'Normal People'? An Autistic analysis into neurodiverse communication, and innovation through diversity.

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How to cite:

AXBEY, HARRIET,ANNE (2023) *'Normal People'? An Autistic analysis into neurodiverse communication, and innovation through diversity.*, Durham theses, Durham University. Available at Durham E-Theses Online: http://etheses.dur.ac.uk/15432/

‘Normal People’? An Autistic analysis into neurodiverse communication, and innovation through diversity.

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A thesis submitted in fulfilment for the degree of Doctor of Philosophy

School of Education

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2023

Abstract

Interactions form a major part of our lives, and how successful or not these are deemed to be can affect not only our own and others' happiness, but also our health and life outcomes. The Autistic community have had a long and difficult history, with changing diagnoses over the past 100 years confusing and manipulating what we define as 'normal'. Where previously Autism was framed within deficit models, with Autistic people lacking a 'Theory of Mind' (TOM), the ability to 'read minds', Autism is now being understood within the neurodiversity framework and the double empathy problem. These suggest that Autistic people are not deficient in social abilities, but that they merely interact differently to their not-Autistic, oft-described as 'neurotypical', peers. Not-Autistic people struggle to understand Autistic ways of thinking and communicating, described in this thesis as an 'Autistic Theory of Mind' (ATOM). This thesis examined secondary data, in the form of interactions between Autistic and not-Autistic pairs within diffusion chains, for similarities and differences in the length and number of silences, as well as the output of success from a tower-building task. Findings suggest the longest and most numerous instances of silences between people occurred in mixed-neurotype (neurodiverse) pairs, suggesting a potential lack of rapport between these social actors. There were no significant differences in task success across conditions. A content analysis also showed no significant differences in the topics of conversation between pairs across conditions, or in the instances of offering or help to a partner. Photos of the towers were then analysed for similarity by 351 independent raters (62 Autistic) in an online task, to explore whether replication or innovation were more common depending on the neurotype match or mismatch within the interaction. Outputs were judged as significantly more varied in the neurodiverse groups, showing that participants were less likely to replicate from a participant with a different neurotype to themselves. There were no significant differences in similarity judgements between the Autistic and not-Autistic participants. This is a small-scale study, and future replication of these results is needed to make larger inferences about what this could mean for creativity within groups of neurodiverse people. Further research could explore replication and innovation on a larger scale, looking at group dynamics as opposed to pairs within a diffusion chain.

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Statement of Declaration

I declare that this work is my own. Material in this thesis has been published in a peer-reviews article in 2023, and presented at a conference in the form of a poster presentation. This thesis contains data from the Diversity in Social Intelligence project funded by the Templeton World Charity Foundation, kindly shared with permission from the PI Sue Fletcher-Watson.

Statement of Copyright

Acknowledgements

I would like to thank my supervisors for their support, and for taking up these roles part-way through my thesis.

Catherine Crompton, who stepped in and provided me with support when I was not sure how this thesis could work under COVID-19, and Sue Fletcher-Watson, for all the opportunities, advice, and cheering me up via Twitter.

Emma Flynn, who helped me onto this path, helped me access so many opportunities, and assisted me in gaining the NINE DTP funding, and the NINE DTP for their support, development opportunities, and conferences.

Stephenson College, my wonderful community since 2015, and especially during the many lockdowns of 2020 and 2021.

Jane Dove for all her help over the years.

My wonderful Autistic team at Swansea University

And finally, thank you to all my friends, family, and partners, who have helped me get to where I am today. Thank you for your support and kind words. And thank you to H 'the bairn' for introducing me to Autistic TikTok.

Me quondam mirabitur orbis- Motto of Stephenson College

In memory of Christine Merrell and Lynn Thompson.

1 Introduction

This chapter will introduce the thesis and the rationale behind it, including where the interest for the study came from, and why this thesis matters. It will state the objectives of the study, and the research questions to be investigated. Overall, this thesis will argue that diversity is beneficial, and breeds innovation and creativity through those with different neurotypes interacting. Furthermore, it will argue that the label of Autism itself is problematic, as it has changed so much over the last century, and is based upon male-centric, Westernised norms of sociality. However, it will also present the idea of Autism as an identity, born out of the social model of disability, as a divergence from the 'neurotypical' way of thinking. Many find that this Autistic identity, loosely based upon the diagnostic criteria set out in the Diagnostic Statistics Manual (DSM) and International Classification of Diseases (ICD), accurately describes themselves, while also not being a negative attribute. This thesis will not attempt to rationalise these two stances into one, as the author believes that both can exist in harmony. Autism can be both a constructed diagnosis describing similar traits between people, as well as a valid identity.

1.1 Rationale

1.1.1 Where does the interest for this study come from?

This research grew out of my own experience as an Autistic person. Often, I had my own psychology and experiences explained to me in the context of there being something deficient within me. This had a profound effect over the years, and I have found this to be the case with countless other people labelled as Autistic, who have had their differences explained to them using a medicalised, deficit model of difference and disability. Anecdotally, there was a lot of evidence to suggest that Autistic people interact well with other Autistic people, and I believed there must be a way to explore this experimentally.

1.1.2 Why does this matter?

The way that we communicate with others is crucial to not only our own and others' happiness, but also, often, our survival (Waltz, 2008). These ways of interacting are governed by the, often unspoken, rules, patterns, and hierarchical structures around us. The world we live in is now highly social, and our ability to keep up with changing social norms is judged to the level where disability is diagnosed for those who struggle with this. Autism is considered a social communication deficit disorder, and is diagnosed based upon the interactions an Autistic person has with others, as well as with the world around them. Much less is written and investigated about the ways in which others interact with those diagnosed as Autistic, how Autistic people interact with each other, or how the environment is designed to exclude some, and benefit others. Autism is often defined by deficits in empathy and in lack of a 'Theory of Mind' (Baron-Cohen, 2010). The ability to 'mind-read', say some, is essential to what it means to be human (Baron-Cohen, 1997), and interventions must be put in place for those who cannot read minds (Howlin et al., 1999). However, this thesis states that this is an outdated and prejudiced view. Many now argue that it is a disjuncture in reciprocity between social actors that leads to disruption and difficulties in social situations; meaning those who are not Autistic struggle to understand Autistic people to the same extent as Autistic people struggle to understand those who are not Autistic (Milton, 2012). This has been named by

Damian Milton as the 'double empathy problem' and forms part of the basis for the arguments supporting a neurodiversity approach to Autism studies and education (Crompton et al., 2020b; Milton, 2012). The double empathy problem will form the basis of the analysis of the data concerning neurodiverse and neurosimilar interactions in this thesis.

In several of his works, leading UK Autism specialist Simon Baron-Cohen described Autistic people alongside 'normal adults' (Baron-Cohen et al., 2001a; Baron-Cohen et al., 1999) or 'normal children' (Baron-Cohen, 1990), the suggestion being that being Autistic is a deviation from a norm that is not-Autistic. Neurodiversity is the theory that all minds are different, and that there is therefore no 'normal' way for a brain to work, or for people to interact with others and the world around them. Many different models have been used to describe Autism over the years, however, research shows that Autistic people themselves oppose the medical model which interests itself in causation and cure (Gillespie-Lynch et al., 2017; Kapp et al., 2013), and lean towards a neurodiverse approach to the phenomenon. The idea that Autism is merely a neurological difference, not requiring changing through intervention, is a fairly new concept, and has many critics. However, proponents of neurodiversity and human rights argue that this model of Autism is the only one which will accord people the respect and dignity they deserve.

1.1.3 Concerns of study

This study aims to look at how Autism has been conceptualised over the years, and how the medical model evolved into the neurodiversity model we see today. It will then consider how neurotype-specific interactions can be interpreted using different models. The study will therefore broadly consider:

A. *How Autism has developed over the years as a phenomenon;*
B. *The different models that have been used to describe Autism, and how the world interacts with neurodivergence;*
C. *How Autistic communication is conceptualised within models of difference and disability;*
D. *Neurotype-specific interactional and communication differences.*

1.1.4 How will this thesis address these issues?

The first three issues will be examined through the literature reviews of Chapters 2-5, and the empirical study will use the final concern: *neurotype-specific interactional and communication differences*, and knowledge accumulated from the literature, to explore these neurotype-specific interactional differences. For this, three research questions have been developed:

> *RQ1. Are there differences in cultural transmission task performance depending on the neurotype of the social partner?*
>
> *RQ2: How does reciprocal interaction between neurodiverse groups vary during a task?*
>
> *RQ3: Is there evidence of familial resemblance across chains of neurosimilar people?*

Chapter 8 looks at the themes of success and interactions (Research Questions 1 and 2), comparing the outcomes of a tower-building task, as well as the interactions between people completing the task. Data for this task took the form of secondary data from a study conducted by The University of Edinburgh (Crompton & Fletcher-Watson, 2018) involving seventy-one Autistic and not-Autistic participants completing a tower-building task within diffusion chains. The diffusion chain method is similar to the children's game of 'telephone' and studies how information travels along 'generations' of participants, and is therefore useful for studying the transmission of ideas and methods. The chains were either comprised of all Autistic, all not Autistic, or alternating Autistic and not-Autistic participants. Participants would watch another participant complete the task, before completing it themselves while being watched by the next participant, and so on. Therefore, although participants completed the task independently, there was an element of collaboration as they watched and interacted with other participants in their chain. For a diagram of the diffusion chains used in the study, see Figure 13. In terms of success in the task, the parameter used was height of tower, as participants were asked to build a tower as tall as possible for the task. There were no significant differences in tower height across conditions. For the second theme of *interactions*, the videos of the building task were analysed using content analysis to look at the interactions between participants completing this task. This identified silences as a key element that varied across conditions. Analysis found that there was more silence between the Autistic and not-Autistic participants, suggesting a lack of rapport when there was a mismatch of neurotypes.

Chapter 9 will focus on the theme of *similarities*. This will investigate innovation and replication within the conditions in the first part of the methods. The similarities of the towers built in the diffusion chain study were analysed by 351 independent raters via an online platform. These judgements found that towers were significantly more similar when they were built in 'neurosimilar' chains- that is, chains where participants were interacting with someone with a similar neurotype, e.g., both participants were Autistic.

This thesis will be assessing the models of Autism from a Critical Autism Studies perspective. Within critical Autism studies, the 'criticality' comes from investigating power dynamics that operate in discourses around Autism (Woods et al., 2018), questioning deficit-based definitions of Autism, and being willing to consider the ways in which biology and culture intersect to produce 'disability' (Waltz, 2014, p. 1337). An Autistic analysis, defined here as one conducted by an Autistic author, will be conducted, markedly different from the majority of Autism research conducted by not-Autistic authors, and a neurodiversity perspective will be presented alongside the deficit-constructed view of Autism. This author will consider what exactly is the phenomenon that is Autism, and where this diagnosis might head in the future. The concept that both disability and Autism are socially constructed within colonial and male-centred societies will be explored, and discussion of post-colonial and feminist views of Autism will be presented.

This work focuses primarily on Autistic people and the phenomenon that is 'Autism'. Therefore, when referring to neurodivergences, or neurodivergent people, the majority of citations will be from scholars describing Autistic experiences. However, many other types of neurodivergence are present in the neurodiverse world in which we live, and co-morbidity of neurodivergent 'conditions' is common, for example with 40-70% of Autistic people also exhibiting traits of Attention Deficit and Hyperactivity Disorder (ADHD) (Tye et al., 2018).

Whether these will remain two separate diagnoses as time goes on will remain to be seen, as there are indeed many overlaps, and similarities in the issues affected by both communities.

1.2 What is the original contribution of this thesis?

This thesis is the first to examine the similarity of physical outputs from neurodiverse interactions, and the first to compare the duration and frequency of silences between neurodiverse social actors. It is also the first to consider an Autistic Theory of Mind (ATOM) in such terms. It is hoped that this contribution to the literature can help to establish models of neurodivergent social behaviours and neurodiverse social intelligence theorems.

1.3 Outline of thesis

This section will cover the key terms used throughout the thesis. While definitions are given during the text, these particular terms will be regularly used, and therefore are provided here for easy reference. There will then be a brief summary of the impact of the COVID-19 pandemic on this research project, and adaptations that were made to account for this. This includes a description of how in-person primary data collection was not possible as originally planned for this thesis, and how secondary data from The University of Edinburgh was therefore analysed during the lockdowns in the United Kingdom.

Chapter two is a detailed history of Autism as a diagnosis, from the first known use of the word, to the diagnostic criteria used in 2023. This chapter will look at the key pioneers within the field of Autism studies, and critically examine their contributions; these are, in many cases, contributions that have been detrimental to the public and clinical perception of Autistic people. The purpose of this chapter is both to give background that is often overlooked, but also to demonstrate how the diagnosis has changed over the years.

Chapter three outlines three models of viewing Autism and disability. This starts with detailing the medical model, also often referred to as the deficit model, which defines Autism by impairments and promotes treatments, cures, and interventions. Key figures within this field, current and past, are identified, and literature produced by them critically examined. The next model outlined is the social model of disability, a more modern approach to disability which assumes a deficit on the part of *society* for not accommodating all of its members. The final model examined is the one used for the analysis in this thesis, and the one with which the author identifies: the neurodiversity model. Born from the social model, this model views neurodiversity (the diverse ways in which brains work) as a naturally occurring phenomenon, and it is for society to adapt to meet the needs of those whose brains differ from the 'established norm'.

Chapter four uses elements from the previous two chapters to examine how today's society interacts with neurodivergence. The topics of Autistic health, Autistic presence in the justice system, and how Autism is presented in the media will be explored. This is a salient chapter as it is important to look at interactions as bi-directional, and therefore the ways Autistic people interact, as well as how the world interacts with them, must be considered for an effective social and neurodiversity-affirming model-based research project.

Chapter five looks at the ways information transmission takes place, and is studied, in particular Autistic methods of information transmission, and Autistic phenomena such as masking. The concept of rapport between people will be looked at as well as how this is measured. The transmission of information between and within different groups will be explored, including the concepts of innovation and imitation and how these differ based upon the group in question. The intersectionality of Autism, that is, the other identities that may intersect with an Autism diagnosis, such as being a woman, will be detailed, before the author considers what a diagnosis of Autism means in today's world, and to what extent this diagnosis is a Westernised phenomenon.

Chapter six will introduce the research questions, accompanied by the hypotheses for each question. The research questions will look at the differences in how information is transmitted between Autistic and not-Autistic people, and whether familial similarity can be seen across experimental generations of neurodiverse (those with different neurotypes) and neurosimilar (those with similar neurotypes, e.g., all Autistic) people. The research questions to be explored are as follows:

> *RQ1. Are there differences in cultural transmission task performance depending on the neurotype of the social partner?*
>
> *RQ2: How does reciprocal interaction between neurodiverse groups vary during a task?*
>
> *RQ3: Is there evidence of familial resemblance across chains of neurosimilar people?*

Chapter seven will be a summary of the methodological approaches used within this thesis, including a positionality statement. The diffusion chain method will be detailed and critiqued, as well as the use of online platforms for data collection in experimental designs.

Chapter eight will detail the design and methods used to examine the research questions associated with the secondary data and the themes of success and interactions. The results from these studies will then be reported, and a short discussion will summarise the key findings.

Chapter nine will look at the design and methods associated with the primary data collection, and the theme of similarities, and will also include results and a short discussion.

Chapter ten will synthesise the literature and results in a discussion on the phenomenon that is Autism, and what it means to be Autistic in the twenty-first century, reflecting back upon the history of the diagnosis and the impact of certain key players in the field of Autism studies. This chapter will look at Autism from a feminist and post-colonial lens, using the literature to question the socially constructed nature of Autism. The results from the study will be explored alongside these perspectives.

Chapter 1	**Chapters 2, 3, 4, and 5**	**Chapters 6 and 7**	**Chapters 8, 9, and 10**
Introduction, key terms, and COVID-19 adaptations	Literature relating to Autism, its history, models of disability, and ways in which	Research questions, methodological	Methods, results, discussion, and conclusions

	Autistic people interact with the world, and vice versa	approaches, and analysis methods	

Table 1: Breakdown of Thesis

The diagram below outlines the order in which aspects of this thesis will be approached, with the concerns broadly covering aspects of Autism, models of disability, and interaction; then the research questions focusing on the interactional aspects, and finally the studies and how they attempt to answer these research questions. A discussion will then group all these parts together to form some conclusions and future directions.

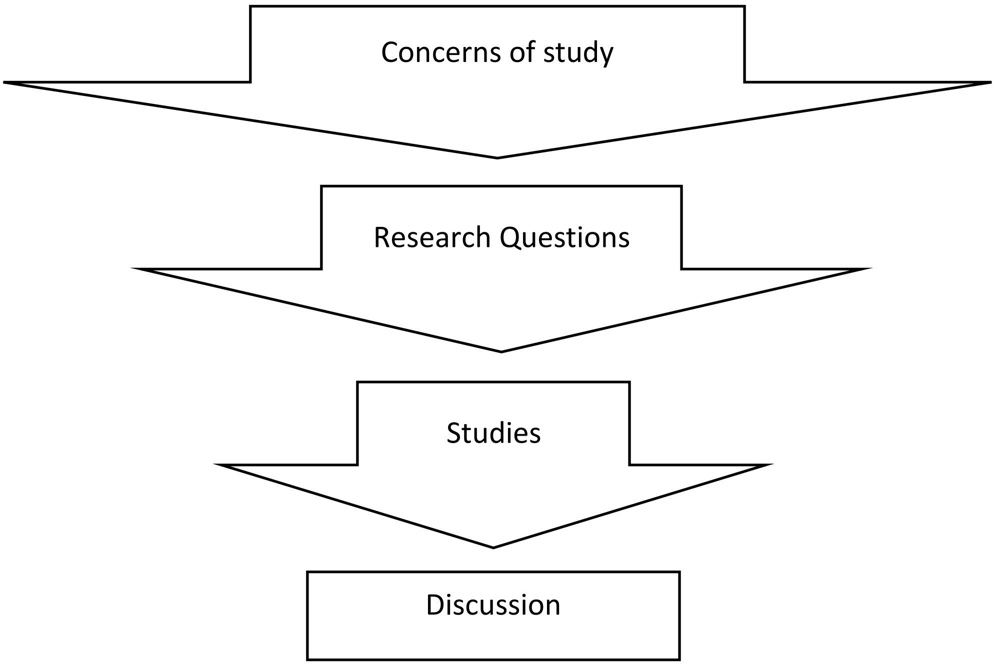

Figure 1: Flow Diagram of Thesis Concepts

1.4 Glossary of Terms

> *"Autism is a neurodevelopmental condition that results in distinguishably different socio-cognitive processing styles which pose advantages and disadvantages within current societal norms" (Chapple et al., 2021, p. 1).*

As will be explored throughout this thesis, definitions and linguistic choices are very important within Autism studies, and disability studies. These definitions below are the ones that are being used by this author. That is not to say that they will not evolve over time.

Autistic: Someone with a diagnosis of, or who identifies as being, Autistic as per the current diagnostic criteria or popular social and academic constructs of Autism. The identity is characterised by difficulties interacting with some others, experiencing sensory difficulties, and enjoying repetitive actions or interests.

Diffusion chain: A method of data collection similar to the children's game of 'telephone', where a physical skill or oral information is passed along a 'chain' of people, in an attempt to simulate cultural information transmission.

Disability: A mental or physical difference or condition that means a person faces substantial and long-term difficulties accessing the world around them.

Disabled: A disabled person is someone who, due to mental or physical differences or conditions, has substantial and long-term difficulties accessing the world around them.

Identity-first language: Referring to someone inclusive of their characteristic, e.g., Autistic person, Black person, gay man, or blind woman.

Intersectionality: The nature of one's identifying characteristics, such as race or gender, overlapping with each other to create different experiences and systems of disadvantage.

Neurodivergent: Those who do not fit the 'neurotypical' model of brain function and development (see below). This could include a diagnosis of a neurodivergent condition such as Autism or ADHD.

Neurodiverse: A group where there are a mix of different neurotypes present, e.g., three Autistic people and two not-Autistic people. The world is neurodiverse as it contains many people, all of whom think differently. A person cannot be neurodiverse.

Neurotypical: This is defined here as someone who does not meet the criteria for many of the diagnoses of mental or psychological difference as per the DSM-5 or ICD-10. This term is not used in the researcher's own study, but is commonly used by others, hence the inclusion in this glossary.

Not-Autistic: Someone who does not have a diagnosis of Autism, and who does not consider themselves Autistic. They could still be neurodivergent in another way, however (e.g., ADHD). This author has made the personal choice to use the term 'not-Autistic' as opposed to 'non-Autistic', and they believe it fits within their conceptualisation of Autism as a difference not an acquired disorder.

Person-first language: Referring to a characteristic separate from the person, e.g., with Autism, with Indian heritage, with Down's syndrome, or with blindness.

Postcolonialism: Represents the current state of affairs in the aftermath of Western colonialism. This encompasses the critical study of the cultural, social, economic, and political impacts of the colonisation, imperialism, and exploitation of peoples and their lands by others.

1.5 Adaptations due to COVID-19 (Methodological limitations)

Fieldwork for the year 2020 was planned, with ethics already accepted for the data collection. However, due to the Coronavirus Pandemic, in-person fieldwork was not possible for the years 2020-2022, and the pilot planned for March 2020 was cancelled as the first lockdown was implemented. Several attempts to conduct research online were made with the help of my supervisor Christine Merrell, following similar research questions to the original plan Axbey (2019b), but the diffusion chain technique proved unsuitable for online use due to differing internet speeds, and technical constraints. During the time where the next steps were unclear, and different methods were being considered, the research concerns of the study were defined so as to ensure a broad basis for the thesis, when it became clear that the in-person primary data collection was becoming untenable. As a result of the lockdowns, secondary data analysis was instead undertaken using data provided by colleagues at The University of Edinburgh with whom I had worked previously (Crompton & Fletcher-Watson, 2018; Crompton et al., 2020c). This research team from The University of Edinburgh had collected data regarding the transmission of information between Autistic and not-Autistic people in diffusion chains (Crompton & Fletcher-Watson, 2018). These data were taken as part of a research day involving several tasks looking at interactions between Autistic and not-Autistic people. These diffusion chain data were relevant to my own original research plans to look at interactions between Autistic and not-Autistic children in diffusion chains and had similar research questions and aims. It differed in that it focused on adults, and did not involve an oral transmission task as planned in my original thesis proposal, which would have used storytelling to examine cultural transmission, as opposed to the more visual and structural transmission explored through the creative building task. Using the analysis of the secondary data from The University of Edinburgh, I was then able to design a study to collect primary data online using a research programme created by Tullo et al. (2022). As mentioned, due to the restrictions on data collection, a more extensive literature review has been undertaken, and this is reflected by the in-depth discussion on the history of Autism and how Autistic people are perceived. This study has been greatly impacted by the Covid-19 pandemic and associated events; however, quality research has been possible, and I would like to especially thank those at The University of Edinburgh.

2 The History of Autism as a Phenomenon and Diagnostic Process

> *"The question of who has the privilege to define Autism- or any category of human difference- is not a scientific, but a philosophical and political one" (Smukler, 2005, p. 22).*

In order to understand where the field of Autism studies is now, it is important to look to the past. It is also important to look at the context of how mental illness and disability have been viewed over time as the historical context in which research is situated is of great importance (Carter, 2004). This chapter will include the impact of deinstitutionalisation in the mid to late twentieth century, when a new matrix of community treatment, special education, and early intervention was created (Eyal, 2013). Due to the focus of the present study taking place from England, and the United Kingdom, an Anglo-centric account has been undertaken which encompasses changes to the American Diagnostic Statistical Manual (DSM) and the International Classification of Diseases (ICD) over the last hundred years. A particular focus on the DSM will be evident as it was, and still is, a significant clinical and research tool used to identify Autism in many countries, as well as the UK (Leveto, 2018). Later in this thesis, the limitations of defining Autism and normality by Western norms will be examined; however, as the diagnostic criteria were developed within the Western world, this is the best place to begin looking at the history of Autism as a phenomenon.

This chapter will include the development of the idea of childhood schizophrenia, the introduction of Autism as a diagnosis, and the removal of Asperger's syndrome as a diagnosis (American Psychiatric Association, 1980, 1994, 2013; World Health Organisation, 1993, 2018). Additionally, Autism and disability have been considered in regards to the laws passed throughout the last century, including Acts of parliament regarding discrimination, education, and Autism in particular. These descriptions will help to provide a rich basis of understanding of how Autism has been constructed over the last century, leading the reader to interrogate how the social construction of the 'disorder' has changed dramatically over the years. This chapter is necessary to explore the research concern of: *how Autism has developed over the years as a phenomenon,* and will explore topics in a chronological order.

2.1 Pre-1900

There is little reference to any support given to patients described as having traits associated with what is now defined as Autism prior to the 1900s. In the early 19th century, attempts were made in the United States to classify psychopathology, mostly in an attempt to regulate the treatment of institutionalised, mentally ill patients (Kawa & Giordano, 2012). For a good account of the treatment of those considered to have learning difficulties specifically, Jarrett (2021) considers the landscape from 1700 to present day, and focuses on what life was like pre-institutionalisation, when the disabled community were cared for within their own communities. We can see the change back to this model in the latter part of the 1900s, as discussed in this chapter.

2.2 1911, The Birth of a Word

Bleuler (1950 [1911]) was the first person to use the word 'Autismus' (Autism) in his seminal study of 1911. 'Autism' etymologically stems from the Greek 'autos' meaning 'self'/'isolated self' and was used to describe the thinking of Bleuler's schizophrenic patients who appeared to live in a world where fantasy dominated over reality. Autism was described not as a disorder, but a way of thinking. 'Autism' defined the 'inner life' of his subjects, who also experienced 'fantasies' and 'infantile wishes' in order to avoid the 'unsatisfying reality' in which they lived (Bleuler, 1950 [1911]). The reader will notice a marked difference in this definition, to later descriptions of Autism as being a '*lack* of imagination' and '*lack* of imaginative play' (American Psychiatric Association, 2013) (emphasis added). Like many in this time, including future Prime Minister Winston Churchill (Brignell, 2010; Churchill, 1910), Bleuler advocated for eugenics, and, in his cases particularly, the eugenic sterilization of persons diagnosed with, or predisposed to, schizophrenia, and therefore also those he described as having 'Autistic' thinking.

2.3 Standardisation and the Mental Deficiency Act 1913

The first legislation in the United Kingdom that sought to protect, in some way, those with psychological disabilities and disturbances, was the Mental Deficiency Act 1913. This Act, passed in England and Wales, ensured institutional care for all those identified as 'mental defectives' (Evans, 2013; Mental Deficiency Act, 1913). The Act decreed so-called 'mental defectives' be taken out of Poor Law institutions (workhouses) and prisons, and placed in specialist institutions and asylums. Furthermore, it set out four categories to describe such persons: '*Idiots*', those unable to protect themselves due to 'deficiency', '*Imbeciles*', those unable to look after themselves or others but not meeting criteria for 'idiot' diagnosis, '*Feeble-minded persons*', those not meeting the criteria to be called 'imbeciles', but still require supervision looking after themselves or others, and '*Moral imbeciles*', those displaying 'mental weakness' coupled with criminal acts or intent (Mental Deficiency Act, 1913). The recommendations and definitions set out in this Act were not repealed until the Mental Health Act 1959, and, although whether the conditions in asylums were better comparably than the workhouses and prisons is debatable, this was the first clear example of a UK Act of Parliament designed to protect those with psychological difficulties from ending up in these places.

In 1918, the American Psychiatric Association (APA) published their Statistical Manual for the Use of Institutions for the Insane, which formalised standardised nomenclature for psychopathological conditions. The manual outlined 22 diagnostic categories from which to work, which were mostly biologically-orientated towards linking 'abnormal' behaviour to 'dysfunctions' of the brain (American Psychiatric Association, 1918; Clegg, 2012; Kawa & Giordano, 2012). This publication was the precursor to the Diagnostic and Statistical Manual of Mental Disorders (DSM) published by the APA in 1952.

2.4 Pre-1930 and Sukhareva

From the creation of the term by Bleuler in 1911, there are very few uses of the word 'Autism' within the literature available to a modern reader until Hans Asperger in the 1930s. However, a few researchers and theorists used the word in a similar context to Bleuler, including Piaget (1923), who used 'Autism' to describe the 'inner life' of children not readily accessible to observers. He theorised that adults are able to condense concepts, whereas children could make no distinction between the various external stimuli that bombarded them (Evans, 2013; Piaget, 1923). This is potentially the first reference to over-stimulation, or the idea that Autistic people become overwhelmed by their environment, leading to withdrawal and/or a 'meltdown' (National Autistic Society, 2016). Meltdowns will not be considered in detail in this thesis, with the focus on communication between people, and the interactions of the world with Autistic people.

Autism is also mentioned in a review written by 'S' and Berger in 1923, in a publication by Kläsi (1922), where it was used when referring to stereotypical behaviours, potentially suggesting it had become of common usage within the area of psychopathology by this time (S. & Berger, 1923), although there are few available references online of this type.

The first clinical description of Autistic people was by Soviet child psychiatrist Grunya Sukhareva in 1926. She wrote her observations and clinical diagnosis of six boys under her care in a 1926 paper translated into English by Wolff (1996). Sukhareva founded a therapeutic school for children with psychiatric problems in Moscow in 1921 where they received social and motor skills training and specific work towards helping them to progress into a mainstream school (Manouilenko & Bejerot, 2015). Although describing children whom she diagnosed with 'schizoid personality disorder', the clear picture she draws of the six boys is remarkably similar to later descriptions by Asperger and Kanner (Posar & Visconti, 2017). Indeed, her descriptions are incredibly like the current DSM-5 diagnostic criteria practitioners now used to diagnose Autism.

Table 2- The DSM-5 criteria for Autism spectrum disorder compared with the descriptions provided by Grunya Sukhareva. From Monouilenko and Bejerot (2015)

Autism spectrum disorder, DSM-5, 2013	Schizoid personality disorders of childhood, Sukhareva, 1925/1926, examples
A. Persistent deficits in social communication and social interaction across multiple contexts	*An autistic attitude: Tendency toward solitude and avoidance of other people from early childhood onwards; avoids company with other children*
1. Deficits in social–emotional reciprocity	• Impulsive, odd behavior • Clowning, rhyming • Some were speaking endlessly or asking absurd questions of the people around them • Affective life flattened • Seems odd • A tendency toward abstraction and schematization (the introduction of concrete concepts does not improve but rather impedes thought processes)
2. Deficits in non-verbal communicative behaviors used for social interaction	• Lack of facial expressiveness and expressive movements • Mannerism; decreased postural tone; oddities and lack of modulation of speech • Superfluous movements and synkinesis • Nasal, hoarse or high pitched whining voice or lacking in modulation
3. Deficits in developing, maintaining and understanding relationships	• Keep apart from their peers, avoid communal games and prefer fantastic stories and fairy tales • Find it hard to adapt to other children • Ridiculed by their peers and have low status
B. Restricted, repetitive patterns of behavior, interests or activities as manifested by at least two of the following	*Tendency towards automatism: Sticking to tasks which had been started and psychic inflexibility with difficulty in adaptation to novelty*
1. Stereotyped or repetitive motor movements, use of objects or speech	• Tic-like behaviors • Grimacing • Stereotypic neologisms • Repetitive questioning; talking in stereotypic ways • Rapid or circumscribed speech
2. Insistence on sameness, inflexible adherence to routines or ritualized patterns of verbal or non-verbal behavior	• A tendency for obsessive-compulsive behavior • Lengthy preparation and difficulty stopping • Pedantic, follows principles • Emotional outbursts • If interrupted becomes agitated and starts the story all over again
3. Highly restricted, fixated interests that are abnormal in intensity or focus	• Strong interests pursued exclusively • Preservative interests, e.g. conversion marked by repetitive obsessional themes; clings to certain themes • Tendency to rationalization and absurd rumination
4. Hyper- or hypo-reactivity to sensory input or unusual interest in sensory aspects of the environment	• Musically gifted—enhanced perception of pitch • Sensitivity to noise, seeks quietness • Sensitivity to smell
C. Symptoms must be present in the early developmental period	*Onset in early childhood*
D. Symptoms cause clinically significant impairment in social, occupational or other important areas of current functioning	*Inability to attend normal school due to their odd behaviors*
E. These disturbances are not better explained by intellectual disability	*Intelligence normal or above normal*

Sukhareva (Wolff, 1996) presented details of these six young boys from ‘intelligent’ and ‘gifted’ families, who appeared polite but shy, were sensitive to noise, took an unusual interest in certain things, were often musically gifted, and asked ‘numerous absurd questions.’ She went on to describe one boy as a ‘little old man’, paralleled by the term ‘little professors’ used by Asperger (Draaisma, 2009). Sukhareva found the boys were distinctly ‘clumsy’, and prone to ‘explosive emotional outbursts’, again, potentially an early account of so-called ‘meltdowns’ (National Autistic Society, 2016; Wolff, 1996). The term ‘Autistic’ was used by Sukhareva, referring to the ‘Autistic attitude’ of the children which compelled them to keep themselves separate from their peers. Interestingly, Sukhareva (Wolff, 1996) emphasised the sensory difficulties experienced by her patients, something which was not made significant again until the DSM-5 (American Psychiatric Association, 2013; Posar & Visconti, 2017). The reasons why her research was not picked up upon more at the time are unclear, although the fact it was published in the Soviet Union, and by a woman, may have contributed to this. Her work was originally published in Russian, but translated into German within a year, and so other academics in the field, for example Hans Asperger and Leo Kanner, would have had access to this. There are several explanations for this, and it has been hypothesised by Zeldovich (2018) that because Sukhareva was Jewish, Asperger may not have wanted, or felt able, to give her credit.

2.5 Asperger and Kanner

Hans Asperger, born in Austria, started work at Vienna University's Paediatric Clinic in 1931 in the Therapeutic Pedagogy Ward (Herwig, 2018). Kanner was born in Austria-Hungary (now Klekotiv, present day Ukraine) and trained in Vienna, but moved to the United States in 1926 where he became head of the John Hopkins clinic in Baltimore (Frith, 1991b). Both men were influential in the development of Autism as a diagnosis, eponymously giving their names to 'Asperger's syndrome' and 'Kanner's Autism' respectively (although both terms are no longer in modern use for diagnosis (American Psychiatric Association, 2013)). Kanner is often referred to as the inventor of the Autism diagnosis (Verhoeff, 2013), however, it can be seen that there are many other examples of clinical observations that predate his in 1943, from Sukhareva as early as 1926, and Asperger in 1938. Asperger worked using Heilpadagogik (remedial pedagogy), an approach to therapy using educational techniques, to support the children he described as being 'Autistic psychopaths', whom he believed possessed an inherited condition that made them 'troublesome', but also 'fascinating' (Frith, 1991). Asperger adopted Bleuler's terminology to develop the term 'Autistic psychopaths' as a separate condition for the first time, whereas previously 'Autistic thinking' had been a subsection of schizoid personality disorder (Asperger, 1938; Wolff, 1996). This is the first instance of Autism being used in or as a diagnostic term.

There are conflicting accounts of the way Asperger's patients were treated. Previous accounts described the clinic as a supportive environment where children were given education and skills for later life (Frith, 1991b; Silberman, 2015). He was described as a revolutionary thinker in the field of child psychiatry, who tried to protect his patients from being sent to the death camps that were being set up for those with mental disabilities by the Nazis (Silberman, 2015). However, new information was brought to light in 2018 to suggest he was in fact sympathetic to the Nazi regime; Herwig (2018) uncovered documents about, and written by, Asperger that directly contradict these previous statements. Despite his Catholic faith, the Nazi party considered Asperger to be 'in conformity with the National Socialist racial and sterilisation laws', and Asperger's own descriptions of his patients became much more racially stereotypical following the Anschluss (Herwig, 2018). Whether he agreed with the forced sterilisation of his patients remains unclear, as, in 1939 he stated that the care of those with 'inferior value' was worthy of commitment so as to make them 'productive members' of the community, rather than a 'burden and a danger' (Asperger, 1939; Herwig, 2018). This suggests, contrary to his sympathies to the Nazi party, that he took a rehabilitation approach to his patients' treatment. As was the prevailing belief at the time, Asperger was a supporter of eugenics, believing that his 'Autistic psychopaths' were born in that manner, writing in 1942 of the influence of environmental conditions on 'hereditarily burdened individuals' (Asperger, 1942, 1944; Herwig, 2018). Eugenicists believed that behaviours such as criminality were hereditable, and could therefore be 'bred out' of a population through sterilisation of the people thought to have undesirable characteristics. The view that Autism is genetic has stood the test of time, although the popular view at the time of children being ‘born criminals/prostitutes’, has not (Herwig, 2018). A common assertion of Asperger is that his work was focused on so-called ‘high functioning’ Autistic people (Gillberg, 1998; Verhoeff, 2013). However he also referred to ‘Autistic psychopath’ symptoms being present in ‘clearly feeble-minded’ children (the common term at the time for those deemed to be having a well below average IQ) (Asperger, 1939; Herwig, 2018). This is interesting, as the later diagnosis of Asperger’s syndrome focused on those without intellectual disability.

Leo Kanner worked in Baltimore from 1926, and became famous for his descriptions of eleven boys from his clinic which he published in 1943 in a paper entitled ‘Autistic disturbances of the affective mind’ (Kanner, 1943). He was working with Asperger’s colleagues Georg Frankl and Anni Weiss, who had emigrated from Austria before the war (Silberman, 2015). Nevertheless, he claimed to have been the first to describe the set of ‘unique’ symptoms which later gave way to the diagnosis of Autism; this is now known to be false, Asperger described these traits before Kanner (Asperger, 1938) and Sukhareva before both of them (Wolff, 1996). Kanner’s paper described eleven children under the age of 11 who displayed ‘extreme Autism, obsessiveness, stereotypy and echolalia’, he named this condition ‘early infantile Autism’, believing this condition to be unique enough to be separated from the previous diagnoses of schizophrenia and personality disorders (Kanner, 1943; Sterwald & Baker, 2019). A particularly famous remark of Kanner’s became the basis for the ‘refrigerator mother’ theory popularised by The Times magazine and author Bruno Bettelheim (Bettelheim, 1967; Sterwald & Baker, 2019). Kanner reported that ‘all’ of his subjects came from ‘highly intelligent families’ where most of the fathers had doctoral degrees, and the majority of mothers were college graduates; many of the parents were scientists and professionals[1] (Kanner, 1943). This precipitated an impression, common in the 1950s and 1960s, that Autism was a disorder of well-educated and high-status families (Volkmar & McPartland, 2014) with parents who were ‘highly organized, professional parents, cold and rational’ (Unknown, 1960). This belief was only quashed in 1980 by Wing, who provided evidence that Autism as a phenomenon was present in, and consistent across, all socio-economic status groups (Wing, 1980).

Along with his assertion of professional or scientific parents of Autistic children, Kanner remarked that among the parents there were ‘really very few warm hearted mothers and fathers’, thus creating the idea of ‘cold’ parents, a concept that the media focused on much more significantly than his other assertion that the parents were all of high intelligence (Kanner, 1943; Sterwald & Baker, 2019). The idea of the ‘refrigerator mother’ was especially popular as it tied in with current beliefs about the ‘schizophrenogenic mother’, and the idea that poor parenting by a mother led to the development of schizophrenia in her children

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[1] For an example of how this view continued into the late 20th and early 21st Centuries see: Baron-Cohen, S. (1998, 1st September). Does Autism Occur More Often in Families of Physicists, Engineers, and Mathematicians? *Autism, 2*(3), 296-301. https://doi.org/10.1177/1362361398023008 and Baron-Cohen, S., Wheelwright, S., Skinner, R., Martin, J., & Clubley, E. (2001b). The Autism-Spectrum Quotient (AQ): Evidence from Asperger Syndrome/High-Functioning Autism, Males and Females, Scientists and Mathematicians. *Journal of Autism and Developmental Disorders, 31*(1), 5-17. https://doi.org/10.1023/a:1005653411471

(Harrington, 2012; Sterwald & Baker, 2019). Although Kanner claimed later that he did not share this belief, his paper paved the way to parental, and particularly maternal, scrutiny in the field of Autism from those such as Bettelheim (1967), where previously it had been centred around the idea of genetic disposition (Asperger, 1942; Sterwald & Baker, 2019). Scrutiny of mothers was also a popular theory among British academics, following the Cambridge evacuation survey (Isaacs et al., 1941) which studied the effects of evacuation on children. This introduced the idea of 'maternal deprivation' to explain why some children developed pathological thinking patterns (Evans, 2013; Isaacs et al., 1941). By 1946, psychodynamic theory was acknowledged as a leading school of thought by the American Board of Psychiatry (Kawa & Giordano, 2012).

Attachment theory has been explored by many, with Bowlby considered the 'father of attachment theory'. Harlow, who met Bowlby in 1958, conducted an experiment with rhesus monkeys, separating infants from their mothers early on, and seeing if they would attach to an inanimate replacement. Harlow found that the infant animals preferred a soft, warm, cloth 'mother', even if it could not provide food, over a wire mother that fed them. Bettelheim, who met Harlow just after Bowlby did in 1958, saw the wire mother of Harlow as being like the refrigerator mother, causing Autism in her child by not providing affection. Bettelheim's solution was to remove the mother, whereas Bowlby's solutions was to involve the mothers (Bowlby, 1952). Harlow was critical of Bettelheim, while being positive of Bowlby (Van Rosmalen et al., 2020). Critics have highlighted that there is an inherent misogyny behind many ideas in Autism and disability, encouraged by theories such as Kanner's and Bettelheim (Singer, 2017). The idea of a perfectly devoted mother also adds to the neo-colonial attitudes being exposed by post-colonial studies into disability and Autism (Savarese, 2010). These will be explored further in later chapters.

2.6 1950s- DSM-I and Mental Health Act 1959

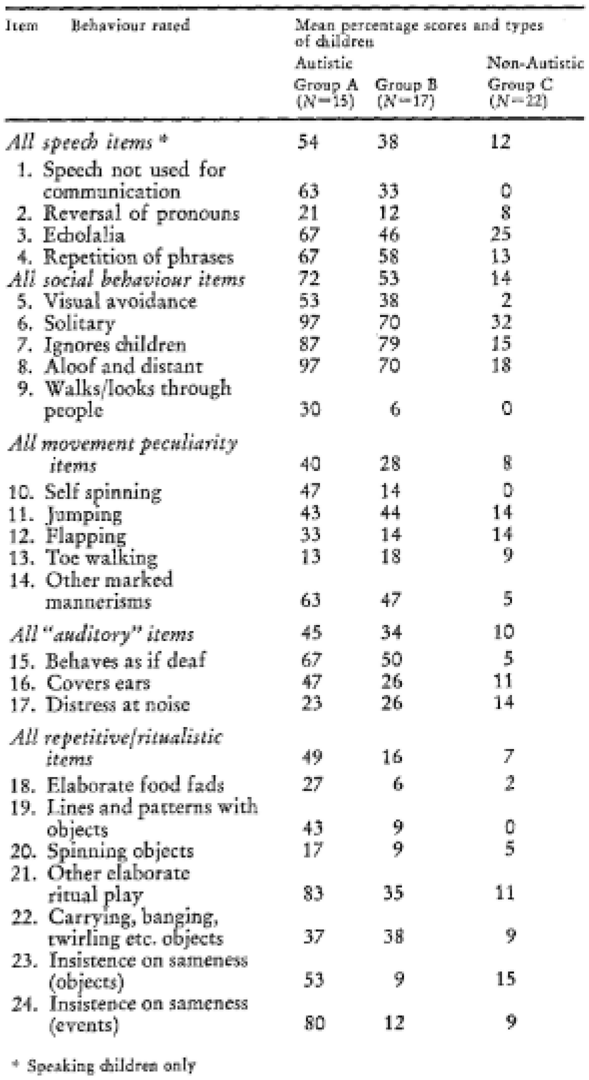
The American Psychiatric Association published the first Diagnostic and Statistical Manual for Mental Disorders in 1952, and it included 102 broadly constructed categories, subdivided into two major groups: those caused by brain dysfunction (e.g., intoxication, trauma, disease), and those resulting from a person's biological constitution mixed with socio-environmental factors (American Psychiatric Association, 1952; Kawa & Giordano, 2012). The second category was further sub-divided into: psychoses (severe conditions such as manic-depressive disorder and schizophrenia) and psychoneuroses (anxiety, depressive disorders, personality disorders), these two categories are relevant to the study of Autism as it is within these that Autism is mentioned in an official capacity for one of the first times, if not in the same way as its modern usage (American Psychiatric Association, 1952). Within the DSM-I under 'Schizophrenic reaction, paranoid type' there is reference to 'Autistic, unrealistic thinking' and 'delusions of persecution and/or grandeur' (American Psychiatric Association, 1952, p. 52). This is similar to the original definition of the word 'Autistic' where it was believed those with the condition 'lived in their own world' (Bleuler, 1950 [1911]). There is further reference to 'Autistic thinking' in the diagnoses of both 'Schizophrenic, childhood type' and 'Schizoid personality' (American Psychiatric Association, 1952). The first DSM had limited bearing on psychiatric practice, but it did start the standardisation of categorisation, if not of diagnosis and treatment procedures (Kawa & Giordano, 2012). The real change, in the UK at least, came about following the Mental Health Act of 1959. This act abolished the category of 'moral imbecile' and repealed the Lunacy and Mental Treatment Acts of 1890-1930 and the Mental Deficiency Acts of 1913-1938 (Mental Health Act, 1959). Most significantly, it made provision for the treatment and care of 'mentally disordered' persons within the community and worked to deinstitutionalise those within psychiatric hospitals, ultimately with the goal of shutting down said facilities (Evans, 2013; Mental Health Act, 1959). This led to major administrative problems, as those who had previously been out of the public eye, in institutions, were now being integrated into the majority population. Previously, a significant number of the British population had been incarcerated for being 'mental defectives' (Evans, 2013). This marked a return to the state of affairs before institutionalisation, where people were cared for by their families and their communities (Jarrett, 2021); however, society did not have lived experience of this as it had been such a long time since this was the case, leading to many problems, and the misguided perception of a growing number of people experiencing difficulties.

2.7 1960s and The Education Act 1970

Diagnoses of Autism rose rapidly between the 1960s and 1980s (Eyal, 2013), following Kanner bringing the idea of Autism into the public consciousness in 1943, and the release of those previously described as 'mentally retarded' from institutions as they were closed down (Evans, 2013). Doctors in local communities were now responsible for the care of those displaying developmental differences (Evans, 2013; Eyal, 2013). Autism was still not a universally recognised condition, however. In 1961 a working group produced a list of nine key features of 'schizophrenic syndrome' in childhood, which included 'presence of an impaired capacity for human relationships' (Creak, 1961). This suggests the diagnosis of schizophrenia was still a popular one for doctors who saw patients displaying difficulties creating and maintaining relationships with others. From the mid-1960s, the term 'Autism' began to be used to describe the opposite of what it had originally meant; whereas in the 1950s it had referred to hallucinations and fantasy in infants and children, by the 1970s it was used to refer to a complete lack of an unconscious, symbolic life, much like the modern assumption that Autistic people 'lack imagination' (American Psychiatric Association, 2013; Evans, 2013). Rutter (1972) described Autism as a 'deficiency of fantasy rather than an excess', marking this radical change in meaning. Although still not including Autism as a separate diagnosis, the second edition of the DSM was published in 1968; this publication was more closely aligned to the ICD-8, reflecting a collaboration between the WHO and US psychiatrists sent to Europe prior to its publication (American Psychiatric Association, 1968; Kawa & Giordano, 2012). The DSM-II included more examples of 'milder' conditions seen in the general population, and had 182 mental disorder categories in total (American Psychiatric Association, 1968; Kawa & Giordano, 2012).

In 1966 a survey was sent to the teachers of 76,388 children between the ages of 8 and 10 in Middlesex, looking to identify Autistic children (Lotter, 1966). It contained twenty-four statements (see Table 3) very similar to the Autism Spectrum Quotient developed by Baron-Cohen et al. (2000), and is significant as it was sent to mainstream teachers, not general practitioners or parents (Lotter, 1966). This suggests that the importance of identifying Autistic children within educational settings was being recognised for the first time, where previously these children had been institutionalised and generally taken out of the public consciousness (Evans, 2013). Teachers are also well placed as professionals to identify behavioural differences due to their experience working with a wide range of children.

Table 3- Mean percentage scores on 24 behaviour items in three groups. From Lotter (1966).



Item	Behaviour rated	Mean percentage scores and types of children		
		Autistic		Non-Autistic
		Group A ($N=15$)	Group B ($N=17$)	Group C ($N=22$)
	All speech items *	54	38	12
1.	Speech not used for communication	63	33	0
2.	Reversal of pronouns	21	12	8
3.	Echolalia	67	46	25
4.	Repetition of phrases	67	58	13
	All social behaviour items	72	53	14
5.	Visual avoidance	53	38	2
6.	Solitary	97	70	32
7.	Ignores children	87	79	15
8.	Aloof and distant	97	70	18
9.	Walks/looks through people	30	6	0
	All movement peculiarity items	40	28	8
10.	Self spinning	47	14	0
11.	Jumping	43	44	14
12.	Flapping	33	14	14
13.	Toe walking	13	18	9
14.	Other marked mannerisms	63	47	5
	All "auditory" items	45	34	10
15.	Behaves as if deaf	67	50	5
16.	Covers ears	47	26	11
17.	Distress at noise	23	26	14
	All repetitive/ritualistic items	49	16	7
18.	Elaborate food fads	27	6	2
19.	Lines and patterns with objects	43	9	0
20.	Spinning objects	17	9	5
21.	Other elaborate ritual play	83	35	11
22.	Carrying, banging, twirling etc. objects	37	38	9
23.	Insistence on sameness (objects)	53	9	15
24.	Insistence on sameness (events)	80	12	9

* Speaking children only

There were substantive advances in psychometric instruments for quantitative assessment, much like the survey conducted by Lotter (1966), throughout the 1960s and early 1970s (Kawa & Giordano, 2012). But perhaps the most significant step at this time towards the development of Autism assistance within schools was the Education (Handicapped Children) Act of 1970. This act removed the classification of children as being 'ineducable', or 'unsuitable', for school, making education universal for all in the UK (Education (Handicapped Children) Act, 1970). This, as well as the closure of mental asylums, created a need for schools to develop resource for children with additional needs (Education (Handicapped Children) Act, 1970; Mental Health Act, 1959). The extent to which this was effectively done, to this day, can be questioned, and this author argues that we still have not recovered from the effects of institutionalisation on the vulnerable populations within society.

2.8 Bettelheim: Blame it on the mothers

Bettelheim is a well-known name within Autism studies; his views are by no means mainstream, but it could be argued that they paved the way for future negative attitudes towards Autistic people, providing those who would cause harm to others with justification for doing so. Bruno Bettelheim was born in Vienna in 1903, and his theories of Autism gained great prominence during his lifetime. In 1938 he was imprisoned in a Nazi concentration camp for ten and a half months before being released and escaping to the United States on a refugee boat. His early background is relevant as it informed much of his work around psychology. Despite being regarded as a psychologist, his qualifications are unclear, and evidence suggests he only ever took three introductory classes in psychology while at university, and no psychoanalyst training, despite claiming to be certified to conduct psychoanalysis (Pollak, 1997). Over the course of his work, he claimed to have at least three doctorates, whereas in reality he had a non-honours degree in Philosophy (Pollak, 1997).

In the United States, he worked in many places including at the University of Chicago and Stanford University, becoming famous for his work on 'feral' children and Autism, his theories growing out of the work of Freud (Fountain, 1990). However, evidence suggests he was not trained by Freud, and likely never even met him, despite claiming otherwise (Pollak, 1997). Drawing on Kanner's description of the parents of Autistic children as 'just happening to defrost enough to produce a child' (Unknown, 1960), Bettelheim propagated the 'refrigerator mother' theory that poor parenting led to childhood disturbances. In his 1967 book The Empty Fortress: Infantile Autism and the Birth of the Self, Bettelheim compares Autism to being prisoner at a Nazi concentration camp. He states that those in the concentration camp at least had the chance to 'develop a personality' unlike those who were Autistic (Bettelheim, 1967). Like many at the time, he believed Autism was in part genetic, in that children could be predisposed to becoming Autistic, but that it was brought out through poor parenting (Bettelheim, 1967). At the time, many in the field were critical of his work, including theorist Harlow who wrote of Bettelheim's 'The Empty Fortress': 'Seldom has an author said so little, about so few cases, in so many words[2]' (Van Rosmalen et al., 2020, p. 230). Following his death in 1990, accusations of physical and mental abuse of his students at the Orthogenic School arose, along with claims of plagiarism and other lies he told regarding his qualifications (Grandin & Panek, 2013; Pollak, 1997). Most now follow the current opinion that Bettelheim's ideas regarding the origin of Autism were wrong, and that most of his patients were not in fact Autistic (Van Rosmalen et al., 2020). His inclusion in this review of the history of Autism is salient however, as this author believes his views of women, motherhood, and Autism, were internalised by many in the medical community, leading to the idea that Autism could be caused by poor parenting to be propagated beyond his time in the field.

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[2] This review was recovered from Harlow's personal archives in Madison, Wisconsin, USA by the authors of Van Rosmalen, L., Van der Veer, R., & Van der Horst, F. C. (2020, Jun). The nature of love: Harlow, Bowlby and Bettelheim on affectionless mothers. *Hist Psychiatry, 31*(2), 227-231. https://doi.org/10.1177/0957154x19898997

2.9 The Warnock Report 1978

In addition to the Education Act, 1970 held the publication of the Chronically Sick and Disabled Persons Act, which instructed local authorities to provide education for Autistic children in maintained or assisted schools (Chronically Sick and Disabled Persons Act, 1970). This was despite a weak understanding of Autism among practitioners and the general public, as acknowledged in the Warnock Report of 1978 (Department of Education and Science, 1978). This report preceded the Education Act of 1981 and made the first mention of Special Educational Needs (SEN). The Warnock report stated that 1 in 5 children would need special education provision at some point in their career (Black, 2019; Department of Education and Science, 1978). Interestingly, although the department admitted it was in the early stages of understanding in Autism, this extract, discussing transfers of Autistic children in schools, shows a noticeable sensitivity to those identified as Autistic: *'Since the effects of change on these children can be particularly adverse, the age of transfer must be as flexible as possible and the transfer itself very carefully organised.'* (Department of Education and Science, 1978, p. 132). This shows an understanding of the potential negative effects of sudden change on Autistic people.

2.10 DSM-III, A Separate Diagnosis

The publication of the DSM-III in 1980 is seen as a significant event in history (Kawa & Giordano, 2012). There were large-scale changes in the views of clinicians, including the removal of homosexuality as a mental disorder (American Psychiatric Association, 1980). There were changes in the way that mental conditions were described, changing terms such as 'an alcoholic' to 'an individual with alcoholism', to avoid the idea that each mental disorder is a discrete entity with sharp boundaries (American Psychiatric Association, 1980; Clegg, 2012; Tsou, 2016). This potentially foreshadowed the future debate over person-first versus identity-first language that has begun among and between the Autistic community and practitioners (Kenny et al., 2016). This is further discussed in the next chapter.

The DSM-III also saw the removal of childhood schizophrenia, and the new category of 'pervasive development disorder', which was sub-categorised into: infantile Autism, childhood onset pervasive development disorder, residual Autism, and an atypical form (American Psychiatric Association, 1980; Evans, 2013). This was updated in the DSM-IIIR, and replaced with Autistic disorder (AD) and Pervasive Development Disorder Not Otherwise Specified (PDD NOS) (American Psychiatric Association, 1987). The prevalence rate at this time was stated to be 4-5 per 10,000 children (AD) and 10-15 per 10,000 children (PDD NOS) (American Psychiatric Association, 1987). Rates of Autism diagnoses, and changes in the perceived prevalence, are discussed later in this chapter.

Volkmar and McPartland (2014) stated that shared and useful diagnostic systems facilitate policy planning. Autism had not been officially recognised prior to the DSM-III (American Psychiatric Association, 1980), and this value given to the diagnostic system was reflected in the literature, as studies prior to this were difficult to interpret due to the lack of a consistent diagnostic approach across studies (Volkmar & McPartland, 2014). The value attached to these reinforced diagnostic criteria was reflected in the number of studies produced, with only 250 peer reviewed articles on Autism prior to 1993, but with between 1,500 to 2,000 per annum in the years leading up to 2014 (Volkmar & McPartland, 2014), a considerable leap in output.

The DSM-III was revised in 1987 to reflect a bulk of evidence that began emerging immediately after the publication of the 1980 version (American Psychiatric Association, 1980, 1987; Blashfield et al., 2014). Structurally, in terms of diagnostic criteria and organisation, the DSM-III and DSM-III-R were the same; however, in terms of specifics, the classification changed significantly, with some even calling it a 'new classification system' (American Psychiatric Association, 1980, 1987; Blashfield et al., 2014). Twenty three new categories were added between the two additions, as well as certain conditions such as 'schizoid disorder of childhood or adolescence' (previously associated with Autism (American Psychiatric Association, 1952)), being dropped entirely (American Psychiatric Association, 1987; Blashfield et al., 2014). This change, within only seven years, shows how quickly understanding of differences such as Autism can be modified, a key message to be taken from this chapter.

2.11 Education Act 1981

The Warnock Report (Department of Education and Science, 1978) preceded the 1981 Education Act, which set out in law the provision for children with SEN. The Act set out a new definition of SEN which stated that a child has a 'learning difficulty' if:

(a) he has a significantly greater difficulty in learning than the majority of children of his age; or

(b) he has a disability which either prevents or hinders him from making use of educational facilities of a kind generally provided in schools, within the area of the local authority concerned, for children of his age; or

(c) he is under the age of five years and is, or would be if special educational provision were not made for him. likely to fall within paragraph (a) or (b) when over that age ("Education Act 1981 c.60," 1981).

The Education Act 1981 built on the foundations of the Chronically Sick and Disabled Persons Act 1970, and required local authorities and governors to take responsibility for ensuring children with SEN received special education provision. It further set out guidelines for the creation, maintenance, and dissolution of special schools in the UK ("Education Act 1981 c.60," 1981). In terms of school choice, parents of children with 'special educational needs' were given priority; with parents now being able to appeal a decision made by the local authority if their request for a particular school was denied on the grounds the school was not suitable or did not have the facilities needed to provide for said child (The Education Act, 1981). Not all were happy with this change however, Hannon (1982) stated the legal phrasing of the 1981 Act *'encouraged a disputatiousness not in the best interests of the child'* (The Education Act, 1981, p. 1). Hannon (1982) further argued that the changing nature of the Local Authorities, as set out in the Education Act 1981, reduced the potential for challenging inadequate provision, despite the new appeals process in the Act.

2.12 The Brief Existence of Asperger's Syndrome

The 1990s began with the introduction of Asperger's syndrome into both the DSM IV and the ICD-10 (American Psychiatric Association, 1994; Evans, 2013; World Health Organisation, 1993). Named after Hans Asperger, who had died in 1980, the main diagnostic difference that set aside the diagnosis of Asperger's syndrome from that which was previously just Autism was the absence of a delay in language or cognitive development (American Psychiatric Association, 1994; World Health Organisation, 1993). The DSM IV focused mostly on the reorganisation of categories and criteria rather than on major theoretical shifts, in order not to be culture-specific but applicable cross-culturally (Clegg, 2012). The extent to which 'cross-culturally' can extend to cultures outside of the Western world can be debated, however. The ICD-10 sub-divided pervasive development disorder (PDD) into categories including childhood Autism, atypical Autism and Asperger's syndrome (World Health Organisation, 1993). Aspergers syndrome was removed in the next edition of the DSM.

In terms of legislation, the 1990s was a large turning point. The Disability Discrimination Act of 1995 made it unlawful to discriminate against disabled persons in connection with employment, provision of goods, facilities, or services; the act also made provision about the employment of disabled persons and the management of premises (Disability Discrimination Act, 1995). In regards to education, the definition of Special Educational Needs (SEN) was set out again in the Education Act of 1996, describing SEN as a person having a disability or learning disability meaning they need special educational provision (The Education Act, 1996). Autistic people were now protected by law, as Autism was a diagnosed condition, meaning that it fell within the 1995 Act. This is relevant when we later consider how the world interacts with Autistic people.

