Cross-cultural Differences in Autistic Traits and the Level of Psychological Distress

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Dedicated to all lives lost in the pursuit of freedom, equality, and the inherent value of every human life. “Woman, Life, Freedom”

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Abstract

This thesis explores the intricate relationship between autism, cultural influences, and mental health outcomes, with a focus on cross-cultural variations in the perception of autistic traits and well-being of parents raising autistic children. Autism is characterized by challenges in social interaction, communication, and repetitive behaviours, and its diagnosis relies on the interpretation of social behaviour, which is culturally influenced. Culture is shaping norms and beliefs about behaviours. Hence, the cultural lens potentially affects the interpretation of autistic traits, affecting diagnosis and support systems. The research aims to shed light on how different cultures perceive autistic traits, their understanding of autism, and the resulting impact on parental mental health. Four comprehensive studies are presented in this thesis, exploring cross-cultural disparities, investigating influential cultural factors, and understanding parental distress across different cultural contexts.

Study 1, in Chapter 2, examines distress and coping among university students. This study serves as the pilot study for study 4 in chapter 5. I conducted this study by using a more accessible sample with high levels of distress (i.e. university students) to explore the relationship between distress variables and coping strategies, and to improve the design of study 4 in chapter 5. Within this study, I investigated stress, anxiety, depression, coping strategies, and concerns, before and during the COVID-19 pandemic. The results indicate that students experience a higher level of depression during the pandemic, and they use coping strategies, such as self-distraction, self-blame, and humour more often than before the pandemic.

Study 2, in Chapter 3, investigates whether culture affects the interpretation and reporting of autistic traits and how autism knowledge is associated with these relations. To

do so, I investigate cross-cultural differences in self-reported autistic traits and the commonness of these traits in Iran, Malaysia, Morocco, and the Netherlands among non-autistic individuals. Additionally, I explored the relationship between (the commonness of) autistic traits and autism knowledge across these countries. The results indicate, consistent with previous studies, cross-cultural differences in both self-reported and commonness of autistic traits. Cross-cultural differences in reporting autistic traits show that cultural background might affect the interpretation of autistic traits.

The cross-cultural differences in reporting autistic traits lead to design and performing Study 3 in Chapter 4 in which I explored the relationship between cultural domains (masculinity, femininity, individualism, and collectivism) and self-reported autistic traits among students. The study uncovers that masculinity and femininity are negatively associated with self-reported autistic traits, whereas individualism is positively associated with self-reported autistic traits, highlighting how societal norms and cultural values may influence self-perception of autistic traits.

Study 4, in Chapter 5, focuses on parental distress, self-reported autistic traits, associative stigma, and coping strategies among parents of autistic children from Malaysia and the Netherlands. This study was informed by the results of my study on the relationship between distress and coping strategies among university students presented in Chapter 1. The research investigates the associations between these factors, considering both similarities and disparities between the two countries. The results illustrate models which demonstrate the unique dynamics of parental distress, coping strategies, and self-reported autistic traits within different cultural contexts.

Collectively, these studies contribute to a comprehensive understanding of the interplay between autism, culture, and mental health outcomes. The findings underscore the need for culturally sensitive diagnostic practices, tailored support systems, and inclusive attitudes toward autism globally. By unravelling the complexities of cultural influences on autism perception and parental well-being, this thesis offers valuable insights for researchers, practitioners, and policymakers striving for more holistic and culturally competent approaches in the field of autism studies.

Contents

Chapter 1: General introduction

Autism spectrum disorders, commonly referred to as autism, are characterized by persistent difficulties in social interaction, communication, and repetitive behaviours or interests (American Psychiatric Association, 2013). Previously, autism was erroneously associated with the upper class or considered a condition specific to modern civilization, mainly due to a lack of knowledge about autism (Daley, 2002). However, due to extensive research and increased awareness, our understanding of autism has significantly evolved over the past decades.

Numerous studies have highlighted the role of genetics in the development of autism (e.g. Pinto et al., 2010; Thapar & Rutter, 2021; Zhou et al., 2021). Nevertheless, the exact cause of autism remains unknown. The complexity and varied symptoms associated with autism make it difficult to attribute the disorder to a single factor. Autism likely arises from a combination of genetic and environmental influences (Bai et al., 2019).

Research has also explored the impact of environmental factors, such as parental conditions and air pollution on the development of autism (Brown et al., 2014; Krakowiak et al., 2012; Volk et al., 2014). These studies suggest that certain environmental factors may act as triggers for autism in individuals with a genetic predisposition. Consequently, autism can be considered a genetic disorder influenced by environmental factors.

Although there is a universal definition of autism, variations in environmental factors across different countries may contribute to varying rates of autism prevalence in each

respective nation. A consistent increase in autism prevalence has been reported in all countries (Chiarotti & Venerosi, 2020), whereas the prevalence varies across different countries For instance the prevalence of autism in different countries has been reported as; South Korea 26.6 per 1000 (Kim et al., 2011), Ecuador 1.1 per 1000 (Dekkers et al., 2015), UK 15.7 per 1000 (Baron-Cohen et al., 2009), Oman 0.14 per 1000 (Al-Farsi et al., 2011), Iran 0.62 per 1000 (Samadi et al., 2012), Japan 2.72 per 1000 (Honda et al., 2005), Mexico 8.7 per 1000 (Fombonne et al., 2016), and Bangladesh 0.76 per 1000 (Akhter et al., 2018). The observed differences in autism prevalence across countries can be influenced by various factors. These include economic situation, healthcare services (Ratto et al., 2016), methodological and sampling variances (Chiarotti & Venerosi, 2020), as well as disparities in the diagnostic process (Montiel-Nava et al., 2017). It is essential to examine the potential impact of cultural influences in this regard. An additional line of evidence supporting the influence of culture on autism is the observed cross-cultural variations in the duration between the recognition of autism symptoms and the actual diagnosis in different countries, which may be partly attributed to cultural differences (Montiel-Nava et al., 2017). For example, in Canada, the diagnosis of autism typically takes approximately 2 to 3 years (Siklos & Kerns, 2007). Similarly, in the United Kingdom, the diagnosis process takes an average of 3.5 years (Crane et al., 2015). Subsequently, this variation might be the reason for the mean age of autism diagnosis varying from 36 to 120 months in different countries (Daniel & Mandell, 2013). Therefore, culture and cultural factors may play a role in the prevalence and diagnosis of autism in different regions.

The diagnosis of autism is influenced by cultural interpretations and economic disparities, leading to differences in identifying autistic traits across countries (Adak & Halder, 2017). Cultural norms and perceptions of neurodiversity impact diagnostic practices, which

can result in underdiagnosis or overdiagnosis of autism (Williams et al., 2008). Economic factors also play a crucial role in the diagnosis of autism, affecting access to resources for diagnosis and intervention (Thomas et al., 2011). Countries with higher economic resources may have more comprehensive diagnostic services and better-funded special education programs, leading to increased awareness and recognition of autism (Adak & Halder, 2017). Conversely, in economically disadvantaged countries, limited resources may result in lower diagnostic rates and less accessible support systems (Adak & Halder, 2017).

Autism and culture

Culture is defined as "a fuzzy set of basic assumptions and values, orientations to life, beliefs, policies, procedures, and behavioural conventions that are shared by a group of people, and that influence (but do not determine) each member's behaviour and his/her interpretations of the 'meaning' of other people's behaviour" (Spencer-Oatey, 2012, p. 3). Moreover, culture plays a pivotal role in shaping various aspects of an individual's behaviour, development, and experiences of illness (Kirmayer, 2008; Lewis-Fernández, 1996). It defines social norms and determines whether certain behaviours are perceived as normal or deviant. As autism is considered a biological disorder characterized by common deficits, social impairments constitute a significant component of these symptoms. Consequently, cultural differences can greatly influence the perception and recognition of social impairments related to autism (Daley, 2002). The perception and recognition, in turn, can affect the presentation, interpretation, and diagnosis of autism symptoms, as well as intervention approaches (Liptak et al., 2008; Mandell et al., 2009). Although our knowledge of autism has improved, our

understanding of the cultural context surrounding autism remains relatively limited (Daley, 2002).

For instance, a cross-cultural study by Carruther et al. (2018) indicated a tendency to do things spontaneously is a highly predictive trait in UK, as the majority of autistic individuals prefer to not do things spontaneously. However, this trait did not exhibit the same level of predictiveness in India and Japan, where a smaller proportion of autistic individuals reported disliking spontaneity (Carruther et al., 2018). This cross-cultural variation in the significance of this particular trait may stem from differing levels of uncertainty avoidance across cultures, as highlighted by Carruther et al. (2018). This difference underscores how cultural values and norms play a crucial role in determining whether a trait is predictive and associated with autism within a specific cultural context.

The influence of culture extends to parents, children, and autistic individuals in various ways. Notably, in non-Western cultures, there is a tendency among parents to place greater emphasis on social and family bonds, thereby directing their attention towards social development and noticing social difficulties first (Daley, 2004). In contrast, parents in Western cultures often prioritize children's language development as a primary focus (Coonrod & Stone, 2004). These contrasting parental priorities regarding specific developmental impairments can introduce biases that affect the reporting of symptoms, potentially leading to variations in the perceived severity of symptoms across different cultures.

Another cultural variation can be observed in the interpretation of specific behaviours associated with autism. For example, the lack of eye contact is commonly considered a feature of autism in Western cultures, as it goes against cultural norms of direct eye contact. However, in some non-Western cultures, such as China, the absence of direct eye contact

may align with cultural norms and not be viewed as indicative of a problem (Norbury & Sparks, 2013).

These cultural differences in norms and expectations regarding behaviour and development can lead to variations in the recognition and interpretation of autism symptoms. They may influence how symptoms are reported, perceived, and assessed within different cultural contexts. Consequently, these cultural variations can influence the diagnosis and understanding of autism, highlighting the need for culturally sensitive approaches to assessment and intervention.

Autism and gender differences

In addition to cross-cultural variations in (the interpretation of) autism, there are also notable gender differences in the condition that may be influenced by cultural factors. Autism is more frequently diagnosed in boys than in girls, with studies reporting varying male-to-female diagnosis ratios. These ratios range from 8:1 (Icasiano et al., 2004) to 3:1 (Loomes et al, 2017), highlighting the consistent observation of a higher prevalence among males while acknowledging the potential range of variations in different studies. Although specific ratios vary, all studies consistently indicate a higher rate of autism diagnoses in males than in females. Additionally, it has been observed that autistic females tend to receive their diagnosis later than autistic males (Begeer et al., 2013; Shattuck et al., 2009). These disparities in autism diagnosis may be influenced by gender-specific traits and social expectations.

In the past two decades, researchers have explored gender differences in autism through theories like the extreme male brain theory (EMB; Baron-Cohen, 2002) and the

phenomenon of camouflaging (Bargiela et al., 2016; Lai et al., 2015). Although the extreme male brain theory emphasizes cognitive patterns within autism, camouflaging highlights the challenges in diagnosing autism in females who conceal their autistic traits.

The EMB theory is an extension of the empathizing-systemizing (E-S) theory, also proposed by Baron-Cohen (2002). The E-S theory suggests that psychological gender differences can be explained in terms of empathizing (E) and systemizing (S) traits. Based on their levels of E and S, individuals can be categorized into five types: Balanced (B), Emphasized (E), Systemized (S), Extreme E, and Extreme S. According to Baron-Cohen (2002), men are predominantly Type S, whereas women are predominantly Type E. The EMB theory further suggests that individuals with autism exhibit impairments in empathizing but possess superior systemizing abilities, placing them in the Extreme S category (or extreme male brain). However, the EMB theory does not imply a direct influence of gender on the aetiology of autism (Ridley, 2019). Rather, it highlights the cognitive and behavioural patterns observed within autism.

Another theory that aims to explain the gender differences in autism diagnoses is the concept of "camouflaging". Camouflaging refers to the practice of suppressing, hiding, or controlling autistic traits that are perceived as deviant according to societal norms (Hull et al., 2017). It has been proposed that autistic females are more proficient or inclined to mask their autistic behaviours through camouflaging (Bargiela et al., 2016; Lai et al., 2015). This masking behaviour can pose challenges in diagnosing autism (Bargiela et al., 2016; Hull et al., 2017; Rynkiewicz et al., 2016). Research indicates that autistic females often report successfully employing strategies to mask or camouflage their autistic traits, such as learning appropriate phrases for social occasions or making efforts to maintain eye contact during conversations

(Milner et al., 2019). Furthermore, autistic females tend to engage in camouflaging to a greater extent than males (Schuck et al., 2019), possibly due to cultural pressures (Kreisser & White, 2014). As a result, autistic females who exhibit more noticeable autistic traits may receive a diagnosis, whereas those who effectively camouflage their behaviours might go undiagnosed.

Therefore, a potential explanation for the gender differences in autism diagnosis is that autistic females often demonstrate higher social communication skills (Conlon et al., 2019; Kauschke et al., 2016; Parish-Morris et al., 2017) or possess a greater ability to mask or camouflage autistic traits (Bargiela et al., 2016; Lai et al., 2015). Additionally, according to Hofstede's (1980) cultural dimensions theory, the level of masculinity and femininity may vary across cultures, influencing diverse aspects of societal norms, behaviours, and organizational practices. For example, in cultures characterized by high masculinity, such as Japan, there tends to be an emphasis on assertiveness, competition, and material success, while in cultures with higher femininity, such as Sweden, values of cooperation, empathy, and quality of life may take precedence. These significant gender disparities raise questions about the potential impact of masculinity and femininity on the expression and reporting of autistic traits, potentially contributing to under-diagnosis or misdiagnosis in certain populations. Cultural factors, including social and cultural expectations related to gender, may play a significant role in understanding these gender differences in autism (Thompson et al., 2003).

Conducting cross-cultural studies is crucial for gaining a comprehensive understanding of how culture and cultural-related factors' influence the perception of autistic behaviours and autism symptoms and the diagnosis. Such studies can provide valuable insights into the cultural variations in the recognition and interpretation of autism symptoms. By examining

diverse cultural contexts, researchers can identify how cultural norms, expectations, and practices influence the presentation and assessment of autism. This knowledge can facilitate the development of culturally sensitive diagnostic tools and intervention strategies that account for the unique needs and perspectives of autistic individuals from different cultural backgrounds.

Autism, parental distress, and coping

In addition to the potential impact of culture and culture-related factors on the perception of autistic traits and diagnosis, culture can also exert its influence on autistic individuals and their families following diagnosis. The experience of parenting autistic children can profoundly impact the mental health and overall well-being of parents. Notably, parents of autistic children often contend with significantly elevated levels of stress, surpassing those faced by parents of children with other developmental conditions (Chen et al., 2020; Dabrowska & Pisula, 2010; Estes et al., 2013) as well as parents of non-autistic children (Dabrowska & Pisula, 2010; DesChamps et al., 2020; Estes et al., 2013).

Furthermore, a consistent body of research underscores that parents of autistic children frequently grapple with heightened levels of anxiety and depression (Al-Farsi et al., 2016; Bitsika & Sharpley, 2004; Lai et al., 2015). These compelling findings underscore the imperative to delve into the various influential factors contributing to the pronounced occurrences of stress, anxiety, and depression among parents in the context of raising autistic children.

The mental health and well-being of parents raising autistic children are influenced by a complex interplay of factors. Alongside well-documented contributors like the child's behavioural challenges (Bishop et al., 2007; Miranda et al., 2019; Tsermentseli & Kouklari, 2021), inadequate professional support, and societal attitudes toward autism (Pisula, 2011), other variables hold potential significance. Notably, factors, such as the extent of parents' own autistic traits, the presence of associative stigma, and the array of coping strategies employed by parents, are poised to exert considerable influence on their mental health. These additional factors add layers of intricacy to the already multifaceted landscape of parenting autistic children.

The extent to which parents themselves exhibit autistic traits may influence the level of their psychological well-being. The Broader Autism Phenotype (BAP), encompassing sub-diagnostic autistic traits more common in families of autistic individuals, elucidates why parents of autistic children report more of these traits than parents of non-autistic children (Bishop et al., 2004; Bora et al., 2017; Rubenstein & Chawla, 2018; Shi et al., 2015; Wheelwright et al., 2010). The association between parents' psychological well-being and their own autistic traits (Duvekot et al., 2016) underscores this potential impact. Elevated rates of autistic traits in these parents, coupled with cognitive parallels with their children, may contribute to comparatively less effective coping skills (Briskman et al., 2001; Zablotsky et al., 2013). This contribution highlights the increased likelihood of encountering coping challenges due to a higher prevalence of autistic traits, including aloof and rigid personality traits, pragmatic language difficulties, and elevated social challenges (Hurley et al., 2007; Murphy et al., 2000) among parents of autistic children compared to those raising typically developing children (Lee, 2009).

Moreover, the pervasive influence of associative stigma—parents' perception of negative societal attitudes towards autism and their child—can significantly exacerbate parental distress and emotional turmoil. Parents of autistic children frequently confront societal reactions to their child's behaviour that jeopardize their psychological well-being. This perception exposes parents to challenging situations, fuelled by autism-related stigma being a predictor of parental mental health issues (Farrugia, 2009; Papadopoulos, 2021). Misconstruing these behaviours as indicators of inadequate parenting may lead to shame, stigmatization, and exclusion from social circles (Farrugia, 2009). As a result, parents may face isolation to evade stigma (Papadopoulos, 2021), leaving them bereft of familial and friend support during childcare. Hence, the extent of associative stigmatization may potentially influences parents' psychological well-being.

Coping strategies, serving as adaptive tools for navigating challenges, play an indispensable role. Using varied coping strategies can distinctly affect parents' psychological well-being, encompassing cognitive and behavioural efforts to manage overwhelming challenges (Lazarus & Folkman, 1984). Effective coping skills are pivotal for successful parental adaptation to autism diagnosis and reducing distress (Zablotsky et al., 2013), with research consistently showing a strong correlation between coping strategies and distress levels (Hastings & Johnson, 2001). The choice between problem-focused and emotion-focused coping strategies, as well as their effectiveness in managing stressors, can greatly influence the mental health outcomes of parents. Research indicates problem-focused coping enhances psychological well-being for parents of autistic children, whereas emotion-focused strategies may adversely affect mental health (Benson, 2010; Cappe et al., 2011; Taylor & Stanton, 2007). Therefore, the selection and efficacy of coping strategies wield a profound impact on parents' psychological well-being, guiding their response to the challenges posed by raising

autistic children and influencing their ability to adapt to an autism diagnosis. Effective coping skills serve as a crucial tool in mitigating distress and fostering parental resilience, with a distinct interplay between different coping strategies shaping mental health outcomes.

Furthermore, parents of autistic children encounter varying degrees of associative stigma and discrimination across countries, influenced by disparities in awareness about autism and support systems. These differences in associative stigma levels are attributed to varying levels of awareness across countries, with implications for rates of parental distress (Ha et al., 2014; Ilias et al., 2018; Ilias et al., 2017; Neik et al., 2014; Sun & Allison, 2010). Notably, the variation in prevalence of autism diagnoses and cultural coping norms further contributes to potential cross-cultural differences in parental distress, warranting investigation (Neik et al., 2014; Roelfsema et al., 2012). Empirical research highlights higher self-reported autistic traits in non-Western countries compared to Western countries (Carruthers et al., 2018; Freeth et al., 2013), underscoring the need to explore potential associations between parental distress and autistic traits among parents of autistic children across different countries. Moreover, distinct coping strategy preferences exist between Western and non-Western parents of autistic children (Lin et al., 2008; Luong et al., 2009; Mak & Ho, 2007; McCabe, 2008; Twoy et al., 2007), suggesting the importance of directly comparing coping strategies across different countries to illuminate cross-cultural similarities and differences in this domain, offering insights into culture-specific behaviours. Hence, the varying degrees of associative stigma and discrimination faced by parents of autistic children across countries, influenced by differences in awareness and support systems, alongside variation in prevalence of autism diagnoses and cultural coping norms, underscore the need for investigating potential cross-cultural differences in parental distress and coping strategies,

while considering the associations with self-reported autistic traits, thereby shedding light on culture-specific behaviours.

The current thesis

This thesis consists of four comprehensive studies that examine cross-cultural differences in the interpretation of autistic traits and autism knowledge (Chapter 3), the association of cultural factors, such as masculinity, femininity, individualism, and collectivism, with the perception of autistic traits (Chapter 4), and the relationship between parental distress and influential factors, considering potential cross-cultural distinctions in the mental well-being of parents with autistic children and their coping mechanisms (Chapter 5).The first study (Chapter 2) was a pilot study for Chapter 5, which aimed to investigate the association between coping strategies, concerns, religious orientation, and distress among university students, and to apply the findings to parents of autistic children. A brief description of the studies is provided below. The main overarching research questions of this thesis are: How valid are autistic traits across cultures? And, how are autistic traits, parental distress, and coping strategies related?

Chapter 2

Study 1 in Chapter 2 serves as the pilot study for Study 4 in Chapter 5. In study 4 I aimed to investigate the relationship between distress and coping strategies among parents of autistic traits. I needed to conduct a pilot study to test the design and analysis plan for Study 4. However, I could not use parents of autistic children as sample for a pilot study due

to difficulties in recruiting this group (I only could recruit parents for study 4). Hence, in study 1, as the pilot study for study 4, I recruited university students to gain a foundational understanding of these dynamics before delving into a more specific investigation involving parents of autistic children. Chapter 2 aimed to investigate the relationship between distress, coping strategies, and concerns among university students. Psychological distress, encompassing stress, anxiety, and depression, is a common issue among students, driven by various factors such as financial concerns, academic pressures, post-graduate plans, and low self-esteem. These factors can significantly affect students' psychological well-being, academic performance, and overall quality of life. However, recognizing the unique circumstances introduced by the COVID-19 pandemic, which began in 2020, I expanded the study's scope. To capture the influence of the pandemic, a second wave of data collection was conducted to compare these factors (coping, stress) before and during the pandemic. This expansion provided an opportunity to assess how the sudden changes brought about by the pandemic affected students' concerns, coping strategies, distress levels, and even their sleeping patterns. In summary, Chapter 2 focused on examining psychological distress among university students, exploring the factors contributing to distress, the coping mechanisms employed, and how the COVID-19 pandemic influenced these aspects. This groundwork laid the foundation for the subsequent investigation into the same relationships among parents of autistic children.

Chapter 3

The second study (Chapter 3) investigated cross-cultural differences in the perception of autistic traits and autism knowledge in four countries (Iran, Malaysia, Morocco, and the

Netherlands). The diagnosis of autism relies partly on the judgment of social behaviour (Harrison et al., 2017). What is perceived as normal or deviant (social) behaviour is influenced by culture, as it shapes norms and beliefs about behaviour. Culture might hence influence the interpretation of autistic symptoms and the diagnostic process. In this chapter, I explored whether countries differ in self-reported autistic traits (SAT), the commonness of autistic-like behaviour (CAB), and the level of autism knowledge. To do so, I conducted this study in Iran, Malaysia, Morocco, and the Netherlands, where I recruited non-autistic adult participants.

Chapter 4

Within the third study (Chapter 4), I aimed to address the influence of cultural factors (masculinity, femininity, individualism, and collectivism) on self-reporting autistic traits. Autism has been diagnosed more frequently in boys than in girls, with various studies reporting different male-to-female ratios. Also, autistic females tend to receive the diagnosis later than autistic males. Gender-specific traits and social expectations may contribute to these gender differences in autism. The gender disparities raise questions about the potential influence of culture and society on the manifestation and reporting of autistic traits, which could contribute to under-diagnosis or misdiagnosis in certain populations. Cultural dimensions, such as individualism, collectivism, masculinity, and femininity, may play a role in understanding these differences. This study aimed to investigate the relationship between cultural dimensions (masculinity, femininity, individualism, and collectivism) and self-reported autistic traits among students.

Chapter 5

Finally, in the fourth study (Chapter 5), I aimed to explore the interplay between parental distress, self-reported autistic traits, associative stigma, and coping strategies in parents of autistic children. The hypotheses propose positive associations between parental distress, autistic traits, and stigma, along with varying effects of coping strategies on distress. The research employs a diverse sample from Malaysia and the Netherlands, acknowledging potential disparities in parental distress, autistic traits, and associative stigma. The study's approach goes beyond viewing country as the sole explanatory factor, considering mediation by associative stigma, autistic traits, and coping strategies. It aims to provide a comprehensive perspective by exploring variations in parental distress, autistic traits, associative stigma, coping, first noticed behaviours, and parenting challenges between the two countries, ultimately aiming to unravel the complex dynamics of parental distress in autism across different cultural contexts.

In conclusion, this thesis aims to contribute to our understanding of cross-cultural variations in the perception of autistic traits, autism knowledge, and the mental health outcomes of parents of autistic children. The findings of this research have important implications for improving diagnostic practices, tailoring support systems to specific cultural contexts, and promoting inclusive attitudes toward autism worldwide.

Chapter 2: University students' psychological distress and coping strategies before and during the COVID-19 pandemic

Most university students are young adults, and considerable changes during this developmental stage make students a vulnerable group, with a high prevalence of stress-related disorders (Ribeiro et al., 2018). University students' psychological well-being is not only threatened by daily life factors, such as financial and family-related concerns, but also by factors related to their academic life, such as the education program they are attending, adjusting to the academic environment, and academic expectations (Ibrahim et al., 2013). Additionally, university students invest time and financial resources in higher education without guarantees of a satisfactory return (Adlaf et al., 2001), which might lead to high levels of psychological distress and a poor quality of life. Moreover, the challenges faced by a recent cohort of university students were further exacerbated by the unprecedented COVID-19 pandemic, introducing additional stressors like social isolation and health concerns, along with the abrupt shift from face-to-face to online learning (Adedoyin & Soykan 2023). Consequently, students struggle to cope with the high level of distress (Cleary et al., 2011) and attempt to decrease the negative effects of high psychological distress by using various coping strategies. Therefore, the current study aimed to assess psychological distress, concerns, coping strategies, and their relationships among university students before and during the COVID-19 pandemic.

Psychological distress

Stress, anxiety, and depression are the most prevalent psychological problems of students (Ibrahim et al., 2013; Sharp & Theiler, 2018). Academic pressures, such as assignments and deadlines, assessments, and grades, significantly increase students' stress and anxiety (Crocker & Luhtanen, 2003; Mackenzie et al., 2011). Additionally, higher rates of depression have been reported among students compared to the general population (Blanco et al., 2008; Ibrahim et al., 2013; Mikolajczyk et al., 2008; Rotenstein et al., 2016), as expressed by symptoms, such as feeling hopeless and sad, being nervous and anxious, loss of interest, and suicidal thoughts (Tomoda et al., 2000). Starting an academic course is a stressful experience for many students, which may significantly increase the levels of depression (Fisher & Hood, 1987) and anxiety (Andrews & Wilding, 2004; Cooke et al., 2006). Although learning is students' main aim of studying, the high rate of psychological distress negatively affects their academic performance and learning process (Andrews & Wilding, 2004; Eisenberg et al., 2009; Heiligenstein et al., 1996). These high levels of psychological distress make university students a vulnerable group.

Students' concerns

Various factors contribute to students' psychological distress, forming a complex interplay of relationships. These factors can be broadly categorized into socio-demographic, academic-related, and personality factors (Sharp & Theiler, 2018). Socio-demographic factors encompass elements such as financial challenges (Larcombe et al., 2016), family dynamics (Adewuya et al., 2006; Omigbodun et al., 2006), and living arrangements, which can exert negative impacts on students' mental health. Academic-related factors, including demands of specific courses (Larcombe et al., 2016), coping with academic requirements (Soet & Seving,

2006), and navigating the pressure of performance evaluations, as well as post-graduation planning (Beiter et al., 2015), play a significant role in shaping students' psychological well-being. Personality factors, like self-confidence, self-esteem (Byrd & McKinney, 2012), and optimism (McDermott et al., 2015; Pritchard et al., 2007), further contribute to the level of psychological distress experienced by students. It is important to note that the influence of these factors can evolve over time. For instance, university students in the USA reported relationship issues as the most common concern before 1994, whereas later, problems related to stress and anxiety were reported as the most common concerns (Benton et al., 2003). Importantly, in addition to these established factors, the emergence of the COVID-19 pandemic has introduced an additional layer of adversity, compounding students' psychological distress.

Psychological distress and concerns during the COVID-19 pandemic

The outbreak of the COVID-19 pandemic has significantly affected human lives across the globe, with a negative influence on almost everyone’s physical and psychological health. The pandemic led governments around the world to announce lockdowns and movement limitations to prevent further global infections and fatalities. In Malaysia, a movement control order (MCO) was announced in March 2020 to control the rapid spread of COVID-19 across the country. The MCO included measures, such as social distancing, in-home isolation, country lockdown, temporary closure of businesses, and closure of all schools and universities.

The COVID-19 pandemic highly affected young adults, specifically university students (Kaparounaki et al., 2020). Students’ lives changed in a short period, and they faced new challenges, such as new regulations, social distancing restrictions, long-term isolation, and

moving from face-to-face to online learning. These new challenges dramatically affected students' social behaviours, life, and mental health (Sahu, 2020).

Although health was the main concern during this global pandemic, students' mental health was not considered a priority (Sun et al., 2021). However, increased levels of stress (Al Omari et al., 2020; Badri & Yunus, 2021; Rudenstine et al., 2020; Sahile et al., 2020; Sun et al., 2021), anxiety (Buckner et al., 2021; Elmer et al., 2020; Islam et al., 2020; Li et al., 2021; Patsali et al., 2020; Wang et al., 2020; Woon et al., 2021), depression (Chen et al., 2020; Debowska et al., 2020), and self-harm and suicidal thoughts (Essadek & Rabeyron, 2020; Wang et al., 2020) have been reported among university students around the world.

The pandemic hence came with new factors that influenced students' psychological distress, including prolonged unemployment and financial insecurities (Islam et al., 2020; Sahile et al., 2020; Son et al., 2020), academic delays due to the closure of universities that provide technical support (Rehman et al., 2020), and elevated concerns about academic performance as students struggled to concentrate when studying alone at home (Chen et al., 2020; Kecojevic et al., 2020). Moreover, there were changes in the learning environments, as students needed to adjust to online learning (Rehman et al., 2020). Additionally, students might have experienced exposure to patients, friends, or family infected with COVID-19 (Badri & Yunus, 2021; Nakhostin-Ansari et al., 2020; Rudenstine et al., 2020). Finally, this pandemic caused irregularities in daily life, such as a reduction in physical activities because sports facilities and equipment were restricted during the pandemic (Chen et al., 2020), and poor sleep quality (Chen et al., 2020; Hamaideh et al., 2021; Ingram et al., 2020). Facing these new challenges can explain the rise of stress, anxiety, and depression among students during the pandemic.

Coping strategies

Coping is defined as an individual's attempt to change the environment or try to change the meaning of the events when they are facing difficulties (Lazarus & Folkman, 1984). Coping strategies have been categorized into two main groups, problem-focused (e.g., planning) and emotion-focused (e.g., distraction). Problem-focused coping strategies are generally considered adaptive coping strategies (Folkman & Lazarus, 1985). Individuals engage in more problem-focused coping when they believe stressors are controllable, whereas they use more emotion-focused coping when they feel powerless against stressors (Folkman & Lazarus, 1980). The effectiveness of a coping strategy also depends on the type of stressful situation; using a problem-focused coping strategy is more effective if the situation is changeable and the individual can control the situation. On the other hand, using an emotion-focused strategy is more effective if it is not possible to control or change the situation (Compas et al., 1988). Using a less effective type of coping strategy for a stressful situation can increase the level of distress (Vitaliano et al., 1990). However, the categorisation of coping strategies into problem- or emotion-focused depends on the situation and an individual's reaction to that situation. For instance, avoidance can be categorized as both problem- and emotion-focused. Avoidance by engaging in an alternative task to be distracted from a problem can be considered problem-focused coping, whereas it can be emotional-focused coping when individuals choose to spend time with others (social diversion) to be distracted from stressful situations (Endler & Parker, 1990).

Categorizing coping strategies as problem- or emotion-focused emphasizes the perception of control over stressors, which might change according to the situation. Therefore, it is not possible to universally categorize coping strategies as emotion- or problem-focused. In this study, I focused on the effectiveness of coping strategies rather than

emotion/problem focus, and I categorize coping strategies as effective or ineffective coping strategies. Effective coping strategies are defined as strategies that decrease the level of distress, whereas ineffective coping strategies result in no change or an increase in the level of distress.

Amid the COVID-19 pandemic, university students have exhibited a diverse array of coping strategies. Approaches such as reframing, maintaining a daily routine, problem-solving, and positive re-evaluation have proven effective, facilitating a reduction in distress (Padrón et al., 2021; Patias et al., 2021). Conversely, coping mechanisms involving disengagement (Padrón et al., 2021), escapism, and acceptance have shown inefficacy, failing to alleviate students' distress (Patias et al., 2021).

Religious beliefs

Religion and religious beliefs might affect students' mental health and coping, although their effects on mental health are often ignored by clinicians and mental health professionals (Dein 2018; Rosmarin et al., 2009), which might be due to inconsistent findings on the relationship between religious beliefs and psychological distress. While some studies have highlighted the beneficial impact of students' religious beliefs on aspects such as mental well-being, academic achievement, and overall life contentment (e.g. Amrai et al., 2011; Astin & Astin, 2010; Steffen et al., 2016), there remains a degree of uncertainty regarding the possibility that students' engagement in religious beliefs and activities could potentially elevate their levels of psychological distress (Winterowd et al., 2005).

It seems that religious coping can have both positive and negative effects on students' mental health. For instance, using positive religious coping strategies, such as seeking God's love and care, partnering with God in times of distress to find strength and relief, religious

forgiveness, and benevolent religious appraisals, improve mental health (Pargament et al., 2011; Tarakeshwar et al., 2005). In contrast, engaging in negative religious coping strategies, such as doubting God's love, reappraisals of God's powers, and feeling abandoned by God, increases distress (Dein 2018; Pargament et al., 2011; Tarakeshwar et al., 2005).

The inconsistency in the relationship between students' religiosity and mental health might (partly) result from religious orientation. Allport and Ross (1967) developed the Religious Orientation Scale (ROS) to explain the relationship between individuals and their religiosity. The ROS contains two pillars of religiosity, extrinsic and intrinsic, which are considered orthogonal factors. Individuals with high extrinsic orientation are extrinsically using their religion for their own good. These individuals perceive religion as a way to provide security, status, and sociability. Individuals with high intrinsic orientation, on the other hand, find their master motive in religion. These individuals internalize religion and follow it fully, and they are intrinsically motivated to live their religion. A high level in one religious orientation does not necessarily mean a low level in the other religious orientation. The two pillars can complement each other.

