotient (AQ10)</b>	8.36 (1.7)	2.36 (1.7)	$p < .001$
<b>Self-reported success</b>	4.42 (1.26)	4.73 (0.56)	$p = .33$
<b>Self-reported motivation</b>	4.15 (1.42)	3.84 (1.38)	$p = .49$
<b>Self-reported happiness</b>	4.31 (1.33)	3.84 (1.38)	$p = .29$
<b>Self-reported grade</b>	5.57 (2.79)	6.47 (2.19)	$p = .28$
<b>Meta-perception of</b>	4.89 (1.28)	5.21 (0.71)	$p = .35$

success			
Meta-perception of motivation	4.73 (1.28)	4.52 (1)	$p = .58$
Meta-perception of happiness	4.63 (1.21)	4.47 (1.21)	$p = .69$
Meta-perception of grade	6.52 (2.42)	6.52 (2.22)	$p = 1$

### 3.2.2 Measures

All study measures were administered online using Microsoft Forms.

#### 3.2.2.1 Academic Performance and Meta-Perception Questionnaire.

The participants provided their demographic information, such as age and gender, and answered a sample rating question on the next page. They then completed the 8-item Perceptions and Meta-Perceptions Questionnaire, where they had to rate their agreement with the following statements on a 6-point scale, ranging from 6 (strongly agree) to 1 (strongly disagree): perception of success (e.g., "I am successful in my academic life so far"), meta-perception of success (e.g., "Other people view me as successful in my academic life so far"), perception of motivation (e.g., "I am motivated to study"), meta-perception of motivation (e.g., "Other people view me as motivated to study"), perception of happiness (e.g., "I am happy at university") and meta-perception of happiness (e.g., "Other people view me as happy at university"). They also reported perception of grades (e.g., "What was your average mark last semester?") and their meta-perception (e.g., "What average mark do other students guess you received last semester?"). These items constituted the entire set

of questions designed to measure both self-perceptions and meta-perceptions across these domains.

### ***3.2.2.2 Autism Quotient (AQ10).***

AQ10 has been devised as a self-report questionnaire, commonly utilised in both clinical and research settings to screen for autism in adults (Baron-Cohen et al., 2012).

### ***3.2.3 Procedure***

The entire procedure was approved by the School of Psychology Ethics Committee, University of Nottingham (S1305).

The study was conducted via Microsoft Teams. The participants were instructed to read an online information sheet and sign a consent form. At this stage, they consented to have the meeting recorded, which they were told was for quality and training purposes. To record their natural behaviours, this small deception was necessary. However, they were informed about the true purpose of the video recordings at the end of the experiment (i.e., to show them to neurotypical participants in the perceiver phase). Once this information was shared with the participants, they were given the option to delete the recordings and withdraw from the study. To ensure similarity across the video stimuli, the participants were asked to position themselves so that their faces and upper bodies were fully visible on the screen.

After they consented to participate in the study, the researcher started the video recording and sent them the link to the AQ and Meta-Perception Questionnaire. Following the completion of the questionnaire, each participant and

the experimenter engaged in a brief, structured conversation regarding the participant's university experiences. To ensure consistency across all participants, the conversation was guided by these two questions: "What do you enjoy about university?" "What do you find the most difficult?" The conversation was designed to last approximately 1 minute. Afterwards, the researcher sent the participants a link to a debrief video explaining the purpose of the study and why the video recordings were taken.

Those who agreed on the inclusion of their videos were asked to record one more video by looking directly at the camera and saying hello to it. At the end of the meeting, the participants completed a video consent form, which approved the use of their videos for further studies.

The whole procedure took approximately 30 minutes to complete all tasks, and the participants were compensated with a £5 Amazon voucher for their time.

### *3.2.4 Stimulus Development*

Camtasia and Windows Live Movie Maker software were used to edit the videos. For each target, 4 short video segments (approximately 7 seconds each) were selected to capture the participant's naturalistic behaviour in response to 4 different scenarios: (1) while they completed the questionnaire, (2) while they wrote about their academic experiences, (3) during the conversation with the experimenter (referred to here as a social interaction) and (4) while introducing themselves to the camera (also referred to as the self-reporting clips). In the *writing* scenarios, video clips were taken after the first 10 seconds of starting to answer the questionnaire and before the last 10 seconds of indicating completion. For the *social interaction*



scenario, the clips taken after the first 10 seconds of starting to talk were used. The *self-reporting* clips commenced the moment they began speaking. The sound was removed from all videos to control for variance in speech content and vocal characteristics. Differences in tone, pitch, speech rate and content could affect participants' responses, making conditions inconsistent across targets. Each target appeared in all four video conditions. All target videos depicted the head and shoulders of the target as they faced a computer screen. When the targets were completing the questionnaire, they did not show any noticeable facial expressions and appeared to stare blankly at the screen. In contrast, when the targets were interacting with the experimenter, they were talking and showing more dynamic facial expressions. When they presented themselves to the camera, most of them smiled and waved their hands. To maintain consistency between the objectives, the videos of two targets were excluded because their faces were not fully visible on the screen. These two targets were not counted among the previous 38 people who were described.

### **3.2.5 Perceiver Phase**

#### **3.2.5.1 Participants.**

A total of 30 non-autistic individuals (5 males and 25 females), between 18 and 33 years old ( $M = 22.84$  years,  $SD = 5.30$ ), who confirmed that they did not have a formal diagnosis of autism, participated in the study. A sensitivity analysis revealed that this sample size is powered to detect a medium effect at 80% power (critical  $t = 2.05$ ), using within-subjects t-tests. They were recruited through the University of Nottingham's PRS and paper advertisements. All participants were either undergraduate or postgraduate students (6 postgraduates and 24 undergraduates).

A first-year student and a PhD student were excluded. To ensure that we recruited participants with more experience and familiarity with the university environment, we made the decision to exclude first-year students who were still adjusting to university life. We also excluded PhD students due to the difference in programme structure between their advanced level of studies and the undergraduate and course-based postgraduate programmes that were our focus. The participants represented various academic backgrounds. While most were psychology students (23), there were also students majoring in law (1), industrial engineering (2), physiology and pharmacology (2), public health (1) and clinical nutrition (1). They gave written consent to participate and were compensated for their time with a £5 Amazon voucher.

#### **3.2.5.2 Stimuli.**

We used videos of 38 targets in this study. As described in **Subsection 3.2.1.1**, we only used the video recording set when the targets completed the AQ questionnaire online. This specific set of videos was selected to capture natural reactions. In Study 1, the observers were instructed to evaluate the academic performance of the individuals in the videos, while the subjects wrote about their life experiences when they felt guilty or happy, etc. In this study, we aim to minimize the emotional impact that could influence the observers' perceptions.

The videos of 4 targets (2 autistic and 2 neurotypical) were excluded because they reported unusually low average grades – below 30 on a 100-point scale – which are atypical for university students. This left a final sample of 34 target participants whose videos were analysed in the study.

### **3.2.5.3 Design**

We used a within-subjects design, with the type of target group (autistic and non-autistic) as the independent variable and the participants' judgements about the targets' academic experiences (success, motivation, happiness and grade) as the dependent variables.

### **3.2.5.4 Procedure**

Each perceiver was tested individually in person in a quiet laboratory, using a 15-inch MacBook Air. The perceivers received verbal instructions about the task. Then, they were asked to read the information sheet and sign the consent form. Next, they were presented with an instruction screen that explained the task. The task involved 1) watching video clips of students writing about their academic experiences and 2) answering questions following each clip. The questions and the response options were as follows:

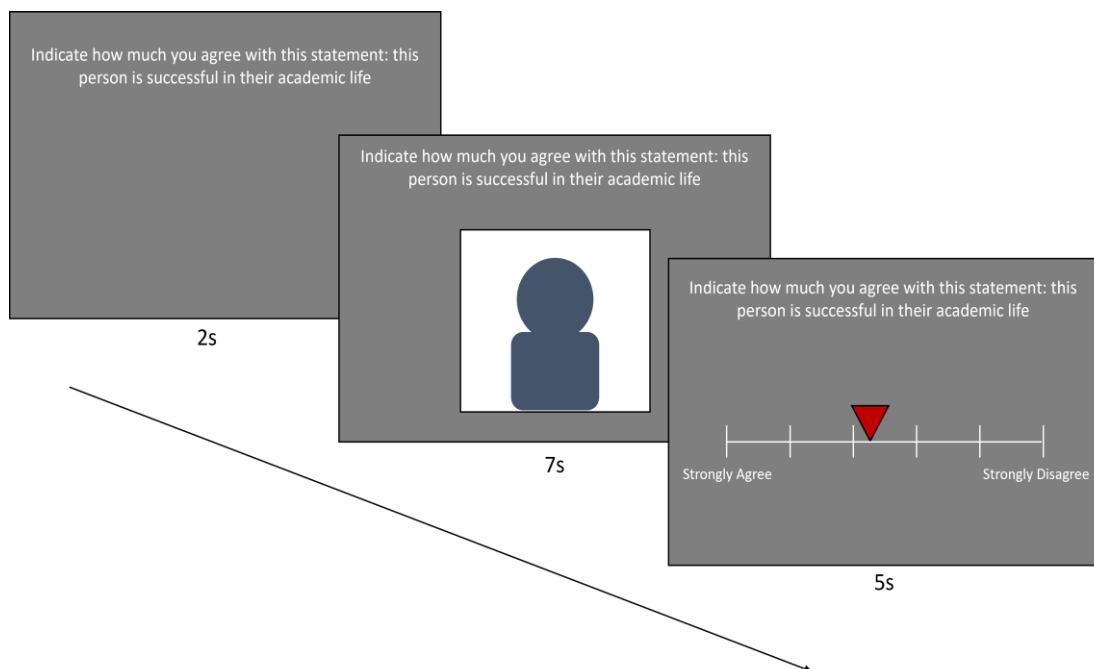
1. Indicate how much you agree with this statement: This person is successful in their academic life. (strongly agree, agree, somewhat agree, somewhat disagree, disagree, strongly disagree)
2. Indicate how much you agree with this statement: This person is motivated to study. (strongly agree, agree, somewhat agree, somewhat disagree, disagree, strongly disagree)
3. Indicate how much you agree with this statement: This person is happy at university. (strongly agree, agree, somewhat agree, somewhat disagree, disagree, strongly disagree)

4. What average mark do you think this person received last semester? (The value must be a number between 0 and 100.)

On each trial, the participants were provided with the academic dimension that they should rate, followed by a 7-second silent video clip of a single target. Next, the response options were presented on the screen. The perceivers responded by clicking on the most appropriate answer (see **Figure 3.1**).

**Figure 3.1**

*Illustration of a Single Trial with the Success Question Response Options*



The participants rated each target video 4 times, one for each academic dimension (success, motivation, happiness and grade). In total, 152 trials were conducted using PsychoPy3 software, and the videos were randomised across four blocks. The participants were given the opportunity to take a break between blocks.

The entire procedure took a maximum of 45 minutes, and the participants were each compensated with a £5 Amazon voucher for their time.

### **3.2.5.5 Data Scoring and Analysis.**

First, we tested whether the findings of Study 1 concerning how non-autistic students perceived the academic performance of autistic students were replicated. Next, we checked the accuracy of the perceivers' judgements regarding the academic performance of the autistic targets. Lastly, we examined the accuracy of the autistic individuals' meta-perceptions about their own academic performance.

We evaluated academic success, motivation to study and happiness at university on a 6-point scale, ranging from 6 (strongly agree) to 1 (strongly disagree). In the perceiver-level analysis, each perceiver's mean judgements of autistic and non-autistic targets were calculated. Higher scores indicate more positive judgements. We also applied a categorical grade classification system, ranging from 1 to 8; a higher score indicates higher perceived performance (8 = 70 and above, 7 = 67–69, 6 = 64–66, 5 = 60–63, 4 = 57–59, 3 = 54–56, 2 = 50–53, 1 = 49 and below). These grade classifications align with the standard classifications at the university, aiming to provide an assessment of student performance.

Paired sample t-tests were used to compare mean judgements of autistic and non-autistic targets at the perceiver level. To evaluate the accuracy of the perceivers' judgements of autistic and non-autistic students' academic performance, as well as the awareness of autistic students' meta-perceptions about their academic performance, we established three key metrics, calculated at the target level. *Accuracy* was calculated by subtracting the target's self-report score from the

perceiver's score. A positive score indicates a positive bias, a negative score shows a negative bias, and zero signifies no bias. *Awareness* was calculated by subtracting the perceiver's perception score from the target's meta-perception score on how they thought they would be perceived. A positive score means a positive bias (overestimates oneself), a negative score denotes a negative bias (underestimates oneself), and zero indicates accurate awareness. *Belief* was calculated by subtracting the target's self-reported perception score from his/her meta-perception score. A positive score indicates the target's more positive belief about oneself than the actual self-report would suggest, and a negative score signifies the target's less positive belief about oneself than the self-report would suggest. Zero means that the target's belief about oneself is consistent with the self-report.

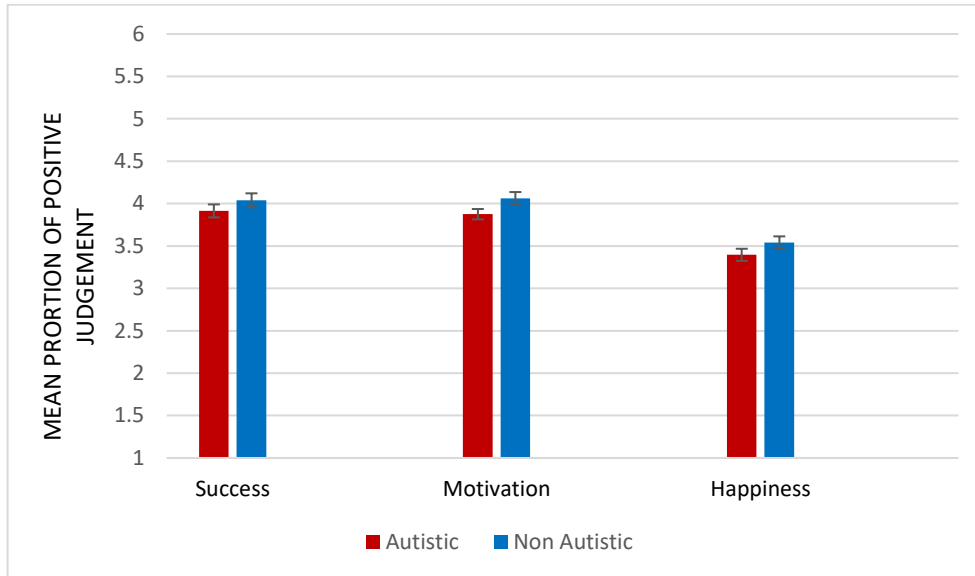
A one-sample t-test was used to determine whether the difference scores for the three metrics (accuracy, awareness and belief) deviated from zero in each target group and across the four academic dimensions (success, motivation, happiness and grade). Bayesian factors (BFs) were then used to detect potential evidence of bias. Specifically, a BF<sub>10</sub> above 3 denotes substantial support for the alternative hypothesis that the mean difference does not equal 0, versus the null hypothesis of no difference. Furthermore, a BF<sub>10</sub> exceeding 10 signals strong evidence for the alternative. Conversely, a BF<sub>10</sub> under 1 provides evidence for the null hypothesis, while a BF<sub>01</sub> represents  $1/\text{BF}_{10}$  and measures evidence for the null hypothesis against the alternative.

### 3.3 Results

#### 3.3.1 *Perceivers' Judgements of Targets' Academic Performance*

**Figure 3.2**

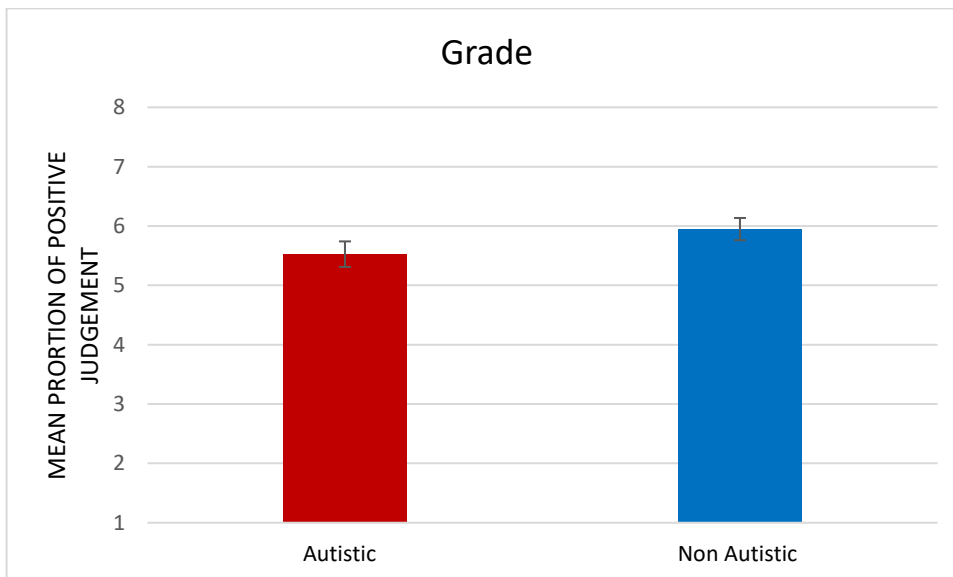
*Mean Judgements on Autistic and Non-Autistic Targets' Academic Success, Motivation and Happiness at University*



Note. Error bars represent +/-1 S.E.M.