2.13 From 0-50: How Autistic are you?

> *"As discussed in the original publication, the AQ was developed from a theoretical understanding of Autism, and therefore has not necessarily undergone the rigorous psychometric evaluation procedure that diagnostic screening tools must pass for inclusion in clinical practice" (Ruzich et al., 2015, p. 9)*

In 2001, Baron-Cohen and colleagues published their 'Autism Spectrum Quotient' (AQ) (see Appendix I), which claimed to be able to detect the 'degree to which' adults of 'average intelligence' are Autistic (Baron-Cohen et al., 2001b). Ten questions each from the areas of 'social skills', 'attention switching', 'attention to detail', 'communication', and 'imagination' are put to those completing the test, with each question being worth either 1 or 0. This gives participants a final score of somewhere between zero and fifty, with anything over 32 being considered Autistic. They state that 80% of adults diagnosed with Autism scored above 32, compared to 2% of the not-Autistic controls, and twice as many men as women scored above 20. Their four groups under investigation for this study were: 'Group 1: 58 adults with Asperger syndrome (AS) or high-functioning Autism (HFA); Group 2: 174 randomly selected controls. Group 3: 840 students in Cambridge University; and Group 4: 16 winners of the UK Mathematics Olympiad' (Baron-Cohen et al., 2001b, p. 5). The test has a four-point scale, giving the options of 'definitely agree' 'slightly agree' (both worth the same when scoring) and 'slightly disagree' 'definitely disagree' (also both worth the same).

Despite it being stated that this was a descriptive tool, not a diagnostic one, to this day (2022, at time of writing), if you seek a diagnosis from your General Practitioner (GP), the first tool a doctor will most likely ask you to complete is the AQ from 2001, with a referral following if the score is above the 32 threshold. A google search (06/03/23) for 'Autism test' produces 370 million results, with six of the first page of nine responses including online tools with questions from the AQ. The AQ was even used to screen participants in the collection of the data analysed by this author in the secondary data analysis in Chapter 8, such is its reputation for being a valid psychometric tool (Crompton et al., 2020b; Crompton et al., 2020c). This author questions whether, if it forms such a major part of the diagnostic process- in that one must score over 32 to be considered by a GP for a referral for a diagnosis of Autism, current diagnoses of Autism are merely, intentionally or not, based upon Baron-Cohen's 2001 conception of the phenomenon in this 50-question tool. As the quote at the beginning of this section shows, the AQ was not designed to be a diagnostic screening tool. To date, only one systematic review of the AQ has been conducted, of which Baron-Cohen was an author (Ruzich et al., 2015), finding that the AQ was often used as a proxy for an Autism diagnosis by researchers, despite this not being its purpose. The review found that across 73 articles the average score for Autistic participants (n= 1,963) was 35.19, compared to 16.94 in the 'non-clinical' (not-Autistic) population (n= 6,934) (Ruzich et al., 2015). The tool may identify Autistic people, however, if those Autistic people are either self-diagnosed and are basing their perception of Autism on online tools using the AQ, or diagnosed by a professional using the AQ, this author argues that this is not surprising.

2.14 The Autism Act 2009

In 2009 the Government passed The Autism Act which had the aim of making provision for meeting the needs of Autistic adults, and required the Secretary of State to publish a document setting out a strategy for meeting these needs in England (Health., 2009). This act was seminal in the fact that it is the only act dedicated to improving support and services for one particular disability (National Autistic Society, 2019). It has had many positive impacts, and has helped to make some changes in the provision for Autistic adults across England; for example, in 2009 most areas did not have an adults diagnostic service, whereas in 2019, 93% did (National Autistic Society, 2019). The act has also helped to safeguard Autism services across England when councils have faced cuts, as the duties set out in The Autism Act have ensured they have been protected from closures or cuts (National Autistic Society, 2019). The Autism Act was extended in 2018 to cover Autistic children, a move that was welcomed by many in the Autistic community (National Autistic Society, 2019).

These can be seen as positive changes as a result of the 2009 act, however, a report by the National Autistic Society and the All-Party Parliamentary Group on Autism found that the overall picture, 10 years after its implementation, was of 'deeply concerning unmet need' (National Autistic Society & All Party Parlimentary Group on Autism, 2019, p. 3). The report, commissioned to examine the impacts of the act, and surveying over 11,000 Autistic people, their families, and professionals, found that Autistic people were not getting the support they needed (National Autistic Society & All Party Parlimentary Group on Autism, 2019). Firstly, only 38% of Autistic adults were aware of the existence of The Autism Act, this number dropping to 25% among families of Autistic people (National Autistic Society & All Party

Parlimentary Group on Autism, 2019). Additionally, 71% of Autistic adults said they were not getting the mental health support they needed, despite 76% of all the Autistic adults stating they had reached out for mental health support in the last five years (National Autistic Society & All Party Parlimentary Group on Autism, 2019). Only a quarter of Autistic adults said they were properly supported, and 60% said that benefits forms were difficult to complete (National Autistic Society & All Party Parlimentary Group on Autism, 2019). This report outlines how far there still is to go in improving services and support for Autistic people, and highlights the argued lack of impact from The Autism Act passing in 2009 to the subsequent 10 years. The NAS and the APPGA made several recommendations off the back of this report, including creating and funding a national Autism understanding campaign, improving mental health services for Autistic people, reducing waiting times for Autism diagnoses, and the introduction of mandatory training on Autism for health and social care workers, Jobcentre Plus staff, and police officers (National Autistic Society & All Party Parlimentary Group on Autism, 2019). The extent to which these have been implemented can be argued, with over 86% of referred people in 2022 waiting longer than the recommended 13 weeks to receive an appointment (NHS, 2023b). The National Autistic Society (2023) say that the COVID-19 pandemic has had a considerable effect, with the number of people waiting to receive a diagnosis up 169% on pre-pandemic levels. The effect of the Autism Act on the current state of affairs must therefore be questioned, although it is clear that any legislation promoting the rights of Autistic people is a step in the right direction for the rights of those who are neurodivergent.

2.15 DSM-5 and ICD-11: What is a Spectrum?

Despite only being added in the previous edition, Asperger's syndrome was removed from the DSM in 2013. Autism was also re-categorised, with each aspect placed into a 'severity scale' of 1 (requiring support) to 3 (requiring very substantial support) (American Psychiatric Association, 2013). The multi-categorical system of the DSM-IV, with subtypes including pervasive developmental disorder not otherwise specified, Rett's disorder, and Asperger's disorder, was replaced in the DSM-5 with a single diagnostic dimension of Autism Spectrum Disorder (ASD) (Grzadzinski et al., 2013). The new DSM (now using numbers [DSM-5] as opposed to Roman Numerals) also simplified the 'symptom combinations' involved in an Autism diagnosis; whereas in the DSM-IV there were 2027 different 'symptom combinations' that would result in a diagnosis, in the DSM-5 there were only eleven (Jabr, 2012). Some researchers, such as Leveto (2018), present that these new definitions would lead to many Autistic people no longer meeting the levels of diagnosis. There is currently no evidence that rates of diagnosis have decreased since the advent of the DSM-5, in fact the opposite is true (Russell et al., 2022). Furthermore, Huerta et al. (2012) found that 91% of children with a DSM-IV diagnosis of PDD would remain eligible for an ASD diagnosis in the DSM-5, commenting that the new criteria had greater specificity than the DSM-IV.

The validity and diagnostic sensitivity of the new DSM-5 criteria have been tested by several studies (Frazier et al., 2012; Mandy et al., 2012). In their testing of the construct validity of the new criteria, Mandy et al. (2012) found the DSM-5 model to be 'superior' to its predecessor, and had been improved by removing the items measuring play, imagination, and 'stereotyped and repetitive use of language'. The new categorisation of Autism in the ICD-11 was accepted in 2019, came into effect on 01/01/22, and contains several more categories than the previous edition (World Health Organisation, 2018). The only noticeable difference between Autism and Asperger's syndrome in the ICD had been the presence or lack of language delay and impairment, this has been specified more clearly in the new ICD (World Health Organisation, 1993, 2018). Within neurodevelopmental disorders, Autism spectrum disorder is divided into:

- 6A02.0 Without disorder of intellectual impairment,
- 6A02.1 With disorder of intellectual impairment and without impaired functional language,
- 6A02.2 Without disorder of intellectual impairment and with impaired functional language,
- 6A02.3 With disorder of intellectual impairment and with impaired functional language,
- 6A02.4 Without disorder of intellectual impairment and an absence of functional language,
- 6A02.5 With disorder of intellectual impairment and an absence of functional language,
- 6A02.Y Other specified ASD,
- 6A02.Z ASD, unspecified (World Health Organisation, 2018).

These diagnostic criteria in the ICD-11 ask practitioners to specify the aspects of the person, rather than the level of support required, as in the DSM-5 (American Psychiatric Association, 2013; World Health Organisation, 2018). Within the next chapter, where models of disability are discussed, this difference becomes more salient, as the ICD refers to the individual 'deficits', a focus on the way the person interacts with the world, whereas the DSM refers to the amount of support the person requires, and therefore how the world interacts with the person.

Often colloquially referred to as being 'on the spectrum', Autistic people, and Autism spectrum generally, are often misunderstood. Many believe that the spectrum is a linear line from 'not Autistic' to 'very Autistic'; with 'everyone somewhere on it'. However, as the criterion makes clear, a spectrum refers to the diversity within the diagnosis itself. In the old diagnosis, this referred to the different diagnoses that were available (e.g., PDD, Asperger's, etc.), in the new diagnostic criteria of the DSM, this refers to the different levels of support required in various areas of life, from 3: Requires Very Substantial Support, 2: Requires Substantial Support, to 1: Requires Support. The perceived linear model should therefore be conceptualised rather as a multi-sided shape, this has been visualised by many, including Bradshaw et al. (2021). This model, using the circular colour spectrum to visually describe individual differences, rejects the idea of low/high functioning Autism, and is aligned to the social and neurodiversity models, which will be explored further in the following chapter.

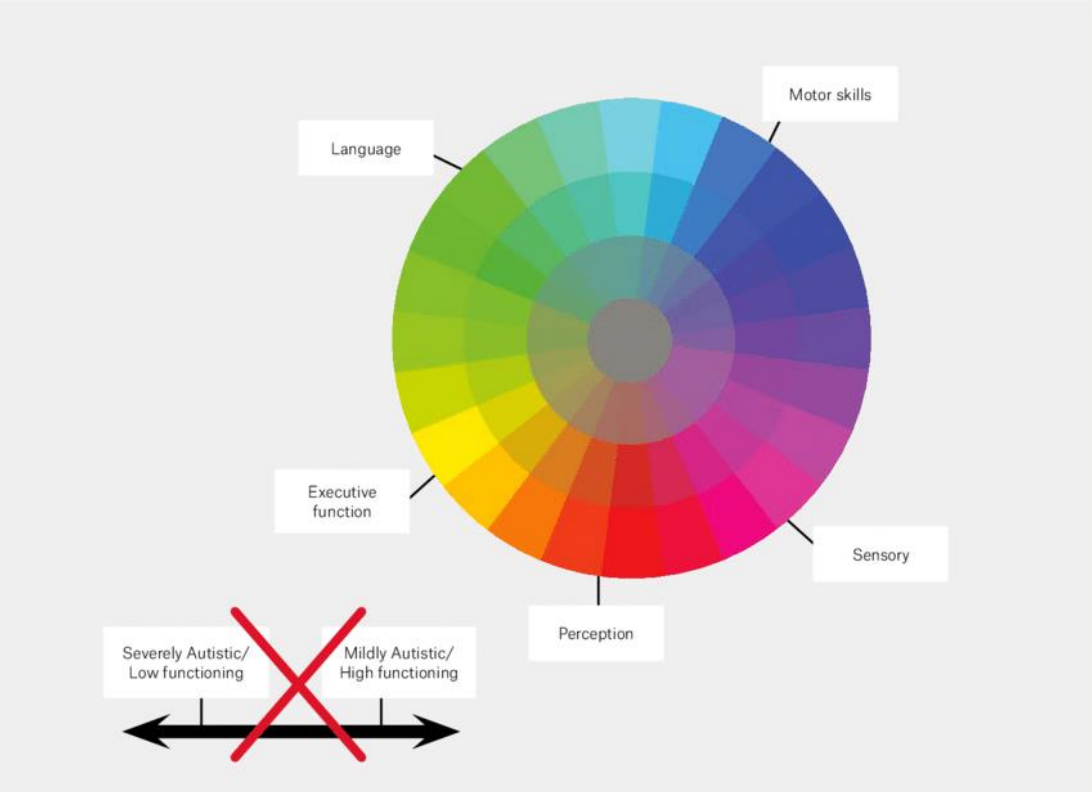

Figure 2: 'An example of a correct (spectrum colour wheel) and incorrect (linear) way to view the Autism spectrum' from Bradshaw et al. (2021).

2.16 One diagnosis to rule them all?

> *"Unlike a diagnosis for strep throat, the diagnostic criteria for Autism have changed with each new edition of the DSM. I warn parents, teachers, and therapists to avoid getting locked into labels. They are not precise. I beg you: Do not allow a child or adult to become defined by a DSM label" (Grandin & Panek, 2013, p. vii).*

Psychiatric diagnoses should be reliable, have clinical utility, and validity (Mandy, 2018). Reliability is not reported as too much of an issue when it comes to Autism; when diagnosed by trained clinicians using standardised measures, the Autism diagnosis is reliable (Lord et al., 2012). The diagnosis also reportedly has clinical utility as it provides a short-hand description of someone's strengths and difficulties which can point towards potentially beneficial support (Calzada et al., 2012). However, validity remains a problem (Mandy, 2018). The diagnosis is applied to a heterogenous, wide range, of people, whereas a diagnosis treats Autism as a discrete condition. Autism is characterised by a wide range of neurodevelopmental atypicality, shown by the fact that Autism 'symptoms' almost never occur in isolation, but as part of a constellation of co-existing features (Mandy, 2018). The behaviours listed in the Autism diagnosis are also listed within the ADHD and anxiety-condition diagnoses, leading to questions as to the validity of any of these diagnoses.

Concerns about rising rates of diagnoses of Autism also threaten the validity of said diagnosis to describe the phenomenon. Some studies point to the rise in diagnoses, but give explanations such as that there are 'insufficient prevention strategies' (Solmi et al., 2022, p. 4178). Many teachers complain of being overwhelmed by 'too many' SEND children in schools

(Honeybourne, 2018, p. 25). A rise in diagnoses could be expected, as explained by Grinker (2008) and Clarke (2012), due to a range of reasons. These include: broader definitions and widening boundaries for symptom inclusion into the diagnosis, changing social policies, less stigma and more public awareness, financial incentives, greater access to diagnosis and new diagnostic techniques, changes in referral patterns, and relabelling (Clarke, 2012; Grinker, 2008). Zeidan et al. (2022) focuses more specifically on the greater awareness within communities of Autism, and the progress which has been made in identification and definition of the phenomena, saying that 1 in 100 people are now thought to be Autistic, based on 99 estimates from 71 studies published. The principle consensus from these studies being that there is not in fact a rise in the number of Autistic people, but merely in the number of *diagnosed* Autistic people. Singer (2017) stated that the number of Autistic children in her daughter's school was no greater than the number of children labelled 'odd' when she herself was at school. And when one takes into account that many of these children would not have been in mainstream education prior to deinstitutionalisation, the apparent abundance of Autism diagnoses makes more sense (Eyal, 2013). We must consider all factors, including the constructed and changing nature of Autism, when thinking about diagnostic rates.

The validity of a diagnosis must be continually questioned, as there are indeed many inherent conflicts within Autism discourse, and there have been throughout sociocultural history (Leveto, 2018), including the variations in the works of Asperger and Kanner themselves (Frith, 1991a), the evolving APA diagnostic criteria, and the continuing push for biomarkers as discussed in the next chapter. Indeed, the question of whether a diagnosis is beneficial at all must also be considered; as Elliott and Gibbs (2008) state, a diagnosis is only useful if different interventions exist for those experiencing similar issues, but with differing diagnoses. If a young child without an Autism diagnosis struggles to interact with their peers, would they need different support to a child with a diagnosis? Would they get less support because they do not have a label?

2.17 Conclusion

The diagnosis of Autism has come a long way since the start of the twentieth century with Bleuler (1950 [1911]), and it is this journey that has inspired the movements we see today that seek to gain recognition of the hardships faced by disabled people in society. An understanding of the history of Autism, its diagnostic criteria, and the terms that have come and gone, is crucial to understanding the world in which Autistic people find themselves today. Whether a diagnosis is the correct thing to assign to a person, and whether that diagnosis will help or hinder them, must be continued to be questioned.

By its nature, Autism does not belong to one discipline (Leveto, 2018), and there is a plea for more interdisciplinary collaboration within and around neuroscientific work, as well as collaboration with social scientists and Autistic people themselves (Fitzgerald, 2017). Autism has been claimed by many different disciplines over the years, from the psychiatrists, to the psychologists, both behavioural and cognitive, to the sociologists, and to the educationalists. Philosophical debate surrounding disability and social communication is expanding day by day, and Autism is likely to change in meaning even more as we progress into the 21st Century and beyond.

The boundaries and definitions of what it means to be Autistic have changed dramatically over time, and therefore the extent to which Autism is socially constructed must therefore be questioned. Labels can have utility only when they offer a purpose or benefit to a group. Understanding this, and the different conceptions of Autism over the last hundred years is important when considering the research concerns of this project:

A. *How Autism has developed over the years as a phenomenon;*
B. *The different models that have been used to describe Autism, and how the world interacts with neurodivergence;*
C. *How Autistic communication is conceptualised within models of difference and disability;*
D. *Neurotype-specific interactional and communication differences.*

These concerns situate Autism within a social model of disability, a model described in detail the next chapter. This model is markedly different to many of the models used in the diagnostic processes detailed within this current chapter, it is therefore important to understand how Autism, diagnosed from the DSM and ICD, has changed into a social phenomenon and identity, while attempting to shake off the stigma attached to those who were once considered needing institutionalisation.

3 Models of Disability, Difference, and Autism

This chapter will explore models of disability that have been associated with Autism. These will be discussed in distinct sections, but this does not preclude the fact that there are overlaps between the three, and there exist indeed many other models that can, and are, used to describe Autism and disability. It will explore the medical model, including discussion of cause, cure, and treatment. The chapter will then move on to the social model of disability, where the concept of society disabling the person will be broached, before the chapter moves on to describing the neurodiversity model, and neurodiversity as a movement. The chapter will then conclude with a discussion on models of the future, and how disability is constructed socially. This chapter is necessary to explore the research concern of: *the different models that have been used to describe Autism and how the world interacts with neurodivergence.*

3.1 Introduction

> *"Without those who are deemed 'unsuccessful', the successful lose power and position" (Elliott & Gibbs, 2008, p. 486).*

The study of the long history of Autism as a phenomenon and its changing diagnostic processes can be accompanied by the changing attitudes to disability and difference in general. Back in the times of institutionalisation, the 'medical model' presided over patient care, embodying the idea that there are cures for mental afflictions and ailments. The medical model promoted normalisation (Kapp et al., 2013), and institutions were the place where people were kept out of the public eye, indefinitely, or until their 'symptoms' vanished (American Psychiatric Association, 1918; Clegg, 2012; Kawa & Giordano, 2012). The medical model can still be seen today, in 'therapies' such as Applied Behaviour Analysis (ABA), a method which rewards not-Autistic behaviours, and punishes Autistic ones; the implementation of ABA is seen by many as inappropriate, and a failure to work to modern evidence (Axbey, 2019a; Denne et al., 2017). With deinstitutionalisation came changes to the ways people were viewed, and the medical model slowly developed into what we now call the social model. This significant change was both a philosophical one, and one inspired by human rights movements across the world (Evans, 2013; Hahn, 1986; Owens, 2015). The social model was not without its critics, indeed, the very notion of viewing disability through models has been criticised for not focusing on lived experience but rather focussing on overarching themes (Ingstad & Whyte, 2007). The neurodiversity model of disability is a relatively new one, and is based upon the principles of the social model, but with a specific focus on neurodivergences being viewed as natural human variation, and any 'disability' in fact stemming from society's failure to accept these variations (Singer, 1998, 2017). Evidence for neurodiversity takes the form of anecdotal and empirical evidence that Autistic people do not struggle in all social situations, more that they struggle most in situations where they are interacting with not-Autistic people. Studies have shown that Autistic people can thrive and 'be themselves' around those with similar neurotypes (Crompton et al., 2020a). This difference in reciprocity between different neurotypes can be explained by the double empathy problem, a term coined by Damian Milton (2012), which will be explored further in Chapter 5.

The term neurodivergence covers a wide range of 'conditions' including ADHD, dyslexia and intellectual disabilities; it is most commonly associated with Autism however (although this may change), and therefore references here to neurodiversity, unless specified otherwise, will relate broadly to the Autistic neurodiversity movement and paradigm (Armstrong, 2010). More research needs to be done around multiple neurodivergent identities and how they intersect with each other, or whether in future they will not in fact be deemed as separate phenomenon.

3.2 The Medical/Deficit Model of Autism

> *"Typically, we search for a diagnostic label because we believe that this will point towards the most efficacious forms of intervention. Following a medical model, one might assume that a clear diagnosis is necessary in order to know how best to intervene" (Elliott & Gibbs, 2008, p. 482).*

The previous chapter dealt with the history of Autism as a diagnostic process, and many of the ways Autistic people were approached in their care was through a lens of the medical model. This section will not focus on historical ‘treatments’ of Autism, but on current ways in which the medical model is employed in the 21st Century because, although human rights organisations have continued to call for the social model to be employed, desire for normalisation still remains (Russell & Norwich, 2012). Additionally, it is worth noting that even as Autism is framed within social and neurodiverse models by many, the fact remains that it is still a diagnosis, with the DSM being used as a significant clinical and research tool to identify Autism in many countries (Leveto, 2018). This suggests that the medical model is still the predominant model used across the globe, and it is therefore important to understand its origins and proponents.

3.2.1 The Search for Causation in the 21st Century

Autistic people are more likely to describe Autism as having a purely biological ‘cause’ (46.2% and 51.3% in diagnosed and undiagnosed Autistics respectively) compared to not-Autistic people (28.4%) (Kapp et al., 2013). However, search for causation is associated with treatment and cure rhetoric, which is more much popular among not-Autistic people, but decreased with knowledge of neurodiversity (discussed further on in this chapter) (Kapp et al., 2013). Within the medical model framework, causation, treatment, and symptom reduction are commonplace (Kapp et al., 2013). As Autism was defined during the dominance of the psychogenic paradigms of mental illness (Sarrett, 2011), researchers have in the past been, and are still currently, looking for the ‘cause’ of Autism, or an ‘Autism gene’ (Anderson et al., 2012; Krishnan et al., 2017). Pre-natal testing, a controversial area of research due to the suggestion that parents could choose not to continue with a pregnancy if the child was Autistic, or choose an embryo that was not-Autistic, has yet to be developed. Baron-Cohen (2009) himself tells people to be wary of such tests, not for the preservation of Autistic people, but in case the test ended up ‘inadvertently’ curing mathematical talent as well as Autism.

> *“Males, maths and Autism. On the face of it, these three things don't appear to be linked. And yet they are…*
>
> *If it [a pre-natal test] was used to 'prevent' Autism, with doctors advising mothers to consider termination of the pregnancy if their baby tested 'positive', what else would be lost in reducing the number of children born with Autism?*
>
> *Would we also reduce the number of future great mathematicians, for example?” (Baron-Cohen, 2009).*

A popular example of genetic causation hypotheses is the ‘male brain’ hypothesis put forward by Baron-Cohen (2002), which hypothesised that, as the ‘male brain’ was better at systemising rather than empathising, Autism is caused by a case of an ‘extreme male brain’ (Baron-Cohen, 2002, 2010). The link between masculinity and Autism still pervades, along with the connections to whiteness and high socio-economic status (Cascio et al., 2020). The cause of the so-called ‘male brain’ was attributed to high intrauterine testosterone levels; it has also been hypothesised that there is a link between maternal stress promoting the secretion of adrenal androgens and Autism (Baron-Cohen, 2002; James, 2014). Some could see this as another form of 'mother blaming', similar to the 'refrigerator mother' theory proposed by readers of Kanner and Bettelheim, and the 'maternal deprivation' theory as outlined in the Cambridge Evacuation Survey (Evans, 2013; Isaacs et al., 1941; Kanner, 1943; Singer, 2017). Issues of maternal blame and the perceived role of the mother in caring for an Autistic person are examined more in Chapter 4 where media representations of Autism are considered, and the impact of these on Autistic people.

Differences in the operations of the brain hemispheres, left versus right, are also sometimes mentioned as being prominent differences found in Autistic children (Peterson et al., 2015). Other studies have attributed Autism to impaired amino acid transport at the blood brain barrier (Tărlungeanu et al., 2016), and disruption of endocannabinoid signalling by Autism 'mutations' (Földy et al., 2013). Further studies have looked to try and identify an 'Autism candidate gene', a specific gene that, when present, results in, or contributes to, the presence of Autism in a person (Anderson et al., 2012; Krishnan et al., 2017). These studies are often, and almost exclusively, conducted using mice (Földy et al., 2013; Krishnan et al., 2017; Tărlungeanu et al., 2016), which questions their validity when discussing what is a human diagnosis, Autism, and a human cultural phenomenon, social interaction. Indeed, researchers using rodents in Autism studies often admit themselves that animal models may be misleading, particularly in regards to MIA (maternal immune activation) models (Massrali et al., 2022). Health Officials in the United Kingdom state that infection does not cause Autism, and that this is a common myth that needs debunking (NHS, 2023a). Comparisons between rodents and human children should also be approached with caution due to the very obvious differences between species.

Autism is commonly agreed to be highly genetic. Bailey et al. (1995) found that Autism was strongly genetic; in their twin study, 60% of the identical twins of Autistic people were also Autistic. However, genetic studies are not always welcomed. A main concern from neurodiversity campaigners regarding the search for causation, is the fear that cause-orientated research will lead to a genetic prevention programme (Kapp et al., 2013). It is also a concern that certain theories of causation with the mother at the centre will lead to an uptake in the 'age-old misogyny' many believe is inherent in the mother-blaming within Autism and disability studies (Singer, 2017). This stemming perhaps from the 'refrigerator mother' interpretation of Kanner's work in the mid-twentieth century (Kanner, 1943), or from the work of Bettelheim in the 1960s. Although Bettelheim believed Autism was not genetic, he did state that 'as with all Autistic children, the origins of (the child's) troubles proceeded her birth' (Bettelheim, 1967, p. 156). This was because he believed that the root of Autism lay in the mothers, and that Autism could be cured by separating the child from their 'cold' mothers, and replacing the mother's 'black milk' with a supportive and nurturing environment (Offit, 2008). Bettelheim claimed he 'restored some children…to full functioning within society' (Bettelheim, 1967, p. 115) (p115) through this removal, and better parenting[3]. The legacy of these views can be seen too in the fears of the parents of Autistic children, who

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[3] Evidence shows it was not in fact Bettelheim himself who cared for the children he removed from their mothers, but his wife Gina Alstadt. See Pollak, R. (1997). *The creation of Dr. B: A biography of Bruno Bettelheim*. Simon & Schuster.

often feel stigma and embarrassment if their child is Autistic; believing other parents will judge them, and be critical of their child-raising abilities (Gray, 2002; Litner, 2022). Viewing Autism as a malignant condition, from a medical model, could also be said to feed into the potential for dehumanisation, which is often seen in coverage of so-called 'mercy killings' of Autistic children by parents (Waltz, 2008), as well as the over-sensationalisation of crimes committed by Autistic people due to the association between curable mental illnesses and Autism (Berryessa, 2014). This will be explored further in the next chapter on How the World Interacts with Neurodivergence.

3.2.2 'Treatments and Cures' for Autism

The medical model of disability, and therefore of Autism, aspires towards normalisation and symptom reduction (Elliott & Gibbs, 2008; Kapp et al., 2013; Russell & Norwich, 2012). Even in the 21st Century, there are those who call for the prevention, or even eradication, of Autism. In a 2022 study by Solmi et al. (2022) the authors call for 'more resources to be allocated to detect ASD in low SDI [socio-development index] countries and to prevent ASD in high SDI countries, as well as to decrease illness burden of ASD globally'. Parents of Autistic children, often those without effective support or accurate information, commonly seek a 'cure' for their child's 'symptoms'; this usually occurs soon after diagnosis due to the belief that treatments work best when delivered early (Kapp et al., 2013). 'Treatments' for Autism are often intensive and expensive, utilising speech and occupational therapies as well as behaviour modification methods (Kapp et al., 2013; Leveto, 2018). In America, it is not uncommon for Autistic children to be administered psychopharmacological drugs (Sarrett, 2011). As Clarke (2012) describes, these medications can range from stimulants, non-stimulants, antidepressants, anti-anxiety, antipsychotic, and mood stabilizers. Many of these are recommended and approved in the US for the 'treatment' of Autism, despite there being little evidence of their effects.

This is in addition to the host of alternative and sometimes unsafe interventions purported by many. As in 1916, when polio hit America and people began resorting to everything from ox's blood, to garlic, to injecting saliva into children's spinal cords, Autism cures of the bizarre are now apparent in our society (Offit, 2008). A simple search on the internet will bring up a deluge of so-called cures and treatments for Autism, ranging from relatively harmless but unnecessary diet interventions such as those self-reported to work as cures by parents like Dawson (2015) in a New York Post article, to potentially fatal fake medicines and solutions (Hupp, 2019; Sarrett, 2011). Interventions including chelation and hyperbaric oxygen chambers have been popularised along with these solutions (Sarrett, 2011). One recent such example of a chemical solution is the 'Miracle Mineral Solution', a potent bleach called chlorine dioxide that parents are advised to administer, anally in the form of enemas, orally as a drink, and topically through baths, to their children; this is sold as a 'cure' for Autism, and causes life-threatening conditions (Weekly., 2019). Diet 'treatments' like those touted by Dawson (2015) are also popular; gluten-free and casein-free diets are recommended to reduce 'Autism symptoms', but can result in Autistic people feeling that they are 'not good enough' and need to be changed in order to become 'more acceptable' (Axbey, 2019a, p. 98). There is not currently any official advice in the UK regarding different diets for Autistic people.

Applied Behaviour Analysis (ABA) is one of the most popular available ‘treatments’ for Autism, more so in the United States where it is considered a ‘gold standard’ (McPhilemy & Dillenburger, 2013), however, it has gained some traction in the UK also, where it is often referred to as PBS (Positive Behaviour Support) (Denne et al., 2017; National Autistic Society, 2024). ABA is a controversial programme with many critics, and Autistic children often resist the interventions provided by it (Leveto, 2018). ABA is a behaviour modification programme which focused on intense intervention to eliminate unusual but harmless ‘Autistic behaviours’ such as avoiding eye contact or repetitive body movements (Kapp et al., 2013; Kirkham, 2017; Leveto, 2018). These programmes have been shown to have harmful effects of Autistic people, with Autistic adults reflecting negatively on their experiences as children (Nadesan, 2013). It is perhaps not surprising that these interventions do not focus on the wellbeing on Autistic people, when the ABA pioneer Lovaas themself said that Autistic people were ‘not people in the psychological sense’ (Dekker, 2019; Lovaas, 1974), an alarming statement which dehumanises Autistic people.

Parents often like anecdotal evidence as much as, if not more than, scientific evidence (Denne et al., 2017); it is relatable, and often more accessible than journal articles and textbooks. Many anecdotally consider ABA to have positive outcomes, but it is worth noting for whom these outcomes are achieved. McPhilemy and Dillenburger (2013) sent questionaries to 15 European families who had all done home-based ABA programmes; they reported that ABA had a positive impact, but the questionnaire was exclusively completed by parents, not the Autistic people themselves. Quotes from parents highlighted how their child (ages ranged from 24 months to 20 years) was now meeting the aspirations they had had for them, such as attending university or being able to swim, and that they had more time to spend with their other children when their Autistic child was in sessions with their therapist (McPhilemy & Dillenburger, 2013). The ‘positive impact’ of the ABA is reported primarily for the *parents* of the child therefore, and a therapy should surely be questioned if it does not benefit those at which it is targeted. In addition to the methodology not focusing on the impact on Autistic people, the recruitment shows some bias towards parents who already employ a medical-model approach to Autism. Six out of the fifteen parents also required their child to be on a gluten-free and casein-free diet, and four had previously fundraised for ABA provision to be made available (McPhilemy & Dillenburger, 2013).

Factors that may affect the parents decision to take part in ABA in the UK include higher parental education, household income, and having children with higher support needs (Denne et al., 2017). Criticism of ABA from the neurodiversity movement argues that it focuses too narrowly and forcefully on normalisation (Kapp et al., 2013). Proponents of ABA often do not approve of Autistic self-advocates critiquing their work, with a recent divisive article by Dillenburger and Keenan (2023) titled ‘No Irish, No Behaviour Analysts, No Dogs!’, comparing the ‘discrimination’ faced by ABA practitioners by Autistic people to the discrimination faced by the immigrant communities in the UK after World War Two[4]. The comparison of paid professionals in a position of power to the persecuted Black community

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[4] ‘No Irish, No Blacks, No Dogs’ was a famous sign seen in a photograph of a Bed & Breakfast window from this time.

can be interpreted as being in particularly poor taste, especially when considering current efforts to decolonise areas of academic research. In July 2023, a draft from the American Medical Association's (AMA) House of Delegates Annual Meeting (June 2023) became available, suggesting ABA will be removed from the AMA's recommendations (Sanborne, 2023).

Critics such as Skubby (2012) assert that instead of medicine trying to 'normalise' Autistic people, difficulties could be relieved by educating the population about Autism. Research by Gillespie-Lynch et al (2017) on the understandings of 636 adults with a connection to Autism has shown that those who are most knowledgeable about Autism are Autistic people themselves, showing a greater scientifically-based knowledge of Autism than the non-Autistic participants. This evidence supports the view of Skubby (2012), who argued that the education of the population should come from Autistic people, rather than from the not-Autistic medical practitioners.

3.2.3 Transition to the Social Model

Deficit models assume Autism is inherently a deficiency, and this perception can be seen even when talking about positive characteristics of Autistic people. Falter et al. (2012, p. 1) described the superior performance of their 17 Autistic participants in a perception task, however, they describe this performance in terms of being 'at the expense of' processing global structure. Smukler (2005, p. 19) states that 'it is not surprising that even when intelligence and talent in Autistic people are recognised, they are still commonly pathologised'. Talents and skills in Autistic people are still often referred to as 'savant' skills (Hughes et al., 2018; Treffert, 2009), a remnant of the 'idiot-savant' skill label, used so because such talent was considered to be so completely unexpected in a person regarded as so incapable (Smukler, 2005). The term 'idiot-savant' is falling out of popularity, not commonly used since the 1990s (O'Connor & Hermelin, 1991), but the term savant, in conjunction with Autism, continues to be used in some publications such as Hughes et al. (2018) where they discuss the psychological profile of savant syndrome in Autistic people.

The medical model from the 1940s conceived Autism as a disorder (Baron-Cohen et al., 2000; Kanner, 1943; Kanner, 1949), but the concept of the 'normal' or 'ideal' human was put forward as early as Ancient Greek times (Galton, 1998), and has been codified more intensely since the Enlightenment (Waltz, 2008). Armstrong (2010) reasons that we should not pretend that there is a 'normal brain' to which all others must be compared, and that lessons learnt about biodiversity, cultural, and racial diversity, need to be applied also to the human brain. Indeed, Autism can teach us new ways of understanding humans, humanity, and the social world, through showing manifestations of atypical interpersonal relations (Leveto, 2018). When considering the concerns of this thesis, the transitions from institutionalisation to community care, and from the medical model to the social model are salient in understanding how we view interactions, as it is not just the interactions between individual people which are important, but also the interactions between the world and the person.

3.3 The Social Model of Disability

From deinstitutionalisation drawing attention to disabled people for the first time, to bolstering from the feminist and civil rights movements, the disability rights movement began to come into common consciousness in the 1980s and 1990s (Evans, 2013; Hahn, 1986; Owens, 2015). This movement argued that disability stemmed not from people being unable to adapt to the demands of society, but from the 'failure of a structured social environment to adjust to the needs and aspirations of citizens with disabilities' (Hahn, 1986, p. 128). This is the basis of the social model of disability, that it is society that needs to adapt to its people, rather than the peoples' failings causing any issues they may have (Berg, 2004; Owens, 2015). The disability rights movement was founded on these principles of the social model, and in 1990 adopted the phrase, originally from the Latin in 1930s Polish foreign policy, 'Nihil de nobis sine nobis': 'Nothing about us without us' (Owens, 2015; Smogorzewski, 1938). This phrase, in the 1930s and in 1990 and beyond, means that no policy should be decided without the full and direct participation of those whom it affects; it was used by disabled people to take control of their lives, the way they were treated by society, and their futures (Owens, 2015; Smogorzewski, 1938). The social model has adapted over time, and is different depending on the culture in which it is presented.

Armstrong (2010) argues that human competence, and therefore human incompetence, is defined by the values of the culture to which you belong; for example, in the cases of sexuality and race, where human incompetence has long been misattributed. The time period is also salient, in an agrarian society, only the privileged few were expected to be literate, but in our current Western society, dyslexia, or anything which presents as a barrier to reading and writing, violates the assumption that all must be successfully literate (Armstrong, 2010). Where literacy is now associated with social value (Elliott & Gibbs, 2008), sociality within the norms decided by current definitions is considered of great importance also.

The social model challenges the discrimination and marginalisation of disabled people, links civil rights and political activism, and frames disability as a social construct (Owens, 2015). The model emphasises the disabling effects of the environment on a person or group, including the attitudes of other people towards both the person, and the disability-label attributed to them (Fletcher-Watson & Happé, 2019). Although the model and some of its proponents such as Owens (2015) can sometimes present a dichotomy between people with learning difficulties and physically disabled people, it also does not necessarily account for social communication differences, a combination of difficulties, or the impact of colonialism on the model itself (Barker & Murray, 2010). Models were primarily constructed within the Western academy, and therefore more research should be done to explore the models of disability that existed elsewhere before the ideas of many Western countries were forced upon large parts of the rest of the world.

3.3.1 Variations in the Model

Due to the Anglo-centric angle of this research, the social models commonly used in the UK and North America will be focused on primarily; however, it is important to note that there are differences between the two, and between these and other models across the world (Berg, 2004; Owens, 2015). A key aspect of all forms of the social model is the emphasis on disabled peoples' participation in everyday life, the healthcare they receive, and the policies that affect them (Owens, 2015). The North American model uses a minority group rights-based approach, linked to the disability and civil rights movements, which includes work that explores the social, cultural, and political dimensions of disability (Owens, 2015). The primary difference between this and the UK model, is the omission of the UK model's materialist focus on oppression; the UK model also clearly distinguishes between impairment and disability, unlike the North American model (Owens, 2015). These two models differ, for example, from the Nordic social relative model of disability, which sees impairment and disability interact with each other on a continuum (Berg, 2004). Within this model, disabled people are viewed as 'flawed' and unable to perform in social roles in the same way as the non-disabled (Berg, 2004). This model takes into account a common criticism of the social model: that it does not take into consideration that many disabled people do suffer, and are negatively affected not only by society, but also by their disability (Owens, 2015; Singer, 2017; Terzi, 2004). However, Berg argues that this model can lead to the justification of some making decisions on behalf of others, to have control over those deemed dependent on the state, leading to the argument over who should be allowed support, and how much. Berg addresses this conflict in Sweden between political actors over whether supporting people leads to 'entitled customers or empowered individuals', a debate that can be seen in the UK today over the levels of support which should be given, and who deserves it (Pring, 2023).

3.3.2 Criticisms of the Social Model

Some researchers have criticised the social model, and in particular the UK social model of disability, for portraying illness and impairment as being distinctly separate (Owens, 2015). Owens (2015) argues that the social model may exclude people with cognitive impairment, acquired impairment, or fluctuating impairment, as the model fails to consider different experiences. Autistic people often have physical needs in addition to the social difficulties they experience, and researchers may argue these are part of Autism, or co-morbidities (Ament et al., 2015; Lidstone et al., 2020). Additionally, people with learning difficulties may be excluded from the social model, as adjusting the social world is not always considered possible (Owens, 2015; Terzi, 2004). Thus, when unable to adjust the social environment, this leaves personal and social differences unacknowledged and undifferentiated, rending the social models of disability essentialist while excluding experiences (Williams, 1999). Armstrong (2010) states that we now live in a 'disability-plagued' culture with one in four adults suffering from a diagnosable mental disorder in any given year. Although it is worth noting that the work of Armstrong (2010) references statistics from the US, whereas in England, the proportion of the population with a diagnosable mental health condition decreased from 23%, nearly one in four, in 2007, to 17%, around one in six, in 2014 (NHS, 2009, 2016). Many medical researchers have a disease-based perspective of the brain, stemming from the medical model of disability, which leads to the strengths and talents of those they are seeing to be de-emphasised (Armstrong, 2010). Some support the idea that this 'disability culture' is being caused in part by advocacy groups who, in order to be able to get appropriate funding and public attention, often highlight the difficulties and negative aspects of a disability (Armstrong, 2010). This can lead to positive attributes not being given the recognition they deserve, in the community's urgent bid for more support generally.

A further criticism of the social model was that it discounted suffering; Singer (2017) states that we are not all born equal, and this fact should be reflected in the models we choose to align ourselves with. Suffering and trauma are often absent in disability studies, due to the commitment to change the perception of disability as a tragedy; however, according to Barker and Murray (2010), this leaves many questions unanswered about the relationship between trauma and disability. Berger (2004) argued something similar when they stated that the discursive abyss between trauma and disability scholarship boarders on denial. The question of whether trauma is a disability, or whether disability is a component of trauma, remains unanswered (Barker & Murray, 2010). In respect to Autism, trauma is important to consider: do Autistic people experience trauma because of their diagnosis, because of their difference, or as some believe (despite lack of evidence), is Autism caused by trauma?

In regards to post-colonial discourse, the social model is laden with Western priorities and value judgements, and the rights activism stems very much from Western political frameworks (Barker & Murray, 2010). This lack of self-reflexivity regarding the model's positioning within systems of globalised capitalism has led to calls to move away from the social model, towards a discourse situated in experience and relative cultural understanding (Barker & Murray, 2010; Ingstad & Whyte, 2007). The model has previously claimed to be able to adapt to local variants and cultures, but the lack of specificity of application has been criticised, particularly in regards to how this would happen in cultures shaped by the consequences of colonialism (Barker & Murray, 2010). These problems require greater research, and, most importantly, consultation with communities around the world, and research led by those outside the Western academy.

3.3.3 Evolution into Neurodiversity

Some of these criticisms, such as that the social model did not account for those with cognitive impairment, or that the social model focused too heavily on physical disability (Owens, 2015), led to the disability rights movement looking to those with cognitive and developmental differences, and their experiences, in more detail. The social model is not distinct from the neurodiversity model, it is more that neurodiversity builds on the social model with a more specific focus on cognitive difference.

3.4 Neurodiversity

The coining of the term 'neurodiversity' is attributed to Harvey Blume in an article of the Atlantic in 1998 (Blume, 1998). Although in the same year, Judy Singer also used the term, with a detailed explanation, in her bachelor's thesis (Singer, 1998). This has led to her also conducting advocacy work, although, she admits that her focus when advocating was more directed towards so-called 'high-functioning Autistics' (Singer, 2017). Broadly, neurodiversity defines atypical cognitive development (as defined by the medical profession and DSM/ICD) as a difference to be celebrated and protected. For example, where attention to detail among Autistic people has been framed as a deficit by psychologists in the past, it could now be considered a gift, and useful in many situations (Armstrong, 2010).

Neurodiversity advocates see Autism as a type of human difference, similar to race or sexuality, that should be respected, not cured through behavioural or medical interventions

(Armstrong, 2010; Leveto, 2018). Evidence is needed, and is being produced, to support the idea of neurodiversity over the promotion of cures and treatments as seen in the medical model. The major evidence for this comes in the form of the views of Autistic people themselves, and evidence that suggests that the deficit model, and Autistic people feeling ‘broken’ or that they are a ‘burden’ are contributing factors towards suicidality in Autistic people (Pelton et al., 2020). The neurodiversity model therefore has the capacity to save lives and reduce mortality in the Autistic community.

As an example of a progressive view of Autism, neurodiversity can be considered post-colonial, which constitutes no betrayal of the latter definition; rather, the comparison between Autism and post-colonial discourse repairs division, oppression, and the hierarchies that make colonialist thinking possible (Savarese, 2010). Disability and postcolonialism are both linked by questions of power (Barker & Murray, 2010); viewing the two in tandem pays respect to the Autistic self-advocates who are fighting for their rights, and contesting ‘hegemonic neurotypically’ (Savarese, 2010). Neurodiversity follows the social model of disability, in that disability is defined as a poor fit between the characteristics of a person and their social context, but with a more specific focus on the cognitive and interactional characteristics of a person, such as those seen in the Autistic community (den Houting, 2019; Leveto, 2018). Neurodiversity can refer to a wide range of conditions including ADHD and dyslexia, but here it will specifically refer to Autism, unless specified otherwise, as this is the most common usage for the term (Armstrong, 2010) and the focus of this thesis.

3.4.1 The Neurodiversity Movement

> *“An understanding developed among Autistic activists that Autistics were an oppressed minority group whose oppression in some ways follows similar patterns to those experienced by other historically oppressed groups” (Walker, 2021, pp. 12-13).*

Deinstitutionalisation contributed to the normalisation movement, which played a key role in making self-advocacy possible for Autistic people (Leveto, 2018). The normalisation approach to Autism uses empowering imagery to make an effort to change society itself through reframing and destigmatising Autism (Russell & Norwich, 2012). At its core, the neurodiversity movement is a social justice movement; within which Autism is conceptualised using the social model of disability, whereby disability is found, not from Autism, but from living in a world which is inhospitable towards Autistic people (den Houting, 2019). The movement challenges the medical model’s interest in causation and cure, believing that Autism is inherent to, and inseparable from, a person’s identity (Kapp et al., 2013). This model does not claim that neurodivergent people are not disabled, but that the disability results from different sociality expectations within society.

The neurodiversity movement, and progressive views of Autism, can be considered post-colonial due to the way in which the struggle for self-determination by Autistic activists represent a kind of ‘neuronationalist’ uprising (Savarese, 2010). However, it is important not to use disability and postcolonialism as metaphors for each other, but rather to understand the two in tandem, especially where Western ideas of disability have predominated historically (Barker & Murray, 2010). Comparisons can be made between the treatment of many marginalised minorities, and these comparisons are often useful for explaining the similarities between situations, and the way that those involved may feel, particularly in regards to victimisation and segregation. However, some forms of disability activism have been criticised by post-colonial scholars, who state that the very notion that environments can be transformed through such minority activism is symptomatic of a deterministic idea of accessibility of environment which does not account for places where inaccessibility and exclusion are not unique to those with disabilities (Barker & Murray, 2010). The neurodiversity movement was historically led almost exclusively by Autistic activists, with little to no involvement from not-Autistic stakeholders, although, increasingly, not-Autistic professionals and researchers are joining the discourse (den Houting, 2019; Fletcher-Watson & Happé, 2019). The Autistic community began really gaining visibility with the advent of the internet and social media; sharing platforms gave people a space to meet other Autistic people from around the world, discuss common interests and issues, and to build a sense of community, as well as driving advocacy for neurodiversity and Autism (Armstrong, 2010; Leveto, 2018). Social media and sharing platforms have catalysed the neurodiversity movement, with Autistic people taking the lead (Armstrong, 2010; Leveto, 2018). The internet has allowed those who do not speak, or are ‘non-verbal’, to communicate in ways that were not possible before, most people are likely to have found out about neurodiversity through online platforms and sources (Kapp et al., 2013). Research also shows that Autistic people, regardless of diagnosis, are more likely to be aware of the neurodiversity movement than their not-Autistic peers (Kapp et al., 2013). Being a parent of an Autistic person was not associated with this awareness, but having an Autistic friend, or having increased educational attainment, were associated (ibid). There is therefore further to go in researching certain members of the Autism community, namely parents of Autistic children and adults, and professionals involved with Autistic people.

3.4.2 Language: Autistic, or with Autism?

The use of language is important within the neurodiversity movement, and old medicalised phrases such as ‘suffers from Autism’ are rejected in place of ‘identity first’ language whereby a person is referred to as being ‘Autistic’ rather than ‘with Autism’ (Kapp et al., 2013). This difference may not seem significant to many, but to many Autistic people, the difference between the person-first ‘with Autism’ and the identity-first ‘Autistic person’ is hugely significant as it highlights Autism as a part of them as a person, rather than an affliction, or illness (e.g., ‘with cancer’) (Fletcher-Watson & Happé, 2019; Kapp et al., 2013). Bottema-Beutel et al. (2021) says much research contains ableist language, defined as language that assumes disabled people are inferior to nondisabled people. They highlight the terms ‘special interests’ and ‘special needs’ as being found particularly patronising by Autistic people (Bottema-Beutel et al., 2021). In their study of which terms the Autism community prefer, Kenny et al. (2016) surveyed 3470 participants, 502 of whom were Autistic adults, 2207 were parents or carers of Autistic people, 1109 were professionals working in the field of Autism, including researchers, students, and volunteers, and 380 were friends and family of Autistic people. They found that Autistic people prefer the use of identity first language ‘Autistic’ to person-first language ‘person with Autism’ (ibid).

> *“Many of our Autistic adults suggested that the use of language that separates a person’s Autism from their identity not only undermines the positive characteristics of*

> *Autism but also perpetuates the notion that Autism is an inherently 'wrong' way of being" (Kenny et al., 2016, p. 457).*

The semantic separation between Autism and the person has been particularly clear in cases of stigmatisation, dehumanisation, and even violence against Autistic people (Bottema-Beutel et al., 2021); Botha et al. (2023) argues that there are therefore very material consequences linked to the use of language when discussing Autism. For example, in cases of filicide, accused parents often fall back onto linguistic separation between Autism and the child (Botha et al., 2023). Autistic people as victims of crime is a topic considered in the next chapter, where this semantic separation will be further discussed. Many consider terms such as 'suffering from Autism' offensive, and some Autistic authors have gone so far as to say that if they are to be described as 'suffering' from anything, that it is from the discrimination they receive from being Autistic, not from Autism (Smukler, 2005). Walker (2021) even described person-first language as 'anti-Autism bigotry', saying that those who use it were either being discriminatory, or simply did not know better.

However, not all agree with this use of language, although the majority of Autistic people in the study by Kenny et al. (2016) preferred identity-first language, there was still variance. Furthermore, parents of Autistic people, and professionals working with Autistic people, were more likely to use person-first language as opposed to identity-first language (Kenny et al., 2016). Additionally, many may feel that Autism is in fact an illness or affliction, and that it negatively affects them or a loved one, and therefore may feel alienated by the neurodiversity advocates telling them there is nothing 'wrong' with them (Dekker, 2019). The field of early intervention, identification, and research is also one of controversy. Fletcher-Watson et al. (2017) surveyed 2317 members of the Autism community in eleven European countries, and found respondents were positively disposed to early years Autism research. However, they found that there was less favourable endorsement of the phrase 'at risk' to describe the infant participants (Fletcher-Watson et al., 2017). This dislike of the phrase did not extend to healthcare practitioners however, mirroring the divide in the community over use of language as investigated by Kenny et al. (2016), whereby Autistic people favoured identity-first language, while the not-Autistic practitioners maintained use of person-first language. These discrepancies show the need for researchers to take community perspectives into account when designing studies and implementing changes (Fitzgerald, 2017; Fletcher-Watson et al., 2017). This thesis, written by an Autistic person, and from a neurodiversity paradigm, uses identity-first language, as evidence suggests is preferred by the Autistic and neurodiversity-supporting communities.

The language used to describe those who do not have a diagnosis of Autism is also up for debate. Many will use 'neurotypical', but this conjures ideas of a 'typical' brain, which contradicts a lot of neurodiversity-based theories. Many suggest using 'non-Autistic', as Autism is not the only form of neurodivergence, and therefore 'neurodivergent' and 'neurotypical' are not binary terms to describe whether or not someone is Autistic (Sedgewick et al., 2022). This thesis chooses to use 'not-Autistic', as the author feels 'non-Autistic' presents the idea of Autism as something one has or does not have, rather than representing a part of human neurodiversity.

3.4.3 Difference or disorder?

The point at which a difference becomes a disability is dependent on both how the individual is perceived by society e.g., in regards to ‘intelligence’ there is a score on the Intelligence Quotient (IQ) test below which a person is deemed to be disabled, and also in terms of support e.g., whether the individual requires additional resources to complete what are deemed ‘normal’ day-to-day activities and pursuits. Within disability, there is the idea of disorder. A key feature of the neurodiversity paradigm is the view that Autism is a difference, not a disorder (Baron-Cohen, 2017; Runswick-Cole, 2014). ‘Disorder’ is term laden with deficit ideas; homosexuality used to be defined as a disorder until changes in the DSM in 1980 (American Psychiatric Association, 1980; Baron-Cohen, 2017). Many now argue that Autism is a naturally occurring brain difference, and therefore not a disorder; with neurodiversity being based on medical pathology whereby Autistic people have a ‘differently wired brain’, that is not disordered, but real, and biologically different (Runswick-Cole, 2014). These differences are beginning to be viewed more positively, with Gillespie-Lynch et al. (2017) finding that Autistic adults were likely to describe positive biological differences between themselves and their not-Autistic peers. Baron-Cohen (2017) states that it is hard to define Autism as a disorder at a neural level, as some regions of the brain are larger in Autistic people (e.g., the amygdala), and some are smaller (e.g., the posterior section of the corpus callosum). Furthermore, these differences to not-Autistic brains are not universal amongst Autistic people, and any such differences would not in itself mean a disorder is present, and there is no evidence of Autistic disorder or dysfunction of the brain, merely that it is ‘wired differently’ (Baron-Cohen, 2017). This distinction between disorder and disability is important to those who hold a neurodiversity view of disability, as a disability requires societal support and acceptance of difference, whereas a disorder requires a cure or treatment (Baron-Cohen, 2017). Many have replaced ‘Autism spectrum disorder’ (ASD) with ‘Autism spectrum conditions’ (ASC) in an attempt to address this issue. However, Autism is still characterised and diagnosed in terms of impairment, and therefore is most often referred to in literature and by professionals as a disorder (Kapp et al., 2013; Leveto, 2018). This thesis will refer to Autism in terms of neurological difference.

3.4.4 Criticisms of Neurodiversity

> *“Indeed, the neurodiversity movement has been criticised for being too aligned to a medical model…, too aligned to (a simplistic mischaracterisation of) a social model…, as not appropriate for use with those with significant intellectual impairments…, and for ignoring such needs…, as well as wanting to stifle scientific research particularly in relation to Autism and minimising disability… I find such criticisms to be lacking nuance to say the least” (Milton, 2019, p. 8).*

As with many ways of viewing the world, there is not a clear dichotomy between neurodiversity and an ‘opposite’ opinion that Autism should be remedied, treated, cured, or defeated (Hart, 2014; Kapp et al., 2013). Many parents and professionals would be found somewhere in the middle, and many Autistic people themselves reject the neurodiversity model (Dekker, 2019; Kapp et al., 2013). In their study of 657 Autistic and not-Autistic people, although 80.5% of the Autistic people aware of neurodiversity described it positively, Kapp et al. (2013) found that 1.8% of those aware of it provided a negative definition such as these:

"A small group of people with a strong sense of entitlement and specialness."

"The idea that we Autistic folks are not "abnormal," just a different kind of normal. (This is bullshit.)"

"A compendium of annoying adult children who need to adapt and stop finding pride in their inherent failure as human beings." (Kapp et al., 2013, p. 64).

It is therefore clear that, though we should not view 'neurodiversity versus the medical model' as a dichotomy, there are certainly those who would be placed at the 'opposed to neurodiversity' end of a linear spectrum of acceptance, and many of those see those who advocate for neurodiversity as 'high-end of the spectrum pretenders' with no right to speak for the more 'severely disabled' members of the Autistic community (Hart, 2014, p. 289). However, this view of 'high functioning' Autistics not speaking for the community of Autistic persons is problematic in a few ways. Diminishing the accounts of authors such as Temple Grandin for not being 'really' Autistic, adds to the underlying assumption that Autism is so incapacitating that an Autistic person would not be able to write with such insight and sensitivity (Smukler, 2005, p. 20). The characterisation of Autistic authors as either frauds or rare exceptions adds to the disabling nature of the deficit model's perception of Autism. Additionally, similarly to the criticisms of the social model, some believe that the idea that environments may be transformed due to minority action, such as that of the neurodiversity movement, is symptomatic of a deterministic notion of accessibility that does not account for places where exclusion is not unique to people with disabilities (Barker & Murray, 2010). This is where evaluation of intersectionality is essential in gaining a full picture of the aspects that may be affecting someone's ability to access society to the degree to which they desire and deserve.

Some argue that the critics of neurodiversity often base their opinions on myths and misconceptions about the movement (den Houting, 2019). They argue that some see the neurodiversity model as purely 'difference not disability' whereas this is not the 'true' meaning of neurodiversity, den Houting (2019) states that neurodiversity accepts that many struggle with disability as well as embracing their difference. Some join neurodiversity-based groups, only to find they do not 'fit in' with the supposed inclusive atmosphere; Dekker (2019, p. 26), an Autistic person reporting on their own experience in Fletcher-Watson and Happé (2019), found that when they joined some neurodiversity groups found they were being 'told what to believe'. Furthermore, Dekker found that the groups excluded people 'who find themselves disabled or broken', failing to account for their needs and experiences (Dekker, 2019, p. 26). However, researchers argue that adopting a neurodiversity stance does not preclude providing support to those who need it (Fletcher-Watson & Happé, 2019). Being Autistic is often accompanied by mental health difficulties such as depression and anxiety, behavioural features such as self-harm and limited diet, and medical conditions such as epilepsy; Fletcher-Watson and Happé (2019) maintain that viewing Autism through a neurodiversity lens does not mean abandoning psychological theory or scientific rigour, a view supported by many key researchers in the field (Bottema-Beutel et al., 2023). It also does not prevent areas of research from being investigated, as Damian Milton states: 'it is not the neurodiversity movement that is repressing certain avenues of enquiry, although advocates may well be critical of research and often are. I know of very few Autistic people with much power to gatekeep' (Milton, 2019, p. 8). It could be argued that, as with any minority group seeking to gain a voice for itself, that a backlash by those from the majority, and those with the power, is to be expected[5].

3.4.5 Evidence for Neurodiversity

> *"Neurodiversity approaches must also recognize that some neurotypes do have a less socially constructed, more genuinely discrete existence based on genetic variants… however, whether diversity is dimensional or discrete, it is still diversity, and thus fundamentally seems compatible with a neurodiversity approach" (Dwyer, 2022, p. 81).*

Neurodiversity as a concept is not a psychological model, however; it can be tested experimentally, for example in the study by Sasson et al. (2017) who looked at 'thin slice' first impressions of Autistic people. Autism is clinically defined by social communication deficits (American Psychiatric Association, 2013; Crompton et al., 2020b); therefore, to promote theories of neurodiversity, there would need to be substantial changes to the way that Autism is viewed and conceptualised in public and clinical minds. However, there is growing evidence that, instead of Autism being a 'deficit' of social skills, the double empathy problem is in fact to blame for social communication difficulties (Crompton et al., 2020a; Crompton et al., 2020b; Crompton et al., 2020c; Milton, 2012). Such evidence of neurodiversity, though novel, is transformative in the field of Autism research. Evidence for neurodiversity ipso facto supports the double empathy problem also, as the double empathy problem suggests natural diversity in social communication methods (Milton, 2012). The double empathy problem is explored in further detail in Chapter 5.

In minority groups where there is a mismatch of social rapport, a phenomenon known as 'minority stress' may occur (Cokley et al., 2013; Meyer, 2003). If Autism were in fact characterised by deficits, then Autistic people would interact poorly with each other. However, Autistic people often report that they enjoy the company of other Autistic people (Crompton et al., 2020a). Indeed, a Swedish study found that Autistic people are 10-11 times more likely to choose romantic partners who are also themselves Autistic (Nordsletten et al., 2016). Autistic people report feelings of comfort and ease when with other Autistic people, they report mutual understandings, a sense of minority status, and belonging to a group (Crompton et al., 2020a). These findings highlight the importance of Autistic-led social opportunities and peer support.