Sleep

Additionally, sleeping hours and quality might influence students' psychological distress. Many students have a poor quality of sleep and report difficulties, such as trouble falling asleep at night, waking up during the night, or waking up too early in the morning (Buboltz et al., 2001; Taylor et al., 2011). This poor sleep quality negatively affects students' mental health (Ahrberg et al., 2012; Taylor et al., 2013). Additionally, poor sleep is associated with a higher rate of suicide or self-harm among students (Russell et al., 2019).

Eighty percent of the students reported changes in their sleeping habits during the COVID-19 pandemic (Wang et al., 2020). The changes in sleeping habits among students are concerning because these changes correlated with depression (Acharya et al., 2018). Although sleeping hours increased during the pandemic, the quality of sleep did not improve (Casagrande et al., 2020). Hence, as sleeping hours may potentially linked with students' distress, in this study I investigated the relationship between sleeping hours and students' psychological distress.

The current study

Within the current study, the aim was to compare the levels of stress, anxiety, and depression, concerns, use of coping strategies, and sleeping hours between two groups of students before and during the pandemic. I expected that the level of stress, anxiety, and depression would be higher among the group of students during the pandemic. The short form of the Depression, Anxiety, and Stress Scale (DASS-21, Lovibond & Lovibond, 1995) measured stress, anxiety, and depression among university students. Additionally, I believed that coping strategies, concerns, religious orientation, and sleeping hours might associate with stress, anxiety, and depression. To investigate the relationships among these variables in the two groups of students before and during the pandemic, I used Structural Equation Modelling (SEM). Moreover, in this study, I interpreted coping strategies that reduced the level of distress (stress, anxiety, and depression) as effective coping strategies and coping strategies that increased distress variables or that did not affect those distress variables as ineffective coping strategies.

Method

Participants

Four-hundred seventy-two students at the University of Nottingham Malaysia participated in the study in two phases. In Phase 1, 333 participants were recruited between June 2019 and October 2019. Incomplete responses (*N* = 36) were excluded, and 297 participants completed the survey (see Table 2.1). Their age ranged from 18 to 36 years (*M* = 20.91, *SD* = 2.65). Initially, this study was designed to only use Phase 1's sample to evaluate the relationship between distress, coping, and religion among university students. The outbreak of the COVID-19 pandemic gave me the unique opportunity to collect data during the pandemic and lockdown, hence I decided to broaden the scope of the project and additionally study the effects of the COVID-19 pandemic on the relationship between distress, coping, and religion. In Phase 2, I recruited another 139 participants between May 2020 and August 2020. Incomplete responses were excluded (*N* = 36), and 103 participants completed the survey (see Table 2.1). Their age ranged from 18 to 44 years (*M* = 21.44, *SD* = 4.32). The data was collected anonymously in both phases; therefore, it is not possible to track whether any participant participated in both phases.

Table 2.1

Participants' demographic information

	Gender		Nationality		Level of Education	
	Female	Male	Malaysian	International	Undergraduate	Postgraduate
Phase 1	194 (65.3%)	103 (34.7%)	240 (80.8%)	57 (19.2%)	256 (86.5%)	41 (13.5%)
Phase 2	81 (78.6%)	22 (21.4%)	59 (57.3%)	44 (42.7%)	86 (83.5%)	17 (16.5%)

Materials

The short form of the Depression, Anxiety, and Stress Scale (DASS-21, Lovibond & Lovibond, 1995) is a standardized measurement of stress, anxiety, and depression. The DASS-21 (Appendix A) contains 21 items, with 7 items measuring each psychological variable. Items are rated on a four-pointed Likert scale (0 = "Did not apply to me" to 3 = "Applied to me very much or most of the time"). The final scores for each variable on the DASS-21 are calculated by multiplying the raw scores by 2, as recommended by the developers. The earliest version of the DASS has 42 items, and by multiplying the scores with two, it is easier to interpret the scores across the two versions. Hence, stress, anxiety, and depression scores ranged from 0 to 42. Scores up to 14, 7, and 9 fall within the normal range for stress, anxiety, and depression, respectively. Mild levels are indicated by scores between 15-18, 8-9, and 10-13 for stress, anxiety, and depression, respectively. Scores in the range of 19-25, 10-14, and 14-20 are categorized as moderate for stress, anxiety, and depression, respectively. Severe levels are denoted by scores between 26-33, 15-19, and 21-27 for stress, anxiety, and depression. Extremely severe levels are represented by scores higher than 34, 20, and 28 for stress, anxiety, and depression, respectively (Lovibond & Lovibond, 1995). The DASS-21 has good to excellent psychometric reliability (Cronbach's α for the depression scale, anxiety scale, stress scale, and total scale are respectively .88, .82, .90, and .93; Henry & Crawford, 2005).

Students' concerns were measured by a list of factors (Appendix B), which were reported by Beiter et al. (2015) as the most important concerns of students. This list contains 10 items; (1) academic performance, (2) pressure to succeed, (3) post-graduation plans, (4) financial concerns, (5) quality of sleep, (6) relationship with friends, (7) relationship with family, (8) overall health, (9) body image, and (10) self-esteem. Participants' responses ranged from 1 = "not concerned at all" to 5 = "extremely concerned" on each factor.

To investigate coping strategies, I used the Brief COPE (Carver, 1997; Appendix C). The Brief COPE is a self-report questionnaire, containing 28 items, with two items measuring each coping strategy; (1) self-distraction, (2) active coping, (3) denial, (4) substance use, (5) use of emotional support, (6) use of instrumental support, (7) behavioural disengagement, (8) venting, (9) positive reframing, (10) planning, (11) humour, (12) acceptance, (13) religion, and (14) self-blame. Items were rated on a four-point rating scale, ranging from 1 = ‘‘I haven’t been doing this at all’’ to 4 = ‘‘I’ve been doing this a lot’’. The internal reliability of the Brief COPE is good (Cronbach’s α ranged from .88 to .81; Carver, 1997).

Students’ religious orientation was measured with the Age Universal I-E Scale (Gorsuch & Venable, 1983; Appendix D). This questionnaire contains 20 items and measures the level of extrinsic and intrinsic religious orientation. Some examples of extrinsic religiosity items are “I enjoy reading about my religion”, “I pray mainly to gain relief and protection”, whereas “My whole approach to life is based on my religion” and “I pray mainly to gain relief and protection” are examples of intrinsic religiosity items. Items were rated on a five-point rating scale ranging from 1 = ‘‘I strongly disagree’’ to 5 = ‘‘I strongly agree’’ except for one item, “I would prefer to go to church/mosque/temple”, which was rated from 1 = “A few times a year or less” to 5 = “More than once a week”. I modified the questionnaire’s items to be used for other religions than Christianity (e.g., “I would prefer to go to church” was changed to “I would prefer to go to church/mosque/temple”).

Procedure

The data was collected online and anonymously through Qualtrics in both phases. The study (both phases) received ethical approval from the Science and Engineering Research

Ethics Committee of the University of Nottingham Malaysia (OF250319). This survey was distributed through social media and the university recruitment email.

After providing informed consent, participants responded to demographic questions, such as age, gender, major of study, and religion, and they reported their hours of sleep per day. After providing demographic information, the participants completed the DASS-21, rated their concerns, and completed the Brief COPE. Finally, they replied to the "Age Universal" I-E Scale. At the end of the survey, they were thanked for their contribution and explained the purpose of the study. Completing this survey took, on average, 15 to 20 minutes.

Results

Data assumptions

I used SPSS 28 and AMOS 28 for data analysis. In Phase 1, 43.1%, 72.1%, and 59.9% of the participants scored higher than the normal range (mild, moderate, severe, extremely severe) in stress, anxiety, and depression, respectively, whereas in Phase 2, 60.2%, 66%, and 70.9% of the participants scored higher than the normal range (mild, moderate, severe, extremely severe) in stress, anxiety, and depression, respectively. The normality of the stress, anxiety, depression, religiosity orientations, and sleep hours in both phases were tested with Shapiro-Wilk. Shapiro-Wilk tests indicated significant deviance from normality in stress ($W(297) = .97$, $p < .001$), anxiety ($W(297) = .96$, $p < .001$), depression ($W(297) = .94$, $p < .001$), intrinsic religiosity ($W(297) = .97$, $p < .001$), and sleep hours ($W(297) = .92$, $p < .001$) in Phase 1; whereas extrinsic religiosity ($W(297) = .99$, $p = .012$) was normally distributed. Moreover, there was a significant deviance from normality in anxiety ($W(103) = .93$, $p < .001$), extrinsic religiosity ($W(103) = .95$, $p = .001$), and sleep hours ($W(103) = .95$, $p < .001$) in Phase 2,

whereas depression ($W(296) = .97$, $p = .01$), stress ($W(103) = .98$, $p = .10$), and intrinsic religiosity ($W(103) = .97$, $p = .01$) were normally distributed. I, therefore, decided to use non-parametric data analyses.

Exploratory Factor Analyses

Exploratory factor analyses (EFA) were conducted on the total sample ($N = 400$) to evaluate factors among concerns and among coping strategies. This approach reduced the number of variables and allowed me to compare concerns and coping factors between the two phases.

Concern factors were analysed using EFA with Varimax (orthogonal) rotation (see Table 2.2 and Table 2.3). Two factors were chosen based on Eigenvalues greater than 1. Factor 1 was labelled "Personal Concerns" due to the high loadings of the items: quality of sleep, relationship with friends, relationship with family, overall health, body image, and self-esteem. The second factor was labelled "Academic Concerns", because of the high loadings of the items: academic performance, pressure to succeed, post-graduation plans, and financial concerns.

Table 2.2

Factor loading and Communalities for Varimax Rotated Two-Factor for 10 Students' Concerns (N = 400)

	Factor loading		
	1. Personal Concerns	2. Academic Concerns	Communality
Quality of sleep	**.69**	.11	.49
Relationship with friends	**.75**	.20	.60

Relationship with family	**.74**	.16	.58
Overall health	**.80**	.06	.65
Body image	**.56**	.30	.40
Self-esteem	**.58**	.47	.55
Academic performance	.08	**.74**	.55
Pressure to success	.17	**.77**	.62
Post-graduation plans	.12	**.71**	.51
Financial concerns	.30	**.59**	.43

Table 2.3

Eigenvalues, Percentage of Variance, and Cumulative Percentage for Factors for Students' concerns

Factor	Eigenvalue	% of variance	Cumulative %
1. Personal concerns	4.01	40.07%	40.07%
2. Academic concerns	1.37	13.72%	53.79%

Performing an EFA to group coping strategies yielded four factors (Tables 2.4 and 2.5). Four factors were a good fit because they explained most of the variability (58.07%). Factor 1 was labelled "Active Engagement" and included the following items: active coping, positive reframing, planning, and acceptance. The second factor was labelled "Seeking Support", and included the following items: use emotional support, venting, use instrumental support, and religious coping. Factor 3 was labelled "Passive Avoidance" and included the following items: denial, substance use, and behavioural disengagement. Factor 4 was labelled "Personal Coping" and included the following items: self-distraction, self-blame, and humour.

Table 2.4

Factor loading and Communalities for Varimax Rotated Four-Factor for 14 Students' Coping Strategies (N = 400)

	Factor loading				
	1.Active Engagement	2.Seeking Support	3.Passive Avoidance	4.Personal Coping	Communalities
Active coping	**.75**	.17	.11	-.08	.62
Positive reframing	**.76**	.16	-.12	.13	.64
Planning	**.79**	.11	.11	.09	.65
Acceptance	**.57**	.16	-.10	.43	.54
Emotional support	.11	**.86**	.01	.19	.78
Venting	.16	**.48**	.42	.31	.52
Instrumental support	.22	**.87**	.01	.05	.80
Religious coping	.26	**.40**	-.02	-.27	.30
Denial	.10	.08	**.83**	-.01	.70
Substance use	.01	-.12	**.73**	.06	.56
Behavioural disengagement	-.17	.16	**.63**	.39	.60
Self-distraction	.11	.12	-.03	**.69**	.51
Self-blame	-.06	.00	.38	**.62**	.53
Humour	.13	.02	.11	**.60**	.38

Table 2.5

Eigenvalues, Percentage of Variance and Cumulative Percentage for Factors for Students' Coping Strategies

Factor	Eigenvalue	% of variance	Cumulative %
1. Active Engagement	3.47	24.76%	24.76%
2. Seeking Support	2.24	16.02%	40.78%
3. Passive Avoidance	1.25	8.96%	49.74%
4. Personal Coping	1.17	8.33%	58.07%

Comparing two phases

To compare stress, anxiety, depression, concerns, coping strategies, and sleeping hours between Phase 1 and 2, Mann-Whitney tests were used (see Table 2.6.). There was a significant difference in depression between Phase 1 (*Mdn* = 12, *IQR* = 16) and Phase 2 (*Mdn* = 16, *IQR* = 14), *U* ($N_{Phase\ 1}$ = 297, $N_{Phase\ 2}$ = 103) = 12752.00, *Z* = 2.52, *p* < .05 (see Table 2.6); students reported higher depression symptoms during the pandemic. There were no significant differences for anxiety and stress.

Additionally, there was a significant difference in personal concerns between Phase 1 (*Mdn* = 10, *IQR* = 6) and Phase 2 (*Mdn* = 9, *IQR* = 6), *U* ($N_{Phase\ 1}$ = 297, $N_{Phase\ 2}$ = 103) = 13123.50, *Z* = -2.15, *p* < .05 (see Table 2.6); students had fewer personal concerns during the pandemic. There was no significant difference for academic concerns.

Moreover, there was a significant difference in using personal coping between Phase 1 (*Mdn* = 8, *IQR* = 6) and Phase 2 (*Mdn* = 9, *IQR* = 5), *U* ($N_{Phase\ 1}$ = 297, $N_{Phase\ 2}$ = 103) = 18844.50, *Z* = 3.53, *p* < .001 (see Table 2.6); students used more personal coping during the pandemic

than before the pandemic. There were no significant differences for using active engagement, seeking help, or passive avoidance.

Finally, there was a significant difference in sleeping hours between Phase 1 (*Mdn* = 7, *IQR* = 1) and Phase 2 (*Mdn* = 7, *IQR* = 2), *U* ($N_{Phase\ 1}$ = 297, $N_{Phase\ 2}$ = 103) = 10534.50, *Z* = 4.89, *p* < .001 (see Table 2.6); students slept more in Phase 2 than in Phase 1.

Table 2.6

Comparing stress, anxiety, depression, concerns, coping strategies, and hours sleeping between Phase 1 and 2

Variable	Phase 1		Phase 2		U	Z	Effect size	Sig.
	Mean Rank	Mdn(Mean)	Mean Rank	Mdn(Mean)				
Stress	195.54	14(14.75)	214.81	16(16.17)	16769.50	1.46	.07	.14
Anxiety	202.40	12(12.39)	195.03	10(12.25)	14732.00	-0.56	-.03	.58
Depression	**191.94**	**12(13.11)**	**225.19**	**16(15.98)**	**17839.00**	**2.52**	**.13**	**.01***
Academic concerns	200.53	8(8.28)	200.42	9(8.16)	15287.50	-0.01	-.001	.99
Personal concerns	**207.81**	**10(9.85)**	**179.41**	**9(8.73)**	**13123.50**	**-2.15**	**-.11**	**.03***
Active engagement	196.62	14(13.98)	211.68	15(14.62)	16447.00	1.14	.06	.25
Seeking support	200.79	10(10.21)	199.67	10(10.10)	15209.50	-0.09	-.005	.93
Passive avoidance	199.75	2(2.92)	202.66	2(2.95)	15518.00	0.22	.01	.82
Personal coping	**188.55**	**8(7.84)**	**234.96**	**9(9.31)**	**18844.50**	**3.52**	**.18**	**<.001*** **

Sleeping hours	**184.47**	**7(6.67)**	**246.72**	**7(7.36)**	**20056.50**	**4.89**	**.25**	**<.001*** **

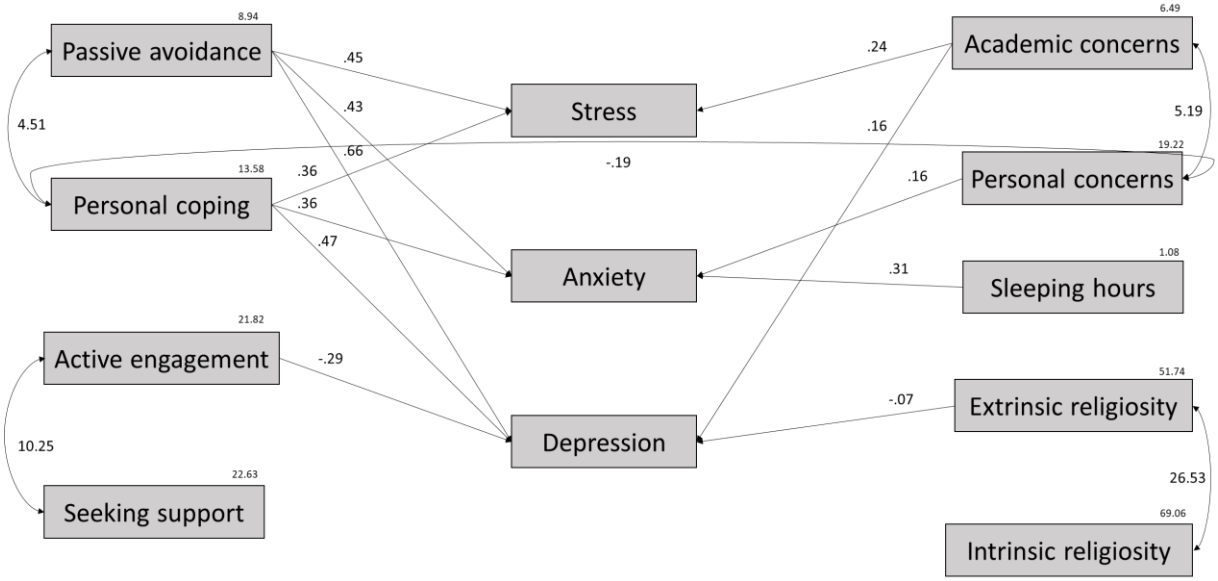
Note: *p < .05, **p < .01, ***p < .001

The relationship between stress, anxiety, depression, concerns, coping, religion, and sleep

Structural equation modelling (SEM) assessed the direction and strength of the (possibly predictive) association between stress, anxiety, depression, coping strategies, concern factors, religious orientations, and sleeping hours in both phases. Two models (Figure 2.1 and 2.2) assessed the effects of coping strategy factors, concern factors, religious orientations, and hours sleeping on stress, anxiety, and depression in Phase 1 and 2. I assessed these models with indices of goodness-of-fit, such as the Comparative Fit Index (CFI), Tucker-Lewis Coefficient (TLI) and Root Mean Square Error of Approximation (RMSEA). Figure 2.1 shows the model in Phase 1, χ^2 = 176.48, *df* = 46, p < .01, *CFI* = .88, *TLI* = .82, *RMSEA* = .10 (90% confidence interval = .08–.11). Figure 2.2 illustrates the model during Phase 2, χ^2 = 145.71, *df* = 48, p < .01, *CFI* = .75, *TLI* = .66, *RMSEA* = .14 (90% confidence interval = .12–.17). Chi-square's (χ2) p > .05, *CFI* > .90, *TLI* > .90, and *RMSEA* < .08 are considered criteria for a good fit model (Hu & Bentler, 1999). Therefore, Phase 1 and 2 models are not good fitting models; however, they are close to good fit.

Figure 2.1

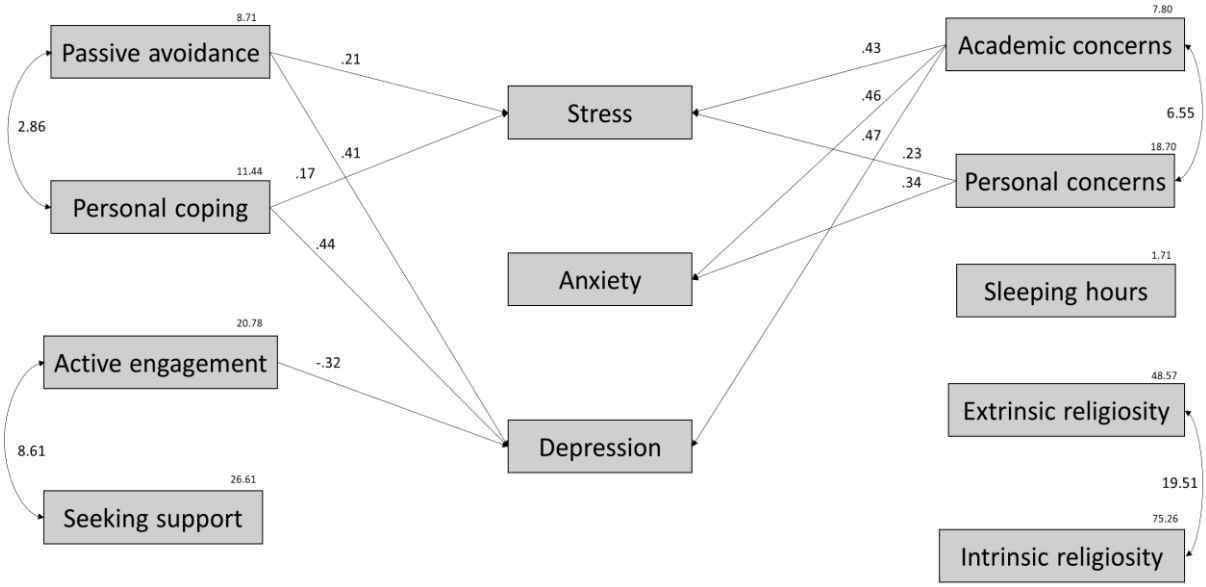
Effects of coping strategies, concerns, religiosity, and hours sleeping on distress variables in Phase 1.



Note: All reported paths ($p < .05$) are standardized estimates, and non-significant relationships and errors were omitted for clarity.

Figure 2.2

Effects of coping strategies, concerns, religiosity, and sleeping hours on distress variables in Phase 2.



Note: All reported paths ($p < .05$) are standardized estimates, and non-significant relationships and errors were omitted for clarity.

Discussion

The first aim of this study was to compare the levels of stress, anxiety and depression, concerns, coping strategies, and sleeping hours between two groups of university students before and during the pandemic. The group of students during the pandemic experienced a higher level of depression. Additionally, concerns about factors, such as quality of sleep, relationships with family and friends, overall health, body image, and self-esteem were reported less by the group of students during the pandemic. Moreover, the group of students during the pandemic used coping strategies, such as self-distraction, self-blame, and humour, more often than the group of students before the pandemic. In addition, students' hours of sleep were higher during the pandemic.

I hypothesized that stress, anxiety, and depression would be higher among the group of students during the pandemic due to long-term isolation, which might negatively influence students' psychological distress (Chen et al., 2020). The results indeed indicated a higher rate of depression characteristics among the group during the pandemic. 59.9% of students scored mild, moderate, severe, or extremely severe in depression before the pandemic, whereas this proportion was higher (70.9%) among the group of students during the pandemic. This finding is particularly concerning because students already had relatively high levels of depression in non-pandemic times. Several previous studies also report high rates of depression among students before the pandemic (Blanco et al., 2008; Ibrahim et al., 2013; Mikolajezyk et al., 2008; Rotenstein et al., 2016). Imposing severe restrictions and drastic changes in students' life might hence have contributed to their depression levels during the pandemic. This result is consistent with earlier studies during the pandemic (Chen et al., 2020; Debowska et al., 2020; Sahile et al., 2020). Moreover, this higher rate is particularly alarming, because a high level of depression might lead to self-harm and suicidal thoughts (Tomoda et al., 2000).

Additionally, pandemic-related restrictions and their influence on daily life routines might be able to explain the increase in depression.

Additionally, 43.1% and 60.2% of students reported mild, moderate, severe, and extremely severe stress before and during the pandemic and 72.1% and 66.0% of students scored mild, moderate, severe, and extremely severe anxiety before and during the pandemic. Although there was no significant difference in stress and anxiety between the two groups, high stress and anxiety were prevalent among students before and during the pandemic.

Students' concerns about personal factors, such as quality of sleep, relationships with family and friends, overall health, body image, and self-esteem, was reported lower by the group of students during the pandemic compared to the group before the pandemic. Less concern about the quality of sleep might be the result of longer sleeping hours during the pandemic than before. Pandemic-related changes, especially moving to online teaching, probably allowed students to sleep longer. However, I only measured sleeping hours in this study. Sleeping hours and sleeping quality do not have a linear relationship, and more sleeping hours do not necessarily mean an improvement in the quality of sleep (Casagrande et al., 2020). Therefore, there is a need for more investigation into the relationship between quantity and quality of sleep during the pandemic. Additionally, the group of students during the pandemic were, surprisingly, less concerned about their relationships with family and friends, overall health, body image, and self-esteem compared to the group of students before the pandemic. The pandemic-related restriction rules and regulations, such as social distancing and isolation, reduced social interactions during the pandemic. Although one might think that this these limitations during the pandemic would lead to higher stress about social

relationships, it might also have led to fewer social pressures, less fear of missing out, and fewer concerns about social skills in a new study environment.

The second aim of this study was to investigate the relationship between stress, anxiety, depression, coping strategies, concerns, religious orientations, and sleeping hours in the two groups of students before and during the pandemic. Although the models were not a good fit, fit indices were close to a good fit, and there were slight changes between the two phases, knowing that the data should be interpreted carefully. The models demonstrated that using coping strategies, such as denial, substance use, behavioural disengagement, self-distraction, self-blame, and humour, had a positive relationship with stress, anxiety, and depression among the group of students before the pandemic, and had a positive relationship with stress and depression among the group of students during the pandemic. These associations mean that using these coping strategies increased the chance of high stress, anxiety, and depression. Therefore, I interpreted these coping strategies as ineffective. On the other hand, using coping strategies, such as active coping, positive reframing, planning, and acceptance, had a negative relationship with depression in the both groups before and during the pandemic. These associations mean that using these copings decreased the chance of high depression scores. Hence, I interpreted these coping strategies as effective. Interestingly, using some coping strategies, including emotional support, venting, instrumental support, and religious coping, had no relationship with stress, anxiety, or depression in both groups, while they had a positive correlation with effective coping strategies. Hence, I interpreted these as indirectly effective coping strategies, because they may enhance the use of effective coping strategies or buffer the negative effects of ineffective coping strategies. The indirect effective coping strategies can help people manage stress and

challenges by providing emotional, social, or practical support, or by facilitating positive emotions and coping resources.

The group of students during the pandemic experienced a higher level of depression symptoms. This finding demonstrates the importance of effective coping strategies for depression. In addition, students used personal coping strategies (self-distraction, self-blame, and humour) as ineffective coping strategies more often during the pandemic, which might have increased their depression symptoms. On the other hand, using effective coping strategies, such as active coping, positive reframing, planning, and acceptance, could have helped students to reduce depression symptoms. Therefore, employing suggestions by Chen et al. (2020) could effectively help students; 1. Informing students about symptoms of high psychological distress, 2. Increasing their knowledge about how to reduce the negative effects of high distress, 3. Informing them about positive behaviours during isolation and their role in reducing distress, 4. Adjusting academic expectations.

Additionally, the models indicated that academic-related concerns, such as academic performance, pressure to succeed, post-graduation plans, and financial concerns, had a positive relationship with stress and anxiety in the group of students before and with stress, anxiety, and depression in the group of students during the pandemic. Moreover, personal concerns had a positive relationship with anxiety in the group before, and with stress and anxiety in the group during the pandemic. Indicating, despite the group of students during the pandemic reported fewer concerns about these personal factors, these concerns may associate with students' distress *more* during the pandemic, as they were linked with stress and anxiety.

The group students during the pandemic were able to sleep longer compared to the group of students before the pandemic. In addition, although longer sleeping hours had a

positive relationship with students' anxiety in the group before the pandemic, it was unrelated to stress, anxiety, and depression in the group during the pandemic. The change in sleeping hours' relationship with stress, anxiety, and depression might be the result of sufficient sleeping hours during the pandemic. When students sleep adequately, sleeping hours might become a neutral factor, whereas lack of adequate sleep might trigger an effect on distress variables. Therefore, not affecting students' distress by sleeping hours might be a ceiling effect because students were able to sleep sufficiently during the pandemic.

Previous studies have reported inconsistent relationships between stress, anxiety, depression, and religiosity among students. Although some indicated that students' religiosity decreased distress (e.g., Astin & Astin, 2010; Cokley et al., 2012), there is the report of it increased distress (e.g., Winterowd et al., 2005). I hypothesised that religious orientation might be the reason for this inconsistency. Extrinsic and intrinsic religiosity had a strong positive correlation in both groups of students. Additionally, higher levels of extrinsic religiosity had a negative relationship with depression in the group before the pandemic, whereas religious orientations did not affect students' distress in the group during the pandemic. Extrinsic religiosity strongly relies on religious socializing and gatherings, but these activities were restricted and limited during the pandemic. This change can explain why extrinsic religiosity reduced depression in the group before the pandemic but was not effective in the group during the pandemic. Therefore, the result showed that students' extrinsic religious orientation might be able to reduce stress, anxiety, and depression; however, this relationship is not permanent and requires gatherings and other social events.

Limitations

There were some limitations to this study. Firstly, this study was conducted at a private university in Malaysia, and the results might not apply to students of all Malaysian universities. Collecting data from a variety of universities would make the results more generalizable. Secondly, most participants in this study were female. A gender-balanced sample would produce better generalizable results because higher levels of stress, anxiety, and depression have been reported among females compared to males (Chen et al., 2020; Debowska et al., 2020; Essadek & Rabeyron, 2020; Patsali et al., 2020). Thirdly, it is important to consider the potential dissimilarity between the second group and the first. Given that this study takes a cross-sectional approach when discussing trends of increase or decrease, it becomes crucial to exercise caution in interpreting the findings. Fourthly, the sample size for Phase 2 is relatively small (N=103) in contrast to Phase 1 (N=297). Moreover, a notable disparity emerges between Phase 1 and Phase 2 concerning the proportion of international students (phase 1: 19.2%, phase 2: 42.7%), potentially exerting an influence on the results. Hence, it is imperative to approach interpretation with care and exercise particular caution when attempting to generalize the outcomes. Lastly, a potential source of concern in this study is the potential for response bias. The inclusion of the term "distress" in the study's title could have influenced students experiencing higher distress to either evade the survey or, conversely, specifically opt to participate. Furthermore, it is worth noting that in phase 2, respondent bias could have played a role – the respondents might have been those who maintained contact with their university or were active on social media, possessing the energy to engage with the questionnaire. This could have introduced a bias away from the most severely affected individuals and could have potentially affected the observed outcomes.

Additionally, there might be a concern that some participants may take the survey twice, potentially anchoring their subsequent responses based on their initial response. Remarkably, I believe that the possibility of participants engaging in both groups does not compromise the outcomes of this study. The study employs a between-group design, and the recruitment of the two groups occurred with one year in between, effectively minimizing the likelihood of respondents becoming familiar with the questionnaire even if they participated in both groups. There was no specific question asking participants if they had previously taken the survey because the one-year gap serves as a practical safeguard against practice effects and any significant impact on subsequent responses due to potential familiarity. Furthermore, I hold the view that anchoring effects typically do not endure beyond a few weeks (Mussweiler, 2001). While individuals may recall their participation in a study from a year ago, leading some items to appear familiar, I question whether they can accurately recall their specific responses after such a prolonged interval.

Conclusions

Despite these limitations, this study revealed that the group of students during the pandemic experienced higher levels of depressive symptoms. Some effective coping strategies, such as active coping, positive reframing, planning, and acceptance, might have helped students to reduce the level of depression symptoms, whereas using ineffective coping strategies, such as denial, substance use, behavioural disengagement, self-distraction, self-blame, and humour, seemed to increase their distress. Unfortunately, the group of students during the pandemic engaged in ineffective coping, like self-distraction, self-blame, and humour, more often than the group of students before the pandemic. These findings highlight the importance of awareness about effective and ineffective coping strategies, and

informing students about these strategies might help to reduce their distress. Moreover, the group of students during the pandemic reported fewer concerns about personal-related factors compared to the group of students before the pandemic. However, both academic and personal-related concerns were more linked with students' distress during the pandemic. Therefore, it is essential to support students to deal with these concerns, especially during hard times, such as a pandemic. Additionally, students managed to sleep longer during the pandemic due to changes in their lifestyles and teaching methods. Lastly, religious orientations had mixed effects on distress. Higher extrinsic religiosity reduced depression before the pandemic, whereas religious orientations had no relationship with distress during the pandemic. These findings emphasize the vulnerability of university students and highlight the crucial need to provide them with support during challenging periods, encompassing not just the pandemic. Notably, students in both the pre-pandemic and pandemic groups demonstrated relatively positive outcomes. There were no discernible rises in anxiety or stress levels, and heightened academic concerns were absent. Consequently, the results do not strongly indicate a significant detrimental impact of this stressful period on the student cohort, even though there was a slight increase in depression. It is important to interpret this within the backdrop of already existing high levels of anxiety, stress, and depression among students prior to the pandemic. As the pandemic has now concluded, it is recommended to sustain a continuous effort to enhance students' mental well-being during typical circumstances.

Chapter 3: Cross-cultural differences in the interpretation of autistic traits, a comparison between Iran, Malaysia, Morocco, and the Netherlands

Autistic traits refer to features and behaviours associated with autism, including diagnostic features and broader patterns of behaviours. Diagnostic features are the specific symptoms or characteristics that are used to diagnose someone with autism. These features include persistent difficulties in social interaction, communication, and repetitive behaviours or interests (American Psychiatric Association, 2013). The broader autism phenotype (BAP) refers to sub-diagnostic traits that are more prevalent in families of autistic individuals than in the general population (Bora et al., 2016; Rubenstein & Chawla, 2018; Shi et al., 2015).These traits can encompass a wide range of behaviours, including mild social, communicative, or other characteristics that may differ from the norm but are not as severe as the diagnostic criteria for autism (Bora et al., 2016; Rubenstein & Chawla, 2018; Shi et al., 2015). Autism is typically diagnosed when these traits are more marked, significantly affecting an individual's social functioning, communication, and overall daily functioning. It is important to recognize that while some individuals may display mild autistic traits, not everyone who exhibits these traits will necessarily meet the criteria for an autism diagnosis. Additionally, the presentation and severity of traits can vary widely among individuals diagnosed with autism.