**Figure 3.3**

*Mean Judgements on Autistic and Non-Autistic Targets' Academic Grades at University*



Note. Error bars represent +/-1 S.E.M.

Paired sample t-tests were performed to find out if there were significant differences in the perceivers' judgements about the non-autistic versus the autistic targets (see **Figures 3.2** and **3.3**). The perceivers judged the non-autistic targets as more successful than the autistic students ( $t(29) = 3.301, p = .003, d = 0.603$ ). The non-autistic targets were judged as more motivated than their autistic counterparts ( $t(29) = 3.382, p = .002, d = 0.618$ ). The non-autistic targets were rated as happier than their autistic peers ( $t(29) = 2.285, p = .030, d = 0.417$ ). The non-autistic students were perceived as achieving higher grades than the autistic targets ( $t(29) = 3.629, p = .001, d = 0.663$ ).

### *3.3.2 Accuracy of Perceivers' Judgements*

The perceivers showed a general tendency to underestimate the academic success of both autistic and non-autistic targets. Their judgements of non-autistic targets were negatively biased ( $M = -0.725, SD = 0.781$ ), significantly lower than zero ( $t(16) = -3.829, p = .001, BF_{10} = 27$ ). Their judgements of autistic students ( $M = -0.557, SD = 1.245$ ) were not significantly lower than zero ( $t(16) = -1.844, p = .084$ ), but there was no evidence that they were accurate, either ( $BF_{01} = 1.008$ ).

The perceivers' accuracy in judging the happiness levels of autistic students ( $M = -1.075, SD = 1.421$ ) was significantly lower than zero ( $t(16) = -3.118, p = .007$ ), and evidence showed their judgements as inaccurate ( $BF_{10} = 7.573$ ). In contrast, for non-autistic students, the results did not significantly differ from zero. Moderate evidence supported their accuracy ( $M = -0.224, SD = 1.577; t(16) = -0.584, p = .567, BF_{01} = 3.452$ ). The perceivers' accuracy in judging the motivation levels of autistic students did not significantly differ from zero, but there was no evidence of their



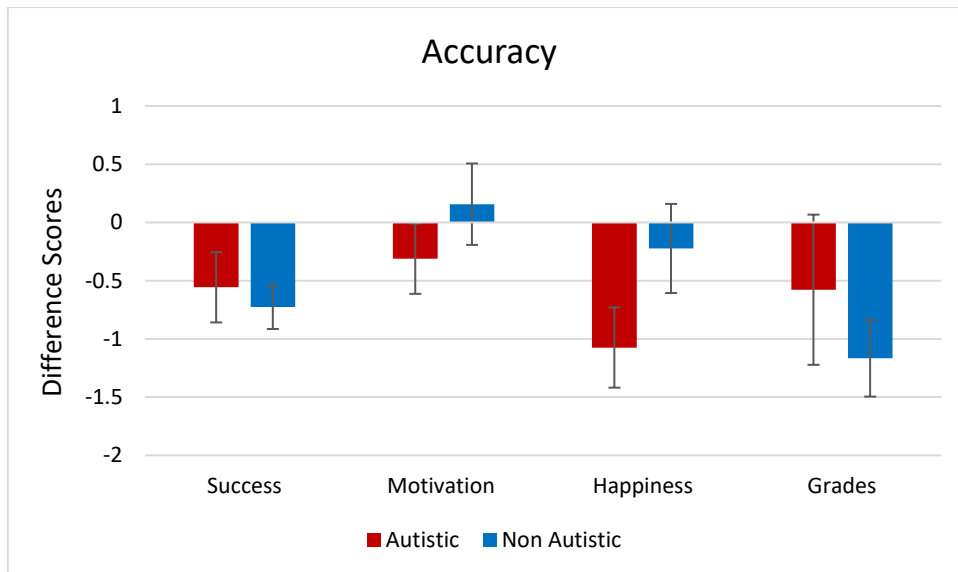
judgements' accuracy ( $M = -0.312$ ,  $SD = 1.243$ ;  $t(16) = -1.034$ ,  $p = .317$ ,  $BF01 = 2.526$ ). For non-autistic students, the results also did not significantly differ from zero, but moderate evidence showed the judgements' accuracy ( $M = 0.157$ ,  $SD = 1.442$ ,  $t(16) = 0.449$ ,  $p = .660$ ,  $BF01 = 3.672$ ).

The accuracy of perceiver judgements of grades was similar to that of the success results. The non-autistic targets received negatively biased judgements ( $M = -1.167$ ,  $SD = 1.356$ ), significantly lower than zero ( $t(16) = -3.548$ ,  $p = .003$ ,  $BF10 = 16.26$ ). The judgements on the autistic students' grades ( $M = -0.578$ ,  $SD = 2.660$ ) were not significantly lower than zero ( $t(16) = -0.896$ ,  $p = .384$ ), but there was weak evidence of accurate perceptions ( $BF01 = 2.828$ ), (see **Figures 3.4**).

Overall, perceivers tended to rate stimuli participants more negatively than self-ratings, with some exceptions. Non-autistic participants were underestimated in terms of success and grades but accurately perceived in terms of motivation and happiness. Autistic participants were underestimated in success, happiness, and grades, and weak evidence that they were perceived accurately on the Motivation dimension.

### **Figure 3.4**

*Accuracy Scores in Success, Motivation, Happiness and Grade Dimensions*



Note. Error bars represent +/-1 S.E.M.

### 3.3.3 Awareness of Perceptions

Both autistic and non-autistic students were generally unaware of how they were perceived. Both groups overestimated how they would be perceived more positively than they actually were across most academic dimensions (success, motivation, happiness and grade).

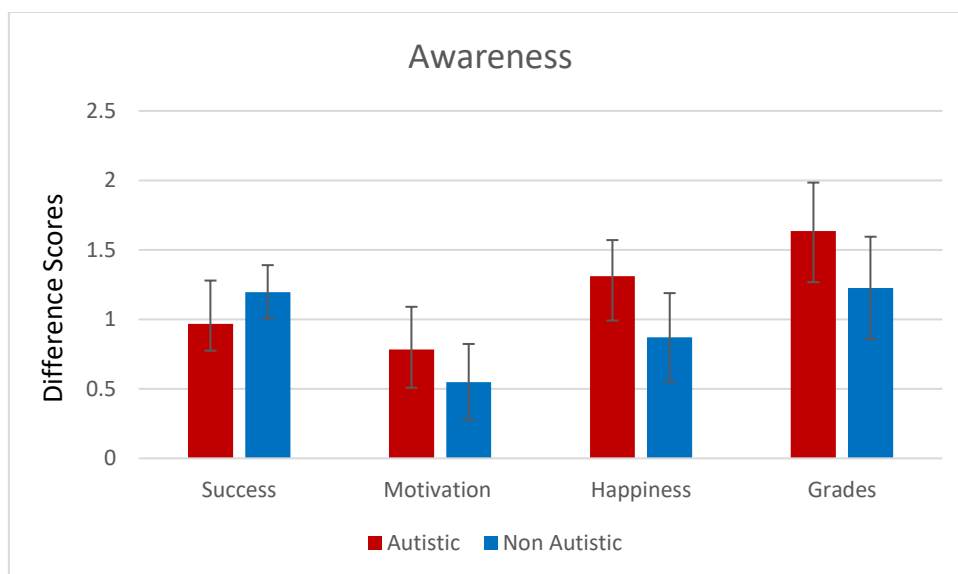
The autistic students' awareness scores on success were significantly greater than zero ( $M = 0.969$ ,  $SD = 1.281$ ;  $t(16) = 3.117$ ,  $p = .007$ ,  $BF_{10} = 7.557$ ). We found similar results for non-autistic students ( $M = 1.196$ ,  $SD = 0.801$ ;  $t(16) = 6.159$ ,  $p < .001$ ,  $BF_{10} = 1664.496$ ). Regarding motivation, the autistic students' awareness scores were significantly greater than zero ( $M = 0.782$ ,  $SD = 1.271$ ;  $t(16) = 2.538$ ,  $p = .022$ ,  $BF_{10} = 2.830$ ). In contrast, the non-autistic students' awareness scores were not significantly greater than zero ( $M = 0.549$ ,  $SD = 1.130$ ;  $t(16) = 2.004$ ,  $p = .062$ ), but there was no evidence of their accuracy ( $BF_{01} = 0.805$ ).

The awareness scores on happiness were significantly greater than zero for both autistic ( $M = 1.310, SD = 1.075; t(16) = 5.023, p < .001, BF10 = 233.064$ ) and non-autistic students ( $M = 0.871, SD = 1.313; t(16) = 2.734, p = 0.015, BF10 = 3.914$ ). Lastly, the awareness scores on grades were significantly greater than zero for both autistic ( $M = 1.637, SD = 1.435; t(16) = 4.704, p < .001, BF10 = 131.593$ ) and non-autistic targets ( $M = 1.226, SD = 1.522; t(16) = 3.320, p = .004, BF10 = 10.809$ ),(see **Figures 3.5**).

Generally, stimuli participants overestimated how positively they would be perceived. Non-autistic participants showed this bias strongly for success and grades, moderately for happiness, and weakly for motivation. Autistic participants showed strong bias for Success, happiness, and grades and moderate bias for motivation.

**Figure 3.5**

*Awareness Scores in Success, Motivation, Happiness and Grade Dimensions*



*Note.* Error bars represent +/-1 S.E.M.

### 3.3.4 Beliefs About Perceptions

Both autistic and non-autistic students had positive beliefs about their academic performance across most dimensions. The autistic students' belief scores on success were significantly greater than zero ( $M = 0.412$ ,  $SD = 0.712$ ;  $t(16) = 2.384$ ,  $p = .030$ ,  $BF_{10} = 2.207$ ). The non-autistic students' scores were also significantly greater than zero ( $M = 0.471$ ,  $SD = 0.874$ ;  $t(16) = 2.219$ ,  $p = .041$ ,  $BF_{10} = 1.708$ ).

For motivation, the autistic students' belief scores were not significantly greater than zero, and there was no evidence of accuracy ( $M = 0.471$ ,  $SD = 1.125$ ;  $t(16) = 1.725$ ,  $p = .104$ ,  $BF_{01} = 1.181$ ). However, the non-autistic students' scores were significantly above zero ( $M = 0.706$ ,  $SD = 1.263$ ;  $t(16) = 2.304$ ,  $p = .035$ ,  $BF_{10} = 1.948$ ).

Regarding happiness, the autistic students' belief scores were not significantly greater than zero, with weak evidence of their accuracy ( $M = 0.235$ ,  $SD = 0.970$ ;  $t(16) = 1.000$ ,  $p = .332$ ,  $BF_{01} = 2.600$ ). The non-autistic students' scores were significantly above zero ( $M = 0.647$ ,  $SD = 1.169$ ;  $t(16) = 2.281$ ,  $p = .037$ ,  $BF_{10} = 1.881$ ).

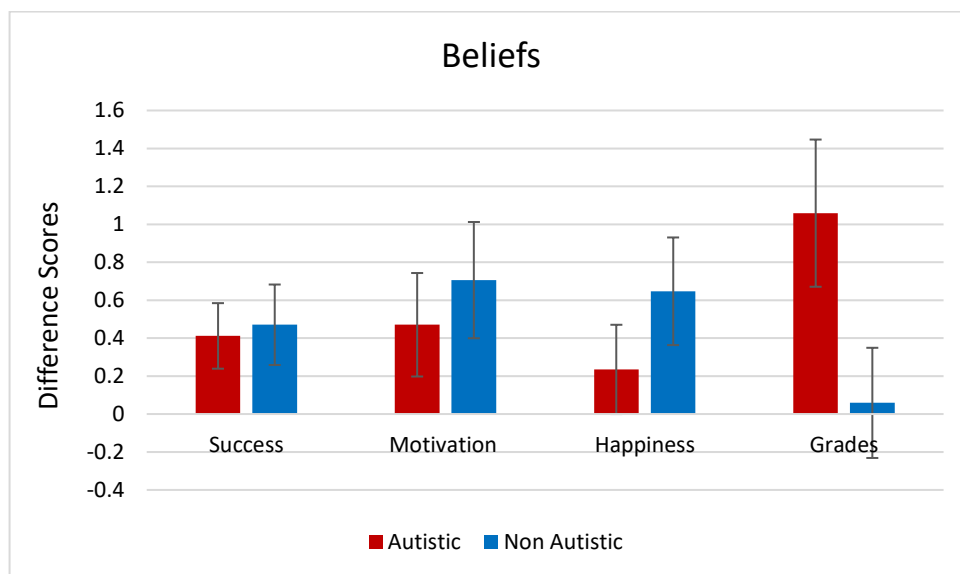
Finally, the autistic students' belief scores regarding their grades were significantly greater than zero ( $M = 1.059$ ,  $SD = 1.600$ ;  $t(16) = 2.729$ ,  $p = .015$ ,  $BF_{10} = 3.881$ ). In contrast, the non-autistic students' scores were not greater than zero, with moderate evidence of accuracy ( $M = 0.059$ ,  $SD = 1.197$ ;  $t(16) = 0.203$ ,  $p = .842$ ,  $BF_{01} = 3.943$ ), (see **Figures 3.6**).

Overall, both groups of stimuli participants reported slightly more positive meta-perceptions than self-perceptions, but the evidence was mostly weak. Non-autistic participants showed weak evidence of believing their success would be perceived

positively, and motivation and happiness without bias. Autistic participants showed strong evidence of believing their grades would be perceived positively, weak evidence for success and motivation and weak evidence of believing Happiness would be perceived without bias.

**Figure 3.6**

*Belief Scores in Success, Motivation, Happiness and Grade Dimensions*



*Note.* Error bars represent +/-1 S.E.M.

### 3.4 Discussion

In this study, we replicate the results of Study 1 and again reveal a consistent negative bias against autistic individuals across various dimensions of academic life. Specifically, non-autistic individuals were judged more favourably in terms of their academic success, motivation and happiness. The bias even extended to estimates of more objective measures such as their academic grades. This result is consistent with many studies' findings, indicating that autistic students frequently encountered stigma and negative perceptions from their peers. For instance, Alkhaldi et al., (2021) examined whether neurotypical students were more likely to express dislike towards

autistic individuals, as opposed to those perceived to be neurotypical. The participants (neurotypical students) were shown videos of both autistic and neurotypical individuals and were subsequently asked if they liked each person and their reasons for their judgements. The results revealed that the participants were more inclined to like neurotypical targets compared to autistic ones. This finding supports those of several studies, suggesting that neurotypical adults tend to view autistic people in a less positive way based on the former's first impression, perceiving the latter as more socially awkward and less favourable, thus making the perceivers less inclined to interact with them (Grossman, 2015; Sasson et al., 2017; Sasson & Morrison, 2019).

However, when comparing perceiver judgements to self-reports, notable differences were observed in how students' academic success was judged by others compared to how the students reported it themselves. On one hand, for the non-autistic group, there was evidence that perceivers underestimated their academic success, as demonstrated by the significant discrepancy between the perceivers' judgements and the non-autistic students' self-reports. On the other hand, for the autistic group, there was no statistically significant difference between the perceivers' judgements and the students' self-reports. This contrast suggests the considerable gap between external perceptions and self-reports between the two groups. For the non-autistic students, this discrepancy might be due to self-enhancement. This bias is closely linked to the desire to maintain high self-esteem and is a fundamental part of human psychology. In academic settings, self-enhancement bias can manifest as raters' evaluation of their abilities, efforts and achievements more favourably than those of others. Studies often find little

correlation between how people rate themselves on knowledge/skills and how they actually perform on objective tests of those abilities. The correlations tend to be modest, weak or even non-existent. For instance, self-perceived intelligence correlates only around .2–.3 with scores on IQ tests or academic tasks (Hansford & Hattie, 1982). Freshmen's self-evaluations of academic ability correlate just .35 with their professors' evaluations (Chemers et al., 2001). Likewise, in professional settings, expected versus actual performance on complex tasks have roughly .2 correlation (Stajkovic & Luthans, 1998). However, such biases might not apply to autistic students, which could explain why the accuracy result of academic success perceptions was not statistically significant.