Empirical experimental evidence has also been gathered which seems to support the concept of neurodiversity. In a study by Komeda (2015), it is clear that Autistic people do not lack empathy, but rather all participants prefer to identify with people similar to themselves. Furthermore, Crompton et al. (2020b) found, within their information transmission study using diffusion chains, the steepest decline in detail retention was within the chains that

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[5] See Dunivin, Z. O., Yan, H. Y., Ince, J., & Rojas, F. (2022). Black Lives Matter protests shift public discourse. *Proceedings of the National Academy of Sciences, 119*(10). https://doi.org/10.1073/pnas.2117320119 who demonstrate on Page 8 how each time #BlackLivesMatter trends upwards, there are upwards trends in #WhiteLivesMatter, #AllLivesMatter, and #BlueLivesMatter also.

alternated between Autistic and not-Autistic participants. This empirical evidence suggested that Autistic people did not have issues interacting with each other, a finding that is supported by anecdotal and qualitative evidence from studies involving Autistic people (Crompton et al., 2022; Crompton et al., 2020a; Crompton et al., 2020c). Rather, Autistic people experience difficulties interacting with not-Autistic people, and not-Autistic people experience difficulties interacting with Autistic people (Crompton et al., 2020b).

With all models, it is important to consider which model those being described wish to use. Gillespie-Lynch et al. (2017) found that Autistic people described Autism experientially, or as a neural difference, while opposing the medical model. This, and the research from Crompton et al. (2020, 2022), shows that the neurodiversity model is the most appropriate for describing Autism and Autistic people.

3.4.6 Neurodiversity as a social construct

The fact that there is evidence to suggest Autism is a distinct group, does not detract from the fact that our concepts of Autism and disability are socially constructed. If diagnoses are only useful when considering interventions (Elliott & Gibbs, 2008), and prominent neurodiversity advocates argue against interventions for Autistic people: of what value is the Autism diagnosis? This author argues that the Autism label allows for a sense of community among those who have previously been treated badly and misunderstood within society. Much like many dyslexic people hold onto the label with pride because of the stigma attached to the concept of 'low intelligence', Autistic people take pride in their label because of the stigma of being 'weird'. Our constructs of literacy (Elliott & Gibbs, 2008) and social competence are subject to change according to societal priorities and anxieties. Additionally, new terms are developing within neurodiversity-based literature all the time, for example Walker's 'neuroqueer'. The term 'neuroqueer' was coined by Walker in 2008 as a way of embodying neurodivergence and 'queering' neuronormativity. They describe neuroqueer as an intentional noncompliance with the demands of normative performance while actively engaging with neurodivergence and queerness (Walker, 2021). It is important to keep up to date with the new terms, as understanding about neurodifference increases, as these terms are central to those that use them to describe their own identity, and the ways in which they interact with the world.

3.5 Models and the Future for Research

> *"In short, the current balance of research appears overwhelmingly biased towards studying – and treating – individual "deficits" rather than exploring the role that environments, contexts, and society play in disabling individuals" (Dwyer, 2022, p. 82).*

This chapter has outlined the major models through which Autism has been characterised, from the medical model, which viewed Autism as a disorder needing treatment, prevention, or cure, to the social model, which views disability as inflicted by society. The neurodiversity movement rose out of the social model, and focuses specifically on the diversity that exists within neurology. This author firmly believes that this is the direction Autism research is heading. As with many phenomena that have previously been stigmatised, pathologised, or even criminalised, such as homosexuality, it is believed that Autism will come to be accepted as natural human variation. Neurodiversity advocacy is inherently a justice movement, and as such focuses on empowerment of the community it wishes to represent. There will be many criticisms of the neurodiversity model, and, as with any social change, there will be pushback by those who feel their own rights are being infringed by the legitimisation of a minority.

3.5.1 Autistic Research: A Neurodiversity Approach

The social model was not without its critics, especially those who maintain the social model shows little understanding of intersectionality especially when considering colonialism (Barker & Murray, 2010). It is therefore important to develop neurodiversity-led practices which are representative of the world in which we live, and are sensitive to the intersectionality which exists within Autism research. Research shows that Autistic people who are aware of neurodiversity as an idea are more likely to endorse positive emotions about Autism (Kapp et al., 2013), and having a positive view of oneself is essential for good mental health. This is especially salient as research shows that feelings of suicidality in Autistic people are associated with feelings of not belonging, and being burdensome on others (Cassidy et al., 2014). Autistic health and mortality will be explored further in the following chapter.

Interventions are a common field of research in Autism studies. However, many of these promote a normalisation agenda at odds with human rights and neurodiversity-informed movements (Leadbitter et al., 2021). Furthermore, the tools used to measure the outcomes from interventions are questionable at best, and poor at worst. In an NHS systematic review of the tools used to measure outcomes for Autistic children in intervention studies between 1992-2013, McConachie et al. (2015) identified 131 such tools from 128 studies; they found that there was limited evidence any of these tools were good at detecting change from the interventions, and were unable to recommend any of the tools examined. They highlighted the many gaps in available outcome measures of factors such as well-being, participation, and quality of life, the very domains most valued by the Autistic young people and their families (McConachie et al., 2015). Over the following years, this outlook of the field did not seem to improve, with Leadbitter et al. (2021) identifying these areas, as well as areas of anxiety, autonomy, and coping strategies, as areas where there is not the emphasis on, or the tools to, examine the impact of interventions on. Leadbitter et al. (2021) warned that the tools used to measure intervention outcomes are still strongly focused on the reduction of ‘Autism symptoms’, and that these intervention targets needed re-evaluating.

Future research which is based within ideas of neurodiversity is therefore the way forward. Dwyer (2022) set out a range of recommendations of things that researchers can do to apply the neurodiversity approach to their own work, focusing on the idea that research is a subjective process. Recommendations include researching the strengths of neurodivergent people, and using these to promote success, as well as learning of different ways to interpret research findings based on theories, concepts, and ideas used by neurodivergent people. These recommendations can be found in full in Appendix II and are based upon ideas of listening to neurodivergent people, their experiences, and the ways their environments, contexts, and social networks might disable them. Dwyer also recommends the involvement of neurodivergent people in the research process, which is a key theme throughout this thesis.

It is also important to consider those who self-identify as Autistic when conducting research. Diagnosis is a lengthy, and for some, expensive, process, which can take many years. By accepting peoples' own accounts of their life, and the difficulties they experience, there may be much more scope for participant research, as well as discoveries of previously unknown phenomenon. An example of the benefits of including those who self-diagnose would be increased participation in empirical research; in the study by Griffiths et al. (2019), there would have been 495 Autistic participants, rather than 426, had self-identification been accepted by the researchers. These additional 69 people could have added depth to the study of vulnerability and negative life experiences in Autistic people, potentially with the added insight of not being able, or not wishing, to obtain a diagnosis which could help them access support.

3.6 Conclusions and Disability as a Social Construct

> *"Separating and distinguishing populations can lead to meaningful research findings. The socially constructed nature of disability categories does not make them useless; they can be useful and do appear quite compatible with the dimensional aspects of the neurodiversity approaches" (Dwyer, 2022, p. 81).*

While many disabilities are considered mostly unambiguously to be disabilities, many labels we commonly use today have a complex socio-cultural significance and background that can lead us to question whether they are helpful being labelled as such. A good example of this is dyslexia; literacy in itself is a fairly recent phenomenon in the history of human evolution, and universal literacy even more so, having been previously reserved, in Western society at least, for the powerful elite (Cook-Gumpertz, 2006; Elliott & Gibbs, 2008). However, now that we live in a society where institutions such as schools are valued on their overall performance in literacy tests, illiteracy is seen as a dangerous threat to society (Elliott & Gibbs, 2008). Perhaps, now that we live in a society with far more socialising, both in person and online, the ability to 'read' others, much like the ability to read text, has become more salient, leading to Autism being considered disabling?

As the previous chapter on the changing history of the diagnostic processes of Autism illustrated, the meaning and boundaries of what it means to be Autistic have changed over time, and this chapter described how socially constructed meanings of Autism differs across medical factions and political spectrums. However, this does not mean that a label of Autism is not useful, or empowering for those who choose to use it. As Dwyer (2022) explains, categories can be useful to qualify people for support, and when these categories are used to distinguish populations it can lead to salient and helpful research findings. Some argue that the neurodiversity movement is hypocritical in its advocacy for both a belief in a natural spectrum of human neurological variance, while also aligning itself with particular categorical labels such as Autism. However, this author believes that labels can serve a powerful purpose in helping a person to identify themselves with a group to which they feel aligned. That is not to say that these labels are inflexible, or unchanging; many who previously embraced the label of Asperger's syndrome rejected it soon after information came to light regarding Hans

Asperger’s allegiances to the Nazi party (Herwig, 2018). But empathy is needed when considering why someone wishes to use a label, as there are many marginalised groups whose identities are very much socially constructed, either through colonial imperialism, social class identification, or indeed individual preference for a team or group. To dismiss these labels and characterisations is to dismiss the identities of these groups. For surely it is those who situate themselves within the marginalised or minority group to decide how they should be described?

4 How the World Interacts with Neurodivergence

This brief chapter address some of the key ways in which the world affects Autistic people, in the areas of the media, health, work, and crime. As interactions are bidirectional, focusing purely on the ways Autistic people interact with the world is narrow to say the least. We must also consider how the world portrays Autistic people, and how Autistic people are treated by others, in order to fully gain an understanding of neurodiverse interactions. The media is a prime example of the importance of studying the bidirectional interactions, as media in all its forms help to provide the general public, and particularly not-Autistic people, with an understanding of what it means to be Autistic. If these perspectives are wrong, then these interactions can lead to negative consequences for the Autistic population. A feminist analysis has been undertaken when exploring ideas of media representations of Autism, as there are stark contrasts in content depending on the target audience of the media source. Health will be studied, and it will be questioned why the life expectancy for Autistic people is so low. In addition to health, the sexuality and gender identity of Autistic people will be covered, as this can have great bearing on how people are treated in society, and studies that explore gender and sexuality often collect data on these negative experiences also. A major way that the world interacts with Autistic people is in the area of crime and punishment, which will be briefly covered in terms of the risk profiles of Autistic people. Also considered in this chapter are the ways Autistic people can positively contribute to a workplace environment using neurotype-specific strengths and qualities. This chapter continues to address the research concern of: *the different models that have been used to describe Autism and how the world interacts with neurodivergence,* with the focus now on the latter.

4.1 Models and the Media

Despite many academics and advocacy groups' efforts to move from the deficit model to the neurodiverse model, the public's conceptualisation of Autism is deeply entrenched in the former, and aided by the media, and social media, representations of Autism. As discussed previously, the sensationalisation of Autism can have dramatic and harmful effects (Waltz, 2008). Moreover, omitting the voices of Autistic people from articles about themselves and their communities reinforces a violation of the human rights of Autistic people (Clarke, 2012). This section will focus on the prominent models apparent through media depictions, from the 1960s to the 21st Century, and question why so many have misogynistic rhetoric. More positive portrayals will also be considered, looking at the most recent forms of social media such as TikTok. The second concern of this thesis is addressed particularly in this section, as the models presented by the media are often the only models non-medical persons have access to, and therefore will base their understanding of Autism off.

4.1.1 Inaccuracy

Despite the growing wealth of empirical data to support Autism being a genetic and inherently natural phenomenon, the reach of scientific journals has been described as 'no match' for the often 'inaccurate and demeaning stereotypes' within the media, which shape the public perception of human difference (Sarrett, 2011, p. 142). Treweek et al. (2019) conducted research into Autistic participants' perception of not-Autistic people's views of Autistic people. They found within their key themes that Autistic people view themselves as being considered 'weird' by not-Autistic people, and that there had been many negative effects and consequences from the Autistic stereotypes people were exposed to (Treweek et al., 2019). These negative perceptions can make it harder for Autistic people to disclose their Autistic status, or 'come out', as it is sometimes described (Davidson & Henderson, 2010). This idea of 'coming out' can draw parallels to that of the LGBTQ+ community, both in terms of the stigma felt by people due to an unalterable feature or identity of themselves, and also because of the visually hidden nature of Autistic status, gender, and sexuality, often requiring a person to disclose these facts about themselves to become known.

The often inaccurate Autism tropes and stereotypes presented in the media today are the remnants of the portrayals of Autism within the psychogenetic paradigms of mental illness. After Autism stopped being associated with poor, or 'refrigerator', parenting, and broken families (Bettelheim, 1967; Sarrett, 2011), the public perception of Autism looked to other 'causes' of the phenomenon. Cause and cure rhetoric is inherently tied into the medical deficit model as it suggests an ideal way of being, and routes to reach it. Huws and Jones (2011) conducted a qualitative content and discourse analysis of news articles on Autism between 1999 and 2008. They found that the three key themes of conceptualisations of Autism were: the missing voices of Autistic people themselves, narratives around the burden of Autism, and sensationalising, misconceiving, and misusing the label of Autism (Huws & Jones, 2011). They found that, even at the beginning of the twenty-first century, Autism was being standardised and homogenised in the media in ways that failed to recognise human diversity and heterogenicity (Huws & Jones, 2011). Furthermore, 'experts' within these articles were not Autistic people themselves, but mothers (fathers were seldom mentioned) and scientists, with no attention given to the ethical and human rights of the Autistic people themselves

(Clarke, 2012). The medical model saw a resurgence in the early 2000s; this surge is attributed mostly to the now redacted and discredited paper by Andrew Wakefield and colleagues. During a retrospective analysis of news coverage regarding Autism between 1973 and 2004, Singh et al. (2007) found that discussion of environmental causes accounted for 48% of newspaper coverage, despite only forming 7% of funded research. Of these, 70% focussed on the MMR vaccine, and 40% referred to the study by Wakefield et al. (1998) (Singh et al., 2007). See in Figure 3 the spike in 1998 onwards regarding coverage of environmental causes of Autism in the international press.

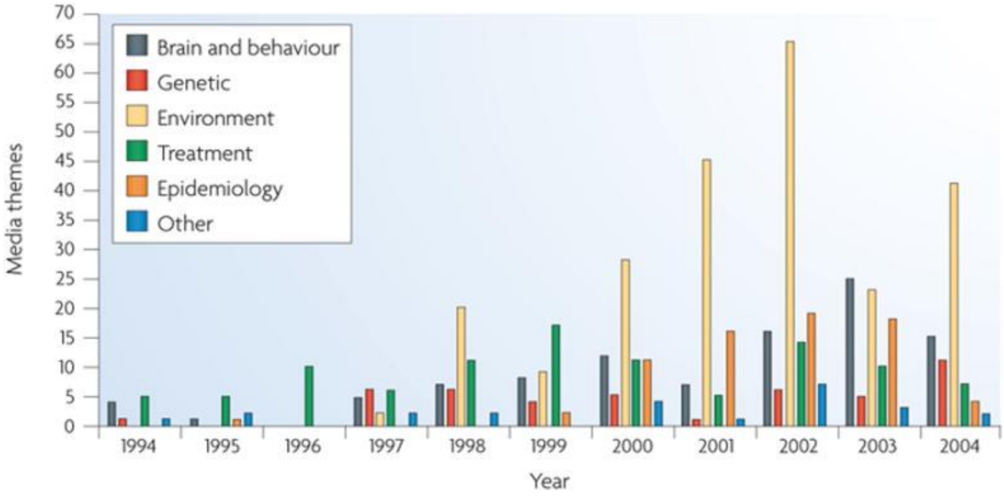

Figure 3 from Singh et al. (2007): Themes of articles on Autism in the international press (1994–2004). p157

Furthermore, this media coverage was found to be particularly problematic in the United Kingdom. Clarke (2008) found that US media dismissed the link between Autism and vaccines at a rate of 4 to 1, whereas in the UK this rate was only 3 to 1. This desire for perceived objectivity and 'showing both sides', led to a dangerous pseudoscience, threatening the lives of many who would otherwise have had protection against many preventable diseases.

Clarke (2012) describes how in 'general audience' magazines, Autism is described using a stereotypical discourse that values science, numbers, genetic and other biological research, as well as perceived objectivity. However, as Clarke states, this seeming objectivity is belied by the fact that the stories, numbers, and findings in studies presented are contradictory from article to article. The dramatic figures used to describe rises in incidence of Autism over the years are misleading, and the numbers and rates are used incomparably (Clarke, 2012). Furthermore, various causes are mentioned that have no basis in scientific fact, from vaccines to increased rainfall[6] (Clarke, 2012). The model of disability presented in media publications can be deduced from their methods of data collection; articles focusing on children rather than adults, despite Autism being a lifelong phenomenon, and articles repeatedly not interviewing Autistic people themselves before making claims about Autism, are examples of practices that may not be working in the best interest of Autistic people (Huws & Jones, 2011). Clarke (2012) found in their study of magazines between 2000 and 2009, that magazines

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[6] See Wallis, C. (2006, 30th October). Blame it on the teletubbies. *Time*, *168*(18), 65. The 'rationale' was that more rain equals more time spent watching television, which equals more Autism.

failed to cover the perspectives of Autistic people in their coverage of the phenomenon, and omitted any reference to discussions about whether Autism is a 'problem' or a natural and neutral neurological difference. Although only covering the media form of magazine articles, this research concluded that the lack of Autistic voice within the media constituted a violation of the human rights of the Autistic people discussed (Clarke, 2012). Further research could be done to analyse the articles and advertisements now found commonly on social media, a source not studied by Clarke; indeed many forms of popular social media, such as Instagram, did not exist in 2009 when their data collection period concluded.

4.1.2 Imagery

The language and visual stimuli used to describe Autism can be particularly powerful, especially when covering the personal stories of those 'affected' by Autism (note here, in popular media this most often does not refer to Autistic people themselves, but often the families of the Autistic person). In the study by Clarke (2012) looking at depictions of Autism in magazines designed for women, and magazines designed for a general audience from 2000 to 2009, very strong language was found in the articles aimed at women. These magazines often focused on a mother's feeling of loss following a child's diagnosis of Autism, phrases such as 'end of the world', 'tragedy' and 'bullets ripped through my skull', with one mother saying she 'cried for a week' following her child's diagnosis (Clarke, 2012, pp. 187-188). These powerful phrases and visual imagery depict Autism as something to be mourned, a deep blow to a family.

4.1.2.1 The role of the mother

> *"The job of the mother is clearly articulated. She is to be responsible and absolutely dedicated to making things better for her child. She is described as emotional and suffering great sorrow and stigma because of the fate of her child" (Clarke, 2012, p. 192).*

In the latter part of the 2000s, discussion of the potential causes of Autism turned to the so-called 'consequences' of Autism, with particular focus on the effect it had on the mothers of Autistic children (Clarke, 2012). Whereas previously mothers had been blamed for their child being Autistic (Bettelheim, 1967; Kanner, 1943; Sterwald & Baker, 2019), coverage in the 2000s depicted mothers as heartbroken yet heroic, 'moving heaven and earth' for their child, and to achieve their child's normality (Clarke, 2012). Autism was presented as a tragedy, and the heroically-acting mothers as the victims of said tragedy (Clarke, 2012). This heroic, isolated, and stigmatised mother repudiates the previously common claims of 'cold parenting' causing Autism (Farrugia, 2009), but created negative images of Autism, as well as reinforcing gender stereotypes. This is not to say that parenting is an easy feat by any measure, many mothers of Autistic children report difficulties, with many describing experiencing stigma, isolation, and aloneness (Clarke, 2012). Most mothers are indeed heroic in their dedication to improving the lives of their children and others. However, the focus in the media purely on the female parent, the emphasis on the mothers giving up work to dedicate their lives and time to the 'cause', the implication that parenting an Autistic child is harder than parenting a not-Autistic child, and that Autistic people are burdensome, creates a negative image of Autistic people, and places a pressure on mothers who may feel like it is their sole responsibility to care for their family. Furthermore, the portrayals of Autistic people as burdensome has also been linked to higher rates of suicide within the Autistic population (Cassidy et al., 2014). The onus is therefore on publishers to consider the wording of their outputs, to prevent harm being done to a vulnerable minority population.

Within many women's magazine articles, mothers are described as feeling responsible for 'dealing' with the 'issue' of Autism; they heroically founded schools and charitable organisations, and raised money for causes, walking, running, and hiking all 'for Autism' (Clarke, 2012). Fathers are rarely mentioned, and therefore this narrative reinforces the 'good mother ideology' (Johnston & Swanson, 2006). Clarke (2012) states that the gendered role of the 'ideal' mother was being clearly articulated in these women's magazines. Women must be responsible and absolutely dedicated, be emotional and suffer great sorrow and stigma because of their child, have no occupation outside of motherhood, and be able to evaluate medical opinions, knowing better than doctors and teachers to be the 'independent entrepreneur of the health and health care of her children' (Clarke, 2012, p. 193). This burden on mothers, and the assertion that mothering should be an intensive activity (Hays, 1996) is a profoundly anti-feminist, and conservative portrayal (Clarke, 2012), with the different portrayals across the media aimed at men and women reinforcing regressive binary gender role identities (Baker, 2005). In many ways, this is very similar to the ways women were seen by those such as Bettelheim and Kanner in the 1940s and 1960s. Back then, the mothers of Autistic children were criticised for being intelligent, having degrees and careers, causing them to be cold towards their offspring (Bettelheim, 1967; Unknown, 1960). The impression given in the 21st Century of these 'heroic' mothers is one of someone who does not work, but is constantly devoted to her children, expending every effort for their sakes. And still, women are blamed for their children experiencing difficulties, and Autism is described in terms of burden and disease (Solmi et al., 2022). This author hopes that, going forward, a feminist critique can be given on the perception of motherhood presented throughout media regarding Autism.

4.1.2.2 Visual depictions

The ways in which information is delivered and recalled is dependent upon their audience and effect; the 'comic, pathetic and dramatic' (Bartlett, 1932, p. 266) will spring to prominence. Therefore, exaggeration, a common characteristic of rumour, is the best way to produce effective information recollection (Bartlett, 1932). This can lead to extreme examples. The media has a responsibility to make portrays of characters and identities as accurate as possible, however, in regards to Autism, this is rarely the case, with many providing an extremely limited depiction of the phenomenon (Prochnow, 2014). Prochnow (2014, p. 134) describes what they call the four different categories of Autistic character within film and television: 'the magical/savant, the "different"/quirky individual, the character with undiagnosed/unlabelled behaviours, and the Autistic person whose portrayal is more realistic or even based on a real-life person'. A commonly cited example of an Autistic character is that of 'Rain Man' in the 1988 eponymous film (Prochnow, 2014); although an example of savant depiction, an incredibly rare phenomenon even within the Autistic community, this media example resonated through several generations (Clarke, 2012), and was used as a comparison to many Autistic people. This is an example of a specific representation of one person being generalised to large numbers of the population, a common trope in the media when trying to portray a social group (Prochnow, 2014). This can often be a good thing, as it draws into public consciousness a previously unknown or misunderstood phenomenon; however, it can also reinforce negative stereotypes, or promote misinformation.

Sarrett (2011) looked at images associated with Autism in the media between the 1960s and the 2000s and found the photographs used were nearly always of children, pictured alone, and looking away from the camera, or displaying behavioural abnormalities such as interacting with toys in different ways to the ‘norm’. These images are used in order to communicate a presumed withdrawal from reality and sense of oddity, with a sense of urgency needed to ‘rescue’ or ‘cure’ the child, lest they be lost to Autism forever (Sarrett, 2011). Sarrett (2011) explains how the themes within these images have persisted over the years, despite conflicting evidence; reinforcing the idea that Autistic children are actually normal children, who have been imprisoned, fragmented, and are no longer whole. A perception made worse, according to Sarrett, by self-proclaimed Autism experts such as Bruno Bettelheim, whose 1967 book ‘The Empty Fortress’, provided a picture of the ‘broken child’ with something missing (Bettelheim, 1967). As discussed before, Bettelheim’s claims of qualifications are dubious, and his conduct while working has been questioned by many (Grandin & Panek, 2013; Pollak, 1997), and so the legacy of his vision of fragmentation must be considered in this respect.

4.1.2.3 Fragmentation

The move from the perception of Autism as being *caused by* a broken family, to being the *cause of* a broken family, occurred in the latter part of the twentieth century. The idea was that these children were still inherently broken, defective, not whole, but the emphasis moved to fixing and rehabilitating the child rather than the family, on whom the blame was no longer placed. Parental resources on coping, high divorce rates, and familial stress added to this idea that Autism fragmented lives and families (Sarrett, 2011). Damaged, or missing a piece, was the imagery used by much of the media to describe the idea that Autistic people need saving by not-Autistic people (Sarrett, 2011). Similar to the ‘white saviour’ complex (Yu, 2021), the theory that Autistic people have total unawareness to themselves and their own situation, as well as to the situations of others, is a commonly repeated rhetoric, with colonial themes. As Sarrett (2011) states, Autistic people do not need rehabilitation, or ‘fixing’ in order to be successful, and to interact with the world. Indeed, empirical evidence shows not-Autistic people often think they are being much more helpful towards Autistic people than they are being in reality (Heasman & Gillespie, 2019b), and yet, the idea of people missing an intrinsic piece from themselves pervades. The puzzle piece has long been an internationally recognised symbol of Autism (Crosman, 2019; Gernsbacher et al., 2018), adding to this perception of fragmentation. So inescapable was this piece of imagery, that in 2005, there were very few organisations that did not use the puzzle piece/jigsaw symbol (Smukler, 2005), and many continue to use it to this day. American organisation Autism Speaks has even trademarked the blue puzzle piece as its logo, and the colour blue is often associated with Autism because of this. Gernsbacher et al. (2018) empirically investigated 400 participants for their implicit and explicit associations with the puzzle piece and Autism. They found that even generic, unbranded puzzle pieces were associated with incompleteness, imperfection, and oddity, recommending that if an organisation wanted to promote positive associations with Autism, they should choose an alternative design (Gernsbacher et al., 2018). Although very much still present, opposition to the fragmentation rhetoric is growing stronger, with the neurodiversity movement encouraging the idea that Autism completes, rather than fragments, the person (Sarrett, 2011). Although some arguments remain about whether the neurodiversity-led accounts encompass all Autistic people.

Figure 4 Examples of Puzzle Piece Imagery, used with permission from Crosman (2019)

4.1.3 Neurodiverse Media Representations

Many neurodiversity-focused organisations have adopted gold for their logos and colour schemes; stemming from the ‘Au’ in Autism, these gold logos are often infinity symbols (Green, 2021), a shape that is frequently depicted in rainbow colours also, to reflect the diversity of Autism.

Figure 5 Logo for the North East Autism Society. From their Facebook page

Print media rhetoric regarding Autism has typically been fairly negative, for example the mere two articles describing parents who accepted and celebrated their ‘different’ child being described as anomalous for their time by Clarke (2012, p. 190). There is, however, an emerging popularity among those on newer platforms of social media, for example TikTok, to celebrate Autism, and to satirise portrayals of Autism such as those put out by cure/causation centred organisations such as Autism Speaks. A good example of this is a TikTok trend that uses an audio from the organisation (a dramatic and urgent appeal to parents on recognising the presence of Autism, including a satanic sounding voice ‘I am Autism’ bragging about the destruction it will cause (Botha et al., 2023)), and mocks the message behind it (BadddWolf?, 2022). This satirisation shows that, despite media coverage still discussing treatments and interventions, the younger generations online find these depictions inaccurate, even laughable.

Sedgewick et al. (2022) states that the advent of the internet has made it much easier for Autistic people to discuss the issues affecting them. The range of ways to connect with others such as blogs, articles, Twitter threads, and TikToks, gives Autistic people the option on how they would like to communicate these difficulties, and share their successes. Modern media, and social media in particular, have also allowed many non-speaking (non-verbal) people to have a voice, challenging the prominent rhetoric that speaks for them:

> *“Those of us who are ‘neurotypical’ may find it much easier to speak about, and ultimately speak for, someone who is not speaking; we think there is no fear of contradiction!” (Smukler, 2005, p. 21).*

Whereas previously, non-speaking has been equated to non-thinking (Rubin et al., 2001), non-verbal people can use other forms of media including text and images to express themselves. Although, there is still a long way to go to make technology accessible for everyone.

4.2 Crime and the Justice System

4.2.1 Perpetrators

In a study, 21% of Autistic respondents reported having been tricked or pressured into breaking the law, compared to 6% of not-Autistic controls (Griffiths et al., 2019). Autistic adults are at a higher risk of being cautioned and arrested by police (Griffiths et al., 2019) and Autistic people continue to be disproportionately over-represented in the criminal justice system. However, there is little evidence of the often-asserted over-representation of certain kinds of crimes (King & Murphy, 2014). The media often focuses on reporting crimes committed by those diagnosed with Autism, or suspected of being Autistic, which has led to this societal speculation of a link between Autism and crime, despite no solid evidence (Berryessa, 2014). Judges reported that the sensationalisation of crimes associated with Autistic people, particularly those described as being 'high-functioning', such as the Sandy Hook shootings, led to misleading media coverage, as well as a false association between being mentally ill with criminality, and being Autistic (Berryessa, 2014). This links in with the discussion at the beginning of this chapter on media representations and the dangers of inaccurate portrayals.

In regards to interactions with social workers, Autistic parents report their ability as a parent being called into question, with research showing they are four times more likely to have their ability to care for their child questioned by professionals than their not-Autistic peers (Griffiths et al., 2019). This is despite evidence that Autistic people who give birth are able, despite having many difficulties placed upon them, to put their child's best interests first, and act in the best interests of their child (Pohl et al., 2020). Much like parents were blamed for their children being Autistic, and therefore the issues they encountered accessing the world, Autistic parents are now often blamed for the issues their children encounter, or it is presumed their children will encounter due to their parents being Autistic. This shows a cycle of blame surrounding Autistic people, when a social model would suggest it is societies fault for not accommodating all of its citizens.

4.2.2 Victims

Griffiths et al. (2019) developed a 'Vulnerability Experiences Quotient' (VEQ), with the help of eight Autistic adults, which asked participants about 60 items across 10 domains. This quotient was conducted online and was found to have good internal validity (α= 0.89 [Autistic sample], α= 0.88 [not-Autistic sample]). The results from 694 (426 Autistic) participants found that, in addition to higher rates of anxiety and depression, Autistic people had higher rates of negative life experiences in all areas questioned, including domestic abuse, and financial hardship and exploitation. As many as nine out of ten Autistic women have experienced sexual violence (Cazalis et al., 2022); in the study by Griffiths et al. (2019) Autistic adults reported experiences of domestic abuse significantly higher than the not-Autistic controls, with questions such as 'my partner forced me into sexual activity,' being answered positively by 20% of Autistic participants, and 9% of participants. The authors hypothesised that the lack of research available regarding Autistic people's experiences of domestic abuse could be due to the assumption that romantic relationships are unusual for Autistic people, despite this not being the case, with 83% of Autistic people reported having had one (Griffiths et al., 2019).

Autistic participants were also more likely to have been scammed or been victims of 'mate crime', with 48% of Autistic participants being tricked or pressured into giving someone money or possessions, compared to 20% to not-Autistic people (Griffiths et al., 2019). As mentioned previously, Autistic women are also much more likely to have unwanted sexual experiences than their not-Autistic peers (Sala et al., 2020), and research suggests 90% of Autistic women have been victims of sexual assault (Cazalis et al., 2022). There is therefore a very real need to recognise Autistic people as being vulnerable to being the victims of crime, and to support the distribution of correct information regarding Autism, and how to support Autistic victims.

There are real life consequences of pervasive and persistent misinformation, as well as from the usage of debilitating metaphors to describe Autistic people (Waltz, 2008). One result of this 'metaphoric dehumanisation' of Autistic people has culminated, says Waltz, in cases of murder being euphemistically referred to, and condoned, as mercy killing (Waltz, 2008, p. 13). So-called 'mercy killings', particularly those committed by parents, are often not punished in the same way as other murders, because the victims are represented in ways that devalue them as human beings, making it easy to pity, and sympathise with, their carers (Waltz, 2008). Bottema-Beutel et al. (2021) identified Autism as a risk factor in 'altruistic filicide' ('mercy killings'), and Coorg and Tournay (2013) found that, between 1982 and 2010, 56% of filicide (murder of a child by a parent) victims in the USA were Autistic, despite only making up 1-2% of the population. In his 2008 book 'Autism's False Prophets', Offit (2008, p. 5) describes in some harrowing detail, children who were killed by their parents who had become 'frustrated beyond reason and sanity', perhaps providing a chilling example of this dangerous rhetoric behind the murders of Autistic children. Offit's own use of the term 'disease' to describe Autism as a phenomenon is also telling of the views abound at the time in which it was published (Offit, 2008). Semantic separation of Autism from the child has implications that are especially clear in the cases of filicide, says Bottema-Beutel et al. (2021), citing one case where a mother found guilty of killing her child claimed she was not killing the child, but the Autism (Sampier, 2008).

4.3 Autistic Health

Autistic people have poorer physical and mental health outcomes than their not-Autistic peers (Donaghy et al., 2023), and the average life expectancy of an Autistic person has been reported to be as low as 39 (Hirvikoski et al., 2016; Smith DaWalt et al., 2019). However, it is important not to misattribute physical health as a 'symptom' of neurodivergence (Donaghy et al., 2023), and instead focus on the impact of poor health on neurodivergent people in education and work settings, and the barriers they may face in getting support. Evidence that Autistic people are more likely to have health conditions in general is lacking, indeed, one study by Kapp et al. (2013) asked participants (n= 643 for this question) whether they had a medical condition, and the response was 43.5% and 37.5% in the diagnosed and undiagnosed Autistic conditions, but 56.1% in the not-Autistic condition. This, although an isolated study, suggests Autistic people are not more likely to report a medical condition than not-Autistic people, in fact the opposite may be true, although this should be treated with caution as it is a small sample comparatively.

In their study of the 20-year period from 1998-2018, Smith DaWalt et al. (2019) found that 6.4% of their Autistic sample died, at an average age of just 39 years old. In a much larger sample from Sweden looking at the years 1987-2009, Hirvikoski et al. (2016) saw an average life expectancy of only 53.87 years for Autistic people, with those labelled 'high-functioning' having an average of 58.39 years, and those labelled 'low-functioning' 39.50 years. This is compared to their control group who died at a mean age of 70.20 years (Hirvikoski et al., 2016). Given that none of the diagnostic criteria for Autism describe life-limiting physical symptoms (American Psychiatric Association, 2013; World Health Organisation, 2018), this is deeply worrying. There is no underlying heart defect, or breathing problem associated with being Autistic, and diagnosis is based entirely around behaviour and social development. Why then is the life expectancy nearly 40 years below the average for many countries[7]? There are two potential routes to take when looking at explanations for this: internal and external factors.

Internally, co-morbidity with other conditions must be considered; although this views Autism as a medical condition which is also problematic in many ways, as will be discussed in the following chapter. However, research into the rates of co-morbid conditions, and the cause/consequence debate surrounding them (see Figure 6), is still ongoing. For example, Tye et al. (2018) reported that at least 10% of Autistic children have a comorbid medical condition or conditions requiring formal evaluation, but Tuchman and Cuccaro (2011) state that 20% of Autistic children have epilepsy, and that 20% of epileptic children are also Autistic. These rates change based on whether the person is considered to have an 'intellectual disability', however. Doshi-Velez et al. (2014) identified four sub-groups of co-morbidities in Autistic children in their study. Firstly, those that experiences seizures, then those with multi-system disorders (including gastrointestinal issues, auditory disorders, and infections), thirdly, a group experiencing psychiatric disorders, and lastly one group that remained unresolved. Epilepsy could be considered a contributing factor in the high mortality rate in the Autistic community; however, the statistics do not necessarily support this. In a meta-analysis of 24 studies between 1963 and 2006, 21.4% of Autistic people 'with an intellectual disability' were epileptic, compared to 8% without (Amiet et al., 2008). Although, as illustrated in this chapter, there has been much change in the diagnosis for Autism since 1963. As people with a diagnosis of epilepsy can have a reduction in life expectancy of between 2 years (idiopathic/cryptogenic epilepsy) and 10 years (symptomatic epilepsy) (Gaitatzis et al., 2004), therefore the extent to which the reduction in life expectancy of Autistic people is due to the co-morbidity with epilepsy is questionable.

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[7] In the UK, the average life expectancy is currently around 80 years. See: Office for National Statistics. (2022b). *National life tables – life expectancy in the UK: 2018 to 2020*. https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/lifeexpectancies/bulletins/nationallifetablesunitedkingdom/2018to2020

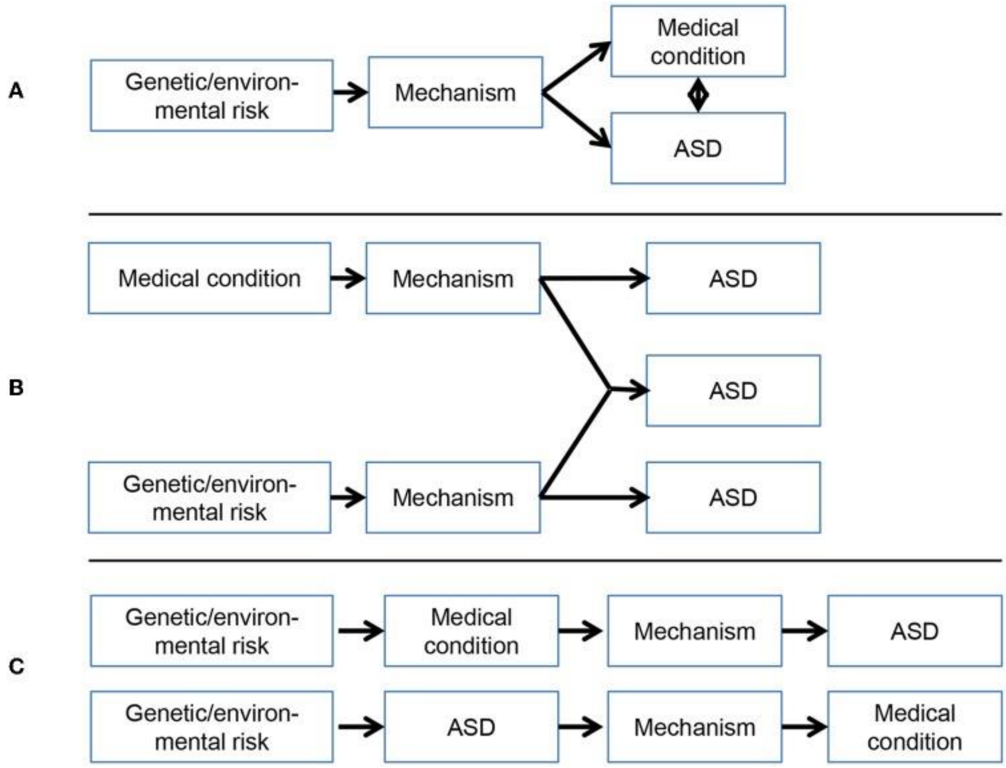

Figure 6: ‘Possible models of the association between medical conditions and ASD’[8], from Tye et al. (2018).

A variety of medical disorders are more prevalent in Autistic people; two of the most commonly mentioned are those relating to sleep and gastrointestinal problems. Sleep problems affect somewhere between 50-80% of Autistic people, compared with 9-50% in ‘typically developing’ people; these issues can include insomnia and parasomnias (Tye et al., 2018). Gastrointestinal problems became more associated with Autism after the fraudulent paper by Andrew Wakefield and colleagues (Wakefield et al., 1998), and to this day, special diets are recommended for Autistic children by some ‘experts’, although there is no evidence that these work in relieving gastrointestinal issues in those without intolerances, or, indeed, reducing ‘Autistic’ symptoms (Tye et al., 2018). They also can have unintended negative consequences. The statistics for rates of those experiencing gastrointestinal issues are massively inconsistent, with estimates between 9% and 91% of the Autistic population reportedly having them (Tye et al., 2018). This incredibly large difference across studies illustrates the limited extent to which this topic is understood at present. Although, as 27% of Autistic people experience food selectivity (Tye et al., 2018), this external influence (external though related to Autism) could be argued to be behind a large number of problems relating to the gut and bowel. It should be noted that Tye et al. (2018) and others focus predominantly on children in their studies, excluding potential data from Autistic adults. This is salient, as many food-related issues in childhood may be experienced differently, or disappear altogether, once the individual has control over their own diet and understands their body better.

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[8] Note that none of these flow charts start with ASD at the beginning of the chain, the assumption being that Autism is ‘acquired’ rather than an innate neurological difference.

Externally, one must consider reasons not genetically imposed on the Autistic person for this early mortality. Mortality ratios of Autistic persons are over twice that of the general population (Tye et al., 2018), but the odds ratio of suicide in Autistic people is 7.55 compared to the general population (Cassidy et al., 2014; Hirvikoski et al., 2016). In their study of negative life experiences of Autistic people, Griffiths et al. (2019) found that in a sample of 426 people, 64% had self-harmed, 60% had made suicide plans, and 41% had made a suicide attempt. They reported that very few Autistic adults had good social support networks. Viewing suicide as a social problem, inherently consequential of society and societal circumstances (Mueller et al., 2021), suggests that this high rate of suicide within the Autistic community is indicative of the difficult situations many Autistic people find themselves in. Autistic people show higher rates of anxiety, depression, and substance disorders (Posar & Visconti, 2019), and are significantly more likely to report suicide plans and attempts, with 66% self-reporting suicidal ideation (Cassidy et al., 2014). In their study of 200 Autistic adults aged 18-67 (mean 38.9, SD 11.5), Camm-Crosbie et al. (2019) found that 90.4% of participants had a mental health diagnosis, mostly diagnoses of depression and anxiety. Furthermore, 83.2% were currently, or had previously, received treatment for suicidality (Camm-Crosbie et al., 2019). Hirvikoski et al. (2016) states that 'high-functioning' Autistic people are more at risk of suicide than 'low-functioning' Autistic people, but that both had a higher risk than the controls. Camm-Crosbie et al. (2019) found that 'high-functioning' Autistics, and those with diagnoses of Asperger's syndrome, were more likely to be dismissed for mental health treatment as they were viewed as 'coping'. Higher rates of suicide among the Autistic population have been attributed to a 'lack of coping skills' by some, although more likely are the reported lack of social networks, reduced overall life satisfaction, and the effect of camouflaging Autistic traits (Cassidy et al., 2014; Cassidy et al., 2020; Hirvikoski et al., 2016). Cassidy et al. (2020) found that camouflaging Autistic traits was associated with an increased risk of lifetime suicidality. Camouflaging and masking as phenomena will be explored further in Chapter 5.

Further reasons suggested for poor mental health outcomes in Autistic adults have been: the lack of professionals' understanding, long waiting lists, lack of funding, Autistic people not being listened to or believed, and Autism support being geared towards children rather than adults (Camm-Crosbie et al., 2019). All areas of health and wellbeing are important when considering Autistic people, and one area not studied until recently is that of Autistic maternity care. Grant et al. (2022) found that there was an urgent need for maternity and infant feeding services to accommodate the needs of Autistic mothers and birthing people. This includes in both service design, and staff training, so that all professionals involved in the process are fully informed about the wishes of the Autistic person (Grant et al., 2022; Quinn, 2021). This is particularly important as, as Grant et al. (2022) investigated, Autistic people face additional barriers to breastfeeding and birth compared to not-Autistic people. In their study of 355 Autistic, and 132 not-Autistic (all of whom had at least one Autistic child) people who had given birth, Pohl et al. (2020) found that Autistic people were more likely to experience pre and post-partum depression, and were more likely to report not being understood by professionals. It is therefore essential to invest in training for health and social care providers on Autistic health, and the common barriers they may face. Some neurodiversity-affirming resources have been created in recent years, such as ‘Autistic and Expecting’ (Quinn, 2021), but there is no doubt there are many areas still to explore in regards to Autistic people and their health experiences.

4.4 Gender Identity and Sexuality

Research has shown that Autistic people are more likely to identify within the LGBTQ+ community than their not-Autistic peers, with increased diversity and dysphoria in gender and identity within the Autistic community, and although this is a much more recent area of research, there is substantial evidence to support this (Sala et al., 2020). Exact rates of those identifying as not cis-gender (with the gender they were assigned at birth based upon their sex) differ across studies, potentially because of misunderstandings between sex and gender. Warrier et al. (2020) looked at the results of five independently recruited cross-sectional data sets with 641,860 participants in total. They found that transgender and gender divergent people were 3.03 to 6.36 times more likely to be Autistic than the not-Autistic participants (controlling for age and educational attainment). However, the largest data set (n= 514,100) had three options for its participants: male, female, and transgender, the question also asked for participants’ ‘sex’, not their ‘gender’. This is problematic as the two mean very different things, showing a lack of understanding on behalf of the researchers. Not only did the two main datasets originally ask for participants’ sex and not gender, and do not record gender separately, but even within the manuscript collating the datasets, the two are conflated (Warrier et al., 2020). This author therefore believes that the percentage of Autistic people who identify as not cis-gendered may be even higher than suggested in these studies, due to participants answering their sex assigned at birth on the ‘sex’ question, when their gender was not asked for. Furthermore, many transgender people do not see their gender as ‘transgender,’ but merely as male or female, as this is the gender they identify with; they may have then answered this question with the gender they are now, rather than the one assigned to them associated with their ‘sex’ at birth. Additionally, ‘transgender’ does not cover the many diverse identities that people may use to describe their gender: ‘non-binary’ and ‘gender-fluid’ are two such common examples. Many transgender and gender divergent people may have therefore been missed in these studies on gender identity and Autism. For the study conducted in this thesis, the researcher asks for participants ‘gender,’ and allows participants to self-describe in a free text box if the male or female options do not apply. Another example of where the gender identity of participants was not recorded correctly, is the study undertaken by Baron-Cohen and colleagues, where they examined the experiences of ‘Autistic and non-Autistic mothers’ (Pohl et al., 2020). The title of the study: ‘A comparative study of Autistic and non-Autistic women’s experience of motherhood,’ refers to the experiences of women, however, as can be seen from their participants, 5% of their Autistic sample, and 2% of their non-Autistic sample, did not identify as female.

In terms of sexual orientation, George and Stokes (2018) stated that 69.7% of their Autistic sample (n= 309) reported a non-heterosexual orientation, compared with 30.3% in the ‘typically developing’ comparison group (n= 310). In an online survey of 2386 adults (1183 Autistic) aged 16-90 years old, Weir et al. (2021) found that Autistic people were less likely to be heterosexual than their Autistic counterparts. Furthermore, ‘risky’ or ‘premature’ sexual experiences were not more prevalent in either group, as the age of sexual activity onset, or the rate of contraction of STIs did not differ between neurotype conditions. However, Autistic women are much more vulnerable to having unwanted sexual experiences than Autistic men or not-Autistic women (Sala et al., 2020), with evidence suggesting 9 in 10 Autistic women have been victims of sexual violence (Cazalis et al., 2022), a particularly shocking figure which will undoubtedly have an impact on healthy sex and relationships in the lives of Autistic women.

4.5 Conclusion

This brief chapter aimed to consider the ways in which the world interacts with neurodivergence. This includes the ways neurodivergence, specifically Autism, are portrayed in popular media and imagery from organisations involved with Autism. When looking at interactions more generally, a bidirectional approach is necessary to gain understanding of the whole picture, and therefore of salience are not only the interactions most obvious at first glance: speech, eye contact, gestures etc., but also the interactions the world reciprocates, in terms of attitudes, care, and safety. We have explored in this chapter how Autistic people are portrayed in the media, and how their healthcare needs and outcomes differ from not-Autistic people. These are all ways in which the world interacts with Autism, and when considering any neurodiversity model, where one considers neurodifference a natural and positive human variation, these factors are therefore of great importance.

5 Information Transmission and Autistic Communication

The ways in which we communicate are incredibly diverse and variable. Many consider information transmission to refer solely to oral speech; however, transmission can take place in nonverbal, written, pictorial, or sensory forms also. This chapter will cover some ways information is transmitted, and the ways that this has been measured. The concepts of imitation, innovation, and emulation will be explored, as well as how rapport between social actors is judged. There exists a gap in research investigating Autistic-Autistic interactions (Heasman & Gillespie, 2019a), and this, as well as ideas of neurotypical assumptions about sociality, will be discussed. This chapter will also consider Autism from a social constructivist and post-colonial perspective, and look at how information transmitted using Western norms can be mistaken for 'neurotypical' interactions. It will consider to what extent the Autistic diagnosis is based upon colonialised ideas of what is 'normal' and socially acceptable in terms of information transmission, and what other possible explanations there are for certain social behaviours, such as reduced eye contact, or prolonged silences in speech.

As much of Autism research is deficit based, and defined by those in positions of power (Grant & Kara, 2021), the benefits and positive outcomes of Autistic interactions are severely understudied. The concept of 'mindblindness' and a lack of a theory of mind (the inability to read others' emotional states) will be introduced here, as it is often attributed as a cause for the difficulties Autistic people face. Despite some suggestions otherwise, Autistic people are not necessarily less expressive, sometimes even more so (Sheppard et al., 2016). Furthermore, higher levels of adaptability have been found in Autistic people, due to their enhanced ability to generate new neural pathways, with hyperplasticity potentially contributing to creative problem solving (Grant & Kara, 2021). These differences can be studied from a neurodiversity-based perspective to see how neurodivergent ways of communication can be seen from a positive light. Here will be introduced the authors own description of an 'Autistic theory of mind' to counter the deficit view proposed in the medical model. This chapter therefore focuses on the third and fourth concerns of this thesis:

C. *How Autistic communication is conceptualised within models of difference and disability*
D. *Neurotype-specific interactional and communication differences.*

5.1 A Note on Essentialism

Barker (2020) interviewed Simon Gibbs, who argued that the education system relies upon locating young people into groups, as example of essentialism. Haslam and Whelan (2008) define essentialism in this context as the belief that a social category is unalterable, and highly informative. Quite different from essentialism, many acknowledge that Autism is a social construct, a constructed label to describe human variety (Smukler, 2005). While most of our social constructs might strike us as self-evident, social representations actually change significantly over time (Smukler, 2005), as the description of how the diagnosis of what is now Autism has changed in Chapter 2 illustrates. However, inferring that a group has an internal property is in not in and of itself essentialist thinking, but it becomes so when said property is seen as deep-seated, unchanging, and responsible for the groups' observable attributes (Haslam & Whelan, 2008). This chapter will identify some Autistic communication characteristics that have been studied, and include some positive traits that are common across the Autistic community. This does not aim to be essentialist in its depictions, as generalisations to the whole Autistic community have been avoided, as have any implication of blaming these attributes for any difficulty experienced by Autistic people.

5.2 Baron-Cohen's Mindblindness, and Theory of Mind

> *"Mind reading, like many other mental abilities, has evolved further in humans" (Baron-Cohen, 1997, p. 65).*

Being less evolved therefore, is being unable to read minds? Baron-Cohen states that 'tragically' Mindblindness is not 'a piece of science fiction' but here with us today, within Autistic people (Baron-Cohen, 1997, p. 62). If deficit-orientated approaches are viewed as dehumanising (Smukler, 2005), surely suggesting Autistic people are less evolved falls under this category.

Baron-Cohen proposed the 'mind blindness' hypothesis of Autism, characterising Autism as the inability to take into account the perspectives of others during an interaction (Baron-Cohen et al., 2000). In his 1995 essay on the topic, he describes a 'terrifying' and sensationalised account of what it may be like to 'suffer from Mindblindness' (Baron-Cohen, 1995, p. 5). He warns us that 'Autism is considered the most severe of all the childhood psychiatric conditions. Fortunately, it occurs only rarely' (Baron-Cohen, 1995, p. 60). He proposed that the functional deficits associated with Autism involve a central impairment in the ability of a person to construct a 'Theory of Mind': the recognition of others' beliefs, thoughts, knowledge, desires, and intentions (Berenguer et al., 2018). The concept referred to as 'Theory of Mind' was first discussed in 1978 by Premack and Woodruff, two primatologists in Pennsylvania, who questioned whether the chimpanzee has a theory of mind. Here they described theory of mind as the ability to 'imputes mental states to himself and others' (Premack & Woodruff, 1978, p. 515). They consider, in their conclusion, whether this theory of mind may be deficient in 'retarded children' (Premack & Woodruff, 1978, pp. 525-526). So-called 'tests' for 'Theory of Mind' have been developed over the years and primarily include deception tasks, in particular the 'Sally-Ann Test' (Baron-Cohen et al., 1985). The Sally-Ann test is an example of a false belief task; participants are presented with a problem: Sally has a marble in her basket, she leaves the scene and her marble is moved, by

Ann, into Ann's box. Participants are then asked, where will Sally look for her marble? The assumption being that if Sally has left the scene during the transfer, she will not know her marble is now in Ann's box, and will therefore look in her own basket. Other examples of false belief tasks include a Smarties tube filled with pencils: the experimenter asks the participants what a third person would think was in the tube, the assumption being that a third person would not know the tube did not contain Smarties. A 'pass' for this test would be stating that Sally would look where she had originally placed the marble, or that someone would assume the tube contained smarties. A 'fail' would be stating where the marble actually was, or what the tube actually contained.

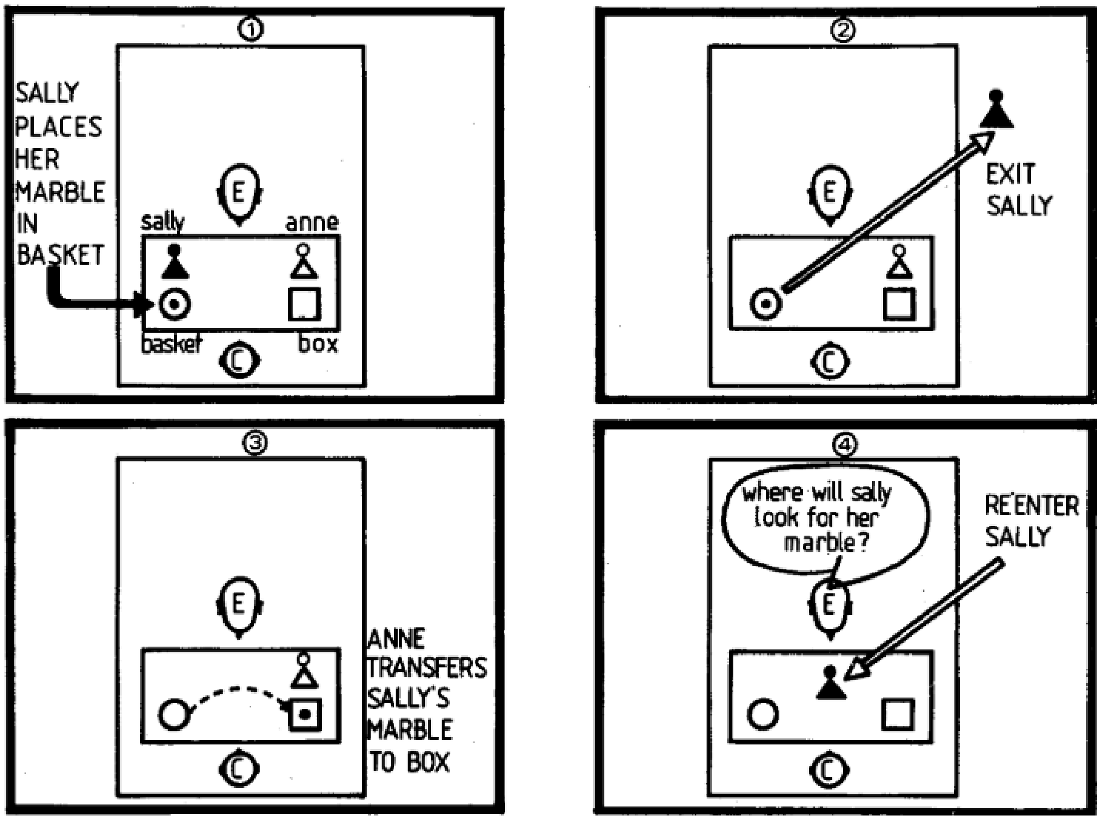
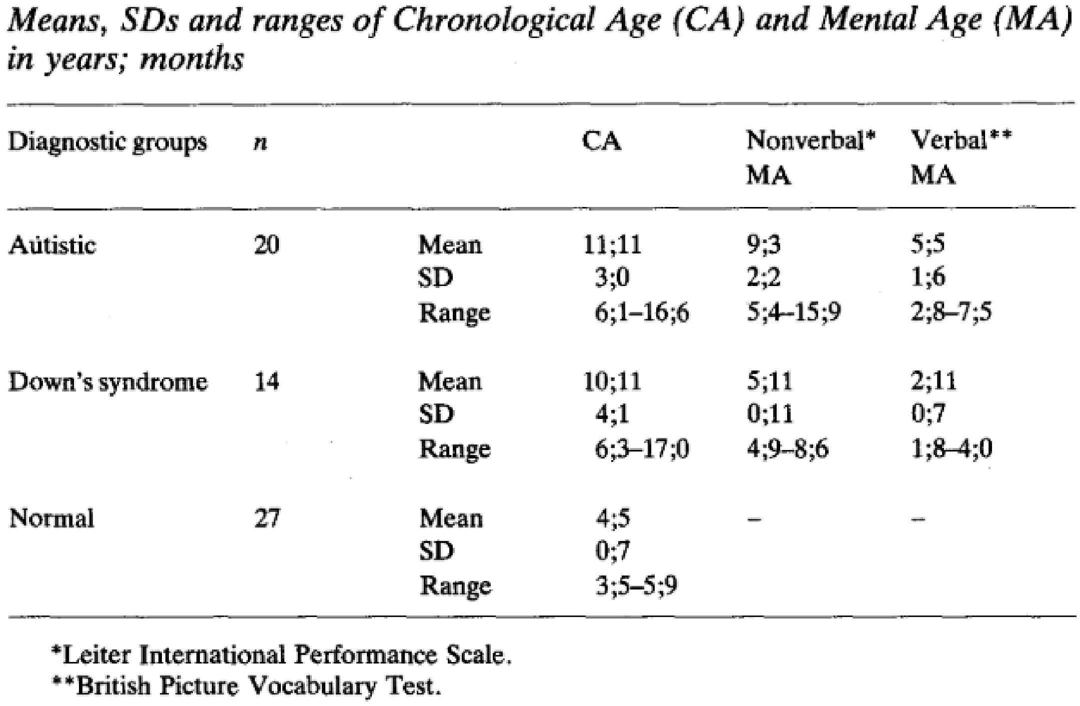


Figure 7: Experimental Set-Up for Sally-Ann Test, from Baron-Cohen et al. (1985, p. 41)

In the 1985 study, 20 Autistic children (as diagnosed according to the criteria set out by Rutter (1978) which included Kanner's syndrome and infantile psychoses), 14 children with Down's syndrome, and 27 'clinically normal' children (Baron-Cohen et al., 1985, p. 40). These three populations, grouped into the 'normal group' and the 'handicapped group' (p.40) were not matched for chronological age, as can be seen in the table, and the 'clinically normal' children were not subjected to the same tests for mental age that the diagnosed children were. All participants were presented with the Sally-Ann Test; 23 out of 27 'normal' children passed the test, 12 out of 14 children with Down's syndrome passed, and 4 out of 20 of the Autistic children passed.



Means, SDs and ranges of Chronological Age (CA) and Mental Age (MA) in years; months

Diagnostic groups	*n*		CA	Nonverbal* MA	Verbal** MA
Autistic	20	Mean	11;11	9;3	5;5
		SD	3;0	2;2	1;6
		Range	6;1–16;6	5;4–15;9	2;8–7;5
Down's syndrome	14	Mean	10;11	5;11	2;11
		SD	4;1	0;11	0;7
		Range	6;3–17;0	4;9–8;6	1;8–4;0
Normal	27	Mean	4;5	–	–
		SD	0;7		
		Range	3;5–5;9		

*Leiter International Performance Scale.
**British Picture Vocabulary Test.