Culture and autism

Cultural norms directly influence the perception of normative behaviours, development, and the notion of social impairments (Daley, 2002), which might affect the presentation and interpretation behaviours related to conditions such as autism and diagnosis of autism (Atherton et al., 2023; Kalb et al., 2012; Liptak et al., 2008; Mandell et al., 2009). Autism measures strongly rely on reporting deviations in social and communication behaviours, and culture directly affects the perception of deviant behaviours (Harrison et al., 2017). Therefore, cross-cultural differences in the perception of normative behaviours might influence the recognition of autistic traits. Considering that, common behaviour could differ across cultures, parents' cultural norms and values likely contribute to the autism diagnosis (Daley, 2002, 2004; Mandell & Novak, 2005; Matson et al., 2017; Norbury & Sparks, 2013).

Across different cultures, a fundamental distinction exists between collectivist and individualistic societies, notably between non-Western and Western countries. Collectivism and individualism serve as overarching cultural frameworks that delineate the interplay between individuals and groups. Collectivism emphasizes prioritizing the group's needs and objectives over those of the individual (Oyserman, 1993). Conversely, individualism entails favouring the individual's needs and ambitions over the group's (Hofstede, 1980). In collectivist cultures, prevalent in many Asian and African societies, there is a high regard for interdependence and harmony within the community. These cultures expect individuals to subordinate personal interests to the collective and seek group approval. In contrast, individualistic cultures, prevalent in many Western societies, place value on autonomy, self-expression, and personal accomplishments. Individuals are encouraged to pursue unique goals and assert their distinct identities. Although these cultural dimensions are general

tendencies, individuals within a culture can still exhibit varying degrees of alignment. Considering the impact of collectivism and individualism on the individual-society dynamic, it becomes apparent that the perception of autistic traits may differ across cultures. Further elaboration on these cultural dimensions can be found in Chapter 4.

Accordingly, parents may exhibit varying degrees of concern and recognition, particularly regarding culture-specific deviant behaviours. For instance, parents from Israel reported fewer autism-related impairments, such as nonverbal communication, verbal communication, and restricted-repetitive behaviours, in their children in comparison to parents from the UK (Matson et al., 2011). Similarly, Israeli parents noted fewer sensory difficulties in both autistic and non-autistic children than American parents did (Caron et al., 2012). These distinctions in parental perceptions, concerns, and levels of distress across cultures could contribute to disparities in the way autistic traits are reported by parents across different countries. A deeper exploration of how parental distress intersects with their perception and concerns about autistic traits will be elaborated upon in Chapter 5.

Diagnostic and screening measures for autism are mostly developed and standardized in Western cultures, and they might, therefore, not be reliable or valid in non-Western cultures (e.g., Freeth et al., 2013). These measures strongly rely on self or others' perceptions of deviant behaviours, which can be influenced by culture. Although some autism measures (e.g., Autism Diagnostic Observation Schedule) indicated reliability in clinical samples across countries (Kim et al., 2016), other measures (e.g., the Autism-spectrum Quotient, AQ) showed differences across countries (Carruthers et al., 2018; Freeth et al., 2013). Therefore, the proper adaptation process of an autism measurement in a new culture or language is crucial. Adaptations can be done by adding culturally relevant indicators, avoiding misinterpretation

by changing the wording, avoiding confusion by adding examples, and changing the format of the tool according to respondents' response style (Soto et al., 2014). Despite previous studies reporting cross-cultural differences in AQ scores (Carruthers et al., 2018; Freeth et al., 2013), there is a lack of investigation on how cross-cultural differences in the perception of autistic traits might affect these measures.

The AQ (Baron-Cohen et al., 2001), a questionnaire measuring autistic traits, has been translated into many languages and used in a wide range of studies on autism. A higher score on the AQ indicates a greater number of autistic traits. The AQ has adult (self-report), child and adolescent (parent-report) versions. Individuals with autism score higher on the AQ than individuals without autism (Baron-Cohen et al., 2001; Hoekstra et al., 2008; Lepage et al., 2009; Ruta et al., 2012). Even though the AQ is reliable in measuring autistic traits, cross-cultural studies reported differences in AQ scores between countries. For instance, non-autistic Japanese people scored higher compared to British people (Wakabayashi et al., 2006), and Indian and Malaysian students scored higher compared to British students (Freeth et al., 2013). Freeth and colleagues (2013) suggested culture plays the main role in the cross-cultural differences in reporting autistic traits, as culture influences the interpretation of, and the response to, some AQ items (Hurst et al., 2007). Investigating whether culture affects the reporting of one's own and others' autistic traits similarly in Western and non-Western countries helps us to further understand the cultural influence on the perception of autistic traits.

Two factors, the perceptions of behaviours and knowledge about autism (I use "autism knowledge" throughout this thesis) might be able to explain differences in scores of autism measures across cultures. Culture defines whether specific behaviours are considered

common or not. There is a possibility that some behaviours that are considered uncommon in one culture may be more accepted or even valued in another culture. This difference might lead to individuals in the latter culture scoring higher on the AQ for those behaviours, as they may not see them as uncommon. Therefore, the perceived commonness of autistic-like behaviour (CAB) might affect AQ scores, and items on the AQ may not be fully valid across cultures. In other words, the items may not accurately measure the same underlying construct (autistic traits) in different cultures. This issue highlights the importance of considering cultural context when using measures like the AQ and interpreting their scores. Cultural differences in perceptions of behaviour are the result of complex interactions between cultural norms, values, and beliefs. Cultural differences in the perceptions of behaviour are complex and important factors to consider when studying autistic traits and related measures. More research is needed to better understand how cultural context may influence the validity of measures like the AQ and how best to account for cultural differences in interpreting scores.

Autism knowledge

Autism knowledge may be another factor that influences cross-cultural differences in reporting autistic traits. Autism knowledge is the level of understanding and awareness that individuals and communities have about autism and its features, causes, and treatments. Previous studies have shown that autism knowledge varies across different populations (Ballantyne et al., 2019; de Vries et al., 2020; Neik et al., 2014; Obeid et al., 2015). Higher autism knowledge is also related to more positive attitudes towards autism and autistic individuals (Shand et al., 2020). This association suggests that individuals from cultures with

less autism knowledge may be less likely to recognize or report autistic traits, resulting in lower AQ scores. Conversely, people from cultures with more autism knowledge may be more likely to recognize and report these traits, resulting in higher AQ scores.

Cross-cultural differences in autism knowledge might subsequently affect stigma and beliefs about autism across countries (de Vries et al., 2020; Obeid et al., 2015). A higher level of autism knowledge increases understanding and acceptance by society and reduces difficulties faced by autistic individuals in society (Gardiner & Iarocci, 2013). Stigma and negative attitudes towards autism and individuals with autism may also influence reporting of autistic traits. In cultures with higher levels of stigma and negative attitudes towards autism, individuals may be less likely to report autistic traits, either in themselves or in others, due to fear of social discrimination. This attitude towards autism could contribute to cross-cultural differences in reporting autistic traits and scoring autism measures. Hence, the acceptance and lower stigma about autism may facilitate reporting or being diagnosed with autism.

Direct contact with autistic individuals strongly improves autism knowledge (Dillenburger et al., 2017; Dillenburger et al., 2013; Stronach et al., 2018; White et al., 2016). The differences in autism prevalence across countries suggests that there is a higher chance of direct contact with autistic individuals in countries with a higher prevalence of autism than in countries with a lower prevalence of autism. As a result, cross-cultural differences in autism knowledge might be partially due to the different prevalence of autism across countries. Therefore, it is important to consider the potential impact of autism knowledge and stigma, and eventually the level of contact, on cross-cultural differences in reporting autistic traits.

By measuring autism knowledge across cultures, I can gain insights into how familiar individuals are with the characteristics of autism and how it might be associated with reporting autistic traits in different cultures. In addition, these insights can help us to better understand potential cultural biases in the interpretation of measures like the AQ. Moreover, measuring autism knowledge can help to identify gaps in understanding and awareness of autism across countries, which could inform efforts to increase awareness and understanding of autism and its characteristics. Awareness and understanding, in turn, could help to reduce stigma and improve access to resources and support for autistic individuals and their families. Therefore, measuring autism knowledge can provide valuable insights into how cultural context may influence the recognition and reporting of autistic traits and can help to inform efforts to promote greater awareness and understanding of autism across cultures.

The current study

This study aims to contribute toward a greater understanding of cross-cultural differences in autistic traits and the commonness of autistic-like behaviour. The systematic review conducted by Salari et al. (2022) revealed varying prevalence rates of autism, with estimates of 0.4%, 0.5%, and 1% in Asia, Europe, and Africa, respectively. These disparities underscore the importance of exploring differences in the perception of autistic traits across regions. As a result, this study selected four countries with diverse cultural backgrounds from different regions to investigate these variations. Specifically, the countries chosen to represent a mix of non-Western and Western cultures: Iran (Middle East), Malaysia (Southeast Asia), Morocco (North Africa), and the Netherlands (Western Europe). The current study had four aims. The first aim was to compare the level of self-reported autistic traits

(SAT) across four countries. Previous studies indicated that non-Western cultures reported higher rates of autistic traits compared to Western cultures (Carruthers et al., 2018; Freeth et al., 2013). Therefore, conforming to previous studies, I expected higher rates of SAT in non-Western countries (Iran, Malaysia, and Morocco) than in a Western country (the Netherlands). Additionally, I was interested in exploring the differences in SAT between three distinctive non-Western countries.

The second aim was to evaluate whether the perception of CAB follows a similar pattern as SAT. I developed a questionnaire (based on the AQ items) to measure CAB by asking how 'common/uncommon' behaviours in the AQ items (autistic traits) were in each country. Similar to the SAT, I expected a higher level of CAB in non-Western countries compared to a Western country, as this difference might explain why SAT scores are higher in these countries.

The third aim was to compare the level of autism knowledge across countries. Measuring and comparing autism knowledge across these four countries would help to investigate differences in the level of autism knowledge and, furthermore, its influence on reporting autistic traits. I expected, in line with previous studies (e.g., de Vries et al., 2020; Obeid et al., 2015), that participants from the Netherlands would score higher in autism knowledge compared to participants from Iran, Malaysia, and Morocco.

Subsequently, the fourth aim was to explore the relationship between SAT and CAB in the four countries. I argued that CAB might affect the perception and reporting of autistic traits about oneself. As alignment between the perception of self and others' traits varies across cultures, they might result in cross-cultural differences in self-reported autistic traits. I expected that CAB would positively associated with SAT in the total sample, but this effect

might vary across cultures. As I expected that autism knowledge and country may link with SAT too but had no prediction with respect to the direction, I included autism knowledge and country as a control variable in the analysis.

Method

Participants

To estimate the minimum sample size required for a medium effect size and a well-powered dataset, an a-priori G*Power analysis (Faul et al., 2007) was performed. Based on the assumptions of a four-group design, an alpha level of α=.05, and a power of 1−β=.95, the analysis indicated that a total of 280 participants (70 participants in each group) was needed to detect a medium effect size of f=0.25. A total of 665 participants from Iran (n=100), Malaysia (n=226), Morocco (n=161), and the Netherlands (n=161) were recruited. As I aimed to recruit non-autistic adults in this study, at first, four participants who claimed be diagnosed with autism (one from Iran and three from the Netherlands) were excluded from the analyses. Next, I excluded incomplete responses, and the final sample size for the study was 476 participants, with 88 participants from Iran, 181 from Malaysia, 94 from Morocco, and 113 from the Netherlands (see Table 3.1). The age range of the participants was 18 to 69 years (M = 25.15, SD = 8.38). I did not set an age limit for participants because previous research has suggested that age and reporting of autistic traits are unrelated (Lodi-Smith et al., 2021). I recruited non-autistic participants in this study to examine cross-cultural differences in interpreting autistic traits in the general population, aiming to enhance screening measures. Autistic individuals had been previously diagnosed using standardized measurements and exhibited similar autistic traits. Therefore, including non-autistic individuals allowed for a

comprehensive assessment of how different cultural backgrounds perceive these traits. This approach is crucial for refining screening tools to detect behavioural features indicative of autism across diverse cultural contexts, ensuring that individuals who may require clinical care or diagnostic services are accurately identified, regardless of cultural differences.

In this study, I did not incorporate sub-cultures, acknowledging that they exist within every country. In the Malaysian sample, ethnicities were reported, given that Malaysia comprises three major ethnic groups; 69.1% Bumiputera (Malay and Indigenous groups), 22.6% Chinese, 6.8% Indian, and 1.5% others. It is important to note that these ethnicities have coexisted in Malaysia for centuries. The relatively lower representation of Indian Malaysians in the sample does not introduce any confounding factor to the study results.

Table 3.1

Participants' gender, age, and ethnicity

Country	Gender		Age			Ethnicity
	Male	Female	Range	Mean	S.D.	
Iran	34 (38.6%)	54 (61.4%)	19-69	33.74	12.84	88 Persian (100%)
Malaysia	76 (42.0%)	105 (58.0%)	18-47	21.57	5.15	109 Chinese (60.2%)
						60 Malay (33.2%)
						12 Indian (6.6%)
Morocco	32 (34.0%)	62 (66.0%)	18-52	26.33	6.45	94 Moroccan (100%)
Netherlands	48 (42.5%)	65 (57.5%)	18-39	23.22	3.01	113 Dutch (100%)

Materials

I used the AQ to measure SAT. The AQ is a self-rated questionnaire designed to measure the presence of autistic traits in adults who may or may not have a clinical diagnosis of autism. The AQ was developed by Simon Baron-Cohen and his colleagues at the Autism Research Centre in Cambridge, UK, and was first published in 2001. The AQ consists of 50 items that ask about a person's behaviours, preferences, and thought processes (Appendix E). The items are divided into five subscales: social skills, attention switching, attention to detail, communication, and imagination. Although the AQ reliably measures autistic traits, several studies have doubted its subscales and suggested different models than the original 5 subscales (e.g., do Egito et al., 2017; Russell-Smith et al., 2011; Stewart & Austin, 2009). English et al. (2019) conducted a comprehensive investigation into various Autism-Spectrum Quotient (AQ) models, concluding that the three-factor model proposed by Russell-Smith et al. (2011) exhibited the highest accuracy and reliability. Furthermore, an under-review study by Abu Bakar et al. (under review) provided additional validation of this three-factor model within the Malaysian context compared to other models (including original AQ-50 5 subscales model, two alternative Western-developed models, and two Asian-developed factor models). Based on the findings from these studies, I inferred that the three-factor model would likely demonstrate similar reliability across all four countries. However, due to limitations in sample size, conducting confirmatory factor analyses for each country was unfeasible. In the current study, I hence decided to focus on the AQ total score and three-factor model by Russell-Smith et al. (2011) to measure Social Skills, Details-Patterns, and Communication-Mindreading. The Social Skills factor measures autistic traits, such as difficulty with social communication, (e.g., “I frequently find that I do not know how to keep a conversation going”) and difficulty with social interaction (“I find it hard to make new friends”). The Details-Patterns factor focuses

on autistic traits, such as attention to details (e.g., “I tend to notice details that others do not’) and strong pattern recognition (e.g., “I notice patterns in things all the time”). The Communication-Mindreading factor measures autistic traits, such as difficulty understanding nonverbal cues (e.g., “I know how to tell if someone listening to me is getting bored”), literal interpretation of language (e.g., “I am often the last to understand the point of a joke”), and difficulty with perspective taking or empathizing (e.g., “I find it difficult to work out people’s intentions”). Participants’ rate how strongly they agree or disagree with each AQ statement on a 4-point scale, and half of the items are reverse-scored. Although Baron-Cohen et al. (2001) suggested a binary (0/1) scoring for the AQ, the 4-point Likert scale provides more information about participants’ responses (Stewart et al., 2015) and improves test-retest reliability of the AQ score compared to binary scoring (Stevenson & Hart, 2017). A higher score on the AQ indicates a higher rate of autistic traits. The internal constancy of the AQ total score in a general population was reported satisfactory, $\alpha = .71$ (Hoekstra et al., 2008).

To measure CAB, I used a modified version of the AQ (Appendix F). Hence, to create the CAB measure, the AQ was modified by replacing the pronoun "I" in the items with "People usually" in the CAB measure. For instance, “I prefer to do things with others rather than on my own” (AQ item) was modified to “People usually prefer to do things with others than on their own” (CAB item). Similar to the AQ, I used the CAB total score and three-factor model (Social Skills, Details-Patterns, and Communication-Mindreading). Participants were asked to complete the CAB based on whether these behaviours were considered “socially appropriate, accepted, expected, or common in your culture (society, family, direct environment, everyday life)”. Item responses were scored on a 6-point Likert scale (ranging from ‘‘agree’’ to ‘‘disagree’’), unlike the AQ, which uses a 4-point Likert scale. This change was made to make the AQ and CAB look less similar to participants. Like the AQ, the CAB measure contains 50

items, and half of the items are reverse-scored. A higher score on the CAB measure indicates a higher rate of perceived social appropriateness, acceptance, expectation, or commonness of the behaviours and traits described in the AQ within a specific cultural context.

The Revised Autism Knowledge Survey (AKS-R; Appendix G; Swiezy et al., 2005) is a 20-item self-report questionnaire that measures an individual's level of knowledge about autism. The AKS-R is designed to assess knowledge about autism in various areas, including communication, social behaviour, causes, and treatment options. For example, some items from the AKS-R are statements, such as “Autism is an emotional disorder”, “Autism is more frequently diagnosed in males than in females”, and “We now have treatments that can cure autism”. Participants are asked to respond to each item on a 6-point Likert-type scale, with responses ranging from “agree” to “disagree”. Half of the AKS-R’s items are reverse-scored. A higher score on the AKS-R indicates a greater level of knowledge about autism. The AKS-R is a revision of a 23-item scale developed by Stone (1987) and is updated to reflect the current understanding of autism (Stuart et al., 2008). The AKS-R was created by a team of researchers and clinicians from the Christian Sarkine Autism Treatment Center and the HANDS in Autism Interdisciplinary Training and Resource Center at the Indiana University School of Medicine (Stuart et al., 2008). The AKS-R was validated using a sample of 502 individuals from various disciplines and backgrounds, such as parents and caregivers, educational personnel, medical care providers, and licensed therapists (Stuart et al., 2008). Although the AKS was developed in the U.S., it was designed to be applicable to different contexts and cultures, as it uses general and inclusive language and covers a range of topics related to autism (Stuart et al., 2008).

The questionnaires were given in Persian, English, Arabic, and Dutch for Iran, Malaysia, Morocco, and the Netherlands, respectively. The translations of the AQ in Persian, Arabic and Dutch were available on Autism Research Centre website. Furthermore, the CAB measure and AKS-R were translated from English into Persian, Arabic, and Dutch using Brislin's (1986) method of translation, which involves both forward and backward translation.

Procedure

The Science and Engineering Research Ethics Committee of the University of Nottingham Malaysia (OF220119) granted international ethical approval for the study. Furthermore, additional ethical approvals were secured from Morocco and the Netherlands. Qualtrics was used to administer an online survey in Malaysia, Morocco, and the Netherlands, whereas paper-and-pencil surveys were used in Iran. In Malaysia, Morocco, and the Netherlands, I distributed the online survey via social media, by posting the survey link on platforms, such as Facebook and Instagram, and asking people to participate and share the link with others. I also sent the link of the online survey to WhatsApp groups, used posters with QR codes and links to the survey, and used the university's recruitment email, which informed all students once a month about new studies looking for participants. In Iran, I conducted the survey using paper-and-pencil, which means I printed the survey and gave it to the participants to fill out by hand. I distributed the paper survey using the snowball method, which means I asked the initial participants to recruit other participants from their social networks, such as friends, family, or colleagues.

Before participating, all participants received information about the study, but they were not told that it was related to autism to avoid biased responses to the AQ and CAB

measures. After completing the consent form, participants answered demographic questions, such as age, gender, and nationality. Then, participants responded to the AQ items, followed by the CAB measure, and the AKS-R. The order of the measures was the same for the four countries, as I used paper-and-pencil in Iran and kept the order consistent in all countries. This order did not affect the participants' responses, as they did not know that the survey was related to autism until they completed the AKS-R, which was the last measure. Therefore, their responses to the AQ and CAB measures were not biased. Upon completion of the survey, participants received a debriefing sheet that outlined the main objectives of the study. Completing the survey took between 25 to 30 minutes for participants.

Results

Data assumptions

SPSS 28 was used to conduct the data analysis. Shapiro-Wilk test was used to examine the normality of the AQ-50 total score (referred to as AQ-50 total), the CAB total score (referred to as CAB-50 total), and the AKS-R score in the four countries. The results revealed non-significant deviations from normality in all variables except for the AKS-R in Iran ($W(88) = .73$, $p < .001$), Malaysia ($W(96) = .96$, $p = .009$), and Morocco ($W(94) = .97$, $p = .04$) and the CAB-50 in Malaysia ($W(96) = .95$, $p < .001$). Despite the non-normal distribution of the data, I opted to use parametric tests due to their greater statistical power, which enhances the ability to detect differences between groups or relationships between variables. This decision was based on the fact that parametric tests are more effective when sample sizes are large enough, which is the case in this study. However, non-parametric tests were conducted to validate the results obtained from the parametric tests. Similar outcomes were obtained from

both types of tests, thereby supporting the validity of the study findings. I reported only the results obtained from parametric tests in the study.

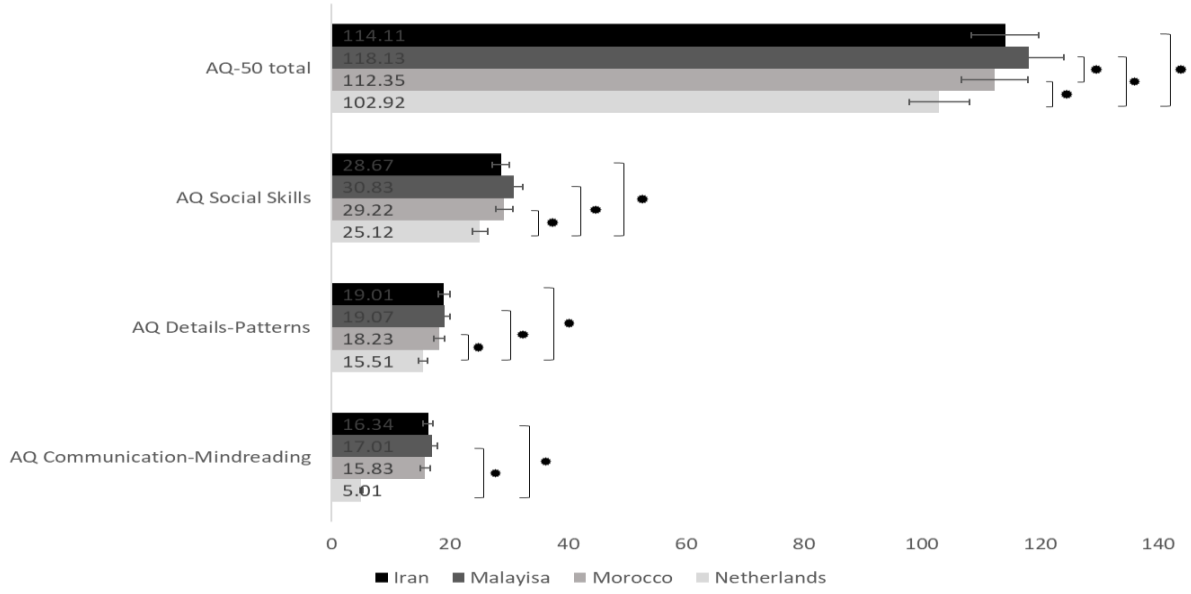
Comparing the level of SAT across four countries

Four one-way ANOVAs were conducted to compare the AQ-50 total and its factors (Social Skills, Details-Patterns, and Communication-Mindreading) across Iran, Malaysia, Morocco, and the Netherlands. There was a significant difference in the AQ-50 total between the four countries, $F(3, 472) = 34.01$, $p < .001$. Post-hoc analyses using a Bonferroni correction (see Figure 3.1 or Appendix H) showed that participants from Iran, Malaysia, and Morocco scored significantly higher than participants from the Netherlands on the AQ-50 total. In addition, participants from Malaysia scored significantly higher than participants from Morocco.

Furthermore, the one-way ANOVAs on the factors indicated significant differences in AQ Social Skills ($F(3, 472) = 18.23$, $p < .001$), AQ Communication-Mindreading ($F(3, 472) = 22.97$, $p < .001$), and AQ Details-Patterns ($F(3, 472) = 7.97$, $p < .001$) between the four countries. Bonferroni post-hoc analyses indicated that participants from Iran, Malaysia, and Morocco scored significantly higher than participants from the Netherlands on the AQ Social Skills and Details-Patterns factors. Additionally, participants from Iran and Malaysia scored significantly higher than participants from the Netherlands on the AQ Communication-Mindreading factor (see Figure 3.1 or Appendix H).

Figure 3.1

*Cross-cultural difference on the AQ-50 total score and factor scores (*p < .05)*



Comparing the level of CAB across four countries

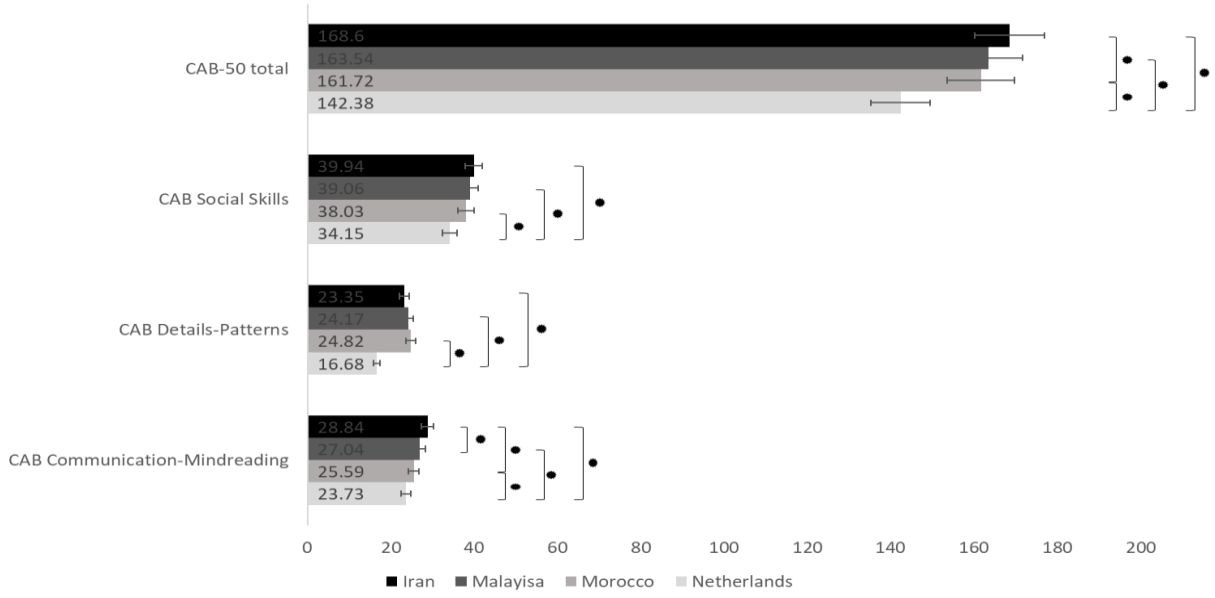
Four one-way ANOVAs were conducted to compare the CAB-50 total and its factors across Iran, Malaysia, Morocco, and the Netherlands. There was a significant difference in the CAB-50 total between the four countries, $F(3, 472) = 66.03$, $p < .001$. Bonferroni post-hoc analyses tested CAB-50 total multiple comparisons between the four countries (see Figure 3.2. or Appendix I). Iran, Malaysia, and Morocco scored significantly higher than the Netherlands on the CAB-50 total. In addition, Iran scored significantly higher than Morocco.

There were also significant differences in CAB Social Skills ($F(3, 472) = 18.00$, $p < .001$), CAB Communication-Mindreading ($F(3, 472) = 55.40$, $p < .001$), and CAB Details-Patterns ($F(3, 472) = 24.44$, $p < .001$) between the four countries. Bonferroni post-hoc analyses indicated that Iran, Malaysia, and Morocco scored significantly higher than the Netherlands on the CAB

Social Skills, Details-Patterns, and Communication-Mindreading factors. Additionally, Iran scored significantly higher than Malaysia and Morocco on the CAB Communication-Mindreading factor (see Figure 3.2 or Appendix I).

Figure 3.2

*Cross-cultural difference on the CAB-50 total score and factor scores (*p < .05)*

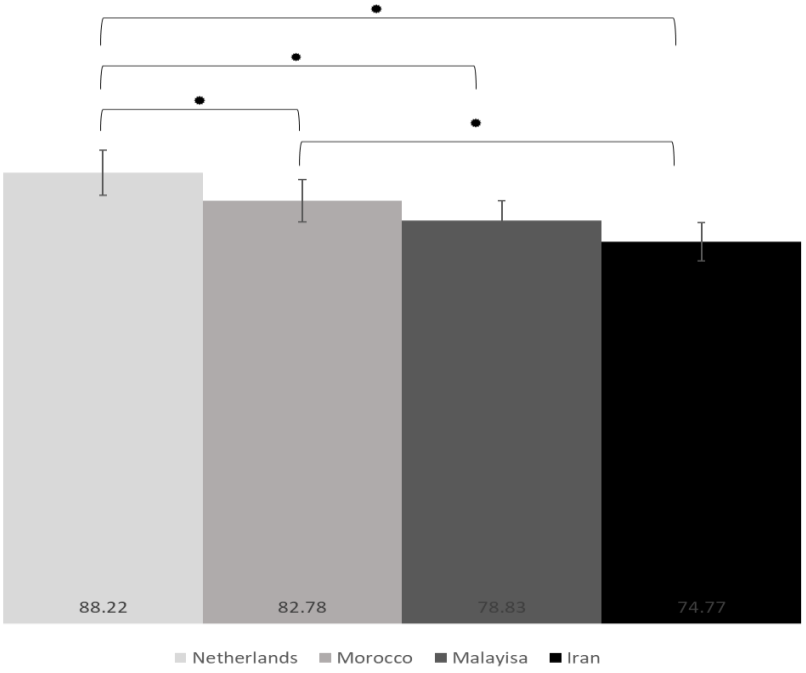


Comparing the level of autism knowledge across countries

A one-way ANOVA was conducted to compare the AKS-R score across the four countries. There was a significant difference in AKS-R between the four countries, $F(3, 383) = 29.68$, $p < .001$. With Bonferroni post-hoc analyses, I tested differences between the four countries (see Figure 3.3 or Appendix J), showing that autism knowledge was higher in the Netherlands than in the other three countries, and lower in Iran than in Morocco.

Figure 3.3

*Cross-cultural difference on the AKS-R score (*p < .05)*



The relationship between SAT and CAB

To investigate the relationship between SAT and CAB, I used multiple linear regression with the AQ-50 total as the dependent variable, the CAB-50 total as the independent variable, and AKSR-R and country as control variables for the total sample (see Table 3.2). A significant regression equation was found in the total sample ($F(3, 383) = 30.30$, $p < .001$), with R^2 of .19. Participants' AQ-50 total was equal to 105.14 + 0.18 (CAB-50 total) – 0.21 (AKS-R) – 1.88 (country). The CAB-50 total was significantly associated with the AQ-50 total in the total sample ($t = 4.27$, $p < .001$). Both control variables, AKS-R ($t = -3.26$, $p < .001$) and country ($t = -2.67$, $p = .001$), were significantly related to the AQ-50 total.

The significant negative relationship between country and the AQ-50 total indicated the possible differences between countries. Therefore, as post-hoc analyses, I performed four multiple regressions with the AQ-50 total as the dependent variable, the CAB-50 total as the independent variable, and AKSR-R as the control variable for each country separately (see Table 3.2). There was no significant regression equation in Iran ($F(2, 85) = 0.40$, $p = .67$), with R^2 of .01. However, a significant regression equation was found in Malaysia ($F(2, 93) = 9.03$, $p < .001$), with R^2 of .16. Participants' AQ-50 total is equal to 159.00 + 0.05 (CAB-50 total) – 0.60 (AKS-R). The AKS-R was significantly related to the AQ-50 total in Malaysia ($t = -3.76$, $p < .001$), but there was no significant relationship between the AQ-50 total and the CAB-50 total. Moreover, a significant regression equation was found in Morocco ($F(2, 91) = 11.07$, $p < .001$), with R^2 of .20. Participants' AQ-50 total was equal to 132.09 + 0.12 (CAB-50 total) – 0.48 (AKS-R). The AKS-R was significantly related to the AQ-50 total in Morocco ($t = -3.47$, $p < .001$), but the CAB-50 total was not significantly associated. Furthermore, a significant regression equation was found in the Netherlands ($F(2, 106) = 6.19$, $p = .003$), with R^2 of .11. Participants' AQ-50 total was equal to 98.14 + 0.22 (CAB-50 total) – 0.31 (AKS-R). The CAB-50 total was significantly associated with the AQ-50 total in the Netherlands ($t = 3.01$, $p = .003$), but the AKS-R was not significantly related to the AQ-50 total.

Table 3.2

The relationship between AQ-50 total and CAB-50 total in the total sample and each country.

	AQ-50				
	Total sample	Iran	Malaysia	Morocco	Netherlands
N	476	88	181	94	113

R^2	.19	.01	.16	.20	.11
F	30.30 ***	.40	9.03 ***	11.07 ***	6.19 **
β_0	105.14	118.69	159.00	132.09	98.14
CAB (β_1)	.18 ***	.003	.05	.12	.22 **
AKS-R (β_2)	-.21 **	-.07	-.60 *	-.48*	-.31
Country (β_3)	-1.88 **	-	-	-	-

Note: The AKS-R was used as a control variable in these regressions, *** p<.001, ** p<.01, * p<.05

To explore cross-cultural differences in the relationship between the AQ-50 total and the CAB-50 total, I explored the relationship between the three factors of the AQ and CAB in the total sample and in each country separately with Pearson correlations (see Table 3.3). In the total sample, there was a significant positive correlation between the AQ and CAB Details-Patterns (r(474) = .37, p < .001) and between the AQ and CAB Communication-Mindreading (r(474) = .23, p < .001). However, there was no significant correlation between the three factors of the AQ and CAB in Iran. In Malaysia, there was a significant positive correlation between the AQ Details-Patterns and the CAB Details-Patterns (r(179) = .21, p = .004). Moreover, in Morocco there was a significant positive correlation between the AQ Details-Patterns and the CAB Details-Patterns (r(92) = .34, p < .001), and between the AQ Communication-Mindreading and the CAB Communication-Mindreading (r(92) = .27, p = .01). Furthermore, in the Netherlands there was a significant positive correlation between the AQ Social Skills and the CAB Social Skills (r(111) = .20, p = .04), and between the AQ Details-Patterns and the CAB Details-Patterns (r(111) = .37, p < .001), and between the AQ Communication-Mindreading and the CAB Communication-Mindreading (r(111) = .25, p = .01).