In contrast, the findings of **Study 2** have shown that non-autistic students' motivation and happiness were generally perceived accurately, while those of autistic students were perceived incorrectly. This outcome confirms the results reported in a broad body of literature, showing that perceivers can accurately detect some attributes of neurotypical individuals based on thin-slice judgements (Ambady & Rosenthal, 1992; Todorov et al., 2015). This discrepancy may be attributed to society's greater familiarity with the emotional cues and expressions typical of non-autistic individuals (Baron-Cohen et al., 1985). Another reason could be that the ways in which non-autistic students express their happiness and motivation align more with broadly acknowledged standards, making their feelings easier to comprehend and interpret (Harms et al., 2010).

It is noteworthy that perceivers were more accurate in judging non-autistic students' happiness and motivation but underestimated the success and grades of

both autistic and non-autistic individuals. This difference in outcomes can be attributed to the objective versus subjective nature of these aspects. Motivation and happiness are naturally subjective experiences, often communicated through non-verbal cues such as facial expressions, body language and tone of voice, which can be universally recognised to some extent. Relying on these cues, non-autistic perceivers might be more adept at discerning these subjective states in non-autistic individuals, whose expressions might align more closely with conventional or socially accepted norms of displaying emotions (Baron-Cohen et al., 2001; Klin et al., 2002). Autistic individuals might express their emotions and motivations differently from neurotypical norms, leading to potential misinterpretation by non-autistic observers (Heasman & Gillespie, 2018; Sasson et al., 2017).

Intriguingly, the results showed that students, whether autistic or neurotypical, were generally unaware of how they were perceived by others and often thought that they were viewed more positively than in reality. Regardless of their neurotype, it is quite common for individuals to believe that others think of them more favourably than they actually are. This phenomenon can be partly attributed to cognitive biases such as the illusory superiority bias, where individuals often have an overly positive self-perception compared to others (Alicke et al., 1995), and the self-serving bias, which motivates individuals to credit their successes to their own efforts and blame their failures on external situations (Mezulis et al., 2004). This result is consistent with Locke and Mitchell's (2016) research findings about autistic teenagers' tendency to overvalue their social skills more than their non-autistic peers do.



However, it is theoretically possible that the reason for the lack of accuracy in meta-perception is that targets have overly positive perceptions compared to perceivers' perceptions. This seems unlikely for autistic targets because, according to emerging empirical evidence, non-autistic people tend to rate autistic others negatively on a range of social favourability traits (e.g., likeability) and report a lower intention to interact with them (Sasson et al., 2017). In this regard, the discrepancy in meta-perceptions' accuracy results may be due to the perceivers being more negative in their judgements rather than the autistic targets being too positive.

These results also suggest that both autistic and non-autistic students were unaware that they would be perceived negatively, thinking instead that they would be viewed positively. This finding goes against the idea that autistic individuals might face intensified challenges due to their difficulties in understanding social scenarios and comprehending others' viewpoints, often referred to as ToM deficits (Baron-Cohen et al., 1985). It was previously assumed that as a result of such difference, they might have misconceptions about how others perceived them. However, given that both groups were similarly unaware of potential negative judgements, this perspective needs re-evaluation. The finding is supported by studies showing that many autistic children and adults have successfully performed TOM tasks, suggesting that mind blindness is not a universal or defining characteristic of autism (Gernsbacher & Yergeau, 2019). Therefore, the wide range of group differences in meta-perception abilities between autistic and non-autistic individuals implies that these variations are not limited to specific traits or characteristics. Instead, these difficulties may stem from broader disparities in social cognition that affect the capacity to precisely determine how one is perceived by others.

To conclude, this study replicated the results of our previous findings in Study 1, which showed that autistic students received consistently more negative perceptions about their academic performance compared to non-autistic students across all four academic aspects (success, motivation, happiness and grade). However, interestingly, evidence revealed that the non-autistic group was underestimated in their attainment of academic success and good grades, whereas there was no such evidence for the autistic group. Notably, both groups were unaware of these perceptions.

Despite significant progress in understanding the academic performance and meta-perceptions of autistic adults, knowledge gaps remain. The factors that drive these perceptions are still unknown. Additionally, a limitation of this study was its basis on videos of autistic students' behaviours in situations with relatively low social demands. At university, autistic individuals are often observed by their peers in contexts where the social demands are much greater. Therefore, it is important to understand how the social demands of a situation may affect peer judgements.

## Chapter 4: How Do We Perceive Autistic Students in Different Contexts?

### 4.1 Background

The social communication challenges faced by autistic individuals are frequently manifested through observable physical behaviours. These behaviours may include atypical patterns of eye contact, reduced facial expressiveness and emotional sharing, as well as limited use of gestures (American Psychiatric Association, 2013). Several studies support this clinical definition – that is, autistic individuals often show little facial expression or "flat affect" in both quantified small facial muscle movements (Czapinski & Bryson, 2003) and reduced expressiveness during regular interactions (Bieberich & Morgan, 2004; Stagg et al., 2014). These visible autistic traits and misunderstandings may lead to negative attitudes during first impression formation (DeBrabander et al., 2019; Edey et al., 2016; Grossman, 2015; Sasson et al., 2017; Sheppard et al., 2016). This inference is aligned with our previous research findings (Study 1 and Study 2), which suggest that autistic university students are adversely judged compared to their non-autistic peers (Alhusayni et al., under review).

A growing body of research suggests that typically developing individuals perceive autistic individuals as awkward, less engaging, unusual, less attractive, less empathetic and less socially warm, based solely on their non-verbal expressions and presentation style (Alkhaldi et al., 2019; Heerey et al., 2003; Lipson et al., 2020; McCann & Peppé, 2003; Sasson et al., 2017). However, these negative first impressions were absent when the speech transcript was presented without visual stimuli. This finding indicates that physical appearance and expressive differences influence the bias

(Sasson et al., 2017). In Study 2, it has also been observed that autistic individuals are often viewed more negatively than their non-autistic counterparts in terms of their academic abilities. However, this study was based on videos of autistic individuals in situations with relatively low social demands (the targets were recorded when they were completing a questionnaire). At university, autistic individuals will often be observed by their peers in contexts with much greater social demands. Therefore, it is important to understand how these social demands may affect the judgements of peers. Which context has the greater impact on these negative biases? From a different perspective, is it just a matter of a general negative judgement based on appearance and non-verbal behaviour?

Physical appearance can play a role in shaping stereotypes and judgements about others. The concept of the "halo effect", where positive traits are attributed to attractive individuals, has been supported by various studies (Dion et al., 1972; Feingold, 1992; Langlois et al., 2000). Research shows that people whose facial features reflect a particular culture's positive stereotypes tend to experience advantages in various aspects of life (Olivola et al., 2014). Cadets whose facial features appear more dominant tend to attain higher ranks in the military (Mueller & Mazur, 1996). Hamermesh and Parker (2005) found that undergraduate students at the University of Texas at Austin gave higher teaching evaluations to professors who were considered attractive compared to those who were not as good-looking (Hamermesh & Parker, 2005). This finding could be applicable to autistic individuals, notwithstanding the limited research on the relation between appearance and autism. Relatedly, Grossman, (2015) found that typical adults judge autistic children

as more socially awkward than neurotypical children even with brief exposure to their images or recordings. This outcome implies that physical appearance contributes to unfavourable judgements about autistic individuals more than their less expressive behaviour does.

In contrast, Alkhaldi et al., (2019) propose that the less expressive behaviour of autistic individuals may be the reason for their reduced social acceptance among non-autistic peers. When the authors investigated the relation between readability and positive impressions, the results showed a strong positive correlation between readability and social favourability in certain scenarios (as explained in **Chapter 1**). To explore the possibility of the role played by expressive behaviour in social favourability judgements about targets, Alkhaldi et al. (2022, in press) conducted a follow-up study. Two sets of images, consisting of highly expressive and less expressive behaviours, were extracted from archived videos in Sheppard and colleagues' (2016) study. Non-autistic perceivers were presented with these images across two studies and were asked to rate each image on the social favourability scale. As hypothesised, if expressiveness drives the effect, favourability differences between autistic and non-autistic targets should increase for less expressive images. Favourability should also be correlated with video-based readability ratings. However, regardless of whether more or less expressive images were used, autistic individuals were perceived less favourably in social situations compared to non-autistic individuals. Though this may suggest that judgements are based on physical appearance rather than expressive behaviour, this interpretation is weakened by the correlation observed between readability (based on video rating) and social

favourability (based on still images). If participants truly judged social favourability solely based on appearance in the static images, then social favourability would not be correlated with readability (as physical appearance should not influence readability). Therefore, the researchers suggest that their attempted manipulation of expressivity may have been ineffective, and the extracted images may still have reflected aspects of the targets' more or less expressive behaviour.

Due to such negative perceptions, many autistic adults, especially females, adopt "camouflaging" tactics to avoid unfavourable impressions, which require significant effort to conceal their social differences and behave more like neurotypical individuals (Hull et al., 2017; Lai et al., 2017; Perry et al., 2022). In reality, camouflaging can have considerable negative mental health consequences for autistic individuals, including increased anxiety, depression and poorer self-image (Boyd et al., 2011; Bradley et al., 2021; Miller et al., 2021). Importantly, these results are associated to an increased risk of suicide (McGee et al., 2001; Orbach, 2007). However, the urge to conceal an autism diagnosis may suggest that certain autistic individuals believe that they would not be embraced or that society would not provide the necessary assistance if they were to disclose their condition (Davidson & Henderson, 2010). Moreover, the pursuit of autism acceptance is a significant undertaking since autistic persons who perceive lower levels of acceptance from others also encounter heightened symptoms of depression and stress (Cage et al., 2018). Therefore, it is vital to investigate all factors driving autistic individuals to use this strategy.

While the cited studies show that non-autistic people often view autistic people negatively, some inquiries regarding this matter remain unresolved. One main issue is that all experiments conducted thus far have utilised images or recordings of stimuli that were produced in a social setting, frequently requiring interactions with a non-autistic experimenter, audience or non-social environments. Nevertheless, it remains uncertain if the context has an impact on the specific sort of judgement formed – whether there is a universal negative perception of autistic individuals or if this bias is confined to certain circumstances. Another aspect not yet understood is how the act of masking influences the perceptions about autistic people. Many autistic individuals may try to fit into what is regarded as "normal" to avoid being judged or left out (Cage & Troxell-Whitman, 2019). Masking in autistic individuals can be detrimental to their interactions and reduce their quality. Additionally, when autistic individuals are not engaged in social contexts, they may be less inclined to mask themselves. Thus, in this study, we aim to determine whether such disclosure affects perceptions about them by comparing the perceptions on targets' behaviours while being surreptitiously video recorded versus when they are informed beforehand.

Finally, further investigation is needed to explore the significance of social expressivity in the differences in social interactions experienced by autistic people. While studies exploring the causes of social interaction differences in autism have mostly focused on social perception (e.g., Uljarevic & Hamilton, 2013), the role of social expressivity has been relatively overlooked. Nevertheless, effective social interaction depends on both the accurate perception and expression of emotional information

between social partners (Halberstadt et al., 2001). Understanding this distinction is crucial because extant indicates autistic individuals' tendency to show greater differences from neurotypical individuals in their ability to express non-verbal information rather than in their ability to perceive it (Grossman & Tager-Flusberg, 2012). Nevertheless, a criticism of Study 2 is that the observers were instructed to assess the academic performance of the individuals in the videos while the targets were answering a questionnaire. In that study, we discovered that autistic individuals universally received lower positive evaluations across the four domains of academic success compared to non-autistic targets. It is worth mentioning that when these targets were engaged in writing, they might have appeared less expressive, which could have influenced the observer's evaluation. Hence, it is worthwhile to examine whether variations in autistic individuals' social expressivity may also play a role in the differences observed in social interactions (Begeer et al., 2008). Thus, to disclose more information about the judgements made by the perceivers, in this study, we investigated three types of scenarios: (1) writing – low social demand, unaware of recording, potentially less expressive; (2) conversation – high social demand, unaware of recording, potentially more expressive; and (3) introduction – high social demand, aware of recording, potentially more expressive due to the awareness of being recorded.

In this study, we aimed to examine how different contexts influenced judgements of academic success with regard to autistic individuals. By conducting an experiment using various social contexts, we sought to uncover the mechanisms shaping perceptions and judgements. We recorded three different types of video



recordings of autistic and non-autistic targets. We captured the natural behaviours of these targets, either while they were filling out a questionnaire and interacting with the experimenter or while they were introducing themselves to the camera after being informed about the study's objectives to determine whether such disclosure would influence the perceptions formed about them. Based on previous studies, we hypothesised that autistic students would receive fewer positive perceptions across all three conditions (Edy et al., 2016.; Sasson et al., 2017; Sheppard et al., 2016). We also expected that the group differences would be more pronounced in the social contexts with high demand conditions (conversation and self-presentation) compared to the social condition with a low demand (writing) (Alkhaldi et al., 2019; Sasson et al., 2017). Moreover, the self-presentation condition might reveal the most significant group difference because of its heightened social demand. However, the group difference could be less obvious in the self-presentation condition compared to the conversation scenario if the act of self-presentation would prompt effective masking among autistic participants. Understanding these dynamics is essential for educators, employers, policymakers and the broader society, as it can help inform strategies to foster a more inclusive and equitable environment for autistic individuals.

## 4.2 Method

To ensure transparency and minimise biases in the research process, we pre-registered this study on the OSF. The registration document can be accessed at <https://doi.org/10.17605/OSF.IO/5NG76>.

#### 4.2.1 Stimuli

Target videos from Chapter 3 were used in this study. These included clips of 38 university students (19 autistic and 19 neurotypical, mean age = 22.26 years) who were recorded while completing an online questionnaire, interacting with the experimenter or introducing themselves to the camera. All targets self-reported their average academic grades, as well as their success, motivation and happiness at university on 6-point Likert scales. They also reported how others would perceive them on the same measures (meta-perceptions). Each target appeared in all three video conditions, all target videos depicted the head and shoulders of the target as they faced a computer screen, when targets were completing the questionnaire. In contrast, when the target was interacting with the experimenter, they were talking and showed more dynamic facial expressions. When they present their self to the camera, most of the targets were smiling and they wave their hands to the camera. Target videos were edited to be 7 seconds long using Windows Live Movie Maker and Camtasia software. For the 'Writing' segment, clips were taken from 10 seconds before they indicated they were finished. For 'Social Interactions', clips from 10 seconds after they start talking. The 'self-presentation' clips commenced the moment they began speaking.

#### 4.2.2 Participants

Thirty participants (9 males and 21 females), aged between 18 and 34 years ( $M = 23.9$ ,  $SD = 4.47$ ), were recruited through the PRS and advertisements at the University of Nottingham. This sample size was derived from a power analysis using G\*Power. The analysis indicated that a total sample size of 26 was required to detect

a medium-sized effect ( $f = 0.25$ ), with 0.8 power when alpha error probability = 0.05, for a 2 (autistic or non-autistic) by 3 (writing, social interaction, and self-presentation) repeated measures ANOVA. The participants were undergraduate or taught postgraduate students, and all were native English speakers. The exclusion criteria were those who participated in this study before, those with an autism diagnosis and first-year undergraduate students. The participants received a £5 Amazon voucher as compensation for their time.

#### 4.2.3 Procedure

The study's procedure was subjected to an ethical review, and approval was received from the School of Psychology Ethics Committee, University of Nottingham. The participants were tested individually in a quiet room. They watched a series of short videos, and for each, they rated how successful the target was in one's academic life. In Study 2, we recorded videos of autistic and non-autistic participants and had raters judge their academic performance across four aspects (success, motivation, happiness and grade). However, we were concerned that evaluating all four areas made the experiment too long and taxing for raters. Therefore, in this follow up study, we decided to streamline the rating process by focusing on just one key aspect of academic performance. We decided to exclude *happiness* and *motivation* from our focus to avoid the potential impact of facial expressions, which could have affected the results, particularly for autistic students. Furthermore, in Study 2, our findings indicated a notable similarity between the outcomes in the *success* and *grade* dimensions. This observation led us to consider *success* as a more encompassing metric, inherently reflecting various elements of academic

experience, including aspects of motivation, happiness and academic achievement. By narrowing our focus to *success*, we aimed to achieve a more streamlined yet comprehensive evaluation of academic performance.