Figure 8: Demographics of participants from Baron-Cohen et al. (1985)

In their many subsequent works, the authors of the Sally-Ann Test argued that an absence of a 'Theory of Mind' is at the heart of what Autism is (Smukler, 2005), and that this can be demonstrated by failing the Sally-Ann Test, or a similar false belief task (Charman & Baron-Cohen, 1992; Frith, 1991b; Leslie & Frith, 1988). Everything from difficulties interacting and communicating, to having intense areas of interest, have been constructed to be as a result of this specific neurologically based deficit (Baron-Cohen, 1990, 1995; Smukler, 2005). This is therefore an example of a 'core-deficit' model, which, in the case of Autism, has been debunked by Happé et al. (2006), with authors such as Astle and Fletcher-Watson (2020) calling it reductionist. However, the reliance on a single task, measuring a core-deficit, to explain an entire phenomenon such as Autism, is still remarkably present (Astle & Fletcher-Watson, 2020). The false belief test remains a popular example to explain why Autistic children are different from 'normal' children. The authors of the Sally-Ann Test even developed an adult version of the task, which involved reading emotions from images of people's eyes alone (Baron-Cohen et al., 1997; Baron-Cohen et al., 2001a; Baron-Cohen et al., 1999). This was described as: 'Reading the mind in the eyes' and compared 'normal adults' with Autistic adults[9] (Baron-Cohen et al., 2001a). All of the pictures in the task are of Caucasian adults (Vellante et al., 2013). This is a very different task to the false-belief tasks they assigned to children, and yet is claiming to be measuring the same phenomenon. The assumption being that if you can read someone's face, specifically their eyes, you can tell what they are thinking. In their 1999 paper, their sample size was three Autistic people: a mathematician, a physicist, and a computer scientist, and fourteen not-Autistic controls

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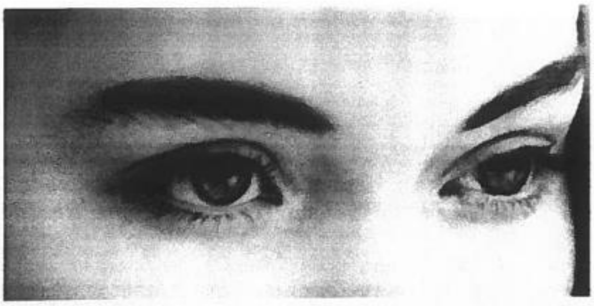
[9] Baron-Cohen, S., Wheelwright, S., Hill, J., Raste, Y., & Plumb, I. (2001a, 2001/02/01). The "Reading the Mind in the Eyes" Test Revised Version: A Study with Normal Adults, and Adults with Asperger Syndrome or High-functioning Autism. *Journal of Child Psychology and Psychiatry, 42*(2), 241-251. https://doi.org/https://doi.org/10.1111/1469-7610.00715

(Baron-Cohen et al., 1999). One of the criticisms Astle and Fletcher-Watson (2020) brought against core-deficit studies was their highly selective inclusion and exclusion criteria for participants, something which can be seen here and in many of the Theory of Mind studies.



(c) REFLECTIVE vs. Unreflective.

(d) SYMPATHETIC vs. Unsympathetic.

Figure 9: Example Stimuli from the Eyes Test, from Baron-Cohen et al. (1997)

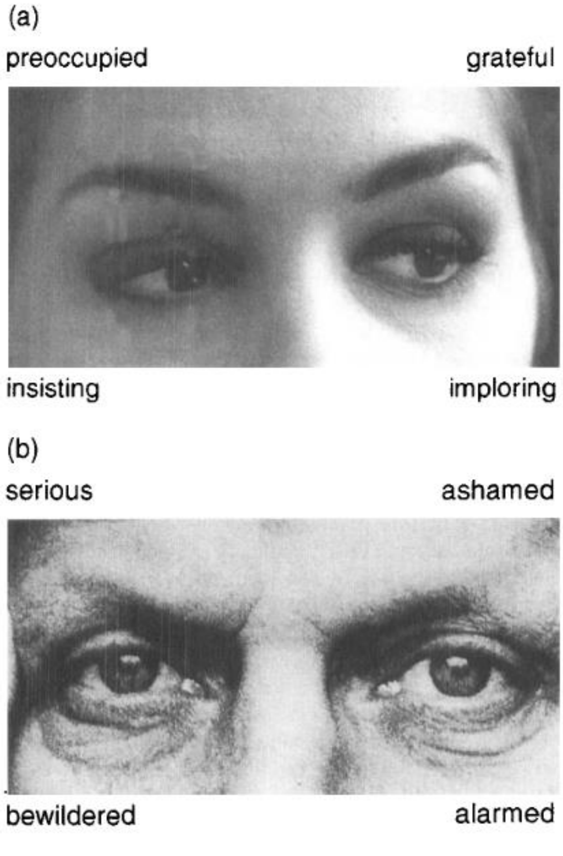


Figure 10:Part of the 'Reading the Mind in the Eyes' Test (Revised), from Baron-Cohen et al. (1999)

There are many critics of the Theory of Mind hypothesis. Fletcher-Watson et al. (2014) conducted a review on interventions for Autistic people based around the Theory of Mind model, and found the evidence to support such a model graded as either 'low' or 'very low' in quality. Their review, which studied twenty-two randomised control trials, varied based on country of origin, sample size, participant age, intervention delivery type, and outcome measures, looked at the efficacy of interventions based upon the theory of mind hypothesis for Autistic people. Despite these studies using a high-quality basic methodology (randomised control trials), the authors had concerns over poor study design and reporting (Fletcher-Watson et al., 2014). For example, there was no evidence of the skill being taught in the interventions being generalisable to new contexts, or of the skill being maintained over time.

Furthermore, this author questions the validity of the research when participants vary so much in age, not only in the original 1985 study by Baron-Cohen et al., but also in the similar 1992 false belief test by Charman and Baron-Cohen. As can be seen, not only were some of the Autistic and 'mental handicap' participants actually *adults*, the age range is significantly above that of the 'control' group, who were also not subjected to verbal and non-verbal mental age tests.

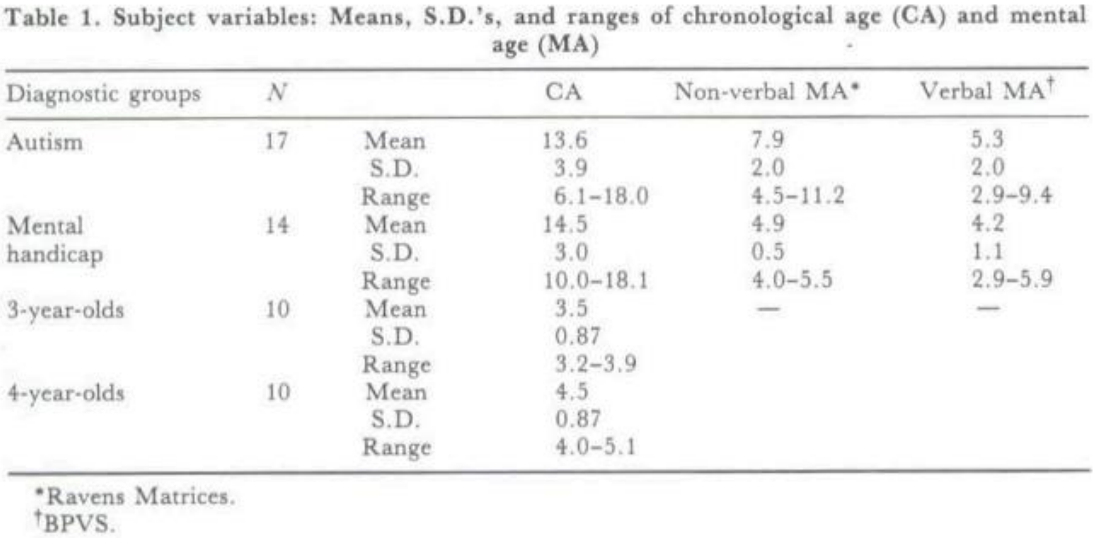


Table 1. Subject variables: Means, S.D.'s, and ranges of chronological age (CA) and mental age (MA)

Diagnostic groups	*N*		CA	Non-verbal MA*	Verbal MA†
Autism	17	Mean	13.6	7.9	5.3
		S.D.	3.9	2.0	2.0
		Range	6.1–18.0	4.5–11.2	2.9–9.4
Mental handicap	14	Mean	14.5	4.9	4.2
		S.D.	3.0	0.5	1.1
		Range	10.0–18.1	4.0–5.5	2.9–5.9
3-year-olds	10	Mean	3.5	—	—
		S.D.	0.87		
		Range	3.2–3.9		
4-year-olds	10	Mean	4.5		
		S.D.	0.87		
		Range	4.0–5.1		

*Ravens Matrices.
†BPVS.

Figure 11: Table of demographics from study by Charman and Baron-Cohen (1992)

Moreover, Theory of Mind is an example of a unifying theory, however, as Smukler (2005) explains, Autistic people are much more likely to describe Autism as individual and diverse, unable to be described by one unifying, deficit-based theory. Said unifying theory is a broad concept: the idea that Autistic people cannot understand others; however, it is evaluated in an exceptionally narrow and particular way: through false belief tasks. This disparity between a large idea of one specific Autistic deficit, and the minor task-based experimental design that has been reused by many, shows a huge amount of generalisability and lack of understanding of what it means to be Autistic.

Further criticisms of the theory of mind model include Leveto (2018) who argues that it is oversimplified, and Gernsbacher and Frymiare (2005) who are critical of the method of testing such a phenomenon. To test ones 'theory of mind', linguistic ability must also be tested, which conflicts with the fact that impairment in communication is one of the primary diagnostic criteria for Autism, Gernsbacher and Frymiare (2005) argue. Additionally, over 50% of Autistic people succeed in theory of mind tasks, therefore a deficit in such a phenomenon would not characterise Autism, even if the measurement was valid (Gernsbacher & Frymiare, 2005). The adult test for theory of mind is also highly problematic. If Autistic people find direct eye contact uncomfortable, then this test, requiring them to look directly at someone's eyes, deliberately discriminates against its Autistic participants.

5.3 Autistic Theory of Mind (ATOM) and the Double Empathy Problem

The idea that Autistic people lack a 'Theory of Mind', and thus need educating in it, has been perpetuated by the creation of resources such as Howlin et al. (1999) 'Teaching Children with Autism to Mind-Read', and Ordetx (2018) 'Teaching the Basics of Theory of Mind'. These resources suggest to educators that Autistic children lack empathy (Baron-Cohen, 2010), and the ability to interact with others in a standard way, and therefore can be taught the 'correct' methods for doing so. This is challenged by the 'Double Empathy Problem' as set forth by Milton (2012). In his seminal work, Milton suggested that Autistic people do not lack the ability to act 'normally' in social situations, they merely behave in a different manner to not-Autistic people. Equally, while Autistic people struggle to understand not-Autistic people, the reverse is also true. Therefore, he hypothesised, the problem lies not with the Autistic people, but with the mismatch of neurotypes of those interacting, and a lack of reciprocity due to these differences (Milton, 2012). This has been backed up by empirical studies such as that by Komeda (2015) who found that Autistic people empathised with characters similar to themselves, in that they were also Autistic. They also found that 'typically developing' participants also empathised with those similar to themselves: those not having an Autism diagnosis.

The author of this thesis proposes that if Autistic people are considered to lack a 'Theory of Mind' (TOM), then, employing the double empathy model, not-Autistic people lack an 'Autistic Theory of Mind' (ATOM) (Axbey, 2019b). Interventions to help not-Autistic people with this difficulty have been proposed before, though without using this exact terminology:

> *"Perhaps programmes of intervention should focus not only on helping people with ASD to understand others' minds but should also focus on helping those who frequently encounter people with ASD to improve their ability in interpreting the behaviour of those with ASD" (Sheppard et al., 2016, p. 1253).*

Sheppard et al. (2016) asks how well not-Autistic people can interpret Autistic peoples' mental states. By assuming a norm, not-Autistic people assume everyone is like them, showing a lack of theory of mind (Blackburn et al., 2019), and an unawareness of the neurodiversity that exists in the world. In two of their studies, Heasman and Gillespie (2018, 2019b) found that not-Autistic people over-estimate how helpful they are towards Autistic people, as well as overestimating how ego-centric their Autistic family members are. This is a good example of the double empathy problem in action, and these findings shed light on the real-world difficulties in the interactions between Autistic and not-Autistic people that can affect the mental health, wellbeing, and self-esteem of Autistic people (Crompton et al., 2020a). Understanding that a mismatch of neurotypes leads to misinterpretations of intent by both Autistic and not-Autistic people could help to heal divisions and relationships under stress due to this lack of reciprocity.

The concepts behind the double empathy problem are not limited merely an 'Autistic versus not-Autistic phenomenon' however; studies have found that highly extroverted participants show greater empathy for extroverted characters, and that the same is true for neurotic participants and neurotic characters (Komeda et al., 2013). Furthermore, extroverted participants show this greater level of empathy towards the extroverted characters in a story by judging the outcomes of said characters more rapidly than their less extroverted counterparts (Komeda et al., 2009). In their study of 69 Japanese speakers studying at Kyoto University, Komeda et al. (2009) constructed four stories, two with an extroverted protagonist, and two with an introverted one. The benefit of conducting this study in Japanese was that subjects are often omitted from sentences; therefore, the stories could be read with the protagonist as either 'I' or 'you', leaving the reader able to interpret the story in two possible ways. After each story they were asked to rate the emotions of the protagonist using a seven-point scale. In the case of extraverted protagonists, the extroverted participants rated much higher positive emotions, whereas less extraverted participants highly rated negative emotions (ibid). This demonstrates that predictability and understanding between people, or from a person to a fictional character, is highly dependent on their similarity to said person or character. Within their discussion of these findings, Komeda et al. (2009) reference Baron-Cohen's 'theory of mind' as a reason for these particular empathies. However, this author believes there are more parallels to the idea of double empathy, as the degree to which participants identified with the character was dependent upon their own characteristics: whether they were introverted or extroverted. This suggests a disjuncture in reciprocity between these two groups, a hallmark of the double-empathy theory.

5.4 Autism as a Western Phenomenon

Post-colonial studies of disability, those that consider the impact of colonisation on oppressed countries, cultures, and ideas, often see intersectionality at the core of culturally specific ideas about identity and belonging, and how they shape disability experiences (Barker & Murray, 2010). Western ideas of what it means to be disabled dominate discourses, and the concept of intersectionality playing a part in disabling people is often not considered. McRuer (2010) uses the earthquake in Haiti to exemplify this intersectionality related to post-colonial studies, as they state that the disabilities caused by the natural disaster were immovably entangled with the economic relations and cultural discourses which themselves are a legacy of colonialism in Haiti. When considering models of disability, it is therefore imperative to remember where they originated, and the colonial history behind them.

It is important to note that ideas of Autism and social communication difficulties are deeply embedded within the Western doctrine. The example of eye contact is a obliging one in this case; a commonly associated 'symptom' of Autism, lack of eye contact is often used to portray that a person is Autistic through film and media (Sarrett, 2011). Among psychologists who diagnose Autism, a lack of direct eye contact between the individual and the speaker is seen as so different from the norm, that is requires inclusion in a diagnosis of a disability. However, among some communities, such as the Navajo Nation in North America, making eye contact with someone while they are speaking is seen as rude, and a deliberate attempt to make the speaker uncomfortable (Connors & Donnellan, 1993). This is not an isolated example, the Gusii of Kenya also maintain far less eye contact, and historically in China, direct eye contact was seen as rude and arrogant (Jaswal & Akhtar, 2019; Zhang et al., 2006). Further research could be done on perceptions of eye contact across cultures, and whether these cultures also associate different, or lack of, eye contact with Autism.

Many assume that eye contact is essential for the healthy development of children, however, research has shown that eye contact can cause overstimulation, and in some cultures, caregivers consciously avert their eyes to lower the heart rates of babies who are overstimulated (Dixon et al., 1981; Field, 1981). We do not assume that the Navajo Nation, or the Gusii of Kenya, or historic inhabitants of China, are all Autistic because of these preferences to avoid direct eye contact. And yet, when apparent in people, it is assumed as so much of an oddity as to warrant a diagnostic status. In their study, Klin et al. (2002) found that there was no relation between the time spent looking at the eyes of the actors, and social competence. They did, however, find a link between time spent looking at the mouths of the actors, and higher social competence (Klin et al., 2002). This would follow logically, as what someone is saying comes out of their mouth, and therefore, through lip reading, we can ensure we correctly gauge what they are saying.

Certain social situations can be interpreted differently depending on the cultural norms of the observer. Bartlett (1932) noted how some Swazi people viewed English policemen as particularly friendly because the way that the policemen stopped traffic was similar to how the Swazi would greet each other (Wagoner, 2017a, 2017b). Bartlett, writing from a colonial mindset (Wagoner, 2017a, 2017b), framed many of his findings as evidence of deficiencies in the Swazi people, viewing them as having few interests, leading to them having more detailed recall methods (Bartlett, 1932). A double-empathy theory informed view of these interactions would say that the Swazi people were not wrong about the policemen's actions, as, in Swaziland (now Eswatini), they would be correct that this action was a greeting: it is about the *context* of the action, of which only the social actor themselves can be the expert. Bartlett omitted the words of many of his participants (Wagoner, 2017a), but his finding that they produced more detailed recollections surely shows an *effective* system of remembering, not a deficit in social understanding.

The Western desire to define difference by deficit theory is so deeply intrenched in our society that we may fail to see the alternatives. In their study of the Navajo Nation in North America, Connors and Donnellan (1993) wrote that differences in social behaviour are observed within communities, but that they are treated very differently to those subjected to the Autistic interventions with which we are familiar. Within these communities, people are not removed or re-educated if they display less than desirable behaviours, as the idea of forcing a person to conform to community standards of appropriateness is seen as far more distasteful than merely tolerating the behaviour (Connors & Donnellan, 1993, p. 273). Here, we see an alternative view of social difference, and an example of how the Western doctrine dominates the literature on Autism and what it means to behave 'appropriately'. However, while decolonising our ideas of normality within what is considered disability studies, it is important to consider that the social model itself needs decolonising; as transforming environments through minority activism, the removal of barriers, and the implementation of universal design, has been labelled by some as being insensitive to post-colonial ideas of accessibility and disability (Barker & Murray, 2010). Decolonising Autism, and the social model of disability, can therefore only happen with the full support of the communities and people traditionally excluded or misrepresented.

5.5 Intersectionality and Autism

Autism is marked in people most notably through differences in social communication and information transmission style; when diagnosing, professionals take into account any difficulties the person experiences in making friends, following authority, or getting on with others (see Chapter 2 for diagnostic criteria changes over the years). However, these factors cannot be studied in isolation to each other, many factors can impact how a person interacts with the world, and this is where intersectionality is vital in understanding how Autism, and disability in general, are constructed.

Intersectionality is defined as acknowledging that the identifying features of a person, for example their sex, gender, ethnicity, or disability, do not exist alone, but interact and intersect in complex ways that impact upon individual experience, most notably to increase marginalisation and/or discrimination (Cascio et al., 2020; Crenshaw, 1989). The exclusion of those from marginalised subgroups in regards to Autism research leaves large gaps in the usage of inclusive terminology, accessible communication strategies, and the researcher's commitment to travel to meet participants (Cascio et al., 2020). This is a benefit of moving into the digital age, in that, hopefully, with the internet and translation software being more available, researchers can access those who were historically not included in studies.

Through efforts to decolonise disability studies, the impacts of colonialism are beginning to be seen throughout models and assumptions made by academics in the Western world. Post-colonialism challenges the suitability of the analytical tools that researchers apply to global descriptions of, and research into, disability (Barker & Murray, 2010). The example described by McRuer (2010) of the Haiti earthquake, and the disabilities resulting from that being intertwined inextricably with Haiti's history of colonialism, show how deep the legacy of colonialism goes, and how important it is to consider intersectionality in disability studies.

5.6 Silences

Social encounters where the primary goal is conversation provide people with one of the hardest tests of social and communicative competence (McLaughlin & Cody, 1982). Conversation needs to involve turn taking to be considered 'conversation', a phenomenon which is described as a 'prominent type of social organisation' (Sacks et al., 1974, p. 696). During these situations, people operate under an 'implicit but nonetheless very compelling obligation to sustain interaction so as to avoid or at least minimise potential gaps.' (McLaughlin & Cody, 1982, p. 299). If gaps do occur, masking behaviours such as coughing, or, these days, looking at one's phone, may be used to relieve the tension within the situation to avoid unnecessary social estrangement.

Literature shows that the lack of speech can mean as much, if not more, than the words being spoken (Fordham, 1993; Haddix, 2012). Fluency in conversing suggests a positive state of affairs (Winkielman et al., 2003), and conversational flow is associated with positive emotions, as well as a heightened sense of belonging and self-esteem (Koudenburg et al., 2011). Fluency and flow within conversation also suggest a form of consensus, which can lead to feelings of social validation (Koudenburg et al., 2011). Disrupting the flow of a conversation, even by a brief silence, can therefore produce negative emotions, and feelings of rejection (Koudenburg et al., 2011). Proficiency, or presumed proficiency, in using the language can also contribute towards the flow of conversation, with Sharma (2015) finding that teachers often attribute students' silences to a lack of said proficiency and confidence with the English language.

Hallin et al. (2016) studied the differences in conversations between Autistic children, labelled 'high functioning', and 'typically developing' children. They found, in their sample of 24 school-age children, that Autistic children utilised fewer spontaneous causal statements, and fewer filled pauses within conversation than their typically developing peers (Hallin et al., 2016). Additionally, they state that there was also a significant and positive relationship between these filled pauses and so-called 'pragmatic ability', after controlling for structural language ability (Hallin et al., 2016). This suggests that neurotype-specific conversational patterns may exist, which could account for the higher rapport experienced between neurosimilar people (Crompton et al., 2020c).

Autism could be considered a minority group (Walker, 2021), and some researchers have written about the reasons for silences within minority groups; for example Fordham (1993) who studied the silences of Black girls and women in majority-white American high schools. They found that some women used silence as a means to progress through the academic and social structures of the setting, constrained by ideas of 'femaleness' and 'womanhood' that were attributed mainly to their white, middle-class peers (Fordham, 1993). Fordham further found that, for African-American women, silence was also used as an act of defiance: a rejection of the downward expectations pervasive among officials at said schools (Fordham, 1993). These 'performative silences' were a conscious manipulation of speech and silence, a protective shield to their engagement and participation through signifying their agency as language users (Haddix, 2012). Silence was therefore not indicative of their lack of power or agency, as it is often represented as in some of the literature on minority groups (Haddix, 2012). Fordham writes that gender also plays a role in the silence of these women, specifically implicating silence in the greater scholarly success of women, as it conceals the female voice, and thus the resulting gender expectations (Fordham, 1993). Indeed, Pagano (1990, p. 12) stated that the more successful women have been as students; scholars, and teachers, the greater has been their active participation in their own exclusion (Fordham, 1993). It is interesting to consider this in terms of other minority groups, where perhaps Autistic success depends on how much they mask their Autistic traits through silence. The subject of 'passing' in reference to Black women's experiences, holds many parallels to the phenomenon of 'masking' within the Autism community, a phenomenon further explored later in this chapter (Crompton et al., 2022). Fordham (1993) describes how women of colour are compelled to consume images of white American women, including linguistic patterns and styles of interacting, and thus are silenced and forced into ‘passing’ through these patterns in order to be successful.

The length of time at which a silence becomes ‘awkward’ has been looked at by McLaughlin and Cody (1982). They decided that, in interactive circumstances, silences of more than three seconds would be considered an ‘extended silence’, based on research by Matarazzo and Weins (1967) whose studies indicated mean duration of latencies (the time during which A realises B is not going to speak) between participants was just over three seconds. This indicated that in interactions where the primary goal is conversation, pauses of three seconds or longer would be considered uncomfortable. Further research into ‘social competence’, indicated that silences of over four seconds result in significantly lower ratings of social competence by conversational partners (Biglan et al., 1980; Dow et al., 1980). Social competence is obviously a very subjective matter, and one engrained in ‘neurotypical’ and deficit-model thinking. To judge social competence suggests a scale against which one can measure, which, from a constructionist point of view, would be different for every individual. These studies do offer an idea as to the general assumption of at which point a silence becomes uncomfortable or ‘awkward’. Although these studies focus on interactions where discourse is the primary aim, not on situations where participants must also engage in a task. However, during a task that does not centre around discussion, participants may not welcome speech. Indeed, when one requires concentration, speech can raise cortisol levels and cause stress (Radun et al., 2021). Radun et al. (2021) conducted a study looking at the effect of different noises on participants taking part in a task requiring concentration. Measuring stress hormone concentrations in plasma, heart rate variability, and blood pressure, as well as the subjective measures of annoyance, workload, and fatigue, Radun et al. (2021) found that participants rated speech as more annoying and loading than silence and other noise. Cortisol levels were also higher when participants were exposed to speech than in the other two conditions.

This is an example where silence is not only welcomed, but encouraged. In another study, Pfeifer and Wittmann (2020) found that silence has a positive effect on people under certain circumstances. Their research exposed participants to several minutes of silence under different contexts, both social and environmental, where participants did not know how long the silence would last (Pfeifer & Wittmann, 2020). Silence increased relaxation and improved mood in participants, demonstrating, as the authors put it, that exposure to silence can be effective promoting relaxation and wellbeing in both therapeutic, and educational settings (Pfeifer & Wittmann, 2020). Considering this in terms of Autism, it could be especially therapeutic to Autistic people due to their often-heightened sensitivities around noise.

Task difficulty may also contribute to the amount of talking versus silence that occurs. Sharma (2015) noted that teachers often attributed discussion of off-task matters to complex tasks, saying that students chose to avoid the intellectual opportunity and choose the social one instead. This may also depends on the existing relationship between participants, as their shared experiences, interests, and modes of communicating may influence the levels they are able to communicate on (Sharma, 2015). Silence between two people does not therefore necessarily denote a negative state of affairs, as silence can have many different roles. It can be an active choice, of defiance, or indeed of friendship, as one offers the other a chance to concentrate on a task. Silence can have many positive benefits, but long gaps between statements can be considered ‘awkward’. What is clear, however, is the subjective nature of silence in all these circumstances, and the reason for silence cannot be assumed without intervening to ask the social actors themselves.

5.7 Rapport

Relationships between people, and the success of their interactions, can be judged internally or externally: internally by the people in the interaction themselves, and externally by asking observers to rate how they believe the relationship or interaction has gone. Sometimes, rapport can be measured by someone’s opinion of someone else after viewing information on them, even if they have not met. The concept of rapport, and how is it measured, is complex, so some examples will be explored here.

The definition of what rapport means can vary based on a person’s neurotype. In a study by Rifai et al. (2022), researchers looked at the interactions between 72 Autistic people during a task; it is worth noting that 71 of these participants are the same as those from which the secondary data was collected for this thesis, and therefore these results are highly relevant to this study. Participants were placed within diffusion chains (see Chapter 7 for a full exploration of this technique) in one of three conditions: all Autistic, all not-Autistic, or mixed (alternating Autistic and not-Autistic). For this task they were asked to transmit information in the form of a story, down the chain in a method similar to the game ‘telephone’ (Crompton et al., 2020b). Participants were therefore paired with someone with a similar neurotype (e.g., they were both Autistic, or both not-Autistic), or with a different neurotype (one Autistic and one not-Autistic person), and were asked to recount the story they had heard to their partner, before that partner then recounted it to the next person in the chain. Following the task, participants were asked to complete a self-rated rapport, using a five dimension scale. Results from this were published in Crompton et al. (2020b), and a researcher analysed the mutual gaze and backchannelling between participants (Rifai et al., 2022). Researchers found that backchannelling was significantly lower in the mixed and Autistic pairs, but that this only translated to lower ratings of rapport within the mixed condition. The authors explain that this could suggest these ‘non-Autistic social norms’ (Rifai et al., 2022, p. 8) are less important to the success of Autistic interactions. Meaning that rapport is judged differently by Autistic and not-Autistic people.

The analysis of the videos in the study above was conducted by one researcher, several other studies have asked multiple external raters for their opinions on Autistic people’ sociability. The size and scale of these studies varies; for example, Sasson and Morrison (2019) asked 215 raters to judge 20 Autistic and 20 not-Autistic people in their study, although all their raters were not-Autistic themselves, whereas Crompton et al. (2020c) recruited 80 raters, but half of these raters were Autistic. The study by Heasman and Gillespie (2019a) had one Autistic person to conduct inter-rater reliability. Although not measuring rapport specifically, the studies by Komeda et al. (2009) and Komeda et al. (2013) introduce the idea that people empathise more with, and predict the behaviour more accurately of, those similar to themselves. This was further explored in the study of empathy in Autistic and not-Autistic people which found empathy was highest for those with a similar neurotype (Komeda, 2015). This debunks the theory that empathy is lower or non-existent in Autistic people, and instead suggests that Milton's Double Empathy Problem (Milton, 2012) may actually be to blame for the lower rapport between those of different neurotypes.

Opinions on people and their rapport with others can also be influenced by the opinions of rater. Sasson and Morrison (2019) found that despite first impressions being worse for their Autistic participants, they were significantly better when the observer was told of the participants Autistic status. Furthermore, knowledge of Autism in not-Autistic raters was positively associated with more favourable impressions of Autistic participants (Sasson & Morrison, 2019). In the secondary data analysed in this thesis, and therefore also in the studies by Crompton et al. (2020b); Rifai et al. (2022), participants were aware of the diagnostic status of the person with who they were interacting, although external raters were not. This illustrates the importance of having multiple raters for studies, and a mix of Autistic and not-Autistic raters.

The assumptions of people about the abilities of those with whom they are interacting are also salient to the connections made during said interactions. Bogdan and Taylor (1989) found that one's social constructs about disability change depending on the relationship of the observer to the person labelled as disabled. When closer to the person, participants were more likely to construct them as competent, likeable, and human, whereas those 'severely *disabled'* (italicised word has been changed from the original text) with whom the observer was not familiar, were less likely to be viewed as such (Bogdan & Taylor, 1989). These assumptions of competence have an impact on a person's performance also. Kliewer and Biklen (2001) state that, when education inclusion allows all children to be learners, literate behaviours previously assumed to be absent can emerge. When social competence is presumed among Autistic people, they are more likely to engage in complex and sophisticated communication (Rubin et al., 2001), perhaps indicating what, to many, would be obvious: that if you treat someone with respect and assume they can communicate with you, they will be more likely to reciprocate than if you assume they cannot, and do not afford them this respect. Positive or negative rhetoric regarding Autistic people are chosen by the individual, and these choices result from the individual's perspectives, which dictate who is valued, and how power and privilege are distributed (Smukler, 2005).

Research has shown that participants empathise more with a character if they share an Autistic status with said character (Komeda, 2015). Greater rapport between those with a similar neurotype has also been reported, both by the people interacting, as well as observers (Crompton et al., 2020c). A person's personality traits can also affect their empathy towards others (Komeda et al., 2009). In a study task similar to Theory of Mind story tasks, Komeda et al. (2009) asked participants to estimate the protagonists emotions, however, they notably also asked about the participants' emotions too. They found that empathy with a similar character to themselves led the participants to correctly guess the emotions of the character (ibid). They also discovered that reading comprehension was higher in extraverted participants when they were reading about extraverted characters (Komeda et al., 2009). These results show support for the similarity hypothesis, in that participants understood the actions and emotions of characters they felt similar to, and therefore empathised with. These findings are supported by the findings of Morrison et al. (2020); the researchers studied dyadic interactions in three conditions similar to the ones in the empirical section of this thesis (n= 125 [67 Autistic]). They asked participants, following a five-minute unstructured conversation, to rate the interaction quality, and the impressions of their partner. They found that the Autistic participants trended towards interaction with other Autistic participants, and vice versa with the 'typically developing' (TD) participants. Autistic participants also disclosed more information about themselves to other Autistic participants than they did to the 'typically developing' participants, also suggestive of this reported preference for interacting with someone of a similar neurotype.

In their study, Debrabander et al. (2019) asked 32 Autistic, and 32 TD participants to watch videos of 20 TD and 20 Autistic people interacting. They found that the first impressions of Autistic people were generally lower, similar to findings by Sasson et al. (2017), however, what is especially interesting is that the impressions made by the TD participants improved if they were made aware of the person they were watching's Autism diagnostic status. These first impressions did not change for Autistic participants, however; Autistic participants rated the Autistic people the same regardless of whether they were told that the person was Autistic. The authors hypothesised that this could be either because the Autistic participants were able to infer the Autistic status of the person they were viewing, without being told by the experimenter, and therefore their rating did not change as there was no new information, or that Autistic people are less affected than TD people by the knowledge of an Autism diagnosis. They concluded, based on their results, that Autistic people express greater inclusivity and less discriminatory attitudes about social differences. The idea of an 'A-Dar', or the Autistic ability to tell that another individual is Autistic without being informed of their status, has been suggested by several researchers, and is currently a topic under peer-review for publication at time of writing, with this author as a co-author.

The concept of rapport must furthermore be considered in terms of its subjectivity, as well as the inter-subjectivity of people creating meaning and understanding together (Heasman & Gillespie, 2019a). Progress in psychological sciences is often limited by the assumptions of the scientists themselves (Jaswal & Akhtar, 2019). In regards to Autism, Heasman and Gillespie (2019a) advise authors to have Autistic raters in their studies on Autistic people and sociability, in order to question the 'neurotypical assumptions' embedded in their research. Autistic people behave in ways that seem unusual to not-Autistic observers, such as not partaking in sustained eye contact or pointing (Jaswal & Akhtar, 2019). However, assuming that eye contact means social interest, will mean that those who make less eye contact are deemed not to be socially interested (Jaswal & Akhtar, 2019), despite eye contact having a variety of different cultural and social functions across the world and different neurotypes. This is not only damaging to the Autistic community, but also to those communities who use eye contact in ways that differ from the 'norm' established in popular Western sociological discourse. There is even new evidence that questions the assumption that Autistic people make atypical eye contact. In their 2023 study of 80 adults (40 Autistic), Clin and Kissine (2023) found that Autistic participants did not differ in their eye behaviours to their 'neurotypical' counterparts. Furthermore, Autistic people were not distressed when looking at the experimenters' eyes, but the neurotypical participants experienced more stress when placed in the condition of gaze aversion. The authors hypothesised that the neurotypical distress exhibited when eye contact was not reciprocated, could lead to insistent behaviours, which in turn make Autistic people uncomfortable. This study, using a bidirectional perspective on interactional difficulties in Autism, shows how interactional differences can be studied from a neurodiversity perspective. These outcomes could point towards a double-empathy based explanation for the commonly reported 'symptom' that is often reported in Autism: difficulties with eye contact; this study suggests those with the difficulties in this case were not in fact the Autistic participants, but their neurotypical peers.

Lack of eye contact in Autistics is not the only commonly held assumption being questioned by neurodiversity affirming research. Jaswal and Akhtar (2019) point out that the long-standing and widely held belief that Autistic people lack social interests is widely contradicted by Autistic testimony, and has had negative effects on the ways Autistic people are treated and studied. This is often because of the assumptions underpinning psychological studies of neurological difference. In terms of the success of interactions between people, the way in which rapport is measured varies across neurotype (Rifai et al., 2022). Autistic people are neurologically divergent, and yet the methods used to research Autistic sociality tend to assume 'neurotypical' definitions of being social, resulting in deficit views of Autism using not-Autistic benchmarks (Heasman & Gillespie, 2019a). Examples of not-Autistic benchmarks include backchannelling, mutual gaze, and sustained eye contact (Rifai et al., 2022).

5.8 Helping behaviour

The extent to which we reach out and help our peers can depends upon many factors, such as whether we have a social or familial connection to them, or whether we are in a position of responsibility or power. Someone helping another because it is their job, for example a teacher or driving instructor, will have different motives to a friend helping you answer a difficult text message, or a stranger in the street helping you up after a bicycle fall. In the context of Autism, many Autistic people report not-Autistic people trying to be helpful (Heasman & Gillespie, 2019b), but these efforts coming across as condescending, due to an assumption of superiority (Treweek et al., 2019), much like the white saviour paradigms which echo colonial attitudes towards Black people (Dabiri, 2020; Yu, 2021).

These anecdotal accounts are supported by research such as that by Heasman and Gillespie (2019b), who found that not-Autistic participants, when they thought they were interacting with an Autistic person, overestimated how helpful they were being. In reality, they were interacting with an artificial intelligence (AI), which was programmed to behave the same way for all interactions; however, participants judged the AI to be more intelligent and useful, if they believed it to be Autistic (Heasman & Gillespie, 2019b).

A study by O'Connor et al. (2019) found that Autistic children showed less helping behaviours than not-Autistic children, although the researchers suggested this was due to difficulty initiating action in a social context rather than lower social motivation. Social motivation was found to be lower in Autistic children; however, the measures of social motivation were reports from parents, rather than the children themselves. With a mean age of 12.46 years, it could be argued that the Autistic children themselves would be best placed to complete the reports on this information about themselves.

5.9 Masking

Autistic people are characterised by their difficulties interacting with not-Autistic people, and these difficulties can lead to prejudices and abuse. In an attempt to ‘fit in’ or to assimilate with the not-Autistic population, Autistic people often use strategies to hide their Autistic difficulties from others, this is called ‘masking’. Masking involves supressing a characteristic because of the stigma attached to it. In terms of Autism, this can include actions such as forcing eye contact when they do not want to, even if it is uncomfortable, and has been likened to people masking their sexuality where there are social prejudices (Sedgewick et al., 2022). This often involves restricting the movements one needs for their sensory needs, often feeling like they are ‘putting on a character’, this can be exhausting for the individual (Sedgewick et al., 2022, p. 25).

Masking is different from camouflaging; as Helen Ellis describes, camouflaging is the act of changing, hiding, or blending in, whereas masking happens when camouflaging is not possible (Sedgewick et al., 2022, p. 16). However, the two terms are used interchangeably by many to describe the same concept of attempting not to appear, or be discovered to be, Autistic. Sedgewick et al. (2022) describes the four types of masking: conscious, instinctive, subconscious, and ingrained. Conscious masking is the active recognition of an Autistic person, within a situation, that it does not feel like a safe place to be themselves. The individual will then actively choose which masking strategies to use, as they do not feel comfortable with the situation. Instinctive masking is similar to the ‘freeze’ survival response, used to hide distress when one is in pain, or in a position of stress or risk. Subconscious masking is developed in reaction to the Autistic person’s life history. This is similar to a trauma response, for example if a person has previously been told off for stimming, if they are then reprimanded or belittled by a teacher, this can trigger a trauma response while they fight this natural action. The final type of masking, ingrained masking, is a learned response, something that was once a conscious choice and is now embedded within the individual. Masking can have a negative impact on the Autistic person; the ‘Four O’clock Timebomb’ (Sedgewick et al., 2022, p. 25), where children who have been at school all day come home and experience a distressing meltdown, can be the result of them having masked throughout the day. Additionally, Sedgewick et al. (2022) state that masking can cause mental health problems such as depression, low mood, and suicidal thoughts and actions. Cassidy et al. (2020) found in their study of 160 undergraduates that the camouflaging of Autistic traits is associated with an increased risk of lifetime suicidality. They hypothesised that this is because masking reduces the feelings of reciprocity during social interactions, leaving Autistic people feeling the interactions are less authentic, and experiencing loneliness.

5.10 Replication, Imitation, Innovation, and Emulation

The extent to which we imitate others, or innovate from them, has developed over our evolutionary history, and can be crucial to human survival (Hopper et al., 2010; Horner et al., 2006). Replication, or imitation, is the act of copying another, be it in actions or words, once is producing something the same, or similar, to what was there before. Innovation, conversely, is the act of creating something new, or different, to what has been previously. Innovation is often seen as a good outcome, when creative and diverse methods are warranted, whereas copying or repeating what has been before can be seen as repetitive and tired. However, in many instances, copying is the ideal outcome, when what is being taught is necessary for safety or survival, or what is needing to be repeated is particularly important to one's education or wellness. It is therefore circumstantial whether innovation or replication is preferable, and it is important to study the processes through which these phenomena occur, so as to harness their essential nature.

Imitation and innovation have often been explored using the diffusion chain method (explored in Chapter 7), and can be measured empirically. However, the reasons for this imitation or innovation may vary, and a myriad of demographic and personality traits may be responsible for a person's decision to copy, or not to copy. The similarity hypothesis suggests humans are more likely to imitate from, and empathise with, those with whom they are similar. Komeda (2015, p. 2) described the similarity hypothesis as: 'perceivers empathize with targets similar to themselves, and, as a consequence, subsequent cognitive processing is facilitated'[10]. Greater similarity with a person could lead to greater rapport, which in turn leads to imitation or emulation of that individual or their work (Brewer, 1979; Matthews et al., 2012). However, if people copy from those whom they feel similar to, the reverse must also be considered; whether people are more likely to innovate if they feel that they are different from the individual they are interacting with. This leads to more diverse outcomes where the people involved are different from one another, which can have many positive applications. This is often coined the 'value in diversity' model, that suggests diverse groups of people (and therefore people who are different from each other) will produce better, more innovative outcomes (Herring, 2009; Hofstra et al., 2020).

Within business, this diversity hypothesis can be profitable and beneficial to a company, with research showing companies that diversify have better outcomes (Herring, 2009). However, despite leading to better outcomes, those from underrepresented groups often have less successful outcomes (Hofstra et al., 2020). In a near-complete population of around 1.2 million doctoral recipients in the US, Hofstra et al. (2020) found that those diversifying the organisations had less successful careers within them. This shows that although diversity breeds innovation, the credit is not being placed where it is due.

In terms of definitions, imitation is described as copying behaviour e.g., a method for opening a puzzle box; whereas emulation is described as copying a product, e.g., a drawn picture (Matthews et al., 2012). It is argued that, in this thesis, the tower building task used to explore the research questions outlined in Chapter 6, is an example of imitation, as participants observed the building of the towers, not just the end result (as was the case in Matthews et al. (2012) study on in/out groups, where pictures of towers were given as stimuli).

In this section, imitation, emulation, and innovation will be described in terms of different groups in which they occur. Studying these phenomena in this way is useful for society, as it

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[10] See also Komeda, H., & Kusumi, T. (2007). The emotional process in narrative comprehension: the situation model construction based on the reader-protagonist interaction. *Japanese Psychological Review, 50*, 163-179.

can help us to learn how others learn, as well as to consider, when learning from others does not seem to be effective, why that may be the case. It is also important to consider whether replication is a beneficial outcome in all instances, as creativity, shown through innovation, can have many benefits, as shown in the ‘value in diversity’ model. More detail on what is known about information transmission in terms of innovation and replication can be found in Chapter 7, where the diffusion chain method is discussed.

5.10.1 Neurotype

The previously described study looking at rapport in Autistic people (Rifai et al., 2022) used data from the diffusion chain study by Crompton et al. (2020b). This study, asking participants to recall a story down a chain of either neurosimilar or neurodiverse people, found that replication (through accurate repetition) of the story was greater in the neurosimilar groups. With a sample size of 72 (36 Autistic), this study looked at the transmission down nine diffusion chains, and found significant group differences (ANOVA[$F(2,69) = 4.60$, $p < 0.05$]), with a regression analysis showing a steeper decline in the mixed (neurodiverse) condition ($b = –6.04$, standard error (SE) = 1.32, $p < 0.0001$). Interestingly, the Autistic and not-Autistic conditions did not differ significantly from each other, a finding that rejects deficit-based conceptions of Autism and memory or sociability, as under a deficit model, Autistic people would be expected to perform worse on a task that requires social interactions. Under a deficit model, not-Autistic people would perform best, followed by the neurodiverse condition, with the Autistic condition performing worst.

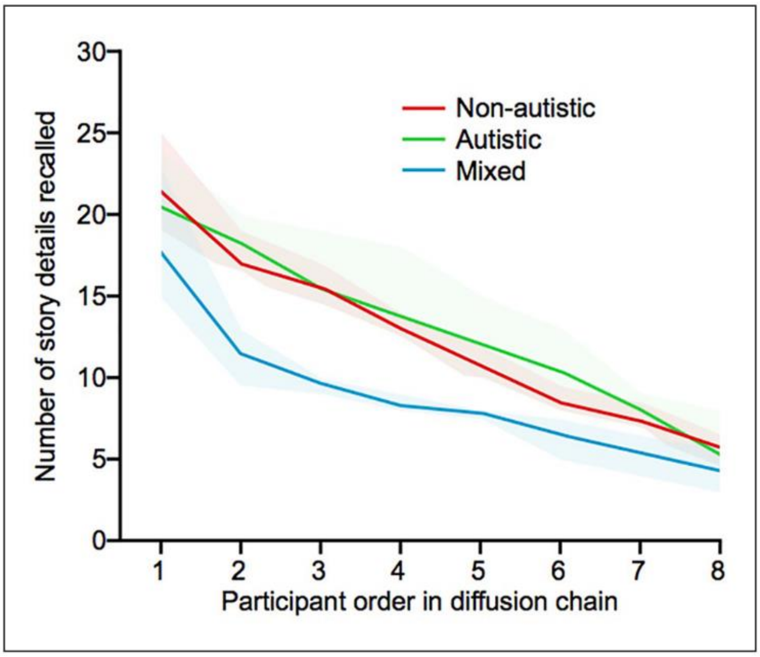

Figure 12: Mean and range of story details (out of 30) transferred in the diffusion chain, by group and position. From Crompton et al. (2020b)

We can therefore see how Autistic-Autistic communication is highly effective, and that the difficulties arise where there is a mismatch of neurotypes, as explained by Crompton et al.:

> *“Autism is conceptualised clinically, and in scientific research, by core deficits in social communication, interaction and emotional reciprocity, deficits in non-verbal*

> *communicative behaviours used for social interaction and an absence of interest in peers…In theory, this should translate into poor information transfer with others. These results, however, are the first empirical evidence that suggest the difficulties in Autistic communication are apparent only when interacting with non-Autistic people, and are alleviated when interacting with Autistic people." (Crompton et al., 2020b, p. 6)*

This is evidence of the double empathy problem described by Milton (2012), and is directly relevant to this thesis as it outlines a neurodiversity affirming model of information transmission. The authors raise the very important issues of one belonging to a community, especially in the case of suicide prevention, and also in terms of fostering a sense of community. These communities do not have to be neurotype specific, as one can find associations on many different levels, such as with those of a similar heritage, interest, or cultures. Exploration into information transmission between some different groups is continued in the other headings within this section.

The study by Crompton et al. mentioned previously, linked to the study undertaken in this thesis, is a rare example of studying neurodivergent information transmission. In this study, repetition and replication were the goals, in that participants were encouraged to transmit information with a high fidelity of factual maintenance. However, innovation and deviation from the information given in terms of creative outputs are not explored here, or indeed within any studies focused on Autistic individuals. This dearth of information is a gap within the literature which should be addressed.

5.10.2 Racial, Ethnic, or Cultural Group

The type of in-group under discussion may impact whether imitation occurs. In their study of racial differentiation, Krieger et al. (2016) found that appearance may not be sufficient in itself to elicit an in/out group effect, as four-year olds did not imitate the in group more often than the out group. Although the subjects of this study were very young, and many cultural divisions, such as those based on race, are learnt as a child grows older, from their environment and those around them. Phylogenetic methods, such as those used by evolutionary biologists, can also be used to study the evolution of oral traditions and narratives (Tehrani, 2013). In their study of the phylogeny of the tale of 'Little Red Riding Hood', Tehrani (2013) found that this method allowed them to map out the development of the tale across geographic regions and time periods, proving phylogenesis to be a powerful method with a useful set of tools pointing to new directions for research into the transmission of oral narratives. In their discussions of Transmission Isolating Mechanisms (TRIMS), Durham (1990, 1992) and Tehrani and Collard (2013) describe how the transmission of information is constrained by factors such as language barriers, group rivalries and warfare, in-group conformity, endogamy, and xenophobic attitudes. A major reason for the disruption of the transmission of ideas and information, therefore, is the attitudes of those transmitting the information towards those with whom they are communicating, based on racial or ethnic identity.

Using a cladistic analysis, Tehrani and Collard (2002); Tehrani and Collard (2013) studied the textile diversity of the designs on items such as rugs, woven bags, and blankets, in four tribes in Western Iran. They found there were more barriers to transmission (TRIMS) between the groups than within. There was therefore more similarity of design within the cultural groups at a horizontal level, showing a horizontal transmission of innovation and imitation (Tehrani & Collard, 2013). Although they did not speak to the tribe members themselves, Tehrani and Collard (2002) concluded that TRIMS play a major role in cultural phylogenesis, with their results supporting the TRIMS hypothesis. This was important to study, as in this case, innovation and replication could be used as a proxy measure to understanding community dynamics. Understanding how information was transmitted in the form of this creative output, the textile diversity, helped the researchers to understand the language, community tensions, and barriers to interaction that existed between communities. It is therefore useful to see these physical outputs not just in terms of their visual properties, but in how they deviate from each other, so as to see whether people have copied others, or innovated their own designs.

5.10.3 Family Groups

For most, the first humans an infant interacts with are those of their biological family; these connections are the initial, and often most important, ones they will make, as many attachment theorists would attest. This is not to say that other social learning, such as in the school environment, is not significant (Paradise & Rogoff, 2009), as neither precludes or inhibits learning in other ways. However, with growing evidence that Autism is an inherent genetic and biological phenomenon, the presence of Autistic families, and the impact of growing up among those who share a neurotype to you (e.g., either a not-Autistic family, or an Autistic family) must be considered in terms of social imitation and emulation.

5.10.4 No Identifying Characteristic Groups

Sometimes, the only characteristic that people need for them to imitate or emulate is to believe they are in the same group as the other person. In the diffusion chain study by Matthews et al. (2012), spaghetti towers built by people in four subpopulations became recognisable as being from each of those subpopulations over a few generations. Participants were shown stimulus images of towers that had been built by others in their group (the first images in the chain being those created by researchers and then randomly assigned to the groups) and then asked to build their own tower. Over generations, towers gained characteristic features based on the chain they were from, showing this emulation is influenced by viewing the results of others in the group (Matthews et al., 2012).

5.11 Conclusion

This chapter explored some ways in which information can be transmitted, including through silence and eye contact. It situated these within the context of postcolonial understandings, to question to what extent we decide how much of a certain social action is too much or not enough, and thus defining what is ‘normal’. Furthermore, it explored the ways this transmission can differ depending on the group in question, particularly neurotype. Information can be replicated, imitated, or copied, and evidence shows that such replication is more common within groups that are neurosimilar (Crompton & Fletcher-Watson, 2018; Crompton et al., 2020b).

The idea of a Theory of Mind, as proposed by Baron-Cohen et al. (1985), proposed that Autistic people lack the ability to 'mindread' others. The ability to mindread was tested in children using false-belief tasks such as the Sally-Ann test (Baron-Cohen et al., 1985), and in adults using the 'Reading the Mind in the Eyes' test (Baron-Cohen et al., 2001a); two very different tests claiming to examine the same phenomenon. Many researchers such as Fletcher-Watson et al. (2014); Gernsbacher and Yergeau (2019); Smukler (2005) have questioned the empirical evidence behind Theory of Mind, stating that this is severely lacking, with no quality evidence supporting interventions targeting the supposed phenomena. Furthermore, using mindblindness to describe Autistic people has been shown to have negative connotations for them, with researchers being warned to be wary of the consequences of such descriptions (Dinishak & Akhtar, 2013), with Milton (2014) comparing the belief that Autistic people do not have a Theory of Mind to the belief that vaccinations can cause Autism. However, there is evidence that Autistic people struggle to understand not-Autistic people, but that this is equally true in reverse (Crompton et al., 2022; Crompton et al., 2020a). From a theory of mind perspective, we would then be considering an 'Autistic Theory of Mind' (ATOM), a phenomenon possessed by not-Autistic people, a 'mindblindness to Autism'.

However, both concepts can be rationalised into the 'Double Empathy Problem', a concept proposed by Milton in 2012, which describes how people of different neurotypes can struggle to interact due to a disjuncture in reciprocity of sociality. This can lead to the false belief that Autistic people are deficient in the ability to 'read minds', where in fact people of all neurotypes struggle to understand those who think differently to them. This has been empirically explored in studies looking at the transfer of information between social actors, which have shown equally effective communication in neurosimilar groups, but less effective communication in neurodiverse (mixed) groups (Crompton & Fletcher-Watson, 2018; Crompton et al., 2020b). The misunderstanding that Autistic people are deficient can lead to interventions aiming at teaching Autistic people how to behave in a not-Autistic or 'neurotypical' way, such as ABA or strategies to help with 'mindblindness' (Howlin et al., 1999; Ordetx, 2018). These interventions and conditioning methods can lead to Autistic people superficially changing their behaviours in a phenomenon known as 'masking', which has been shown to have a negative effect on Autistic people's mental wellbeing (Sedgewick et al., 2022). As we have seen through the literature explored throughout this thesis, the negative effects of deficit models can have devastating consequences for the mortality rates within the Autistic community (Guan & Li, 2017; Hirvikoski et al., 2016; Smith DaWalt et al., 2019). It is therefore important to investigate Autistic methods of communication, in order to provide the empirical evidence necessary to explore the double empathy problem further. With this information, strategies of support can be developed which support those of all neurotypes to understand how others interpret the world around them.

This chapter explored information and Autistic communication, having built on the foundations of understanding of the different models of disability associated with Autism, and the ways in which the world interacts with Autistic people. Knowledge from this will be used in the next chapter to develop research questions for the empirical studies of this thesis.

6 Research Questions and Rationale

The previous literature chapters emphasised the gaps in the literature in terms of the need for a neurodiversity affirming perspective on Autism and Autistic neurology. In the second chapter, the analysis of the history of the term, situated Autism within its historical context, but also highlighted the numerous and significant changes that have occurred during this time. A key message from this chapter was the fickleness of a diagnosis, such as the creation and removal of the Asperger's diagnosis in the space of under two decades. This chapter attempted to highlight those who have had a major influence over the evolution of Autism, so as to set the scene for future actors in the form of deficit and neurodiversity combatants. The research questions developed in this thesis stem from this early identification of the gaps within Autism studies, particularly prevalent when one relies on the deep-rooted and prejudicial views of the past. These previous views, steeped within Westernised norms and misogyny, must be tested by questioning whether a deficit model is empirically sound.

In Chapter 3, these models were scrutinised further, revealing a dearth of neurodiversity-based practice within the UK, a dearth that was scrutinised further in Chapter 4, which examined some of the many challenges facing Autistic people in the 21st Century. This chapter highlighted the sexism within Autism research, building upon the stories on Sukhareva and Weiss from Chapter 2, and the lost voices of Autism studies during the 20th Century, to emphasise the importance of intersectionality within research. This led to the development of a more detailed positionality statement, to be found in Chapter 7.

Further major gaps were bared in the final literature chapter, which described ideas of innovation and replication, and questioned why so many assumptions about human interaction were based upon Westernised medicalised norms. The question of eye contact is one with a particular scarcity of information; as a key identifying feature of Autism to many practitioners, a lack of eye contact is only problematic in certain societies, leading to the question of why it has been pathologised within Western discourse. Through introducing the idea of Autistics as a cultural group like other minority groups, the gap in the literature can begin to be filled.

Through using post-colonial discourses, such as those described in the previous chapter, new ways of looking at Autism and Autistic people's interactional abilities can be uncovered. A further major omission from the literature was the idea of an 'Autistic Theory of Mind' (ATOM), which would counter claims that Autistic people lack the ability to understand non-Autistic people, by using the double empathy problem to suggest that non-Autistic people lack the ability to understand how Autistic people may be thinking. This chapter will use these ideas to develop research questions based upon these notions of a bi-directionality in disjunctures in reciprocity between social actors with different neurotypes.

The concerns of this study regarded the ways in which Autism and neurodivergence are conceptualised and modelled, and how these interact with the world:

A. *How Autism has developed over the years as a phenomenon;*
B. *The different models that have been used to describe Autism and how the world interacts with neurodivergence;*

C. *How Autistic communication is conceptualised within models of difference and disability;*
D. *Neurotype-specific interactional and communication differences.*

The focus of this part of the thesis builds upon these concerns, and on the topic of differences in interaction success, and style, between neurodiverse (mixed Autistic and not-Autistic) and neurosimilar (Autistic or not-Autistic) groups. Literature from a deficit perspective would suggest Autistic people lack social abilities and motivations that those without a diagnosis possess (Baron-Cohen, 1995; Baron-Cohen et al., 1985). However, new research, looking through a neurodiversity lens, employing the double empathy problem (Milton, 2012), would suggest that this difference, not deficit, is due to natural variations in human social experience, and that neurosimilar interactions can herald great benefits to those involved (Crompton et al., 2020a). As original in-person field data collection was not possible due to the ongoing Covid-19 pandemic, see the 'Adaptations due to COVID-19' section, it was decided this thesis would use a secondary data set to explore these phenomena. The data were viewed before fully developing the research questions so as to gain an idea of the content.

The data in question were collected as part of a Templeton Foundation funded project on Diverse Social Intelligence. This study has yielded many outputs already including studies on rapport (Crompton et al., 2020c; Rifai et al., 2022), Autistic friendships (Crompton et al., 2020a), and information transmission (Crompton et al., 2020b), and is currently in the process of replication across three sites in Edinburgh (UK), Nottingham (UK), and Texas (US)(Salvesen Mindroom Centre, 2023). This wider project had several topics within it, each with several tasks used to explore the research questions. One task in particular was used as the secondary data for this thesis. The original question that was proposed along with the collection of the data at The University of Edinburgh was as follows:

> Research Question from Templeton-funded study with The University of Edinburgh: *ED/RQ: Does Autistic performance on a cultural transmission task vary depending on the Autism status of the social partner?*

To investigate this question, a diffusion chain method was used to study the transmission of ideas, and replication across cultural generations. From this University of Edinburgh research question, original research questions were developed for this thesis to fully explore the data that were produced, as well as having the potential to collect further data to explore the concepts further. This further data collection took part using images from the original data collection as stimulus to examine the replication and innovation of designs over cultural generations of neurodiverse and neurosimilar people.

6.1 Research Question 1

The first research question developed focused on the concept of success, whether Autistic or not-Autistic people performed objectively better in the task based on parameters set by the researcher. This question explores the deficit and neurodiversity theories explicitly, as success is a value judgement, and therefore Autistic and not-Autistic conditions can be compared directly; this could be explored quantitatively using the already available information from the research team. This research question is very similar to the original one proposed for the Templeton Study, as, as this was the purpose of the data collection, it would be suitable to explore the original question of performance across neurotypes.

> *RQ1. Are there differences in cultural transmission task performance depending on the neurotype of the social partner?*

This question attempts to close the research gap around task performance between Autistic and not-Autistic people, but approached from a neurodiversity lens. The use of the diffusion chain method hopes to analyse cumulative effects, something which has not been done with a physical task and neurodiverse chains of adults before.

6.2 Research Question 2

The literature explored in Chapter 5 showed a dearth of research around neurodiverse interactions. The second research question looked more deeply at the interactions occurring between Autistic and not-Autistic people during the completion of the task. This was to be able to delve into the nuances of the interactions, in particular this idea of reciprocity, as it has often been reported that Autistic people lack social motivation.

> *RQ2: How does reciprocal interaction between neurodiverse groups vary during a task?*

This question goes some way to fill the gap in the literature around issues of the double empathy problem (Milton, 2012), and ATOM, asking whether the nature of reciprocity differs based on the neurotype of the social actors. Once explored using secondary data analysis (see Chapter 8), one further research question was developed.

6.3 Research Question 3

Information transmission between Autistic and not-Autistic people has been examined in a few studies, as described in the previous chapters. However, in no studies have the physical outputs been studied, in ways that could teach us about how those with different neurotypes may copy or innovate each other. The final research question aims to fill this gap by focusing on the idea of innovation versus replication, as the concept of reciprocal interactions extends to the products of said interactions. In that, if an interaction is highly reciprocal, and people are getting along well, any products of that interaction might reflect this high level of reciprocity, and that there therefore might be more replication where rapport is higher.

> *RQ3: Is there evidence of familial resemblance across chains of neurosimilar people?*

The term familial resemblance was used to describe similarity, as the diffusion chain method extends the basic paired interaction to multiple interactions which can represent cultural generations. This research question focuses on neurosimilar people, but also poses the question whether there would be less evidence of familial resemblance across chains of neurodiverse people, such as chains containing Autistic and not-Autistic people.

This final research question also raises the question of those producing the data on familial resemblance. If investigating the differences between Autistic and not-Autistic perceptions of social interactions, the differences in perceptions of the products must also be considered. It is possible that, as a somewhat subjective measure, opinions on similarity may differ between those who are Autistic, and those who are not.

These research questions will be analysed in order, through the use of qualitative and quantitative methods and data analysis. A reflexive approach will be taken to take into account the positioning of the researcher, and in terms of the key issues affecting Autism studies, decolonisation, and feminist perspectives.

Findings from this study have been published, and can be found at: Axbey et al. (2023).

6.4 Hypotheses

Each research question brings along with it several potential outcomes; these are informed by the different models of disability explored in Chapter 3. For each research question, the neurodiversity model shall inform the main hypothesis, while an explanation of what the ‘opposing’, deficit hypothesis, might be, will also be explored. A deficit model hypothesis is hereby defined as one which is based upon the assumption that Autistic people lack a certain ability, or motivation. Whereas a neurodiversity-based hypothesis assumes a different, but equal, set of abilities and motivations across neurotypes.

6.4.1 Research Question 1

RQ1. Are there differences in cultural transmission task performance depending on the neurotype of the social partner?