Table 3.3

Correlation between three factors of AQ and CAB in the total sample and each country.

			R	*p*
Total Sample	AQ Social Skills	CAB Social Skills	.07	.12
(N=476)	**AQ Details-Patterns**	**CAB Details-Patterns**	**.37**	**<.001**
	AQ Communication-Mindreading	**CAB Communication-Mindreading**	**.23**	**<.001**
Iran	AQ Social Skills	CAB Social Skills	-.16	.16
(N=88)	AQ Details-Patterns	CAB Details-Patterns	.13	.23
	AQ Communication-Mindreading	CAB Communication-Mindreading	.12	.25
Malaysia	AQ Social Skills	CAB Social Skills	-.05	.48
(N=181)	**AQ Details-Patterns**	**CAB Details-Patterns**	**.21**	**.004**
	AQ Communication-Mindreading	CAB Communication-Mindreading	.09	.26
Morocco	AQ Social Skills	CAB Social Skills	-.08	.45
(N=94)	**AQ Details-Patterns**	**CAB Details-Patterns**	**.34**	**<.001**
	AQ Communication-Mindreading	**CAB Communication-Mindreading**	**.27**	**.01**
Netherlands	**AQ Social Skills**	**CAB Social Skills**	**.20**	**.036**
(N=113)	**AQ Details-Patterns**	**CAB Details-Patterns**	**.37**	**<.001**
	AQ Communication-Mindreading	**CAB Communication-Mindreading**	**.25**	**.008**

Note: significant differences are in bold.

Discussion

The current study aimed to explore cross-cultural differences in SAT and CAB across four countries: Iran, Malaysia, Morocco, and the Netherlands. The study aimed to compare SAT, CAB, and autism knowledge across countries, and explore the relationship between SAT and CAB. The study found that non-Western countries (Iran, Malaysia, and Morocco) reported higher levels of autistic traits and CAB and lower autism knowledge than the Western country (the Netherlands), consistent with previous studies. Surprisingly, the study discovered inconsistent relationships between SAT and CAB across the four countries, implying that perception of autistic-like behaviours influences self-reporting of autistic traits differently in the four countries.

Comparing the level of SAT and CAB across countries

In line with previous studies (e.g., Carruthers et al., 2018; Freeth et al., 2013, Liu et al., 2020) and in line with the hypothesis, participants from the Netherlands reported lower SAT and CAB scores compared to participants from Iran, Malaysia, and Morocco. These cross-cultural differences observed in the reporting of autistic traits, whether SAT or CAB, indicate that there are cultural variations in the interpretation of these traits, which can influence the diagnosis of autism.

Participants from Iran, Malaysia, and Morocco reported poorer Social Skills in both SAT and CAB compared to participants from the Netherlands, but there were no differences between Iran, Malaysia, and Morocco. An example of items measuring Social Skills in SAT/CAB is “I prefer to do things with others rather than on my own/People usually prefer to do things

with others rather than on their own". This item might be culturally biased. Although this item aims to measure difficulties in establishing and maintaining peer relationships and a preference to perform activities alone as seen in autism, it might be interpreted as a willingness to participate in group-work. According to Sosik and Jung (2002), individuals with Western cultural backgrounds tend to exhibit higher tendencies and efficiency in group-work as compared to individuals with non-Western cultural backgrounds. This finding highlights the potential influence of cultural factors on group dynamics and the tendency to participate in group work. In some cultures, the value placed on individual achievement may mean that individuals are more likely to prefer working independently, even if they are socially skilled. Given these considerations, it is possible that participants from non-Western cultures in my sample, including Iran, Malaysia, and Morocco, may have had different attitudes towards and interpretations of group work than participants from Western cultures, like the Netherlands. It is important to be aware of such cultural differences and potential biases when interpreting findings on autistic traits related to group work and social skills.

Although speculative, cultural differences in social etiquette might influence the relationship between cultural norms and autistic traits. Non-Western or collectivistic cultures are highly group-oriented and emphasize social etiquette, whereas Western or individualistic cultures are more individual-oriented (individualism and collectivism are discussed in the next chapter in more detail). Non-Western cultures with their group-orientation hence focus on social skills, might exhibit higher levels of social skills or lower levels of autistic traits related to social skills compared to Western cultures, but this study's results indicated the opposite. For instance, SAT/CAB Social Skills included items related to social occasions, such as "I find social situations easy/People usually find social situations easy", "I enjoy social chit-chat/People usually enjoy social chit-chat", and "I enjoy social occasions/People usually enjoy

social occasions". One possible explanation for this unexpected finding is that in-group pressures and interactions may make social occasions more stressful or less enjoyable (Stephan et al., 1999) or make people overly conscious of their social skills. As non-Western or collectivistic cultures are group-oriented and emphasize stricter social etiquette, this emphasis can create anxiety and reduce the individual's ability to display their social skills effectively or makes individuals more sensitive about their social behaviour and more aware of their skills and shortcomings.

Furthermore, the study revealed that participants from Iran, Malaysia, and Morocco scored significantly higher on the Details-Patterns factor of the AQ and CAB compared to participants from the Netherlands. This cross-cultural difference may be attributed to varying cultural values concerning numbers and dates. The Details-Patterns factor of AQ/CAB includes items like "I usually notice car number plates or similar strings of information/People usually notice car number plates or similar strings of information", "I am fascinated by dates/People are usually fascinated by dates", and "I am fascinated by numbers/People usually are fascinated by numbers". These items may receive different responses across cultures, as numbers and dates hold distinct cultural significance. Numbers and dates are important for Iranians. For instance, numbers like 7 and 40 are considered lucky numbers due to their historical or cultural significance. Additionally, numbers play a vital role in Chinese culture, which is significant because many Malaysian participants were of Chinese ethnicity. In Chinese culture, Number 8 (as a lucky number) sounds similar to "prosperity" in Chinese, hence Beijing's summer Olympics started at 8:08 pm on 08/08/08 (Yang, 2011). Number 6 is also considered to be a lucky number in Chinese culture. This is because the word for "six" in Mandarin Chinese sounds like the word for "smooth" or "well-off". It is believed that the number 6 brings good luck, especially in matters related to money and finance. Number 4 is,

however, considered to be an unlucky number in Chinese culture. This is because the word for "four" in Mandarin Chinese sounds like the word for "death". Many Chinese people try to avoid the number 4 whenever possible, and it is often omitted from phone numbers, license plates, floors in apartments, and other important numbers. Furthermore, in Morocco, as being an Islamic country, odd numbers are preferred over even numbers and number 7 is associated with perfection. However, in the Netherlands, there are no specific numbers that are widely considered lucky or unlucky. Apparently, numbers play a more important role in non-Western cultures than in Western cultures and paying attention to numbers and dates is perceived as normal, or socially preferable, behaviour in non-Western cultures, whereas paying attention to numbers and dates is less common in Western cultures. Therefore, a focus on numbers might be interpreted as common and socially acceptable in non-Western cultures, even though the AQ's Details-Patterns factor intends to measure autistic traits related to an "extreme" focus on numbers.

Additionally, Iranian and Malaysian participants reported higher levels of SAT in Communication-Mindreading compared to Dutch participants. Almost similar, participants from Iran, Malaysia, and Morocco scored higher rates of CAB in Communication-Mindreading than participants from the Netherlands, indicating a higher tendency to report autistic-like behaviours related to Communication-Mindreading in Iran, Malaysia, and Morocco compared to the Netherlands. Some behaviours might be considered normal in Western cultures, but they might be perceived as impolite in non-Western cultures, and an example of these behaviours is showing boredom (Freeth et al., 2013). SAT and CAB in Communication-Mindreading are measured by items, such as “I know how to tell if someone listening to me is getting bored/People usually know how to tell if someone listening to them is getting bored” or “I find it difficult to work out people’s intentions/People usually find it difficult to

work out other's intentions". Whereas Dutch culture (as a Western culture) is famous for being direct and straightforward, non-Western cultures (Iran, Malaysia, and Morocco) discourage bluntness and highly value "keeping face" as a way to maintain respect in interacting with others (e.g., Eslami, 2004; Hwang, 2010). Therefore, individuals with a Dutch cultural background have a higher tendency to mention their intention or show if they are bored of listening to someone. This overtness might make it easier for them to recognize others' intentions or to notice that someone is getting bored. On the other hand, non-Western cultures emphasize not showing emotion or intention directly to maintain dignity and highly discourage showing getting bored with others talking. As a result, individuals with non-Western cultural backgrounds tend to avoid direct mention of their intention or displays of boredom, and it might be more difficult for them to recognize these behaviours in others.

Moreover, one of items measuring SAT and CAB in Communication-Mindreading is "I find it easy to work out what someone is thinking or feeling just by looking at their face/People usually find it easy to work out what someone is thinking or feelings just by looking at their face". Although this item aims to measure autistic-related difficulties in perceiving others' feelings or emotions, it might be interpreted differently across cultures. Expressing and perceiving emotions or intentions are influenced by culture at different levels. First, cultural background determines to which part of the face one pays attention for emotional cues. Individuals in Western cultures tend to pay more attention to the eyes and mouth to perceive facial emotions, whereas individuals in non-Western cultures focus relatively more on the eyes (Jack et al., 2012). Second, cross-cultural differences influence the perception of emotions through speech. Whereas individuals pay more attention to the meaning of words in Western cultures, individuals pay more attention to discovering emotional information and vocal tones in non-Western cultures (Ishii et al., 2003). Third, cross-cultural differences

influence the value of emotions. Expressing emotions is considered reflective of the true self in Western cultures (valuing individuality, independence, and autonomy), whereas in non-Western cultures (valuing group harmony and interdependency) expressing emotions might be perceived as disruptive and socially undesirable (Wang, 2013). Therefore, cross-cultural differences in expressing and perceiving emotions might affect reporting autistic traits related to emotions across countries. In addition, exploring the sub-cultures within each country, particularly within Malaysia with its three distinct sub-cultures, could offer valuable insights. However, such an investigation extends beyond the intended scope and objectives of this study. Nevertheless, this proposition presents an intriguing direction for future research endeavours.

Comparing the level of autism knowledge across countries

The findings of this study demonstrate that individuals from the Netherlands possess a higher level of knowledge about autism when compared to participants from Iran, Malaysia, and Morocco. This result is consistent with previous studies (e.g., de Vries et al., 2020; Obeid et al., 2015). The Netherlands has a strong tradition of NGOs and self-advocacy that focus on autism-related issues (Waltz, 2015), which may have contributed to the higher levels of autism knowledge in this country. In contrast, the availability of support, including informational support, is limited in Iran (Zarafshan et al., 2019), Malaysia (Lim, 2015), and Morocco (Oneib et al., 2022). Despite efforts to improve autism knowledge in recent years, this study highlights the need for more autism-related information in these countries. Enhancing understanding and knowledge about autism is crucial as it promotes more positive attitudes towards individuals with autism (Sasson & Morrison, 2019). As people become more

knowledgeable about autism, they are more likely to be accepting and understanding of autistic individuals and their traits. Consequently, the increase in autism knowledge might affect the perception of autistic traits.

However, it is also important to recognize that the impact of increasing autism knowledge on attitudes towards autism may not be the same across all cultures (Mac Cárthaigh & López, 2020). Cultural beliefs and values can influence the way people perceive and respond to autism, and so the effect of increasing autism knowledge may be different in different cultural contexts. Therefore, it is important to develop culturally sensitive approaches when promoting autism awareness and education. This will ensure that autistic individuals are understood and supported in a way that is respectful of their cultural background. Furthermore, promoting cultural sensitivity will also help reduce the stigma and discrimination often faced by autistic individuals from different cultures. Overall, this study underscores the importance of continuing efforts to improve autism knowledge and awareness globally while taking into account cultural differences and promoting sensitivity towards diverse perspectives.

The relationship between SAT and CAB

The results indicated that CAB might affect the perception and reporting of autistic traits about oneself. Investigating the relationship between SAT and CAB in the whole sample revealed a positive relationship. In line with my expectations, a higher rate of perceived CAB increases the chance of a higher rate of SAT. In other words, it is possible that individuals report a higher rate of autistic-like behaviours if these autistic-like behaviours are considered more common in their society. These cross-cultural differences in CAB can therefore partially

explain the different AQ scores across countries as reported in previous studies (e.g., Freeth et al., 2013). This finding has important implications for understanding how cultural factors may influence the perception and reporting of autistic traits. However, I did not study which specific cultural factors might explain these cross-country differences, and I did not include a clinical population. Future research should consider examining how different cultural contexts and societal norms shape the perception and reporting of specific autistic traits or include a clinical population. Overall, my findings contribute to the understanding of the complex interplay between culture and perception of autistic traits and emphasize the importance of considering sociocultural factors when assessing and understanding autism.

In addition to the main analysis, I conducted an exploratory analysis to examine how autism knowledge and country (culture) associated with SAT. The results indicated that both variables had significant effects on SAT. In particular, higher autism knowledge was linked to lower self-reported autistic traits. This association could be explained by the possibility that individuals with more autism knowledge could recognize and report autistic traits more accurately. Furthermore, more autism knowledge could also decrease negative attitudes and stigma towards autism and autistic behaviours (de Vries et al., 2020; Obeid et al., 2015), which could make individuals more willing and honest about reporting their own autistic traits. These findings have important implications for future research and public health awareness campaigns that aim to improve attitudes towards autism. The results also suggest that autism knowledge may play a role in cross-cultural differences in reporting autistic traits, as I found that autism knowledge varied across the four countries studied. Therefore, more research is needed to better understand how knowledge and self-reported autistic traits are related in different cultural contexts.

Moreover, the findings suggest that cultural differences may associated with SAT, potentially affecting the relationship between SAT and CAB. It is essential to acknowledge that the questionnaire used to measure SAT and CAB, the AQ, was initially developed in a Western context, which could imply that it reflects Western values and norms. This raises the question of whether the AQ may not fully capture non-Western perspectives on autistic traits, as it might contain items that are culturally biased or specific to Western culture. For example, some items in the AQ may not be universally applicable and could be viewed as Western culture-specific (e.g., I would rather go to the theatre than a museum). As a result, it remains unclear which non-Western common social behaviours are not addressed or questioned by the AQ, potentially leading to a limited understanding of autistic traits in non-Western contexts. To explore this further, I conducted additional analyses to examine the relationship between SAT and CAB in each country separately, as well as the relationships among the three factors of SAT, CAB, and cultural background. Interestingly, the results indicated inconsistent relationships between SAT and CAB across countries. In particular, I found no significant relationship between SAT and CAB in Iran, Malaysia, and Morocco, whereas a positive relationship was observed in the Netherlands. These findings suggest that people in non-Western countries may not necessarily perceive their autistic traits as being related to the common autistic-like behaviours observed in their respective cultures. Alternatively, individuals in these non-Western countries may not recognize these behaviours as autistic-like or may not view them as particularly common. In contrast, the positive relationship between SAT and CAB in the Netherlands suggests that people in this country may be more likely to perceive their autistic traits as being related to the common autistic-like behaviours observed in their culture. This could be due to a better awareness and recognition of these behaviours as being autistic-like. However, it is crucial to acknowledge that these

interpretations are speculative, as the results are highly exploratory, and there are no existing references to support these specific interpretations. Moving forward, future research should delve into how cultural factors shape individuals' perception and reporting of autistic traits in various contexts and populations. Additionally, it would be essential to develop or adapt assessment tools that are more culturally sensitive and encompass a broader range of cultural perspectives, as the current Western-oriented instruments may not fully capture the diversity of autistic traits across different cultural backgrounds.

Furthermore, the result indicated that the relationship between autism knowledge and SAT varied across different countries. In Malaysia and Morocco, a negative relationship was observed, whereas no such relationship was found in Iran and the Netherlands. These findings suggest that cultural factors might influence the relationship between autism knowledge and SAT. It is noteworthy that the relationship between autism knowledge and SAT may be limited beyond a certain threshold, as indicated by the presence of a ceiling effect. This threshold may vary depending on the level of autism knowledge in each country. For example, in Malaysia and Morocco, where autism knowledge is relatively high compared to Iran, the impact of autism knowledge on SAT was evident. However, in the Netherlands, which had the highest level of autism knowledge among the four countries, the relationship between autism knowledge and SAT was not observed, possibly due to the ceiling effect. This means if individuals know more about autism and score high, the relationship might disappear. In addition, it is worth considering the potential influence of collectivism-individualism on the relationship between autism knowledge and SAT, particularly given the observed variations between Malaysia and Morocco (collectivistic cultures) compared to the Netherlands (individualistic culture). This underscores the importance of conducting further

research to examine the interplay between autism knowledge, collectivism-individualism, and autistic traits across diverse countries.

Moreover, an exploratory analysis of the relationships between three factors (Social Skills, Details-Patterns, and Communication-Mindreading) in SAT and CAB across the four countries (Iran, Malaysia, Morocco, and the Netherlands) showed inconsistent relationships between the factors in SAT and CAB across the countries. These findings highlight the need for further research to investigate the complex relationship between autism knowledge and SAT, as well as the relationship between the three factors across different cultural and social contexts.

Strength and limitations

One notable strength of the study is its cross-cultural design, which gathered data from four countries with different cultural backgrounds, including Middle Eastern, South-East Asian, North African, and West European. Such a design improves the generalizability of the findings and can provide insights into more effective approaches for addressing cross-cultural variations in SAT and CAB. Additionally, the study's sample size is relatively large, and it includes participants from diverse ethnicities, which enhances the generalizability of the study results and allows for conclusions that are more robust. Moreover, the study used a three-factor model of the AQ, which is deemed more accurate than the original five subscales model. This refined model can assist researchers in gaining a more nuanced understanding of the factors that contribute to an individual's AQ score.

However, the study has some limitations. The first limitation pertains to the survey's language. Although I used official languages in Iran (Persian), Morocco (Arabic), and the Netherlands (Dutch), I used English in Malaysia. Although English is widely spoken in Malaysia due to its colonial history, the use of official and native languages in cross-cultural studies could improve the reliability of the results. Chee and de Vries (2022) reported that language might affect AQ scores; however, language proficiency can reduce this effect. Therefore, the use of official or native languages in cross-cultural studies could enhance the reliability of the findings. Second, the study did not control for potential confounding variables, such as educational attainment and socioeconomic status, which may have influenced the results. Therefore, it is crucial to interpret the findings with caution and refrain from making definitive conclusions. Future studies should attempt to control for these confounding variables to more accurately assess cross-cultural differences in SAT and CAB. The third limitation pertains to the data collection method. I used online surveys in Malaysia, Morocco, and the Netherlands, whereas I used paper-and-pencil surveys in Iran. This difference in data collection methods could have introduced some bias into the results, as individuals who respond to online surveys may differ systematically from those who respond to paper-and-pencil surveys. Future research could consider using the same data collection method across all countries to minimize potential bias between survey samples.

Conclusions

In conclusion, the main objective of this research was to contribute toward a greater understanding of cross-cultural differences in the reporting of autistic traits and the

commonness of autistic-like behaviour. The present study emphasizes the importance of cultural factors in assessing and understanding autism across different cultures.

The study revealed clear cross-cultural variations in the interpretation of autistic traits, which can have significant implications for the diagnosis and support of autistic individuals. The findings also revealed a significant gap in autism knowledge between Western and non-Western countries, highlighting the need for more autism-related information and resources in non-Western countries.

Additionally, the study showed that the perception of CAB influences SAT, highlighting the role of cultural factors in the diagnosis and assessment of autism. It is crucial for clinicians and researchers to be aware of the impact of cultural factors when evaluating autism symptoms and to ensure that assessments are culturally appropriate and sensitive.

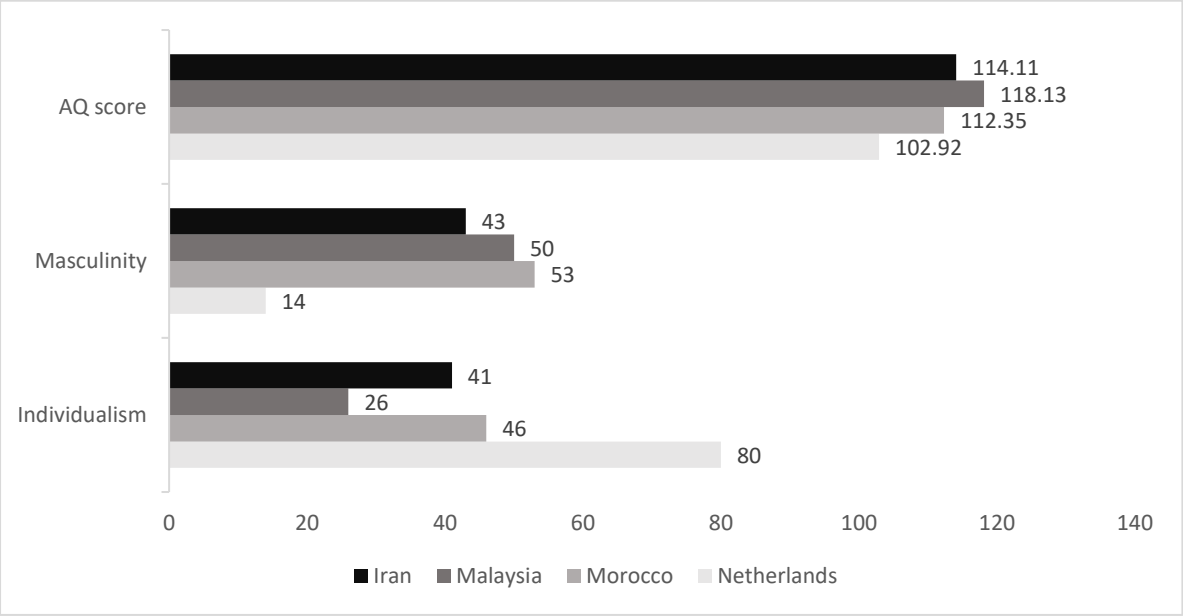
These findings underscore the importance of considering cross-cultural differences in the perception of autistic traits, particularly when utilizing autism measures like the AQ, especially in non-Western cultures. A critical step is to evaluate whether the AQ's items align with the cultural norms and nuances of the population under investigation. To address this challenge, further research should delve into the cultural appropriateness of AQ items, exploring the necessity for potential modifications, additions, or omissions to more accurately capture autistic-related social and communication behaviours in non-Western cultures. Recognizing and addressing these cultural differences in the use of autism measures such as the AQ can significantly enhance our efforts to provide appropriate support and understanding for autistic individuals worldwide while respecting and accommodating their diverse cultural backgrounds.

Chapter 4: Exploring the interplay: Unveiling relationships between masculinity, femininity, individualism, collectivism, and autistic traits

Culture, as defined by Hofstede (1980), is the shared mental framework that sets apart individuals belonging to a particular group or category from those in other groups. Hofstede (1980) proposed the cultural dimensions theory, and later Hofstede and Minkov (2010) proposed six cultural dimensions, in which countries could vary. These dimensions are “Power Distance”, “Uncertainty Avoidance”, “Individualism vs. Collectivism”, “Masculinity vs. Femininity”, “Long Term vs. Short Term Orientation”, and “Indulgence vs. Restraint”. The study in Chapter 3 indicated higher self-reported autistic traits in Iran, Malaysia, and Morocco compared to the Netherlands. Hofstede (1984) observed similar patterns with respect to two cultural dimensions; a higher rate of masculinity and a lower rate of individualism in Iran, Malaysia and Morocco compared to the Netherlands (see Figure 4.1). In addition, gender differences in autistic traits suggest that the level of masculinity and femininity might affect (self) reported autistic traits. Hence, it is plausible that masculinity, femininity, individualism, and collectivism contribute to the cross-cultural variations in reporting autistic traits.

Figure 4.1

The level of masculinity and individualism in the four countries according to Hofstede (1984), and AQ scores according to Chapter 3.



Gender differences, masculinity, femininity, and autism

Autism is diagnosed four times more often in boys than in girls (American Psychiatric Association, 2013). Studies have reported varying male-to-female diagnosis ratios, ranging from 8:1 (Icasiano et al., 2004) to 3:1 (Loomes et al., 2017), highlighting the consistent observation of a higher prevalence among males. Moreover, autistic females, on average, receive the diagnosis later than autistic males (Begeer et al., 2013; Shattuck et al., 2009). In the past two decades, many researchers have attempted to explain gender differences in autism. For instance, according to the extreme male brain theory (Baron-Cohen, 2002), autistic individuals show impairment in empathizing and superior systemizing, which categorizes them as having an “extreme male brain”.

Additionally, gender-specific traits or social expectations might be associated with these gender differences in autism. Autistic females indicate a higher rate of social difficulties than males, whereas they present fewer restricted behaviours than autistic males (Van Wijngaarden et al., 2014). However, autistic males' social difficulties are more visible among their peers compared to autistic females' social difficulties (Dean et al., 2017). These seemingly opposing findings might be because autistic females present better social communication skills compared to autistic males (Conlon et al., 2019; Kauschke et al., 2015; Parish-Morris et al., 2017) or because autistic females may be more skilled at masking their autistic traits (Bargiela et al., 2016; Lai et al., 2015). Hence, autistic females' social difficulties are noticed less in society. Moreover, there appear to be gender differences in topics of specific interests. Whereas autistic females more often show a focused interest in topics related to people or animals, autistic males are more often interested in topics related to numbers or transportation (Lai et al., 2015). The latter might be considered more common for autism, and hence be flagged by society (or parents, teachers, or clinicians), whereas female-specific interests might not be noted.

These substantial gender disparities raise questions about the potential influence of masculinity and femininity on the manifestation and reporting of autistic traits, which may contribute to underdiagnoses or misdiagnosis in certain populations. Culture can be an influential factor in gender differences in autism, as social and cultural expectations on behavioural domains differ by gender (Thompson et al., 2003). Masculinity and femininity terms refer to characteristic behaviours that are typically associated with being male or female, respectively (Hofstede, 1980). Typical masculine behaviours are being independent, being competitive, and feeling superior (Bem, 1974). On the other hand, some typical feminine behaviours are being emotional, being helpful, and being aware of feelings (Bem,

1974). Bem (1974) proposed masculinity and femininity as two separate dimensions by developing the Bem Sex-Role Inventory (BSRI). She proposed that individuals with higher rates of masculinity do not necessarily indicate lower femininity. Similarly, Runge and colleagues (1981) proposed masculinity and femininity as two independent dimensions. Therefore, in the current study, I interpret masculinity and femininity as two independent dimensions.

Additionally, masculinity and femininity can be perceived on two levels, personal and cultural. Masculinity and femininity on a personal level refer to behaviours and traits that are traditionally considered masculine or feminine. For instance, being independent and aggressive are considered masculine behaviours, but expressing emotions and empathy are considered feminine behaviours. Masculinity and femininity on a cultural level refer to social norms and expectations related to gender roles and behaviours. These social and personal norms and expectations can vary widely across cultures. For example, in certain cultures, there is an emphasis on assertiveness and achievement as primary roles for men, with the expectation that they should be the primary breadwinners. Conversely, women in these cultures may prioritize quality-of-life issues, caregiving, and helping the less fortunate, often with an expectation to focus on household duties. In this study, I consider masculinity and femininity as the mixture of both levels (personal and cultural), because these two levels highly relate to each other.

There is some evidence that autistic individuals may have difficulties with understanding and expressing gender-specific social norms. Autistic females report a higher rate of masculinity and a lower rate of femininity compared to non-autistic females (Bejerot et al., 2012; Cooper et al., 2018), whereas autistic males report lower levels of masculinity than non-autistic males (Bejerot et al., 2012). Importantly, autism is a spectrum, the level of

autistic traits can vary among autistic individuals, and non-autistic individuals can express some autistic traits as well. Autistic individuals (with high rates of autistic traits) indicate deviance from gender-related social norms regardless of their gender. Autistic traits are related to gender defiance, although it is unclear whether this relationship is direct or indirect. Hence, I argue there might be a relationship between autistic traits, masculinity, and femininity in the general population.

Therefore, within the current study, I aimed to investigate whether masculinity and femininity are associated with the rate of reporting autistic traits. Investigating the relationship between masculinity, femininity, and reporting autistic traits among students can provide valuable insights into the ways that gender-related norms affect the perception of autistic traits. Autism has traditionally been viewed as a condition that predominantly affects males, with diagnostic criteria based on male behaviour patterns. By examining how masculinity and femininity relate to the reporting of autistic traits, I can achieve a better understanding on how gender-related norms influence the expression and recognition of autistic traits.

Individualism, collectivism, and autism

In individualistic (Western, independent) cultures, the assumption is that individuals are independent of their in-group, and people prioritize their autonomy and self-fulfilment over those of their in-group (Hofstede, 1980). In individualism, people focus on rights compared to duties and they behave according to their attitudes rather than the norms of their group (Triandis, 2001). On the other hand, in collectivistic (non-Western, interdependent) cultures, the assumption is that people are interdependent within their in-

group, and they prioritize their group norms (Mills & Clark, 1982). Therefore, individuals in collectivistic cultures see themselves as a part of society and organise their behaviours based on their perception of others' thoughts, feelings, and actions (Markus & Kitayama, 1991).

Cross-cultural studies by Freeth et al. (2013), Kurita et al. (2005), Wakabayashi et al. (2006), and Chapter 3 showed a lower rate of reporting autistic traits in Western countries (with a higher rate of individualism) compared to non-Western countries (with a higher rate of collectivism). These findings show the possibility of differences between individualistic and collectivistic cultures affecting the perception and reporting of autistic traits. Hence, I aimed to investigate whether the relationship between individualism, collectivism, and reporting autistic traits can explain cross-cultural differences in reporting autistic traits. According to previous studies (Freeth et al., 2013; Kurita et al., 2005; Wakabayashi et al., 2006), I hypothesised that individualism would be negatively, and collectivism would be positively associated with self-reported autistic traits.

Additionally, despite Hofstede's (1980) suggestion that individualism and collectivism form a single continuum, I considered individualism and collectivism separate dimensions in the current study, in line with Triandis and Gelfand's (1998) approach. By investigating the relationships between individualism, collectivism and reporting autistic traits among students, I can gain a better understanding of how these cultural factors may influence the expression of autism-related traits.

The current study

Study 2's cross-cultural comparison hinted at a possible connection between masculinity-femininity and self-reported autistic traits, sparking curiosity. Study 3, a pilot investigation, seeks to explore this link further. However, it is crucial to note that this study does not offer a complete cross-cultural analysis. The complexity of this topic calls for more extensive cross-cultural research in the future. Subsequent studies may uncover the intricate connections among gender norms, self-reported traits, and cultural variations.

In my previous study (Chapter 3), I found that there were differences in the reporting of autistic traits among non-autistic individuals across four countries (Iran, Malaysia, Morocco, and the Netherlands). Specifically, non-autistic participants in Iran, Malaysia, and Morocco reported higher rates of autistic traits compared to those in the Netherlands. With the current study, I aimed to explore whether cultural factors, such as masculinity, femininity, individualism, and collectivism, contribute to these cross-cultural differences.

Hofstede's (1980) reports on masculinity and individualism in different cultures (see Figure 4.1) suggest that people in more masculine and less individualistic cultures report more autistic traits compared to less masculine and more feminine cultures. Building on these findings, I aimed to explore the associations between cultural domains (i.e., masculinity, femininity, individualism, and collectivism) and reported autistic traits among students. Within the current study, I aimed to investigate; 1. The relationships between masculinity, femininity, and reported autistic traits, 2. The relationships between individualism, collectivism, and reported autistic traits.

Method

Participants

To estimate the minimum sample size required for a medium effect size and a well-powered dataset, an a priori G* Power analysis (Faul et al., 2007) was performed. Based on the assumptions of one group with four predictors design, an alpha level of α=.05, and a power of 1−β=.95, the analysis indicated that a total of 129 participants were needed to detect a medium effect size of f=0.25. In this study, I recruited 206 students from the University of Nottingham Malaysia. Of these students, 140 completed the survey and were included in the analysis. The sample consisted of 113 females (80.7%) and 27 males (19.3%). The age of the participants ranged from 18 to 40 years, with a mean age of 21.25 years (SD = 4.23). The sample included 93 (66.4%) Malaysian students and 47 (33.6%) international students. Within the Malaysian student group, there were 56 (60.2%) Chinese students, 20 (21.5%) Malay students, 12 (12.9%) Indian students, and 5 (5.4%) students from other ethnic groups. International students were from a variety of countries (3 Bangladesh, 1 British, 1 Canadian, 2 Chinese, 2 Egyptian, 1 German, 14 Indian, 1 Kenyan, 2 Maldivian, 5 Mauritian, 1 Mexican, 1 Mozambican, 2 Pakistani, 2 South Korean, 4 Sri Lankan, 1 Turkmenistani, 1 Ugandan, 2 American, 1 Zimbabwean). To examine how cultural domains influenced reporting autistic traits, like Chapter 3, I selected participants who were not autistic. This choice was made because the autistic individuals had already been identified by standard measurements and had comparable levels of autism. While it is valid to consider differences in population behaviours and diagnostic instruments across countries, this study aimed to understand the general population's perception of autistic traits within diverse cultural contexts. By including non-autistic participants, I could assess how cultural backgrounds influence the interpretation

of these traits across a broader spectrum. This approach acknowledges the need for culturally sensitive screening measures that can accurately identify individuals with autism, regardless of the severity of their symptoms or the cultural context in which they reside.

Materials

Masculinity and femininity were assessed with three measures: the Traditional Masculinity-Femininity Scale (TMF; Appendix K; Kachel et al., 2016), the German Extended Personal Attributes Questionnaire (GEPAQ; Appendix L; Runge et al., 1981), and the Bem Sex-Role Inventory (BSRI; Appendix M; Bem, 1974). These measures had not been previously used in studies conducted in Malaysia. I, therefore, planned to test the psychometric properties of these measures and only use the best measure in the main analyses. For a detailed examination of the evaluation of these measures, please refer to Appendix N. Based on these analyses, I included only the GEPAQ in the main analyses.