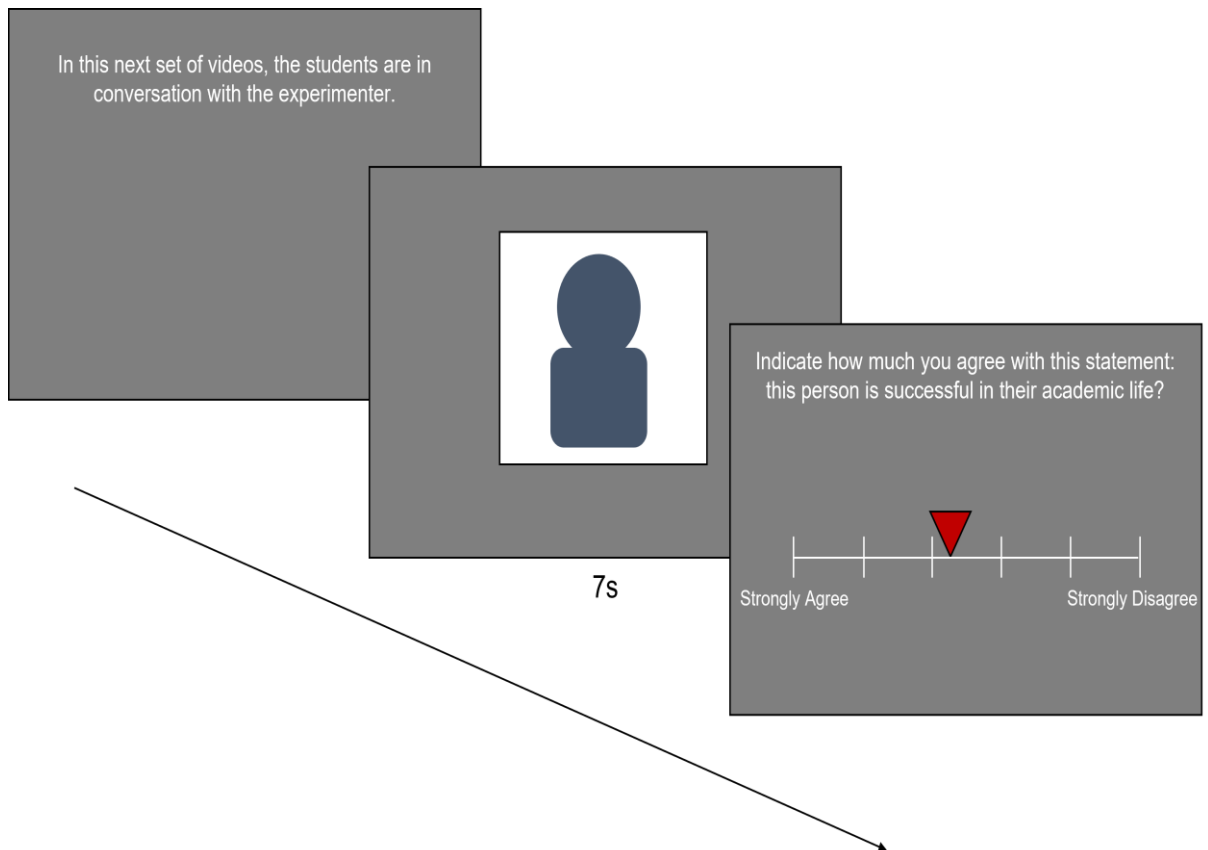
The participants were presented with 114 video clips (38 targets x 3 conditions: AQ, social and introduction) in three blocks. In each block, they viewed one stimulus type, with the targets appearing in random order. The block order was counterbalanced across the participants. Before being shown each set of videos, the perceivers were provided with information about each task. Regarding the writing task videos, they were informed that they would be watching students writing about their academic experiences. For the social interaction videos, they would observe students conversing with the experimenter. For the self-presentation videos, they would see students introducing themselves to the camera.

To simulate interactions that mirrored real-world situations, the perceivers were not informed about the diagnostic status of the individuals recorded in the videos. This decision was made to mitigate the potential influence of the knowledge that the disclosure and awareness of autism can influence initial impressions about autistic individuals and behaviours towards them (Gillespie-Lynch et al., 2021; Sasson & Morrison, 2019). The video clip of the target was presented first, and then the question about how much they agreed with the statement – "This person is successful in academic life" – followed by six response options presented on the screen immediately after the video. The participants responded by clicking on their appropriate answer, with no specific time constraint before advancing to the next

trial (as shown in **Figure 4.1**). They took a maximum of 45 minutes to complete the study using PsychoPy3 software (Peirce et al., 2019).

**Figure 4.1**

*Illustration of a Single Trial with the Social Interaction-Context Question and the Response Options*



#### *4.2.4 Data Scoring and Analysis*

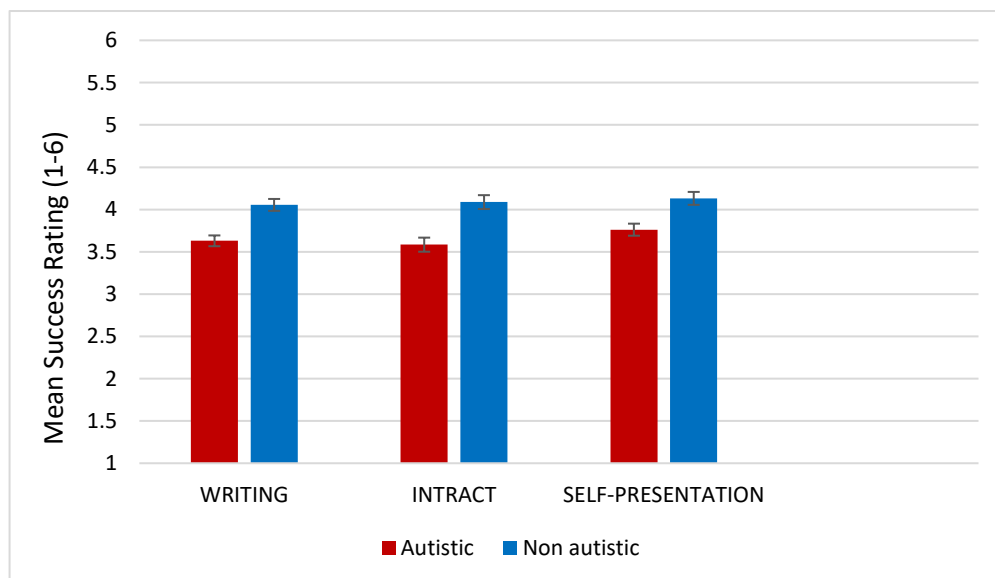
The researcher processed and examined the data using SPSS version 27. Each perceiver provided judgements for all targets, and the dataset had no missing values. The targets' academic success was rated on three different stimulus types (writing, interaction and self-report), on a scale ranging from 6 (strongly agree) to 1 (strongly disagree). Each perceiver's mean judgements on autistic and non-autistic targets were calculated. Higher scores indicate more positive judgements.

### 4.3 Results

To examine whether the diagnostic group or the stimulus type influenced perceiver judgements, a 2 (autistic or non-autistic) by 3 (writing, social interaction and self-presentation) repeated measures ANOVA was performed. The results showed the main effect of the target group ( $F(1,29) = 81.43, p < .001, \eta^2 = 0.73$ ), suggesting that across all three contexts, autistic individuals were perceived more negatively than non-autistic individuals, See **Figure 4.2**. No main effect of the stimulus type was found ( $F(2,58) = 2.81, p = .06, \eta^2 = 0.08$ ), suggesting no significant differences in the perceiver's perceptions of academic success between social and non-social contexts. Additionally, no significant interaction was observed ( $F(2,58) = 1.56, p < .21, \eta^2 = 0.05$ ).

**Figure 4.2**

*Mean Judgements on Autistic and Non-Autistic Targets' Academic Success in Three Contexts*

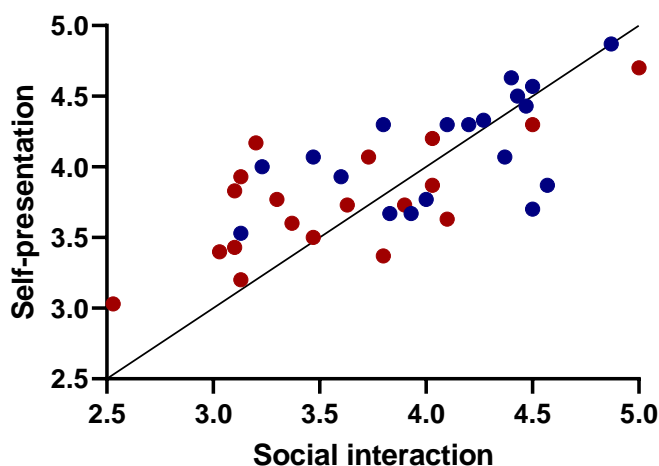


Note. Error bars represent +/-1 S.E.M.

A correlation analysis was used to explore whether the targets were perceived consistently in different contexts. In this analysis, we examined the association between the perceiver's scores for each target in the writing, social interaction and self-presentation conditions. The results of the correlation analysis revealed a strong significant association between the social interaction and self-presentation conditions ( $r = 0.722, p < .001$ ; see **Figure 4.3**). The correlations between writing and social interaction ( $r = 0.546, p < .001$ ) and between writing and self-presentation ( $r = 0.540, p < .001$ ) were statistically significant but numerically weaker (see **Figures 4.4** and **4.5**). The overall pattern of significant correlations across all conditions suggests that there is a degree of consistency in how individuals are perceived across different contexts, supporting the idea of stable individual differences in social presentation. However, the varying strengths of these correlations also highlight the importance of context in shaping social perceptions.

**Figure 4.3**

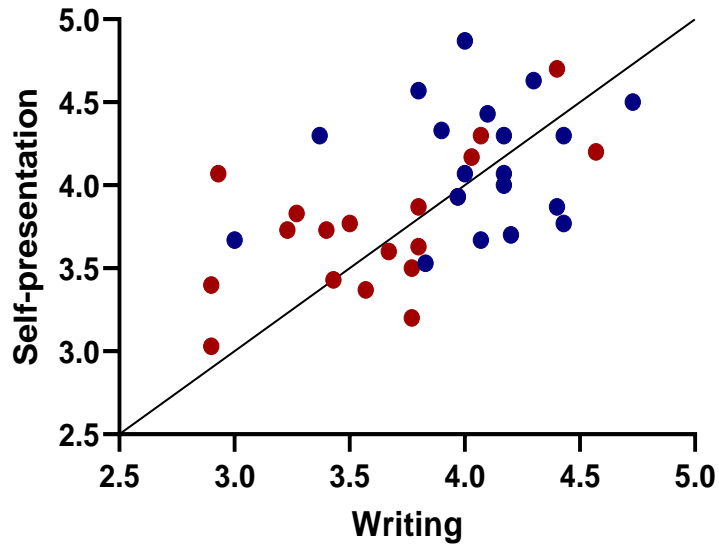
*Correlation Between the Social Contexts (Self-Presentation and Interaction) Across Autistic and Non-Autistic Targets*



*Note.* The red circles represent autistic targets; the blue circles signify non-autistic targets.

**Figure 4.4**

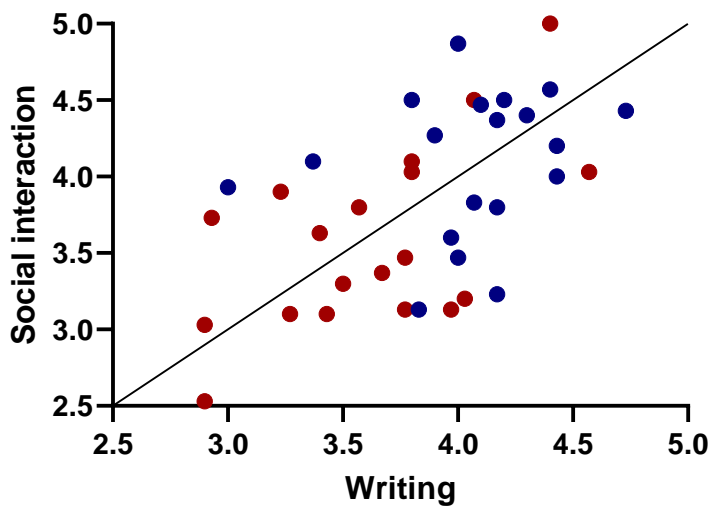
*Correlation Between the Social Contexts (Writing and Self-Presentation) Across Autistic and Non-Autistic Targets*



*Note.* The red circles represent autistic targets; the blue circles signify non-autistic targets.

**Figure 4.5**

*Correlation Between the Social Contexts (Writing and Interaction) Across Autistic and Non-Autistic Targets*



*Note.* The red circles represent autistic targets; the blue circles signify non-autistic targets.



## 4.4 Discussion

In this study, we aimed to investigate how various social demands in university settings could influence individuals' perceptions. Specifically, we intended to determine whether there would be differences in perception between contexts with low social demands and those with high social demands. By understanding differences in perception and potential biases, we can create collaborative classroom environments where all students can contribute effectively. This study's results consistently showed that autistic individuals were judged as less successful in their academic life than non-autistic students across three different types of contexts (writing, social interaction and self-presentation). These findings align with those of previous research that examined perceptions of autistic individuals. Such studies, which often used videos or photos to depict behaviours associated with autism, generally found that autistic individuals were perceived more negatively than non-autistic individuals (Grossman, 2015; Sasson et al., 2017; Sasson & Morrison, 2019).

We predicted that there would be differences across all conditions, with a larger difference observed in the more social conditions. Particularly, we hypothesised that autistic targets would be more negatively perceived in social contexts such as self-presentation and interacting with others, where social difficulties are more visible, compared to the writing context. However, our findings showed that across all contexts, autistic students were judged as less academically successful. These results could be explained by many factors. For the first condition – the writing context (when the targets were writing, with a low social demand) – the result could be based on physical appearance, in which various studies have

supported the concept of the "halo effect", where positive traits are attributed to attractive individuals (Dion et al., 1972; Feingold, 1992; Langlois et al., 2000). For instance, individuals with dominant facial features tend to attain higher ranks in the military, and students are inclined to give higher teaching evaluations to attractive professors (Hamermesh & Parker, 2005; Mueller & Mazur, 1996). This result also aligns with Sasson and colleagues' (2017) finding that autistic individuals were frequently perceived less favourably, even based on just photographs. Another study (Alkhaldi, 2022) supported this finding, showing that non-autistic people usually had a less positive perception of autistic individuals, no matter how expressive the photos were.

As for more social demands (social interaction and self-presentation), even when the targets discussed positive experiences at university, the perceivers tended to give more negative responses overall. This finding can be explained by many empirical studies that have shown evidence of reduced facial expressivity or "flat affect" in quantified small facial muscle movements (Czapinski & Bryson, 2003) and reduced expressiveness during regular interactions (Bieberich & Morgan, 2004; Stagg et al., 2014). Autistic adults find it harder than the control group to differentiate among emotions and describe their feelings (Hill et al., 2004). Other studies have reported the production of more ambiguous or blended expressions (e.g., Yirmiya et al., 1989) that tend to be perceived as more stilted, unusual, odd, awkward, less engaging, less attractive, less empathetic and less socially warm (Alkhaldi et al., 2019; Grossman et al., 2013; Lipson et al., 2020; Macdonald et al., 1989; McCann & Peppé, 2003; Sasson et al., 2017; Volker et al., 2009). Thus, people

are often biased in judging negatively in the face of uncertainty (Ito et al., 2017). According to Edey et al. (2016), typical adults show a lack of understanding towards autistic people, attributed to the ease with which people can interpret body language that resembles their movements, while autistic and neurotypical individuals move in quantifiable different ways. This finding is supported by the study of Marchena and Eigsti (2010), who discovered that the motions of the autistic group were not as closely coordinated with their simultaneous speech compared to the control group. The synchronisation of gestures and words had a distinct impact on the quality of communication among all participants.