For the first research question, the measure is success within a cultural transmission task. This task is one that involved building something, and is therefore primarily physical and visual rather than social. However, there is a social element, as participants are paired with someone of either a similar neurotype, or a different neurotype. Therefore, the social elements cannot be overlooked when predicting success.

A deficit perspective, one which views Autism as a deficiency, would assume Autistic participants perform worse on tasks that involve social interaction, as well as potentially having less skill in the building task due to dexterity issues (Lidstone et al., 2020). A deficit model hypothesis could therefore predict the worst task performance from Autistic people, with the potential for Autistic people to perform better when paired with a not-Autistic person due to the not-Autistic person helping them.

Whereas, a neurodiversity-rooted hypothesis, one which does not view Autism as a deficit but rather a neurological difference, would suggest equal performance in the task, due to similar abilities across neurotypes. However, if taking social interaction into account as potentially affecting performance, the instances where a person is completing a task with someone of a similar neurotype, the all Autistic, or all not-Autistic chains, would yield better results than the heterogeneous chains. This is due to the potential for higher rapport between neurosimilar people, and the double empathy problem affecting neurodiverse interactions (Crompton et al., 2020b; Milton, 2012).

The hypothesis for the first research question is therefore:

HRQ1: Performance may be slightly higher in the similar-neurotype chains.

However, it is worth noting that this is not an information-based task like those set by Bangerter (2000); Bangerter and Lehmann (1997); Bartlett (1932) and Crompton et al. (2020b). In these types of tasks, success across the generations of a chain can only decrease as information is omitted, therefore it is impossible for the last participant to outperform the first participant. Whereas, in a building task, it is possible for subsequent participants to achieve greater success than their previous counterparts, which adds a layer of complexity when analysing success as a measure for a diffusion chain, as individual ability becomes more salient.

6.4.2 Research Question 2

RQ2: How does reciprocal interaction between neurodiverse groups vary during a task?

A deficit model hypothesis, which suggests a lack of social motivation and helping behaviours in Autistic people; would suggest that the interactions between Autistic participants were infrequent, and less likely to involve offers of help (O'Connor et al., 2019). Using this model, the reciprocal interaction in the not-Autistic pairs would be the most frequent, and conducive to the task performance (see RQ1). The neurodiverse condition would fall somewhere in the middle, with the assumption that not-Autistic participants would continue to offer interaction and support to their Autistic counterparts, but that this would not be reciprocated. Conversely, a neurodiversity-driven hypothesis would predict the least reciprocal interaction within the neurodiverse groups, due to issues related to the double empathy problem, and decreased rapport (Crompton et al., 2020b; Milton, 2012). In terms of the difference between the neuro-similar conditions, evidence from a neurodiversity perspective does suggest Autistic people may have lower social motivation in some situations (Fletcher-Watson & Crompton, 2019), so whether this translates into decreased reciprocal interactions within a task remains to be seen. It could also result in less helping behaviours, either because the people do not feel they need to offer support, or because they do not wish to offer it.

The hypothesis for this research question, based upon a neurodiversity-driven perspective is therefore:

HRQ2: There will be the least reciprocal interaction within the neurodiverse condition.

6.4.3 Research Question 3

RQ3: Is there evidence of familial resemblance across chains of neurosimilar people?

This research question focuses on the idea of innovation versus replication, which may be affected by rapport between participants (Crompton et al., 2020b; Crompton et al., 2020c) although the measurement and judgement of rapport may vary across neurotypes (Rifai et al., 2022). Research has also shown that Autistic people may have higher levels of creativity in some tasks, which could translate into greater innovation (Kasirer et al., 2020).

A deficit perspective may assume less cohesion between Autistic participants, leading to more innovation. However, a deficit perspective may also predict less creativity between Autistic participants, leading to less innovation. Many studies focus on the interactions between Autistic and not-Autistic people, rather than between Autistic peers. From a neurodiversity perspective, if higher levels of rapport exist between neurosimilar people (Crompton et al., 2020c), and this translates into those people being more likely to replicate the work of the other participant (Crompton et al., 2020b), then there would be less innovation within the neurosimilar conditions (all Autistic or all not-Autistic).

The neurodiversity-led hypothesis for this research question is therefore:

> *HRQ3: There will be the most innovation from neurodiverse interactions.*

Within the exploration of this research question, the question of whether perception of similarity differs depending on Autistic status will also be considered. This is because some studies show that Autistic people view stimulus data differently to not-Autistic people. One study, by Olu-Lafe et al. (2014), suggested that Autistic participants were slower than not-Autistic participants in a two-to-one shape integration task because of their difficulty in integrating local information.

6.5 Concluding Remarks

These original research questions were developed from a project led by a neurodiversity affirming team working on diverse social intelligence, and through in-depth analyses of the literature throughout the first four chapter of this thesis. These chapters identified an absence of literature on the products of neurodiverse interactions, and of research carried out using a neurodiversity paradigm. The neurodiversity paradigm runs as a theme throughout this thesis, and informs the analysis, which aims to be reflective of the researcher and the research environment in which the data were collected. These research questions do not aim to disprove the deficit hypotheses, however, and although biases may exist, the integrity of the research remains paramount when exploring the data. This will be explored further in the positionality and reflexivity sections of the following chapter.

7 Methodological Approaches and Research Strategy

> *"A commitment to democratic and inclusive communities requires a process of communicative partnership that elicits narratives based on all voices, even those that are difficult to decipher." (Smukler, 2005, p. 22).*

This chapter will cover a critical analysis of the methods and paradigms chosen for this thesis, along with the rationale behind each one. An underlying concept of neurodiversity has been applied to the methodologies in this thesis, from the design, to the participants. Including Autistic people in the design and implementation of research is salient. Smukler (2005) states there is no alternative that will accord Autistic people dignity, and researchers therefore need to be willing to tolerate some communicative ambiguity to be ethical in this regard. The topics covered in this chapter will include positionality and reflexivity (including the author's own positionality statement), research strategy, and data collection and analysis methods. There will be a justification for each of these methods' inclusion in this thesis.

7.1 Positionality

No science is ever entirely objective (Smukler, 2005), and it is therefore important to consider positionality when conducting any research. Positionality, or a person's world view, and the position they take about a research task and its social and political context, is key to establish and report as part of the research process (Holmes, 2020). A researcher's ontological and epistemological assumptions, shaped by factors such as the individual's values, beliefs, politics, religion, gender, and location, have an impact on how the research is conducted, its outcomes, and its results (Holmes, 2020; Rowe, 2014). Reflexivity is therefore paramount when conducting research, as reflexivity informs positionality (Cohen et al., 2018). This means acknowledging and disclosing the researcher's self in the research in an attempt to understand and make clear their influence on it (Cohen et al., 2018). Identifying preconceptions brought into the research by the researcher is the first step in the reflexivity process, as any previous experiences, both personal and professional, will undoubtedly affect how the researcher views the topic in question (Malterud, 2001). Additionally, the motivations and qualifications of the researcher looking into the phenomenon need to be considered when looking at the research questions and hypothesis that are produced (Malterud, 2001).

Developing a position on 'empathic neutrality' (Legard et al., 2003) is important in remaining as impartial as possible while collecting data reflexively. However, aiming to adopt a position and taking that position are different things; no matter how reflexive and reflective a researcher is, there will undoubtably be aspects that are missed, unknown, or deliberately hidden by the researcher (Holmes, 2020). Additionally, from a constructivist or subjectivist perspective, no amount of reflexivity can ensure a researcher objectively describes a phenomenon as it is, as it is impossible to objectively describe reality (Dubois, 2015). Positionality statements and reflexivity generally are fundamentally anti-positivist as they assume there is no objective reality (Grix, 2019). A constructivist acknowledges that even language itself is a human construct, and as such, the experiences and interpretations of language, such as from social interactions, are also each individually constructed (von-Glasersfeld, 1998).

7.1.1 Reflexivity

Key to all research is the process of reflexivity that should occur at all points from the start to the end (Sultana, 2007). It leads to the reduction of bias and partisanship, and is essential for research to be considered ethical (BERA, 2018; Rowe, 2014; Sultana, 2007, p. 375). It is not possible to 'add on' reflexive statements at the end of research, as this is merely introspection, and leaves positivist methodologies intact (Sultana, 2007, p. 376). This thesis uses many positivist elements, and acknowledges this, but the positionality of the researcher will be woven throughout the thesis to ensure a reflexive process is undertaken.

In terms of post-colonial studies, and feminist interpretations, a reflexive process opens up research to complex and nuanced discussions of issues, as well as a consideration of the unequal power relationships between researcher and participant, embedded in the research questions and methods of data collection (Sultana, 2007, pp. 375-376). However, reflexivity is not a panacea, nor is it a guarantee of honest, truthful, ethical research; as with all positionality statements, facts can be omitted, either by accident of through deliberate action (Holmes, 2020). But what it does help with is the clarity and context of the researchers position for the participants, and any readers of research outputs (Holmes, 2020). The factors which are explicitly built into the research therefore need to be thought about reflexively, declared openly, and discussed in the final results and research outputs (Smith, 2012). In addition to this, said results should be disseminated back to the groups in question in an appropriate way, using accessible language (Smith, 2012).

7.1.1.1 My own reflexive method

Throughout the research process I focused on where I would situate myself within the concepts I was studying. As an Autistic woman, I was aware I would be bringing certain pre-conceptions and beliefs about the Autistic world into the research with me. In order to produce a balanced account, I have considered three different models of disability in my analysis. Although I personally subscribe to the neurodiversity model, I have efforted to include other views on the phenomenon of Autism, while also accepting that my stance will certainly affect the ways in which I write about it. In terms of dissemination, I have worked to ensure that any outputs from this research can be passed on to the Autistic and not-Autistic communities in language that will make sense to a non-academic audience.

7.1.2 Insider versus outsider perspective

There is much debate as to whether being part of the community or culture you are studying is beneficial or counterproductive. Epistemologically speaking, whether the researcher is an ‘insider’ or ‘outsider’ concerns whether it is possible for them to present their research accurately and truthfully (Holmes, 2020). An insider is often described as one who has a priori knowledge of the group being researched, in that they have a certain ‘lived familiarity’ with the experiences of those concerned (Holmes, 2020). This can be beneficial, as it allows the researcher specialist knowledge of the group and their experiences (Kusow, 2003), as well as potential access to gatekeepers an outsider would not have (Sanghera & Thapar-Björkert, 2008). However, Mercer (2007) points out that these very things can lead to the negatives of insider research, as it could be argued it may lead to a lack of objectivity, and an increase in bias. It is important for researchers to consider their position in terms of the participants, e.g. are they going into the research with the predetermined position of an outsider, or do they identify with the community to be studied (Savin-Baden & Major, 2013). Some theorists argue that there is not a dichotomy as simple as insider versus outsider, that there is a continuum with multiple dimensions (Mercer, 2007). For example, a Jewish man studying women’s health may be seen as both an insider and an outsider to a group of Jewish women depending on which characteristics are considered. In addition to this continuum model, beliefs towards a researcher can change considerably over the course of a research study (Carter, 2004), so it is even more important to consider a pluralistic approach that considers the many lenses through which humans can be considered rather than a single ascribed status (Holmes, 2020; Mercer, 2007). There is also the question as to whether insider status matters, as Kusow (2003, p. 597) states ‘the insider/outsider dichotomy as methodologically distinguishable analytic categories cannot be supported empirically.’ Although, as a lot of sociological, educational, and anthropological data is qualitatively analysed, any empirical differences caused by bias may be harder to see.

7.1.2.1 Insider Autistic Perspective

> *"For me, belonging to the Autistic community, acknowledging our marginalization, and recognizing our suffering within society means that hope for a better and just future has always, and will always underpin my work" (Botha, 2021, p. 1).*

In regards to Autism, an insider perspective is often considered to be those who are themselves Autistic. Autistic people have historically not been consulted in research on Autistic people, however. Grant and Kara (2021) argue that the first time Autistic people were considered experts in their own neurology was in 1986, with Grandin's descriptions of their life. However, even this led to an 'othering' of those considered 'low-functioning' and therefore assumed not to be represented by Grandin's perspective (Grant & Kara, 2021). Despite the benefits Autistic people can bring in terms of lived experience, as well as skills common in Autistic people that can be great assets in qualitative research, even in the 21st Century, too much Autism research is done *on* Autistic people, not *with* or *by* them (Grant & Kara, 2021). These benefits in qualitative research can include a greater ability to adapt their approaches to those being adopted by others, due to extensive experience masking; Grant and Kara (2021, p. 595) refer to this ability as Autistic people being good at being 'methodological and paradigmatical chameleons', giving an 'Autistic advantage' that has specific applications for qualitative research work.

7.1.2.2 My own insider/outsider position

The insider perspective questions whether an outsider could ever fully understand the experiences of the group to be studied, whereas the outsider asks whether an insider can detach themselves suitably in order to study without bias (Kusow, 2003). However, as the dichotomy is not necessarily as simple as 'Autistic as insider versus not-Autistic as outsider', there are many factors to consider (Mercer, 2007). It could be argued that my 'insider status' as an Autistic person allowed me to gain more Autistic participants via Twitter, as Autistic people may have felt more inclined to take part in a study conducted by another Autistic person, and thus someone who would understand their experiences. This links to the research of Sanghera and Thapar-Björkert (2008) who found that distrust of outsiders, and therefore trust in insiders, affected the gatekeeping in their research.

7.1.3 Positionality Statement

As researchers are part of the social world in which they are researching (Cohen et al., 2018; Hammersley & Atkinson, 1983), it is important to note the ways their positionality has impacted the research, especially if they hold a position within the community of interest. This social world has already been interpreted in many ways by other social actors, and as such, these also need to be acknowledged (Grix, 2019). The development of a positionality statement is therefore the opposite of a positivist conception of an objective reality (Grix, 2019), as it acknowledges the constructivist and subjectivist nature of the social world and knowledge about it. A positionality statement should contain a description of the lenses from which the researcher is viewing the phenomenon (Savin-Baden & Major, 2013), this could include the personal, philosophical, or theoretical perspectives of the researcher, as well as any potential influences on the research such as age, politics, race, previous career, or gender. There will always be bias and subjectivity within research (Holmes, 2020), but stating how, when, and in what way these might have influenced the research process can give the research project context (Savin-Baden & Major, 2013). It is also important for the reader to understand this context, as many could incorrectly infer what they believe to be the researcher's stance or perspective on a matter from limited demographical information (Holmes, 2020).

7.1.3.1 My own positionality statement

Epistemologically speaking, I hold a constructivist position with subjectivist elements. I believe that there is no universal objective truth when it comes to social interactions and the social world, as people are all social actors with their own construction of the world. Language and the meaning we give to words are individually constructed (von-Glasersfeld, 1998), and therefore this fact was taken into account when conducting analysis on the discourse in the data. I believe certain phenomenon, such as Autism, may have constructed definitions and identities that exist within groups, and these have led to the rise is self-advocacy among Autistic people, as they form a group understanding of the concept to 'Autism'. I believe my background has influenced this positionality; during teacher training, the constructivist approach was favoured as it allowed us to focus on the world of the individual child, as well as understand how knowledge is constructed, in order to teach it. A good researcher is attentive to the politics of knowledge production (Sultana, 2007, p. 376), and as such it is important to consider where my own knowledge of Autism arose. Growing up in a Western country that has been responsible for the colonialisation and destruction of many cultures, I must also acknowledge that my construction of the world, and the world of disability, will be influenced by this fact. Barker and Murray (2010) state that the assumption that accessibility can be achieved through minority activism is symbolic of the Western academy and ideals, and it is important to factor this in when discussing my own neurodiversity perspective on disability.

Social research cannot be separated from wider society, and from the researcher's biography (Holmes, 2020). My identification as a woman could also be seen to influence the research. It may have affected how participants interacted with the research task, to know it was being carried out by a woman; and my own view on Autism will have been shaped by growing up and being an Autistic woman in a world where Autism is often assigned a 'male' status (Baron-Cohen, 2002, 2010). Identifying with feminist methodologies and interpretations may also influence the significance I give these within analysis. Even the importance I place on, and my belief in, the concept of positionality, is influenced by my own positionality: shaping my interpretation, understanding, and belief in the validity of other's research (Holmes, 2020). It is therefore important to state that in this research I myself am coming from the perspective of a white, cis-gendered Autistic woman of dual British and Irish nationality.

It is further important to note how, as an Autistic person, the analysis of data may differ to that of a not-Autistic person. Transcription, for example, may be more difficult due to auditory processing issues experienced when there are multiple sounds occurring at the same time. However, as Grant and Kara (2021) and Russell et al. (2019) have found, there are also many benefits to being Autistic in terms of work and research, such as additional attention to detail and focus.

7.2 Experimental approach

This thesis includes a quasi-experimental design for the analysis of the research questions detailed in Chapter 6. An experimental design is defined as a ‘test under controlled conditions that is made to demonstrate a known truth, or examine the validity of a hypothesis’ (Muijs, 2022, p. 11), and quasi-experiments are named as such due to the lack of random allocation to groups. Experimental approaches have had a major impact in psychology, neuroscience, and education, have made significant contributions in these fields (Eysenck & Keane, 2000), and are considered the ideal by many due to their controls and their use of random allocation (Black, 1999; Muijs, 2022). Experimental methods are high in internal validity, as controls are a key element of their design (Eysenck & Keane, 2000; Muijs, 2022). Controlling many factors allows researchers to make stronger claims about causality as long as certain conditions are met. Firstly, there must be a relationship between variables in order for causality to be implied, secondly there must be a distinct time order to establish effect, and thirdly, the relationship between said variables must not be the result of a confounding variable (Muijs, 2022).

There are many obvious advantages to the experimental approach to research such as the higher internal validity and more reliable causality statements, however, limitations must be considered also. Neglect of emotional factors, as well as decoupling, are described by Eysenck and Keane (2000), as it is impossible to isolate part of the brain in order to conduct an experiment. They go on to say that, in experimental designs, there is a de-emphasis of individual difference, as well the construction of particularly specific theories, both of which are limitations of this method (Eysenck & Keane, 2000). Additionally, the use of an artificial environment, seen as a positive of the method in regards to controls, can also be seen as a limitation from the angle of real-world applicability (Muijs, 2022), as discussed below in regards to ecological validity. Furthermore, experimental designs may simple be too difficult in practice (Muijs, 2022); for example, in a school, many practitioners and parents may consider it unethical for one group of children to receive a potentially beneficial intervention, when other children do not. Quasi-experiments are also a form of experimental design, however, in quasi-experiments, random allocation does not take place (Black, 1999; Muijs, 2022). This is common in places such as schools, where random allocation into groups is not possible or feasible.

7.2.1 Ecological Validity

A common criticism of the experimental approach is its lack of ecological validity, or ‘real world’ experience. Within a live experiment, participants are well motivated, undistracted, know exactly what they are supposed to do, and have no other goals other than the task at hand (Eysenck & Keane, 2000). Put simply, the conditions have high internal validity and are near-optimal, which is what leads to this lack of real-world applicability, as results cannot be generalised into the ‘real world’ outside an experimental environment. Of course, a naturalistic approach would have higher ecological validity than an experimental approach, but the variables become much harder to assess in this design (Eysenck & Keane, 2000), with far more factors to consider, lowering the internal validity of the research.

7.2.2 Repeated Measures Experimental Design

A repeated measures design, often called a within subjects design, is one where each participant experiences all levels of the independent variable (Coolican, 2019). Participants must be naïve for each condition, and attempts should be made to mitigate the order effect (effects on participants based on the order of the measurements to be taken, changing it so that, in the case of three, some participants experience ABC, and some CBA, or BAC, for example). This order effect is fully mitigated in the online experimental design described in Chapter 9, as participants are presented with one of each condition on every page of the programme.

7.3 Diffusion Chains

The secondary data analysed in this thesis were collected at The University of Edinburgh using the diffusion chain method. This section describes the facets of this method, its drawbacks, and the ways it has been implemented in previous research on social transmission.

Psychologists and sociologists have long been interested in the transmission of information between people. Examples of dyadic interaction studies such as the 'Bobo doll' experiment at Stanford University (Bandura, 1977), have been influential in studies of social transmission. In this case, children watched an adult play with a doll in either an aggressive or non-aggressive way, before then playing with it themselves. This was followed by other studies looking at the ways in which children copy actions (Ellen & Fischer, 2013; Nielsen et al., 2012).

Replication versus innovation has been a key area of interest in diffusion chain studies, ever since the work of Bartlett (1932). One of the first studies on the diffusion of innovation was the work of Ryan and Gross (1943) who studied the usage of a hybrid-corn in Iowa, interested in how, and how fast, a particular type of corn had spread between farmers across an area (Hoppitt & Laland, 2013). Methods of reproduction became popular in the study of memory in the early 1900s, and it was Bartlett, who published his book 'Remembering: A Study in Experimental and Social Psychology', who introduced the idea of 'The Method of Serial Reproduction' that has become what we now call diffusion chains (Bartlett, 1932). This serial method was different from the method of repeated reproduction in that it asked participants to reproduce from the previous person, therefore creating a chain of reproductions (Bartlett, 1932). Participants were provided with some text or an image, and after a period of time, were asked to reproduce it from memory as accurately as possible; this reproduction was then given to the second participant who, after a period of time, also must reproduce it, and so on with the third and subsequent participants (Bartlett, 1932). The output of the first participant, or the researcher in some cases, is the stimulus or 'seed' for the next participant, and this continues down the chain until the last person has recalled, demonstrated, or transmitted the information (Axbey, 2019c; Flynn, 2008; Horner et al., 2006; Miton & Charbonneau, 2018).Through this method, a series of texts or images is produced which show changes over the course of the process which can then be analysed. Looking at information transmission in this way moves away from the dyadic approach, and attempts to mimic the creation of cultural traditions at a micro level as researchers can follow transmission and modification from the point of seeding (Hoppitt & Laland, 2013; McGuigan & Cubillo, 2013). Bartlett (1932) found that the main changes that occurred during the process of serial reproduction were: omissions of information, rationalisations of actions or events, transformation of details, or changes in the order or sequence of events described. He also found that in serial reproductions using images, there was 'a strong tendency to preserve apparently trivial or disconnected detail' (Bartlett, 1932, p. 185). Which, although different in methods, can be compared to the preservation of irrelevant information from a task, as investigated by McGuigan and Graham (2010).

Not merely investigating how memory worked, Bartlett undertook to establish how 'elements of culture, or cultural complexes, pass from person to person within a group, or from group to group'. He looked at how this transmission resulted in a conventionalised form of the original information, which could take an 'established place in the general mass of culture possessed by a specific group' (Bartlett, 1932, p. 118). The method of serial reproduction using linear transmission chains, therefore, sought to represent the real-life occurrence of information transmission between people and groups, simulating some aspects of cultural transformation (Kashima, 2000a, 2000b).

An interesting example of this can be seen in the study by Allport and Postman (1945), an experimental study where participants were shown a picture of two men talking in a subway. The white man holds a razor, but in over half of the experiments, at some stage the Black man is reported to be holding it, even said to be brandishing it wildly or threatening the white man with it. Authors emphasise the similarities between social memory and rumour, suggesting that the meaning that emerges through these processes is common to the social group or culture to which the people belong (Allport & Postman, 1945). Significant distortions introduced by a person tend to 'snowball' in the course of serial reproduction, and therefore variations in content within chains of reproduction are susceptible to idiosyncratic tendencies (Allport & Postman, 1945, p. 59).

Serial reproduction as a method fell out of use in the 1950s (Hoppitt & Laland, 2013) and the next prominent studies were not until the late 1990s and 2000s with several authors conducting studies to investigate the transmission of information from stories and other texts (Bangerter, 2000; Barrett & Nyhof, 2001; Griffiths et al., 2008; Kashima, 2000a; Stubbersfield et al., 2017). It was then that the term 'diffusion chain' started to become common usage, defined as a way of studying transmission across cultural generations, extending the work of Bartlett (1932) to include the culture aspect he had suggested was key.

An influential example of Bartlett's method being used to look at cultural change is Bangerter's 2000 study of 75 people, in 20 segregated chains of 4 reproductive generations, who were asked to reproduce a text describing the conception process. Bangerter (2000) found that word count decreased by more than 60% between the original and fourth generations. This study was seminal as it found that abstract biological descriptions progressively turned into anthropomorphic descriptions personifying the sperm and ovum, with stereotypical gendered attributes projected onto the gametes (Bangerter, 2000). This study was an extension of the 1997 study by the same author and Lehmann, and that itself was in response to a study from 1995 (Bangerter & Lehmann, 1997; Wagner et al., 1995). Bangerter stated that 'transformations of meaning arise when groups come into contact with new and unfamiliar ways of thinking' (Bangerter, 2000, p. 522), something that is later explored in diffusion studies of neurodivergence (Crompton et al., 2020b).

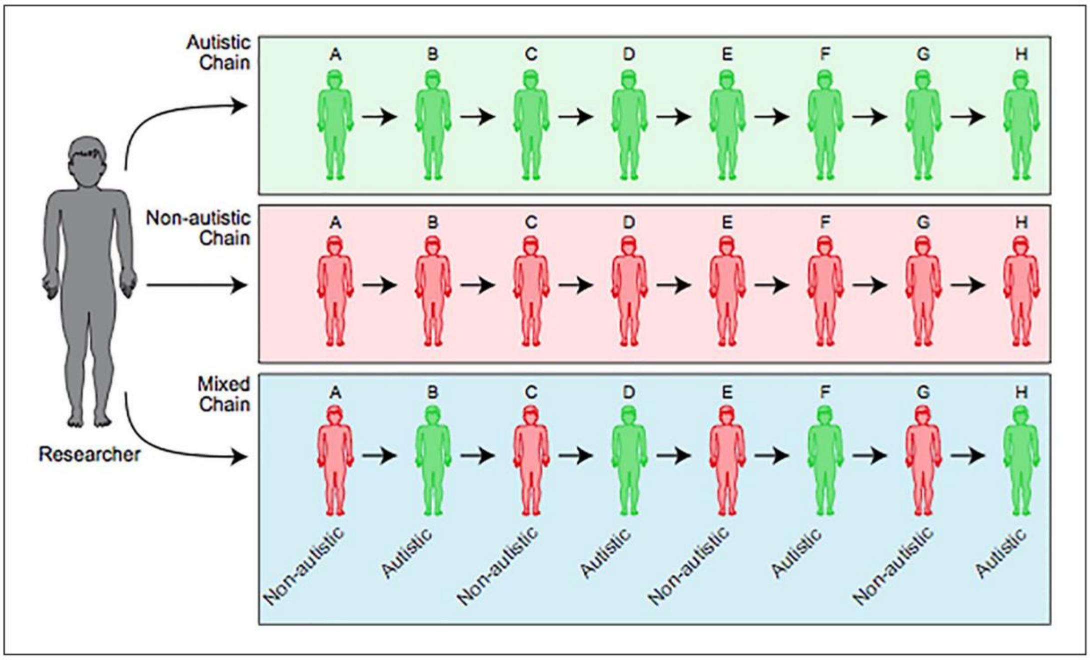

Figure 13: Example of a Diffusion Chain Set-Up from Crompton et al. (2020b, p. 3)

The nature of seeding affects the impact and speed of the diffusion; one-to-many transmissions result in rapid change and reinforcement, whereas many-to-one transmissions favour cultural conservation, a good example of the latter can be seen in family groups (Axbey, 2019c; Cavalli-Sforza & Feldman, 1981). In terms of seeding, there are two commonly used types of diffusion chain in the serial reproduction method: open and closed. The open method more accurately mimics the natural transmission of information, as the researcher does not control the speed of the transfer, who each participant interacts with, or the order of interaction (Axbey, 2019c). This produces a more realistic transmission, but is harder to control, and therefore to study, from the perspective of the researcher (McGuigan & Cubillo, 2013). Closed diffusion meanwhile, focus on one-to-one interactions pre-specified by the researcher, and although this linear approach loses the natural fluidity from social interactions that can be seen in open diffusion, it has a higher degree of experimental control, as it is easier to determine from whence the information came (Flynn & Whiten, 2008; Hoppitt & Laland, 2013; McGuigan & Cubillo, 2013). In addition to the initial seeding, the interpersonal relationships involved in the transmission are also important; Ellen and Fischer (2013) use the example of nursery rhymes, which are able to span over twenty generations due to the relationship between parent and child.

Studies of closed diffusion in recent years have taken the form of puzzle box tasks, where the participants each have to open a box through a series of steps (Flynn, 2008); this task can include seeded actions which are ultimately irrelevant to the mechanism (McGuigan & Graham, 2010). Another popular diffusion chain task is the story method, similar to those of Bartlett (1932) and Bangerter (2000), but using oral communication rather than written. This has the advantage of researchers being able to study transmission in those too young to yet be able to write fluently, and also to study the transfer of information orally, thus introducing further layers of communication to be analysed (Crompton et al., 2020b; Miton & Charbonneau, 2018; Stubbersfield et al., 2015).

Diffusion chains can also examine the difference in communication styles between and within different cultural groups. Using the same sample as in the secondary data analysed later in this thesis, Crompton et al. (2020b) investigated the trajectory of transmission between people in diffusion chains, with Autistic status as the control. Participants were asked to recount a story along the chains, which were split into 'Autistic', 'non-Autistic', and 'mixed' (neurodiverse). This allowed researchers to analyse the difference in information transference between and within groups, with the added element of cultural difference found within the groups from the social communication necessary to recount the story (Crompton et al., 2020b).

Cultural transmission studies have been criticised for producing vague characterisation of cultural units, although, over time, researchers are unlikely to misinterpret short-term behaviours as long-term adaptions like those seen in society (Ellen & Fischer, 2013). The diffusion chain method has addressed the earlier criticisms that the serial reproduction method was not an effective technique as it did not take into account the interactive nature of communication and the outcome of this on discourse (Bangerter, 2000; Gauld & Stephenson, 1967). Indeed, the method offers several advantages to others examining social learning; it allows for the control of extraneous variables and factors influencing social transmission, and lets researchers more accurately pinpoint the stage in transmission where corruption, imitation, or innovation occurs, and therefore to study this in isolation (Hoppitt & Laland, 2013).

Diffusion chains are a method of serial reproduction used to study cultural transmission, these chains can mimic the transmission of information in society which allows researchers to make inferences about the workings of interactions and interpersonal-relationships (Axbey, 2019c). Within cultural transmission, there are two stages: the awareness of the information or behaviour being transmitted, and then the acceptance of said information or behaviour by the recipient (Schönpflug, 2008). Transmission is reliant on where, when, and how it takes place, as well as the relationship between people; it is therefore easier to examine transmission when these factors can be controlled within a research environment using serial reproduction (Axbey, 2019c; Hoppitt & Laland, 2013; Schönpflug, 2008). More recently, diffusion chains have been used to study the transmission of information between those with similar and differing neurotypes, leading to questions about neurodiversity within our society (Crompton et al., 2020b).

7.4 Online Experimental Designs

The primary data collection of this thesis used online data collection. Before deciding to use this method, careful considerations were taken, including the benefits and drawbacks of online research. However, due to the COVID-19 pandemic, there were no alternatives for data collection for this thesis, and therefore, this approach was ultimately taken for reasons of feasibility.

Experimental designs historically took place in laboratories under close supervision from researchers. However, with the advent of the internet, and especially in the wake of the COVID-19 pandemic which saw a growth in online usage, more and more studies are taking place online, including those with experimental designs. Internet based experiments adhere to many of the same principles as true and field experiments, with some key differences; the reach of the research, and the fact that the researcher has less control over the research environment (Cohen et al., 2018; Coolican, 2019).

7.4.1 Reach

Online research is inherently more accessible; it can reach more people, and those people do not need to leave their homes to complete the research (Cohen et al., 2018), add to this the range of accessible features on computers, such as braille keyboards, audio description, and image descriptors, and online research has the opportunity to reach a much wider, and differently abled range of participants. Added diversity is especially good in situations where an in-person experimental design would yield a particularly homogenous group, such as in universities; for example, around 80% of undergraduate psychology students (a common participant pool) are female (Coolican, 2019). However, despite this greater diversity, some studies have found that those who take part in online experiments may be higher up the socio-economic scale, although this gap between online and live experimental results is narrowing (Coolican, 2019), perhaps even more so following the COVID-19 pandemic initiating greater internet usage.

It is also possible to get larger sample sizes due to this ease of gaining participants, and will cost the researcher less as less commitment is needed from the participants, as well as less equipment and lab time. These larger samples can lead to higher statistical power. Anonymity of participants is also easy to maintain (Cohen et al., 2018), given the researcher uses a secure platform, as the participants need not directly interact with the researcher, although this can lead to control issues, as mentioned below.

7.4.2 Environmental Control

Many of the factors that make online experimental designs useful, such as anonymity, ease of access, wide reach etc., can add to the disadvantages with this method. The freedom from experimenter bias by having the researcher separated from the participants can also lead to a lack of control over said research environment (Cohen et al., 2018). The ability of participants to take part in their own environments at times suitable to them leads to the experimenter having less experimental control as they have no control over the environment. Participants may not follow instructions, they may lie on questions, or they may have large variations in the devices they use to complete the task, such as screen brightness and resolution, or computer model and updated software (Coolican, 2019).

However, online experimental designs are superior to live experiments in terms of ecological validity, an oft criticised element of experimental designs in general (Eysenck & Keane, 2000). Within internet experiments, greater ecological validity is had because the research is 'coming to the participants'; it is conducted in settings familiar to participants, at times suitable to them (Cohen et al., 2018), indeed, the very things that make environmental control difficult for the researcher. Additionally, with the high degree of voluntariness within online experiments, more authentic behaviours can be observed, adding to this ecological validity (Cohen et al., 2018)

7.5 Timing

This PhD began in October 2019, and the focus of the first year was to study the literature regarding Autism and the history of the diagnosis, as well as preparing for the data collection planned in Year 2. A pilot was planned for March 2020, however, the COVID-19 pandemic hit in early 2020, leading to the original data collection which was planned, being deemed impossible. An online diffusion chain was trialled, with ethics approved by Durham University, however, this was found to be an unsustainable method of data collection due to difficulties in managing the sequence of participants via an online platform. A new design was then implemented, which needed to be piloted and evaluated. Primary data collection for the study in this thesis therefore did not occur until the August of 2021.

7.6 Sampling

There are several methods used to work out the required sample size necessary to be able to reach the conclusions the researcher wants to reach. G*Power (Faul et al., 2007) is a software first developed in 2007 to enable researchers to freely work out statistical phenomenon. This includes effect size, many different statistical tests of the t, F, and χ2 test families, and power analysis of z tests and some exact tests.

A common measure used to assign participants into groups is IQ (intelligence quotient). In previous Autism studies, such as the famous Sally-Ann test, IQ has featured highly. Although a valid measure for measuring someone's ability to complete tasks such as those on the IQ test, the concept of an 'IQ' to measure intelligence has its critics. Gould (1981) states that it is absurd to assign a single unitary, rankable, number to something as complex as human intelligence. Additionally, there is a great stigma attached to the idea of low intelligence, which leads to Autistic authors often having to assert that they are intelligent in order to be respected (Biklen & Duchan, 1994). However, this can end up being a double-edged sword, as these Autistic authors can then be disregarded for not seeming to 'speak for' or represent, those Autistic people deemed to be of low intelligence. This study has not gathered data on IQ of participants in the primary data collection, although data for IQ was collected for the original participants in the tower-building study designed and carried out by The University of Edinburgh.

7.7 Silences

Later in this study, for the analysis of data to answer the second research question, the length of silences between people will be analysed. Silences of ten seconds or longer will be considered significant. Research suggests that silences of three or four seconds or longer are considered uncomfortable; however, these were within situations where the primary aim was to take part in conversational discourse (Biglan et al., 1980; Dow et al., 1980; Wiemann, 1977). Additionally, Miura (1993) found that speech during a task that requires concentration can cause psychological stress and it raises cortisol levels.

Ten seconds, as coded in this thesis, adds a few extra seconds to the 'uncomfortable' level deduced by McLaughlin and Cody (1982), as the experimental task at hand is the primary goal of the interaction, not discourse. Participants were not instructed to talk to one another, and therefore, to use the time lapse measurements as set out in research with different aims would be inappropriate. Additionally, due to the nature of the experimental task, speech may hinder participants in tasks requiring concentration, therefore adding seconds takes into account the time taken to concentrate on the task at hand.

7.8 Summary

Cultural transmission can be measured in many different ways, and using a diffusion chain method is an experimentally sound method to be able to extract meaningful data from the study (Flynn & Whiten, 2008; McGuigan & Graham, 2010). The study in this thesis will examine the replication of a model by a chain of people, and the interactions occurring during those chains. The background literature to this study has been discussed, including the research questions involved, and the methods that will be employed to explore said research questions. For this study I will be taking a constructivist approach, with a qualitative analysis strategy with quantitative elements. From a reflexive researcher standpoint, I will examine my own insider and outsider positions within this research while examining the data. Additionally, ideas of post-colonial theory, feminist theory, and de-colonising disability studies will be woven into the analysis, to question how assumptions of Autism and disability are built upon foundations of male, Westernised norms.

8 Design and Methods of Secondary Data

This chapter will describe the methods used to explore the research questions outlined in Chapter 6 regarding Autistic communication, replication, and innovation through interactions. The interactions under consideration took place during a study conducted at the University of Edinburgh as part of the Diverse Social Intelligence study (Fletcher-Watson and Crompton, 2019), and analysis of these forms the results for this thesis. The methods of this thesis are organised into three themes, within two parts. The first two themes of *success* and *interactions* can be found within this chapter, as both of these themes concern the secondary data analysed. The third theme of *similarities* is explored in Chapter 9, as it concerns primary data collection using stimulus from the original task.

8.1 Background and Rationale

The literature in this thesis explored the history of the diagnosis that is now Autism, and the development of attitudes towards people considered disabled over the years. Models of disability were explored for their attributes, strengths, and weaknesses, with the neurodiversity model favoured for this particular research due to the new but growing body of evidence to support it. Explored then were the ways in which information is transmitted, as well as the nuances that must be considered when exploring the concept of Autism, such as intersectionality and post-colonialism. In the methodological approaches chapter, the diffusion chain technique, a tool used for studying information transmission, was explored, along with its strengths and weaknesses as a tool in quantitative and qualitative research. This chapter will use the research questions that were developed from the literature, and demonstrate how they were explored with the use of the methods described in Chapter 7.

The study detailed in this chapter investigates success within heterogeneous and homogenous neurotype chains as well as more closely examining the interactions between Autistic and not-Autistic people. This thesis first looks at the data collected by a team from The University of Edinburgh that takes the form of an experimental task using the diffusion chain method with Autistic and not-Autistic adults.

8.2 Research Questions and Themes

For this thesis there were several stages of research question development to consider. Having seen the data from The University of Edinburgh team, and using the literature explored, the first two research questions of this thesis were developed:

> *RQ1. Are there differences in cultural transmission task performance depending on the neurotype of the social partner?*
>
> *RQ2: How does reciprocal interaction between neurodiverse groups vary during a task?*

8.2.1 Hypotheses

The two paradigms considered when looking at creating hypotheses for these data were the neurodiversity or 'difference' paradigm, and the deficit paradigm. Using a theory of deficit, Autistic people would be expected to perform poorly compared to their not-Autistic peers, due to difficulties in communicating regarding task instructions and general poor rapport with their partner. The expected outcome for this task from this perspective would be that not-Autistic chains were the most successful, followed by neurodiverse chains, and then by Autistic chains. Additionally, given that poor motor skills are often associated with Autism (Ament et al., 2015; Lidstone et al., 2020), Autistic people could be expected to perform worse than their not-Autistic counterparts due to reduced dexterity ability.

Conversely, a neurodiversity paradigm using the theory of Double Empathy would suggest people are more successful when paired with someone with a similar neurotype, with Autistic people fairing no worse than their neurotypical counterparts (Crompton et al., 2020b; Milton, 2012). The expected outcome using this perspective would therefore be that Autistic and not-Autistic chains are equally successful, and that neurodiverse chains were less successful than the heterogenous neurotype chains. The deficit hypothesis for the second research question would assume the least reciprocal interaction in the Autistic chains, followed by the neurodiverse chains, with the not-Autistic chains exhibiting the most reciprocal interaction. However, the hypothesis for this thesis, based on the neurodiversity paradigm, is that there will be the least reciprocal interaction in the neurodiverse condition.

For the first research question, the hypothesis therefore was:

> *HRQ1: Performance may be slightly higher in the similar-neurotype chains.*

And for the second research question:

> *HRQ2: There will be the least reciprocal interaction within the neurodiverse condition.*

8.2.2 Secondary Data

To test these hypotheses, both qualitative and quantitative analyses were done. The dataset for the analysis of the first research question contained information on the success of both Autistic and not-Autistic participants, and which condition they were placed into to produce this result. This study was part of a larger study, a Templeton Foundation funded project, by the psychiatry team at The University of Edinburgh, and this experimental task formed one part of this project. Data from this project can be found at Crompton and Fletcher-Watson (2018).

The data provided by The University of Edinburgh were originally on a Microsoft Excel Comma Separated Values File, which was then transferred to a Microsoft Excel Worksheet, before being brought across to SPSS.

8.2.3 Experimental Design

A diffusion chain method was used for the experimental task (Flynn & Whiten, 2008). Participants were randomly allocated to either a single neurotype, or mixed neurotype chain. An experimental design was chosen due to its high internal validity; furthermore, the controlling of external factors leads us to make stronger claims regarding causality (Eysenck & Keane, 2000; Muijs, 2022). This was a live experiment as opposed to an online experiment, which allowed the researcher to control the environmental conditions of participants. A naturalistic approach would have made it much harder to assess the variables at hand, despite having higher ecological validity (Cohen et al., 2018; Eysenck & Keane, 2000). This task was designed and conducted by Catherine Crompton and Sue Fletcher-Watson as part of the Templeton-Funded project ‘Investigating the transfer of information in neurodiverse groups’ (Crompton & Fletcher-Watson, 2018).

8.2.3.1 Participants

Participants for this study were recruited by The University of Edinburgh through social media, community networks, and local Autism organisations. 72 were originally recruited, with 24 in each of the Autistic, not-Autistic, and neurodiverse groups. G* power was utilised to run a prospective power analysis (Faul et al., 2007), and for 95% power to detect medium effect of 0.5 (0.05 alpha error probability) the sample would need to be 66. 72 was chosen to allow for an equal number of eight-person chains in each condition, although, as explained below, only 71 participated in this task due to attrition.

The effect being tested for in this power analysis was the effect of chain type (Autistic, Not-Autistic, and Mixed Autistic and Not-Autistic [Neurodiverse]), and the order in the chain (1st, 2nd, 3rd, etc.), on the overall accuracy of data transfer between participants (Crompton et al., 2020b).

Participants in the three condition groups (Autistic, not-Autistic, and neurodiverse) were matched for gender, age, years of education, and intelligence quotient (IQ); all spoke English to a native level and did not have a clinical diagnosis of social anxiety disorder (Crompton et al., 2020b). Participants all scored within the typical range of the Wechsler Abbreviated Scale of Intelligence II (WASI-II) (Wechsler, 2011), and all not-Autistic participants scored below 32 on the Autism Quotient (AQ) (Baron-Cohen et al., 2001b). Although, as discussed in the literature chapters of this thesis, there are many difficulties associated with labelling Autism in these terms, the AQ is a common tool used by researchers to measure so-called 'Autistic traits', and therefore was used in this University of Edinburgh study to identify not-Autistic participants as distinct from Autistic participants. 33 of the original 36 Autistic participants were already diagnosed as Autistic, with the remaining three scoring above 32 on the AQ (Baron-Cohen et al., 2001b).

For this particular task, only 71 participated as one of the 36 Autistic participants was not present for this part of the research day. They were due to be the first participant in an Autistic condition; the participant due to be second in the chain therefore became first in chain, third in chain became second in chain and so on. The chain was only 7 people long as opposed to the other chains in 8.

8.2.3.2 Procedure

The experiment took place in a research suite in the Division of Psychiatry at The University of Edinburgh (Crompton et al., 2020b). There were nine diffusion chains in the study, all originally containing eight participants, though for this activity, there were seven composed of eight participants, and one composed of seven participants due to the attrition of one participant.

There were three chains of each of the conditions: 'Autistic', 'not-Autistic', and 'neurodiverse'. Due to the time needed for a number of tasks, each chain was run on a separate day, with each chain containing either all Autistic, all not-Autistic, or four Autistic and four not-Autistic participants. In the case of the neurodiverse chains, participants alternated within the chains, with the chains starting with a not-Autistic participant, followed by an Autistic participant in the second position (Crompton et al., 2020b).

Participants were aware of which chain condition they were in (Autistic, not-Autistic, or neurodiverse), and had not met any other participants before the research day. During the research day, participants maintained isolated rooms outside of the diffusion chain taking place, to maintain the validity of the study, as one study measured rapport between participants, and additional interaction would have impacted on this study (Crompton et al., 2020c). Each chain was organised in ascending age order, to reduce potential effects of age-related memory decline.

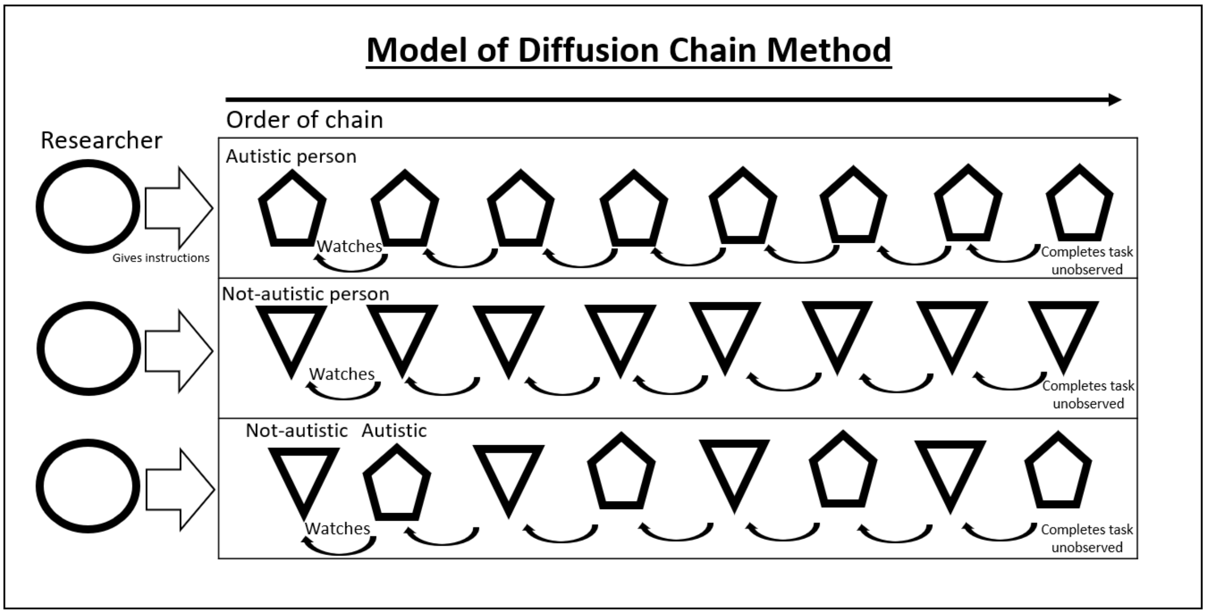

Figure 14: Model of Diffusion Chain Method

For the study and data analysed here, participants were asked to build a tower as tall as possible using spaghetti and plasticine in the space of 5 minutes. Details of the instructions given to participants can be seen in Appendix V. A participant would build the tower whilst being observed by the next participant in the chain, once they had finished, the participant observer would complete the task observed by the next participant in the chain. Participants were provided with a sand timer to give them an idea of when the five minutes was up. The image below shows a completed tower made out of spaghetti and plasticine. One piece of spaghetti is approximately 25cm long.

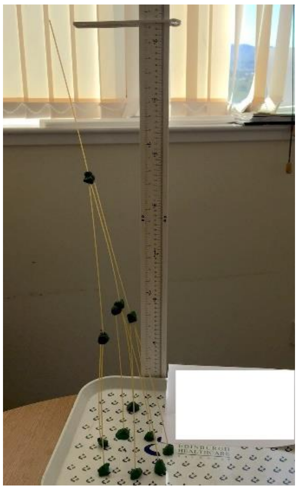

Figure 15: One of the towers built by participants

8.2.4 Data analysis plan

This section will lay out the methods that were used for the analysis of the data. These were developed prior to the analysis taking place, so as to provide a clear unbiased structure and plan for said analysis.

8.2.4.1 Theme 1: Success

As the task asked participants to create a tower as tall as possible, success is described in terms of how tall a tower was built, with taller being better. For this first theme of success, a basic quantitative analysis comparing means will be undertaken. Success is defined for this study as the height of the tower in centimetres. There are 71 cases, separated into three main conditions which can be easily analysed. As this was a diffusion chain study, as well as being in one of three conditions (Autistic, not-Autistic, and neurodiverse), participants can also be categorised by a number in a chain of seven or eight people, and by their binary Autistic status (Autistic or not-Autistic), so these can also be studied in terms of their success. An Analysis of Variance (ANOVA) can be conducted to establish if any differences observed between groups are significant. Following the guidelines by Curtis et al. (2018), post-hoc tests will only be conducted if F achieves significance ($p<0.05$).

The data provided by The University of Edinburgh took the form of the measure of success for each individual, as well as the condition they were placed into. For each participant, the following information was provided:

Table 4: Variables and their measures

Variable	**Measure**
Autistic Status	Binary: Autistic or not-Autistic
Condition	Categorical: neurosimilar (Autistic), neurosimilar (not Autistic), or neurodiverse (mixed not-Autistic and Autistic)
Success	Scale: continuous

8.2.4.2 Theme 2: Interactions

For the qualitative data: the second theme of interactions, the researcher viewed the data before deciding which elements to focus upon. There were 71 participants who took part in this study, all of whom built a tower for the task. As the last person in each diffusion chain completed the task without an observer, these will not be analysed for the second theme of 'interactions' due to the lack of a person to interact with. This leaves 62 videos to transcribe and analyse for themes.

A small sub-section of six videos will be used to determine which factor to focus on. These will be chosen from six different chains across the three conditions, and at different points in the chains, to allow for variety. These six videos will be transcribed and analysed before the rest of the data set also goes through the same process. During the analysis of this sub-sample, some codes for the full sample will be chosen. Videos are roughly five minutes in length; the starting point of each transcription will begin as the researcher closes the door, and the end point will be when they re-enter to end the task. NVivo will be used to help with the analysis of the transcripts as it is well designed for this process due to its set up of memos, coding, and nodes (Bryman, 2016).

After transferring the transcripts to NVivo, speakers will be coded, identified by their participant number, before moving on to the coding of the text from speech. Although these data are qualitative in nature, the coding may produce some numerical data that can be analysed statistically. This will be done using SPSS to compare means and, if necessary, to run analysis of variance (ANOVA) tests.

Finally, the researcher will be blind to the conditions these videos are from. Once coded, the condition (Autistic, not-Autistic, neurodiverse) will be added to each data file, however, to avoid potential bias from the researcher (see positionality statement in Chapter 7), this will be not labelled until after the coding has taken place.

This qualitative analysis uses content analysis, which was chosen due to the nature of the data; as a cursory viewing of the data showing that the pairs did not engage in extensive conversation, so analysing the frequency of certain topics was most appropriate. Content analysis is a systematic way of finding themes within the data and reducing the information into themes that can be explored within the whole narrative of the field (Kyngäs, 2020). This thesis therefore uses content analysis for this qualitative data as it allows the researcher to tally the instances of each topic within the conversations between participants (Lindgren et al., 2020). This method is similar to Braun and Clarke's thematic analysis method (Braun & Clarke, 2006), but is used to identify patterns in a way that can be quantified. Through transcribing the data, I will become familiar with the content, and can then code instances of each topic, in a way that can be tallied to create identifiable patterns across the dataset.

8.2.4.2.1 Silences

As part of the approach used, the length of silences in the task interaction was noted as a point for further exploration. Silences of ten seconds or longer were coded, this meant that participants were not talking, or making other verbal noises during this time. The number of whole seconds, starting at ten, spent in silence for each interaction was recorded, so that means of the three conditions (not-Autistic, Autistic, and neurodiverse) could be compared. These will be analysed along with the other themes established from the data.

8.2.5 Ethics

Ethical approval was provided by The University of Edinburgh for the collection of these data, reference number 265-1718/1. Approval was submitted on 28th March 2018 and granted on 10th April 2018.

Ethical approval for the analysis of the tower heights was deemed a low-risk project and approved on the 15/06/20 by Durham University School of Education Ethics Committee.

Ethical approval for the secondary analysis videos taken of the tower-building task was granted on the 18/08/20 by Durham University School of Education Ethics Committee.

All data transferred via The University of Edinburgh followed the data management guidelines.

8.3 Results: Theme 1, Success

Participants were asked to build a tower as tall as possible out of dried spaghetti and plasticine. Seventy-one participants took part in this task and were assigned to one of three conditions (diffusion chains): Autistic, not-Autistic, and neurodiverse (alternating Autistic and not-Autistic participants beginning with a not-Autistic person).

The average height of the towers built was 58cm (S.D. 22.129), with a range from 18cm to 106cm.

Table 5: Descriptive Statistics for Tower Height Measure

Descriptive Statistics for Tower Height Measure. Values in centimetres (cm)	
Mean	57.68
Median	53.00
Mode	50
Std. Deviation	22.129
Range	88
Minimum	18
Maximum	106

8.3.1 Conditions

The mean height of towers built was highest in the not-Autistic condition, followed by the Autistic condition, and then the neurodiverse condition.

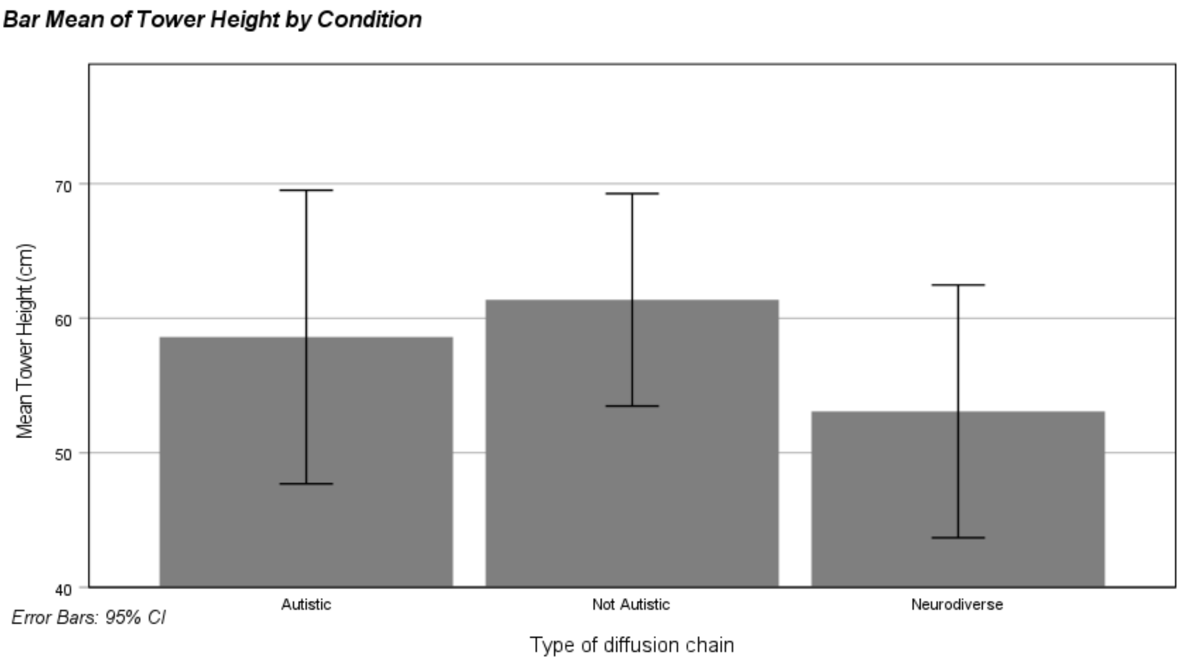

Figure 16: Mean height of towers by condition

The error bars covered a substantial area, therefore despite the slight differences, a statistical analysis was undertaken to see if these differences were significant.

Means and standard deviations for each condition can be seen in Table 6.

Table 6: Mean height of towers by condition

Mean Height of Towers by Condition			
Type of diffusion chain	Mean	N	Std. Deviation
Autistic	58.61	23	25.233
Not-Autistic	61.38	24	18.692
Neurodiverse	53.08	24	22.246
Total	57.68	71	22.129

A one-way analysis of variance (ANOVA) was conducted to see if these differences were significant. For this, the independent variable was the type of diffusion chain, whether the tower was built as part of a neurosimilar or neurodiverse chain of participants. The dependent variable was the height of the tower built, in centimetres, with success determined as a taller tower.

The one-way ANOVA comparing the effect of the condition (diffusion chain type) on the height of towers built revealed there was not a statistically significant difference in height between the three groups (F [2,68] =0.869, p= 0.424).

As the neurodiverse chains contained both Autistic and not-Autistic persons, an analysis was done to see if there was a statistically significant difference in success between these two groups. The dependent variable in this case is therefore the binary distinction by Autistic status.

Table 7 Mean height by Autistic status

Mean Height of Towers by Autistic Status			
Autistic status	Mean	N	Std. Deviation
Autistic	56.91	35	25.024
Not-Autistic	58.42	36	19.234
Total	57.68	71	22.129

A one-way ANOVA compared success (measured by tower height in centimetres) of Autistic and not-Autistic participants, but found no significant difference between the two groups (F[1,69] = 0.081, p= 0.777).

Success further varied based on the position in the chain, as can be seen in Table 8. These range from an average of 46.11cm in position three, to 68.00cm in position 6, a difference of over twenty centimetres.

Table 8: Mean height by place in diffusion chain

Mean Height by Position in Diffusion Chain			
Order in chain	Mean	N	Std. Deviation
1	55.67	9	13.257
2	63.11	9	21.351

3	46.11	9	23.369
4	47.89	9	14.987
5	58.33	9	25.372
6	68.00	9	28.609
7	65.33	9	22.929
8	56.88	8	21.689
Total	57.68	71	22.129

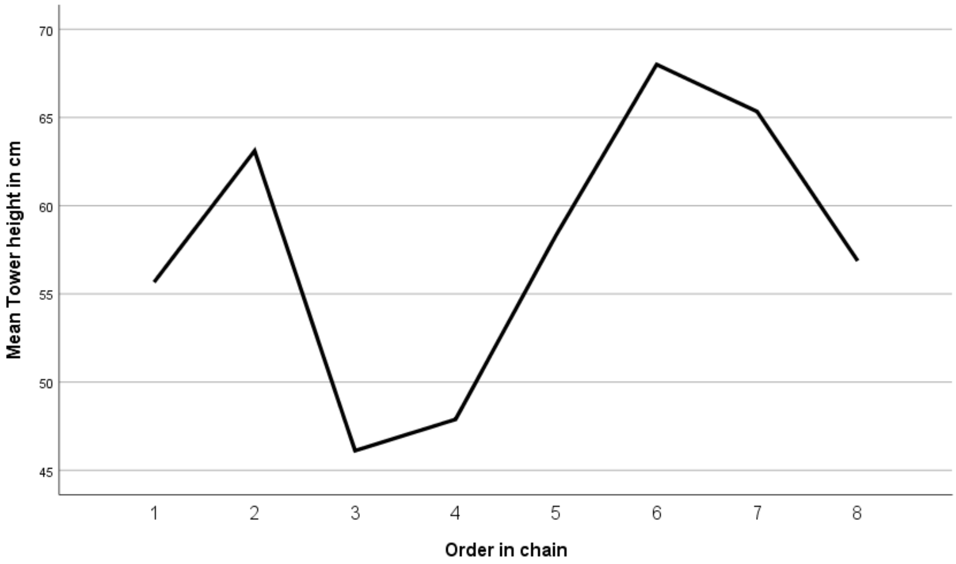

Figure 17: Mean height by position in chain

However, following a one-way ANOVA, these differences were found not to be statistically significant (F [7,63] = 1.143, p= 0.348). As none of these ANOVA's resulted in 40an F which achieved significance, no post hoc tests were carried out.