The GEPAQ was used to assess the individuals' self-perceived gender-related behaviours within the traditional masculine and feminine framework. The questionnaire consists of 16 items, and participants are asked to rate their responses on a 5-point bipolar scale. The scale includes anchor points, such as “Not independent 1 2 3 4 5 Very independent”, allowing participants to indicate their level of agreement with each item. The items in the GEPAQ are designed to capture different aspects of gender-related behaviours. Some examples of GEPAQ items are "not emotional/very emotional" and "decisive/not decisive." These items present opposing characteristics associated with masculinity and femininity. The GEPAQ divides its 16 items evenly between masculinity and femininity, with half of the items assessing masculine behaviours and qualities and the other half assessing

feminine behaviours and qualities. By completing the questionnaire, participants provide self-reports of their own tendencies toward masculine and feminine behaviours. A higher score on the GEPAQ masculinity scale indicates a greater inclination towards masculine behaviours and qualities, whereas a higher score on the GEPAQ femininity scale indicates a greater inclination towards feminine behaviours and qualities. GEPAQ masculinity and femininity indicated good psychometric reliability (Cronbach's alpha coefficients for masculinity and femininity were .88 and .82, respectively, Appendix N).

Self-report autistic traits were measured by using the AQ-50 (Baron-Cohen et al., 2001), and I used the 3-factor model (Russell-Smith et al., 2011), with the factors Social Skills, Details-Patterns, and Communication-Mindreading to obtain insight into specific traits. Please see Chapter 3 materials for more details.

To measure collectivism and individualism, I used the Horizontal and Vertical Individualism and Collectivism Scale (INDCOL; Appendix O; Triandis & Gelfand, 1998). The INDCOL contains 16 items and measures 4 factors; horizontal collectivism, horizontal individualism, vertical collectivism, and vertical individualism. The current study only focused on collectivism and individualism; therefore, I calculated them by summing up horizontal and vertical scores. Examples of INDCOL items are “I'd rather depend on myself than others” and “To me, pleasure is spending time with others”. Participants responded to INDCOL items on a 9-point Likert-type scale, ranging from “never or definitely no” to “always or definitely yes”. INDCOL has adequate Cronbach’s α ranging from .67 to .75 (Germani et al., 2020).

Procedure

The data was collected online and anonymously through Qualtrics. The study received ethical approval from the Science and Engineering Research Ethics Committee of the University of Nottingham Malaysia (OF010920). I distributed this survey through the university recruitment email, which informed all students once a month about new studies looking for participants. Students received RM 5 for participating in this study in both phases as a token of appreciation.

After providing informed consent, participants responded to demographic questions, such as age, gender, and nationality. After providing demographic information, the participants completed the TMF, AQ, BSRI, INDCOL, and GEPAQ. At the end of the survey, they were thanked for their contribution and explained details of the study. Completing this survey took, on average, 25 to 30 minutes.

Results

Data assumptions

I used SPSS 28 for the data analyses. The normality of the AQ-50 total score (AQ-50 total from now) and the three factors (AQ Social Skills, AQ Details-Patterns, AQ Communication-Mindreading) were tested with Shapiro-Wilk tests. The outcomes of these tests indicated no significant deviance from normality of the AQ-50 total ($W(140) = .99$, $p = .50$), AQ Social Skills ($W(140) = .99$, $p = .33$), AQ Details-Patterns ($W(140) = .99$, $p = .45$), and the AQ Communication-Mindreading ($W(140) = .99$, $p = .18$). Descriptive information regarding the dependent and independent variables is presented in Table 4.1.

Table 4.1

Descriptive information of the dependent and independent variables (N = 140).

	Min	*Max*	*M*	*SD*
AQ-50 total	92	155	122.40	13.23
AQ Social Skills	15	51	32.99	7.80
AQ Details-Patterns	8	28	18.71	3.88
AQ Communication-Mindreading	8	26	16.56	3.87
GEPAQ masculinity	11	38	25.94	5.19
GEPAQ femininity	15	39	29.77	4.83
INDCOL individualism	22	67	48.79	8.96
INDCOL collectivism	24	72	50.26	9.84

I conducted two independent-samples t-tests to assess the disparities in masculinity and femininity levels among male and female participants (see Table 4.2). The results indicated significant difference between males and females in GEPAQ masculinity ($t(138) = -2.90$, $p < .01$), whereas there was no significant difference between males and females in GEPAQ femininity.

Table 4.2

Comparing the level of masculinity and femininity between males and females.

	Gender	*M (SD)*	*t*(138)	*P*
GEPAQ masculinity	Male (N=27)	28.48 (5.18)	-2.90	.004**
	Female (N=113)	25.34 (5.03)		
GEPAQ femininity	Male (N=27)	29.00 (3.78)	0.92	.36

	Female (N=113)	29.96 (5.05)

Note: *p < .05, **p < .01, ***p < .001

The relationships between masculinity, femininity, individualism, collectivism, and autistic traits

To investigate the relationships between masculinity, femininity, individualism, collectivism, and autistic traits, four multiple linear regressions were used with the AQ-50 total, AQ Social Skills, AQ Patterns-Details, and AQ Communication-Mindreading as the dependent variables and GEPAQ-masculinity, GEPAQ-femininity, INDCOL-individualism, and INDCOL-collectivism as independent variables (see Table 4.3). A significant regression equation was found for AQ-50 total (F(4, 135) = 12.13, p < .001), with R^2 of .26. Participants' AQ-50 total is equal to 164.82 – 0.93(Masculinity) – 0.85(Femininity) + 0.28(Individualism) – 0.13(Collectivism). Masculinity (t = -4.46, p < .001), Femininity (t = -3.68, p < .001), and Individualism (t = 2.27, p = .03) were significant predictors of AQ-50 total, but Collectivism was not.

Additionally, a significant regression equation was found for AQ Social Skills (F(4, 135) = 20.55, p < .001), with R^2 of .38. Participants' AQ Social Skills is equal to 60.27 – 0.74(Masculinity) – 0.39(Femininity) + 0.24(Individualism) – 0.17(Collectivism). Masculinity (t = -6.61, p < .001), Femininity (t = -3.11, p = .002), Individualism (t = 3.72, p < .001), and Collectivism (t = -2.70, p = .008) were all significant predictors of AQ Social Skills. Moreover, a significant regression equation was found on the AQ Patterns-Details (F(4, 135) = 6.02, p < .001), with R^2 of .15. Participants' AQ Patterns-Details is equal to 7.05 + 0.06(Masculinity) + 0.18(Femininity) + 0.02(Individualism) + 0.07(Collectivism). Femininity (t = 2.53, p = .01) was

a significant predictor of the AQ Details-Patterns, but Masculinity, Individualism, and Collectivism were not. Furthermore, a significant regression equation was found on the AQ Communication-Mindreading ($F(4, 135) = 14.62$, $p < .001$), with R^2 of .30. Participants' AQ Communication-Mindreading is equal to 33.09 – 0.19(Masculinity) – 0.32(Femininity) – 0.05(Individualism) + 0.01(Collectivism). Masculinity ($t = -3.12$, $p = .002$), and Femininity ($t = -4.93$, $p < .001$ were significant predictors of AQ Communication-Mindreading, but Individualism and Collectivism were not.

Finally, considering that the majority of participants were female (80.7%), I conducted a separate analysis including only female participants (see Appendix P). Unsurprisingly, the results of the analysis for female participants yielded similar findings to those obtained when analysing the entire participant sample.

Table 4.3

The relationship between the AQ-50 total, the three factors, masculinity, femininity, individualism, and collectivism.

	Dependent Variables			
N=140	AQ-50 total	AQ Social Skills	AQ Patterns-Details	AQ Communication-Mindreading
R^2	.26	.38	.15	.30
F	12.13 ***	20.55 ***	6.02 ***	14.62 ***
β_0	164.82	60.27	7.05	33.09
Masculinity (β_1)	-.93 ***	-.74 ***	.06	-.19 **
Femininity (β_2)	-.85 ***	-.39 **	.18 **	-.32 ***
Individualism (β_3)	.28 *	.24 ***	.02	-.05

Collectivism (β_4)	-.13	-.17 **	.07	.01

Note: *$p < .05$, **$p < .01$, ***$p < .001$

Discussion

The objective of the current study was to investigate the relationship between four cultural dimensions (masculinity, femininity, individualism, collectivism) and self-reported autistic traits among students. The findings revealed that masculinity and femininity showed a negative association with self-reported autistic traits, consistent with the results of a study conducted by Kallitsounaki and Williams (2020). Additionally, it was found that only individualism, and not collectivism, exhibited a positive association with self-reported autistic traits. Furthermore, the relationship between the cultural dimensions and the three factors of autistic traits (i.e., Social Skills, Details-Patterns, and Communication-Mindreading) showed variations, which will be discussed below in more detail.

Masculinity and femininity

Both masculinity and femininity were negatively related to self-reported autistic traits. These associations indicate that people with more self-reported autistic traits may perceive themselves as less aligned with masculine or feminine social norms. According to Kallitsounaki and Williams (2020), the negative association between masculinity, femininity, and self-reporting autistic traits in non-autistic individuals indicates that those with high autistic traits perceive themselves as neither masculine nor feminine and more often identify as cisgender. This may also be related to the challenges that some autistic individuals, with high rates of

autistic traits, face with regard to their gender identity, as highlighted by Glidden et al. (2016). Furthermore, individuals with more autistic traits may experience difficulties in understanding and adhering to gender-related social norms, which may result in lower levels of self-reported masculinity and femininity compared to those with lower levels of autistic traits. It is noteworthy that the sample included both male and female participants. It is commonly assumed that males score higher on masculine traits and females score higher on feminine traits. Additional analyses conducted within the sample revealed only significant differences in masculinity between male and female participants (higher masculinity score among male participants compared to female participants), whereas there was no significant difference between males and females in terms of feminine traits.

Difficulties in Social Skills and Communication-Mindreading were negatively associated with masculinity and femininity. These associations imply that more masculine and feminine individuals report lower autistic traits related to Social Skills and Communication-Mindreading. Possibly, more masculine and/or feminine individuals adapt better to social situations and expectations due to their adherence to typical gender role behaviours. They may possess a greater ability to notice and respond to nonverbal cues, engage in social conversation, and navigate social norms.

On the other hand, it is important to recognize that individuals with autism or those who exhibit high levels of autistic traits may face unique challenges in specific aspects of Social Skills and Communication-Mindreading. These challenges can be influenced by societal gender norms and expectations. To delve into this concept further, let us consider the following scenario: non-autistic individuals might sometimes exhibit behaviours that could be mistakenly associated with autistic traits. These behaviours might include difficulties in

maintaining eye contact, struggling to effectively engage with social stimuli, and facing challenges in interpreting social cues and facial expressions (Celani et al., 1999; Secrey et al., 2014; Willemsen-Swinkels et al., 1998). The key point here is that certain social behaviours, which might be attributed to autism, can also be observed in individuals without autism. However, the underlying reasons for these behaviours can be different. For individuals with autism, these behaviours may stem from their unique cognitive and sensory processing characteristics, whereas in non-autistic individuals, these behaviours may be influenced by societal expectations and norms related to gender.

Adding to this complexity are the societal gender norms and expectations that shape our interactions. In many cultures, there is an assumption that men are inherently more independent, competitive, and decisive, whereas women are expected to exhibit qualities, like nurturing, understanding, and warmth (Runge et al., 1981). These gender roles and expectations can be associated with how individuals perceive and report their own behaviours and traits, including those related to autism. For example, individuals who identify as highly masculine may be less inclined to report communication difficulties associated with autism because these traits are perceived as not aligning with traditional masculinity norms. Similarly, individuals who identify as highly feminine may be less likely to report difficulties with mindreading and understanding others' perspectives because these traits are perceived as aligning with traditional femininity norms. Therefore, individuals who strongly identify with their gender role may be more likely to conform to gender norms and expectations, leading to hesitation in reporting behaviours or traits that deviate from gender expectations. The negative association observed between reporting autistic traits related to Social Skills and Communication-Mindreading and both masculinity and femininity might be attributed to the same association between AQ total score and masculinity and femininity.

The relationships between masculinity and femininity and reporting autistic traits related to Details-Patterns did not follow a predictable pattern. The level of femininity was positively associated with autistic traits related to Details-Patterns, whereas masculinity did not seem to have any association with reporting these autistic traits. This phenomenon may be attributed to gender differences in paying more attention to details. Research has shown that non-autistic women tend to process and retain visual (van Pelt et al., 2018) and auditory (Toufan et al., 2021) attention more efficiently than men, resulting in a greater focus on details and a greater level of detail evaluation. This increased sensitivity to details may lead to a greater awareness of these features in social situations, potentially contributing to a higher possibility of reporting autistic-like traits related to patterns and details among females compared to males. Furthermore, females are often expected to exhibit greater levels of empathy (Bem, 1974), which may result in a heightened awareness of the emotions and nonverbal cues of others. These factors could also contribute to a higher rate of reporting autistic-related traits related to patterns and details among individuals with higher levels of femininity. Therefore, the relationships between masculinity and femininity and reported autistic traits related to Details-Patterns is not straightforward. This may be due to gender differences in attention to details, where women tend to exhibit a greater focus on details and an increased awareness of emotions and nonverbal cues. As a result, individuals with higher levels of femininity may report more focus on patterns and details.

Individualism and collectivism

Interestingly, the study revealed an unexpected positive association between the levels of individualism and self-reported autistic traits, which contradicts my expectation

based on previous findings (e.g., Freeth et al., 2013; Kurita et al., 2005; Wakabayashi et al., 2006) as well as the results presented in Chapter 3, which indicated higher rates of self-reported autistic traits in countries with more collectivistic cultures. This interpretation implies Simpson's paradox (Blyth, 1972), suggesting that the variation observed among countries in Chapter 3 may not be attributed to differences in individualism or collectivism, but rather, it may be influenced by other cross-cultural factors.

However, individualistic cultures, which place greater emphasis on independence and personal achievement (Hofstede, 1980), may have a higher acceptance of certain characteristics associated with autism, such as a preference for logical thinking, attention to detail, and a focus on individual interests. In contrast, these traits may be less valued in collectivistic cultures, where social harmony and conformity are more highly prioritized (Oyserman, 1993). Therefore, individuals with higher levels of individualism may be more aligned with the values of individualistic cultures and report more autistic traits.

This relationship can be mainly explained by the relationship between individualism and autistic traits related to social skills, as there was no relationship between individualism and autistic traits related to patterns-details and communication-mindreading. Individualistic cultures tend to prioritize personal goals and achievements (Hofstede, 1980), and emphasize self-expression and independence. On the other hand, collectivistic cultures prioritize group harmony and interdependence (Hofstede, 1980). In these cultures, fitting in and maintaining social harmony are highly valued. Individualism might hence align more with the Social Skills as measured with the AQ.

In this study, I explored the potential link between individualism-collectivism and self-reported autistic traits, building upon the insights from Study 2. While individualism-

collectivism emerged as a factor, it is important to acknowledge that cultural differences in reporting autistic traits are complex and multifaceted. The unexpected finding of a positive relationship between individualism and self-reported autistic traits suggests that other cultural factors beyond individualism-collectivism may play a significant role in shaping these behaviours. Moving forward, it is crucial to consider a broader range of cultural factors and behavioural dynamics in future studies. Culture encompasses much more than just individualism-collectivism, and exploring these additional factors could provide valuable insights into the differences observed between Western and non-Western countries.

Limitations

The study has some limitations that should be considered when interpreting the results. First, the sample was imbalanced in terms of gender, with a majority of female participants (80.7%). This disparity might have influenced the observations, particularly when examining the differences in masculinity and femininity between male and female participants within our sample. Although the study aimed to explore masculinity and femininity as distinct variables, a more balanced sample would increase the reliability and generalizability of the findings. The imbalanced sample may also have affected the AQ results, as the AQ was developed based on mostly autistic males, which could have biased it towards male autistic traits. Thus, the results of this study should be interpreted cautiously. Second, despite having a diverse sample, which allowed for a better understanding of how cultural factors may influence the reporting of autistic traits in different populations, the cultural background of the participants was also a limitation, as the majority were from a quite collectivistic culture, namely Malaysia (66.4%) or other collectivistic countries. This

homogeneity within the cultural background of participants might have narrowed the range of responses to the measures. Consequently, it becomes challenging to disentangle the effects of culture from individual differences when examining the relationship between, individualism, collectivism, and reporting autistic traits. Additionally, the inconsistent relationships between individualism and collectivism and reporting autistic traits in this study compared to previous research may be explained by this limitation. Therefore, future research should include participants from both individualistic and collectivistic cultural backgrounds to ensure more representative and generalizable results.

Conclusions

In conclusion, the current study explored the relationships between cultural dimensions (masculinity, femininity, individualism, and collectivism) and self-reported autistic traits among students. The results revealed that masculinity and femininity had a negative association with the frequency of self-reported autistic traits, and only individualism was positively associated with self-reported autistic traits. The relationships between masculinity and femininity and self-reported autistic traits varied depending on the specific autistic traits being measured, and the findings suggest that social norms and gender expectations may influence how individuals perceive and report their own traits and behaviours related to autism. The unexpected finding of the positive association between individualism and autistic traits is interesting and suggests that cultural values and priorities may play a role in interpreting autistic traits. Overall, these findings highlight the complex interplay between culture, gender roles, and autistic traits, and provide important insights for future research in this area.

Chapter 5: Parental distress and coping strategies among parents of autistic children in Malaysia and the Netherlands

Parents of autistic children often encounter higher levels of stress compared to parents of children with other disabilities, such as developmental delays (Chen et al., 2020; Estes et al., 2013), Down syndrome (Dabrowska & Pisula, 2010; Griffith et al., 2010), as well as parents of typically developing children (Dabrowska & Pisula, 2010; DesChamps et al., 2020; Estes et al., 2013). Furthermore, numerous studies have consistently demonstrated that parents of autistic children frequently experience elevated levels of anxiety and depression (e.g., Al-Farsi et al., 2016; Bitsika & Sharpley, 2004; Lai et al., 2015; Machado Junior et al., 2016; Schnabel et al., 2020) compared to parents of non-autistic children. These findings underscore the significant emotional and psychological impacts faced by parents of autistic children, highlighting the need for comprehensive research on the contributing factors.

It is important to consider why parents of autistic children often experience higher levels of stress compared to parents of children with other developmental disabilities. Many developmental conditions, including autism, entail traits expressed by parents and have high heritability rates, which may contribute to heightened distress among parents. For example, the behavioural challenges associated with autism, such as communication difficulties and repetitive behaviours, can pose unique stressors for parents that may not be as prevalent in other developmental disabilities (Altiere & von Kluge, 2009; Bonis, 2016; Hall, 2012; Saisto et al., 2008). Additionally, the complex nature of autism and its impact on various aspects of

family life, including daily routines and social interactions, may further intensify parental stress (Davis & Carter, 2008; Hall & Graff, 2011; Lecavalier et al., 2006; Tomanik et al., 2004). Therefore, while the identified factors play a significant role, the specific characteristics of autism and its effects on family dynamics likely contribute to the heightened stress experienced by parents of autistic children.

In this study, "distress" is defined as a combination of stress, anxiety, and depression, as these factors are closely interconnected (Phetrasuwan & Miles, 2009). First, elevated distress levels among parents of autistic children can have significant detrimental effects on their psychological well-being (Hsiao et al., 2017; Lai et al., 2015; Phetrasuwan & Miles, 2009). The emotional strain experienced by these parents can be overwhelming and may lead to various negative outcomes. Second, it is crucial to recognize that parents' psychological well-being plays a critical role in their interactions with their children and overall family dynamics (Arditti, 2016; McKenzie & Dallos, 2017; Pisula, 2011; Samadi, 2014). A parent's emotional state can profoundly influence the family atmosphere and the quality of relationships within the household. Third, the impact of an imbalanced family dynamic and parental distress can extend to marital conflicts and divorce rates. Research has reported higher rates of marital conflicts or divorce among parents of autistic children compared to parents of non-autistic children (Chan & Leung, 2020; Hartley et al., 2010; Papadopoulos, 2021). The distress and challenges related to raising an autistic child can put considerable strain on a couple's relationship.

Additionally, the psychological well-being of parents significantly influences their child's support journey. Parents experiencing higher levels of distress may perceive themselves as less adequate and subsequently lose motivation to adhere to support guidelines (Schieve et al., 2007). This loss of motivation could hinder the child's progress and

access to necessary support and resources. Therefore, understanding the relationship between influential factors on distress in parents of autistic children is vital for providing comprehensive support to both parents and their children. Recognizing the interconnectedness of these factors makes it possible to develop interventions and strategies to improve the well-being of families facing these challenges.

Several studies have identified different factors influencing parents' mental health, such as the child's behavioural difficulties (Bishop et al., 2007; Miranda et al., 2019; Tsermentseli & Kouklari, 2021), lack of sufficient professional support, and societal attitudes toward autistic individuals (Pisula, 2011). In this study, I specifically investigate the relationship between several potentially influential factors and parental distress, including the level of parents' autistic traits, associative stigma, and coping strategies. Additionally, I compare the level of these three variables between two countries (i.e., Malaysia and the Netherlands).

First, the rate of autistic traits reported by parents of autistic children might negatively affect parental distress. The broader autism phenotype (BAP) refers to sub-diagnostic autistic traits that are more prevalent in families of autistic individuals than in the general population (Bora et al., 2016; Rubenstein & Chawla, 2018; Shi et al., 2015). A comprehensive review by Rubenstein and Chawla (2018) that examined 41 studies showed that 5.3% (Szatmari et al., 2000) to 56.0% (Dawson et al., 2007) of parents of autistic children showed BAP. These findings indicate a greater likelihood of observing these traits among parents of autistic children, but not all parents of autistic children exhibited these traits. Having higher rate of BAP among these parents and the association between parental distress and their own autistic traits (Duvekot et al., 2016) may lead to higher rate of parental distress among parents of autistic children. Moreover, parents who exhibit autistic traits, including aloofness, rigidity

in their personality, pragmatic language difficulties (Hurley et al., 2007), and a higher incidence of social challenges (Murphy et al., 2000), are more likely to experience difficulties in coping when compared to parents of typically developing children (Briskman et al., 2001; Lee, 2009; Zablotsky et al., 2013). Therefore, a higher rate of autistic traits increases the chance of poor coping skills among parents of autistic children.

Second, associative stigma, which reflects the degree to which parents perceive negative societal attitudes and judgments directed at both autism and their child, may contribute to an increase in parental distress. Parents of autistic children often face distressing responses from society regarding their children's behaviour, which significantly threatens their psychological well-being. Despite lacking visible signs (compared to physical disabilities), the behaviours of autistic children are frequently perceived as "different" by others, leading to public stigma (Ooi et al., 2016). This societal perception puts parents in challenging situations (Portway & Johnson, 2005), leading the stigma associated with autism to become a significant predictor of parental mental health problems (Farrugia, 2009; Papadopoulos, 2021). Regrettably, children's behaviours related to autism can be misinterpreted as a reflection of poor parenting, resulting in feelings of shame, stigmatization, and exclusion from social activities for parents (Farrugia, 2009). Consequently, their social circle may significantly shrink (Farrugia, 2009), and they may experience isolation to avoid stigmatization (Papadopoulos, 2021), leaving them without support from family and friends when caring for their children. This lack of support is particularly problematic because social support plays a crucial role in *alleviating* parental distress (Drogomyretska et al., 2020; Ekas et al., 2010; Foo et al., 2014; Santoso et al., 2015). Therefore, the level of associative stigmatization can have a considerable impact on parental distress levels. Additionally, other social factors, such as parents' concerns about their child's future (Abbeduto et al., 2004;

Papadopoulos, 2021) and parental self-blame for their child's diagnosis (Papadopoulos, 2021; Riany et al., 2016), directly jeopardize their psychological wellbeing.

Lastly, using different coping strategies can differently associate with the level of parental distress. Coping refers to the cognitive and behavioural efforts that individuals employ to manage overwhelming demands or challenges that exceed their available resources (Lazarus & Folkman, 1984). Effective coping skills play a crucial role in facilitating successful parental adaptation to an autism diagnosis and reducing parental distress (Zablotsky et al., 2013). Research consistently demonstrates a strong correlation between parents' coping strategies and their distress levels (Hastings & Johnson, 2001), underscoring the significant impact of coping strategies on parents' mental well-being (Benson, 2014; Dabrowska & Pisula, 2010; Wang et al., 2013).

Folkman and Lazarus (1980) proposed two key dimensions of coping strategies: problem-focused and emotion-focused coping. Problem-focused coping involves taking direct action to address the distressing problem, including strategies, such as cognitive reframing and seeking social support (Penley et al., 2002; Taylor & Stanton, 2007). Emotion-focused coping, on the other hand, aims to manage the emotional distress associated with the problem and includes strategies, like disengagement, active-avoidance, and escape-avoidance (Penley et al., 2002; Taylor & Stanton, 2007). As discussed in Chapter 2, individuals tend to engage in more problem-focused coping when they perceive stressors as controllable, whereas they resort to more emotion-focused coping when they feel powerless against stressors (Folkman & Lazarus, 1980). Therefore, the effectiveness of a coping strategy depends on the perception of the stressful situation. Using an ineffective coping strategy for a stressful situation can increase distress levels (Vitaliano et al., 1990).

Research suggests that the use of problem-focused coping strategies generally improves the psychological well-being of parents of autistic children, whereas the use of emotion-focused coping strategies may negatively affect their mental health (Benson, 2010; Cappe et al., 2011; Taylor & Stanton, 2007). Additionally, coping strategies can be categorized as adaptive or maladaptive. Adaptive coping strategies, such as active coping, have been found to reduce parental distress (Dabrowska & Pisula, 2010; Wang et al., 2013), whereas maladaptive coping strategies, including substance use, significantly increase parental distress (Benson, 2014; Vernhet et al., 2019). Because the interpretation of coping strategies largely depends on context, in this study, I focus on investigating the relationship between using specific coping strategies and parental distress, rather than the distinction between predefined emotion-focused and problem-focused or adaptive and maladaptive coping.

Malaysia and the Netherlands

Parents of autistic children experience varying degrees of associative stigma and discrimination across different countries (Ha et al., 2014; Illias et al., 2018), which may lead to different rates of parental distress across countries. The variation in associative stigma levels can be attributed to differences in awareness about autism across countries, with some countries having higher levels of awareness and other countries still being in the early stages (Illias et al., 2017; Neik et al., 2014; Sun & Allison, 2010). My previous study in Chapter 3 already highlighted differences in autism knowledge between Malaysia and the Netherlands among the general population. It is possible that disparities in autism knowledge might result in different rates of associated stigma and parental distress across countries.

In recent years, Malaysia and the Netherlands have pursued distinct approaches to addressing autism awareness and support. Although Malaysia has shown a growing

recognition of autism through government efforts and with organizations like the National Autism Society of Malaysia (NASOM), parents in Malaysia still face challenges due to limited resources and awareness (Neik et al., 2014; Chu et al., 2020). The Netherlands, on the other hand, has established a support system with a focus on inclusive education and tailored options for autistic students (van Kessel et al., 2019), supported by collaborations between the government and organizations like the Dutch Association for Autism (NVA). Additionally, there are notable differences in the prevalence of autism diagnoses, with higher estimate rates in the Netherlands (Roelfsema et al., 2012) compared to Malaysia (Neik et al., 2014). These differences may be attributed to undiagnosed individuals in Malaysia, underscoring the need for further investigation to understand the factors contributing to these variations and related to parental distress across countries.

In Chapter 3, the study focused on empirically investigating cross-cultural variations in the perception of autistic traits and autism knowledge. My findings revealed a higher prevalence of self-reported autistic traits in Malaysia compared to the Netherlands within the general population. These results align with previous studies conducted by Carruthers et al. (2018) and Freeth et al. (2013). Therefore, it is crucial to begin by comparing the rates of self-reported autistic traits between Malaysian and Dutch parents of autistic children and subsequently explore whether these differences in self-reported autistic traits correspond to variations in parental distress between the two countries. Similarly, cross-cultural differences in the perception of autistic traits might lead to differences in noticing first autism-related behaviours or parenting challenges.

Furthermore, parents of autistic children in Western countries tend to utilize emotion-focused coping strategies, such as passive appraisal and avoidance, more frequently compared to parents in non-Western countries (Lin et al., 2008; Luong et al., 2009).

Conversely, parents in non-Western countries tend to employ problem-focused coping strategies more frequently compared to Western parents (Luong et al., 2009; Twoy et al., 2007). However, cultural norms in non-Western countries, such as the concept of "saving face," may cause parents to internalize their stressful emotions and refrain from seeking social support, as a means to avoid social stigma and embarrassment associated with having a child with special needs (Luong et al., 2009; McCabe, 2008; Mak & Ho, 2007). Therefore, a direct comparison of parents' coping strategies between Malaysia and the Netherlands can offer insights into cross-cultural differences and similarities in this area. Such comparison will aid in understanding culture-specific behaviours exhibited in different countries.

The current study

In this study, I sought to investigate the relationship between parental distress, self-reported autistic traits, associative stigma, and coping strategies among parents of autistic children. I hypothesized parents' autistic traits and associative stigma would be positively associated with parental distress. Additionally, I believed that using different coping strategies would have different effects on parental distress. Whereas using some coping strategies might help parents by reducing their distress, using other coping strategies might increase parental distress. To establish a more comprehensive model for these relationships, I examined a sample of parents of autistic children from both Malaysia and the Netherlands. Moreover, I tested the applicability of the model within each country separately.

Furthermore, taking into account the disparities in autism knowledge and the differences in self-reported autistic traits observed between Malaysia and the Netherlands in Chapter 3, it is reasonable to expect differences in parental distress, autistic traits, and associative stigma between these countries. However, rather than assuming that country is a

unique factor explaining these differences, I recognize the possibility that country-specific variations in parental distress may be mediated by country differences in stigma, self-reported autistic traits, and coping strategies. Therefore, the present study aimed to provide a broader perspective by exploring variations in parental distress, self-reported autistic traits, associative stigma, coping strategies, first noticed autism-related behaviours, and parenting challenges among parents of autistic children from Malaysia and the Netherlands. I anticipated observing differences in these variables between the two countries and sought to investigate the potential factors influencing such differences. By addressing the influential factors, I aim to gain a more nuanced understanding of the complexities surrounding parental distress in the context of autism across different countries.

Method

Participants

In the present study, a total of 287 parents of autistic children aged between 4 and 16 participated. The sample consisted of 46 Malaysian and 241 Dutch parents. The reason for the low number of Malaysian participants was the difficulty of reaching parents of autistic children in Malaysia. The data collection coincided with the COVID-19 pandemic, when the Malaysian government imposed an extremely strict lockdown. I attempted to contact parents through autism centres, but some of these centres were closed due to the lockdown. These restrictions resulted in a limited data collection in Malaysia, although I still managed to include 46 participants. However, five Malaysian participants were excluded from the analyses due to the absence of an official autism diagnosis. Additionally, 87 Dutch participants were excluded, as they did not complete more than two measures in the survey. The reason

for the large number of excluded Dutch participants was that the Netherlands' data were collected in collaboration with the Netherlands Autism Register (NAR). NAR sends out an online survey annually to parents of autistic children and adds the collected data to their data bank every year. Some measures, such as AQ-28 and DCFS, already existed in their data bank. The NAR's survey for 2020 included other measures, such as Brief COPE and DASS-21. Therefore, there were cases where parents who completed the older NAR's surveys did not participate in the latest survey. As a result, the final sample included 195 parents of autistic children, with 41 parents from Malaysia and 154 parents from the Netherlands (see Table 5.1).

Table 5.1

Demographic information of participants

	Malaysia		Netherlands	
Parents				
	Mother	Father	Mother	Father
Relation to child	34 (82.9%)	7 (17.1%)	143 (92.9%)	11 (7.1%)
Age	20-56	29-61	22-43	24-57
(*M(SD)*)	(38.10 (6.64))	(41.32 (6.95))	(32.32 (4.44))	(34.79 (5.32))
Occupation	24 working (58.5%)	38 working (92.7%)	116 working (75.3%)	134 working (87.0%)
	17 not working (41.5%)	3 not working (7.3%)	38 not working (24.7%)	20 not working (13.0%)
Marital status	30 married (73.2%)		127 married (82.5%)	
	2 divorced (4.9%)		26 divorced (16.9%)	
	9 others (22.0%)		1 others (0.6%)	

Child		
Gender	8 female (19.5%)	39 female (25.3%)
	33 male (80.5%)	115 male (74.7%)
Age (*M(SD)*)	4-16 (7.49 (3.23))	4-15 (11.69 (2.74))
Age of autism diagnosis (*M(SD)*)	17-76 months (40.13 (14.81))	18-159 months (72.87 (33.44))
Age of first suspicion of autism (*M(SD)*)	8-60 months (28.93 (13.70))	11-156 months (48.47 (32.64))

Materials

In Chapter 5 (Study 4), I used similar measurements as in Chapter 2 (Study 1) since Study 1 already demonstrated a link between distress and coping strategies. In this study I assessed parental distress levels using the short form of the Depression, Anxiety, and Stress Scale (DASS-21, Lovibond & Lovibond, 1995). For a detailed description of this measure, please see Chapter 2. In this study, I used the distress score, which is the sum of stress, anxiety, and depression scores. The Brief COPE (Carver, 1997) measured the coping strategies of parents. For more information about this measure, please see Chapter 2.

To measure parents' self-reported autistic traits, I used a shortened version of the Autism Spectrum Quotient (AQ-50). Hoekstra et al. (2011) introduced the AQ-28 (Appendix Q) as a condensed version of the AQ-50, consisting of 28 items. The AQ-28 has demonstrated a high correlation with the AQ-50 (ranging between .93 and .95; Hoekstra et al., 2011), and has been studied in the Netherlands and Malaysia (Chee et al., 2023).

Furthermore, I employed the Devaluation of Consumer Families Scale (DCFS; Struening et al., 2001; Appendix R) to assess the perceived devaluation or discrimination towards family members of autistic children, commonly referred to as associative stigma. The DCFS was originally developed to estimate caregivers' beliefs about devaluation toward families of individuals with serious mental illness. Slight modifications were made to adapt DCFS for use with families of autistic children. The DCFS comprises 7 items, such as "Most people look down on families that have a child with autism living with them" and "Most people blame parents of children with autism." Participants responded to the DCFS items using a 4-point Likert scale (4= strongly agree; 3= agree; 2= disagree; 1= strongly disagree). The internal consistency of the DCFS was reported to be satisfactory, with α = .71 - .77 (Struening et al., 2001).