However, it seems that the masking that we expected in the self-presentation condition does not affect the observers' perceptions, which appear similar to those in the other perception conditions. This result can be explained by the fact that the autistic participants featured in the video clips may have used the camouflage strategy throughout the experiment, not just in the self-presentation condition. Thus, they may not be affected after being informed of the purpose of this experiment (measuring other perceptions in different contexts) because the video clips of the targets were supposed to be recorded secretly, and the targets would later be informed about the purpose of the study when the session was finished. However, due to the circumstances of the research during the COVID-19 pandemic, we had to recruit participants online and do a simple deception, which was not to inform the participants of the main goal of the recordings to ensure that their responses would not be affected and we could extract more natural behaviours. They were informed that the session was recorded for quality and training purposes.

Nonetheless, even if they were not informed of this purpose, the effect of being informed of the recording may still exist, prompting the participants to hide their autistic traits during the three scenarios.

Interestingly, the correlation analysis on the perceivers' judgements in the three conditions (writing, social interaction and self-presentation) revealed a strong connection between each pair in all contexts. At first glance, this result points to the fact that the judgements in all conditions are based on physical appearance only. However, although the correlation between each pair in the three conditions (writing, social interaction and self-presentation) is strong, it is weaker in the low social demand context (writing). It can be due to some behavioural traits that are highly consistent across different situations but are more apparent in the contexts of the high social demands. This finding aligns with those reported in studies on autistic individuals, who, despite lacking distinct physical features, are stigmatised due to their atypical behaviours that are often misinterpreted as social deviance rather than manifestations of an underlying condition (Gray, 1993; Huws & Jones, 2010).

This finding suggests that negative perceptions about autistic individuals can arise from a multitude of factors. For instance, having knowledge about autism has been linked to creating better first impressions of autistic individuals, which can lead to improved social interactions between autistic and non-autistic individuals (Sasson & Morrison, 2019). A brief online autism training session for college students not only increased their knowledge about autism but also reduced the stigma that they attached to autism (Gillespie-Lynch et al., 2015). Morrison et al. (2019) conducted research to determine the relation between participant characteristics (e.g., autism

knowledge and stigma beliefs about autism) and first impressions of an autistic person being observed. They concluded that the initial perception about an autistic person was more related to the observer's characteristics, such as the latter's knowledge of autism, rather than the characteristics of the autistic person under observation. The way in which non-autistic perceivers view autistic individuals may depend more on the former's internal knowledge and beliefs, rather than the latter's external presentation (Morrison et al., 2019). This outcome is supported by the study of Stronach et al. (2019), who found that knowledge and consciousness regarding autism are accompanied by significantly reduced levels of bias towards autistic individuals (Stronach et al., 2019).

However, while our research clearly reveals the pervasive negative views targeting autistic college students, there is a need for further exploration of how specific contexts shape those attitudes. The significant main effect of the target group, with a large effect size ( $\eta^2 = 0.73$ ), definitively shows that autistic individuals are perceived more negatively across all settings compared to their non-autistic peers. However, the influence of the stimulus type on the perceptions produced a marginal  $p$ -value of .06, slightly exceeding the standard threshold for statistical significance. This result suggests potentially meaningful, though non-significant, differences in how stimuli categories may guide observer impressions. Our study had adequate power to detect medium-sized effects but not subtle ones. Revealing smaller impacts, such as those stimulus types could exert, might require increased power. By considering experimental power and nuances of effect sizes, future work can build on these initial findings to uncover more precise insights into the

mechanisms driving stigma and biased perceptions. While clearly demonstrating widespread negative views on autistic students, our results point to the need for more research on specific contextual factors shaping the emergence and intensity of negative attitudes towards this group.

The research conducted so far on biases against autistic people has certainly provided useful information about social views and stereotypes. However, there is a noticeable lack of knowledge about how physical appearance plays a role in these biases. Filling this research gap is important if educators, policymakers and inclusivity advocates want to create more accepting environments and better support for autistic people in social situations. Researchers need to expand their focus beyond just social perceptions to also investigate how appearance affects the judgements that people make. This more well-rounded understanding could help overcome the biases that autistic individuals face head-on. Taking physical appearance into account alongside social factors will allow the scientific community to work towards creating a more complete picture of the stigma challenges encountered by autistic people. It will bring us steps closer to finding effective solutions to combat those unfair biases.

This study has potential limitations. Our participant sample in all three studies only came from the University of Nottingham, so it may not reflect diversity in higher education overall. This limitation means that we do not know if these findings extend to other significant groups, such as teachers or the general public. Exploring teachers' views is crucial since their expectations and beliefs substantially shape student achievement. Research clearly shows that positive expectations are linked to high levels of student motivation and better academic performance (Hughes et al., 2005;

Rosenthal & Jacobson, 1968). Thus, if negative assumptions about autistic students come mostly from their peers, we could improve the situation through more peer inclusivity training in schools. However, if teachers and society also view autistic students' academic potential more negatively than others, we would need broader change. Moreover, it is important to consider that incorrect beliefs or stereotypes about autism often differ markedly among cultures (Obeid et al., 2015). Thus, our next study will focus on perceptions of the academic success of autistic students, involving three groups: educators, students and society in general. Comparing their perspectives will allow us to gain a better understanding of and address prejudices or the lack of knowledge related to autism across these segments of the population.

In conclusion, the perceptions about the academic success of autistic students were consistently more negative in comparison to other students across three different social context demands. Based on the data provided here and the information in the literature, we suggest that the first negative impressions about autistic individuals are not attributable to any aspect of social presentation. Rather, they result from subtle physical, dynamic cues in presentation, which may incorporate supplementary features such as body movements, gaze patterns and facial expressions.

## Chapter 5: How do university academic staff perceive autistic students based on their behaviours?

### 5.1 Introduction

The relationship between students and the academic staff, especially in higher education, is a crucial part of the learning process (Del Río et al., 2018). However, differing expectations between students and their educators regarding their interactions can lead to disagreements (Roberts & Seaman, 2018). For autistic students who may not fully grasp the social or academic norms expected by their tutors or supervisors, this relationship can become even more challenging, potentially limiting its value as a learning resource (Cai & Richdale, 2016). Autistic students may face pressure from both their peers and the staff to meet academic or social expectations, which can result in them quitting school (Cage & Howes, 2020). Autistic students in Australia, the US, and the UK have reported negative impacts on their learning and wellbeing due to issues with social expectations. These issues are prevalent across a range of geographical and social contexts, as revealed by the experiences shared by students from various institutions (Cai & Richdale, 2016; Madriaga & Goodley, 2010; Sarrett, 2018).

A considerable number of autistic students have reported experiencing negative encounters or a deficiency in autism awareness among university staff (Cage et al., 2020; Goddard & Cook, 2022; Scott & Sedgewick, 2021; Van Hees et al., 2015). Gelbar et al. (2015) provide examples of situations in which even educators with autism knowledge and expertise failed to identify autistic students in their classrooms (Gelbar et al., 2015). However, understanding how the academic staff view autistic



students is vital because their perceptions can significantly affect the students' learning experiences, engagement in the classroom and overall academic achievement. Multiple studies have revealed that teachers treat students differently, based on their expectations of them (e.g., Hughes et al., 2005; Tenenbaum & Ruck, 2007). Teachers tend to evaluate the work of high-expectation students more positively than low-expectation students. They also provide high-expectation students with more response opportunities, challenging instruction and praise, as well as interact with them in more supportive and caring ways. Several studies have shown that high-expectation students receive preferential treatment from teachers (Babad, 1992; Brophy, 1983; Jussim et al., 1996). This special treatment of high-expectation students may explain, at least partly, why teacher expectations have a positive impact on student achievement (Hughes et al., 2005; Rosenthal & Jacobson, 1968).

According to a study (Morrier et al., (2011), less than 15% of the participants reported receiving guidance on evidence-based practices in their college or university teacher preparation coursework. In another study (Able et al., 2015), teachers also expressed the need for teacher preparation programmes to address the characteristics of autistic students and to introduce trainees to effective teaching strategies utilised in this context. However, some teacher preparation programmes, in accordance with state licensure requirements, mandate teacher candidates to finish at least one course on individuals with disabilities. These courses usually cover the various disability categories outlined in the Individuals with Disabilities Education Act of 2004, including autism, and provide concise overviews of the past treatment of individuals with disabilities, as well as current educational laws and

practices (Klehm, 2014; Turner, 2003). Blackwell et al., (2017) found that as a result of these programmes, several students who attended teacher training programmes possessed a certain level of knowledge regarding autism. They could recognise the fundamental characteristics and some of the early signs of autism. However, the teacher candidates appeared to have the least understanding of the causes of autism and the effective interventions for teaching autistic individuals. Additionally, Jones and colleagues (2021) discovered that an autism awareness training programme led to a boost in autism-related knowledge and a reduction in explicit biases and misconceptions about autism. However, the training did not have any impact on implicit biases.

Several studies have shown that possessing greater knowledge about autism leads general education teachers to hold a more favourable view of including autistic students in mainstream educational settings (Busby et al., 2012; Segall & Campbell, 2012). In contrast, previous experience with autistic students may reflect negative perceptions that both educators and fellow students hold against them. It has been found that these students often struggle with aspects of academic life, such as participating in group discussions or making presentations in front of their peers (Gobbo & Shmulsky, 2014; Van Hees et al., 2015). For some autistic students, asking questions or interacting with peers can be overwhelming. These difficulties might lead their educators and peers alike to mistakenly assume these individuals' lack of interest or capability. Thus, negative biases are fostered.

So far in this thesis, I have presented three distinct studies that investigated non-autistic students' perceptions about their autistic peers. In different contexts,

autistic students were consistently judged as less successful in their academic life than their non-autistic counterparts. In Study 1, autistic students were perceived as having lower levels of success, motivation and happiness and lower grades (Alhusayni et al., under review). In Study 2, we replicated these findings and demonstrated that perceivers were more accurate in judging non-autistic students in terms of their happiness and motivation, but there was an underestimation of success and grades of both autistic and non-autistic individuals. In Study 3, across three different contexts (writing, interaction and self-report), autistic students were once again perceived as less successful.

It is noteworthy that all these studies examining judgements about the academic performance of autistic students primarily focused on student perceptions. It remains unclear whether these negative impressions extend to educators as well. In **Study 4**, our objective was to explore how university academic staff perceived autistic students, specifically gauging whether biases against autistic students also existed among those interacting with them professionally. This is an important aim because being perceived negatively could pose a significant obstacle to the academic success and wellbeing of autistic individuals. In this study, we also aimed to examine the accuracy of university educators' judgements of autistic and non-autistic students' academic success compared to the general population and undergraduate students. Brief videos of autistic and non-autistic people were presented (through Prolific) to 270 non-autistic participants (educators, students and members of the public), who were asked to make judgements about the targets' academic success at university. The participants judged the targets' future academic

success, based on brief video samples of their behaviours. We hypothesised that university educators would perceive autistic students less negatively than the general population and undergraduate students did. We also predicted that university educators would make more accurate judgements of autistic and non-autistic students' academic success compared to the judgements made by the general population and undergraduate students. They were expected to display less bias towards autistic students.

## 5.2 Method

Prior to the data collection, we pre-registered this study on the OSF. The registration documents are available at <https://doi.org/10.17605/OSF.IO/A854P>.

### 5.2.1 Stimuli

The target videos from Study 2 were used in this study. These included clips of 38 university students (19 autistic and 19 neurotypical, mean age = 22.26 years) who were recorded while interacting with the experimenter as they were asked about what they liked about university. We chose this specific task based on the results of our previous study (Study 3), which showed no effect of the three different social contexts, whether the targets were in situations with high demand (self-presentation and interaction with the experimenter) or low demand (writing) on the perceivers' perception. Therefore, we decided to use the conversation task, which was consistent with the methodology applied in several studies (e.g., Sasson, 2017).

All targets self-reported their average academic success at university. During the recording process, they rated their agreement with the statement "I am

successful in my academic life so far" using a 6-point Likert scale, with the following anchors: 1 = strongly disagree, 2 = disagree, 3 = somewhat disagree, 4 = somewhat agree, 5 = agree and 6 = strongly agree.

### *5.2.2 Participants*

In total, 270 participants (90 university educators, 90 general population, and 90 university students) were recruited online through Prolific from diverse ethnic backgrounds, spanning various locations and nationalities (as shown in **Tables 5.1** and **5.2**). This sample size was derived from a power analysis using G\*Power. A total sample size of 246 was required to detect a small-sized effect ( $f = 0.1$ ), with 0.8 power and an alpha error probability of 0.05. The power analysis was based on a between-subjects design involving three perceiver groups (university educators, students, and the general population) and two target groups (autistic and non-autistic). The educator participants comprised 36 males and 54 females, aged between 24 and 70 years ( $M = 40.58$ ,  $SD = 10.92$ ), with 1–33 years of experience ( $M = 10.19$ ,  $SD = 8.92$ ). The student participants consisted of 50 males and 40 females, aged between 20 and 36 years ( $M = 23.64$ ,  $SD = 3.62$ ). The participants representing the general population included 47 males, 41 females and 2 who identified as other, aged between 20 and 55 years ( $M = 32.11$ ,  $SD = 8.13$ ). All participants were native English speakers who confirmed that they had no autism diagnosis. The exclusion criteria were those who reported having an autism diagnosis and who reported less than 1 year of teaching experience in the university educator group. The ethnic distribution of the participant groups in this study reveals significant insights into the diversity of the sampled population. As illustrated in **Table 5.1**, there is a notable difference in the

ethnic composition among the general population, educators, and students who participated in the study.

**Table 5.1**

*Ethnic Distribution of Participant Groups*

General Population	Educators	Students
White (68%)	White (80%)	White (50%)
Asian (1%)	Asian (11%)	Asian (3%)
African (26%)	African (2%)	African (40%)
Latino (4%)	Latino (4%)	Latino (3%)
Other (1%)	Other (2%)	Other (3%)

**Table 5.2**

*Nationality Distribution of Participant Groups by Continent*

Continent	General Population	Educators	Students
Europe	(67%)	(57%)	(51%)
North America	(3%)	(33%)	(2%)
South America	(0%)	(2%)	(1%)
Africa	(29%)	(2%)	(43%)
Asia	(1%)	(6%)	(2%)

### *5.2.3 Design*

In this study, we used a between-subjects design with three perceiver groups (university educators, students and the general population) and two target groups (autistic and non-autistic).

### *5.2.4 Procedure*

The research procedure underwent an ethical review and received approval from the School of Psychology Ethics Committee, University of Nottingham. The participants were recruited online through Prolific Academic, and an identical experiment was set up three times on Prolific, with each recruiting a different target group (university students, academic staff and general population). The experiments were designed using PsychoPy software (v2022.2.4) and uploaded on Pavlovia. Initially, the participants were informed that the targets in the video clips were all undergraduate students at the university and that the study focused on understanding whether academics could detect differences in academic performance based on students' behaviours. They were not told that some of the targets were autistic. The purpose of this minor deception was to gauge their perceptions, without them being influenced by knowing the autism diagnosis. Subsequently, they answered demographic questions (age, gender, ethnicity, country of birth, country of residence and current job). If they were university educators, they were also asked how long they had been teaching and what subjects they taught. The student participants were asked about their major courses. The participants then watched the 38 target videos, and for each, rated how successful the target was in one's academic life. The target videos were presented in random

order. On each trial, the video played in a continuous loop while the questions were displayed on the screen. The participants were asked to watch the video and respond by indicating how much they agreed with the statement "This person is successful in their academic life" using six response options: strongly agree, agree, somewhat agree, somewhat disagree, disagree, and strongly disagree. After completing the main tasks, the participants were asked to complete AQ10 (Allison et al., (2012). and to tell us whether they had an autism diagnosis. They were then debriefed, fully informed about the study's purpose and compensated for their time.

#### *5.2.5 Data Scoring and Analysis*

In accordance with the pre-registration, some data were excluded for the following reasons: participants who failed to finish the task (n = 35), participants who reported having an autism diagnosis (n = 20), participants who provided the same response on each trial (indicating lack of engagement, n = 5) and participants in the university educator group who reported less than 1 year of teaching experience (n = 13). These exclusions resulted in a final analysed sample size of 270.

The data were analysed using SPSS version 26. To evaluate the perceivers' judgements of autistic and non-autistic students' academic performance, mean judgements for autistic and non-autistic targets were calculated for each perceiver group (educators, students and the general population). Higher scores indicate more positive judgements. The group means were analysed using a 2 x 3 (target group x perceiver group) mixed ANOVA. To evaluate the accuracy of the perceivers' judgements of autistic and non-autistic students' academic performance, difference scores were calculated for each target by subtracting each perceiver group's mean



judgement from the target self-report. Zero, positive and negative scores indicated no bias, overestimation and underestimation, respectively. Bias scores were analysed using Bayesian one-sample t-tests and JASP 0.16.3.