8.3.2 Unusual Data Points

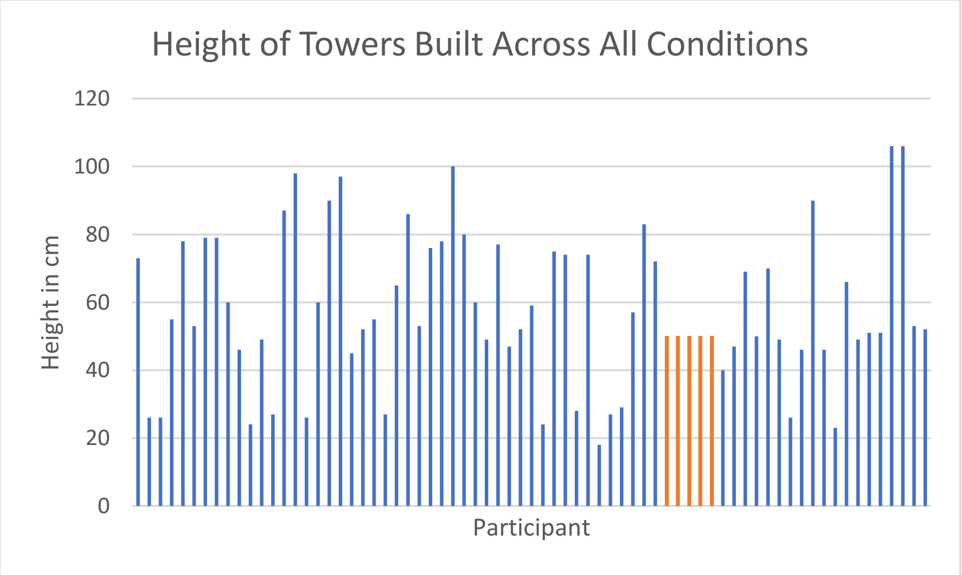

Figure 18: Tower Heights of all participants

As five participants in a row had towers of 50cm in height (in red), this was checked for accuracy. The videos were double checked to see the towers being measured in person by the researcher, and the still images containing the height written down were observed again. The towers were in fact this height, and it is worth noting that one piece of dried spaghetti is around 25cm long. Therefore, as many participants created a tower two-spaghetti-pieces high, it would ipso facto that many of the towers were around 50cm in height. It is interesting that five participants in a row, in the same chain, created towers of this height however, and may be due to similarity of design, which is examined later through the results of a similarity-ranking task created using a matching matrix to answer the third research question of this thesis.

8.4 Results: Theme 2, Interactions

For the study of interactions, a small sub-section of videos was analysed for themes to be explored further in the rest of the sample. Six videos, from six different diffusion chains, and from six different positions in a chain, were chosen and transcribed.

Each five-minute video took around one hour to transcribe. It was decided that transcription would start from the moment the researcher closed the door of the room being filmed, and end with them opening the door at the end of the task. This gave a clear cut-off point for every video, as it was impossible to tell exactly when the sand timer had finished, but it was much clearer to observe the opening and closing of the door.

8.4.1 Findings from Sub-Sample

The sub-sample provided the basis on which to analyse the rest of the videos, including which codes and nodes to use for the NVivo analysis. Each of these videos was from a different diffusion chain, and from a different point within the chain (1st person in chain, 3rd person, etc).

From the initial coding of the transcripts, differences between interactions appeared significant, particularly in regards to reciprocal conversation, and helping behaviours. The range in conversation was marked as a point for further analysis, as some discussed the task, others the research day, and some the diagnosis of Autism and their experiences with it. Of particular interest were the times when there was no reciprocal interaction, where the participants completed the task in near or complete silence.

For the analysis of the transcriptions for the remaining 56 videos, the following concepts will be coded and analysed:

- Discussion of task itself
- Discussion of the rules of the task
- Offering and accepting help
- Discussion of Autism
- Silences between participants

8.4.2 Findings from Full Sample

The analysis here is for the 62 videos transcribed and coded, this includes the six videos from the sub-sample used to establish themes. NVivo allowed for the coverage of each code to be calculated, so that, even if dialogue was not lengthy, the dominant topics would be clear. The percentages described below therefore refer to the percentage coverage of the full transcript for each interaction, averaged across conditions. This way of presenting the findings gave more importance to the topics, regardless of the number of total words spoken. Examples of interactions, in the form of extracts from transcripts, can be found in Appendix VI.

8.4.2.1 Discussion of task

Interesting to note is the difference in the amount of time participants discussed the task itself, not-Autistic participants were more likely to talk about the tower-building activity, or the research day. Using NVivo, analysis showed 69% coverage of 'Task talk' in the not-Autistic interactions (S.D. 20.54). This is compared to 66% in the neurodiverse chains (S.D. 23.46), and only 60% in the Autistic groups (S.D. 25.8). A one-way analysis of variance (ANOVA) found no significant differences between groups for this factor (F [2, 59] = 0.729, p= 0.487).

Discussion of topics not related to the task were also documented: in the not-Autistic condition, off-task talk covered 22% of conversation (S.D. 22.95), compared to 10% in the neurodiverse condition (S.D. 14.24), and 16% in the Autistic condition (S.D. 22.24). A one-way analysis of variance (ANOVA) found no significant differences between groups for this factor either (F [2, 59] = 2.041, p= 0.139).

8.4.2.2 Discussion of the rules of the task

Discussion of the rules of the task was consistent across conditions, with an average of 4% coverage in the not-Autistic condition (S.D. 3.46), and 5% coverage in both the neurodiverse condition (S.D. 6.04), and the Autistic condition (S.D. 6.22). A one-way analysis of variance (ANOVA) found no significant differences between groups for discussing the rules of the task (F [2, 59] = 7.127, p= 0.782).

8.4.2.3 Offering and accepting help

Offers of help were highest in the neurodiverse condition, with 6% coverage (S.D. 9.01), as compared to 3% in both the not-Autistic (S.D. 4.95) and Autistic (S.D. 4.51) conditions. In the neurodiverse condition, the instances of offers of help were equal from Autistic and not-Autistic participants (9 instances in each). A one-way analysis of variance (ANOVA) found no significant differences between groups for offering and accepting help (F [2, 59] = 1.070, p= 0.350).

8.4.2.4 Autism talk

Autism was only discussed in six interactions in two conditions: three Autistic and three not-Autistic, with none in the neurodiverse condition. However, discussion of Autism took up a greater percentage of time in the Autistic chains (15%, 21%, 65%) than in the not-Autistic chains (10%, 15%, 1%). Statistical analysis for this factor was not conducted due to the low number of instances.

8.4.2.5 Silences

The task itself was five minutes long, so the videos were all close to 300 seconds in length. Silences were recorded if they reached ten seconds or over, and then summed to reach a 'total silence' in seconds for each interaction. The range of total silences went from zero seconds (no silences of ten seconds or longer) to 303 seconds (the entire interaction took place in silence). There was a mean of 100.90 seconds, and a median of 72.50 seconds (S.d. 95.804 seconds).

Table 9: Descriptive statistics for silences in all conditions

Descriptive Statistics: Silence Total							
	N	Range	Minimum	Maximum	Mean	Median	Std. Deviation
Silence Total	62	303	0	303	100.90	72.50	95.804

When comparing conditions, the highest total mean time spent in silences over ten seconds was within the neurodiverse condition, averaging 142 seconds per interaction, which is an average of almost half the total time spent in silence. The means for all three conditions, and the total mean, can be seen in Table 10.

Table 10: Total silence by condition

Total Silence by Condition			
Chain condition	Mean	N	Std. Deviation
Not Autistic	37.71	21	44.195
Neurodiverse	141.57	21	107.707
Autistic	124.55	20	91.489
Total	100.90	62	95.804

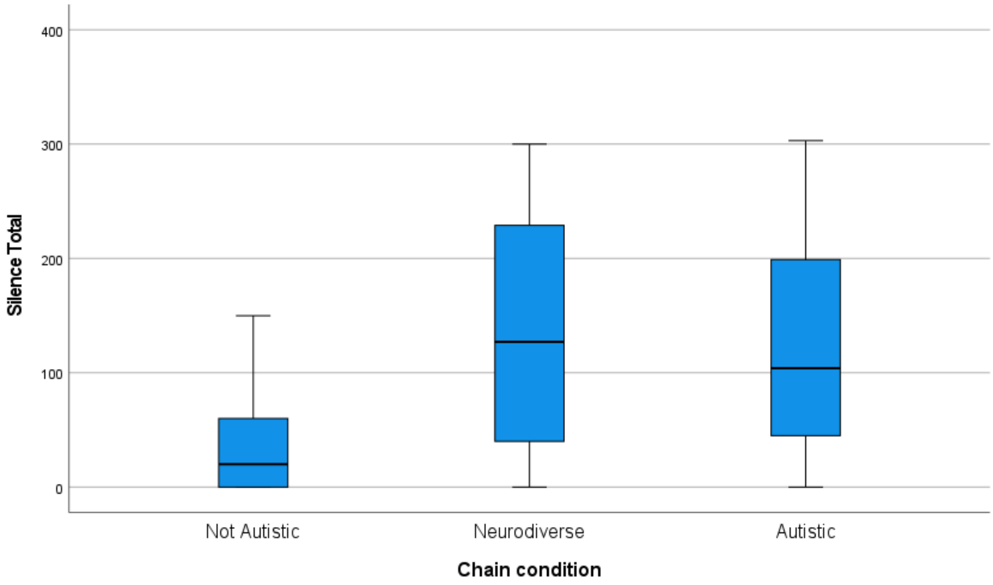

Figure 19: Total silence by condition

To see if these differences were significant, a one-way analysis of variance (ANOVA) was undertaken. The ANOVA showed there was a statistically significant difference in the total length of silences lasting ten seconds or more between the three conditions (F[2, 59] = 8.900, p<0.001).

A post hoc analysis with Bonferroni adjustment determined that the total silence between individuals in the neurodiverse condition was significantly greater than that in the not-Autistic condition (Mean difference ND minus NA: 103.86 [95% CI, 38.93 to 168.79], p<0.001) and silence in the not-Autistic condition was significantly shorter than in the Autistic condition (Mean difference NA minus A: -86.84 [95% CI, -152.57 to -21.10], p<0.01). The post-hoc tests revealed no significant differences in the total silence between participants in the Autistic and neurodiverse conditions.

Table 11: ANOVA of silences

ANOVA of Total Silence and Condition					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	129765.041	2	64882.520	8.900	<.001
Within Groups	430114.379	59	7290.074		
Total	559879.419	61			

8.5 Short Discussion (Themes 1 and 2)

Unlike story-based diffusion chain studies (Crompton et al., 2020b; Stubbersfield et al., 2015), in this experimental task, as the task was manual and not limited based on the information imparted by a partner, it was possible for the second participant to out-perform the first, and so on. This adds a layer of complexity to the analysis, as there is no 'base level' to compare to: participants may get lucky with their first idea, or be particularly competent at using their hands for fine motor skills. It is therefore not possible to draw final conclusions on 'success' in this task when looking at mere heights alone, as these may not be reflective of the social interactions that took place. It is therefore necessary to look at these interactions themselves, and what they could show us regarding rapport between participants, cultural transmission, and familial similarity in design. Empathy between people can be considered as a factor leading to higher rapport between participants, as people often find it easier to feel empathy towards, and understands the actions of, those with a similar personality or neurotype (Komeda, 2015; Komeda et al., 2009; Komeda et al., 2013).

8.5.1 Adherence to task

What was interesting to observe, was the dedication of the builder to the task when being observed. Some participants prioritised the task above all else, barely talking to their partner, and focusing on building their tower. These participants often began talking to their partner once they realised the sand timer had finished. Participants who checked the sand timer sometimes stopped working on the task when they saw the timer had finished, as opposed to waiting for the researcher to enter the room to tell them the task was over.

Other participants took a much more multi-tasking approach, talking their partner through the task, or chatting more generally while they constructed the tower. These participants often didn't notice the sand timer had run out and only finished working on their tower when the door reopened, and the researcher re-entered the room. Participants discussed the task more than any other topic, often verbalising questions about the 'rules' such as whether they were allowed to talk, or to talk to discuss the task, or the observer ruminating on whether they were allowed to help the tower-builder with their task.

8.5.2 Silence

As part of the analysis of the secondary data in this section, silences between participants building the spaghetti towers were measured. Silences of ten seconds or longer were recorded. This length of time fits with research by McLaughlin and Cody (1982) suggesting that silences over 3 seconds could be considered 'extended', balanced with the findings of Radun et al. (2021) who discovered that the sound of speech during tasks requiring concentration raises stress hormone levels. There was a marked difference in the amount of time pairs spent in silences of ten seconds or over, with the neurodiverse condition spending an average of 142 seconds in such silences, compared to the Autistic condition at 125 seconds, and the not-Autistic pairs spending an average of only 38 seconds. Such differences can be analysed in several ways; Autistic participants could be seen to be more empathetic to the needs of their partners, giving them more space and silence to complete the task. Alternatively, there could be a lack of rapport between the Autistic and not-Autistic people, leading to 'awkward' silences.

It is unlikely, however, that Autistic people are the sole reason for extended silences, as, if this were the case, the longest observed silences would have taken place within the Autistic condition, not the neurodiverse condition. The mere fact that significantly the longest silences observed were in dyads where one participant was Autistic and the other was not, shows that this mis-match in neurotype is at least somewhat responsible. However, as the post-hoc analysis showed no significant differences between the Autistic and neurodiverse conditions, this would need further examination in future studies.

People may choose to remain silent during interactions for a myriad of reasons. They may feel excluded from the group, they may not wish to contribute to the interaction, or not feel they are able to, or they may simply be concentrating on something else, in this situation: the task (Radun et al., 2021). They may also struggle to understand the language being used (Sharma, 2015), although in this study all participants were fluent English speakers. However, even within the English language there are regional and class colloquialisms that may not be recognisable to one another.

8.5.3 Limitations

Transcription in this circumstance was a difficult task, it was a struggle to hear what participants were saying; often participants would whisper, or speak over each other, and this, on top of a range of accents, and background noise of fans and traffic, made it hard to accurately transcribe every utterance. As mentioned in the positionality statement in Chapter 7, as an Autistic person, the researcher can struggle to decipher conversations with background noise, which added to the difficultly of the task of transcription, as each video required many more replays before the researcher was sure of what the participant had said.

Further research could involve larger sample sizes, or neurodiverse chains where participants are ordered differently to the neurodiverse chains in this study. No significant differences were found from this small-scale study, but this is significant in itself when critiquing the deficit-based model of Autism, as a deficit-based view could anticipate Autistic people performing worse than their not-Autistic peers (Crompton et al., 2020b).

9 Design and Methods of Primary Data

The previous chapter detailed the analysis of the secondary data as collected by The University of Edinburgh. Themes from this chapter were subdivided into success, and interactions. The third theme of *similarities*, concerns primary data collection using stimulus from the original task. This study has been published, Axbey et al. (2023), and can be found in Appendix XI. This study used the secondary data to create a quasi-experimental design to explore the similarity in design between the outputs achieved in the experimental task put to participants in Chapter 8.

9.1 Research Question and Hypothesis

Stimuli from the task described in Chapter 8 were used in a second, quasi-experimental, task, this time online, to investigate innovation and replication, and similarity perception among Autistic and not-Autistic raters. Once the first two research questions had been explored using secondary data analysis, one further research question was developed:

> *RQ3: Is there evidence of familial resemblance across chains of neurosimilar people?*

For the third research question, a deficit hypothesis could be considered from many angles in regard to innovation and replication. However, a neurodiversity-led hypothesis, used for this project, suggests the most innovation would arise from the neurodiverse chains. I therefore considered the literature on rapport between individuals with different neurotypes to produce a hypothesis:

> *HRQ3: There will be the most innovation from neurodiverse interactions.*

To investigate the research question, outputs from neurodiverse interactions would need to be studied for their similarity or difference. To ensure validity, as similarity can be a subjective judgement, multiple raters of similarity for these outputs would ensure the most valid conclusions. A similarity-judgement task was therefore created using an online platform, to ask raters what their perceived similarity between the results of the three conditions was. This study has been published in Axbey et al. (2023) and can be found in Appendix XI.

9.2 Primary Data Sample

The second, quasi-experimental, study seeks to investigate whether replication or innovation are more common within heterogeneous or homogenous neurotype groups. This study uses the images of the towers built by participants in the first study as a stimulus, and asks observers, both Autistic and not-Autistic, if they can differentiate which chain they came from based on similarity of design.

9.3 Design

A quasi-experimental design was chosen to collect responses regarding the similarities between stimuli. A computer programme was developed which allowed for the matching of multiple stimuli on a safe and secure platform. For the code and stimuli used in this see: Tullo et al. (2022). In order to control for age, gender, and Autistic status, these demographics would also need to be collected.

It was important to the researcher to make the question regarding gender as inclusive of all genders as possible, so the options were 'male', 'female', and then a free text box where people could enter their own text. This meant that participants were not bound by the binary male/female option, but that they were also not constrained by any further options. Many studies have found a link between Autism and a person identifying with a gender different to the sex assigned at birth (Sala et al., 2020; Warrier et al., 2020). Some studies have even dropped participants from analyses because of this association[11]. This author believes it is therefore even more salient to include the option to self-identify in demographic questions of gender when working with Autistic participants to afford appropriate participant choice.

9.4 Participants

A G*Power (Faul et al., 2007) a priori computation of required sample size was utilised to run a prospective power analysis for a repeated measures within factors design, and for 95% power to detect a small effect of 0.1 (0.05 alpha error probability) the sample size would need to be 84.

A common criticism of Autism studies is are that they have highly selective samples with restricted inclusion and exclusion criteria (Astle & Fletcher-Watson, 2020), and therefore for this study it was salient to include as many Autistic people as possible. The criteria were therefore merely that participants be over 18, with Autistic participants not asked to have a formal diagnosis. For the pilot, 31 participants were recruited via Prolific, with a median age of 24, and a range of 44 years. 14 identified as female and 17 identified as male, no participants identified otherwise. Two participants were self-diagnosed Autistic, and one was diagnosed as Autistic, the remaining 28 were not-Autistic.

For the main study, participants were recruited via Prolific and Twitter. This was to ensure a sizeable percentage of participants were Autistic, in order to address whether perception of similarity differed between Autistic and not-Autistic raters. The Twitter platform could be used to specifically target Autistic people, whereas Prolific charged significantly more to filter participants by diagnosis, so this platform was used to recruit participants from across neurotypes. Of the 351 participants, 302 (86%) completed the task via Prolific, and 49 (14%) through Twitter in a post aimed at Autistic adults. Of the 302 Prolific participants, 31 of these were the pilot group who completed the same task, but on an earlier date to the other 271.

Of the 351 participants (including pilot sample), 289 (82.3%) were not Autistic, and 62 (17.7%) were Autistic (43 diagnosed). The mean age of participants was 32, with a median of 28 (range= 18-72). Of the total sample (Autistic and not Autistic), 61% of participants identified as male (n=215), 36% as female (n=127), and a further 3% (n=9) preferred to self-describe in the text-box provided. Of the Autistic sample, 66% (n=41) identified as woman, 21% (n=13) as men, and 13% (n=8) preferred to self-describe.

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[11] See Kapp, S. K., Gillespie-Lynch, K., Sherman, L. E., & Hutman, T. (2013). Deficit, difference, or both? Autism and neurodiversity. *Developmental Psychology, 49*(1), 59-71. https://doi.org/10.1037/a0028353 where transgender and intersex participants were dropped from analyses as gender and Autism were not independent of one another. Gender was subsequently analysed as a binary male/female variable.

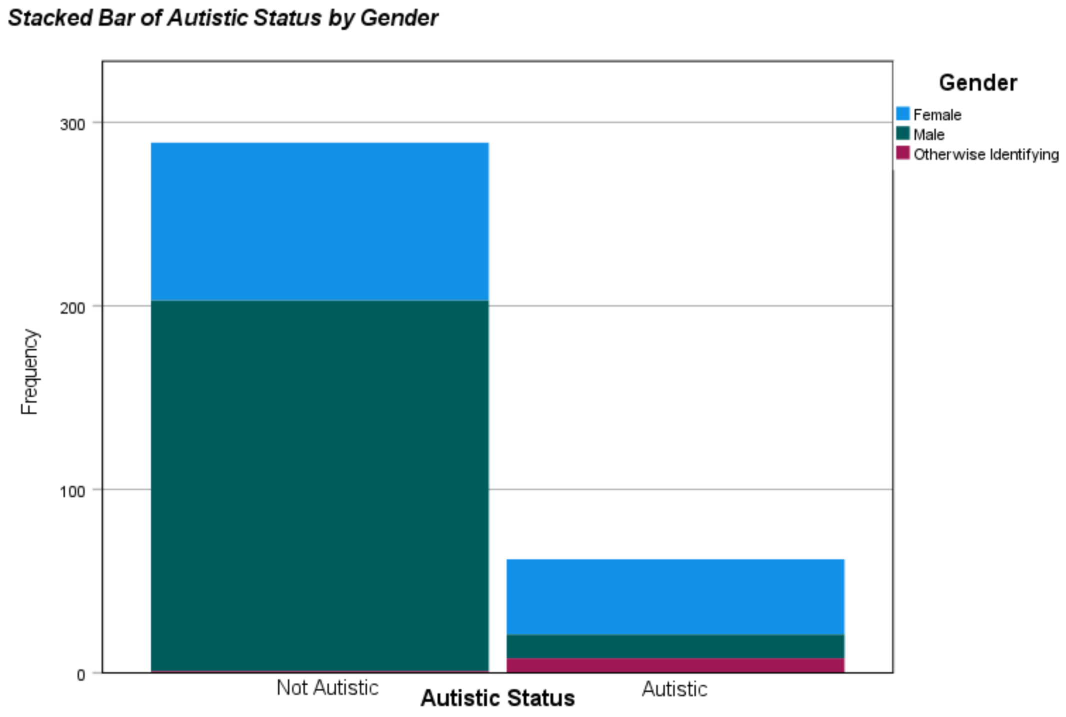

Figure 20: Bar graph of Autistic status by gender

As can be seen in the figure, a larger proportion of the Autistic sample identified as female, whereas in the not-Autistic group, the largest gender by group is male identifying.

9.5 Instruments

In collaboration with The University of Edinburgh, a computer-based programme was developed for use in this study. Details of the specifics of the programme can be found at Tullo et al. (2022). The aim of said programme was to allow participants to view images of stimuli from Chapter 8, and to collect data on their responses.

The similarity judgement programme was developed so that images could be matched for whether the appeared to be similar or not. This was done by allowing matches to be made between the products of the task described in Chapter 8 by clicking to link two images.

The pilot allowed for testing of the programme developed by Tullo et al. (2022) with a small number of participants; this also gave the chance to receive feedback and make any necessary changes before the main study. The programme was adapted following the pilot to allow participants to be able to check the instructions again at any time during the study.

9.6 Procedure

Using the programme developed by Tullo et al. (2022), participants were presented with a screen containing six images of towers built during the research days described in Chapter 8: three at the top and three underneath. These photos corresponded to towers from the same point in chains, with two chronologically from each of the three chain conditions of Autistic, not-Autistic, and neurodiverse (mixed neurotype). This mix of conditions on each page attempted to mitigate against the order effect oft criticised in repeated measures designs (Coolican, 2019), although participants were naïve to this fact.

Participants were asked to match images, and in the data, they received either a 'correct' (1) or an 'incorrect' (0) score. As there were three matches to be made, and participants were required to make a guess at all three, participants were only able to get none, one, or three correct matches on each page.

The instructions for participants were as follows:

> *"In a previous study we asked people to build towers out of spaghetti and play-doh*
>
> *Now, we want to ask you to decide how similar the towers were to each other.*
>
> *We're going to show you six photos of spaghetti towers; three on the top row and three on the bottom row. Your job is to pair up the pictures, according to how similar you think they are.*
>
> *Click on a picture in the top row, and then click the tower on the bottom row that you think is most similar, to create a linked pair. You must make three links to move on to the next screen.*
>
> *Sometimes there will be one photo that really doesn't look like any of the other towers on the page. You still have to pick a pair for it!*
>
> *If you're not happy with your choices click "Clear" to remove them and start again. Once you click "Submit" your choice is recorded and you can't go back. Please don't use your browser's "back" button as this will exit the experiment!"*

To practise, participants were presented with the following screen containing three different breeds of dog:

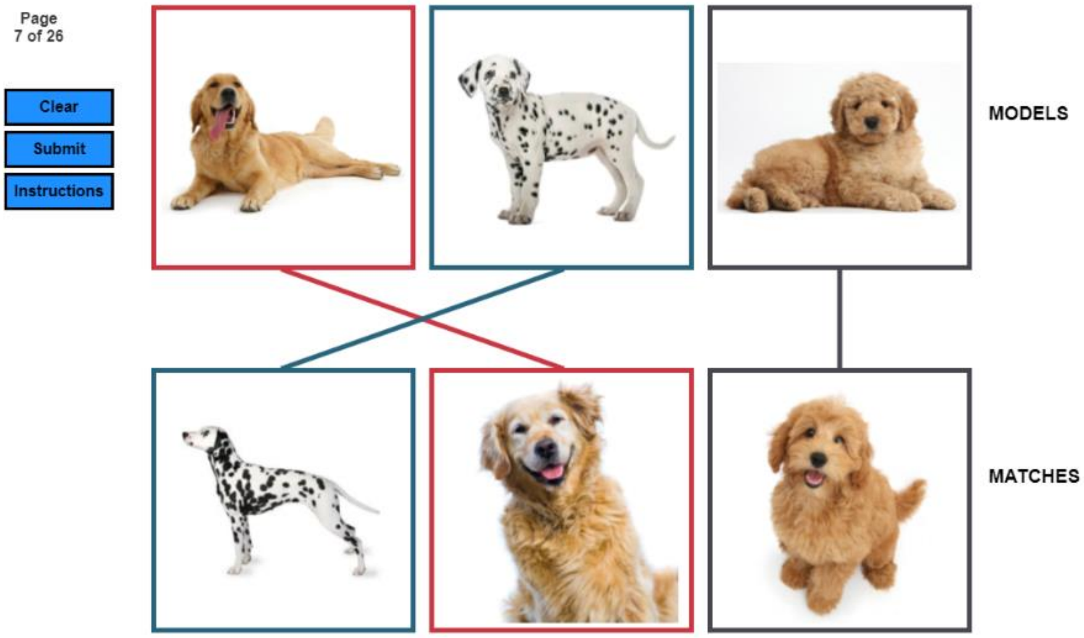

Figure 21: Screenshot of first screen from task (practise slide)

This allowed them to get to grips with the matching system before being shown the more complex pictures of the towers. Participants were then presented with 18 screens, like the one below, containing the towers from the research day described in Chapter 8[12].

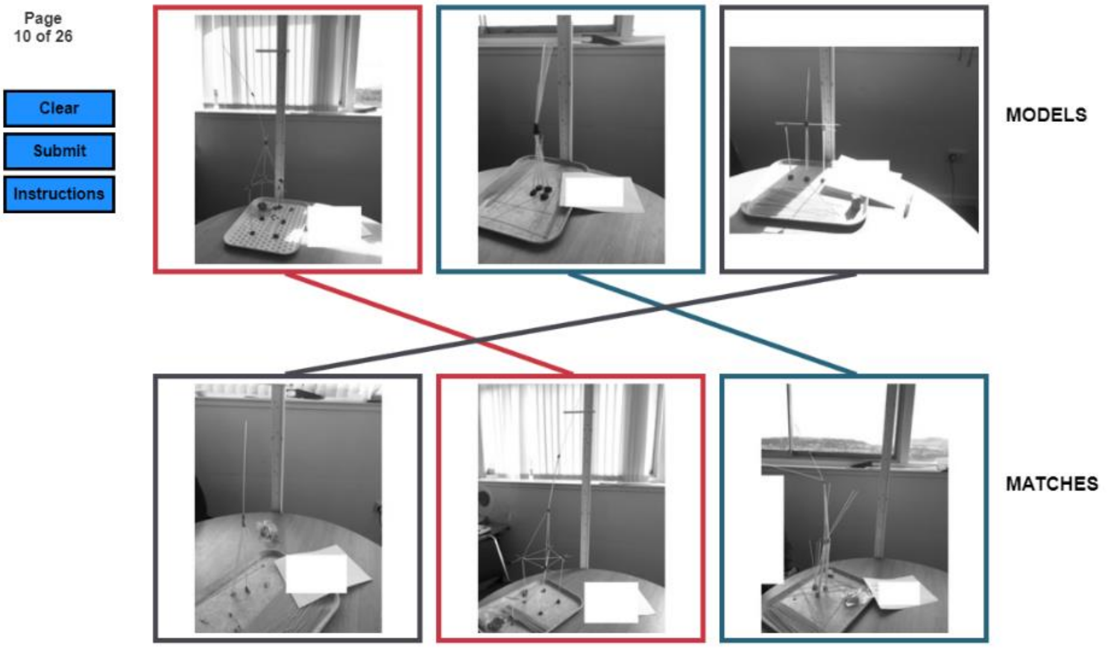

Figure 22: Screenshot from matching task

On the last page of the task, participants were given a completion code and reminded to take note of this.

Following a pilot on Prolific, and feedback from participants, a change was made to the procedure so that it was possible for participants to view the instructions at any time (see below the 'submit' button in Figure 22.) This change was not considered significant enough to exclude the results of these participants from the final analysis.

9.6.1 Reimbursement

Prolific participants were reimbursed £0.84 for around 8 minutes of their time. It would not have been feasible to pay the Twitter participants this amount, as there was not the infrastructure Prolific has. Therefore, Twitter participants were offered the chance to be entered into a draw to receive a £50 Amazon voucher. Of the 49 who completed the study via Twitter, 14 emailed with their completion code to be entered into the draw. The numbers 1-14 were then placed in a random number generator and the winner was emailed the voucher.

The number of participants who emailed to enter the voucher competition was much lower than the number who were eligible to email in. It can be assumed the other participants either did not want to take part in the draw, or did not read the tweet fully when it asked them to send their completion code for a chance to win.

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[12] This screenshot does not necessarily show the 'correct' matches for these towers, this is merely a demonstration of the matching task page.

9.7 Data analysis plan

Each participant would produce 54 ratings of similarity: three per page of the 18 pages of the task. There will be 18 ratings per condition (not-Autistic, Autistic, and neurodiverse [mixed Autistic and not-Autistic]). Averages can therefore be calculated for the overall similarity judgement of each participant across all 54 judgements (how many ‘correct’ matches they make), and across the three conditions (how many ‘correct’ matches they make per Autistic/not-Autistic/neurodiverse condition).

For each participant taking part in this study, the following information will be collected:

Table 12: Variables and measures for theme 3

Variable	Measure
Autistic Status	Categorical: Autistic (diagnosed), Autistic (self-diagnosed), Not-Autistic
Age	Scale: continuous whole numbers starting from 18
Gender	Categorical: Male, Female String: Otherwise Identifying (free text box)
Mean of matches for 18 judgements of towers in Autistic condition	Scale: between 0 (all incorrect) and 1 (all correct) An average of 0.5 would show a participant correctly matched half of the towers to one of the same condition
Mean of matches for 18 judgements of towers in neurodiverse (mixed Autistic and not-Autistic) condition	As above
Mean of matches for 18 judgements of towers in not-Autistic condition	As above

As each participant makes several judgements, a repeated measures ANOVA with Greenhouse-Geisser correction will be used to analyse whether any differences between conditions are statistically significant. This will be done for the pilot as well as the main study, although it is accepted that the sample size for the pilot will be considerably smaller. Age and gender will be included as co-variates. As in Methods 1, post-hoc tests will only be carried out if F achieves significance $p<0.05$ (Curtis et al., 2018).

To investigate the question of whether perception of similarity differs across neurotype, the judgements for Autistic and not-Autistic participant raters will also be compared to see if there are any statistically significant differences.

9.8 Ethics

Ethical approval for the tower similarity rating pilot was granted on the 20/11/20, with approval for the full project being granted on 24/02/21.

All data transferred via The University of Edinburgh followed the data management guidelines.

9.9 Results: Theme 3, Similarities

Following on from the analysis in Chapter 8 of the interactions in Theme 2, and the analysis of success in Theme 1, similarity was tested as a third theme. For this, independent raters were asked to judge the similarity of towers through a matching task (Tullo et al., 2022) which was piloted with 31 participants before the rest of the participants took part.

9.9.1 Pilot

The mean similarity reported by participants varied by condition, with the towers in the not-Autistic condition being rated the most similar (x̄= 0.620, s.d. 0.0963), followed by the neurodiverse condition (x̄= 0.593, s.d. 0.144), with the Autistic condition judge as having the least similarity of output (x̄= 0.590, s.d. 0.107). However, when using an ANOVA with repeated measures with a Greenhouse-Geisser correction, the mean scores for similarity were found to not be statistically significantly different (F[1.979, 59.378] = 1.275, p= 0.287). One-way ANOVAs for gender and Autistic status also found no significant differences in judged similarity (F[1, 29] = 0.722, p= 0.402), (F[1,29] = 0.593, p=0.448) although this is a small sample so such statistics cannot be relied upon to inform conclusions about any hypotheses at this stage.

9.9.2 Full

The full study, including the 31 participants from the pilot, comprised 351 participants rating the similarity of towers built in three different conditions. Similarity was judged as highest in the not-Autistic condition at 0.580 (s.d. 0.121), and lowest in the neurodiverse condition at 0.544 (s.d. 0.130). The Autistic condition fell between these two results at 0.560 (s.d. 0.123).

Table 13: Similarity by condition

Average Judged Similarity from Correct Matches			
	Mean	Std. Deviation	N
Mean Correct Not Autistic	.5801	.12137	351
Mean Correct Autistic	.5603	.12285	351
Mean Correct Neurodiverse	.5443	.13048	351

The judged similarity of towers differed significantly between conditions, as shown by a repeated measures ANOVA (F [696] = 5.968, p< 0.05; Partial Eta Squared=0.17), using age and gender as co-variates. A post hoc analysis with Bonferroni adjustment determined that the similarity between towers in the neurodiverse condition was significantly less than that in the Autistic condition (Mean difference ND minus A:-0.016 [95% CI, -0.031 to -0.001], p<0.05) and the not-Autistic condition (Mean difference ND minus NA:-0.036 [95% CI, -0.051 to -0.021], p<.0005). The similarity between the not-Autistic and the Autistic conditions also differed significantly (Mean difference A minus NA:-0.020 [95% CI, -0.036 to -0.004], p<0.05).

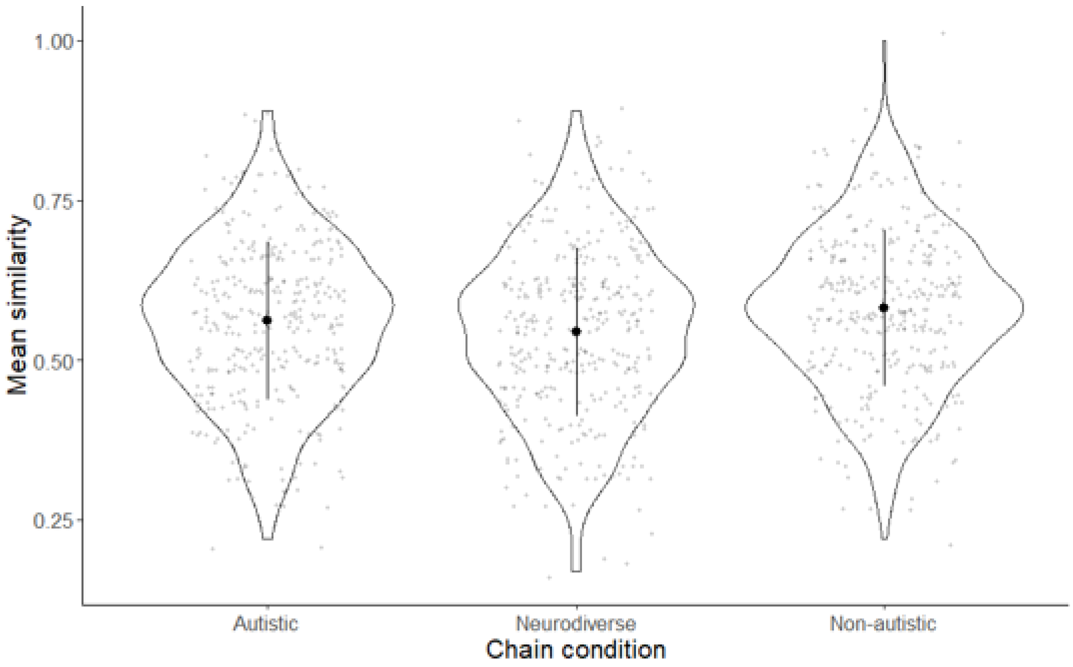

Figure 23: Violin Plot of Judged Similarity Between Conditions (from Axbey et al., 2023)

A Cohen's d calculation using pooled standard deviations showed that the difference between the similarity judged between the Autistic and neurodiverse conditions' chains had an effect size of d=-0.126 (SD_{pooled} = 0.127). The effect size between the not-Autistic and the neurodiverse conditions was larger, at d=-0.284 (SD_{pooled} = 0.126).

9.9.2.1 Autistic Status of Rater

Similarity judgements did not differ statistically significantly depending on the Autistic status of the rater (F [1, 349] = 1.529, p= 0.22). Furthermore, not-Autistic raters in this study were no more or less likely to identify similarities between towers built by not-Autistic people (F (1, 349) = 1.134; p = 0.288), and Autistic raters were no more or less likely to identify similarities between towers built by Autistic people (F (1, 349) = 0.988; p = 0.321).

Table 14: Similarity by Autistic status

Similarity Scores in Conditions by Autistic Status of Rater					
Autism Status Binary		Mean Correct: Not Autistic Condition	Mean Correct: Autistic Condition	Mean Correct: Neurodiverse Condition	Mean Correct: Total
Not Autistic	Mean	.5769	.5573	.5409	.5584
	N	289	289	289	289
	Std. D	.12074	.12606	.13306	.10635
Autistic	Mean	.5950	.5744	.5600	.5765
	N	62	62	62	62
	Std. D	.12418	.10643	.11744	.09534
Total	Mean	.5801	.5603	.5443	.5616
	N	351	351	351	351

	Std. D	.12137	.12285	.13048	.10459

Table 15: ANOVA of Autistic status and similarity scores

ANOVA Table for Autistic Status and Similarity Scores

			Sum of Squares	Df	Mean Square	F	Sig.
Mean Correct NT * Autism Status Binary	Between Groups	(Combined)	.017	1	.017	1.134	.288
	Within Groups		5.139	349	.015		
	Total		5.156	350			
Mean Correct Autistic * Autism Status Binary	Between Groups	(Combined)	.015	1	.015	.988	.321
	Within Groups		5.267	349	.015		
	Total		5.282	350			
Mean Correct Mixed * Autism Status Binary	Between Groups	(Combined)	.019	1	.019	1.093	.297
	Within Groups		5.940	349	.017		
	Total		5.959	350			
Mean Correct Total * Autism Status Binary	Between Groups	(Combined)	.017	1	.017	1.529	.217
	Within Groups		3.812	349	.011		
	Total		3.829	350			

9.10 Short discussion (Theme 3)

Innovation versus replication is a topic of interest within the field of cultural transmission studies (Carr et al., 2015; Rawlings et al., 2017). Evidence from The University of Edinburgh suggests that there may be neurotype-specific interactions, which lead to higher rapport between those with an Autism diagnosis or between those who are not-Autistic (Crompton et al., 2020b; Crompton et al., 2020c). It could be hypothesised that those with higher rapport have a higher likelihood of imitation rather than innovation. Additionally, if there are neuro-specific ways of interacting, then Autistic dyadic, and not-Autistic dyadic, transmissions could result in more similar outcomes than the heterogeneous Autistic-not-Autistic dyadic ones.

In the experimental task conducted as part of the ‘Diverse Social Intelligence’ project (Fletcher-Watson and Crompton, 2019) described in the previous chapter, participants watched the previous person in a diffusion chain construct a tower, before then constructing their own tower in front of another participant. The heights of these towers have been analysed in Theme 1, and there were no statistically significant differences in success across conditions.

The study described in this chapter investigated whether the designs of the towers differed across conditions, looking at whether participants from the stimulus study were more likely to replicate or innovate. In this second, quasi-experimental, task, asking raters to provide their Autistic status allowed the extra analysis of whether there were any differences in similarity judgement between Autistic and not-Autistic raters. In the study by Matthews et al. (2012), spaghetti towers became recognisable as being from a subpopulation (the chain from which they came) over a few generations. In that study, participants were not organised into groups based on any specific demographics, and yet this emulation effect was still seen. In this study, participants were organised into subpopulations based on neurotype, and the statistical significance in the similarities between the tower outcomes show that there was an effect from the either neurosimilar, or neurodiverse interactions on the imitation and emulation occurring in tower construction.

The average age of participants was only 32; this skew towards the younger age group could be attributed to the nature of the study; being hosted online could have attracted younger people to participate, although, given the timing of the study during the Coronavirus pandemic, it cannot be argued that older people would not have had access to the study. Interestingly to note, the number of people identifying as neither male nor female is higher in the Autistic group. Only 0.35% (n=1) of the not-Autistic sample identified this way, compared to 12% (n=8) of the Autistic sample. This fits with the findings from Warrier et al. (2020) who found that people who do not identify with the sex they were assigned at birth (transgender or gender-diverse) are three to six times more likely to be Autistic than those who do (cisgender people). Although this is a small sample so no conclusions can be drawn from this.

Olu-Lafe et al. (2014) suggested that their results showed Autistic people took longer to complete shape-integration tasks than their not-Autistic peers because of trouble integrating local information. There is no evidence to suggest this in this study, as similarity scores did not differ based on the neurotype of the rater.

Using each of the neurosimilar groups (not-Autistic and Autistic) as the 'baseline', these results show that the neurologically heterogeneous condition produced towers that were less similar. In the case of neurodiverse versus not-Autistic, the difference shows that mixing neurotypes had a small effect (Cohen, 1988). These findings support the hypothesis that there would be less replication within neurodiverse chains. This could be due to the double-empathy problem leading to a mismatch in sociality styles, leading to lower rapport between the social actors, and therefore participants choosing to innovate rather than copy the person they had watched already.

The finding that participants were no more likely to judge towers built by people with the same neurotype as them could be said to go against the findings by Komeda et al. (2009). However, as this task was a more abstract, and much less socially-based, task than the story-task by Komeda et al., the two cannot be compared directly. However, the finding that towers were judged to be more similar in the single-neurotype condition do support the empathy findings by Komeda et al. (2009) and Komeda et al. (2013) as the building itself involved a social element.

Further research could expand upon these findings with new stimulus, such as a different type of tower-building task. This would allow for new images, which could be provided in colour, and would increase the reliability of the findings with regard to innovation and replication in neurologically-heterogenous chains of adults. Furthermore, this study could be expanded to look at neurodivergences other than and including Autism, such as ADHD, to see if neurodivergence in general, or diagnostic match, has a larger effect on participant replication rate. Additionally, this study could be expanded to have a larger number of independent raters, potentially with a larger age range to include participants under 18.

The next chapter will consider these findings, together with the findings from the first two themes, and will incorporate literature from the exploration of all the concerns of this study to draw together conclusions on the interactions, innovations, and replications of neurosimilar and neurodiverse communications.

10 Discussion and Conclusions

> *“Change over time in the ways that human differences are understood creates both the opportunity and the obligation to reinterpret socially constructed knowledge” (Smukler, 2005, p. 12).*

10.1 Introduction

Born out of the researcher’s own desire to explore the models of disability surrounding Autism and their evidence, this study had four main concerns:

A. *How Autism has developed over the years as a phenomenon;*
B. *The different models that have been used to describe Autism, and how the world interacts with neurodivergence;*
C. *How Autistic communication is conceptualised within models of difference and disability;*
D. *Neurotype-specific interactional and communication differences.*

Literature has been explored concerning the history of Autism, and how it has changed drastically over the last century. Different models were considered, as well as their proponents, and the direction that research is heading in regards to the social model of disability and the emergence of the neurodiversity movement. From the final concern, research questions were developed, which led to results exploring the themes of success, interactions, and similarities, all using knowledge from the literature into Autism and models of disability.

Despite diversity breeding innovation, the underrepresented groups that diversify organisations have less successful careers within them (Hofstra et al., 2020), showing a lack of accreditation to the people meriting the businesses. In this thesis, the interactions between Autistic and not-Autistic participants were studied using a quantitative analysis of success paradigms, and qualitative investigation using analysis of discourse between participants. The similarities in the products produced by these people were further analysed by independent raters for their similarity.

Overall, what stands out from this research is the persistent lack of supporting evidence for a deficit hypothesis. Autistic people did not perform worse than their not-Autistic counterparts in tasks where success could be measured, and their topics of conversation did not differ significantly depending on whom they were talking to. Silences between people were highest when there was a mismatch of neurotype, suggesting, if we are to use ongoing reciprocal verbal interaction as a rapport measure, that these interactions were the least ‘successful’ in this regard. Again, this does not support the deficit hypothesis, which would suggest Autistic people are less social, with less social motivation, and are therefore less likely to initiate social contact than their not-Autistic peers.

Through the analysis of the similarities of the outcomes of neurosimilar and neurodiverse interactions, this thesis explored whether people would be more likely to innovate or replicate depending on the match or mismatch of neurotype with their social partner. This relates to theories of rapport and empathy, and also to ideas of in-group and out-group behaviours. Findings suggest that people are more likely to innovate in a neurodiverse setting, which this author suggests could be seen as both evidence of the double empathy problem suggested by Milton (2012) , and the idea that diversity breeds innovation.

The findings of this thesis can therefore be collected into three sub-conclusions:

- Autistic people performed equally well in the task
- There were differences in interaction styles between the three conditions. Significantly in regards to length of silence, and minorly in terms of some topics of conversation
- Neurodiverse interactions resulted in more varied outcomes in the task.

These findings will be discussed in regard to the literature examined, as well as part of a broader discussion on Autism studies and its future direction. Due to the COVID-19 pandemic, fewer data were collected than anticipated, therefore the focus of the discussion will be mostly on the implications for future research looking at innovation, replication, and Autistic social interactions.

10.2 Research Questions and Hypotheses

For this thesis, the following research questions were examined, and hypothesis developed for each one is as follows:

RQ1. Are there differences in cultural transmission task performance depending on the neurotype of the social partner?

HRQ1: Performance may be slightly higher in the similar-neurotype chains.

RQ2: How does reciprocal interaction between neurodiverse groups vary during a task?

HRQ2: There will be the least reciprocal interaction within the neurodiverse condition.

RQ3: Is there evidence of familial resemblance across chains of neurosimilar people

HRQ3: There will be the most innovation from neurodiverse interactions.

10.3 Original Contribution

The literature explored within the early chapter of this thesis revealed a dearth of information on neurodiverse interactions. Information transmission is at the heart of all interactions between people, be it in the form of innovation, emulation, or replication; however, in regards to Autism and Autistic people, this area has not been explored in depth. Particularly lacking were studies that examined interactions between Autistic and not-Autistic people. This work is the first to examine the physical outputs from neurodiverse social interactions. Examining these physical outputs can offer insight into whether people are more likely to copy, to 'replicate', or to change, to 'innovate', from what they observe. This can lend ideas to the possibility of a neurodivergent sense of creativity and design, and to question whether rapport between social actors can affect the similarity of physical output during a task.

This thesis is also the first to analyse the length and frequency of silences between neurodiverse pairs of social actors. This will add to the limited literature around rapport and pauses in conversation between individuals, considering neurotype as a factor in how people perceive their social partner. In analysing these silences, this thesis hopes to shed light on neurodiverse interactions in a way that has not been explored before, as well as being able to compare these silences to those in the single-neurotypes conditions. It is hoped that this information can inform further research into neurodiverse interactions, and neurodivergent social intelligence.

10.4 Who are the 'normal people'?

> *The terms "normality," "norms," and "normativity" have different meanings in different disciplines. In sociology… norms are understood as socio-cultural rules that regulate appearance and behavior in social systems, sanctioning behavior that goes against the norm…That is: norms—in the sociological sense—are always normative as they stipulate a right and a wrong way, how something ought to be, should be done; an endorsed and authoritative moral ideal…Moreover, the statistically normal often becomes normatively normal in that the "normal" becomes the "good" as "the normal" turns into "an attractive normative position, which other positions are viewed against" (Persdotter, 2020, p. 359).*
>
> *"Recognition of the ways in which the tyranny of the norm disempowers and exploits marginalised groups and individuals is the foundation of any perspective that works for increased social justice (Biklen, 2000). This is why progressive and critical perspectives strive to give voice to previously silences constituencies." (Smukler, 2005, p. 21).*

In 2001, Baron-Cohen et al. (2001a) released their article titled "The "Reading the Mind in the Eyes" Test Revised Version: A Study with Normal Adults, and Adults with Asperger Syndrome or High-functioning Autism". What does the term normal refer to here? In this study, they had 15 Autistic participants, and 239 'normal controls.' All participants, regardless of neurotype, were of 'normal' intelligence, (including 103 of the 239 not-Autistic participants studying for undergraduate degrees at Cambridge University), and yet the 239 not-Autistic participants were deemed to be 'normal', but not the Autistic participants. This may be therefore an example of how the statistical norm, and the social norms, become entangled, as described by Persdotter (2020). Wing (1981) conceived the idea of the triad of impairments, but warned that it left many loose ends. Nonetheless, it was then used for the diagnosis of Autism, adding to the idea that Autism is a negative deviation from an established norm. In their book 'Neuroqueer Heresies', Walker (2021) states that for too long, these pathology-based paradigms have dominated Autism related discourse and praxis, coining the term 'neurominority' in 2004 to describe those they felt were negatively affected by this model. Walker argues that neuroessentialism, even within a neurodiversity framework, puts limitations on the possibilities, much like gender essentialism limits those who feel their biological sex should not determine their gender (Walker, 2021). Categories serve purposes, but not when they are pathologised or stigmatised (Walker, 2021); therefore, whether an Autism diagnosis serve a beneficial purpose must be determined by the impact on the individual and their wellbeing. In the case of some neurological differences, a diagnosis can provide additional support, such as in the case of dyslexia. Gibbs and Elliott (2020) argue that those who have access to the label benefit over those who do not, citing socio-economic factors as reasons why some have access to diagnostic process. However, whether this applies to the diagnosis of Autism must be explored further.

Normality often has no distinct definition, unlike Autism. What is means to be normal has changed arguably more than the criteria for Autism, even within the same time scale. We may consider how dialogue may have looked in 1990, when this quote was produced:

> *"In its (Autism's) mildest form however, a child may be able to produce normal sentences but in a way that violates the norms of dialogue" (Baron-Cohen, 1990, pp. 85-86).*

This article was written before the release of the World Wide Web, only a year after the Berlin Wall fell. In 1990, 14 years before same-sex couples could even have civil partnerships, and it was still illegal to teach children in school about homosexuality, what did normal look like? In 2023, communication and dialogue are interspersed with emojis, memes, and gifs. People choose to communicate through voice notes, images with text overlayed, or even just reactions in the form of a thumbs up on a piece of text. Norms of dialogue are changing, have been changing, throughout history, and pathologising those who use speech and dialogue in a different way to others merely inhibits our growth as a social species.

What, then, is Autism, if not a deficit in social communication abilities? From its outset, Autism has been defined by the ways in which Autistic people interact with others and their surroundings. However, much less has been investigated into how other people and the environments interact with Autistic people. Research has been conducted by not-Autistic people from a position of power based on dominant, Westernised, social norms (Smukler, 2005). Autism is seen by many as occupying the extreme end of a spectrum of humanity: the 'less Autistic' one becomes, the more acceptable and normal the result. However, this is a misunderstanding of the idea of a spectrum; as described earlier in this thesis, the Autism spectrum refers to the many different, complementary, and encompassing features that define Autism as a phenomenon, and it is not accurate to say that 'everyone is a little Autistic', as if it were a linear scale.

What is becoming clear is the genetic nature of Autism; although genetics themselves are exceedingly complex (Grandin & Panek, 2013) and this does not indicate the presence an 'Autism gene'. Autistic people are more likely to marry other Autistic people (Nordsletten et al., 2016), and have Autistic children (Constantino & Todd, 2005; Pruitt et al., 2016). This suggests Autism as a genetic, but also cultural phenomenon, with research showing Autistic people are more drawn to other Autistic people in terms of companionship (Crompton et al., 2020a) as well as reproduction. This could be due to the reported higher rapport, feelings of minority status, or the desire to be with one like oneself.

People often fear what deviates from their own individual and societal norm, and it is only through identification and rejection of the 'abnormal' that concepts of humanity, impairment, and normality are constructed (Waltz, 2008). Ideas of disability are continuing to be constructed, with diagnosis a socio-cultural issue. Universal literacy only became normalised in the post-industrialised world (Cook-Gumpertz, 2006), and yet illiteracy is now viewed as a disability. Perhaps, following the greater movement of peoples following developments in transport technology, and now that we live in a highly social world of communication medias, the idea of being different or deficient socially, has now entered our consciousness as a disability.

The dominant, medicalised discourse of Autism is pervaded with otherness and dehumanisation, and representations of Autism are entwined with the desire to define what is 'normatively human' (Waltz, 2008, p. 21). Ideas of normalcy and social acceptability, a perceived lack of which can lead to a person receiving an Autism diagnosis, are deeply entrenched within Western discourse, without much thought given to the ways social norms vary across society. This thesis has considered the ways in which certain concepts, such as eye contact and silence between speakers, could be perceived differently across cultural contexts.

In this study, interactions between Autistic and not-Autistic people completing a task were analysed, showing few differences in terms of topic of conversation. In all three conditions, most pairs discussed the task itself, regardless of Autistic status. This represents a confusion to ideas of normalcy. Some frame Autism is a puzzle because they believe Autistic people can learn about the world yet not translate this knowledge into real-life social adaptive actions (Klin et al., 2003, p. 357) and there is still a pervading view that Autistic people learn about others in a way that departs from 'normative processes of social development' (ibid). Waltz (2008, p. 21) describes efforts to define what is normatively human as an effort to 'constrain the boundaries of acceptable human variation'. Autism is often described as exotic or extreme; for many cognitive scientists, Autistic people function as a counter-example 'to throw an author's ideas about cognition into clear relief', as the extreme end of a continuum of humanity (Smukler, 2005, p. 16). It could be argued that through the advent of television and multimedia, there have been more opportunities for the world to view a certain kind of 'normal' interaction; that is, a Westernised, not-Autistic socialisation. Before this time, people would base their ideas of normalcy, and acceptability, on much more localised ideas, based on those around them in their culture, or village. Repeatedly seeing examples of what is considered to be 'normal' made it more likely that people would begin to spot deviations from this norm in those around them, whereas previously they would not have considered these differences notable.

10.4.1 Why is this important?

Neurodiversity as a concept extended out of the difference model, the idea that some brains are wired differently to others, developed in response to evidence that Autism is a genetic condition (Baron-Cohen, 2017; Kapp et al., 2013; Leveto, 2018). This evidence changed the ways people understood themselves and how they were treated by others; with Autism rights movements seeking to build a collective identity for diagnosed people and their families (Leveto, 2018). This unifying identity marker brings people together, building collective resistance, and showing the power of a community in showing that social justice cannot be ignored (Leveto, 2018). Many may quip about 'political correctness', or that terms are changing too fast to keep up with; one minute person-first language is used, the next identity-first is the one deemed suitable, and many researchers, parents, and educators feel left behind by what is considered offensive and what is not. However, the foundations of neurodiversity are not about semantics; they are about saving lives. Suicide is the leading cause of death for young people aged 20-34 (Cassidy et al., 2020), and the odds ratio of suicide in Autistic people is 7.55 compared to the general population (Cassidy et al., 2014; Hirvikoski et al., 2016). Baron-Cohen himself stated that Autistic people felt strong feelings of perceived burden, thwarted belonging, and experienced suicidality related to these feelings (Pelton et al., 2020), and yet a medicalised model persists that paints a picture of Autistic people as the 'other'. Person-first language, and deficit-modelled terms such as 'person with Autism' and 'suffers from Autism' add to a perception that Autistic people can be changed or cured. Numerous studies have shown that Autism cannot be cured, and Autistic people cannot be changed by 'therapies' such as ABA or chelation (Gillespie-Lynch et al., 2017; Kapp, 2019; Kapp et al., 2013; Sarrett, 2011).

It is easier to victimise those who are perceived as different, and this can be shown in the rates of abuse directed at the Autistic community. Autistic people reported higher levels of sexual assault than their non-Autistic peers at all life stages including childhood (Gotby et al., 2018; Sedgewick et al., 2022; Weiss & Fardella, 2018), and Autistic people can be more vulnerable to mate crime and risky behaviours (Sedgewick et al., 2022), despite being less likely to give in to peer pressure (Yafai et al., 2014), due to their masking, and desire to fit in and be accepted. It is also easier to victimise those seen as non-human. If Autistic people are not perceived as fully human, people feel more comfortable making certain comments about them. One doctor for example compared the presence of Autism to the absence of the World Trade Centre (Smukler, 2005), a dehumanising comparison that will shock many. Changing how Autism and Autistic people are viewed is salient, questioning the constructs that underpin our perceptions. Alternative constructions of Autism are possible when Autistic voices are valued and listened to (Smukler, 2005).

'Normal' is a social construction of its time (Honeybourne, 2018); if we consider that homosexuality was illegal only just over fifty years ago, and that until *2003* under Section 28 it was illegal to be seen to promote homosexuality in schools in England and Wales, we can see how fast our ideas of what is normal can change. Viewing Autism, and indeed any 'SEND' as a negative or inconvenience within an educational setting, can lead to a great number of issues. When using a medical model, many teachers report feeling 'overwhelmed' by 'too many' SEND children (Honeybourne, 2018, p. 25), despite numbers of children with additional needs not rising. What then, is fuelling this perceived burden within the teaching profession? With deinstitutionalisation, many people who would not otherwise have been educated in the mainstream schooling system became the responsibility of local authorities to educate, and it is possible that schools have still not caught up to the needs of the population. Or potentially, it is the standards of support for teachers that are decreasing; less education on SEND within teacher training courses, stretched resources, and not enough hours in the day can make teachers feel unprepared for facing their classes to the best of their ability. What is salient is that those with additional needs are afforded the same respect, and understanding, as their peers.

This thesis argues that ‘normal people’ do not exist, normal differs across time, and cultures (Honeybourne, 2018). It even varies across diagnostic manuals such as the DSM and ICD, and the perceptions of normality within psychiatry have been based upon, most commonly, white, Western, male people and their values (Oliver & Barnes, 1998); leading to Black people and women being diagnosed as disordered at much higher rates than their white peers (Schwartz & Blankenship, 2014). King and Jeynes (2021, p. 460) question whether what they term ‘White Psychiatry’ has moved on since the 19th Century: ‘there is a tendency to treat the experiences and behaviour of African men as abnormal’ they state, echoing the views of many who feel that ideas of normality are based upon too small a percentage of the population. Ongoing reflexivity throughout the research process is key (Holmes, 2020), and questioning the colonial nature of much of the research within disability studies is necessary in moving forward. Old models using medicalised and patriarchal baseis must be questioned. For example, the so-called ‘cure agenda’, and the idea of motherly devotion above all else, has been labelled ‘neo-colonial drama’ by Savarese (2010). By situating disability as something that can be cured, and something that takes the life from those around it, particularly the mothers, adds to the dehumanisation of those in the disability community.

Neurodiversity is therefore not merely a scientific term, but a political one (Singer, 2022). It has been described as responsible for stifling research, mischaracterised as monolithic and extreme, criticised for being too aligned to the medical model of disability, and too aligned to the social model, as well as not being appropriate for those with intellectual differences (Milton, 2019). However, this thesis argues that neurodiversity is the direction with which Autism studies needs to travel. Bringing Autism studies into the twenty-first century, therefore, means redefining normal. It means adopting a neurodiversity stance on neurological differences, incorporating the double empathy problem into multiple areas of what would previously have been psychiatry, to acknowledge that different people exist in the world, and that a different brain does not necessarily mean a deficient one. Re-adaptation of perceptions of normality are essential in order to provide the best possible support to the greatest number of people, and to realise when it is society, not the individual, that needs changing.