To determine the first noticed autism-related behaviours, I asked parents to select three behaviours from a list of 28 autism-related behaviours (Appendix S). Similarly, I assessed the main parenting challenges related to autistic children by asking parents to choose three main challenges from a list of 11 challenges (Appendix T). Both lists were selected based on standard lists used by the Netherlands Autism Register (NAR).

Study 1 serves as the pilot study for Study 4. Initially, I incorporated religious orientation to investigate its associations with distress and coping strategies. Additionally, I aimed to compare these relationships between two countries, Malaysia and the Netherlands, considering the contrasting levels of religious adherence between the two. Regrettably, due to logistical constraints in measuring religious orientation in the Netherlands, it had to be excluded from the scope of Study 4. Nevertheless, I did include the measurement of religious coping as part of the Brief-COPE questionnaire.

The surveys were administered and could be chosen in English, Malay, and Chinese in Malaysia and in Dutch in the Netherlands. The DASS-21, Brief COPE (Van der Hallen et al., 2020), AQ-28, and DCFS were available in Dutch. The DASS-21 (Ramli et al., 2007) and Brief COPE (Yusoff, 2011) were available in Malay and Chinese. The DCFS had to be translated to Malay and Chinese, which was done with the Brislin's method of translation (1986), which involves both forward and backward translation.

Procedure

The Netherlands

The data of Dutch participants was collected by the Netherlands Autism Register (NAR), an online cohort study of autistic children and adults in the Netherlands. The NAR was founded in 2013 by a collaboration of the VU University Amsterdam and the Dutch Autism Society (NVA). Each year the NAR sends out online surveys to their participants (i.e., self-reporting autistic adults, parents of a child with autism, and legal representatives of autistic adults with high support needs). The NAR received ethical approval from the Ethics Committee of VU University Amsterdam (VCWE2020-041R1).

Malaysia

The collection of Malaysian participants' data was approved by the Science and Engineering Research Ethics Committee of the University of Nottingham Malaysia (OF27112019). For data collection in Malaysia, I employed Qualtrics as the survey platform. To collect data in Malaysia, I sent the online survey to autism centres in the country and asked

them to forward it to parents of autistic children. Before their involvement in the study, all participants were provided with comprehensive research information and were required to complete a consent form. Then, participants were requested to provide demographic details, including their relationship with the autistic child, parents' age, parents' occupation, child's age, child's gender, and child's diagnosis. Subsequently, participants responded to various measures, including DASS-21, Brief COPE, AQ-28, and DCFS. Upon survey completion, participants received a debriefing sheet expressing gratitude for their participation. Additionally, three participants were selected through a lucky draw and received MYR 100 as a token of appreciation. The time for completing the entire survey was between 30 and 40 minutes.

Results

Data assumptions

Data analysis was performed by using SPSS 28 and AMOS 28. To assess the normality of the DASS-21, AQ-28, and DCFS in both countries, the Shapiro-Wilk test was employed. Shapiro-Wilk tests indicated significant deviance from normality on the DASS-21 ($W(195) = .88$, $p < .001$), the AQ-28 ($W(195) = .98$, $p = .002$), and the DCFS ($W(195) = .95$, $p < .001$). I, therefore, decided to use non-parametric data analyses.

To follow a similar analysis plan for Study 4 as in Study 1, I first ran an exploratory factor analysis (EFA) on the Brief COPE items of the entire sample to reduce the number of variables. The Brief COPE assesses 14 different coping strategies. This analysis also allowed us to compare coping factors between the two countries. It is important to highlight that I

conducted separate EFAs for the two studies, yielding different factors for each. This decision was driven by the distinct sample populations: Study 1 involved university students, whereas Study 4 focused on parents of autistic children. Although both populations experience high levels of distress, I hypothesized that their methods of coping might differ, leading to varied results. This rationale guided my choice to conduct separate EFAs, allowing for a more nuanced understanding of coping strategies within each population. EFA to group coping strategies yielded three factors, explaining 57.43% of the variability (see Tables 5.2 and 5.3). Factor 1 was labelled "Active Coping" and included the following items: active coping, use of emotional support, venting, use of instrumental support, positive reframing, planning, humour, and acceptance. The second factor was labelled "Passive Coping", and included the following items: self-distraction, denial, substance use, behavioural disengagement, and self-blame. Factor 3 was labelled "Religious Coping" as it only included religious coping.

Table 5.2

Factor loading and commonalities for Varimax rotated three-factor for Brief COPE's coping strategies (N = 195).

	Factors			
	1. Active Coping	2. Passive Coping	3. Religious Coping	Communalities
Active coping	**.70**	.08	.23	.57
Emotional support	**.77**	.06	-.02	.80
Venting	**.78**	.01	-.24	.74
Instrumental support	**.77**	-.09	.15	.79

Positive reframing	**.70**	.13	.32	.71
Planning	**.71**	.05	.41	.70
Humour	**.49**	.19	-.32	.69
Acceptance	**.59**	-.03	.55	.73
Self-distraction	.43	**.44**	.21	.43
Denial	.08	**.68**	.10	.47
Substance use	.02	**.70**	-.14	.52
Behavioural disengagement	-.13	**.78**	.63	.69
Self-blame	.11	**.70**	-.17	.53
Religious coping	.11	-.001	**.84**	.76

Table 5.3

Eigenvalues, percentage of variance and cumulative percentage for factors of Brief COPE's Coping Strategies.

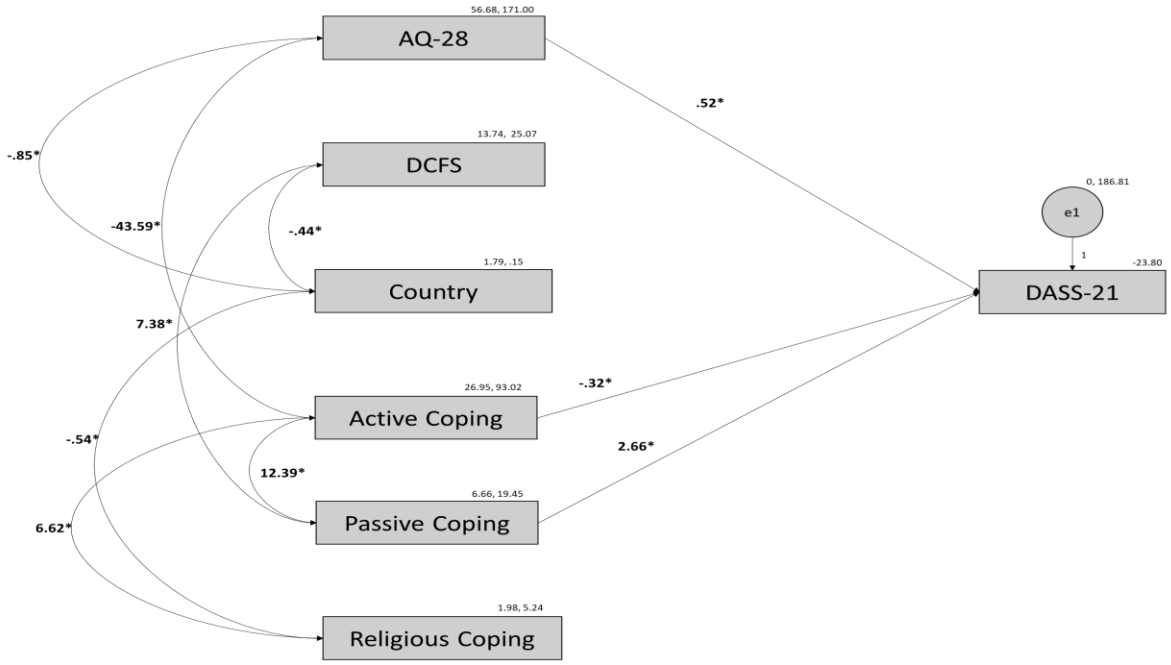
Factor	Eigenvalue	% of variance	Cumulative %
1. Active Coping	4.49	32.05%	32.05%
2. Passive Coping	2.24	15.96%	48.01%
3. Religious Coping	1.32	9.42%	57.43%

The relationship between the DASS-21, AQ-28, DCFS, and Brief COPE factors

In Study 4, I utilized Structural Equation Modelling (SEM), extending the methodology employed in Study 1 to delve into the complex interplay between distress and coping strategies. This decision was informed by the unique characteristics of the participant sample in Study 4, which consisted of parents of autistic children. Recognizing the potentially distinct coping mechanisms within this population, I adapted the SEM approach to capture the nuanced relationships between distress and coping strategies specific to parents facing the challenges associated with autism. assessed the direction and strength of the association between the DASS-21 (parental distress), AQ-28 (parents' self-reported autistic traits), DCFS (associative stigma), country, and Brief COPE (coping factors) in both countries. The first model (Appendix U) assessed the effects of the AQ-28, DCFS, country, and Brief COPE factors on the DASS-21 in the total sample. The second model (Figure 5.1) is a trimmed model of the first model, which only includes significant relationships to have an improved and stronger model. I assessed these models with indices of goodness-of-fit; Comparative Fit Index (CFI), Tucker-Lewis Coefficient (TLI) and Root Mean Square Error of Approximation (RMSEA). The results from the second model (Figure 5.1) indicated the following fit indices: χ^2 = 409.71, *df* = 21, $p < .001$, *CFI* = .95, *TLI* = .91, *RMSEA* = .31 (90% confidence interval = .28–.34). Chi-square's (χ2) $p > .05$, *CFI* > .9, *TLI* > .9, and *RMSEA* < .08 are considered criteria for a good model fit (Hu & Bentler, 1999). Meeting two criteria (CFI and TLI), this model has a good fit.

Figure 5.1

The relationship between the DASS-21, AQ-28, DCFS, country, and Brief COPE factors among parents of autistic children (p < .001).*



Additionally, I used the second model for each country separately to check the applicability in both countries (excluding the factor country). The second model showed the following fit indices in Malaysia (Figure 5.2); χ^2 = 83.08, *df* = 15, *p* < .001, *CFI* = .93, *TLI* = .86, *RMSEA* = .34 (90% confidence interval = .27–.41), and indicated, χ^2 = 202.65, *df* = 15, *p* < .001, *CFI* = .98, *TLI* = .96, *RMSEA* = .29 (90% confidence interval = .25–.32) in the Netherlands (Figure 5.3). This indicates that the second model in both countries showed an acceptable fit.

Figure 5.2

The relationship between the DASS-21, AQ-28, DCFS, and Brief COPE factors among parents of autistic children in Malaysia (p < .001).*

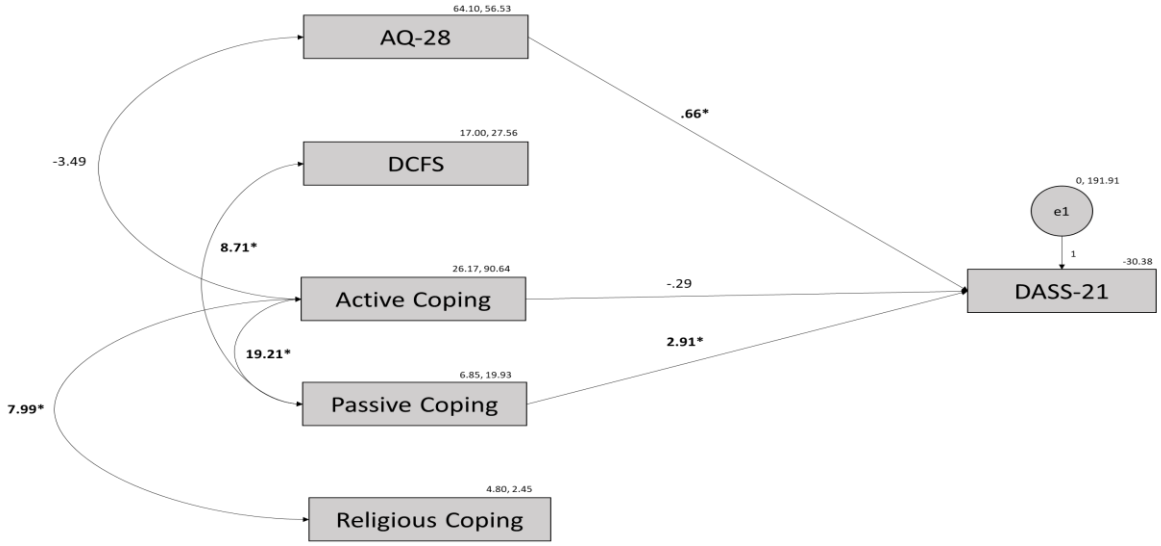
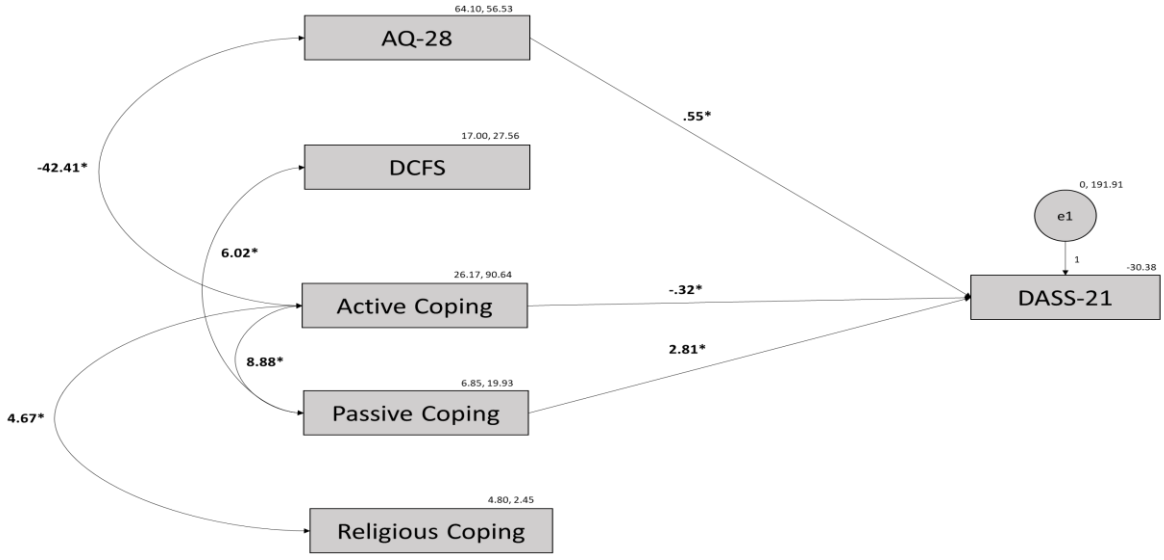


Figure 5.3

The relationship between the DASS-21, AQ-28, DCFS, and Brief COPE factors among parents of autistic children in the Netherlands (p < .001)*.



Comparing the DASS-21, AQ-28, DCFS, Brief COPE factors, first noticed autism-related behaviours, and parenting challenges between parents from Malaysia and the Netherlands

To compare the DASS-21, DCFS, and Brief COPE factors between Malaysia and the Netherlands, Mann-Whitney U tests were used (see Table 5.4). There was a significant difference in DCFS between parents from Malaysia (*Mdn* = 17.00, *IQR* = 8) and the Netherlands (*Mdn* = 13.00, *IQR* = 8), *U* ($N_{Malaysia}$ = 41, $N_{Netherlands}$ = 154) = 1788.00, *Z* = -4.28, *p* < .001; Malaysian parents reported higher DCFS compared to the Dutch parents. Moreover, there was a significant difference in AQ-28 score between parents from Malaysia (*Mdn* = 66.00, *IQR* = 12) and the Netherlands (*Mdn* = 51.50, *IQR* = 17), *U* ($N_{Malaysia}$ = 41, $N_{Netherlands}$ = 154) = 1590.50, *Z* = -4.88, *p* < .001; parents in Malaysia self-reported a higher rate of autistic traits compared to parents in the Netherlands. Additionally, there was a significant difference in using Religious Coping between parents from Malaysia (*Mdn* = 5.00, *IQR* = 2) and the Netherlands (*Mdn* = .00, *IQR* = 2), *U* ($N_{Malaysia}$ = 41, $N_{Netherlands}$ = 154) = 625.50, *Z* = .88, *p* < .001; parents in Malaysia reported a higher rate of using Religious Coping compared to parents in the Netherlands. There were no significant differences in distress, Active Coping, and Passive Coping between parents from Malaysia and the Netherlands. Moreover, I reported three first noticed autism-related behaviours, and three main parenting challenges in each country (see Table 5.5). Malaysian parents reported little eye contact, response to their own name, and abnormal speech as three first noticed autism-related behaviours, whereas Dutch parents reported strange initiative for social interactions, interest in certain subjects, and little eye contact as three first noticed autism-related behaviours. Parents in both countries reported autism symptoms, dealing with peers, and eating problems as three main parenting challenges.

Table 5.4

Comparing DASS-21, DCFS, AQ-28, and Brief COPE factors between parents from Malaysia and the Netherlands.

Variable	Malaysia (N = 41)		Netherlands (N = 154)		U	Z	Effect size	Sig.
	Mean Rank	Mdn(Mean)	Mean Rank	Mdn(Mean)				
DASS-21	105.51	22.00(24.63)	96.00	18.00(23.06)	2969.50	-.97	-.07	.33
DCFS	**131.39**	**17.00(17.00)**	**89.11**	**13.00(12.87)**	**1788.00**	**-4.28**	**-.31**	**< .001*** **
AQ-28	**136.21**	**66.00(64.10)**	**87.83**	**51.50(54.70)**	**1590.50**	**-4.88**	**-.35**	**< .001*** **
Active Coping	97.11	29.00(26.17)	98.24	28.50(27.16)	3193.50	-.11	-.01	.91
Passive Coping	99.22	6.00(6.85)	97.68	6.00(6.61)	3107.00	-.16	-.01	.88
Religious Coping	**159.74**	**5.00(4.80)**	**81.56**	**.00(1.23)**	**625.50**	**.88**	**.06**	**< .001*** **

Note: ***p < .001, **p < .01, *p < .05. AQ-28 Autism Spectrum Quotient, DASS-21 Depression, Anxiety, and Stress Scale, DCFS Devaluation of Consumer Families Scale

Table 5.5

Comparing first noticed autism-related behaviours, and parenting challenges between parents from Malaysia and the Netherlands.

Variable	Malaysia (N = 41)	Netherlands (N = 154)
3 first noticed autism-related behaviours	- Little eye contact (73%)	- Strange initiative for social interactions (39%)
	- Response to own name (39%)	- Interest in certain subject (32%)
	- Abnormal speech (34%)	- Little eye contact (31%)
3 main parenting challenges	- Autism symptoms (56%)	- Autism symptoms (53%)
	- Dealing with peers (56%)	- Dealing with peers (40%)

- Eating problems (56%) - Education problems (28%)

Discussion

The present study aimed to investigate the intricate relationship between parental distress, self-reported autistic traits, associative stigma, and coping strategies among parents of autistic children. My hypotheses were that higher levels of self-reported autistic traits and associative stigma would be positively associated with parental distress. The results indicated a positive association only between self-reported autistic traits and parental distress. Additionally, as expected, I found a negative association between Active Coping strategies and parental distress and a positive association between Passive Coping strategies and parental distress. Furthermore, the study sought to explore differences in parental distress, autistic traits, associative stigma, coping strategies, first-noticed autism-related behaviours, and parenting challenges between Malaysia and the Netherlands. The results revealed that Malaysian parents reported higher levels of self-reported autistic traits, associative stigma, and the use of religious coping compared to Dutch parents.

The relationship between parental distress, autistic traits, associative stigma and coping strategies

Within this study, I developed a model for the relationship between parental distress, autistic traits, associative stigma, and coping strategies. It is noteworthy my model showed a good fit in both countries.

First, the study revealed a significant negative association between parents' self-reported autistic traits and their level of distress, suggesting that a higher incidence of autistic traits among parents is linked to increased parental distress. This finding raises the question of how parents' autistic traits may contribute to parental distress. One plausible explanation for this relationship lies in the connection between autistic traits and difficulties with executive functions (EF). EF difficulties have been identified as a central impairment in autism (Torske et al., 2018), and a higher prevalence of autistic traits has been shown to be associated with increased EF difficulties (Mason et al., 2021). Notably, EF difficulties have been found to be closely linked to heightened parental distress (Tsermentseli & Kouklari, 2021). Specific EF deficits, such as difficulties with initiation and working memory, have been reported to exert a significant influence on parental distress (Miranda et al., 2019; Tsermentseli & Kouklari, 2021). Consequently, it is conceivable that parents' autistic traits indirectly affect their level of parental distress by increasing the likelihood of experiencing EF difficulties. In other words, a higher incidence of autistic traits among parents could lead to a greater likelihood of experiencing EF difficulties, ultimately contributing to elevated levels of parental distress.

Furthermore, extensive research has underscored the substantial role of genetics in the development of autism (Pinto et al., 2010; Thapar & Rutter, 2021; Zhou et al., 2021). As a result, there is an increased likelihood that parents with elevated autistic traits may have children who exhibit higher or more severe autistic traits. This genetic predisposition forms a critical backdrop to understanding the potential interplay between parental traits and the traits of their autistic children. It is noteworthy that the behavioural difficulties associated with autism displayed by the child can significantly affect the mental well-being of parents (e.g. Giovagnoli et al., 2015; Gong et al., 2015; Nieto et al., 2017; Pastor-Cerezuela et al.,

2016). Therefore, when parents themselves exhibit a higher prevalence of autistic traits, it follows that they may be more likely to have children with elevated and more severe autistic traits. This heightened overlap in autistic traits between parents and children potentially amplifies the likelihood of increased parental distress.

Second, contrary to my expectations, I did not find a direct association between associative stigma and parental distress, which appeared inconsistent with previous research that highlighted associative stigma as a significant predictor of parental mental health problems (Farrugia, 2009; Papadopoulos, 2021). However, the findings did reveal a noteworthy relationship; a higher level of associative stigma was linked to an increased likelihood of parents adopting Passive Coping strategies, such as self-distraction, denial, substance use, behavioural disengagement, and self-blame. It is essential to recognize that children's autistic behaviours can sometimes lead parents to blame themselves for their child's condition (Papadopoulos, 2021; Riany et al., 2016), because children's autistic behaviours can be misinterpreted as a reflection of inadequate parenting which may trigger feelings of shame and stigmatization (Farrugia, 2009). Consequently, parents might find themselves with a reduced social circle due to associative stigma, leading to experiences of isolation as they attempt to avoid potential stigmatization (Papadopoulos, 2021). This sense of isolation may push them towards adopting coping strategies like self-distraction, denial, substance use, behavioural disengagement, and self-blame. Although associative stigma itself might not directly increase parental distress, its association with the adoption of coping strategies is significant. Parents who face higher levels of associative stigma are more likely to resort to coping mechanisms, which, in turn, may contribute to higher levels of parental distress. As this study did not examine the causal direction of the relationship between coping strategies and autistic behaviours/associative stigmas, it is possible that this relationship is

bidirectional. That is, parents' coping strategies may not only be influenced by their children's characteristics, but also affect their children's characteristics in return. This bidirectional relation could have important implications for the design and evaluation of interventions that aim to enhance parents' coping skills and reduce their stress, as well as improve their children's outcomes and well-being. As a result, understanding and addressing the impact of associative stigma on the coping mechanisms used by parents of autistic children are vital in supporting their overall well-being.

Lastly, parental distress, which is the emotional strain experienced by parents of autistic children, can be associated with the coping strategies they employ. Active Coping strategies, such as use of emotional or instrumental support, venting, positive reframing, planning, humour, and acceptance, have been found to be negatively associated with parental distress. This indicates that parents who use these coping strategies are more likely to experience lower levels of distress. Several studies have shown that specific active coping strategies contribute to decreased parental distress. For example, Benson (2010) found that parents, who engaged in active coping, planning, use instrumental support, and use emotional support, demonstrated active involvement in addressing the distress posed by raising autistic children. Additionally, acceptance and positive reframing were also found to be negatively associated with parental distress (Benson, 2014). The use of emotional support, instrumental support, active coping, and planning has been correlated with reduced levels of distress among parents (Miranda et al., 2019). Hence, the consistent linkage between the adoption of active coping strategies—use of emotional and instrumental support, positive reframing, planning, humour, and acceptance—and reduced parental distress underscores their pivotal role in enhancing the well-being of parents in such circumstances.

Conversely, Passive Coping strategies, including self-distraction, denial, substance use, behavioural disengagement, and self-blame, are positively associated with distress. This association means that parents who rely more on these coping strategies are more likely to experience higher levels of distress. Benson (2010) observed that parents using self-distraction and self-blame were attempting to distract themselves from the distressing situation. In contrast, the use of behavioural disengagement, substance use, and denial indicated parents' efforts to deny or distance themselves from the challenging reality of their child's autism (Benson, 2010). Furthermore, Benson (2014) found that parents who frequently used self-distraction, self-blame, substance use, behavioural disengagement, and denial reported poorer mental health outcomes. Similarly, Shepherd et al. (2018) also reported that parents' attempts to distance themselves from stressful situations using denial or substance abuse were associated with increased levels of distress. In essence, the use of Passive Coping strategies, such as self-distraction, denial, substance use, behavioural disengagement, and self-blame, has consistently shown a positive connection to heightened distress levels among parents of autistic children.

Therefore, the choice of coping strategies can significantly affect parental distress in the context of raising an autistic child. Active Coping strategies have been shown to reduce distress, whereas Passive Coping strategies tend to increase distress levels. It is essential for parents and caregivers to recognize the effectiveness of various coping strategies and actively promote the use of adaptive coping mechanisms to better manage the challenges associated with parenting autistic children.

Additionally, there were positive correlations between Active, Passive, and Religious Coping, implying that as the use of one coping strategy increases, the use of another coping

strategy also increases. In this context, it suggests that parents who tend to use active coping strategies may also be more likely to use passive and religious coping strategies. Parents who engage in Active Coping strategies, like planning and positive reframing, might also occasionally resort to Passive Coping strategies, like self-distraction, denial, or self-blame. This correlation might occur because certain situations can be too overwhelming for Active Coping alone, leading parents to temporarily employ Passive Coping strategies to cope with distress when they feel helpless or exhausted. For instance, a parent who actively seeks support and tries to address the challenges of raising an autistic child might occasionally resort to self-distraction (a Passive Coping strategy) when faced with particularly demanding or emotionally draining situations. The positive correlation between these coping styles could arise from parents adapting their coping strategies based on the specific stressors they encounter.

Furthermore, Active Coping strategies involve proactive seeking support from others, which can be complemented by Religious Coping, as Religious Coping includes seeking comfort, guidance, or strength through religious beliefs and practices during stressful times. For instance, parents who actively seek support from support groups and family members may also find comfort in their religious community and practices, turning to prayer or spiritual reflection to navigate the challenges they face (Tarakeshwar & Pargament, 2001). This form of "Positive Religious Coping" has been linked with the alleviation of parental distress (Ano & Vasconcelles, 2005; Tarakeshwar & Pargament, 2001). In contrast, a positive correlation can also emerge between Passive Coping and Religious Coping. For example, parents who tend to resort to Passive Coping mechanisms, such as self-blame, may employ Religious Coping as a type of self-condemnation, perceiving the upbringing of an autistic child as a form of divine retribution (Tarakeshwar & Pargament, 2001). Consequently, the adoption of "Negative Religious Coping" can amplify the levels of parental distress (Ano & Vasconcelles, 2005;

Tarakeshwar & Pargament, 2001). Hence, Religious Coping can exert both a positive and negative impact on parental distress, contingent on whether parents adopt Active or Passive Coping strategies.

Differences between parents from Malaysia and the Netherlands

The exploring of differences in parental distress, autistic traits, associative stigma, coping strategies, first-noticed autism-related behaviours, and parenting challenges between parents from Malaysia and the Netherlands emphasizes the significant impact of cultural and societal factors on the experiences of parents raising autistic children in each country.

Surprisingly, there were no significant differences in the level of parental distress between Malaysian and Dutch parents. Similarly, Jiar and Xi (2012) reported no differences between Chinese and Malaysian parents in distress. However, China and Malaysia are both Asian countries and might be culturally more similar compared to my comparison between Malaysia and the Netherlands. Therefore, this result suggests that the experience of distress related to raising an autistic child might be relatively similar across these two countries with culturally diverse settings, implying the presence of universal stressors common to both countries.

Notably, Malaysian parents exhibited a higher frequency of self-reported autistic traits in comparison to Dutch parents. This finding aligns with prior research (Carruthers et al., 2018; Freeth et al., 2013) and is consistent with observations in Chapter 3. These collective insights indicate that individuals in non-Western countries tend to report a greater prevalence of autistic traits compared to their counterparts in Western nations. However, this outcome

raises a pertinent question: given the model's demonstration of a positive association between parents' self-reported autistic traits and parental distress, why did we not identify a corresponding increase in parental distress among Malaysian parents in contrast to Dutch parents? Addressing this query and the apparent discrepancy can be achieved by considering the relationship between cultural perceptions or expectations, and behaviours associated with autism. A higher frequency of self-reported autistic traits among Malaysian parents does not necessarily imply that these parents exhibit a greater number of autistic traits than Dutch parents. Instead, this incongruity in self-reported autistic traits may be attributed to the cultural sensitivity of the autism measure employed. Consequently, although there might be differences in how individuals from various cultural backgrounds identify and express autistic traits, this variation was not significantly associated with the level of parental distress experienced in the two countries.

Furthermore, the presence of associative stigma, indicative of the degree to which parents perceive unfavourable societal attitudes and judgments directed towards autism and their child, was notably more pronounced among Malaysian parents in contrast to Dutch parents. This observation resonates with the findings outlined in Chapter 3, where I documented a lower level of autism knowledge within the Malaysian context as compared to the Netherlands. This discrepancy in autism knowledge likely contributes to disparities in associative stigma between the two countries. Indeed, societies possessing a higher level of autism knowledge tend to exhibit a more comprehensive understanding of, and consequently a greater acceptance of, autistic individuals and their families (Stronach et al., 2018; Yu et al., 2020). This augmented comprehension fosters an environment wherein associative stigma is mitigated. In essence, when a society is better informed about autism and its various aspects, the propensity for misconceptions and negative judgments diminishes, thus leading to a

reduced incidence of associative stigma. The possible link between autism knowledge and associative stigma underscores the critical role of education and awareness initiatives in shaping societal attitudes.

Regarding coping strategies, the study revealed that Malaysian parents used Religious Coping more frequently than Dutch parents did. This finding likely reflects the stronger influence of religious beliefs and practices in Malaysian culture (as a Muslim country), which may serve as a source of comfort, strength, and coping during challenging times. Interestingly, in Indonesia, a neighbouring country with cultural and religious similarities to Malaysia, parents also expressed the belief that having a child with autism is part of God's plan and viewed their role in caring for their child with disability as a religious duty (Riany et al., 2016).

Conversely, no significant differences were observed in the use of Active and Passive Coping strategies between the two countries. This finding offers insight into the absence of differences in parental distress between Malaysia and the Netherlands. However, this outcome diverged from prior research findings. For instance, a study conducted by Twoy et al. (2007) indicated that Asian American parents tend to employ Active Coping strategies more frequently, whereas Caucasian parents lean towards using Passive Coping strategies. In contrast, the study revealed no differences between Malaysian and Dutch parents in using Active and Passive Coping strategies. In addition, the model illustrated both Active and Passive Coping strategies associated with parental distress in both countries. Thus, the results suggest that the uniform adoption of these coping strategies at comparable levels by Malaysian and Dutch parents provides an explanation for the similar levels of parental distress in the two countries. Moreover, this outcome hints at the notion that certain coping

mechanisms might transcend cultural boundaries, implying that these strategies could be part of a more universal coping toolkit employed by parents across diverse cultural contexts.

In terms of first noticed autism-related behaviours, both Malaysian and Dutch parents reported difficulties in making eye contact as a noticeable autism-related behaviour at early stages. However, they also reported some differences. Malaysian parents highlighted little eye contact, a response to one's name, and abnormal speech, whereas Dutch parents mentioned strange initiative for social interactions, interest in specific subjects, and little eye contact. Despite these differences, and consistent with previous studies (Goin-Kochel & Myers, 2005; Young et al., 2003), the shared concern about eye contact indicates its significance as an early indicator of autism in both countries. Notably, it has been suggested that the absence of consistent eye contact could be a cultural norm and less noticeable in non-Western societies, specifically Asian cultures, compared to Western cultures (Atherton et al., 2023; Freeth et al., 2013; Norbury & Sparks, 2013). However, my study's results indicate that both Malaysian (non-Western) and Dutch (Western) parents reported difficulties in making eye contact as one of the first noticed autism-related behaviours. This finding is inconsistent with the suggestion made in the first point. This inconsistency might be attributed to the specific population under examination in my study. In my study, parents, who are the primary caregivers and spend significant time with their children, consistently noticed limited eye contact during the early stages of development. This suggests that parents, irrespective of their cultural backgrounds, tend to observe limited eye contact in their autistic children, whether it is considered a cultural norm or an anomaly in their respective cultures. Furthermore, it is essential to note that the suggestion in the first point may indeed be correct. This suggestion is related to the societal perception of limited eye contact, which is more influenced by cultural norms and expectations. In contrast, parents,

being intimately involved caregivers, are more likely to notice subtle behaviours and differences in their children's development, regardless of the prevailing cultural norms. Therefore, while societal norms can vary across cultures, parental observations appear to transcend these norms due to their close and continuous interaction with their autistic children.

Additionally, this result is valuable as it shows the little eye contact among autistic individuals is applicable to both countries, which can play important role in the early stages of screening of autism. For instance, an advanced tablet-based gaze preference/eye-tracking algorithm, which can accurately measure gaze preference in both autistic and non-autistic children without requiring calibration, training, or physical restraint (Vargas-Cuentas et al., 2017). This method holds promise as an accessible and cost-effective screening tool for autism, especially in resource-constrained environments (Vargas-Cuentas et al., 2017).

Furthermore, Malaysian parents have expressed their primary parenting challenges as encompassing symptoms associated with autism, navigating interactions with peers, and addressing eating difficulties. In a parallel fashion, Dutch parents have cited challenges linked to autism symptoms, managing peer interactions, and tackling educational issues as their central concerns. This convergence underscores a remarkable similarity in the parenting challenges faced by both groups, particularly concerning autism symptoms and peer-related dynamics. Notably, parents' concerns regarding autism symptoms hold significant relevance, given their direct association with heightened parental distress, as evidenced by research (Miranda et al., 2019). In addition, children's autism symptoms are inversely related to the utilization of Active Coping strategies by parents, further contributing to the intricate interplay between parental coping mechanisms and the child's symptoms (Miranda et al.,

2019). In sum, the shared experience highlights the global nature of these specific challenges and suggests that efforts aimed at providing support and solutions in one cultural context could potentially have applicability in the other.