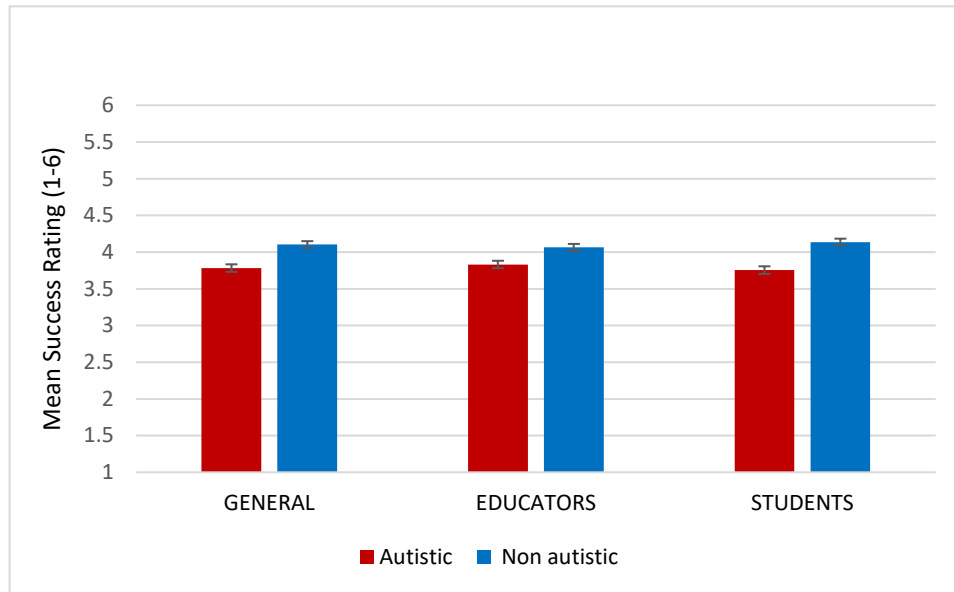
## 5.3 Results

### *5.3.1 Do Educators' Judgements of Autistic Students Differ from those Made by Students and the General Population?*

A 2 x 3 (target group x perceiver group) mixed ANOVA was conducted to analyse the group means. The main effect of the target group ( $F(1, 267) = 185.02, p < .001, \eta^2 = 0.40$ ) indicated that autistic individuals were perceived more negatively than non-autistic individuals. The significant interaction between the target group and the perceiver group ( $F(2, 267) = 4.40, p < .013, \eta^2 = 0.03$ ) showed that although autistic students were perceived more negatively than non-autistic students by all three perceiver groups, the judgement difference between autistic and non-autistic students was less in the educator group ( $Mdiff = .21, std = .35$ ) than in the student group ( $Mdiff = .38, std = .40, p = .011, d = .427$ ). The ratings from the general population ( $Mdiff = .32, std = .35$ ) did not significantly differ from those of students ( $p = .804$ ) or educators ( $p = .206$ ); see **Figure 5.1**.

**Figure 5.1**

*Mean Judgements on Autistic and Non-Autistic Targets' Academic Success, as Rated by Educators, Students and the General Population*



*Note.* Error bars represent +/-1 S.E.M.

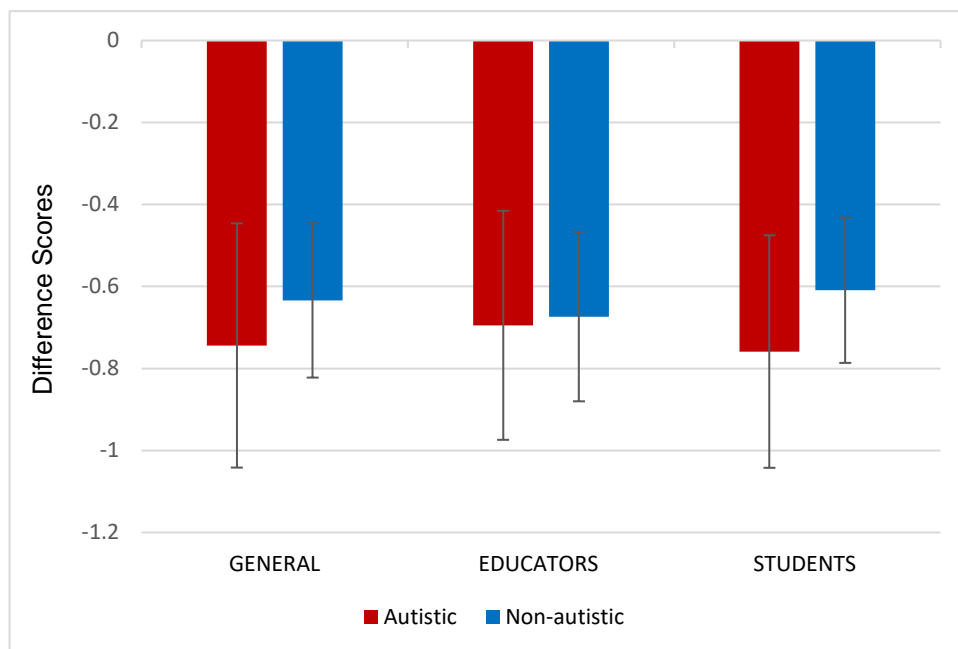
### 5.3.2 Bias in Perceiver Judgements

To examine the accuracy of these judgements, we compared perceiver judgements to targets' reports of their academic success. All three perceiver groups had a general tendency to underestimate the academic achievement of both autistic and non-autistic targets. The accuracy of the educators' scores for autistic students ( $M = -0.695$ ,  $SD = 1.217$ ;  $t(18) = -2.487$ ,  $p = .023$ ) and non-autistic students ( $M = -0.674$ ,  $SD = 0.900$ ;  $t(18) = 3.264$ ,  $p = .004$ ) were statistically different from zero, and there was evidence of the effect in non-autistic students ( $BF_{10} = 10.55$ ) and no effect for autistic students ( $BF_{10} = 2.635$ ). The accuracy of the students' scores for autistic students ( $M = -0.759$ ,  $SD = 1.236$ ;  $t(18) = -2.675$ ,  $p = .015$ ,  $BF_{10} = 3.633$ ) and non-autistic students ( $M = 0.609$ ,  $SD = 1.268$ ,  $t(18) = 3.439$ ,  $p = .003$ ,  $BF_{10} = 14.65$ ) showed

the same pattern. So did the accuracy of the general population's scores for autistic students ( $M = -0.744$ ,  $SD = 1.298$ ;  $t(18) = -2.498$ ,  $p = 0.022$ ,  $BF10 = 2.681$ ) and non-autistic students ( $M = 0.634$ ,  $SD = 0.821$ ;  $t(18) = 3.367$ ,  $p = 0.003$ ,  $BF10 = 12.78$ ).

**Figure 5.2**

*Accuracy of the General Population, Educator and Student Groups' Scores About Autistic and Non-Autistic Students' Academic Success*



*Note.* Error bars represent +/-1 S.E.M.

## 5.4 Discussion

This study showed that three groups of perceivers (general population, students and educators) held more negative perceptions about autistic students' academic performance than that of non-autistic students. These results replicate our previous research findings, and for the first time, extend our knowledge that even educators hold more negative perceptions of the academic performance of autistic students compared to non-autistic students. Even though the impacts of these

perceptions on students are still unknown, these results underscore the stigma experienced by autistic students in the academic environment, even among educators. This situation contrasts prior studies' findings that indicated increasing awareness and acceptance of autism on college campuses (Gardiner & Iarocci, 2014; Nevill & White, 2011; Tipton & Blacher, 2014).

These findings are consistent with and contribute to the existing body of research on how people perceive autistic individuals compared to non-autistic persons in various settings. In their studies, Alkhaldi et al. (2021), (Grossman, (2015), Sasson et al. (2017) and Sasson and Morrison (2019) have all found that based on initial impressions, neurotypical adults and adolescents tend to view autistic individuals in a more negative light. Specifically, participants tend to express more dislike towards autistic individuals compared to non-autistic ones and were less likely to interact with them, perceiving them as more awkward and less likeable. However, our research indicates that negative judgements extend to traits related to competence, such as academic success, in contrast to Sasson and colleagues' (2017) findings that social presentation differences among autistic individuals result in negative evaluations of their unsociable behaviours, including awkwardness and disagreeableness, rather than those associated with competence (intelligence) and character (trustworthiness). Indeed, people's perceptions can vary widely, based on their experiences and biases, such as rater characteristics, for example, prejudice against autism due to their lack of knowledge about the condition (Jones et al., 2021; Morrison et al., 2019; Scheerer et al., 2022). While many studies (e.g., Alkhaldi et al., 2021; Grossman, 2015; Sasson et al., 2017; Sasson & Morrison, 2019) have found a

general trend of public perceptions in social contexts, this does not preclude negative biases in other areas, such as academics.

The relationship between students and their teachers is a crucial factor in achieving academic success. Lecturers, tutors and teaching assistants provide academic knowledge and professional guidance that can shape students' future accomplishments. However, a study (Tipton & Blacher, (2014) reveals that many educators lack sufficient knowledge and information about autism. Moreover, some research Cook et al., (2009) ;Wenzel., (2010) suggests that faculty members may not be well-informed about the rights of students with disabilities and the educational accommodations they require. Such knowledge gaps may result in some university community members' negative perceptions of autistic students' academic performance since without appropriate accommodations and support, the more challenging traits of autism that often appear in high-stress environments are amplified.

A possible reason for these findings is that the autistic students in the video clips presented behaviours commonly associated with autism. These behaviours might be misunderstood by those unfamiliar with autism. Research has shown evidence that how autistic individuals move can be distinct and might be perceived as unusual or awkward by those who are not on the autism spectrum(Guha et al., 2018; Metallinou et al., 2013) . Further analysis focusing on facial expressions has identified nuanced differences in dynamic transitions and in the symmetry of movements across different facial regions (Obafemi-Ajayi et al., 2015). These

differences could be some of the cues that potential conversation partners used to form their first impressions of autistic individuals.

Previous experiences with autistic students may reflect the negative perceptions that both educators and fellow students hold against them. It has been found that these students often struggle with some aspects of academic life, such as participating in group discussions or making presentations in front of their peers (Gobbo & Shmulsky, 2014; Van Hees et al., 2015). For some autistic students, asking questions or interacting with peers can be overwhelming. These difficulties might lead their educators and peers alike to mistakenly assume that these individuals lack interest or capability. Thus, negative biases are fostered. Taylor et al., (2008) documented instances where autistic students exhibited behaviours that were perceived as talkative, disruptive or aggressive. Such behaviours can easily be misconstrued as deliberate defiance or immaturity, instead of symptoms of their conditions. Furthermore, when peers are hesitant to collaborate with autistic students, labelling them as "liabilities" (Knott & Taylor, 2014) , it can indirectly shape educators' perceptions, leading them to view autistic students as potential disruptors of the classroom environment. In contrast, Madriaga and Goodley's study, showed examples of autistic students who excelled in group activities. One additional aspect that may contribute to the unfavourable attitudes towards autistic students is the notion of the "implied student", as described by Ulriksen (2009), pertaining to educators creating their instructional approaches and curriculum frameworks according to their projections regarding the type of student they expect to face. Neurodiversity is often neglected, resulting in the assumption that the

"implied student" is neurotypical. As a result, neurodivergent pupils may not have inclusive learning experiences in this teaching environment.

On the contrary, our study revealed a significant difference in various observer groups' perceptions of academic achievement. Specifically, university educators were found to have a more impartial view of autistic students compared to other perceiver clusters, such as other students. This could be due to the training programmes that university educators often attend in order to meet the different needs of their students (Klehm, 2014; Turner, 2003; Nuri-Robins et al., 2011). Moreover, routine exposure to a diverse student population further bolsters educators' capacity to appreciate and nurture the academic potentials of all students, including those who are neurodivergent. Makas' (1993) contact hypothesis suggests that exposure to autistic individuals may be necessary for the cultivation of positive attitudes, (Makas, 1993) while limited exposure to and unfamiliarity with autism often lead to negative assumptions (Gardiner & Iarocci, 2014). Studies conducted with teachers have shown that individuals who had prior experiences in interacting with autistic persons were more at ease in teaching them and exhibited more favourable attitudes towards them (Gregor & Campbell, 2001; Park et al., 2010). In contrast, students may lack diversity and inclusion training or have limited exposure to individuals on the autism spectrum, both diagnosed and undiagnosed. Due to some autistic individuals without intellectual disability passing under the radar, it is not surprising that students may not even realise that they are around individuals on the spectrum.

It is important to note that in the educator group of perceivers, 16 of them specialised in psychology. Moreover, the educators who were part of the sample had more than a year of teaching experience and were expected to have knowledge regarding the significance of accommodating neurodivergent students in the classroom and promoting inclusive learning environments. However, many of them still held negative perceptions regarding the academic success of autistic students. Actually, it is possible that people who have limited knowledge about autism may not be aware of their own lack of knowledge on the subject. According to a study by McMahon et al. (2020), there is no correlation between perceived and actual autism knowledge among the general population. Furthermore, people with less knowledge tend to overestimate their level of understanding. In their recent study, von Below et al., (2021) investigated how much college professors and other higher education staff understood about autism and how open they were to making adjustments to help autistic students. The researchers conducted in-depth interviews to obtain a detailed picture of people's views. They found a real mismatch between the positive attitude that most educators said they had towards supporting autistic students and what they actually did in the classroom, displaying non-inclusive teaching practices. As a result, autism awareness training may have to be mandatory, although it is not always the case (Chown et al., 2018). This training can be helpful, can yield positive outcomes (Giannopoulou et al., 2019) and decrease the prejudice (Gillespie-Lynch et al., 2015), particularly for those who lack sufficient understanding of autism or require a refresher course. These results underscore the importance of promoting diversity and inclusion training, not just among educators but also among students and other public populations (who are largely neurotypical).



Finally, compared to the targets' self-reports, our findings revealed an overall bias across different perceiver groups (educators, students and the general population), who underestimated the academic achievements of both autistic and non-autistic targets. An unexpected finding was that the evidence of inaccuracy was often greater for non-autistic than autistic students across the perceiver groups. This results conflicts with models positing that judgements of autistic groups involve greater ambiguity and thus less accuracy (Ito et al., 2017). In fact, when targets self-report their academic success, they may engage in self-enhancement biases that inflate their perceived competence and performance. Much research shows that most people demonstrate inflated self-perceptions and positivity biases when evaluating themselves across various domains, including intellectual and academic abilities (e.g., Hoorens, 1993). Thus, when the set of target self-reports of academic achievements is used as the accuracy benchmark, those self-reports likely reflect some degree of self-enhancement bias. This could make perceiver judgements that estimate lower competence or achievement seem less accurate by comparison, even if they are more realistic. Thus, the apparent "underestimation" on the perceiver side could partially result from overestimation on the target self-report side. Therefore, in future studies, comparing judgements to official academic records could increase objectivity.

This study has several limitations. First, conducting the study online reduced the uniformity of the conditions under which the participants were tested, such as the level of quietness and the quality of the video clips, which might vary from device to device. However, this should not have had a large impact on the results since we

collected data from a larger sample size to account for noisier data collection procedures. Furthermore, collecting data online enabled accessing a more diverse participant pool across various backgrounds and courses of study, improving the generalisability of the findings. Second, this study's results confirm that even educators hold negative impressions on the academic success of autistic students. However, we did not investigate in which ways these perceptions might affect the academic life and success of autistic students. Tracing how impressions translate into practice could highlight specific areas for improvement. If certain instructional approaches, biases or misconceptions emerge, we could better target teacher training. This might allow us to optimise support for autistic students so that negative perceptions would not inhibit their potentials. There are a few ways of studying this matter. For example, we can ask autistic students directly if they feel that teachers treat them differently or shape their learning. We can also observe classes to find out how teachers interact with, support and instruct autistic students. Additionally, experimental manipulations can be conducted by assigning students to conditions with more positive or negative educator perceptions and evaluating the causal effects. As a result, teacher expectations can be isolated. Finally, we did not assess the level of autism knowledge among the participants, which could explain the judgement discrepancy between educators and students (Jones et al., 2021; Morrison et al., 2019; Scheerer et al., 2022). It is unclear whether the difference in judgements is due to the students' lack of knowledge or the educators' extensive experience with neurodiverse students.