10.5 Theory of Mind and Empathy

Baron-Cohen proposed that Autistic people have below average empathy, as an example of an ‘extreme of the male brain’, lacking a ‘Theory of Mind’ that helps them to understand how others think and feel (Baron-Cohen, 1990, 1995, 1997, 2010; Baron-Cohen et al., 1985). However, Milton (2012) reframes Autism to question whether a disjuncture in reciprocity, brought about by a clash of neurotypes from two social actors with different dispositions, is the reason for the difficulties experienced in mixed-neurotype interactions. He argues that empathy is a two-way street, and that not-Autistic people also lack empathy towards Autistic people, despite the deficit theory of a lack of ‘Theory of Mind’ persisting (Milton, 2012). Other empirical evidence agrees with this; findings by Komeda (2015) found that Autistic people exhibited empathy towards characters who were also Autistic, and that the same was true for not-Autistic participants, and not-Autistic characters. Furthermore, this phenomenon is not specific to Autism; people who are highly extroverted can guess the actions of extroverted protagonists particularly well (Komeda et al., 2009), as can people displaying high levels of neuroticism with neurotic characters (Komeda et al., 2013).

Smukler (2005) states that the Theory of Mind phenomenon is merely the latest manifestation of the puzzle piece metaphor, both of which 'should have been discarded long ago' (Smukler, 2005, p. 12). Theory of mind fails to adequately describe Autism, and studies that use the paradigm do not even produce consistent answers to the false belief tasks assigned to its Autistic participants (Gernsbacher & Yergeau, 2019). Theory of mind tests on adult have also been limited in scope, for example the Baron-Cohen et al. (1999) which focused on, and drew conclusion from, only three Autistic participants.

10.5.1 Autistic Theory of Mind (ATOM)

This author argues that any difficulty Autistic people have in reading not-Autistic people is reciprocated aequalis by not-Autistic people in their lack of understanding of Autistic people (Axbey, 2019b). Researchers have questioned many times whether this is in fact the case (Sheppard et al., 2016); the double empathy problem asking whether this 'lack of empathy' is two-way phenomenon, merely two people struggling to understand each other (Milton, 2012). The models of Autism that Theory of Mind theorists create are inadequate as they fail to consider the thoughts and feelings of Autistic people, showing a 'mindblindness' to the Autistic perspective (Smukler, 2005). In this thesis, this 'mindblindness' has been attributed to a lack of an 'Autistic Theory of Mind' by not-Autistic people.

Many of the 'deficits' described within Autism can be looked at from multiple angles. For example it is commonly asserted that Autistic children point to objects in order to obtain then, but not to share experiences (Jaswal & Akhtar, 2019). While some researchers would frame this as a deficit, an Autistic analysis could point out that the Autistic person might assume that something they can see is also being seen by those around them, due to them being in the same vicinity; however, the object in need of retrieval needs pointing out in order for the person to know specifically what it is they are requesting. Different actions can have different purposes, and concluding deficit from difference assumes one way of being is preferable to another.

The results of this thesis showing that there was most silence within the neurodiverse dyads, although not significantly less than in the Autistic condition following post-hoc analysis, and that there was less replication within these dyads, could be linked to findings by Morrison et al. (2020) who found that Autistic participants trended towards interactions with other Autistic adults. This, and the higher rapport between Autistic people found in the study by Crompton et al. (2020c), are suggestive of this phenomenon of an 'Autistic theory of mind' (ATOM), whereby Autistic people understand the minds and sociality of other Autistic people better than those of their not-Autistic peers.

10.5.2 Empathy

> *"Hurting another person's feelings is a behaviour that presupposes an active theory of mind, something which Autistic people conspicuously lack." (Frith, 1991a, p. 25).*

Lacking from this statement, and many other accounts of Autism, is empathy towards Autistic people. The assertion that Autistic people are mindblind and unempathetic is considered uncontroversial by many in the professional educational communities. Several not-Autistic authors such as Baron-Cohen repeatedly position themselves as empathetic and enormously patient, whereas Autistic people are portrayed as abrupt, persistent, obsessive, and impatient (Smukler, 2005). Baron-Cohen's use of words such as 'tragically' to describe the presence of Autism (Baron-Cohen, 1997), or 'fortunately' and 'thankfully' when describing its' rarity, and then his use of medicalised language, shows he is positioning himself in an empathetic, but medically superior, position of authority. Smukler (2005) states that Baron-Cohen's frequent characterisation of Autistic people as unfortunate people privileges him, and adds to the diminishment of accounts by Autistic people themselves.

Many believe a 'lack of empathy' from Autistic people is due to their 'male brains'. This follows the highly gendered theory by Baron-Cohen that men have less empathy than women, and therefore Autistic people must have brains more like those of men (Baron-Cohen, 2002, 2010). Several researchers support this belief, even some who claim to be within the neurodiversity affirming community. In support of this theory, Armstrong writes that 'men are more likely to gather around a car and discuss the hydraulic system than sit around a coffee table and discuss the problems of a friend' (Armstrong, 2010, p. 58). As well as the sexist assumptions about sociability, and the toxic masculinity of the idea that men do not, or should not, discuss their feelings, this builds a stereotypical picture of Autistic people as emotionless and unempathetic, even robotic. A damaging assumption that can lead to the dehumanisation of Autistic people and the Autistic community. Within the topics of conversation analysed in this thesis, no great differences were observed. Autistic people did not sit around and discuss mechanics, and the not-Autistic people did not indulge at great lengths regarding their feelings and emotions. In all three conditions, participants discussed the task, its rules, and offered each other assistance.

10.6 Success

The first research question of this thesis asked whether there were differences in cultural transmission task performance depending on the neurotype of the social partner.

> **RQ1. Are there differences in cultural transmission task performance depending on the neurotype of the social partner?**
>
> *HRQ1: Performance may be slightly higher in the similar-neurotype chains.*

Essentially this is a question of success: which group performed best. Empirically, task performance was an easy question to answer, as towers were measured in centimetres, which could then be averaged, and compared. But the extent to which this can measure success in the task can be questioned. Is someone successful if they produce a result that is better than the person before them? Or if someone produces something new and innovative? Or do they need to outperform all other participants to be deemed successful? Some participants created towers shorter than the length of a single piece of spaghetti, is this to say they failed the task, whereas those who produced a tower by typical definition (i.e., one with multiple layers) have passed?

Success in life can be measured in many ways; Armstrong (2010) believes it is a twofold process, first one of adapting one's brain to the needs of the surrounding environment, but then also one of modifying the surrounding environment to fit the needs of one's unique brain. The different models presented in earlier chapters can be seen within this ideal; firstly, the medicalised model of changing one's brain, which has echoes of the psychiatric treatments offered in the early twentieth century, but which also makes an important point about adapting to one's surroundings. However, the second point about modifying the environment to fit one's brain follows a much more social modelled approach, designing the environment to the needs of the individual, with the specific emphasis on the ways each person's brain may work differently, which can be seen in the neurodiverse model.

The hypothesis for this research question was that performance would potentially be slightly higher in the similar-neurotype chains. This hypothesis can be accepted, as, although not significantly different, the towers were tallest in the neurosimilar chains, with the not-Autistic condition having the tallest towers on average, followed by the Autistic condition, and then the neurodiverse condition. Future studies could repeat the method with more participants, to see if this result is replicated. There was no statistically significant difference in tower height, and therefore task performance, across conditions.

The fact that there was no significant difference in tower height across the chains, and that towers did not increase in height as the chain went on, shows that this task was not one where people learnt success from the person before them. Had this been the case, we would have expected to see towers become more successful over generations, as people learnt from the mistakes of others, and sought to avoid these in making their own tower.

A study conducted by Olu-Lafe et al. (2014) concluded that Autistic people find integrating local information more difficult, leading to them being slower than not-Autistic controls at a shape-integration task. No evidence of this was found through the success of people in this task.

10.7 Interactions

The second research question of this thesis asked how the reciprocal interaction between neurodiverse groups varied during a task.

> **RQ2: How does reciprocal interaction between neurodiverse groups vary during a task?**
>
> *HRQ2: There will be the least reciprocal interaction within the neurodiverse condition.*

This was a fairly open-ended question, and themes from the interactions could be extracted after the collection of the data through coding the interactions. The themes chosen for this thesis were silences, and topics of conversation including the task and its rules, offering, and accepting help, and the discussion of Autism. The hypothesis for this question was that there would be the least reciprocal interaction within the neurodiverse condition. Silences were potentially the best indicator of the reciprocity of an interaction within this study, as greater silence could indicate lesser desire to be reciprocal. However, the topics of conversation can help answer the research question in terms of type and format of conversation, which is a form of reciprocal interaction. It should be noted that this is an Autistic analysis, and therefore a not-Autistic viewpoint could interpret these findings differently, which is a potential direction for future studies.

Interactions between people can differ based upon communication style, and rapport between people. Evidence suggests Autistic people may have specific communication preferences, which can lead to difficulties interacting with not-Autistic people. Key examples of this are the evidence that indicates Autistic people do not differ in their eye movements and eye contact, but that not-Autistic people become more distressed than Autistic people when eye contact is averted (Clin & Kissine, 2023); and the evidence to suggest rapport is lower between those of different neurotypes than those of similar neurotype (Crompton et al., 2020c; Rifai et al., 2022).

10.7.1 Silences

This thesis is the first to consider the length and frequency of silences between neurodiverse social actors, and within the interactions analysed in this chapter, there was a significant difference between Not-Autistic and Autistic, and Not-Autistic and Neurodiverse conditions in the length of time spent in silences of ten seconds or longer. As the task took around 5 minutes (300 seconds), the amount of time spent in these silences within the neurodiverse and Autistic groups appears quite large, especially when it is taken into account that these are not the only silences between the dyads, merely those above ten seconds. This is in stark contrast to the not-Autistic dyads who only spent an average of 38 seconds in silences of ten seconds or over.

The differences in the lengths of these silences can be analysed from many different angles. As participants knew which condition they were in, in that they knew if the person they were interacting with was of a similar neurotype or not, a potential feeling of belonging to a group can be considered. From a minority-stress perspective, Autistic people, being from a minority background, may feel uncomfortable in interactions with not-Autistic people (Cokley et al., 2013). The added stress from this, as well as the effort of potentially ‘masking’ their Autistic traits to their partner, may have contributed to the extended silences between the neurodiverse pairs. Autistic people may indeed have consciously chosen to remain silent as a method of controlling their situation, or in an attempt to increase their success at the task (Fordham, 1993).

Alternatively, or perhaps additionally, the not-Autistic people may have chosen not to engage with their Autistic counterpart due to ‘thin-slice judgements’ about them based on a mismatch of neurotypes causing a ‘double empathy problem’ (Milton, 2012; Sasson et al., 2017). Sasson et al. (2017) found that not-Autistic peers are less likely to engage with Autistic peers based on such judgements, and that may be the reason for the large difference between the amount of time spent in silence in the neurodiverse condition, compared with the not-Autistic condition. Additionally, the double empathy problem may have led to lower rapport between the participants in the neurodiverse condition, and this could have resulted in the extended silences observed (Crompton et al., 2020c).

A different interpretation could be that Autistic people are more empathetic to the needs of their partners, either neurosimilar or neurodiverse, noticing that they themselves would prefer silence during a task, and therefore affording it to their partner while they work. This could be supported by the post-hoc tests showing no significant differences in total silence between the neurodiverse and Autistic conditions. Radun et al. (2021) found that the sound of speech during a task that requires concentration increases levels of the stress hormone cortisol, as well as being regarded as more annoying, and making the task load heavier. Autistic people, potentially less occupied with the desire to be talkative during the task as suggested by Fletcher-Watson and Crompton (2019), could have been more attuned to the needs of their partner, and therefore given them the silence they need to complete the task without added annoyance or stress.

Silence does not always demonstrate awkwardness, or lack of rapport. In their study of the Navajo Nation in North America, Connors and Donnellan (1993) found that long silences between people were common, as answering too quickly implied that the question or comment was too trivial to require much thought. It is important to take into account these alternative cultural views, especially as one seeks to decolonise the Autism diagnosis, and Autism as a phenomenon.

Finally, silence could be also viewed as a beneficial factor in this study from a medicalised stance. Based on the work of Pfeifer and Wittmann (2020), silence can be both relaxing and therapeutic. The longer silences, therefore, could be seen as the most successful interactions, with participants giving each other the space for this relaxation during a task environment. Ultimately, unless the people themselves were asked to explain the length of the silences between themselves and their partner, conjecture as to the reasons for said silences is the only possibility. Further research could expand the work of Radun et al. (2021) to look at the effects of speech on Autistic people during a task requiring concentration. This could be compared to a group of not-Autistic people to see if this could be one explanation for the extended silences in the Autistic group from this thesis. Autistic participants may simply have stayed silent as they were allowing their partner to concentrate on the task at hand, showing empathy for their peer (Crompton et al., 2020a; Fletcher-Watson & Bird, 2020; Komeda, 2015; Komeda et al., 2013).

10.7.2 Discussion during task

In addition to the length and quantity of silences, the topics of conversation were coded for analysis using content analysis. Several key themes arose regarding offering and accepting help, and discussion of the task itself, and its rules.

	Autistic	Not-Autistic	Neurodiverse
Discussion of task	60%	69%	66%
Discussion of rules	5%	4%	5%
Offering and accepting help	3%	3%	6%

Figure 24: Coverage of discussion topics during task

There were also six individual instances of Autism being discussed in the interactions, which is significant mostly because this is a small number of interactions, given that participants were aware that they were participating in a research day associated with Autism and Autistic people. Autism was not discussed at all during the neurodiverse chains, and although there were the same number of instances of ‘Autism talk’ in both neurosimilar chains, the coverage was much higher in the Autistic condition. This could indicate that people felt more comfortable discussing Autism with those with whom they shared a neurotype, perhaps as an indicator of greater rapport. Or this could be through politeness, with participants not wanting to broach a potentially sensitive subject, since, as is clear from the literature, there are many different schools of thought around Autism and what it means to be Autistic, and to some, Autism is viewed very negatively.

Gillespie-Lynch et al. (2017) found that Autistic people exhibited more scientifically based knowledge regarding Autism than the not-Autistic people surveyed. They argue that this should mean Autistic adults are considered Autism experts, and therefore be involved as partners in research, a sentiment shared by many (Fitzgerald, 2017; Gillespie-Lynch et al., 2017; Skubby, 2012). The fact that Autism was not discussed in the neurodiverse chains is interesting, as it shows an omission in terms of the transmission of this specialist knowledge on behalf of the Autistic people. This potentially also is indicative of the rapport between people, although the sample is too small to make generalisations on a larger scale.

A common assertion of Autistic people is that they have rigid thinking, and are ‘rule-orientated’ (Honeybourne, 2018). However, in the analysis of the videoed interactions, no evidence was found to support this assertion and the Autistic participants did not discuss the rules of the task to any greater extent than the not-Autistic participants, with coverage of 5% in the neurodiverse and Autistic conditions, and 4% in the not-Autistic condition. This calls into question the assumptions made about Autistic people as a homogenous group, and more research could be done to discover if Autistic people do in fact discuss rules and limitations to a greater extent than the not-Autistic population. In fact, in this study, the not-Autistic group discussed the task itself more than the Autistic group, with 69% coverage in the not-Autistic condition compared with 60% in the Autistic condition. These are not large differences, but also add weight to the countering of assumptions around Autistic preferences for on-task discussion and hyper fixation. In terms of discussion that was definitely ‘off-task’, the group with the smallest coverage for this topic was the neurodiverse condition, with only 10%, compared to 22% and 16% in the not-Autistic and Autistic groups respectively. This could indicate higher rapport in the neurosimilar groups, if people were discussing their lives and views outside of the research day, although more research would need to be done to establish if this was the reason for the greater ‘off-task’ topics under discussion.

In terms of helping other participants during the task, there was not enough evidence to support the findings of Heasman and Gillespie (2019b), as offers of help in the neurodiverse condition came equally from Autistic and not-Autistic participants, although we do not know how helpful these offers were found by the partner in each case. There was also no evidence to support the findings of O'Connor et al. (2019) that Autistic people were less likely to offer help, as coverage was the same in both neurosimilar conditions (3%). This is interesting in and of itself, but further research would need to be done to establish whether these spontaneous offers of help varied significantly based upon the neurotype of the participants involved.

10.7.3 Accepting the hypothesis

The research question asked about reciprocal interactions and how they varied across neurodiverse and neurosimilar conditions, and the hypothesis, quantitatively, stated that there would be less reciprocal interaction in the neurodiverse groups. This hypothesis can be tentatively accepted, if one is defining reciprocal interaction as the presence of speech backwards and forwards. This is because there was significantly more silence between participants in the neurodiverse condition as compared to the not-Autistic condition, although not significantly more than in the Autistic condition. However, this is a tentative acceptance as it became clear while analysing the data and reading the literature, that definitions of reciprocity may vary between people and neurotype. To some, a non-verbal interaction could be highly reciprocal, through showing the construction of a tower. Whereas to others, reciprocity could only be defined as an equal backwards and forwards of verbal communication on a mutually agreed topic. Furthermore, the topics of conversation did not differ significantly between the conditions. Offers of help were similar across conditions, as were instances of discussion of the task and its rules. Autism as a phenomenon was only discussed within the neurosimilar conditions, but as there were only three instances in each condition, conclusions cannot be reached about the scope of this in comparison to the neurodiverse interactions.

10.8 Similarities

The third research question of this thesis asked whether there was evidence of familial resemblance across chains of neurosimilar people.

RQ3: Is there evidence of familial resemblance across chains of neurosimilar people

HRQ3: There will be the most innovation from neurodiverse interactions.

This thesis is the first to examine the similarity of outputs from a task with neurodiverse interactions, and findings showed that similarity of outcome was statistically significantly greater in the neurosimilar chains, in particular the not-Autistic chains. The hypothesis that there would be the most innovation from neurodiverse interactions can therefore be tentatively accepted, as there was the least similarity, however, assumptions about innovation would require further research to establish whether the replication, or lack of, was intentional.

In the tower-building and similarity-judgement task put forth by Matthews et al. (2012), the difference between imitation and emulation is clearly defined as participants are provided with stimulus in the form of a picture of previous towers, and are not present for the building of another tower. This building of a material artefact without social interaction shows this was an example of emulation. However, in the study in this thesis, it is argued that imitation is the phenomenon being explored through the similarity rating task. This is because participants are present for the duration of the tower-building stimulus creation before building their own. Therefore, they see not only the finished product, but the steps taken to reach it, and any challenges they might face. Much like the study by Matthews et al. (2012), distinct sub-populations became clear in this study. However, these were more pronounced in the single-neurotype conditions than in the neurodiverse condition.

The decision to replicate or innovate can be based upon many things: familiarity, sense of belonging, or one's own desire to create something original. It was found that, in diffusion chains of adults completing a tower-building task, not-Autistic people built towers that were most similar to each other (mean= 0.5801). As participants watched the previous person in the chain build their tower, there is an added social element to this finding. If it were the case that Autistic people are more likely to innovate, then this group would have the lowest similarity rating of their towers. However, as it stands, the neurodiverse group has the lowest level of similarity (mean= 0.5443) and the Autistic group fell between this and the not-Autistic group in terms of similarity (mean= 0.5603).

This finding of more similarity within groups than between, mirrors the transmission isolating mechanisms (TRIMS) hypothesis by Durham (1990, 1992). In their study using this method, Tehrani and Collard (2002) found that similar designs were used in-groups, and this is echoed by the findings of this thesis in regards to Autistic status. There was the most similarity within the Autistic and not-Autistic groups, whereas the neurodiverse group showed the least similarity in design, possibly showing Autistic status as an example of a TRIM. In his theory, Durham states that in-group conformity and language barriers can constrain information transmission (Tehrani & Collard, 2013). It is therefore proposed that the double empathy problem (Milton, 2012), leads to feelings of in-group/out-group effects, constraining the transmission of tower design in the neurodiverse interactions.

As a minority group, and, arguably an oppressed minority group (Walker, 2021), neurodivergent people may feel a sense of community when with others they know to be neurodivergent. This could lead to greater conversation, as shown by the slightly (although not significantly, following post-hoc analysis) shorter and less frequent silences between Autistic participants as compared to the Autistic/not-Autistic interactions, and the greater similarity in designs when Autistic people were paired with another Autistic person. Much like the 'loud Black girls' stereotype investigated by Fordham (1993), Autistic people may choose silence when in the company of not-Autistic peers.

Diversity within a group can lead to greater creativity, and this is especially true when considering diversity in neurotype (Bigozzi et al., 2016). In terms of innovation, and the concept of creativity that can come with it, Grandin and Panek (2013) claimed that there was a specific kind of creativity in Autism, with Autistic people seeing details in things better than their 'neurotypical' peers. While in this study we could not directly judge creativity, this could be an interesting approach for a future study. The concepts of imagination and creativity are notoriously difficult to measure, and few researchers can agree on their definitions (Smukler, 2005); however, it could be argued that this lower similarity shows greater innovation, and supports the 'value in diversity' model (Herring, 2009; Hofstra et al., 2020). The diversity in this situation is neurodiversity, of course, and while participants creating the stimulus material were matched for age, gender and IQ, further studies would need to be conducted to look at the impact of neurodiversity when taking into account other characteristics such as race, sexuality, and socio-economic background and circumstances.

Despite suggestions by Olu-Lafe et al. (2014) that Autistic people have difficulty integrating local information, affecting their shape-integration abilities, there was no significant difference in the scores of the Autistic and not-Autistic participants in this study.

10.9 Confronting and Resolving the Double Empathy Problem

This thesis has explored the evidence from the literature that Autistic and not-Autistic people struggle to communicate with each other, and that Autistic people enjoy the company of other Autistic people (Crompton et al., 2022; Crompton et al., 2020a; Crompton et al., 2020b; Crompton et al., 2020c; Debrabander et al., 2019). Findings from the studies in this thesis found that that there were longer silences between people where there was a mismatch of neurotypes, and that there was less replication within neurodiverse pairings (Axbey et al., 2023). While the lack of replication, and therefore increased innovation, can be seen positively, certainly in terms of creativity, and with positive implications for business models (Herring, 2009), the difficulties interacting and empathising with others clearly needs addressing. While this thesis does not attempt to make recommendations based on the findings of its one study, an investigation by Chapple et al. (2021) may herald some interesting suggestions. Within their small-scale longitudinal study of four gender-matched neurodiverse pairs (one Autistic one not-Autistic participant in each), they asked participants to read the novel Of Mice and Men. Then, over the course of four weeks they had pairs take part in four one-hour sessions where they discussed the book and its themes, followed by a one-to-one interview with the researcher to discuss how they found the exercise. Overall results found that the not-Autistic participants reported a better understanding of what it means to be Autistic after the study, and Autistic participants reported having overcome concerns about not-Autistic people stereotyping Autistic people, while feeling valued and accommodated by their not-Autistic partner. This study is thought-provoking as, similar to the interaction analysis in this thesis, participants were designated a task; however, in this example, they were instructed to talk specifically on a topic: a book. One participant from Chapple et al.'s study remarked:

> *"Actually having a topic that you could talk about and around helped. I think if we'd have just gone in a room and said "right, chat" then there would have been a lot of awkward silences" (Chapple et al., 2021, p. 7).*

This could suggest that difficulties regarding the double empathy problem can be overcome, through careful and structed communication between neurodiverse pairs and groups. The researchers state that through discussing their own emotional reactions to the story, participants were able to empathise with each other, and understand better how each other's minds worked. Discussions on racism and prejudice were particularly relevant for this text, which allowed Autistic participants to discuss their own experiences of stigma and discrimination:

> *"While participants had already began to mutually feel with one another, these discussions of stigma tended to be unfamiliar for non-Autistic participants. However, with the prior evocation of empathic responses elicited by similar events within the literature, non-Autistic participants were moved from feeling for to feeling with their*

> *partners, although unfamiliar experiences were being disclosed" (Chapple et al., 2021, p. 10).*

The authors therefore suggest that literature and deep discussion can be great methods of overcoming the double empathy problem, although they note as a limitation that this requires the willingness of not-Autistic people to engage with the tasks, and with Autistic people. The author of this thesis proposes that a tower-building task, as an individual activity, with no discussion required, was a good way to lay bare the double empathy problem in its essence. Overcoming the double empathy problem requires a more nuanced and deliberated feat, such as that by Chapple et al. (2021), where participants are required to listen to, and consider, others' thoughts and feelings, using a creative output such as a book text as a proxy for exploring their own methods of interacting with the world and its peoples.

10.10 Decolonising Autism

The social, temporal, and historical context of research is important (Carter, 2004). Disability studies has been notably absent from fields of post-colonial criticism and theory (Barker & Murray, 2010), and race has been neglected within disability studies (Grant & Kara, 2021). Barker and Murray (2010) state that disability studies still use theories and methodologies developed within Western doctrines, and applies them to global locations with only 'nominal attention' to local formations and understandings. So-called 'cultural models' cannot account for 'either the ontological or the material conditions which are formative in constructing disabled lives' (Barker & Murray, 2010, p. 229). Furthermore, researchers must be sensitive to the comparisons they draw, for example, to compare the plight of two marginalised groups is often seen as acceptable, as in understanding the intersectionality that exists, such as between gender, race, sexuality, and disability. However, taking these comparisons too far may been seen as insensitive, or even offensive, such as in the recent paper by Dillenburger and Keenan (2023) which saw a parallel drawn between the 'discrimination' faced by ABA practitioners and that of the Black community in the UK following World War Two. Academics and researchers must consider the historic context of their remarks, and remember where the power has historically lain, before accusing a minority, in this case Autistic people, of discriminating against them when concerns are raised regarding practises that affect them.

The construction of Autism as a phenomenon occurred within the Western academy, and therefore definitions of Autism must take this into account, but rarely do. Autistic people struggle with not-Autistic communication, relationships, and sensory processing, but this is *within Western environments* (Grant & Kara, 2021). Less research has been done on how these definitions occur outside of Western countries and research studies led by Western researchers. There has also historically been a marked exclusion of Autistic people from marginalised subgroups within Autism research (Cascio et al., 2020; Grant & Kara, 2021), and this constitutes a major concern in terms of not only studying the phenomenon of Autism, but also in terms of intersectionality, and efforts to de-colonise psychology and disability studies. It is important to recognise through intersectionality that some Autistic and disabled people hold more privilege than others, and will therefore have different experiences of Autism and disability (Grant & Kara, 2021). In North America especially, Autism is conflated with ideas of high-socioeconomic status, whiteness, and masculinity (Cascio et al., 2020). This is a theme that can be seen stemming back from the work of Kanner in the 1940s (Kanner, 1943), who situated Autism as occurring within well-educated, well-off families, a belief that prevailed despite being debunked in the latter part of the twentieth century (Volkmar & McPartland, 2014; Wing, 1980).

Much of the literature around Autism has marked colonial undertones. For example, the suggestion by Baron-Cohen that to be able to 'mind read' is a further step in human evolution, thus suggesting those who he has determined are 'mind blind' (Autistic people in his research paradigm) are therefore less evolved, has disturbing similarities to the 'scientific' racial evolutionary theories (Purkayastha, 2022) of the nineteenth and twentieth centuries. The idea that Autistic people are somehow 'less human' is not unique to this example however; Linneman (2001) argues that assumptions about disability have interfered with the ability to construct Autistic people as human, leading to those who can tell us the most about the Autistic experience, Autistic people themselves (Smukler, 2005), being ignored.

Models of disability, created within the Western academy, are being called into question for their introspection, especially in regards to post-colonial theory: the world of the individual research participant and their lived experience taking more of a spotlight in the field of disability studies (Cascio et al., 2020; Ingstad & Whyte, 2007). The social model, though seen as more progressive than the medicalised deficit model, is laden with the value judgements and historical perspectives of colonial thinking, and judgements of what is important and, falls very much within a political framework from Western minority rights activism (Barker & Murray, 2010). Savarese (2010) calls for the need of a post-colonial neurology, arguing that conceiving Autism in post-colonial terms allows us to view the struggle for self-determination by Autistic activists as a form of 'neuronationalist uprising'.

Western assumptions of sociality and appropriateness litter then Autism academic canon, and the idea that, for example, eye contact, could have diverse uses among different peoples and cultures is lost in the diagnostic criteria of a 'social development disorder'. In many cultures, direct eye contact, and the forcing of decided social norms, are frowned upon, even abhorrent (Connors & Donnellan, 1993; Dixon et al., 1981; Field, 1981; Jaswal & Akhtar, 2019), and yet Western psychologists continue to use the lack of it as a sign that one is disabled. Even the measures used to decide whether someone is Autistic have deeply Westernised roots, for example, the 'Eyes Test', where participants are asked to determine the mental state of a person based on a black and white photo of their eyes. The models used for this test's photos are all Caucasian (Vellante et al., 2013), a noticeable exclusion. Even if the argument of a British audience is used, given that, in 2021, 81.7% of England and Wales' population was white (Office for National Statistics, 2022a), a study of 36 photos[13] would still need to contain at least 6 photo stimuli of non-white people to be representative of the native population.

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[13] Thirty-six was the number used in the 2015 study: Baron-Cohen, S., Bowen, D. C., Holt, R. J., Allison, C., Auyeung, B., Lombardo, M. V., Smith, P., & Lai, M.-C. (2015). The "Reading the Mind in the Eyes" Test: Complete Absence of Typical Sex Difference in ~400 Men and Women with Autism. *PloS one, 10*(8), e0136521. https://doi.org/10.1371/journal.pone.0136521

10.11 Feminism and Autism

From the outset, Autism has been dominated by male voices. Less has been heard from key female figures, from the work of Grunya Sukhareva in the 1920s (Manouilenko & Bejerot, 2015; Posar & Visconti, 2017), to Anni Weiss, the nurse who moved from Asperger's team to Kanner's (Silberman, 2015), to Gina Alstadt, the first wife of Bruno Bettelheim, who actually raised the children he claimed to have helped himself (Pollak, 1997). These are not household names in the ways Asperger and Kanner are, but their omission shows a trend within Autism studies. Furthermore, the world is a less safe place for Autistic women, who are at greater risk of sexual violence and exploitation. Sedgewick et al. (2019) reported that up to 80% of Autistic women have been victims of sexual assault, rape, or domestic abuse, higher than the rates for physically disabled women, and up to ten times higher than that of the general population. A more recent study put this figure as high as nine in ten Autistic women experiencing sexual violence (Cazalis et al., 2022). A feminist disability studies approach is therefore important (Grant & Kara, 2021).

Many of the early theories relating to 'causes' of Autism were linked to bad parenting, especially on the part of the mother, who was presumed to be the primary-care giver. Kanner described cold parents, who could only defrost for long enough to produce a child (Unknown, 1960), before raising them in a loveless environment. Bettelheim 'rescued' these children from their 'cold' parents, and 'cured' them of their tragic affliction of Autism, an affliction he compares to his time spent in Nazi concentration camps (Bettelheim, 1967).

Smukler (2005) states that by the late 1970s, ideas of neurological differences had replaced the belief that Autism was a psychosis, and a result of poor parenting. However, evidence of mother-blaming can still be seen after 1970. Baron-Cohen proposed that the mother could be responsible for the presence of difficulties in their children because of high testosterone levels during pregnancy (Baron-Cohen, 2002; James, 2014); James (2014) hypothesised that maternal stress caused the secretion of adrenal androgens, leading to Autism in the developing baby; and Wakefield blamed parents for vaccinating their children against deadly diseases. Solmi et al. (2022) suggests women having children later in life, and maternal obesity, can be blamed for the 'burden' of Autism, along with the suggestion of pollutants and pesticides contributing to the 'disease'. Care-givers, and particularly mothers, of Autistic people were repeatedly simultaneously blamed for their child's difficulties, and yet also portrayed as saintly figures, with valiant patience (Clarke, 2012; Smukler, 2005). Here we see a pattern of mother-blaming, and reinforcement of the stereotypical 'good mother' as one who stays home, does not work, and is dedicated only to her children as their primary care-giver (Johnston & Swanson, 2006). It is notable that the most influential figures within Autism research have been white, cis-gendered men.

> *"So why are males so attracted to studying maths? And why, in over 100 years of the existence of the Fields Medal, maths' Nobel Prize, have none of the winners have ever been a woman?" (Baron-Cohen, 2009).*

In the four ceremonies since this was written, two women have been awarded this prize, suggesting that maybe there were factors preventing women from reaching the top of mathematics achievement other than their biology. It is argued in this thesis that as well as needing to be decolonised, Autism studies must take on a feminist stance in order to progress. Ideas of the ‘male brain’, and an unempathetic, emotionless, highly mathematical Autistic person are not only outdated and stereotypical, but incredibly sexist and harmful to many who are affected by such gendered assumptions. In the same way that where previously it was thought women could not perform as well as men, and now the benefits of a gender-diverse workforce have been recognised, this thesis points to the idea that a neurodiverse society leading to greater innovation and benefits to all, rather than Autistic people being deficient.

10.12 Implications

This thesis is the first to examine the physical outputs of neurodiverse and neurosimilar interactions, and it found that those outputs from neurosimilar interactions were more similar than those from the neurodiverse interactions. This could have implications for the ‘value in diversity’ model (Bigozzi et al., 2016; Herring, 2009; Hofstra et al., 2020), as greater diversity in physical outcome could signal greater creativity within the neurodiverse conditions. Using this as evidence, arguments could be made for employers in the creative sector to employ more Autistic people, and neurodivergent people more generally, to boost their creative outputs. This is a highly capitalist way of viewing the outputs of this research; however, it could have positive outcomes for Autistic people, who often find themselves unemployed. Where previously, these differences in outputs might have been pathologised, they could now be viewed in this more positive light of creativity and diversity of design.

This thesis shows the positive benefits of cross-neurotype interactions empirically, and an additional implication of this work is to encourage this integration further. Much like Chapple et al. (2021) used paired discussions of ‘Of Mice and Men’ to help not-Autistic people to understand Autistic people better, this thesis advises greater awareness of Autistic people, and of neurodiverse interactions. Sasson and Morrison (2019) found that not-Autistic people with more understanding of Autism gave more favourable ratings of Autistic people, and this thesis further supports the education of not-Autistic people in Autistic ways of thinking for both personal development, and the advancement of creative outputs.

Silences between individuals can tell us a great deal about the relationships and dynamics at work, and this thesis is the first to examine silences between neurodiverse pairs of people. Where previously, research had only studied silences between not-Autistic people, the novelty of this thesis examining Autistic-Autistic interactions, and Autistic-not-Autistic interactions has great implications for both practice and future research. In noting that silences were significantly longer in the neurodiverse condition than in the not-Autistic condition, this thesis raises the question of rapport between individuals of different neurotypes, as well as the purpose of silence within a social interaction. Fordham (1993) found that women who were quiet were more successful, a finding that could parallel with ideas of Autistic masking: hiding who one is to further one’s achievements.

This thesis is the first to empirically show that there is more silence between two people of different neurotypes, than between two not-Autistic people. This could have implications for schools and workplaces, who could be further encouraged to listen to their neurodivergent employees or students who may be being purposefully silent to mask their differences. As

Sharma (2015) reported that many teachers attributed silence to lack of language proficiency, this thesis could inform educators as to these purposeful silences of neurodivergent individuals, so as to best support them, and not to assume lack of competence where students are silent.

As an example of an Autistic analysis, it is hoped that this thesis might also pave the way for more research done *by* Autistic people, not just *on* Autistic people. As this project and others have proven, Autistic people think in different ways to not-Autistic people, and this can have many benefits as well as challenges. By only viewing Autism and Autistic people through a 'neurotypical' lens, observations and valuable findings will be missed. This research is therefore of great importance, as it shows an alternative way of viewing and analysing neurodiverse interactions, from an Autistic point of view. It is hoped that the empirical findings of this thesis, and the literature explored, can recommend others to use not just the emotional effective learning dimension, but also the moral, and awareness of others' perspectives, and help people to rethink their assumptions about Autism.

10.13 Limitations and Future Directions

The measurement of success is based upon 71 participants, while this was above the number required for the effect size desired as calculated using G*Power (Faul et al., 2007), further studies could include even more participants.

For the analysis of the data in Chapter 8, all coding of the discourse between participants was done by one researcher. As discussed in Chapter 7, this can lead to a certain level of subjectivity when coding, and potential for error if work is not checked by an external individual. There is also the risk of neuro-bias, where neurotype specific interactions are coded by someone with a different neurotype to those interacting. These data were analysed by an Autistic researcher, and therefore could be biased towards Autistic-specific methods of interacting and markers of rapport (Rifai et al., 2022). Future work could see a team of researchers analyse qualitative data such as videoed interactions between Autistic and not-Autistic people, where codes are then compared for their similarity. Many have argued that work on Autism has not included the voices of Autistic people (Smukler, 2005). The opposite could be a criticism of this work, however, given the wealth of research completed by not-Autistic people on Autism, this author argues that an Autistic-only analysis is a rare occurrence, and should be seen in this respect.

Analysing the silences between people in the task took into account theories of turn taking (Sacks et al., 1974), and masking behaviours such as coughing to hide an uncomfortable gap (McLaughlin & Cody, 1982). However, these pieces of research were conducted before the most recent, and arguably most effective, conversation-gap filler: the mobile phone. Participants in the videos did not access their phones during the study, so how replicable their use of silence versus turn-taking conversation cannot necessarily be assumed. A full study on the use of mobile phones to fill unanticipated, awkward, or unwanted gaps in conversations would be highly informative, potentially followed by a study comparing these results in Autistic and not-Autistic populations.

The study in Chapter 9 took place online, and this brings with it the issue of controls regarding environment and task commitment. Some participants commented that the images were hard to see, some suggesting that if the images were in colour, it would have been easier to complete the task. A future study could re-test the hypothesis with clearer images, in colour, of the stimulus set.

In information-based tasks like those set by Bangerter (2000); Bangerter and Lehmann (1997) and Bartlett (1932), success across chains can only decrease as information is left out, but correct answers cannot be retrieved from previous participants in the chain. However, it is accepted that in this tower-building task, unlike a story-based diffusion-chain task, it is possible for participants further down the chain to out-perform their predecessors. This is due to the nature of the task being more open-ended, and this therefore adds a layer of complexity to the analyses that are possible.

Although there were no significant differences in heights across conditions, the towers from the neurosimilar conditions were taller on average than those in the neurodiverse condition. Future studies could repeat the methods as described in this thesis, to see if these results are replicated on a larger scale.

Further research could include an expansion of the study by Radun et al. (2021) to include Autistic participants. This would attempt to confirm whether Autistic participants find the sound of speech during a task as annoying and stressful as the not-Autistic participants of the original study. This could help to confirm the conclusions drawn from the primary data in this thesis which suggests Autistic people may be more empathetic to the needs of their partner when it comes to silences during a task requiring concentration.

This thesis found no difference between the offers of help from Autistic and not-Autistic participants; however, it is not known how helpful or otherwise these offers were found by the participants paired in the interaction. A future study could build on the work by Heasman and Gillespie (2019b), and ask participants after the tower building how helpful they found their partner. This study was not a paired task, so the objective was not to help someone else, but merely to observe them. However, as participants were being observed by someone who had not, themselves, completed the task or seen someone else complete the task, offers of help could be interesting to analyse, as it could be argued that the expertise very much lay with the builder, unless the observer had completed a similar tower-building task before.

The lack of significant difference in the topics discussed between conditions is of great interest, and could be explored further in a study of discourse between pairs of neurosimilar and neurodiverse people. In this task, discourse was not the main objective, and so the analysis of the conversations between participants can only tell us so much. A study could be conducted where participants are left alone in a room, perhaps waiting for another task to begin, and their conversation topics, if they choose to converse, are analysed. Therefore, they are not distracted by the task, and whether they spontaneously choose to interact, and what they choose to talk about, could be investigated. This study would clearly potentially need a higher level of ethical clearance, if participants are to be unaware of surveillance at any stage. Furthermore, as mentioned previously, a study looking at whether Autistic people discuss and adhere to rules more than their not-Autistic counterparts would be of interest, as this study found no evidence to support the commonly held assertion that Autistic people are rule-orientated and fixate on the rules of a task (Honeybourne, 2018).

A study by Sala et al. (2020) found that Autistic people were more likely to experience gender dysphoria, or to describe their gender differently to their sex assigned at birth. The demographics from this study seem to support this, but the sample is much too small to make conclusions. As a limitation of this study, this association between Autism and gender must be considered, the researcher did not feel it appropriate to exclude from analyses those who had chosen to identify otherwise on the gender demographic question, as in Kapp et al. (2013), however, the association should be recognised, and considered for future studies. Such a future study could investigate the relationship between innovation, replication, and gender, potentially exploring whether people who identify as the same gender would have higher rapport, or higher levels of imitation between each other. This study could therefore control for Autistic status in its analyses.

In terms of innovation and replication, a future study of great salience would involve a mixed methods approach where participants complete a task such as the tower building but are then interviewed for whether they consciously replicated or innovated from their peer. This is important as, although the results are significant, the reason why towers in neurosimilar chains had greatest similarity cannot be established without doubt. Asking Autistic and not-Autistic participants whether they chose to copy the person they had watched or not, would reveal any conscious decision making. It could also reveal which decisions were conscious and which were unconscious, leading to answers regarding unconscious bias, and the in-group versus out-group effect of knowing someone’s neurotype.

Following on from this, a similar study could be conducted, but one in which participants are blind to the condition which they are in. Obviously, they would know their own Autistic status, but the design could be managed so that they are not aware if the person they are observing, or who is observing them, is Autistic or not. This could help control the in-group/out-group effects, as well as any unconscious bias from participants regarding attributes of said group.

Concepts such as creativity and imagination can be implied from innovation versus replication studies, but the meanings of these terms are disputed. A research question could be developed to investigate different kinds of creativity in model-building tasks such as the tower-building task seen in this thesis. This could help investigate theories of Autistic creativity such as those expounded by Grandin and Panek (2013).

Finally, this is an Autistic analysis. This study involved not-Autistic participants, and therefore future studies could incorporate not-Autistic voices and analysis into the discussion, so as to best represent the not-Autistic community. By having a not-Autistic co-author, problems relating to double empathy could be better addressed. Useful discussion regarding what each person considers to be reciprocal interaction, success, or similarity would add depth of understanding and community engagement this this research.

10.14 Conclusions

> *“Before social change, there is discussion of social change” Dunivin et al. (2022, p. 1), discussing the Black Lives Matter protests in America.*

Innovation is central to human development, both individually and as a society; we acquire much of our behaviour from those who innovate, and then go on to disseminate these behaviours to the world around us (Ellen et al., 2013). Theories regarding transmission isolating mechanisms, or ‘Trims’, assumes that societies inherit most of their cultural traits from their ancestors (Durham, 1990, 1992). Mesoudi (2013) states that cultural transmission is at the heart of every social science discipline, but its salience is underappreciated, with cultural influences being ignored or downplayed in favour of explanations in terms of individual responses. This can lead to theories and research with no explicit consideration of the social influences at work.

In this thesis, familial similarity was measured between the designs of towers built by chains of Autistic, not-Autistic, and neurodiverse (alternating Autistic and not-Autistic) participants. These revealed most similarity in those built by not-Autistic participants in chains of other not-Autistic participants. The least similar towers within their chains were found within the neurodiverse chains, where participants alternated between Autistic and not-Autistic. It is proposed that there was an in-group/out-group effect, leading to a TRIM of Autistic status constraining the transmission of design replication in the neurodiverse interactions. No group was more or less successful in the task, and this broadly supports the neurodiversity model, in that the Autistic participants performed just as well as their not-Autistic peers. This also supports the idea that diversity leads to innovation, as there were the most diverse designs created within the neurodiverse condition.

With theory of mind based studies, the subjects of the studies are accorded little power, respect, or voice; Smukler (2005) argues that this is merely yet another way of explaining someone’s child to them in a way that does not match their experiences of living with them. For example, Baron-Cohen states that the majority of Autistic children displayed only a ‘hint’ of interest in other people (Baron-Cohen, 1997), whereas many parents agree their child very much wants to make friends with others, but struggles to know how. Rather than being two separate phenomena, some argue that the theory of mind theory merely transitioned into the male brain theory. They argue that the history of Autism research is one large competition for the position of professional authority; from the psychiatric teams in the 1940s, to the behavioural scientists in the 1960s, to the cognitive psychologists of today (Smukler, 2005). New professional perspectives often gain legitimacy at the expense of earlier constructs; Smukler (2005) states that in the case of Autism studies, this creates merely an illusion of progress, with experimental designs in the social sciences being used in a bid for this greater legitimacy.

The ‘Theory of Mind’ explanation of Autism is an example of researchers attempting to create one unifying theory to describe a group of people. Autistic people are described as those who do not understand others’ perspectives. But, as anyone who has been to a derby match, or seen Prime Minister’s Questions, can attest, we live in a world full of people who cannot understand that other people may have different beliefs and attitudes. Following the 2016

Brexit Referendum, or the 2016 American Presidential Election, millions of people could simply not understand why others did not share their viewpoints. Were all those people labelled Autistic? Did we sit them down in separate rooms and say ‘this is Sally, she voted blue’, ‘this is Ann, she voted red’? Bringing psychology and educational theory into the twenty-first century means recognising that papers describing ‘retarded children’ (Baron-Cohen et al., 1985; Wing, 1981) are testament to the views of their time, and should be studied as such, but not used in modern conceptualisations of neurological difference. Much like the fights of many marginalised groups, neurodivergent people are gaining their voice at the expense of out-dated theories of difference that favour a white, Westernised, male norm. As Walker (2021) states, forcing someone to comply with standards of neuronormative performance is not only harmful and unethical, but also oppressive. In this thesis I argue that the deficit model is just that, deficient. One unifying theory to describe a group of diverse, heterogenous people could never be accurate. More likely, we are all different, and move towards those with whom we connect and feel similar. By encouraging diversity, we can move out of these cliques, and into a more innovative, creative world.

Appendices

Appendix I: The Autistic Quotient Test

The AQ Test

		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've said is impolite, even though I think it is polite.				
8	When I'm 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 to 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 can't pursue.				
17	I enjoy social chitchat.				
18	When I talk, it isn't always easy for others to get a word in edgewise.				
19	I am fascinated by numbers.				
20	When I'm reading a story, I find it difficult to work out the characters' intentions.				
21	I don't 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 theater than to a museum.				
25	It does not upset me if my daily routine is disturbed.				
26	I frequently find that I don't 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 on the small details.				
29	I am not very good at remembering phone numbers.				
30	I don't 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'm not sure when it's my turn to speak.				
34	I enjoy doing things spontaneously.				
35	I enjoy doing things alone.				
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 cars, birds, trains, plants).				
42	I find it difficult to imagine what it would be like to be someone else.				
43	I like to carefully plan any activities I participate in.				
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.				

How to score: "Definitely agree" or "Slightly agree" responses to questions 2, 4, 5, 6, 7, 9, 12, 13, 16, 18, 19, 20, 21, 22, 23, 26, 33, 35, 39, 41, 42, 43, 45, 46 score 1 point. "Definitely disagree" or "Slightly disagree" responses to questions 1, 3, 8, 10, 11, 14, 15, 17, 24, 25, 27, 28, 29, 30, 31, 32, 34, 36, 37, 38, 40, 44, 47, 48, 49, 50 score 1 point.

MRC-SBC/SJW February 1998.
Published: *Journal of Autism* and Developmental Disorders, 31, 5-17 (2001).

Appendix II: Key recommendations for researchers seeking to apply the neurodiversity approach in their own work. From Dwyer (2022, p. 82)

- Do not solely focus on studying neurodivergent individuals' internal weaknesses and challenges; balance such research with research investigating:
    - – neurodivergent individuals' strengths and how these can be used to promote success and thriving;
    - – ways in which neurodivergent individuals' immediate environments, contexts, and social networks (e.g., school, family, peers) might affect them, either in disabling ways or ways that promote resilience and thriving;
    - – ways in which society and social institutions can affect neurodivergent people, again either in disabling ways or ways that promote resilience and thriving;
    - – discrimination and stigma towards neurodivergent people; and
    - – ways in which experiences of barriers, stigma, discrimination, victimization, and trauma can shape and affect neurodivergent people's development.
- Recognize that research is not an objective process. The social positions and backgrounds of researchers – including the social position of being neurotypical – may contribute towards biasing researchers' perspectives.
    - – Consider different interpretations of research findings from different perspectives: instead of assuming that findings reflect individual deficit, are there ways of interpreting findings as evidence of an individual strength, as a difference that is neither a strength nor a weakness, or as a disabling impact of the environment upon the individual?
    - – Be mindful of biases, and work to counteract them, when choosing research questions and designing studies.
    - – Choose language carefully in order to avoid unnecessarily making negative value judgements regarding neurodivergent individuals. Wherever possible, use neutral or positive terms in place of negative terminology.
- Learn more about the ideas, theories, and concepts used by neurodivergent people to understand and make sense of their experiences.
    - – Consider how these ideas could change your interpretation of research results.
    - – Explore whether these ideas could inspire new questions for future research.
- Recognize ways in which research has failed to serve the interests of, or has harmed, neurodivergent people; work actively to earn and deserve the community's trust and confidence.
    - – Understand that the onus of responsibility to promote reconciliation is on researchers, not neurodivergent people.

  - If harm has occurred, be willing to openly acknowledge this and validate the community's opposition.
  - Through your actions, demonstrate a commitment towards listening and responding to the community.
- Reach out to various community stakeholders, such as neurodivergent individuals and their parents, and include them in decisions about research in the hopes of thereby illuminating and reducing the impact of biases that may be held by any particular group, as well as of increasing the relevance of research to communities. This might involve, for example:
  - forming a community advisory board;
  - promoting involvement of neurodivergent people in academic research; or
  - conducting community-based participatory research.

Appendix III: Ethics

Ethical approval was provided by The University of Edinburgh for the collection of these data, reference number 265-1718/1. Approval was submitted on 28th March 2018 and granted on 10th April 2018.

Ethical approval for the analysis of the tower heights was deemed a low risk project and approved on the 15/06/20.

Ethical approval for the secondary analysis videos taken of the tower-building task was granted on the 18/08/20.

Ethical approval for the tower similarity rating pilot was granted on the 20/11/21, with approval for the full project being granted on 24/02/21.

All data transferred via The University of Edinburgh followed the data management guidelines.

Appendix: III.1 Secondary Data Analysis Ethical Approval (Height Data)

Dear Harriet,

Your supervisor has approved your ethical review form for the following project:

Title: Secondary Data Analysis of Spaghetti Towers;
Supervisor: MERRELL, CHRISTINE H.;
Expected Start Date: 15 June 2020;
Application Reference: EDU-2020-06-12T17:17:46-nlfg34.

Based on your responses your project has been categorised as (ethically) low risk and no further review is required before you start work.

Please be aware that if you make any significant changes to your project which mean that ethical approval may be required, you should complete and submit a revised ethical review form.

If you have any queries relating to the ethical review process or requirements for review, please contact your supervisor in the first instance. If you have any queries relating to the online system, please contact research.policy@durham.ac.uk.

Appendix: III.2 Secondary Data Analysis Ethical Approval (Videos)

Dear Harriet,

The following project has received ethical approval:

Project Title: *Secondary Analysis of Video Data;*
Start Date: *10 July 2020*;
End Date: *30 August 2022;*
Reference: *EDU-2020-06-30T16:41:34-nlfg34*
Date of ethical approval: *18 August 2020*.

Please be aware that if you make any significant changes to the design, duration or delivery of your project, you should contact your department ethics representative for advice, as further consideration and approval may then be required.

If you have any queries regarding this approval or need anything further, please contact ed.ethics@durham.ac.uk

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If you have any queries relating to the ethical review process, please contact your supervisor (where applicable) or departmental ethics representative in the first instance. If you have any queries relating to the online system, please contact research.policy@durham.ac.uk.

Appendix: III.3 Similarity Ratings Pilot Ethical Approval

Dear Harriet,

The following project has received ethical approval:

Project Title: *Tower Similarity Ranking Pilot;*
Start Date: *04 November 2020*;
End Date: *20 December 2020;*
Reference: *EDU-2020-11-02T11_29_10-nlfg34*
Date of ethical approval: *20 November 2020*.

Please be aware that if you make any significant changes to the design, duration or delivery of your project, you should contact your department ethics representative for advice, as further consideration and approval may then be required.

If you have any queries regarding this approval or need anything further, please contact ed.ethics@durham.ac.uk

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If you have any queries relating to the ethical review process, please contact your supervisor (where applicable) or departmental ethics representative in the first instance. If you have any queries relating to the online system, please contact research.policy@durham.ac.uk.

Appendix: III.4 Similarity Ratings Main Study Ethical Approval

Dear Harriet,

The following project has received ethical approval:

Project Title: *Tower Similarity Rankings: Main Study;*
Start Date: *18 February 2021*;
End Date: *01 August 2022;*
Reference: *EDU-2021-02-04T15_33_33-nlfg34*
Date of ethical approval: *24 February 2021*.

Please be aware that if you make any significant changes to the design, duration or delivery of your project, you should contact your department ethics representative for advice, as further consideration and approval may then be required.

If you have any queries regarding this approval or need anything further, please contact ed.ethics@durham.ac.uk

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If you have any queries relating to the ethical review process, please contact your supervisor (where applicable) or departmental ethics representative in the first instance. If you have any queries relating to the online system, please contact research.policy@durham.ac.uk.

Appendix IV: Risk Assessment, Similarity Ratings

Potential risk	Likelihood of risk	Severity posed by risk	Measured to be taken by researcher
Accident or injury to researcher	Very Low	Very Low	The researcher will be using their institutional email address for this study, which has a high level of security associated with Durham University. Through advertising the study on Twitter, there is the potential for unwelcome attention, this can be mitigated though monitoring comments on the post carefully.
Accident or injury to participant	Very Low	Very Low	This is an online study, and no information of a sensitive nature is being collected. No identifiable information is shared, unless participants wish to have their data removed from the study. In this case the participant can get in contact with the researcher with their confirmation code to have their details removed.
Data Breach	Very Low	Low	The information collected is stored on the secure server of the DART team in Edinburgh, once transferred to the researcher, they will store data on the Durham University OneDrive, a secure server.

Appendix V: Tower-building task participant instruction sheets

Participant 1

___________________________, You're going to build a tower out of the spaghetti and plasticine.

You've got 5 minutes, which should be plenty of time.

The sand timer will show you how much time you have used, and how long you have left.

Your goal is to **build as tall a tower as possible**.

You can do this however you like, but make sure the base of your tower is on the tray.

Here are some pictures of different kinds of spaghetti towers to help get you started.

When you're done, I'll come back and measure it.

___________________will watch you build the tower, and when you're finished it will be their turn.

Participant 2 _ - 7

____________________You're going to build a tower out of the spaghetti and plasticine.

Your goal is to **build as tall a tower as possible**.

You've got 5 minutes, and the sand timer will show you how much time you have used, and how long you have left.

You can use as much of the plasticine and spaghetti as you want, as long as your tower stays on the tray

When you're done, I'll come back and measure your tower

_________________________will watch you build the tower, and when you're finished it will be their turn.

Instructions to Participant 8

____________________You’re going to build a tower out of the spaghetti and plasticine.

Your goal is to **build as tall a tower as possible**.

You’ve got 5 minutes, and the sand timer will show you how much time you have used, and how long you have left.

You can use as much of the plasticine and spaghetti as you want, as long as your tower stays on the tray

You will be filmed while you are building the tower.

When you’re done, I’ll come back and measure it.

Appendix VI: Participant Quotes from Tower Building Task

Transcription began when the researcher closed the door, and stopped when the door was reopened. Dashes before the participant's initial represent when both participants spoke at the same time, while anything in brackets is an action. Names have been removed for anonymity, where information has been removed, square brackets have replaced said information. All interactions took place at Edinburgh University.

Appendix: VI.1 Extract from an Autistic-Autistic interaction

Both participants (A and B) are Autistic; A is building a tower while B watches.

*This interaction contains examples of off-task talk, such as when participants discuss the rain and where they have come from to get to Edinburgh, as well as discussion of the rules of the task, such as when participant A states "*I'm not allowed to hold it.".

(Researcher closes door)

(133 seconds no talking)

A: ah this rains stopped again

B: mm

A: oh

A: (laughs) interesting (inaudible)

A: (quietly) will that support its weight

A: oops (inaudible)

B: yeah

A: (inaudible)

(61 seconds no talking)

A: see if I can get another one on, don't know if I can

A: (quietly) give it a curl. god that's so (inaudible)

A: Where have you come this way from?

B: Er, [City X]

A: Oh wow

-B: but um

-A: that is a long journey for you

B: but yeah but we er

A: You doing, you staying up and doing something else instead

B: We're visiting my, husbands mum in [City Y] so

-A: (inaudible)

-B: (inaudible) effectively just come from [City Y]

A: oh that’s still, that’s still a long way

B: Yeah it’s still a long way yeah so

A: I thought I’d come a long way from [City Z]

B: Okay

A: but it really isn’t that far. It’s just up the road

-B: (inaudible)

-A: hang on, say if this is support it

B: How long does it take you to get here

A: Ah its only about an hour and a half

B: Okay

A: But then I walked. From the middle of Edinburgh

B: Yeah, okay

A: Right.

A: Question is, is this going to be (inaudible)

A: Hmm

B: (laughs)

A: (inaudible)

A: I’m not allowed to hold it. I know what!

A: Oh

B: mm, timer

(Researcher enters room)

Appendix: VI.2 Extract from a Not-Autistic- Not-Autistic interaction

Both participants (C and D) are Not-Autistic; C is building a tower while D watches.

This interaction contains examples of off-task talk, such as when participants discuss the weather, as well as discussion of the rules, such as when C states "I might break it. Am I allowed to break it?". There is also an example of task talk, when D states "yeah feel like a triangles a good shape".

D: They use these as like ice breakers don't they

C: yeah

C: (inaudible) doing (inaudible)

D: yeah feel like a triangles a good shape

D: (inaudible) so many days, I came up from [City] like, the other day with my friend

-C: ah

D: And it's snowing in [City]

C: Really?

D: yeah

C: oh (laughs) it's quite cold but, er, I was like, I left the house and I was like oh I probably should have taken my winter jacket (laughs)

D: (laughs)

C: but it, the sun's so nice

C: But, anyway. It hasn't really snowed that often here actually

C: Did you take the train?

D: Yeah. I think I only actually got dry when I got to Edinburgh like, I was drenched

C: (inaudible) (quietly) not nice

D: Strong and stable, as Thereasa May would say (laughs)

C: That's it, strong and s-(laughs) as long as it's standing I guess that's the thing, It's kind of wonky. It's not the plan

(15 seconds no talking)

C: Um, okay (laughs)

D: (laughs)

C: what now

D: you try (inaudible)

C: hm that'll

D: That's maybe two the end give it..stronger

C: yeah

C: (inaudible)

D: to be fair she did say you have to hold it so you could just rest it (laughs)

C: yeah (laughs)

D: yeah (inaudible)

C: (laughs) sure is standing, kind of

C: ugh, I'm really unsure about the level of architectural progress at the uni before

C: (laughs)

D: I think it's fine

C: Yeah?

D: (inaudible) mine all to myself so if you don't

C: (laughs)

D: If we start low it can get only better really (laughs)

C: (laughs) yeah

C: yeah, I can be like the one that you can compare like its okay, you did better than that (laughs) it's good

C: Are you here this full day then?

D: Yeah so I seen it and then my friends came up so I've left them

C: mhum

D: In a [pub]

C: oh

D: That was probably a bad idea for when I return

C: (laughs)

D: (inaudible)

C: (inaudible)

C: (laughs)

C: umm

D: (inaudible) that little bend (inaudible)

C: yeah (inaudible) I might break it. Am I allowed to break it?

D: Yeah

C: (laughs)

D: I don’t know, I actually don’t know if that’s a good idea or not

C: (laughs)

D: (laughs)

Appendix: VI.3 Extract from a Neurodiverse interaction

E is Autistic, F is not-Autistic. E builds a tower while F watches.

This interaction contains examples of task talk, such as when F states "spaghetti though easily breakable isn't it", there is also an offer of help from F when they say "more secure or more sturdy if you put (gestures)- One at the bottom -As a base" . F also points out that E's time has come to an end, an example of discussing the rules of the task, when they say "Oh, nearly out of time look. Ooh".

(Researcher closes door)

E: So much pressure with the timer on I'm (inaudible)

F: I know

(18 seconds no talking)

E: Honestly I've no idea what I'm doing I'm just-

-F: No just got for it its er

E: Winging it

F: (mumbles)

(41 seconds no talking)

E: Ah this is not, going to plan

F: (inaudible) spaghetti though easily breakable isn't it

E: I know trying not to (inaudible)

E: -the fear (laughs)

F: I know. It's not even staying here

(16 seconds no talking)

E: (laughs)

(10 seconds no talking)

E: This is awful (laughs)

F: (laughs)

E: Ah

(31 seconds no talking)

E: I think its just going to fall down if I do any more.

F: Sorry?

E: I think its just gonna fall down. At least I've done that.