Limitations

The study's findings should be interpreted with consideration of some limitations. First, a majority of the participants were mothers of autistic children, with a distribution of 82.9% in Malaysia and 92.9% in the Netherlands. This uneven representation may have influenced the observed outcomes, particularly in the context of parental distress. Notably, research has indicated that mothers of autistic children tend to experience higher levels of distress compared to fathers (Ang & Loh, 2019; Cheatham & Fernando, 2022).

Second, it is essential to acknowledge that the data collection occurred during the COVID-19 pandemic and the ensuing restrictions. These unprecedented circumstances may have introduced additional challenges that influenced parental distress and coping strategies. Nevertheless, it is reasonable to assume that parents globally confronted comparable challenges associated with the pandemic, given its worldwide scope.

Lastly, the recruitment of a smaller cohort of parents in Malaysia (41 participants) in comparison to the Netherlands (154 participants) is a notable discrepancy. Although this difference in sample size might raise concerns about the generalizability and reliability of the findings in Malaysia, rigorous additional analyses were undertaken to ensure the model's applicability in both countries. Importantly, the convergence of similar results in both nations

serves as a reassuring indicator that the smaller sample size in Malaysia did not compromise the reliability and relevance of the model within this specific context.

Conclusion

This comprehensive study delved into the complex interconnections among parental distress, self-reported autistic traits, associative stigma, and coping strategies within the context of parents raising autistic children. The findings provided valuable insights that hold potential for informing targeted interventions and support systems. My hypotheses initially suggested associations between self-reported autistic traits and associative stigma with parental distress. However, the results established a direct link only between self-reported autistic traits and parental distress. Notably, Active Coping strategies were found to alleviate parental distress, whereas Passive Coping strategies were associated with increased distress levels. The study's exploration of differences between Malaysian and Dutch parents shed light on the profound impact of cultural factors, revealing varying self-reported autistic traits, associative stigma, and coping strategies between the two countries.

The intricate relationship between autistic traits and parental distress was expounded, revealing how these traits, potentially mediated by EF difficulties, could indirectly contribute to heightened distress. Associative stigma was found to be related to the adoption of coping strategies, suggesting that parents facing stigmatization may resort to Passive Coping mechanisms. Moreover, the examination of coping strategies unveiled the interplay between Active, Passive, and Religious Coping, emphasizing the complexity of parental responses and the role of cultural influences.

The shared experiences of Malaysian and Dutch parents underscored the universal nature of challenges associated with autism symptoms and peer interactions. The study illuminated the importance of addressing these challenges to reduce parental distress and promote effective coping mechanisms. Furthermore, the differences observed in cultural contexts emphasized the need for tailored, culturally sensitive interventions to support parents effectively. By recognizing the significance of cultural nuances and applying this knowledge to support systems, professionals and policymakers can work collaboratively to enhance the well-being of families raising autistic children across diverse contexts.

This study significantly contributes to our understanding of the intricate connections among parental distress, self-reported autistic traits, associative stigma, and coping strategies within the context of parents raising autistic children. The findings offer valuable insights for informing targeted interventions and support systems. Notably, the study refines initial hypotheses by conclusively establishing a direct link between self-reported autistic traits and parental distress, providing a crucial understanding of the specific factors contributing to parental distress. The research distinguishes between Active and Passive Coping strategies, revealing that Active Coping strategies alleviate parental distress, whereas Passive Coping strategies are associated with increased distress levels. This insight is pivotal for the development of effective coping mechanisms tailored to the needs of parents. Additionally, the study illuminates the profound impact of cultural factors by examining differences between Malaysian and Dutch parents. Variations in self-reported autistic traits, associative stigma, and coping strategies underscore the necessity for culturally sensitive interventions and support systems.

Furthermore, the study explores the intricate relationship between autistic traits and parental distress, potentially mediated by executive-functioning (EF) difficulties. It investigates how associative stigma influences the adoption of coping strategies, emphasizing the complexity of parental responses and the role of cultural influences. The shared experiences of Malaysian and Dutch parents highlight the universal challenges associated with autism symptoms and peer interactions, underscoring the importance of addressing these challenges to reduce parental distress and promote effective coping mechanisms. The study advocates for tailored, culturally sensitive interventions to support parents effectively, recognizing the significance of cultural nuances. This guidance can inform professionals and policymakers in collaboratively enhancing the well-being of families raising autistic children across diverse contexts. In summary, the study's key contributions lie in its nuanced exploration of the relationships among various factors, its cultural insights, and its potential to inform interventions and support systems for parents raising autistic children.

In conclusion, the study not only serves as a foundation for future research endeavours but also encourages the exploration of these dynamics in larger, more diverse samples using longitudinal designs. This approach suggests a pathway for further understanding and refining interventions based on an evolving comprehension of parental distress dynamics.

Chapter 6: General discussion

Within this thesis, I aimed to investigate the cross-cultural differences in the perception of autistic traits and autism knowledge, the relationship between culture-related factors (i.e., masculinity, femininity, individualism, and collectivism) and self-reported autistic traits, and the relationship between parental distress and coping strategies among parents of autistic children in a cross-cultural context. The results of Chapter 3 indicated that there are cross-cultural differences in the perception of autistic traits and in autism knowledge across countries. This result led me to explore how cultural dimensions may relate to self-reported autistic traits in Chapter 4. Findings indicated that masculinity and femininity were negatively linked, whereas individualism (but not collectivism) had a positive association with self-reported autistic traits. Moreover, variations in the relationship between cultural dimensions and different aspects of autistic traits were observed. In Chapter 5, I investigated the complex relationship between parental distress, self-reported autistic traits, associative stigma, and coping strategies among parents of autistic children. I found a positive association between self-reported autistic traits and parental distress, a negative association between Active Coping strategies and parental distress, and differences in these factors between Malaysian and Dutch parents.

Cross-cultural differences in the perception of autistic traits and autism knowledge

In Chapter 3, I focused on investigating cross-cultural differences in self-reported autistic traits (SAT) and the observation of behaviours similar to autistic traits in society (commonness of autistic-like behaviours, CAB). The primary objectives of this study were twofold. First, it aimed to build upon prior research findings that indicated higher autistic traits in non-Western cultures compared to Western cultures (Carruthers et al., 2018; Freeth et al., 2013; Liu et al., 2020). The study sought to investigate whether these trends persisted, with a specific hypothesis that non-Western countries, namely Iran, Malaysia, and Morocco, would exhibit higher levels of SAT compared to a Western country, the Netherlands. The second aim involved evaluating whether the patterns of CAB were similar to this SAT pattern. It was anticipated that, similar to SAT, higher levels of CAB would be reported in non-Western countries compared to the Western context, potentially shedding light on the disparities observed in SAT scores.

The results indicated that participants from the Netherlands reported significantly lower scores on both the SAT and CAB when compared with participants from Iran, Malaysia, and Morocco. These findings were consistent with previous research (Carruthers et al., 2018; Freeth et al., 2013; Liu et al., 2020) and aligned with the study's hypotheses. These cross-cultural variations in the expression of autistic traits, including SAT and CAB, underscored the substantial impact of cultural interpretations on (the interpretation of) these traits. Furthermore, these cross-cultural differences were also observed in specific SAT and CAB factors, including Social Skills, Patterns-Details, and Communication-Mindreading.

These findings highlight the potential influence of culture on the reporting of various factors related to autistic traits and, consequently, overall reporting of autistic traits. For

example, cross-cultural differences in group dynamics and individual preferences in collaborative work settings may lead individuals to prefer working independently (Sosik & Jung, 2002). Such cross-cultural differences in the preference for group work can affect the reporting of autistic traits related to Social Skills, as these traits are often measured by one's willingness to work independently. Therefore, it is essential to be aware of these cultural distinctions and potential biases when interpreting findings related to autistic traits.

Additionally, I aimed to compare the level of autism knowledge across countries. Measuring and comparing autism knowledge across these four countries helped to investigate differences in the level of autism knowledge and, furthermore, its relationship with reporting autistic traits. The results indicated individuals from the Netherlands had more autism knowledge compared to participants from Iran, Malaysia, and Morocco, which is consistent with other cross-cultural studies on autism knowledge (de Vries et al., 2020; Obeid et al., 2015). These findings increased the importance of enhancing autism knowledge as it fosters positive attitudes towards autistic individuals (Sasson & Morrison, 2019). This difference in autism knowledge might be the reason parents of autistic children in Malaysia reported higher associative stigma compared to the Netherlands in Chapter 5. Nevertheless, the impact of increased autism knowledge on attitudes can vary across cultures due to cultural beliefs (Mac Cárthaigh & López, 2020). Culturally sensitive approaches are essential for promoting autism awareness and education, ensuring respectful understanding and support. These approaches would also help reduce the stigma faced by autistic individuals from diverse cultures, emphasizing the importance of global efforts for autism awareness.

This study makes a significant and original contribution by undertaking a thorough exploration of cross-cultural distinctions in self-reported autistic traits (SAT), societal

observations of behaviours akin to autistic traits (commonness of autistic-like behaviours, CAB), and the evaluation of autism knowledge across diverse countries. It extends prior research that pointed to elevated autistic traits in non-Western cultures relative to Western ones. In essence, the study provides a nuanced understanding of how individuals perceive and communicate autistic traits, shedding light on the intricate interplay between culture and perception. Furthermore, it underscores the imperative for globally inclusive and compassionate initiatives to enhance autism awareness.

Exploring the relationships between cultural factors and autistic traits

In Chapter 3, I found that there were cross-cultural differences in the perception of autistic traits, with higher rates of SAT and CAB in Iran, Malaysia, and Morocco than in the Netherlands. This finding led me to explore the relationship between culture-related factors (i.e., masculinity, femininity, individualism, and collectivism) and SAT in Chapter 4. I chose these four culture-related factors including masculinity, femininity, individualism, and collectivism, as Hofstede (1980) reported higher levels of masculinity and lower levels of individualism in Iran, Malaysia, and Morocco compared to the Netherlands.

First, I investigated the relationship between masculinity, femininity, and SAT. Both masculinity and femininity were found to be negatively associated with SAT, suggesting that individuals with higher autistic traits may perceive themselves as less aligned with traditional gender norms. This interpretation corresponds with Kallitsounaki and Williams (2020), indicating that those with high autistic traits may perceive themselves as neither masculine nor feminine, which was in line with previous studies showing that autistic individuals face challenges with gender identity (Glidden et al., 2016). Individuals with more autistic traits may

struggle with adhering to gender-related norms, leading to lower reported levels of masculinity and femininity compared to those with lower autistic traits.

Furthermore, higher levels of masculinity and femininity were associated with a lower rate of reported autistic traits related to Social Skills and Communication-Mindreading. These findings are further complicated by societal gender norms and expectations, where traditional assumptions associate men with independence, competitiveness, and decisiveness, and women with nurturing, understanding, and warmth (Runge et al., 1981). Such gender roles can influence how individuals perceive and report their own behaviours and traits, including those related to autism. This bias might lead individuals who strongly identify with their gender role to conform to norms and hesitate in reporting behaviours or traits that deviate from gender expectations, which might explain the observed negative association between self-reported autistic traits related to Social Skills and Communication-Mindreading and both masculinity and femininity.

The connection between masculinity, femininity, and autistic traits related to Details-Patterns displayed an unexpected pattern. Although femininity exhibited a positive association with autistic traits linked to Details-Patterns, masculinity did not demonstrate any significant connection with reporting these traits. This phenomenon may be attributed to gender disparities in attention to details, with research indicating that non-autistic women tend to process visual and auditory information more efficiently than non-autistic men, leading to a heightened focus on details (Toufan et al., 2021; van Pelt et al., 2018). This increased sensitivity to details could contribute to a greater awareness of these features in social settings, potentially leading to a higher likelihood of more feminine individuals reporting more autistic traits related to patterns and details. Additionally, societal

expectations for greater empathy in females (Bem, 1974) might contribute to an enhanced awareness of emotions and nonverbal cues, further influencing the reporting of autistic-related traits related to Patterns-Details by more feminine individuals. Consequently, the relationship between masculinity, femininity, and reporting autistic traits linked to Details-Patterns is multifaceted, potentially influenced by gender-related norm differences in attention to details, and heightened sensitivity to emotions and cues.

Second, Chapter 4 uncovered an unexpected positive association between the level of individualism and self-reported autistic traits, which contradicted my exceptions, because previous studies had showed that individuals with a collectivistic cultural background reported more autistic traits compared to individuals with an individualistic cultural background (e.g., Freeth et al., 2013; Kurita et al., 2005; Wakabayashi et al., 2006). This unexpected relationship might be attributed to the differing cultural values of individualistic societies, where qualities associated with autism, such as logical thinking, attention to detail, and individual interests, might be more accepted due to the emphasis on personal achievement and independence (Hofstede, 1980). On the contrary, these traits might hold less value in collectivistic cultures, which prioritize social harmony and conformity (Oyserman, 1993). Hence, individuals with higher individualism tendencies could be more in line with the values of individualistic cultures, leading them to report more autistic traits. Notably, this association primarily pertains to autistic traits related to Social Skills, as there was no evident connection between individualism and traits related to Patterns-Details and Communication-Mindreading. Therefore, this alignment between individualism and social skills could be attributed to the fact that individualistic cultures prioritize personal goals, achievements, self-expression, and independence, whereas collectivistic cultures emphasize group harmony and interdependence (Hofstede, 1980).

The pivotal and innovative contribution of Chapter 4 lies in its thorough examination of the complex interplay among cultural factors—specifically masculinity, femininity, individualism, and collectivism—and self-reported autistic traits (SAT). This chapter builds upon the earlier identification of cross-cultural variations on SAT, noting elevated rates in Iran, Malaysia, and Morocco compared to the Netherlands. In essence, this study provides a comprehensive perspective on the intricate dynamics involving gender norms, cultural values, and autistic traits. These findings underscore the imperative for ongoing research into these dynamic relationships and emphasize the significance of considering a diverse range of cultural factors that influence an individual's self-perception of autistic traits.

The relationship between parental distress and coping strategies among parents of autistic children

The observation of cross-cultural variations in the perception of autistic traits and their connection with culture-related factors, explored in Chapters 3 and 4, guided my inquiry into the potential association between cross-cultural disparities in autistic trait perception and the interplay between parental distress and coping strategies among parents of autistic children. This interplay prompted the design of the study in Chapter 5, which sought to delve into the intricate relationship between parental distress and coping strategies within a cross-cultural context. In preparation for this investigation, I conducted a pilot study involving university students to gain a comprehensive understanding of the dynamic between distress and coping strategies. Although Chapter 2 may not directly relate to autism or autistic traits, it provided valuable insights into the relationship between distress and coping strategies (which helped

improving the design of the study in Chapter 5) among university students both before and during the COVID-19 pandemic.

In Chapter 2, the study's primary objective was to assess the impact of the pandemic on various factors, including students' distress, coping strategies, and sleeping patterns. Partially aligning with the hypothesis students reported higher distress levels during the pandemic due to prolonged isolation; specifically, they reported higher levels of depression during the pandemic. Notably, a considerable proportion of students already reported mild to extremely severe depression before the pandemic, consistent with previous studies (e.g., Blanco et al., 2008; Ibrahim et al., 2013), which was repeated during the pandemic as well (e.g., Chen et al., 2020; Debowska et al., 2020).

During the pandemic, students exhibited reduced concerns about certain personal factors, such as sleep quality, relationships, overall health, body image, and self-esteem. Coping strategies also shifted, with an increased use of strategies like self-distraction, self-blame, and humour, along with longer sleeping hours. Furthermore, coping strategies were associated with students' distress levels. Ineffective strategies, like self-distraction, self-blame, and humour, were positively associated with higher distress, whereas active coping, positive reframing, planning, and acceptance were negatively associated with depression. Interestingly, some coping strategies, like emotional support, venting, instrumental support, and religious coping, did not directly relate to students' distress but showed a positive correlation with effective coping strategies. Additionally, academic-related concerns, like performance pressure and post-graduation plans, were positively linked to stress and anxiety both before and during the pandemic. Moreover, the relationship between sleeping hours

and distress changed during the pandemic, possibly due to sufficient sleep becoming a more neutral factor with the shift to online education.

By gaining insight into the relationship between distress and coping strategies in Chapter 2, I improved the design of the study in Chapter 5. In this study, a model was developed to explore the relationship between parental distress, autistic traits, associative stigma, and coping strategies, with the model showing a good fit in Malaysia and the Netherlands. The study revealed a significant negative association between parents' self-reported autistic traits and their level of distress, indicating that higher levels of autistic traits among parents of autistic children are linked to increased parental distress. This association might be explained by the connection between autistic traits and difficulties in executive functions (Mason et al., 2021), which are central to autism (Torske et al., 2018) and have been associated with heightened parental distress (Miranda et al., 2019; Tsermentseli & Kouklari, 2021). Future research could explore whether the negative association between parents' autistic traits and distress is indeed mediated by executive functioning difficulties. This would involve a more in-depth exploration of the role of specific executive functions, such as initiation and working memory difficulties, in the context of parental distress among caregivers of autistic children. Such research could provide valuable insights into the underlying mechanisms through which autistic traits may indirectly influence distress levels, offering a more comprehensive understanding of these complex relationships.

Contrary to expectations, the study did not find a direct relationship between associative stigma and parental distress, despite previous research suggesting such a link (Farrugia, 2009; Papadopoulos, 2021). However, the findings did reveal a significant relationship: higher levels of associative stigma were linked to an increased likelihood of

parents adopting Passive Coping strategies, like self-distraction, denial, substance use, behavioural disengagement, and self-blame. Children's autistic behaviours can lead parents to blame themselves due to societal misinterpretations (Papadopoulos, 2021; Riany et al., 2016), triggering shame and stigmatization (Farrugia, 2009). As a result, parents may adopt coping strategies, like self-distraction and denial, possibly isolating themselves due to associative stigma and leading to higher parental distress (Papadopoulos, 2021). Although associative stigma itself might not directly link to parental distress, its impact on coping strategies is substantial and may be associated with parental well-being. Hence, understanding and addressing the influence of associative stigma on coping strategies are crucial for supporting parents of autistic children.

Additionally, the study highlighted the association between coping strategies and parental distress among parents of autistic children. Active Coping strategies, involving seeking emotional support, positive reframing, planning, and acceptance, were negatively associated with distress, demonstrating their effectiveness in reducing parental distress, similar to previous studies (Benson 2010; Benson 2014). Conversely, Passive Coping strategies, such as self-distraction, denial, and substance use, were positively associated with distress, indicating higher distress levels among parents might be associated with using these strategies by parents, also consistent with previous studies (Benson 2010; Benson 2014; Shepherd et al., 2018). The used coping strategies were significantly associated with parental distress, underscoring the need for recognizing and promoting effective coping methods in parenting autistic children. Moreover, there were correlations between Active, Passive, and Religious Coping, suggesting that parents employing active strategies might also resort to passive and religious strategies in response to overwhelming situations. The interplay of these coping styles highlighted the complexity of addressing parental distress.

Furthermore, I investigated differences in parental distress, autistic traits, associative stigma, coping strategies, first noticed autism-related behaviours, and parenting challenges between parents from Malaysia and the Netherlands. Contrary to expectations, no significant distinctions in parental distress levels were observed between Malaysian and Dutch parents. Consequently, the study suggests the existence of shared stressors that transcend cultural boundaries and impact parents raising autistic children in diverse settings. In addition, Malaysian parents reported more autistic traits compared to Dutch parents, consistent with earlier research findings (Carruthers et al., 2018; Freeth et al., 2013) and Chapter 3. This trend suggests that individuals in non-Western countries tend to report a higher prevalence of autistic traits than those in Western nations. The positive link between parents' self-reported autistic traits and parental distress did not lead to higher distress among Malaysian parents compared to Dutch parents. This contradiction can be explained by considering cross-cultural differences in the perception of autistic traits discovered in Chapter 3. Hence, the higher frequency of self-reported autistic traits among Malaysian parents does not necessarily mean they possess more autistic traits than Dutch parents. This discrepancy may be due to the cultural sensitivity of the autism measures. As a result, although cultural backgrounds might affect how individuals report autistic traits, these variations did not notably influence parental distress in the two countries.

Moreover, the study observed a notable disparity in the presence of associative stigma between Malaysian and Dutch parents, with Malaysian parents reporting a higher degree of negative societal attitudes and judgments towards autism. This observation aligns with previous findings of lower autism knowledge in Malaysia compared to the Netherlands in Chapter 3, suggesting that societies with greater autism knowledge tend to exhibit more understanding and acceptance towards autistic individuals and their families (Stronach et al.,

2018; Yu et al., 2020). Therefore, increasing autism awareness helps mitigate associative stigma by reducing misconceptions and negative judgments. Additionally, the research found that Malaysian parents more frequently employed Religious Coping compared to Dutch parents. This discrepancy likely stems from the stronger influence of religious beliefs and practices in Malaysian culture, and perceiving having a child with autism as God's plan (Riany et al., 2016).

Lastly, I compared first noticed autism-related behaviours and parenting challenges between Malaysian and Dutch parents. Both groups noticed difficulties in making eye contact as one of the first noticed autism-related behaviours. Malaysian parents emphasized limited eye contact, name responsiveness, and abnormal speech, whereas Dutch parents mentioned odd social interaction initiatives, specific interests, and limited eye contact as first noticed autism-related behaviours. Despite differences, the significance of impaired eye contact as an early autism indicator was consistent. Cultural norms might affect the perception of eye contact, with it being less noticeable in non-Western societies (Atherton et al., 2023; Freeth et al., 2013; Norbury & Sparks, 2013), but limited eye contact is noticeable for parents regardless of their cultural background. Hence, the study highlights the applicability of noticing little eye contact by parents as an autism indicator in both countries. Furthermore, Malaysian and Dutch parents reported similar parenting challenges, including dealing with autism symptoms and managing peer interactions. Children's autism symptoms are directly linked to parental distress (Miranda et al., 2019). In addition, children's autism symptoms relate inversely to parents' use of Active Coping strategies (Miranda et al., 2019), suggesting a complex relationship between parental coping mechanisms and the child's symptoms. Therefore, the study demonstrates common global challenges for parents of autistic children and implies that solutions in one cultural context might apply to the other.

Chapter 5 makes a significant and novel contribution by developing a model to explore the intricate relationships among parental distress, autistic traits, associative stigma, and coping strategies in the context of raising autistic children. In essence, this chapter advances our understanding of the complex dynamics surrounding parental distress, coping strategies, and societal influences in the context of raising autistic children. The findings contribute valuable insights for future research, intervention strategies, and support mechanisms for parents of autistic children, both within specific cultural contexts and on a global scale.

Conclusions

This thesis makes significant contributions to our understanding of cross-cultural perceptions of autistic traits, culture-related factors, parental distress, and coping strategies among parents of autistic children. The novel insights and overall implications are highlighted across the following key chapters. In Chapter 3, the results suggest that cultural norms and societal factors play a role in how people perceive and describe autistic traits. This finding emphasizes the influence of culture on the understanding of autism, providing a novel perspective on the cultural dynamics involved in shaping perceptions of autistic traits. Chapter 4 explores the relationship between culture-related factors (masculinity, femininity, individualism, and collectivism) and self-reported autistic traits. The results reveal a complex interplay between culture, gender identity, and self-perception of autistic traits. This contributes to our understanding of how cultural factors can influence individuals' identification and reporting of autistic traits. In Chapter 5, the investigation into the relationship between parental distress, self-reported autistic traits, associative stigma, and coping strategies in parents of autistic children in Malaysia and the Netherlands provides

crucial insights. The study indicates an association between parents' self-reported autistic traits and distress levels. Notably, the identification of the link between different coping strategies and distress levels emphasizes the importance of proactive and effective coping mechanisms in managing distress, particularly in the context of parenting autistic children.

This thesis' findings underscore the importance of considering diverse perspectives and cultural nuances when addressing autism-related challenges. Recognizing the influence of cultural norms and societal factors on the perception of autistic traits highlights the need for tailored interventions and support mechanisms aligned with specific cultural contexts. An overarching implication is the pressing need for culturally sensitive approaches in promoting autism awareness and supporting parents of autistic children. This calls for interventions that account for cultural variations and sensitivities, emphasizing the importance of creating inclusive strategies that respect and integrate diverse cultural perspectives.

Additionally, this thesis identified a link between parental distress and self-reported autistic traits, which highlights the need for targeted support and resources for parents experiencing heightened distress levels. This recognition is essential for designing interventions aimed at enhancing the well-being of caregivers in the context of raising autistic children. While providing valuable insights, the thesis suggests avenues for future research, particularly in exploring specific strategies for supporting parents with a focus on coping mechanisms. This recommendation opens the door for further investigations that can offer practical guidance for interventions aimed at improving the overall well-being of caregivers. Furthermore, this thesis emphasizes the global dimensions of autism-related challenges, suggesting that solutions developed in one cultural context may have relevance and applicability in others. This perspective encourages a broader and more empathetic

understanding of autism across diverse societies, fostering a more inclusive and supportive world for individuals on the autism spectrum and their families.

In summary, this thesis contributes novel insights into cross-cultural perceptions of autistic traits, culture-related factors, parental distress, and coping strategies. Its implications extend to the importance of cultural sensitivity, tailored interventions, and proactive support for parents, ultimately promoting a more inclusive and supportive global community for autistic individuals and their families.

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Appendices

Appendix A. Depression, Anxiety, and Stress Scale (DASS-21)

Please read each statement and respond based on how much the statement applied to you over the past week. There are no right or wrong answers. Do not spend too much time on any statement. (0. Did not apply to me at all/1. Applied to me to some degree, or some of the time/2. Applied to me to a considerable degree or a good part of time/3. Applied to me very much or most of the time)

1. I found it hard to wind down

2. I was aware of dryness of my mouth

3. I couldn't seem to experience any positive feeling at all

4. I experienced breathing difficulty (e.g. excessively rapid breathing, breathlessness in the absence of physical exertion)

5. I found it difficult to work up the initiative to do things

6. I tended to over-react to situations

7. I experienced trembling (e.g. in the hands)

8. I felt that I was using a lot of nervous energy

9. I was worried about situations in which I might panic and make a fool of myself

10. I felt that I had nothing to look forward to

11. I found myself getting agitated

12. I found it difficult to relax

13. I felt down-hearted and blue

14. I was intolerant of anything that kept me from getting on with what I was doing

15. I felt I was close to panic

16. I was unable to become enthusiastic about anything

17. I felt I wasn't worth much as a person

18. I felt that I was rather touchy

19. I was aware of the action of my heart in the absence of physical exertion (e.g. sense of heart rate increase, heart missing a beat)

20. I felt scared without any good reason

21. I felt that life was meaningless

Appendix B. List of concerns

Please rate your concern about the following factors. If you have any comments/opinions about each statement, please write them down. (Not concerned at all/Slightly concerned/Moderately concerned/Extremely concerned)

1. Academic performance
2. Pressure to success
3. Post-graduation plans
4. Financial concerns
5. Quality of sleep
6. Relationship with friends
7. Relationship with family
8. Overall health
9. Body image
10. Self-esteem
11. Others (please specify)

Appendix C. Brief COPE

The Brief COPE measures 14 coping strategies that people use to deal with stressful situations. Here is a brief description of each strategy:

Self-distraction: This is when you try to take your mind off the problem by doing something else, such as watching TV, reading, or playing games.

Active coping: This is when you take action to solve the problem or reduce its impact, such as seeking information, making a plan, or seeking help.

Denial: This is when you refuse to accept or acknowledge the reality of the problem, such as pretending it does not exist or minimizing its importance.

Substance use: This is when you use alcohol, drugs, or other substances to cope with the problem or the negative emotions it causes, such as drinking, smoking, or taking pills.

Use of emotional support: This is when you seek comfort, sympathy, or understanding from others who care about you, such as friends, family, or professionals.

Use of instrumental support: This is when you seek practical help, advice, or assistance from others who can help you with the problem, such as experts, authorities, or organizations.

Behavioural disengagement: This is when you give up trying to deal with the problem or achieve your goals, such as withdrawing, avoiding, or quitting.

Venting: This is when you express your negative emotions or feelings about the problem to others or yourself, such as complaining, crying, or yelling.

Positive reframing: This is when you try to see the positive aspects of the problem or the situation, such as finding meaning, learning, or growing from it.

Planning: This is when you think about how to cope with the problem or the situation, such as setting goals, making a schedule, or prioritizing tasks.

Humour: This is when you use humour or laughter to cope with the problem or the situation, such as making jokes, being sarcastic, or finding the funny side of it.

Acceptance: This is when you accept the reality of the problem or the situation, and adapt to it, such as being realistic, flexible, or tolerant.

Religion: This is when you use your religious or spiritual beliefs or practices to cope with the problem or the situation, such as praying, meditating, or attending services.

Self-blame: This is when you blame yourself for the problem or the situation, and feel guilty, ashamed, or responsible for it.

These items deal with ways you have been coping with the stress in your life. There are many ways to try to deal with problems. These items ask what you have been doing to cope with stress. Obviously, different people deal with things in different ways, but we are interested in how you have tried to deal with it. Each item says something about a particular way of coping. We want to know to what extent you have been doing what the item says, how much or how frequently. Do not answer on the basis of whether it seems to be working or not—just whether or not you are doing it. Use these response choices. Try to rate each item separately in your mind from the others. Make your answers as true FOR YOU as you can. (1 = I haven't been doing this at all/2 = I've been doing this a little bit/3 = I've been doing this a medium amount/4 = I've been doing this a lot)

1. I've been turning to work or other activities to take my mind off things.

2. I've been concentrating my efforts on doing something about the situation I'm in.

3. I've been saying to myself "this isn't real".

4. I've been using alcohol or other drugs to make myself feel better.

5. I've been getting emotional support from others.

6. I've been giving up trying to deal with it.

7. I've been taking action to try to make the situation better.

8. I've been refusing to believe that it has happened.

9. I've been saying things to let my unpleasant feelings escape.

10. I've been getting help and advice from other people.

11. I've been using alcohol or other drugs to help me get through it.

12. I've been trying to see it in a different light, to make it seem more positive.

13. I've been criticizing myself.

14. I've been trying to come up with a strategy about what to do.

15. I've been getting comfort and understanding from someone.

16. I've been giving up the attempt to cope.

17. I've been looking for something good in what is happening.

18. I've been making jokes about it.

19. I've been doing something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping.

20. I've been accepting the reality of the fact that it has happened.

21. I've been expressing my negative feelings.

22. I've been trying to find comfort in my religion or spiritual beliefs.

23. I've been trying to get advice or help from other people about what to do.

24. I've been learning to live with it.

25. I've been thinking hard about what steps to take.

26. I've been blaming myself for things that happened.

27. I've been praying or meditating.

28. I've been making fun of the situation.

Appendix D. Age Universal I-E Scale

Following are the items included in the Age-Universal Religious Orientation Scale. Please read each statement and response to them based on how much the statement applies to you.

Items were in the (random) order listed and were all scored (except the 6th item) on the same five point Likert (1) I strongly disagree; (2) I tend to disagree; (3) I'm not sure; (4) I tend to agree; (5) I strongly.

1. I enjoy reading about my religion.

2. I go to church/mosque/temple because it helps me to make friends.

3. It doesn't much matter what I believe so long as I am good.

4. Sometimes I have to ignore my religious beliefs because of what people might think of me.

5. It is important to me to spend time in private thought and prayer.

6. I would prefer to go to church/mosque/temple:

    (1) A few times a year or less

    (2) Once every month or two

    (3) Two or three times a month

    (4) About once a week

    (5) More than once a week

7. I have often had a strong sense of the Divine (i.e., God, Allah, Deity) presence.

8. I pray mainly to gain relief and protection.

9. I try hard to live all my life according to my religious beliefs.

10. What religion offers me most is comfort in times of trouble and sorrow.

11. My religion is important because it answers many questions about the meaning of life.

12. I would rather join a religious study group than a religious social group.

13. Prayer is for peace and happiness.

14. Although I am religious, I don't let it affect my daily life.

15. I go to church/mosque/temple mostly to spend time with my friends.

16. My whole approach to life is based on my religion.

17. I go to church/mosque/temple mainly because I enjoy seeing people I know there.

18. I pray mainly because I have been taught to pray.

19. Prayers I say when I'm alone are as important to me as those I say in church/mosque/temple.

20. Although I believe in my religion, many other things are more important life.

Appendix E. Autism-Spectrum Quotient (AQ) and 3-Factors model

Below is a list of statements. Please read each statement very carefully and rate how strongly you agree or disagree with it by choosing your answer. (Definitely agree/Slightly agree/Slightly disagree/Definitely disagree)

1. I prefer to do things with others rather than on my own
2. I prefer to do things the same way over and over again.
3. If I try to imagine something, I find it very easy to create a picture in my mind.
4. I frequently get so strongly absorbed in one thing that I lose sight of other things
5. I often notice small sounds when others do not
6. I usually notice car number plates or similar strings of information
7. Other people frequently tell me that what I have said is impolite, even though I think it is polite
8. When I am reading a story, I can easily imagine what the characters might look like
9. I am fascinated by dates.
10. In a social group, I can easily keep track of several different people's conversations.
11. I find social situations easy
12. I tend to notice details that others do not
13. I would rather go to a library than a party
14. I find making up stories easy
15. I find myself drawn more strongly to people than to things
16. I tend to have very strong interests, which I get upset about if I cannot pursue
17. I enjoy social chitchat

18. When I talk, it is not always easy for others to get a word in edgeways

19. I am fascinated by numbers

20. When I am reading a story, I find it difficult to work out the characters' intentions

21. I do not particularly enjoy reading fiction

22. I find it hard to make new friends

23. I notice patterns in things all the time.

24. I would rather go to the theatre than a museum.

25. It does not upset me if my daily routine is disturbed.

26. I frequently find that I do not know how to keep a conversation going.

27. I find it easy to "read between the lines" when someone is talking to me.

28. I usually concentrate more on the whole picture, rather than the small details.

29. I am not very good at remembering phone numbers.

30. I do not usually notice small changes in a situation, or a person's appearance.

31. I know how to tell if someone listening to me is getting bored.

32. I find it easy to do more than one thing at once.

33. When I talk on the phone, I am not sure when it is my turn to speak.

34. I enjoy doing things spontaneously.

35. I am often the last to understand the point of a joke.

36. I find it easy to work out what someone is thinking or feeling just by looking at their face.

37. If there is an interruption, I can switch back to what I was doing very quickly.

38. I am good at social chitchat.

39. People often tell me that I keep going on and on about the same thing.

40. When I was young, I used to enjoy playing games involving pretending with other children.

41. I like to collect information about categories of things (e.g., types of car, types of bird, types of train, types of plant, etc.).