Future research should also consider measuring the familiarity with autism among educators more systematically. This could involve developing and administering a comprehensive assessment tool to gauge educators' knowledge, experience, and attitudes towards autism. Such a measure would provide valuable insights into the relationship between educators' familiarity with autism and their perceptions of autistic students' academic performance. It could also help identify specific areas where additional training or education might be beneficial, potentially leading to more inclusive and supportive educational environments for autistic students.

It should be noted that this particular study had a diverse group of participants representing different countries, ethnicities, ages and nationalities. This sample differs from those of the first three studies, which only included participants from the University of Nottingham. This suggests that discrimination against autistic people is a cross-cultural concern, not limited to a specific region or cultural group. Therefore, it is essential for educational institutions and decision-makers to take action by raising awareness about autism in universities.

To conclude, in this study, we found that three groups (the general population, students and educators) held more negative perceptions about the academic performance of autistic students compared to non-autistic students. This finding aligns with prior research results that show negative biases towards autistic people in social contexts, but it contrasts with some studies in which competence traits, such as intelligence, are found to be perceived neutrally. However, we found that educators had more impartial views than students, perhaps due to more training and

exposure to neurodiverse students. Overall, our study's results highlight the need to promote inclusion training and address misconceptions, not just among educators but the broader public as well. Further research could investigate how impressions translate to practice and optimise support for autistic students.

## Chapter 6: General Discussion

### 6.1 Research Overview

In this thesis, we investigated the implications of DEP for higher education by examining non-autistic individuals' perceptions of autistic students' academic experience. The first aim of this thesis was to explore how non-autistic students perceived the academic performance of autistic students. As described in **Chapter 2**, the videos of autistic and non-autistic targets (Jaffrani, 2022) when they were engaged in typing descriptions of their emotional experiences were shown to non-autistic perceivers who were asked to judge different aspects of the targets' academic life (success, motivation, happiness and grade). The second aim was to investigate the accuracy of perceivers' judgements of autistic and non-autistic students' academic performance, as well as to explore whether autistic targets had accurate self-awareness regarding their academic achievements. As described in **Chapter 3**, to answer those questions, we developed an experimental paradigm by capturing the behaviours of both autistic and non-autistic individuals while they were filling out a questionnaire. Subsequently, the recorded videos were shown to the observers who were tasked with evaluating the academic performance of both groups, focusing on the same academic aspects examined in Study 1 (success, motivation, happiness and grade). The third aim of this thesis was to investigate how different social contexts (writing, social interaction and self-presentation) could affect judgements about autistic individuals' academic success. We recorded three types of videos, featuring both autistic and non-autistic individuals. The targets were filmed while either filling out a questionnaire and interacting with the experimenter

or introducing themselves to the camera after being informed about the study's objectives to determine whether such disclosures would influence the perceptions formed about them (**Chapter 4**). Finally, as explained in **Chapter 5**, we aimed to explore how university academic staff perceived autistic students by using the same set of target videos utilised in Study 3, when the targets presented themselves to the camera. Through Prolific, we showed those videos to different groups of perceivers (students, educators and the general population) and asked them to rate the academic success of both autistic and non-autistic targets. The main findings that connect back to each stated aim are discussed in the following subsections.

## 6.2 How Do Autistic Students Perform Academically in the Eyes of Their Non-Autistic Peers?

Across **Chapters 2–5** of this thesis, which present four separate studies, a clear pattern emerged. Autistic students were consistently perceived as less academically successful, less motivated, less happy and less likely to achieve good grades compared to their non-autistic peers. Specifically, **Study 1** demonstrated that autistic students were judged more negatively on all academic aspects assessed when videos of their behaviours were shown to non-autistic perceivers. We replicated these findings in a new target group and evaluated the veracity of these negative judgements by comparing perceiver judgements to target self-reports on a 6-point scale. We used a rating scale instead of binary questions to allow more response variability, with the new paradigm developed in **Study 2**. Two additional studies were conducted to examine contextual influences on judgements (**Study 3**) and compare the judgements by academic staff (**Study 4**); the negative attitude towards autistic

students prevailed when compared to neurotypical students. This persistent effect suggests the presence of systemic biases that have negative impacts on how autistic traits, behaviours and modes of learning are interpreted, understood and supported in mainstream environments. The assumptions that autistic students have less potentials or abilities appear pervasive.

These findings are consistent with the DEP theory and resonate with previous research demonstrating that non-autistic participants make less favourable judgements about autistic people compared to non-autistic people on a range of traits and behavioural intentions (Sasson et al., 2017). However, the results expand on previous research by demonstrating that negative judgements extend to perceptions on autistic people's success in an academic setting, even to a measure as concrete as their academic grades.

In fact, autistic individuals are frequently perceived more negatively than neurotypical people due to common misinterpretations and a lack of public understanding about autism. For example, the lack of eye contact common in autism can be regarded as rude by non-autistic people (Milton, 2012), while limited exposure to and unfamiliarity with autism often lead to negative assumptions (Gardiner & Iarocci, 2014). However, other studies show that disclosing an autism diagnosis can improve others' perceptions (Matthews et al., 2015; Norris et al., 2023) and that accurately labelling autistic behaviours reduces stigma compared to the absence of labels (Gillespie-Lynch et al., 2021). Evidence also suggests autism-specific physical differences, related to the distances between facial features (Obafemi-Ajayi et al., 2015). As a result of these differences, atypical perceptions can

occur, even when examining only static images (Alkhaldi, 2022; Sasson et al., 2017). Additionally, differences in expressiveness (Edey et al., 2016; Grossman, 2013; Sheppard et al., 2016) lead non-autistic individuals to judge autistic people as odd or awkward. Finally, according to a survey (Kuzminski et al., 2019), women generally have more positive attitudes towards autistic individuals than men. However, our recent studies found that despite having a majority of female perceivers (n = 202 out of n = 355 in total), autistic students were viewed more negatively. This discrepancy can be attributed to the fact that Kuzminski and colleagues' survey measured knowledge about autism, which was linked to more positive attitudes. In contrast, our study did not measure such knowledge.

López (2015) suggests that the reason why society at large has been unable to fully comprehend autism is due to insufficient knowledge about its development over time, as well as the role of sociocultural factors in this process. López cites two primary reasons for excluding these developmental and social considerations. First, the strong genetic basis of autism has promoted views of it as a fixed, static disorder with unchanging symptoms. Second, the dominance of cognitive psychology's individualistic approach has hindered the examination of how negative social environments might shape the emergence of autistic traits (López, 2015).

Lately, there has been a lot of discussion about whether revealing one's autism diagnosis can lead non-autistic individuals to be more accepting of neurodivergent individuals. Many studies have found a link between how much non-autistic people know about autism and how positively they view autistic individuals (Jones et al., 2021; Kilee DeBrabander et al., 2022; Morrison et al., 2019; Sasson & Morrison, 2019). This finding



suggests that providing education about autism to the general public may help improve attitudes and reduce stigma (Scheerer et al., 2022). It is important to note that disclosure may not always be advantageous. The effects of disclosure can vary, depending on the situation and the level of autism-related bias held by the person receiving the disclosure (Morrison et al., 2019). In some cases, disclosure may have no effect whatsoever (Alkhaldi et al., 2019; Lipson et al., 2020; R. White et al., 2020).

However, several studies have indicated that having more knowledge about autism does not necessarily result in a more positive attitude towards autistic individuals (Gardiner & Iarocci, 2014; Matthews et al., 2015; McManus et al., 2011; D. White et al., 2019). Makas' (1993) contact hypothesis suggests that exposure to autistic individuals may be necessary for the cultivation of positive attitudes (Makas, 1993). Other studies exploring the opinions of college autistic students (Mahoney et al., 2008) and their intellectual disabilities (Griffin et al., 2012; May, 2012) support this theory, emphasising the significance of positive exposure. For example, Griffin and colleagues (2012) discovered that undergraduate students who expressed being more comfortable around people with intellectual disabilities also held more favourable attitudes towards them. Exposure to people with intellectual disabilities, especially in a positive context, may alleviate concerns and facilitate a more receptive and inclusive attitude. It has also been proposed as a possible mechanism in studies investigating teachers' attitudes towards autistic students (Gregor & Campbell, 2001; Park et al., 2010). However, the quality of communication between autistic and neurotypical people may be affected by the DEP. This is because there are fundamental differences in how each group perceives the world, which can

create challenges in their mutual understanding (Crompton et al., 2020; Milton, 2012).

To sum up, bridging gaps in autism knowledge and experience between non-autistic and autistic people themselves can help counter the emergence of unduly negative perceptions that do not reflect reality or autistic individuals' full potentials.

### **6.3 Do perceivers judge autistic and non-autistic students' academic performance accurately?**

The results of **Study 2** revealed that when comparing perceiver judgements to self-reports, notable differences were observed in how students' academic success was judged by others compared to how the students reported it themselves. Interestingly, there was no significant difference in the self-reported academic success between the non-autistic and autistic groups, indicating that both groups perceived their academic achievements similarly. However, for the non-autistic group, there was evidence that perceivers underestimated their academic success. On one hand, a significant discrepancy between the perceivers' judgements and the non-autistic students' self-reports demonstrated this underestimation. On the other hand, there was no statistically significant difference between the perceivers' judgements and the autistic students' self-reports. These findings suggest a considerable gap between external perception and self-report between the two groups. The discrepancy observed in non-autistic students may be attributed to self-enhancement bias, a psychological tendency driven by the desire to maintain high self-esteem (Sedikides & Gregg, 2008). In academic settings, this bias could lead individuals to rate their abilities, efforts and achievements more favourably than

external evaluators might do. Empirical studies corroborate this assumption self-perceived intelligence shows only a modest correlation (about .2–.3) with objective measures, such as IQ test scores (Hansford & Hattie, 1982). Similarly, freshmen's self-assessments of academic ability align weakly (correlation of .35) with professors' evaluations (Chemers et al., 2001). In professional contexts, the correlation between expected and actual performance on complex tasks is similarly low (around .2) (Stajkovic & Luthans, 1998). However, the data from this study indicate that self-enhancement biases may be inapplicable to autistic students since the perceiver group estimated the success of autistic targets similarly to their own self-reports.

Nonetheless, our findings also suggest that non-autistic students' levels of motivation and happiness are generally perceived accurately. These results align with existing literature demonstrating that perceivers can accurately infer certain attributes of neurotypical individuals based on brief observations or "thin-slice" judgements (Ambady & Rosenthal, 1992; Todorov et al., 2015). However, this perceptual accuracy does not extend as effectively to autistic individuals. One reason for this difference may be that autistic individuals often display less facial expressiveness. According to DSM-5 (APA, 2013), less facial expressiveness characterises autism, although research has yielded mixed evidence. Some studies have shown autistic children's reduced facial expressiveness when describing life events (Stagg et al., 2014) and when posing emotions (Macdonald et al., 1989). However, other works indicate comparable expressiveness between autistic and non-autistic groups in posed expressions (Beadle-Brown & Whiten, 2004; Volker et al., 2009) and automatic facial mimicry (Press et al., 2010). Nevertheless, even if objective behavioural expressiveness is sometimes equivalent between the two groups there may be more

subtle differences in quality of expression that influence perceivers' abilities to read autistic emotions accurately. There is also likely less familiarity with the emotional and expressive cues displayed by autistic individuals (Baron-Cohen et al., 1985). Thus, while non-autistic students' expressions of happiness and motivation align with recognisable norms, making them easier to interpret (Harms et al., 2010), autistic students' equivalent feelings may be misconstrued.

Interestingly, perceivers accurately observed the levels of happiness and motivation of the non-autistic students at university. However, there was a common tendency to underrate the grades of both autistic and non-autistic students. This discrepancy might be attributed the first two attributes' subjective nature versus the third attribute's objective nature. Happiness and motivation are personal feelings, typically conveyed through non-verbal indicators such as facial expressions, gestures and vocal tone, which are somewhat universally recognisable. Non-autistic perceivers, familiar with these cues, might be better at discerning these states in non-autistic individuals, who typically exhibit emotions in line with societal norms (Baron-Cohen et al., 2001; Klin et al., 2002). However, autistic individuals may express their emotions and motivations in ways that diverge from neurotypical norms, potentially leading to misunderstandings or misinterpretations by non-autistic observers (Heasman & Gillespie, 2018; Sasson et al., 2017).

In conclusion, our study's results suggest that perceivers do not judge autistic and non-autistic students' academic performance with equal accuracy. While perceivers underestimate the academic success of non-autistic students, their judgements of autistic students' academic performance are more aligned with the

students' self-reports. This difference in accuracy may stem from various factors, including non-autistic students' self-enhancement bias, differences in emotional expressiveness and communication between the two groups, and potential biases or misunderstandings on the part of non-autistic observers when perceiving autistic individuals.

It is possible for multiple factors to influence the perceptions of both subjective elements (e.g., happiness and motivation) and objective aspects (e.g., grade). Autistic students face additional complexities in neurotypical individuals' perceptions about them due to their non-typical communication methods and expressions, as well as potential misunderstandings and biases by non-autistic observers.

#### 6.4 Do Autistic Targets Have Accurate Meta-Perceptions About Their Academic Performance?

The results of **Study 2** showed that students, whether autistic or non-autistic, were generally unaware of how they were perceived by others and often thought that they were viewed more positively than in reality. It is quite common for individuals, regardless of their neurotype, to believe that they are thought of more favourably by others than they actually are. One possible reason for this result is the Illusory Superiority bias, which causes people to overestimate their abilities and qualities compared to others (Alicke et al., 1995). Additionally, the self-serving bias can also play a role, as individuals often attribute their successes to their own efforts but blame external factors for their failures (Mezulis et al., 2004). However, it is theoretically possible that the reason for the lack of accuracy in meta-perceptions is

that targets have overly positive self-perceptions compared to how perceivers view them. Nonetheless, this seems unlikely for autistic targets because, according to emerging empirical evidence, non-autistic people tend to rate autistic others negatively on a range of social favourability traits (e.g., likeability) and report a low intention to interact with them (Alkhaldi et al., 2019; Lipson et al., 2020; Sasson et al., 2017). The discrepancy in meta-perceptions' accuracy may be due to the perceivers being more negative in their judgements rather than the autistic targets being too positive. These results also suggest that both autistic and non-autistic students were unaware that they would be perceived negatively; instead, they thought the opposite. This finding goes against the idea that autistic individuals might face intensified challenges due to their difficulties in understanding social scenarios and comprehending others' viewpoints, often referred to as ToM deficits (Baron-Cohen et al., 1985). Thus, the idea that autistic individuals may have misconceptions about how others perceive them needs re-evaluation. This idea is supported by studies showing that many autistic children and adults have successfully performed ToM tasks, suggesting that 'mind blindness' is not a universal or defining characteristic of autism (Gernsbacher & Yergeau, 2019). Therefore, the wide range of group differences in meta-perception abilities between autistic and non-autistic individuals suggests that these differences are not limited to specific traits or characteristics. Instead, these difficulties may stem from broader disparities in social cognition that affect the capacity to precisely determine how one is viewed by others.

## 6.5 How Do We Perceive Autistic Students in Different Social Contexts?

The findings of **Study 3** showed that against our predictions, there was no difference regarding changes in non-autistic peers' more negative perceptions about autistic students across high-demand (social interaction and self-presentation) and low-demand (writing) social conditions. Autistic individuals were consistently judged as less successful in their academic life than non-autistic students. These results could be explained by several factors. The perceptions could be based on physical appearance; in this regard, several studies have supported the concept known as the "halo effect", whereby positive traits are attributed to attractive individuals (Dion et al., 1972; Feingold, 1992; Langlois et al., 2000). For example, individuals with dominant facial features tend to achieve higher ranks in the military, and students are inclined to give higher teaching evaluations to attractive professors (Hamermesh & Parker, 2005; Mueller & Mazur, 1996). Meanwhile, some research has shown that autistic adults are often judged as less attractive than non-autistic adults (DeBrabander et al., 2019; Morrison et al., 2019, 2020; Sasson et al., 2017; Sasson & Morrison, 2019). Sasson et al. (2017) have also found that autistic individuals are frequently perceived less favourably, even based on just their photographs. Another study (Alkhalidi, 2022) supports this finding, showing that non-autistic people usually have a less positive perception of autistic individuals, regardless of how expressive the photos are.