42. I find it difficult to imagine what it would be like to be someone else.

43. I like to plan any activities I participate in carefully.

44. I enjoy social occasions.

45. I find it difficult to work out people's intentions.

46. New situations make me anxious.

47. I enjoy meeting new people.

48. I am a good diplomat.

49. I am not very good at remembering people's date of birth.

50. I find it very easy to play games with children that involve pretending.

Social Skills: 1, 10, 11, 13, 15, 17, 22, 26, 34, 38, 44, 46, 47

Details-Patterns: 5, 6, 9, 12, 19, 23, 41

Communication-Mindreading: 20, 27, 31, 35, 36, 39, 45, 48

Appendix F. Commonness of autistic-like behaviours (CAB) and 3-Factors model

The next set of questions will focus on whether some types behaviours are considered to be socially appropriate, accepted, expected, or common in your culture (society, family, direct environment, everyday life). Please read each statement very carefully and rate how strongly you agree or disagree with it. If you have any comments/opinions about each statement, please write them down. (Agree/Mostly Agree/Somewhat Agree/Somewhat Disagree/Mostly Disagree/Disagree)

1. People usually prefer to do things with others rather than on their own.
2. People usually prefer to do things the same way over and over again.
3. If people try to imagine something, they usually find it very easy to create a picture in their mind.
4. People frequently get so strongly absorbed in one thing that they lose sight of other things.
5. People often notice small sounds when others do not.
6. People usually notice car number plates or similar strings of information.
7. People usually tell others that what they said is impolite, when that person thinks it is polite.
8. When people are reading a story, usually they can easily imagine what the characters might look like.
9. People are usually fascinated by dates.
10. In a social group, people can easily keep track of several different conversations.
11. People usually find social situations easy.
12. People usually tend to notice details that others do not.
13. People usually rather go to a library than a party.

14. People usually find making up stories easy.

15. People usually find themselves drawn more strongly to other people than to things.

16. People usually tend to have very strong interests, which they get upset about if they cannot pursue.

17. People usually enjoy social chitchat.

18. When people talk, it is not always easy for others to get a word in edgeways.

19. People usually are fascinated by numbers.

20. When people are reading a story, they usually find it difficult to work out the characters' intentions.

21. People do not particularly enjoy reading fiction.

22. People usually find it hard to make new friends.

23. People usually notice patterns in things all the time.

24. People usually rather go to the theatre than a museum.

25. It does not usually upset people if their daily routine is disturbed.

26. People frequently find that they do not know how to keep a conversation going.

27. People usually find it easy to 'read between the lines' when someone is talking to them.

28. People usually concentrate more on the whole picture, rather than the small details.

29. People are usually not very good at remembering phone numbers.

30. People usually do not notice small changes in a situation or a person's appearance.

31. People usually know how to tell if someone listening to them is getting bored.

32. People usually find it easy do more than one thing at once.

33. When people talk on the phone, they are often not sure, when it is their turn to speak.

34. People usually enjoy doing things spontaneously.

35. People often understand the point of a joke late.

36. People usually find it easy to work out what someone is thinking or feelings just by looking at their face.

37. If there is an interruption, people usually can switch back to what they were doing very quickly.

38. Usually people are good at social chitchat.

39. People often tell others that they keep going on and on about the same thing.

40. Children usually enjoy playing games involving pretending with other children.

41. People usually like to collect information about categories of things (e.g., types of car, types of bird, types of train, types of plant, etc.).

42. People usually find it difficult to imagine what it would be like to be someone else.

43. People usually like to plan any activities they participate in carefully.

44. People usually enjoy social occasions.

45. People usually find it difficult to work out other's intentions.

46. New situations usually make people anxious.

47. People usually enjoy meeting new people.

48. People are usually good diplomats.

49. People are usually not very good at remembering other's date of birth.

50. People usually find it very easy to play games with children that involve pretending.

Social Skills: 1, 10, 11, 13, 15, 17, 22, 26, 34, 38, 44, 46, 47

Details-Patterns: 5, 6, 9, 12, 19, 23, 41

Communication-Mindreading: 20, 27, 31, 35, 36, 39, 45, 48

Appendix G. Revised Autism Knowledge Survey (AKS-R)

The next set of questions will focus on general knowledge about Autism Spectrum Disorder (ASD). Please read each statement very carefully and rate how strongly you agree or disagree with it. If you have any comments/opinions about each statement, please write them down. (Agree/Mostly Agree/Somewhat Agree/Somewhat Disagree/Mostly Disagree/Disagree)

1. Autism is an emotional disorder.

2. Early intervention can lead to significant gains in children's social and communication skills.

3. All children with autism display poor eye contact.

4. Children with autism typically perform better when tasks are presented visually than when tasks are presented verbally.

5. Problems with social relatedness that are present in autism are different from social problems seen in other psychiatric conditions.

6. Autism is more frequently diagnosed in males than in females.

7. Children with autism do not show attachments, even to parents/ caregivers

8. Research indicates that sensory integration therapy is an effective treatment for autism and its symptoms.

9. Children with autism are deliberately uncooperative.

10. Most parents/ caregivers of children with autism report their first concerns were related to the child's social behaviour.

11. Autism tends to run in families.

12. We now have treatments that can cure autism.

13. Children with autism can grow up to live independently.

14. There is one approach/ program that works for all children with autism.

15. It is important that all children diagnosed with autism receive some form of special education services at school.

16. Autism occurs more commonly among higher socioeconomic and educational levels.

17. Autism can be diagnosed as early as 18 months.

18. With the proper treatment, most children diagnosed with autism eventually outgrow the disorder.

19. Children with autism do not show affection.

20. The need for routines and sameness is one of the earliest behavioural features of autism.

Appendix H. Cross-cultural difference on the AQ-50 total score and factor scores.

Four one-way ANOVAs were conducted to compare the AQ-50 total and its factors (Social Skills, Details-Patterns, and Communication-Mindreading) across Iran, Malaysia, Morocco, and the Netherlands. There was a significant difference in the AQ-50 total between the four countries, $F(3, 472) = 34.01$, $p < .001$. Post-hoc analyses using a Bonferroni correction (see Table H.1) showed that participants from Iran, Malaysia, and Morocco scored significantly higher than participants from the Netherlands on the AQ-50 total. In addition, participants from Malaysia scored significantly higher than participants from Morocco.

Furthermore, the one-way ANOVAs on the factors indicated significant differences in AQ Social Skills ($F(3, 472) = 18.23$, $p < .001$), AQ Communication-Mindreading ($F(3, 472) = 22.97$, $p < .001$), and AQ Details-Patterns ($F(3, 472) = 7.97$, $p < .001$) between the four countries. Bonferroni post-hoc analyses indicated that participants from Iran, Malaysia, and Morocco scored significantly higher than participants from the Netherlands on the AQ Social Skills and Details-Patterns factors. Additionally, participants from Iran and Malaysia scored significantly higher than participants from the Netherlands on the AQ Communication-Mindreading factor (see Table H.1).

Table H.1

Cross-cultural difference on the AQ-50 total score and factor scores.

Variable	Effect Size	Post hoc Country *Mean (SD)*		*Mean Difference*	*SE*	*C.I.*	P_{bonf}
AQ-50 total	.18	Iran	Malaysia	-4.013	1.644	[-8.37,	.090
		114.11 (12.04)	118.13 (11.59)			.34]	
			Morocco	1.763	1.876	[-3.21,	1.00
			112.35 (12.01)			6.73]	
			Netherlands	**11.193**	**1.798**	**[6.43,**	**<.001**
			102.92 (15.04)			**15.96]**	
		Malaysia	**Morocco**	**5.776**	**1.608**	**[1.52,**	**.002**
		118.13 (11.59)	**112.35 (12.01)**			**10.04]**	
			Netherlands	**15.207**	**1.517**	**[11.19,**	**<.001**
			102.92, (15.04)			**19.22]**	
		Morocco	**Netherlands**	**9.431**	**1.766**	**[4.75,**	**<.001**
		112.35 (12.01)	**102.92 (15.04)**			**14.11]**	
AQ	.10	Iran	Malaysia	-2.187	.843	[-4.42,	.059
Social Skills		28.65 (5.70)	30.83 (7.39)			.05]	
			Morocco	-.576	.962	[-3.13,	1.00
			29.22 (5.53)			1.97]	
			Netherlands	**3.533**	**.922**	**[1.09,**	**<.001**
			25.12 (6.23)			**5.98]**	
		Malaysia	Morocco	1.611	.825	[.57,	.308
		30.83 (7.39)	29.22 (5.53)			3.80]	
			Netherlands	**5.719**	**.778**	**[3.66,**	**<.001**
			25.12 (6.23)			**7.78]**	

		Morocco	**Netherlands**	**4.108**	**.906**	**[1.71,**	**<.001**
		29.22 (5.53)	**25.12 (6.23)**			**6.51]**	
AQ	.13	Iran	Malaysia	-.060	.495	[-1.37,	1.00
Details-Patterns		19.01 (4.32)	19.07 (3.16)			1.25]	
			Morocco	.777	.565	[-.72,	1.00
			18.23 (3.74)			2.27]	
			Netherlands	**3.498**	**.542**	**[-1.25,**	**<.001**
			15.51 (4.37)			**1.37]**	
		Malaysia	Morocco	.838	.484	[-.45,	.51
		19.07 (3.16)	18.23 (3.74)			2.12]	
			Netherlands	**3.559**	**.457**	**[2.35,**	**<.001**
			15.51 (4.37)			**4.77]**	
		Morocco	**Netherlands**	**2.721**	**.532**	**[1.31,**	**<.001**
		18.23 (3.74)	**15.51 (4.37)**			**4.13]**	
AQ	.05	Iran	Malaysia	-.665	.454	[-1.87,	.865
Communication-		16.34 (3.43)	17.01 (3.23)			.54]	
Mindreading							
			Morocco	.511	.518	[-.87,	1.00
			15.83 (4.00)			1.88]	
			Netherlands	**1.332**	**.497**	**[.02,**	**.046**
			5.01 (3.50)			**2.65]**	
		Malaysia	Morocco	1.176	.444	[.00,	.051
		17.01 (3.23)	15.83 (4.00)			2.35]	
			Netherlands	**1.997**	**.419**	**[.89,**	**<.001**
			5.01, (3.50)			**3.11]**	
		Morocco	Netherlands	.821	.488	[-.47,	.559
		15.83, (4.00)	5.01 (3.50)			2.11]	

Note: significant differences are in bold.

Appendix I. Cross-cultural difference on the CAB-50 total score and factor scores.

Four one-way ANOVAs were conducted to compare the CAB-50 total and its factors across Iran, Malaysia, Morocco, and the Netherlands. There was a significant difference in the CAB-50 total between the four countries, $F(3, 472) = 66.03$, $p < .001$. Bonferroni post-hoc analyses tested CAB-50 total multiple comparisons between the four countries (see Figure 3.2. or Appendix I). Iran, Malaysia, and Morocco scored significantly higher than the Netherlands on the CAB-50 total. In addition, Iran scored significantly higher than Morocco.

There were also significant differences in CAB Social Skills ($F(3, 472) = 18.00$, $p < .001$), CAB Communication-Mindreading ($F(3, 472) = 55.40$, $p < .001$), and CAB Details-Patterns ($F(3, 472) = 24.44$, $p < .001$) between the four countries. Bonferroni post-hoc analyses indicated that Iran, Malaysia, and Morocco scored significantly higher than the Netherlands on the CAB Social Skills, Details-Patterns, and Communication-Mindreading factors. Additionally, Iran scored significantly higher than Malaysia and Morocco on the CAB Communication-Mindreading factor (see Table I.1).

Table I.1

Cross-cultural difference on the CAB-50 total score and factor scores.

Variable	Effect Size	Post hoc Country *Mean (SD)*		*Mean Differences*	*SE*	*C.I.*	P_{bonf}
CAB-50 total	.30	Iran 168.60 (12.17)	Malaysia 163.54 (13.09)	5.066	1.931	[-.05, 10.18]	.054
			Morocco 161.72 (14.77)	**6.879**	**2.204**	**[1.04, 12.72]**	**.011**
			Netherlands 142.38 (18.95)	**26.222**	**2.113**	**[20.62, 31.82]**	**<.001**

		Malaysia 163.54 (13.09)	Morocco 161.72 (14.77)	1.813	1.889	[-3.19, 6.82]	1.00
			Netherlands 142.38 (18.95)	**21.155**	**1.782**	**[16.43, 25.88]**	**<.001**
		Morocco 161.72 (14.77)	**Netherlands 142.38 (18.95)**	**19.343**	**2.075**	**[13.85, 24.84]**	**<.001**
CAB Social Skills	.10	Iran 39.94 (6.37)	Malaysia 39.06 (6.31)	.882	.830	[-1.32, 3.08]	1.000
			Morocco 38.03 (7.07)	1.911	.947	[-.60, 4.42]	.265
			Netherlands 34.15 (5.89)	**5.793**	**.908**	**[3.39, 8.20]**	**<.001**
		Malaysia 39.06 (6.31)	Morocco 38.03 (7.07)	1.029	.812	[-1.12, 3.18]	1.000
			Netherlands 34.15 (5.89)	**4.91**	**.77**	**[2.88, 6.94]**	**<.001**
		Morocco 38.03 (7.07)	**Netherlands 34.15 (5.89)**	**3.881**	**.891**	**[1.52, 6.24]**	**<.001**
CAB Details-Patterns	.26	Iran 23.35 (6.56)	Malaysia 24.17 (5.15)	-.819	.705	[-2.69, 1.05]	1.000
			Morocco 24.82 (5.84)	-1.467	.805	[-3.60, .67]	.414
			Netherlands 16.68 (4.42)	**6.671**	**.771**	**[4.63, 8.71]**	**<.001**
		Malaysia 24.17 (5.15)	Morocco 24.82 (5.84)	-.648	.690	[-2.48, 1.18]	1.000
			Netherlands 16.68 (4.42)	**7.490**	**.651**	**[5.77, 9.21]**	**<.001**
		Morocco 24.82 (5.84)	**Netherlands 16.68 (4.42)**	**8.138**	**.757**	**[-.67, 3.60]**	**<.001**
CAB Communication - Mindreading	.13	Iran 28.84 (5.02)	**Malaysia 27.04 (3.74)**	**1.797**	**.578**	**[.27, 3.33]**	**.012**
			Morocco 25.59 (4.94)	**3.256**	**.660**	**[1.51, 5.00]**	**<.001**
			Netherlands 23.75 (4.60)	**5.089**	**.632**	**[3.41, 6.76]**	**<.001**

Malaysia	Morocco	1.459	.565	[-.04, 2.96]	.06
27.04 (3.74)	25.59 (4.94)				
	Netherlands	**3.292**	**.533**	**[1.88, 4.70]**	**<.001**
	23.75 (4.60)				
Morocco	**Netherlands**	**1.833**	**.621**	**[.19, 3.48]**	**.020**
25.59 (4.94)	**23.75 (4.60)**				

Appendix J. Cross-cultural difference on the AKS-R score

A one-way ANOVA was conducted to compare the AKS-R score across the four countries. There was a significant difference in AKS-R between the four countries, $F(3, 383) = 29.68$, $p < .001$. With Bonferroni post-hoc analyses, I tested differences between the four countries (see Table J.1), showing that autism knowledge was higher in the Netherlands than in the other three countries, and lower in Iran than in Morocco.

Table J.1

Cross-cultural difference on the AKS-R score.

Variable	Post hoc					
	Country *Mean (SD)*		*Mean Differences*	*SE*	*C.I.*	P_{bonf}
AKS-R (Effect Size: .19)	Iran 74.77 (16.98)	Malaysia 78.83 (7.25)	-4.061	1.544	[-8.15, .03]	.053
		Morocco 82.78 (9.03)	**-8.004**	**1.551**	**[-12.12, -3.89]**	**<.001**
		Netherlands 88.22 (6.27)	**-13.447**	**1.499**	**[-17.42, -9.47]**	**<.001**
	Malaysia 78.83 (7.25)	Morocco 82.78 (9.03)	-3.943	1.518	[-7.97, .08]	.058
		Netherlands 88.22 (6.27)	**-9.387**	**1.464**	**[-13.27, -5.50]**	**<.001**
	Morocco 82.78 (9.03)	**Netherlands 88.22 (6.27)**	**-5.444**	**1.472**	**[-9.35, -1.54]**	**.001**

Note: significant differences are in bold.

Appendix K. Traditional Masculinity-Femininity Scale (TMF)

The TMF (Trait-Masculinity-Femininity; Kachel et al., 2016) is a measurement tool used to assess an individual's gender role self-concept. It encompasses various aspects of gender-role identity, including physical appearance, behaviours, interests, and attitudes/beliefs. The TMF consists of six items, and participants are asked to rate their responses on a 7-point scale, ranging from "very masculine (1)" to "very feminine (7)". This scale allows individuals to express the degree to which they identify with masculine or feminine traits across different domains.

Please rate statements below, and indicate how well each item describes you:

	Very masculine						Very feminine
	1	*2*	*3*	*4*	*5*	*6*	*7*
I consider myself…	o	o	o	o	o	o	o
Ideally, I would like to be…	o	o	o	o	o	o	o
Traditionally, my interests would be regarded as…	o	o	o	o	o	o	o
Traditionally, my attitudes and beliefs would be regarded as…	o	o	o	o	o	o	o
Traditionally, my behavior would be regarded as…	o	o	o	o	o	o	o
Traditionally, my outer appearance would be regarded as…	o	o	o	o	o	o	o

Appendix L. German Extended Personal Attributes Questionnaire (GEPAQ)

Please rate the statements below, and indicate how well each item describes you:

Masculinity-Scale

1. Not independent	*1*	*2*	*3*	*4*	*5*	Very independent
4. Very passive	*1*	*2*	*3*	*4*	*5*	Very active
5. Not competitive	*1*	*2*	*3*	*4*	*5*	Very competitive
8. *Decisive	*1*	*2*	*3*	*4*	*5*	Not decisive
9. Gives up easily	*1*	*2*	*3*	*4*	*5*	Never gives up
12. Not self-confident	*1*	*2*	*3*	*4*	*5*	Self-confident
13. Feels inferior	*1*	*2*	*3*	*4*	*5*	Feels superior
16. Doesn't stand up under pressure	*1*	*2*	*3*	*4*	*5*	Stands up under pressure

*Items with asterisks had to be recoded (1 to 5, 2 to 4, 3 to 3, 4 to 2, 5 to 1).

Femininity-Scale

2. Not emotional	*1*	*2*	*3*	*4*	*5*	Very emotional
3. *Devotes self to others	*1*	*2*	*3*	*4*	*5*	Doesn't devote self to others
6. Very rough	*1*	*2*	*3*	*4*	*5*	Very gentle
7. Not helpful	*1*	*2*	*3*	*4*	*5*	Very helpful
10. Very unkind	*1*	*2*	*3*	*4*	*5*	Very kind
11. Not aware of feelings	*1*	*2*	*3*	*4*	*5*	Aware of feelings
14. Not understanding	*1*	*2*	*3*	*4*	*5*	Very understanding
15. Cold	*1*	*2*	*3*	*4*	*5*	Warm

*Items with asterisks had to be recoded (1 to 5, 2 to 4, 3 to 3, 4 to 2, 5 to 1).

Appendix M. Bem Sex-Role Inventory (BSRI)

The BSRI (Bem, 1974) contains 60 characteristics, including 20 masculine characteristics ("aggressive", "athletic", "dominant"), 20 feminine characteristics ("cheerful", "gentle", "loyal"), and 20 neutral characteristics ("happy", "friendly', "moody"). It is noteworthy we only used masculinity and femininity characteristics, as we were not interested in the relationship between neutral characteristics and reporting autistic traits. Characteristics are rated from 1 ("never or almost never true") to 7 ("always or almost always true"). The BSRI has excellent psychometric reliability (Cronbach's α for masculinity and femininity are, respectively, .95 and .92; Holt & Ellis, 1998).

Indicate how well each item describes you on the following scale.

(1- never or almost never true/2- usually not true/3- sometimes but infrequently true/4- occasionally true/5- often true/6- usually true/7- always or almost always true)

	(M)1. self-reliant		(M)31. makes decisions easily
	(F)2. yielding		(F)32. compassionate
	(A)3. helpful		(A)33. sincere
	(M)4. defends own beliefs		(M)34. self-sufficient
	(F)5. cheerful		(F)35. eager to soothe hurt feelings
	(A)6. moody		(A)36. conceited
	(M)7. independent		(M)37. dominant
	(F)8. shy		(F)38. soft spoken
	(A)9. conscientious		(A)39. likeable
	(M)10. athletic		(M)40. masculine

	(F)11. affectionate		(F)41. warm
	(A)12. theatrical		(A)42. solemn
	(M)13. assertive		(M)43. willing to take a stand
	(F)14. flatterable		(F)44. tender
	(A)15. happy		(A)45. friendly
	(M)16. strong personality		(M)46. aggressive
	(F)17. loyal		(F)47. gullible
	(A)18. unpredictable		(A)48. inefficient
	(M)19. forceful		(M)49. acts as a leader
	(F)20. feminine		(F)50. childlike
	(A)21. reliable		(A)51. adaptable
	(M)22. analytical		(M)52. individualistic
	(F)23. sympathetic		(F)53. does not use harsh language
	(A)24. jealous		(A)54. unsystematic
	(M)25. has leadership abilities		(M)55. competitive
	(F)26. sensitive to the needs of others		(F)56. loves children
	(A)27. truthful		(A)57. tactful
	(M)28. willing to take risks		(M)58. ambitious
	(F)29. understanding		(F)59. gentle
	(A)30. secretive		(A)60. conventional

Appendix N. The correlation and reliability of masculinity and femininity measures.

We employed three measures, namely TMF (the most recent measure), GEPAQ, and BSRI, to assess the levels of masculinity and femininity. Our intention was to utilize the most reliable and valid measure for our study. While the TMF measures masculinity and femininity as a single-dimensional variable, we planned to evaluate them as distinct variables. Hence, we employed the TMF as a means to evaluate the other two (older) measures. Initially, we conducted an analysis to assess the correlation among these three measures. To examine whether the three questionnaires capture similar masculine and feminine characteristics, we conducted a series of Pearson correlation coefficients involving the TMF total score, GEPAQ masculinity, GEPAQ femininity, BSRI masculinity, and BSRI femininity (refer to Table N.1.).

We found significant positive correlations between the TMF total score and GEPAQ femininity ($r(138) = .22$, $p = .01$), as well as between the TMF total score and BSRI femininity ($r(138) = .19$, $p = .02$). On the other hand, a significant negative correlation was observed between the TMF total score and GEPAQ masculinity ($r(138) = -.25$, $p = .004$). Furthermore, we identified a significant positive correlation between GEPAQ masculinity and BSRI masculinity ($r(138) = .73$, $p < .001$) suggesting that these two measures tap into similar masculine characteristics. Similarly, there was a significant positive correlation between GEPAQ femininity and BSRI femininity ($r(138) = .73$, $p < .001$) indicating that these measures assess similar feminine characteristics. The high correlations between masculinity and femininity in both the GEPAQ and the BSRI provide evidence that they measure comparable masculine and feminine traits.

Table N.1.

The correlation between TMF total score, GEPAQ masculinity, GEPAQ femininity, BSRI masculinity, and BSRI femininity.

	1 *R*	2 *R*	3 *r*	4 *r*	5 *R*
TMF (1)		**-.25****	**.22***	-.15	**.19***
GEPAQ masculinity (2)			.16	**.73*****	.02
GEPAQ femininity (3)				.13	**.73*****
BSRI masculinity (4)					.13
BSRI femininity (5)					

Note: *** p<.001, ** p<.01, * p<.05. In grey the expected significant correlations.

Subsequently, we conducted reliability tests on the measures of GEPAQ masculinity, GEPAQ femininity, BSRI masculinity, and BSRI femininity. The results revealed good psychometric reliability for both the GEPAQ and the BSRI measures. For GEPAQ, the Cronbach's alpha coefficients for masculinity and femininity were calculated as .88 and .82, respectively, indicating high internal consistency. Similarly, for BSRI, the Cronbach's alpha coefficients for masculinity and femininity were .76 and .78, respectively, suggesting good internal consistency. Despite the good reliability of both measures, we decided to proceed with GEPAQ for further analysis. This decision was based on the higher reliability observed in the GEPAQ measure compared to the BSRI measure. Additionally, GEPAQ indicated better correlations with the other two measures. By selecting the GEPAQ measure, we aimed to ensure greater confidence in the accuracy and consistency of our findings in relation to masculinity and femininity within the scope of this study.

Appendix O. Horizontal and Vertical Individualism and Collectivism Scale (INDCOL)

Please rate items below, and indicate how well each item describes you:

(The items should be mixed up prior to administering the questionnaire. All items are answered on a 9-point scale, ranging from 1= never or definitely no and 9 = always or definitely yes.)

Horizontal Individualism

(1) 1. I'd rather depend on myself than others

(5) 2. I rely on myself most of the time, I rarely rely on others

(9) 3. I often do my own thing

(13) 4. My personal identity, independent of others, is very important to me

Vertical Individualism

(2) 1. It is important for me to do my job better than the others

(6) 2. Winning is everything

(10) 3. Competition is the law of nature

(14) 4. When another person does better than I do, I get tense and aroused

Horizontal Collectivism

(3) 1. If a co-worker gets a prize, I would feel proud

(7) 2. The well-being of my co-workers is important to me

(11) 3. To me, pleasure is spending time with others

(15) 4. I feel good when I cooperate with others

Vertical Collectivism

(4) 1. Parents and children must stay together as much as possible

(8) 2. it is my duty to take care of my family, even when I have to sacrifice what I want

(12) 3. Family members should stick together, no matter what sacrifices are required

(16) 4. It is important to me that I respect the decision made by my groups

Appendix P. The relationships between masculinity, femininity, individualism, collectivism and autistic traits among female participants

To investigate the relationships between masculinity, femininity, individualism, collectivism and autistic traits among female participants, four multiple linear regressions were used with the AQ-50 total, AQ Social Skills, AQ Patterns-Details, and AQ Communication-Mindreading as the dependent variables and GEPAQ-masculinity, GEPAQ-femininity, INDCOL-individualism, and INDCOL-collectivism as independent variables (see Table P.1.). A significant regression equation was found for AQ-50 total ($F(4, 108) = 10.53$, $p < .001$), with R^2 of .28. Participants' AQ-50 total is equal to 162.69 – 1.06(Masculinity) – 0.87(Femininity) + 0.38(Individualism) – 0.11(Collectivism). Masculinity ($t = -4.25$, $p < .001$), Femininity ($t = -3.32$, $p < .01$), and Individualism ($t = 2.64$, $p = .01$) were significant predictors of AQ-50 total, but Collectivism was not.

Additionally, a significant regression equation was found for AQ Social Skills ($F(4, 108) = 15.45$, $p < .001$), with R^2 of .36. Participants' AQ Social Skills is equal to 59.13 – 0.78(Masculinity) – 0.39(Femininity) + 0.27(Individualism) – 0.14(Collectivism). Masculinity ($t = -5.83$, $p < .001$), Femininity ($t = -2.78$, $p = .006$), Individualism ($t = 3.48$, $p < .001$), and Collectivism ($t = -1.93$, $p < .05$) were all significant predictors of AQ Social Skills. Moreover, a significant regression equation was found in AQ Patterns-Details ($F(4, 108) = 5.36$, $p < .001$), with R^2 of .17. Participants' AQ Patterns-Details is equal to 7.25 + 0.03(Masculinity) + 0.18(Femininity) + 0.01(Individualism) + 0.09(Collectivism). Femininity ($t = 2.15$, $p < .05$) was significant predictor of AQ Details-Patterns, but Masculinity, Individualism, and Collectivism were not. Furthermore, a significant regression equation was found in AQ Communication-Mindreading ($F(4, 108) = 11.97$, $p < .001$), with R^2 of .30. Participants' AQ Communication-

Mindreading is equal to 31.75 – 0.23(Masculinity) – 0.28(Femininity) + 0.01(Individualism) – 0.03(Collectivism). Masculinity (t = -3.43, p = .002), and Femininity (t = -3.98, p < .001) were significant predictors of AQ Communication-Mindreading, but Individualism and Collectivism were not.

Table P.1

The relationship between the AQ-50 total, the three factors, masculinity, femininity, individualism, and collectivism among female participants.

	Dependent Variables			
N=113	AQ-50 total	AQ Social Skills	AQ Patterns-Details	AQ Communication-Mindreading
R^2	.28	.36	.41	.31
F	10.53 ***	15.45 ***	5.36 ***	11.97 ***
β_0	162.69	59.13	7.25	31.75
Masculinity (β_1)	-1.06 ***	-.78 ***	.03	-.23 **
Femininity (β_2)	-.87 ***	-.39 **	.18 *	-.28 ***
Individualism (β_3)	.38 ***	.26 *	.01	.01
Collectivism (β_4)	-.13	-.14 *	.09	-.03

Note: *** p <.001, **p <.01, *p <.05

Appendix Q. Autism-Spectrum Quotient (AQ-28)

Below is a list of statements. Please read each statement very carefully and rate how strongly you agree or disagree with it by circling your answer.

(1= definitely agree, 2= slightly agree, 3= slightly disagree, 4= definitely disagree)

1. I prefer to do things with others rather than on my own (1)

2. I prefer to do things the same way over and over again (2)

3. Trying to imagine something, I find it easy to create a picture in my mind (3)

4. I frequently get strongly absorbed in one thing (4)

5. I usually notice car number plates or similar strings of information (6)

6. Reading a story, I can easily imagine what the characters might look like (8)

7. I am fascinated by dates (9)

8. I can easily keep track of several different people's conversations (10)

9. I find social situations easy (11)

10. I would rather go to a library than to a party (13)

11. I find making up stories easy (14)

12. I find myself drawn more strongly to people than to things (15)

13. I am fascinated by numbers (19)

14. Reading a story, I find it difficult to work out the character's intentions (20)

15. I find it hard to make new friends (22)

16. I notice patterns in things all the time (23)

17. It does not upset my if my daily routine is disturbed (25)

18. I find it easy to do more than one thing at once (32)

19. I enjoy doing things spontaneously (34)

20. I find it easy to work out what someone is thinking or feeling (36)

21. If there is an interruption, I can switch back very quickly (37)

22. I like to collect information about categories of things (41)

23. I find it difficult to imagine what it would be like to be someone else (42)

24. I enjoy social occasions (44)

25. I find it difficult to work out people's intentions (45)

26. New situations make me anxious (46)

27. I enjoy meeting new people (47)

28. I find it easy to play games with children that involve pretending (50)

Appendix R. Devaluation of Consumer Families Scale (DCFS)

Please rate statements below:

4= strongly agree; 3= agree; 2= disagree; 1= strongly disagree

1. Most people in my community would rather not be friends with families that have a relative who has autism living with them.

2. Most people believe that parents of children with autism are not just as responsible and caring as other parents.

3. Most people look down on families that have a child with autism living with them.

4. Most people believe their friends would not visit them as often if a member of their family were diagnosed with autism.

5. Most people would not treat families with an autistic member in the same way they treat other families.

6. Most people blame parents of children with autism.

7. Most people would rather not visit families that have a member with autism.

Appendix S. List of autism-related behaviours

What was the first abnormal/notable (behaviour) that you noticed in your child's development? Multiple answers possible

1 = Little interest in other people,

2 = No, little or strange initiative for social interactions,

3 = Little eye contact,

4 = Delayed, absent or markedly abnormal speech,

5 = Delayed or no response to own name,

6 = Repetitive movements (rocking or flapping hands),

7 = Self-harming behaviour,

8 = Unusually intense interests in certain subjects, toys or activities,

9 = Unusual reaction to touch, taste, smell or sound,

10 = No pointing, gestures or imitation of others,

11 = Loss of skills,

12 = Needed less sleep than other children,

13 = Abnormal or delayed motor development,

14 = Other people said something was wrong,

15 = Other, namely…,

16 = Don't know / Unknown,

17 = Much need for structure, difficulty with transitions / changes,

18 = Very sensitive to stimuli, intense expressions of emotions (fear, anger),

19 = Difficulty with social contacts and behaviour / "being different",

20 = Recognition (brother / sister / own child /stranger n),

21 = Compulsion,

22 = Overtiredness / sleeping a lot,

23 = Hyperactive / Impulsive behaviour,

24 = Does not recognize emotions,

25 = Depression / feeling down / anxiety,

26 = Live in your own world / withdraw from the outside world / little fantasy/imagination,

27 = Abnormal or delayed cognitive development (smarter, slower, different),

28 = Aggressive behaviour / tantrums)

Appendix T. List of parenting challenges.

What is most bothering your child at the moment?

Note: Enter a number for a maximum of 3 problems that bother your child the most, starting with number 1 with the problem that most bothers your child, and continuing up to number 3. If your child only has 1 problem, only put number 1 at that point. If your child is not experiencing any problems at the moment, only put a 1 in the answer option "My child does not seem to be bothered by anything".

1 = Symptoms or complaints related to the autism,

2 = Eating problems,

3 = Sleeping problems,

4 = Dealing with peers at school or during leisure time,

5 = Bullying,

6 = Education that does not match my child's needs has,

7 = Stressful personal environment (think of; divorce of parents, moving house, etc.),

8 = Trauma,

9 = Lack of close friendships,

10 = Something else (Please specify),

11 = My child does not seem to be bothered by anything)

Appendix U. Model one, the relationship between AQ-28, DCFS, country, coping strategies, and distress among parents of autistic children

Figure U.4 shows the model in both countries, χ^2 = 409.71, *df* = 21, *p* < .001, *CFI* = .96, *TLI* = .85, *RMSEA* = .31 (90% confidence interval = .28–.34). Chi-square's (χ2) *p* >.05, *CFI* >.9, *TLI* >.9, and *RMSEA* <.08 are considered criteria for a good fit model (Hu & Bentler, 1999). Therefore, this model can be considered a good fit model, as it met one criteria (*CFI*) of a good fit model.

Figure U.4

The relationship between the DASS-21, AQ-28, DCFS, country, and Brief COPE factors among parents of autistic children (p < .001).*