However, although the autistic targets in the second condition were talking about positive experiences at university, they still received fewer positive perceptions about their academic success. This might be because they displayed a

consistent atypical behavioural pattern in all three social contexts. Several empirical studies have provided evidence supporting the presence of reduced facial expressivity, or what is commonly known as 'flat affect'. This is mainly observed through quantified analysis of small facial muscle movements (Czapinski & Bryson, 2003) and during regular interactions (Bieberich & Morgan, 2004; Stagg et al., 2014). Autistic adults encounter challenges in discerning emotions and expressing their feelings, in contrast to control participants (Hill et al., 2004). Other investigations reveal the creation of expressions that are harder to interpret or are a combination of different emotions (Yirmiya et al., 1989) that tend to be perceived as more stilted, unusual and odd (Grossman et al., 2013; Macdonald et al., 1989; Volker et al., 2009). Therefore, individuals frequently exhibit a biased tendency to make unfavourable judgements when confronted with situations that lack clarity or certainty (Ito et al., 2017). This finding can be related to people's ability to read body language that closely mirrors their own movements, while autistic and neurotypical individuals move in noticeably distinct ways (Edey et al., 2016).

Our study revealed that when the autistic participants were informed about the real reason for the experiment and then asked to appear on camera, whether or not they used camouflage techniques had no effect on the findings. Autistic individuals engage in camouflaging in social situations to hide their autistic traits and appear more similar to neurotypical individuals. This is done with the hope of gaining social advantages, such as being more accepted or liked by others (Hull et al., 2017; Lai et al., 2017; Perry et al., 2022). Thus, when we informed the autistic participants about the purpose of this study, we expected them to use camouflaging.



Nevertheless, the participants possibly used the masking technique throughout the experiment since we had informed them right at the beginning about the recording, even though we did not reveal the real purpose to them. We had informed them that the recording was for training and quality purposes only. However, the fact that they were being watched could have influenced their behaviour during the experiment.

Notably, the perceivers' impressions were strongly correlated across the writing, social interaction and self-presentation conditions. This result initially indicated that judgements in all scenarios relied on some consistent factor, such as appearance or noticeable autistic mannerisms. However, despite the robust correlation across the conditions, it was slightly weaker for the writing task, which had less social pressure. This implies that certain behavioural tendencies are quite steady from person to person but become more evident as social demands rise. This outcome aligns with studies reporting that autistic individuals, who, despite their lack of distinct physical facial expressions, face stigmatisation due to their atypical behaviours that are often misinterpreted as social deviance rather than manifestations of an underlying condition (Gray, 1993; Huws & Jones, 2010).

The reasons behind the less positive perceptions about autistic students are complex and multifaceted. Greater knowledge about autism correlates with more positive first impressions about autistic individuals, potentially improving social interactions between autistic and non-autistic people (Sasson & Morrison, 2019). Similarly, a short autism training course online for college students increased their understanding and decreased the stigma attached to autism (Gillespie-Lynch et al., 2015). The initial perceptions about an autistic person depended more on observer

traits, such as autism awareness, rather than on the characteristics of the autistic target. In essence, how non-autistic people view autistic individuals relies more on their own internal knowledge and beliefs instead of the outward presentation of the autistic persons (Morrison et al., 2019).

## 6.6 How Do University Academic Staff Perceive Autistic Students Compared to How Other Students and the General Population Perceive Them, Based on Their Behaviours?

The findings of **Study 4** revealed a significant discrepancy in three different groups' (general population, students and educators) perceptions about autistic and non-autistic students' academic success. This outcome not only corroborates our previous findings but also marks a novel revelation – that is, educators also harbour more adverse views about the academic capabilities of autistic students compared to their non-autistic peers. This significantly demonstrates implicit bias against autistic students in educational environments, conflicting with previous research suggesting growing acceptance of autism in higher education (Gardiner & Iarocci, 2014; Nevill & White, 2011; Tipton & Blacher, 2014). Several reasons could explain why educators hold a negative attitude towards autistic students, including the existing stigma surrounding autism and a general lack of knowledge about the condition (Jones et al., 2021; Morrison et al., 2019; Scheerer et al., 2022; Scott & Sedgewick, 2021; Van Hees et al., 2015). For instance, a survey (Segall & Campbell, 2012) asked 196 teachers and principals 15 questions to test their knowledge about autism. On average, the mainstream teachers and principals admitted not knowing the answers to around 7

out of the 15 questions (Segall & Campbell, 2012). Moreover, studies have shown that autistic students often face difficulties in various academic aspects, such as participating in group discussions or making presentations in front of their peers (e.g., Van Hees et al., 2015). Thus, academic professionals' preconceived notions may be influenced by their experiences. In particular, some autistic students have reported feeling stigmatised by their educators, attributing this to being judged based on the latter's previous experiences with other autistic students (Goodall, 2018). This could be blamed on the lack of autism training (Dillenburger et al., 2016). However, it is important to recognise that each student is unique and deserves a fair chance to succeed in one's academic pursuits.

However, the results of **Study 4** demonstrated a significant difference in various observer groups' perceptions of academic achievement. Specifically, university educators were found to have a more impartial view of autistic students compared to other perceiver clusters, such as other students. This could be due to the training programmes that university educators often attend to meet the different needs of their students. Another reason could be their exposure to a diverse student body, or their specific training in understanding and teaching neurodivergent students might have provided them with more unbiased perspectives (Nuri-Robins et al., 2011). These findings could be linked to a couple of fairly recent studies indicating that teacher education students report accurate knowledge about most aspects of autism (Blackwell et al., 2017; Talib & Paulson, 2015). This is a positive indicator of the increased awareness about autistic individuals, but we still have much work to do.

It is worth noting that among the members of the educator group, 16 specialise in psychology. Additionally, the remaining educators in the sample have over a year of experience and should already be aware of the importance of accommodating neurodivergent students in the classroom and promoting inclusive learning environments. However, many of the educators still hold negative perceptions regarding autistic students' academic success, which is supported by McMahon et al., and colleagues' (2020) and von Below et al., and colleagues' (2021) findings that individuals lacking knowledge of autism tend to overestimate their understanding of it. This tendency is especially problematic for those who hold crucial support or instructional positions. Individuals who had been teaching about autism had not attended inclusive teaching and autism classes, claiming that they did not require such classes, and displayed non-inclusive teaching practices. As a result, autism awareness training might need to be mandatory, which is not always the case (Chown et al., 2018). Specifically for individuals who lack sufficient understanding of autism or those who require a refresher course. This training can be beneficial, yielding positive outcomes (Giannopoulou et al., 2019) and decreasing the stigma attached to autism (Gillespie-Lynch et al., 2015).

## 6.7 Limitations and Future Research Directions

This research is limited because it does not address the complexities of real-world student interactions, including intersectionality between autism diagnosis and other protected characteristics (race, ethnicity, gender and socioeconomic status). This drawback is partly due to the lack of available data from the stimulus targets and participants and partly because these are complex issues that cannot be

addressed in depth in simple cognitive experiments. Further work examining the impact of intersectionality in this field is warranted but beyond the scope of this research. The lack of involvement of members of the autistic community in this research is also a limitation. For instance, the autistic community members' engagement would strengthen our understanding of the impacts of their peers' negative perceptions in an academic context and ensure that the measures and behaviours sampled are those most relevant to the academic outcomes for this population.

Another limitation is that the participants were not provided with definitions of the variables they judged; therefore, they may have made their judgements based on different concepts of what those variables encompassed. This might be particularly the case for judgements about success, which was included as a holistic impression but could mean different things to different raters (e.g., degree attainment, grades, employability). Possibly, the participants perceived the autistic targets as facing more barriers in higher education, which were taken into account in their judgements of success. Future research could provide a more specific definition of success or ask participants to explain the reasons for their answers to gain a better understanding of their interpretations of the question.

We also need to acknowledge the restrictions on self-reported data on academic performance when we use such data in evaluations. This type of subjective data may fall short of reliability and validity criteria. Those reporting on themselves may not have enough self-awareness to precisely assess and communicate their own academic performance, as well as related emotional dimensions such as happiness

and motivation. Additionally, self-reporting honesty is a key and possibly troublesome matter. We cannot presume that people will choose to truthfully depict their academic performance due to their personal inclinations. Wanting to make a certain impression or seek a specific result could shape their self-reports and distort the data. Factors such as these underline the inherent limitations of using subjective self-assessments of achievement. The data may end up skewed if those reporting inflate or deflate their academic performance for any range of internal reasons. Thus, while self-reported performance data can have value, we must account for their intrinsic restrictions.

It is necessary to conduct further research to examine how different contexts affect people's perceptions. **Study 3** demonstrated that in all three contexts, autistic individuals were perceived more negatively than their non-autistic peers, with a significant main effect of the target group and a very large effect size ( $\eta^2 = 0.73$ ). However, the effect of the stimulus type on perceptions resulted in a marginal  $p$ -value of .06, just above the standard threshold for statistical significance. This suggests that there may be meaningful differences in how various contexts influence people's impressions. Revealing smaller impacts, as those stimulus types could exert, may require increased power. Future work can build on these initial findings by considering experimental power and nuances of effect sizes to uncover more precise insights into the mechanisms driving stigma and biased perceptions.

Further extensions of this work could examine the impacts of diagnostic disclosure and knowledge of autism on judgements about academic experience. This would help ascertain whether diagnostic disclosure will aid students in their peer

relations at university. Additionally, inclusion of an autistic participant group would provide information about whether this bias is mitigated in same-neurotype pairs and would offer evidence as the basis for initiatives that build autistic student communities at universities. However, as autistic students are often in the minority, the judgements of their non-autistic peers are likely to be more prevalent and impactful to their academic experience.

Finally, it should be noted that the small sample size of 19 autistic university students in the target phase may limit the generalisability of the study's results. There are reasonable concerns about whether these students fully represent the diversity of the autistic student population in higher education. While the study reported the autistic students' relatively high grades on average, this provides a limited insight into the range of their academic performance and experiences. Some students in the sample might have excelled academically, while others might have struggled yet still managed to persist at university. Without more detailed information on the academic profiles and achievement levels of the autistic student sample, it is difficult to confidently generalise the findings to all autistic college students. The study likely did not adequately capture autistic students across the full spectrum of academic functioning, particularly those who might have already dropped out or faced barriers to attending university in the first place. Future research in this area should aim to recruit larger, more representative samples of autistic students that better reflect the diversity of their academic performance and experiences in higher education. This would provide a more robust basis for drawing conclusions about the barriers and support needs of autistic university students in general. However, for the perceiver phase, we had participants representing various

countries, ethnicities, ages and nationalities. This diversity indicates that discrimination against autistic individuals is a global issue, not restricted to any particular region or cultural group. Hence, it is crucial for educational establishments and policymakers to take the necessary steps to increase awareness about autism in universities.

## 6.8 Implications

### *6.8.1 Double Empathy Problem versus the Theory of Mind*

This project enhances the knowledge on the double empathy challenge faced by autistic students in higher education. It emphasises the importance of redirecting attention away from perceived deficits of autistic individuals towards promoting mutual understanding between autistic and non-autistic individuals. Our findings demonstrate unequivocal evidence of heightened unfavourable judgements regarding the academic achievement among autistic young adults beyond extensively documented social challenges. This underscores the complex interplay between social perceptions and academic appraisals, where negative autism-related social cues may inadvertently affect judgements of academic competence. These results align with the bidirectional DEP framework (Milton, 2012), which positions communication challenges between autistic and non-autistic persons as mutual, not solely stemming from autistic shortcomings. The anti-autistic student bias cannot be rationalised by the predominant ToM deficit explanation (Baron-Cohen et al., 1985). Thus, increasing awareness of these neurological differences and fostering a more open, thoughtful discussion focused on understanding behaviours before judgement rather than assumptions could help promote greater public appreciation and



acceptance of autism spectrum disorders. We all have more space to listen, learn and support those who experience the world differently than we do.

### *6.8.2 Further Education and Training*

Autistic students may face peer judgements' significant negative consequences for their university experience, including their academic success, involvement and enjoyment. Specially, some reports indicate that autistic individuals may encounter more social isolation, bullying, stigmatisation and loneliness compared to their non-autistic peers (Gelbar et al., 2014; Madriaga et al., 2010; VanBergeijk et al., 2008). Thus, facing additional judgement or stigma from peers can exacerbate these challenges and lead to anxiety, depression and lower self-esteem. In turn, these difficulties can directly harm their academic performance by decreasing their class participation, group work contributions and motivation.

These findings further highlight the importance of training and educational programmes aimed at enhancing knowledge about autism, which have resulted in positive outcomes regarding perceptions about and attitudes towards autistic individuals (Jones et al., 2021). Hence, educators can benefit from training to shift their perspectives and appreciate the unique strengths of autistic students. This can help them create an inclusive and comfortable learning environment for all students. Without proper training, educators may be unprepared to foster empathy and understanding for those with different neurotypes.

### *6.8.3 Universal Design for Learning*

The Universal Design for Learning (UDL) centres on recognising each student's unique talents and meeting all of them where they are. It rejects the assumption that

a single teaching approach can serve all learners. Instead, the UDL holds the following beliefs: Every student can reach high levels of achievement when provided with targeted support. Obstacles to achievement frequently originate from inflexible instruction rather than from individual deficiencies. Options customised to individuals' strengths lead to the best outcomes. Reflective habits empower students to gain mastery of the learning process. This framework places the onus on education systems to adapt to diverse learners, not the other way around. When students are embraced as they are and equipped with agency over their education, they can attain both personal and academic success (Butler, 2019).

Despite the negative perceptions among some peers and educators about the academic performance of autistic students, implementing initiatives aligned with UDL principles can help overcome obstacles by emphasising shared experiences and understanding. For example, implementing autism awareness training in the campus community can illuminate the strengths and challenges faced by individuals on the spectrum, fostering empathy and support. Creating structured opportunities for autistic and neurotypical students to work collaboratively, such as in group projects, allows peers to directly experience and appreciate one another's skills and contributions. Moreover, supporting student organisations that celebrate neurodiversity and advocate autism awareness promotes a sense of belonging and a collective voice, enhancing the overall campus culture.

It is essential to educate the staff about numerous methods for learners to achieve and present their learning outcomes. It is equally important to make them

aware that showcasing these outcomes in a unique manner does not compromise the quality of student learning.

## 6.9 Future Directions

As the evidence for the DEP in higher education continues to grow, it is vital to examine its impact on the lives of autistic adults in the academic setting. Specifically, we need to consider how it affects their relationships in the classroom and with their teacher and whether that leads them to drop out of the course or limits their access to tailored support. Additionally, it is important to explore the factors that influence how autistic students are perceived by their non-autistic peers and educators, including potential differences in the content and presentation of videos used in research.

One area of future research that could yield valuable insights involves the examination of the various sources of differences between the videos of autistic and non-autistic students. These differences may extend beyond the specific behaviours linked to autism and may include factors such as video quality, background settings, facial expressions, and even non-verbal cues like body language. By identifying and controlling for these variables, researchers can better isolate the true impact of autistic behaviours on judgments and reduce the influence of extraneous factors. To investigate the effect of these differences, future studies could adopt a more controlled experimental design. For example, researchers could standardize the videos by ensuring that all participants are recorded in similar settings with equivalent lighting, and camera angles. This would allow us to examine whether judgments of autistic students are genuinely due to their behaviours or are

influenced by unrelated factors like how their voice sounds or the environment they are filmed in.

Studying the experiences of autistic university students can uncover barriers to their inclusion and success. Additional research on topics such as social stigma, bullying, mental health issues and academic impacts could give higher educational institutions valuable insights. For example, surveying autistic students on how these factors affect their university life (their enjoyment, sense of belonging, class participation and grades) and future careers would quantify real challenges. Documenting these impacts helps colleges and universities recognise obstacles to equitable education for neurodiverse learners. It also informs effective support services and accommodations. Further investigations into the lived experiences of autistic students fuel progress towards more acceptance, inclusion and support.

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## Appendices

### Meta-Perceptions Questionnaire

**Q1. To what extent do you agree or disagree with each statement:**

		Strongly Agree	Agree	Somewhat Agree	Somewhat Disagree	Disagree	Strongly Disagree
1	I am successful in my academic life so far.						
2	I am motivated to study.						
3	I am happy at university.						
4	Other people view me as successful in my academic life so far.						
5	Other people view me as motivated to study.						
6	Other people view me as happy at university.						

**Q2. What was your average mark last semester?**

**Q3. What average mark do other students guess you have received last semester?**

**Q4. Describe a recent challenge that you experienced at university and how you dealt with it.**