(35 seconds no talking)

E: (inaudible) my hands red

(23 seconds no talking)

F: Can I ask a (inaudible) question?

E: Yeah

F: (inaudible) more secure or more sturdy if you put (gestures)-

-E: one

-F: One at the bottom

E: Yes I think so

F: As a base

E: Maybe yeah

(32 seconds no talking)

F: If you needed more room, you, would you need to take that off too (points)

E: That's a good idea (laughs) (moves pot of spaghetti)

F: Gives you, gives you the full tray to use then if it's

(26 seconds no talking)

E: (inaudible) stick one on top

F: See that'll be absolutely solid on the base now

E: Thank you (laughs) for your help

E: Scared to touch it

F: Oh, nearly out of time look. Ooh (laughs)

E: (laughs)

(Researcher enters room)

Appendix VII: Similarity Ratings Information sheet

Information to Participant

This study is conducted by Harriet Axbey as part of her PhD studies at Durham University. This research project is supervised by Dr Nadin Beckmann (nadin.beckmann@durham.ac.uk) and Professor Julian Elliott (joe.elliott@durham.ac.uk), at Durham University School of Education. It is supported by the Economic Social and Research Council (ESRC).

This is a study to look at the similarity of spaghetti towers built by a group of participants. You will be asked to match pictures of towers based on their similarity. You will be asked demographic questions relating to your age, gender, and Autistic status. No other identifiable information (e.g. name/contact details) will be taken. If you are taking this study through Prolific, your ID will be linked to the study, so that if you wish to withdraw your responses at any point, you can get in contact at the email below.

Harriet.a.axbey@durham.ac.uk

Appendix VIII: Privacy Statement for Similarity Ratings

Privacy Notice and Withdrawal of Consent

All responses will be kept confidential. Your Prolific ID/Confirmation Code will be removed from the data and never revealed. You will not be identified individually by name and there will be no way to connect your name to your responses at any time during or after the study. The records of this study will be kept secure, private, and password protected.

You may withdraw your consent at any time without any negative consequences. Just email me at the address below, with your confirmation code you will receive at the end of the study.

If you have any questions, requests, or concerns regarding this research, please contact me via email at harriet.a.axbey@durham.ac.uk.

This study has been reviewed and approved by the School of Education Ethics Sub Committee at Durham University (date of approval: 24/02/21).

Appendix IX: Consent Form for Similarity Ratings

Consent (tick boxes):

- I confirm that I have read and understand the information on this study and the privacy notice for the project.
- I have had sufficient time to consider the information and ask any questions I might have, and I am satisfied with the answers I have been given.
- I understand who will have access to personal data provided, how the data will be stored and what will happen to the data at the end of the project.
- I agree to take part in the above project.
- I understand that my participation is voluntary and that I am free to withdraw at any time without giving a reason.

By clicking next you are agreeing to the above statements.

Appendix X: Debrief Sheet

Debrief Sheet

The purpose of this study was to see if individuals are more likely to copy someone if they feel they have a connection with them. You saw pictures of towers built by individuals who had spent time watching someone else building a tower similar to theirs. This study aims to identify whether participants made a tower similar to the one they watched being built, or if they created a new design.

Thank you for taking part in this study, if you have any questions or concerns, please contact me at: harriet.a.axbey@durham.ac.uk, remember to quote your confirmation code.

Appendix XI: Confidentiality Document: Edinburgh University

Declaration of Confidentiality of Personal Identifiable Information

I understand that, in the course of my duties I may have access to personal identifiable information, some of which may be sensitive and all of which is highly confidential.

I undertake not to disclose such information to any person not concerned with the care, diagnosis or treatment of the individuals concerned. If I am in any doubt as to the authority of the person seeking information, I shall refer to my senior manager.

It has been explained to me that any breach of such confidence is gross misconduct and will lead to disciplinary action.

Signed (removed for privacy)

Name (IN BLOCK LETTERS): HARRIET AXBEY

Date: 25/06/20

To be completed by Senior Manager and copy held in HR file

I certify that I have explained the importance of confidentiality of medical information and other areas of research governance as relevant to the role/project

Yes, see email correspondence 24th June 2020 (from SFW) and 30th June 2020 (from Catherine Crompton) + acknowledgements from H Axbey

……………………………………………………………………………………………...……………………………………..

Signed (removed for privacy)

Name (IN BLOCK LETTERS) Sue Fletcher-Watson

Post: Director, Salvesen Mindroom Research Centre

Department: CCBS, University of Edinburgh

Date: 30th June 2020

Appendix XII: Innovation through neurodiversity: Diversity is beneficial. Autism Paper 2023

Autism
OnlineFirst, March 7, 2023

https://doi.org/10.1177/13623613231115868

Short Report

Innovation through neurodiversity: Diversity is beneficial

Harriet Axbey [14], Nadin Beckmann [1], Sue Fletcher-Watson [2], Alisdair Tullo[2], and Catherine J Crompton [2]

Those experiencing high rapport or strong social connection are more likely to copy each other, or emulate each other's ideas, either consciously or sub-consciously. In this study, we use this phenomenon to examine whether neurotype match or mismatch impacts degree of imitation in a creative task. We asked 71 participants in neurodiverse pairs (including both autistic and non-autistic participants) and single-neurotype pairs (both autistic or both non-autistic), where one participant builds and one observes, to build the tallest possible tower from dried spaghetti and plasticine. We measured the height of each tower and photographed them to create a stimulus set. We then asked independent raters (n = 351, 62 autistic) to rate towers for degree of similarity. We hypothesised that lower similarity scores would be generated for towers created by people in neurodiverse pairs, showing positive innovation. Results showed towers built in the neurodiverse condition had least similarity, whereas towers built in the autistic and non-autistic conditions were significantly more similar. There was no difference in performance (height of tower) based on condition. Our results are the first to examine creativity within single-neurotype and neurodiverse pairs; they indicate that neurological diversity may be beneficial within a group setting. Subsequent research is required to examine how this interacts with divergent communication styles.

Lay abstract Neurodivergences such as autism have been previously viewed from a negative, 'deficit', perspective. However, research is beginning to show the benefits of being autistic, and the positive outcomes of neurodiverse interactions. Diversity in the way we think can lead to diversity in the outcomes we produce. In this study, we asked independent raters to compare the similarity of towers built by autistic and non-autistic individuals in single-neurotype (both people were autistic or both people were non-autistic) and

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neurodiverse (one autistic person and one non-autistic person) pairs, to see whether people would be more or less likely to copy someone who shared their diagnostic status. Our results showed there was the least similarity in design in the neurodiverse pairs; people were less likely to copy the design of the previous builder if that person had a different autistic status to themselves. This could imply people felt more confident in copying someone with a similar neurotype, mirroring results from rapport studies where autistic individuals reported greater rapport with other autistic participants than with non-autistic participants. This also shows there was more evidence of creativity in designs, and innovation from stimulus design (the tower they had watched being built) when the pairs had different autistic diagnoses. This could inform practice and support involving autistic people, encouraging education and care providers to create more diverse methods and designs for support mechanisms, content delivery, and research data collection.

Keywords

autism, creativity, diffusion chains, neurodiversity, innovation

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Introduction

Autism is an example of neurodivergence; where there are individuals with different neurotypes, such as in a group of people, some of whom are autistic and some of whom are not, this is called neurodiversity. Most research examines autistic social behaviour and cognition at an individual level, through direct comparison of autistic and non-autistic people (Gernsbacher & Yergeau, 2019). However, in doing so, this neglects the role of interactive and interpersonal dynamics, which are an essential part of understanding neurodiversity.

There is evidence that stronger social connections can lead to imitation and emulation.

The ability to both replicate from others and innovate has helped human survival to the present day, and is necessary in our development both physically and socially (Hopper et al., 2010; Horner et al., 2006). Innovation has been studied experimentally using the diffusion chain method, a method of studying the cultural transmission of information across generations, in a way similar to the children's game of 'telephone' (Carr et al., 2015). This method involves pairs of participants completing a task together within a larger 'chain' of participants (Crompton, Ropar, et al., 2020). This method facilitates examination of the evolution of ideas, and how they develop through 'generations' of participants (Caldwell & Millen, 2008a).

In this study, we aimed to investigate social connectivity and similarity through observation, to see whether there would be greater imitation within single-neurotype pairs compared with mismatched pairs of autistic and non-autistic people. Participants were asked to rate the similarity of Spaghetti Towers (Caldwell & Millen, 2008a, 2010) that had been created by autistic and non-autistic individuals, during a diffusion chain procedure. The towers were created by people who had previously watched another individual make a tower, while being observed by the next participant in the chain. In one condition, the observer and first tower-maker were both autistic, in another, they were both non-autistic, and in a third, the pair were mismatched (autistic and non-autistic). We also compared the heights of the towers created by participants in each of the three groups as a performance indicator.

We hypothesised that participants who were in mismatched pairs would create less similar tower designs as indicated by lower similarity scores given by raters. If their tower was less similar, this could suggest they had innovated from their stimulus tower; innovation in this context is considered positive and beneficial, as it shows diversity and creativity in outcomes. We also examined tower height, but had no a priori hypothesis about this.

Method

Creating the photo stimuli

Seventy-one photo stimuli were created for use in this study during a research day as part of a wider project looking at diverse social intelligence (Crompton, Ropar, et al., 2020). Each photo featured a tower built from dried spaghetti and plasticine that had been created by a participant.

The stimuli were created during a diffusion chain study (Crompton, Ropar et al., 2020; Flynn & Whiten, 2008). Chains consisted of eight participants (seven in one case due to attrition) and were in one of three conditions: autistic, non-autistic, and neurodiverse (alternating autistic and non-autistic participants, beginning with a non-autistic participant). Participants in each chain were asked to build a tower as tall as possible within the space of five min: they took turns both observing and building a tower. For example, Participant Three in the chain would watch Participant Two build a tower out of spaghetti and playdough. Then, Participant Two would leave the room and their tower would be deconstructed. Participant Four would enter the room and watch Participant Three building a tower. This pattern continued through the entire chain.

Before being deconstructed, towers were measured in centimetres by a researcher, using a metre stick. This task was completed by 71 adult participants (35 autistic) at the University of Edinburgh. An example of one of the towers is shown in Figure 1.

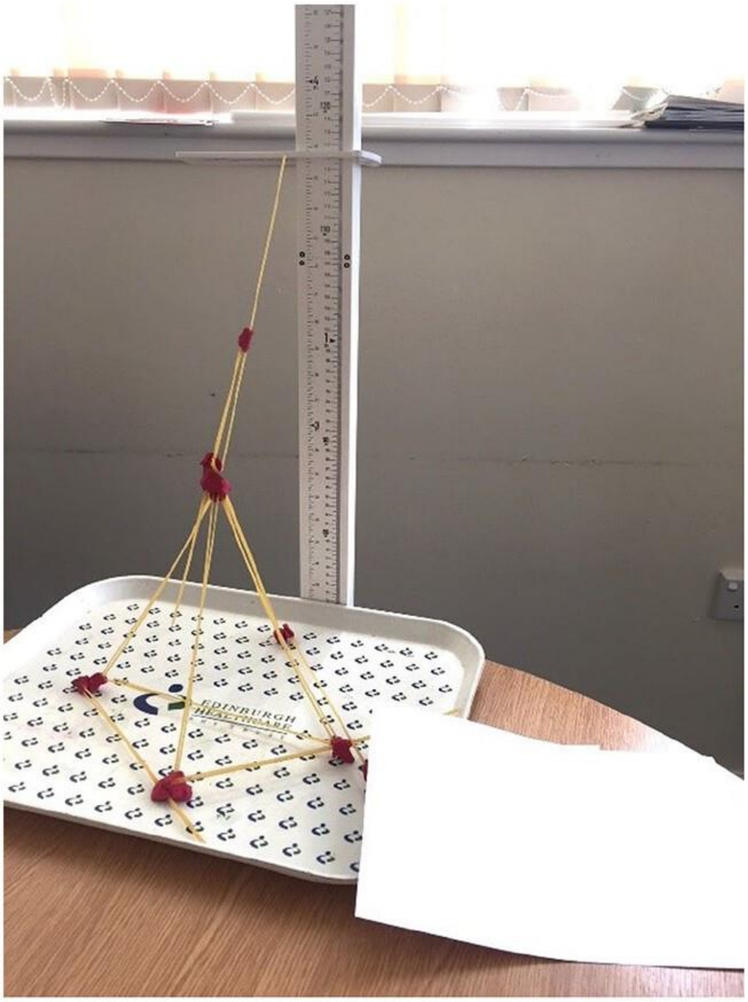

Figure 1. An example photo stimulus, indicating a spaghetti tower created by a participant.

Ratings of similarity

We used an experimental design using independent raters to judge the similarity of task outcomes (towers built) by autistic and non-autistic individuals from the observation and building task. The experimental factor was the condition under which the original stimulus tower was built. This was a computer-based task, administered online. Full code for the task programme and the stimuli used can be found in Tullo et al. (2022).

The task presented raters with six images at once (see Figure 2). Each block of six images contained two consecutive images from three different types of diffusion chains (autistic, non-autistic, and neurodiverse). Participants were not informed whether the stimuli were created by autistic or non-autistic participants, nor did they know what conditions (i.e. matched or mismatched neurotype observer) applied when the tower was built. Raters were asked to match images into pairs based on their similarity, instructions read as follows:

> In a previous study we asked people to build towers out of spaghetti and playdough. Now, we want to ask you to decide how similar the towers were to each other. We're going to show you six photos of spaghetti towers; three on the top row and three on the bottom row. Your job is to pair up the pictures, according to how similar you think they are. Click on a

> picture in the top row, and then click the tower on the bottom row that you think is most similar, to create a linked pair. You must make three links to move on to the next screen. Sometimes there will be one photo that really doesn't look like any of the other towers on the page. You still have to pick a pair for it! If you're not happy with your choices click 'Clear' to remove them and start again. Once you click 'Submit' your choice is recorded and you can't go back. Please don't use your browser's 'back' button as this will exit the experiment!

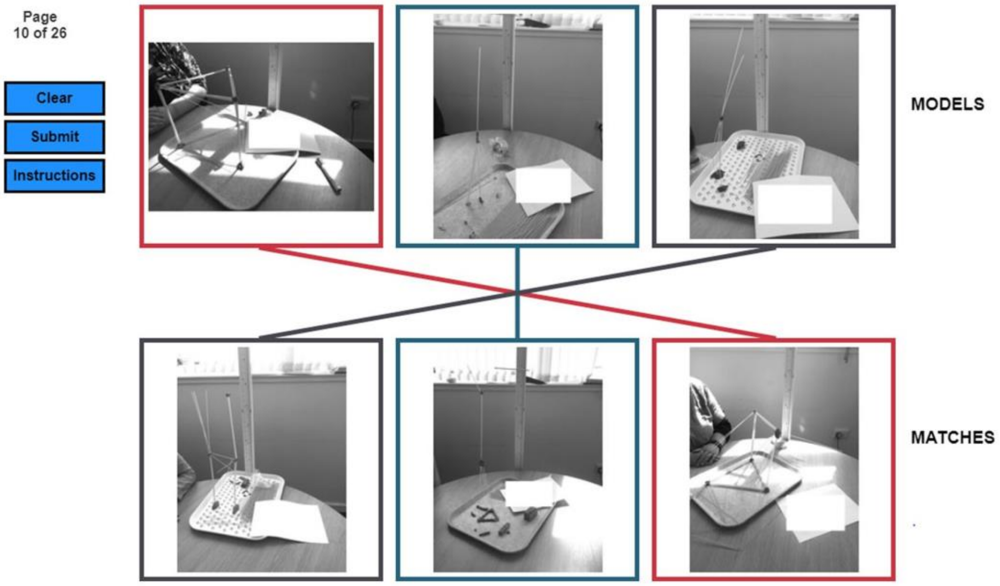

Figure 2. A screenshot from the task.

A correct match was scored as 1, and an incorrect match scored as 0. A correct match was defined as the rater matching two pictures from the same diffusion chain. Therefore, the mean average score for each diffusion chain (autistic, non-autistic, neurodiverse) is found between 0 and 1.

Raters for the similarity judgements were recruited via Prolific and Twitter. Of the 351 raters, 62 reported being autistic (43 diagnosed, 19 self-diagnosed). Participants' ages ranged from 18 to 71 years (mean (M) = 32, standard deviation (SD) = 12.14), with 215 male, 127 female and 9 identifying otherwise. Specific data on race/ethnicity and socioeconomic status were not recorded. Raters recruited via Prolific were reimbursed for their time (£0.84 for 8 min), and participants recruited via Twitter had the opportunity to be entered into a draw for a £50 gift voucher.

Ethical approval

Ethical approval for the diffusion chain stimuli creation was granted by the University of Edinburgh, and approval for collecting the similarity judgements from independent raters was approved by Durham University.

Results

The mean similarity rating (mean average score for each diffusion chain) was the highest for towers built in the non-autistic condition (M = 0.580, SD = 0.121) followed by the autistic condition (M = 0.560, SD =

0.123) and finally, the neurodiverse condition (M = 0.544, SD = 0.130) (Figure 3).

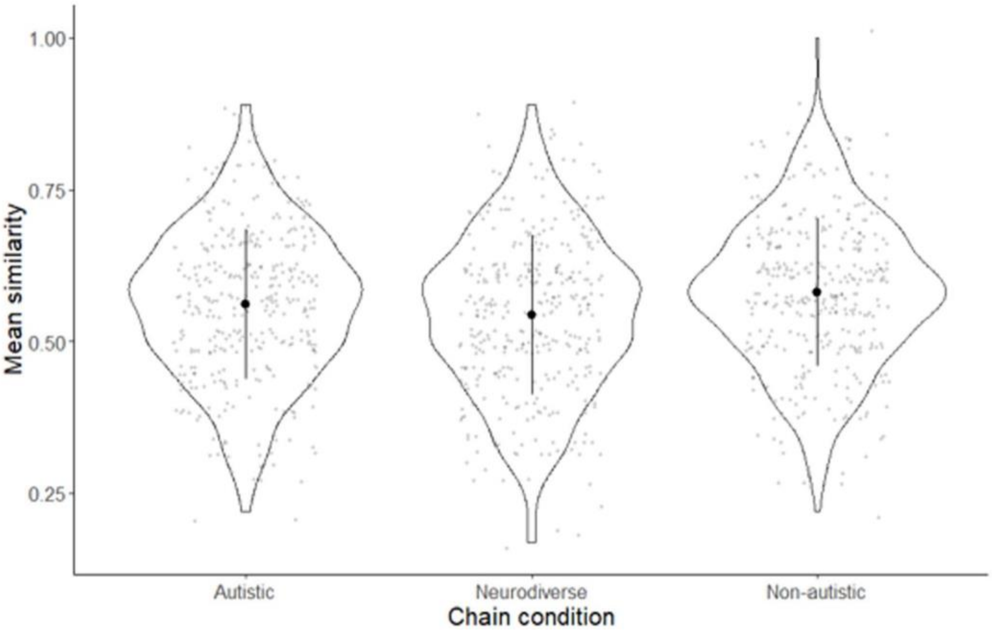

Figure 3. Mean similarity of towers as judged by 351 raters.

Perceived similarity of towers differed significantly between conditions, as shown by a repeated measures analysis of variance (ANOVA) ($F(696) = 5.968$, $p < 0.05$; $\eta_p^2 = 0.17$), using age and gender as covariates. A post hoc analysis with the Bonferroni adjustment determined that the similarity between towers in the neurodiverse (ND) condition was significantly less than that in the autistic (A) condition (mean difference ND minus A = −0.016 (95% confidence interval (CI) = −0.031 to −0.001), $p < 0.05$) and the non-autistic (NA) condition (mean difference ND minus NA = −0.036 (95% CI = −0.051 to −0.021), $p < 0.001$). The similarity between the non-autistic and the autistic conditions also differed significantly (mean difference A minus NA = −0.020 (95% CI = −0.036 to −0.004), $p < 0.05$).

A Cohen's d calculation using pooled standard deviations showed that the difference between the similarity judged between the autistic and neurodiverse conditions' chains had an effect size of $d = -0.126$ ($SD_{pooled} = 0.127$). The effect size between the non-autistic and the neurodiverse conditions was larger, at d

$= -0.284$ ($SD_{pooled} = 0.126$).

The average tower height across conditions was 57.68 cm (SD = 22.13 cm). Descriptively, the mean height of towers was the highest in the non-autistic condition (61.38 cm, SD = 18.69 cm) and the lowest in the neurodiverse condition (53.08 cm, SD = 22.45 cm); towers in the autistic condition averaged 58.61 cm (SD = 25.23). A one-way ANOVA found there was no significant difference between the three conditions ($F(40, 30) = 1.23$, $p = 0.28$).

Discussion

The results show that there was a small but significant difference in perceived similarity between towers in the neurodiverse condition and towers in the single-neurotype conditions, with non-autistic towers being the most similar of the three conditions. We therefore tentatively accept our hypothesis that similarity would be the lowest in the neurodiverse groups.

In this study, a greater range in design (as indicated by lower similarity between towers) is a better outcome as it shows greater creativity. Our results indicate that neurodiversity creates more diverse solutions, adding to the 'value in diversity' model that suggests that diverse groups will produce better outcomes (Herring, 2009; Hofstra et al., 2020).

Furthermore, the greater similarity rated within the single-neurotype conditions suggest that participants were more likely to imitate from those who shared a similar neurotype. This could be related to greater rapport between participants, if they chose to replicate the design of the person they were observing, especially if they identified with the identity of the builder, given that their autistic status was known (Brewer, 1979; Matthews et al., 2012). Using the same sample set, greater rapport between those with similar neurotypes was reported during a separate task, so this could be transferred across to this towerbuilding task (Crompton, Sharp, et al., 2020).

Imitation and emulation are not always beneficial, as we need creativity and innovation in many areas, such as business. Diversity within a group (including *neuro*diversity) and a diverse workforce can add productivity, creativity and even profitability, as research shows that such diverse workforces lead to increased sales, more customers, and greater relative profits (Bigozzi et al., 2016; Herring, 2009). We argue that these findings suggest neurodiversity produces more innovative and diverse designs as an output to a tower-building task. The diffusion chain method for the collection of the stimulus data helped to replicate the natural transmission of cultural and design ideas, and is useful as it shows cumulative effects (Caldwell & Millen, 2008b; Flynn, 2008). Within research, those from under-represented groups are shown to produce higher rates of scientific novelty, and yet these novel contributions are often not recognised, or given due credit (Hofstra et al., 2020). As a minority group, autistic individuals' contributions may be overlooked or undervalued, which should be considered when looking at observation and similarity-based tasks such as these. While we know that individually, neurodivergent people may be more creative in how they complete tasks (Bigozzi et al., 2016), we do not know whether neurodiversity within groups leads to improved innovation and creative problem-solving. This could be explored further in future research.

There were no significant differences between the heights of the towers built across conditions. This shows that no condition achieved 'worse' than another, that is, task performance did not vary significantly based on neurotype. This sheds new light on theories that present autism and neurodivergences as 'deficit'; theories which are empirically questionable, yet still pervade to create harmful societal impacts (Gernsbacher & Yergeau, 2019).

This study does have limitations, which should be addressed by future research. First, this study only used one stimulus set. The study could be repeated with an additional stimulus set to examine creativity across different types of tasks. Second, although all towers were built in the same room, on the same table, and therefore the images had the same background and lighting, the images were presented to participants in black and white. This was necessary as in the stimulus photos, towers had been created with different colours of plasticine, which may have meant raters based their similarity pairings on colour, rather than structure. Future studies could repeat this method using a full colour stimulus set. Finally, as this is inherently an observation-based rather than collaborative task, it would be interesting to study the effects of being watched while building the towers. Although the first participant in each chain did not watch anyone, and the final participant did not have an observer, no participant completed the task completely independent of another. Further studies could include a control condition, where the builders construct their towers alone, without having observed another and without an observer.

Previous studies on replication and innovation have shown innovation to be rare, especially as age increases (Carr et al., 2015). Therefore, the significant effects of neurodiversity on creative outcomes here show some exciting prospects for the field of innovation studies. Our results are the first to examine innovation and creative thinking within single-neurotype versus neurodiverse pairings, and indicate that neurological diversity may be beneficial in this way. Subsequent research is required to examine how this interacts with divergent communication styles of autistic and non-autistic people.

Community involvement statement

The lead author on this article is autistic, and the collection of data involved support from the autistic community in Edinburgh.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: ESRC Grant Award/Number ES/P000762/1. Templeton World Charity Foundation Grant Number: TWCF0200.

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References

Bigozzi L., Tarchi C., Pinto G., Donfrancesco R. (2016). Divergent thinking in Italian students with and without reading impairments. *International Journal of Disability, Development and Education*, 63(4), 450–466. Crossref

Brewer M. B. (1979). In-group bias in the minimal intergroup situation: A cognitive-motivational analysis. *Psychological Bulletin*, 86(2), 307–324. Crossref

Caldwell C. A., Millen A. E. (2008a). Experimental models for testing hypotheses about cumulative cultural evolution. *Evolution and Human Behavior*, 29(3), 165–171. Crossref

Caldwell C. A., Millen A. E. (2008b). Studying cumulative cultural evolution in the laboratory. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 363(1509), 3529–3539. Crossref

Caldwell C. A., Millen A. E. (2010). Conservatism in laboratory microsocieties: Unpredictable payoffs accentuate group-specific traditions. *Evolution and Human Behavior*, 31(2), 123–130. Crossref

Carr K., Kendal R. L., Flynn E. G. (2015). Imitate or innovate? Children's innovation is influenced by the efficacy of observed behaviour. *Cognition*, 142, 322–332. Crossref

Crompton C. J., Ropar D., Evans-Williams C. V. M., Flynn E. G., Fletcher-Watson S. (2020). Autistic peer-to-peer information transfer is highly effective. *Autism*, 24, 1704–1712. Crossref

Crompton C. J., Sharp M., Axbey H., Fletcher-Watson S., Flynn E. G., Ropar D. (2020). Neurotype-matching, but not being autistic, influences self and observer ratings of interpersonal rapport. *Frontiers in Psychology*, 11, 586171.
Crossref

Flynn E. (2008). Investigating children as cultural magnets: Do young children transmit redundant information along diffusion chains? *Philosophical Transactions of the Royal Society B: Biological Sciences*, 363(1509), 3541–3551.
Crossref

Flynn E., Whiten A. (2008). Cultural transmission of tool use in young children: A diffusion chain study. *Social Development*, 17(3), 699–718. Crossref.

Gernsbacher M. A., Yergeau M. (2019). Empirical failures of the claim that autistic people lack a theory of mind. *Archives of Scientific Psychology*, 7(1), 102–118. Crossref

Herring C. (2009). Does diversity pay? Race, gender, and the business case for diversity. *American Sociological Review*,
74(2), 208–224. Crossref

Hofstra B., Kulkarni V. V., Munoz-Najar Galvez S., He B., Jurafsky D., McFarland D. A. (2020). The Diversity– Innovation Paradox in Science. *Proceedings of the National Academy of Sciences*, 117(17), 9284–9291. Crossref

Hopper L. M., Flynn E. G., Wood L. A. N., Whiten A. (2010). Observational learning of tool use in children:

Investigating cultural spread through diffusion chains and learning mechanisms through ghost displays. *Journal of Experimental Child Psychology*, 106(1), 82–97. Crossref

Horner V., Whiten A., Flynn E., de Waal F. B. M. (2006). Faithful replication of foraging techniques along cultural transmission chains by chimpanzees and children. *Proceedings of the National Academy of Sciences*, 103(37), 13878–13883. Crossref

Matthews C., Roberts G., Caldwell C. A. (2012). Opportunity to assimilate and pressure to discriminate can generate cultural divergence in the laboratory. *Evolution and Human Behavior*, 33(6), 759–770. Crossref

Tullo A., Crompton C., Fletcher-Watson S., Axbey H. (2022). *Image chain similarity* [Computer Software]. Zenodo.
https://zenodo.org/record/6908258#

11 References

Allport, G. W., & Postman, L. J. (1945). The basic psychology of rumor. *Transactions of the New York Academy of Sciences, 8*, 61-81. https://doi.org/10.1111/j.2164-0947.1945.tb00216.x

Ament, K., Mejia, A., Buhlman, R., Erklin, S., Caffo, B., Mostofsky, S., & Wodka, E. (2015). Evidence for Specificity of Motor Impairments in Catching and Balance in Children with Autism. *Journal of Autism and Developmental Disorders, 45*(3), 742-751. https://doi.org/10.1007/s10803-014-2229-0

American Psychiatric Association. (1918). *Statistical Manual for the Use of Institutions for the Insane*. National Committee for Mental Hygiene.

American Psychiatric Association. (1952). *Diagnostic and Statistical Manual of Mental Disorders* (1st ed.). American Psychiatric Association.

American Psychiatric Association. (1968). *Diagnostic and Statistical Manual of Mental Disorders* (2nd ed.). American Psychiatric Association.

American Psychiatric Association. (1980). *Diagnostic and Statistical Manual of Mental Disorders* (3rd ed.). American Psychiatric Association.

American Psychiatric Association. (1987). *Diagnostic and Statistical Manual of Mental Disorders* (Rev. 3rd ed.). American Psychiatric Association.

American Psychiatric Association. (1994). *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.). American Psychiatric Association Press Inc.

American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders : DSM-5* (5th ed.). American Psychiatric Association.

Amiet, C., Gourfinkel-An, I., Bouzamondo, A., Tordjman, S., Baulac, M., Lechat, P., Mottron, L., & Cohen, D. (2008, Oct 1). Epilepsy in autism is associated with intellectual disability and gender: evidence from a meta-analysis. *Biol Psychiatry, 64*(7), 577-582. https://doi.org/10.1016/j.biopsych.2008.04.030

Anderson, G. R., Galfin, T., Xu, W., Aoto, J., Malenka, R. C., & Sudhof, T. C. (2012). Candidate autism gene screen identifies critical role for cell-adhesion molecule CASPR2 in dendritic arborization and spine development. *Proceedings of the National Academy of Sciences, 109*(44), 18120-18125. https://doi.org/10.1073/pnas.1216398109

Armstrong, T. (2010). *The Power of Neurodiversity: Unleashing the Advantages of Your Differently Wired Brain*. Da Capo Press.

Asperger, H. (1938). Das psychisch abnorme Kind. *Wiener Klinische Wochenschrift, 49*, 1314-1317.

Asperger, H. (1939). Pädagogische Therapie bei abnormen Kindern. *Med Klin, 35*, 943-946.

Asperger, H. (1942). "Jugendpsychiatrie" und" Heilpädagogik". *Munch Med Wochenschr*(89), 352-356.

Asperger, H. (1944). Die 'Autistischen Psychopathen' im Kindesalter. *Arch Psychiatr Nervenkr, 117*(1), 76-136.

Astle, D. E., & Fletcher-Watson, S. (2020). Beyond the Core-Deficit Hypothesis in Developmental Disorders. *Current Directions in Psychological Science, 29*(5), 431-437. https://doi.org/10.1177/0963721420925518

Axbey, H. (2019a). Community Contribution: Harriet Axbey- Autistic Trainee Teacher. In F. H. Sue Fletcher-Watson (Ed.), *Autism: A New Introduction to Psychological Theory and Current Debate* (pp. 98-99). Routledge.

Axbey, H. (2019b). *Neurotypical interventions : a neurodiverse approach to school-based social communication support* Imagining Better Education Conference 2018,

Axbey, H. (2019c). *A Systematic Review into the Implementation of the Closed Diffusion Chain Method with Children* [Master's, Durham University]. (Unpublished).

Axbey, H., Beckmann, N., Fletcher-Watson, S., Tullo, A., & Crompton, C. J. (2023). Innovation through neurodiversity: Diversity is beneficial. *Autism, 0*(0), 13623613231158685. https://doi.org/10.1177/13623613231158685

BadddWolf? [@badd_woolf]. (2022, 4th April 2022). *Got me tearing up from laughing. Way to say the quiet part out loud. #autismawarenessmonth #actuallyautistic #autismspeaksdoesntspeakforme* [Video]. TikTok.

Bailey, A., Le Couteur, A., Gottesman, I., Bolton, P., Simonoff, E., Yuzda, E., & Rutter, M. (1995). Autism as a strongly genetic disorder: evidence from a British twin study. *Psychological Medicine, 25*(1), 63-77. https://doi.org/10.1017/s0033291700028099

Baker, M. (2005). *Families changing trends in Canada* (5th ed.). McGraw Hill.

Bandura, A. (1977). *Social Learning Theory*. Prentice Hall.

Bangerter, A. (2000). Transformation between scientific and social representations of conception: The method of serial reproduction. *The British Journal of Social Psychology, 39*, 521-535.

Bangerter, A., & Lehmann, K. A. (1997). Serial reproduction as a method for studying social representations.

Barker, C., & Murray, S. (2010). Disabling Postcolonialism: Global Disability Cultures and Democratic Criticism. *Journal of Literary & Cultural Disability Studies, 4*(3).

Barker, I. (2020, 2020 Feb 21). How a SEND diagnosis affects teachers' judgement. *The Times Educational Supplement*.

Baron-Cohen, S. (1990). Autism: A specific cognitive disorder of "mind-blindness.". *International Review of Psychiatry, 2*, 81-90. https://doi.org/10.3109/09540269009028274

Baron-Cohen, S. (1995). *Mindblindness: An essay on autism and theory of mind*. MIT Press.

Baron-Cohen, S. (1997). Mindblind. *Natural History*, *106*(8), 62-65.

Baron-Cohen, S. (1998, 1st September). Does Autism Occur More Often in Families of Physicists, Engineers, and Mathematicians? *Autism, 2*(3), 296-301. https://doi.org/10.1177/1362361398023008

Baron-Cohen, S. (2002). The extreme male brain theory of autism. *Trends in Cognitive Sciences, 6*(6), 248-254. https://doi.org/10.1016/s1364-6613(02)01904-6

Baron-Cohen, S. (2009). Autism test 'could hit maths skills'. *BBC News*. http://news.bbc.co.uk/1/hi/health/7736196.stm

Baron-Cohen, S. (2010). Chapter 11 - Empathizing, systemizing, and the extreme male brain theory of autism. In I. Savic (Ed.), *Progress in Brain Research* (Vol. 186, pp. 167-175). Elsevier. https://doi.org/https://doi.org/10.1016/B978-0-444-53630-3.00011-7

Baron-Cohen, S. (2017). Editorial Perspective: Neurodiversity - a revolutionary concept for autism and psychiatry. *Journal of Child Psychology and Psychiatry, 58*(6), 744-747. https://doi.org/10.1111/jcpp.12703

Baron-Cohen, S., Bowen, D. C., Holt, R. J., Allison, C., Auyeung, B., Lombardo, M. V., Smith, P., & Lai, M.-C. (2015). The "Reading the Mind in the Eyes" Test: Complete Absence of Typical Sex Difference in ~400 Men and Women with Autism. *PloS one, 10*(8), e0136521. https://doi.org/10.1371/journal.pone.0136521

Baron-Cohen, S., Jolliffe, T., Mortimore, C., & Robertson, M. (1997). Another Advanced Test of Theory of Mind: Evidence from Very High Functioning Adults with Autism or Asperger Syndrome. *Journal of Child Psychology and Psychiatry, 38*(7), 813-822. https://doi.org/10.1111/j.1469-7610.1997.tb01599.x

Baron-Cohen, S., Leslie, A. M., & Frith, U. (1985). Does the autistic child have a "theory of mind" ? *Cognition, 21*(1), 37-46. https://doi.org/10.1016/0010-0277(85)90022-8

Baron-Cohen, S., Tager-Flusberg, H., & Cohen, D. J. (2000). *Understanding other minds: Perspectives from developmental cognitive neuroscience*. Oxford University Press.

Baron-Cohen, S., Wheelwright, S., Hill, J., Raste, Y., & Plumb, I. (2001a, 2001/02/01). The "Reading the Mind in the Eyes" Test Revised Version: A Study with Normal Adults, and Adults with Asperger Syndrome or High-functioning Autism. *Journal of Child Psychology and Psychiatry, 42*(2), 241-251. https://doi.org/https://doi.org/10.1111/1469-7610.00715

Baron-Cohen, S., Wheelwright, S., Skinner, R., Martin, J., & Clubley, E. (2001b). The Autism-Spectrum Quotient (AQ): Evidence from Asperger Syndrome/High-Functioning Autism, Males and Females, Scientists and Mathematicians. *Journal of Autism and Developmental Disorders, 31*(1), 5-17. https://doi.org/10.1023/a:1005653411471

Baron-Cohen, S., Wheelwright, S., Stone, V., & Rutherford, M. (1999). A mathematician, a physicist and a computer scientist with Asperger syndrome: Performance on folk psychology and folk physics tests. *Neurocase, 5*(6), 475-483. https://doi.org/10.1080/13554799908402743

Barrett, J., & Nyhof, M. (2001). Spreading Non-natural Concepts: The Role of Intuitive Conceptual Structures in Memory and Transmission of Cultural Materials. *1*(1), 69. https://doi.org/https://doi.org/10.1163/156853701300063589

Bartlett, F. C. (1932). *Remembering : a Study in Experimental and Social Psychology*. Cambridge : Cambridge University Press.

BERA. (2018). *Ethical Guidelines for Educational Research*. British Educational Research Association.

Berenguer, C., Miranda, A., Colomer, C., Baixauli, I., & Roselló, B. (2018). Contribution of Theory of Mind, Executive Functioning, and Pragmatics to Socialization Behaviors of Children with High-Functioning Autism. *Journal of Autism and Developmental Disorders, 48*(2), 430-441. https://doi.org/10.1007/s10803-017-3349-0

Berg, S. (2004). *Personal Assistance and Social Reform According to the Swedish Relative Model of Disability: a Qualitative Analysis of the 1994 Reforms* [Dissertation, Leeds University]. Leeds. http://disability-studies.leeds.ac.uk/files/library/berg-Susanne-Berg-MA-dissertation.pdf

Berger, J. (2004). Trauma without disability, disability without trauma: A disciplinary divide. *Jac*, 563-582.

Berryessa, C., M. (2014). Judicial Perceptions of Media Portrayals of Offenders with High Functioning Autistic Spectrum Disorders. *International Journal of Criminology and Sociology*. https://doi.org/10.6000/1929-4409.2014.03.04

Bettelheim, B. (1967). *The Empty Fortress: Infantile autism and the birth of the self*. Free Press.

Biglan, A., Glaser, S. R., & Dow, M. G. (1980). *Conversational skills training for social anxiety: An evaluation of its validity. Unpublished manuscript*. University of Oregon.

Bigozzi, L., Tarchi, C., Pinto, G., & Donfrancesco, R. (2016). Divergent Thinking in Italian Students with and Without Reading Impairments. *International Journal of Disability, Development and Education, 63*(4), 450-466. https://doi.org/10.1080/1034912x.2015.1127335

Biklen, D. (2000, Oct). Lessons from the margins, narrating mental retardation: a review essay. *Ment Retard, 38*(5), 444-456. https://doi.org/10.1352/0047-6765(2000)038<0444:Lftmnm>2.0.Co;2

Biklen, D., & Duchan, J. F. (1994, 1994/09/01). "I Am Intelligent": The Social Construction of Mental Retardation. *Journal of the Association for Persons with Severe Handicaps, 19*(3), 173-184. https://doi.org/10.1177/154079699401900303

Black, A. (2019). A Picture of Special Educational Needs in England–An Overview. *Frontiers in Education, 4*. https://doi.org/10.3389/feduc.2019.00079

Black, T. R. (1999). *Doing Quantitative Research in the Social Sciences: An Integrated Approach to Research Design, Measurement and Statistics*. SAGE.

Blackburn, J., Gottschewski, K., George, E., & L, N. (2019). A discussion about Theory of Mind: From an Autistic Perspective from Autism Europe's Congress 2000 [Autism; Neurodiversity; Theory of Mind]. *1*(6). http://www.larry-arnold.net/Autonomy/index.php/autonomy/article/view/AR27

Blashfield, R. K., Keeley, J. W., Flanagan, E. H., & Miles, S. R. (2014). The Cycle of Classification: DSM-I Through DSM-5. *Annual Review of Clinical Psychology, 10*(1), 25-51.

Bleuler, E. (1950 [1911]). *Dementia Praecox, oder Gruppe der Schizophrenien* [Dementia praecox or the group of schizophrenias] (J. Zinkin, Trans.). International Universities Press. (Dementia Praecox, oder Gruppe der Schizophrenien)

Blume, H. (1998, September 1998). Neurodiversity: On the neurological underpinnings of geekdom. *The Atlantic*. https://www.theatlantic.com/magazine/archive/1998/09/neurodiversity/305909/

Bogdan, R., & Taylor, S. (1989). Relationships with severely disabled people: The social construction of humanness. *Social Problems, 36*(2), 135-148.

Botha, M. (2021, 2021-September-28). Academic, Activist, or Advocate? Angry, Entangled, and Emerging: A Critical Reflection on Autism Knowledge Production [Conceptual Analysis]. *Frontiers in Psychology, 12*. https://doi.org/10.3389/fpsyg.2021.727542

Botha, M., Hanlon, J., & Williams, G. L. (2023). Does Language Matter? Identity-First Versus Person-First Language Use in Autism Research: A Response to Vivanti. *Journal of Autism and Developmental Disorders, 53*(2), 870-878. https://doi.org/10.1007/s10803-020-04858-w

Bottema-Beutel, K., Kapp, S. K., Lester, J. N., Sasson, N. J., & Hand, B. N. (2021). Avoiding Ableist Language: Suggestions for Autism Researchers. *Autism in Adulthood, 3*(1), 18-29. https://doi.org/10.1089/aut.2020.0014

Bottema-Beutel, K., Kapp, S. K., Sasson, N., Gernsbacher, M. A., Natri, H., & Botha, M. (2023, 2023-September-08). Anti-ableism and scientific accuracy in autism research: a false dichotomy [Perspective]. *Frontiers in Psychiatry, 14*. https://doi.org/10.3389/fpsyt.2023.1244451

Bowlby, J. (1952). *Maternal Care and Mental Health*. World Health Organisation.

Bradshaw, P., Pickett, C., Brooker, K., Urbanowicz, A., & van Driel, M. (2021, 03/01). 'Autistic' or 'with autism'? Why the way general practitioners view and talk about autism matters. *Australian journal of general practice, 50*, 104-108. https://doi.org/10.31128/AJGP-11-20-5721

Braun, V., & Clarke, V. (2006, 01/01). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*, 77-101. https://doi.org/10.1191/1478088706qp063oa

Brewer, M. B. (1979). In-group bias in the minimal intergroup situation: A cognitive-motivational analysis. *Psychological Bulletin, 86*(2), 307-324. https://doi.org/10.1037/0033-2909.86.2.307

Brignell, V. (2010). The eugenics movement Britain wants to forget. *New Statesman*. https://www.newstatesman.com/society/2010/12/british-eugenics-disabled

Bryman, A. (2016). *Social Research Methods* (5th ed.). Oxford University Press.

Calzada, L. R., Pistrang, N., & Mandy, W. P. (2012). High-functioning autism and Asperger's disorder: Utility and meaning for families. *Journal of Autism and Developmental Disorders, 42*(2), 230-243.

Camm-Crosbie, L., Bradley, L., Shaw, R., Baron-Cohen, S., & Cassidy, S. (2019). 'People like me don't get support': Autistic adults' experiences of support and treatment for mental health difficulties, self-injury and suicidality. *Autism, 23*(6), 1431-1441. https://doi.org/10.1177/1362361318816053

Carr, K., Kendal, R. L., & Flynn, E. G. (2015). Imitate or innovate? Children's innovation is influenced by the efficacy of observed behaviour. *142*, 322-332. https://doi.org/10.1016/j.cognition.2015.05.005

Carter, J. (2004). Research note: reflections on interviewing across the ethnic divide. *International Journal of Social Research Methodology, 7*(4), 345-353. https://doi.org/10.1080/1364557032000094560

Cascio, M., Weiss, J., & Racine, E. (2020, 05/14). Making Autism Research Inclusive by Attending to Intersectionality: a Review of the Research Ethics Literature. *Review Journal of Autism and Developmental Disorders*. https://doi.org/10.1007/s40489-020-00204-z

Cassidy, S., Bradley, P., Robinson, J., Allison, C., McHugh, M., & Baron-Cohen, S. (2014, 2014/07/01/). Suicidal ideation and suicide plans or attempts in adults with Asperger's syndrome attending a specialist diagnostic clinic: a clinical cohort study. *The Lancet Psychiatry, 1*(2), 142-147. https://doi.org/https://doi.org/10.1016/S2215-0366(14)70248-2

Cassidy, S. A., Gould, K., Townsend, E., Pelton, M., Robertson, A. E., & Rodgers, J. (2020). Is Camouflaging Autistic Traits Associated with Suicidal Thoughts and Behaviours? Expanding the Interpersonal Psychological Theory of Suicide in an Undergraduate Student Sample. *Journal of Autism and Developmental Disorders, 50*(10), 3638-3648. https://doi.org/10.1007/s10803-019-04323-3

Cavalli-Sforza, L. L., & Feldman, M. W. (1981). *Cultural transmission and evolution : a quantitative approach*. Princeton University Press.

Cazalis, F., Reyes, E., Leduc, S., & Gourion, D. (2022). Evidence That Nine Autistic Women Out of Ten Have Been Victims of Sexual Violence. *Front Behav Neurosci, 16*, 852203. https://doi.org/10.3389/fnbeh.2022.852203

Chapple, M., Davis, P., Billington, J., Myrick, J. A., Ruddock, C., & Corcoran, R. (2021, 2021-July-27). Overcoming the Double Empathy Problem Within Pairs of Autistic and Non-autistic Adults Through the Contemplation of Serious Literature [Original Research]. *Frontiers in Psychology, 12*. https://doi.org/10.3389/fpsyg.2021.708375

Charman, T., & Baron-Cohen, S. (1992). Understanding Drawings and Beliefs: a Further Test of the Metarepresentation Theory of Autism: a Research Note. *Journal of Child Psychology and Psychiatry, 33*(6), 1105-1112. https://doi.org/10.1111/j.1469-7610.1992.tb00929.x

Chronically Sick and Disabled Persons Act c.44, (1970).

Churchill, W. (1910). *Letter from WSC (Home Office) to the Cabinet enclosing a report of an address on the feeble-minded [see CHAR 12/1/3] delivered in May 1909 by Dr A F Tredgold (one of the medical advisors to the Royal Commission)*. http://www.churchillarchive.com/churchill-archive/explore/page?id=CHAR+12%2F1%2F2

Clarke, C. E. (2008, 2008/09/01). A Question of Balance: The Autism-Vaccine Controversy in the British and American Elite Press. *Science Communication, 30*(1), 77-107. https://doi.org/10.1177/1075547008320262

Clarke, J. N. (2012). Representations of Autism in US Magazines for Women in Comparison to the General Audience. *Journal of Children and Media, 6*(2), 182-197. https://doi.org/10.1080/17482798.2011.587143

Clegg, J. W. (2012). Teaching about mental health and illness through the history of the DSM. *History of Psychology, 15*(4), 364-370. https://doi.org/10.1037/a0027249

Clin, E., & Kissine, M. (2023). Neurotypical, but not autistic, adults might experience distress when looking at someone avoiding eye contact: A live face-to-face paradigm. *Autism, 0*(0), 13623613221148553. https://doi.org/10.1177/13623613221148553

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences*. Routledge.

Cohen, L., Manion, L., & Morrison, K. (2018). *Research methods in education* (8th ed.). Routledge.

Cokley, K., McClain, S., Enciso, A., & Martinez, M. (2013). An Examination of the Impact of Minority Status Stress and Impostor Feelings on the Mental Health of Diverse Ethnic Minority College Students. *Journal of Multicultural Counseling and Development, 41*(2), 82-95. https://doi.org/10.1002/j.2161-1912.2013.00029.x

Connors, J. L., & Donnellan, A. M. (1993). Citizenship and culture: the role of disabled people in Navajo society. *disability, handicap & society, 8*(3), 265-280. https://doi.org/10.1080/02674649366780271

Constantino, J. N., & Todd, R. D. (2005, Mar 15). Intergenerational transmission of subthreshold autistic traits in the general population. *Biol Psychiatry, 57*(6), 655-660. https://doi.org/10.1016/j.biopsych.2004.12.014

Cook-Gumpertz, J. (2006). Literacy and Schooling. In J. Cook-Gumpertz (Ed.), *The Social Construction of Literacy* (2nd ed., pp. 19–49). Cambridge University Press.

Coolican, H. (2019). *Research Methods and Statistics in Psychology* (7th ed.). Routledge.

Coorg, R., & Tournay, A. (2013). Filicide-Suicide Involving Children With Disabilities. *Journal of Child Neurology, 28*(6), 745-751. https://doi.org/10.1177/0883073812451777

Creak, M. (1961). Schizophrenic Syndrome in Childhood. *British Medical Journal, 2*(5256), 889-890. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1969857/

Crenshaw, K. (1989). Demarginalizing the Intersection of Race and Sex: A Black Feminist Critique of Antidiscrimination Doctrine, Feminist Theory and Antiracist Politics. *The University of Chicago Legal Forum, 140*, 139-167.

Crompton, C. J., & Fletcher-Watson, S. (2018). *Investigating the transfer of information in neurodiverse groups* https://doi.org/10.17605/OSF.IO/KRBSZ

Crompton, C. J., Hallett, S., Axbey, H., McAuliffe, C., & Cebula, K. (2022). 'Someone like-minded in a big place': Autistic young adult's attitudes towards autistic peer support in mainstream education. *Autism*, 136236132210811. https://doi.org/10.1177/13623613221081189

Crompton, C. J., Hallett, S., Ropar, D., Flynn, E., & Fletcher-Watson, S. (2020a, Aug). 'I never realised everybody felt as happy as I do when I am around autistic people': A thematic analysis of autistic adults' relationships with autistic and neurotypical friends and family. *Autism, 24*(6), 1438-1448. https://doi.org/10.1177/1362361320908976

Crompton, C. J., Ropar, D., Evans-Williams, C. V. M., Flynn, E. G., & Fletcher-Watson, S. (2020b). Autistic peer-to-peer information transfer is highly effective. *Autism*, 1362361320919286. https://doi.org/10.1177/1362361320919286

Crompton, C. J., Sharp, M., Axbey, H., Fletcher-Watson, S., Flynn, E. G., & Ropar, D. (2020c). Neurotype-Matching, but Not Being Autistic, Influences Self and Observer Ratings of Interpersonal Rapport. *Frontiers in Psychology, 11*. https://doi.org/10.3389/fpsyg.2020.586171

Crosman, C. (2019). THE ABLEIST HISTORY OF THE PUZZLE PIECE SYMBOL FOR AUTISM. https://intheloopaboutneurodiversity.wordpress.com/2019/03/20/the-ableist-history-of-the-puzzle-piece-symbol-for-autism/

Curtis, M. J., Alexander, S., Cirino, G., Docherty, J. R., George, C. H., Giembycz, M. A., Hoyer, D., Insel, P. A., Izzo, A. A., Ji, Y., Macewan, D. J., Sobey, C. G., Stanford, S. C., Teixeira, M. M., Wonnacott, S., & Ahluwalia, A. (2018). Experimental design and analysis and their reporting II: updated and simplified guidance for authors and peer reviewers. *British Journal of Pharmacology, 175*(7), 987-993. https://doi.org/10.1111/bph.14153

Dabiri, E. (2020). *Don't Touch My Hair*. Penguin Books.

Davidson, J., & Henderson, V. L. (2010). 'Coming out' on the spectrum: autism, identity and disclosure. *Social & Cultural Geography, 11*(2), 155-170. https://doi.org/10.1080/14649360903525240

Dawson, M. (2015). The miracle that cured my son's autism was in our kitchen. *New York Post*. https://nypost.com/2015/06/17/is-diet-the-key-to-curing-autism/

Debrabander, K. M., Morrison, K. E., Jones, D. R., Faso, D. J., Chmielewski, M., & Sasson, N. J. (2019). Do First Impressions of Autistic Adults Differ Between Autistic and Nonautistic Observers? *Autism in Adulthood, 1*(4), 250-257. https://doi.org/10.1089/aut.2019.0018

Dekker, M. (2019). Community Contribution: Martin Dekker- Autistic Advocate and Founder of Autistic Online Community, INLV. In F. H. Sue Fletcher-Watson (Ed.), *Autism: A New Introduction to Psychological Theory and Current Debate* (pp. 25-27). Routledge.

den Houting, J. (2019). Neurodiversity: An insider's perspective. *Autism, 23*(2), 271-273. https://doi.org/10.1177/1362361318820762

Denne, L. D., Hastings, R. P., & Hughes, J. C. (2017). UK parents' beliefs about applied behaviour analysis as an approach to autism education. 1-13. https://doi.org/10.1080/08856257.2017.1297568

Department of Education and Science. (1978). *Special Education Needs: The Warnock Report*. H. M. S. Office. http://www.educationengland.org.uk/documents/warnock/warnock1978.html

Dillenburger, K., & Keenan, M. (2023). No Irish, No Behavior Analysts, No Dogs. *International Electronic Journal of Elementary Education*. https://doi.org/10.26822/iejee.2023.292

Dinishak, J., & Akhtar, N. (2013). A Critical Examination of Mindblindness as a Metaphor for Autism. *Child Development Perspectives, 7*(2), 110-114. https://doi.org/10.1111/cdep.12026

Disability Discrimination Act 1995 c.50, (1995).

Dixon, S. D., Tronick, E. Z., Keefer, C., & Brazelton, B. (1981). Mother-infant interaction among the Gusii of Kenya. In T. M. Field, Sostek, A. M., Vietze, P., & Leiderman, P. H., (Ed.), *Culture and early interactions* (pp. 149–170). Erlbaum.

Donaghy, B., Moore, D., & Green, J. (2023). Co-Occurring Physical Health Challenges in Neurodivergent Children and Young People: A Topical Review and Recommendation. *Child Care in Practice*, 1-19. https://doi.org/10.1080/13575279.2022.2149471

Doshi-Velez, F., Ge, Y., & Kohane, I. (2014). Comorbidity Clusters in Autism Spectrum Disorders: An Electronic Health Record Time-Series Analysis. *Pediatrics, 133*(1), e54-e63. https://doi.org/10.1542/peds.2013-0819

Dow, M. G., Glaser, S. R., & Biglan, A. (1980). *The relevance of specific conversational behaviors to ratings of social skill: A review and experimental analysis.* Speech Communication Association November 1980, New York.

Draaisma, D. (2009). Little professors (B. Fasting, Trans.). In D. Draaisma (Ed.), *Disturbances of the Mind* (pp. 298-325). Cambridge University Press. https://doi.org/Doi: 10.1017/cbo9781139193276.013

Dubois, M. (2015). *Sociology of Ideology,* (2nd ed.). Elsevier.

Dunivin, Z. O., Yan, H. Y., Ince, J., & Rojas, F. (2022). Black Lives Matter protests shift public discourse. *Proceedings of the National Academy of Sciences, 119*(10). https://doi.org/10.1073/pnas.2117320119

Durham, W. H. (1990). Advances in Evolutionary Culture Theory. *Annual Review of Anthropology, 19*, 187-210. http://www.jstor.org/stable/2155963

Durham, W. H. (1992). Applications of Evolutionary Culture Theory. *Annual Review of Anthropology, 21*(1), 331-353. https://doi.org/10.1146/annurev.an.21.100192.001555

Dwyer, P. (2022). The Neurodiversity Approach(es): What Are They and What Do They Mean for Researchers? *Human Development, 66*(2), 73-92. https://doi.org/10.1159/000523723

Education (Handicapped Children) Act 1970 c.52, (1970).

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Ellen, R. F., & Fischer, M. D. (2013). On the concept of cultural transmission. In R. F. Ellen, S. J. Lycett, & S. E. Johns (Eds.), *Understanding cultural transmission in anthropology : a critical synthesis* (Vol. 26). New York : Berghahn Books.

Ellen, R. F., Lycett, S. J., & Johns, S. E. (Eds.). (2013). *Understanding cultural transmission in anthropology : a critical synthesis* (Vol. 26). Berghahn Books.

Elliott, J. G., & Gibbs, S. (2008, 2008/08/01). Does Dyslexia Exist? [https://doi.org/10.1111/j.1467-9752.2008.00653.x]. *Journal of Philosophy of Education, 42*(3-4), 475-491. https://doi.org/https://doi.org/10.1111/j.1467-9752.2008.00653.x

Evans, B. (2013). How autism became autism:The radical transformation of a central concept of child development in Britain. *History of the Human Sciences, 26*(3), 3-31. https://doi.org/10.1177/0952695113484320

Eyal, G. (2013). For a sociology of expertise: The social origins of the autism epidemic. *American Journal of Sociology, 118*(4), 863-907.

Eysenck, M. W., & Keane, M. (2000). *Cognitive Psychology: A Student's Handbook* (4th ed.). Psychology Press, Taylor and Francis.

Falter, C. M., Elliott, M. A., & Bailey, A. J. (2012). Enhanced Visual Temporal Resolution in Autism Spectrum Disorders. *PloS one, 7*. https://link-gale-com.ezphost.dur.ac.uk/apps/doc/A477052693/AONE?u=duruni&sid=bookmark-AONE&xid=b59ca6f6

Farrugia, D. (2009). Exploring stigma: medical knowledge and the stigmatisation of parents of children diagnosed with autism spectrum disorder. *Sociology of Health & Illness, 31*(7), 1011-1027. https://doi.org/10.1111/j.1467-9566.2009.01174.x

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39*, 175-191. https://doi.org/10.3758/BF03193146

Field, T. M. (1981, 1981/03/01/). Infant gaze aversion and heart rate during face-to-face interactions. *Infant Behavior and Development, 4*, 307-315. https://doi.org/https://doi.org/10.1016/S0163-6383(81)80032-X

Fitzgerald, D. (2017). *Tracing autism: Uncertainty, ambiguity, and the affective labor of neuroscience*. University of Washington Press.

Fletcher-Watson, S., Apicella, F., Auyeung, B., Beranova, S., Bonnet-Brilhault, F., Canal-Bedia, R., Charman, T., Chericoni, N., Conceição, I. C., Davies, K., Farroni, T., Gomot, M., Jones, E., Kaale, A., Kapica, K., Kawa, R., Kylliäinen, A., Larsen, K., Lefort-Besnard, J., Malvy, J., Manso de Dios, S., Markovska-Simoska, S., Millo, I., Miranda, N., Pasco, G., Pisula, E., Raleva, M., Rogé, B., Salomone, E., Schjolberg, S., Tomalski, P., Vicente, A. M., & Yirmiya, N. (2017). Attitudes of the autism community to early autism research. *Autism, 21*(1), 61-74. https://doi.org/10.1177/1362361315626577

Fletcher-Watson, S., & Bird, G. (2020). Autism and empathy: What are the real links? *Autism, 24*(1), 1362361319883506. https://doi.org/10.1177/1362361319883506

Fletcher-Watson, S., & Crompton, C. J. (2019). Autistic people may lack social motivation, without being any less human. *Behavioral and Brain Sciences, 42*, e88, Article e88. https://doi.org/10.1017/s0140525x18002406

Fletcher-Watson, S., & Happé, F. (2019). *Autism: A New Introduction to Psychological Theory and Current Debate*. Routledge.

Fletcher-Watson, S., McConnell, F., Manola, E., & McConachie, H. (2014). Interventions based on the Theory of Mind cognitive model for autism spectrum disorder (ASD). *Cochrane Database of Systematic Reviews*. https://doi.org/10.1002/14651858.cd008785.pub2

Flynn, E. (2008). Investigating children as cultural magnets: do young children transmit redundant information along diffusion chains? *Philosophical Transactions of the Royal Society B: Biological Sciences, 363*(1509), 3541-3551. https://doi.org/10.1098/rstb.2008.0136

Flynn, E., & Whiten, A. (2008). Cultural Transmission of Tool Use in Young Children: A Diffusion Chain Study. *Social Development, 17*(3), 699-718. https://doi.org/10.1111/j.1467-9507.2007.00453.x

Földy, C., Malenka, R. C., & Sudhof, T. C. (2013). Autism-Associated Neuroligin-3 Mutations Commonly Disrupt Tonic Endocannabinoid Signaling. *Neuron, 78*(3), 498-509. https://doi.org/10.1016/j.neuron.2013.02.036

Fordham, S. (1993). “Those Loud Black Girls”: (Black) Women, Silence, and Gender “Passing” in the Academy. *Anthropology & Education Quarterly, 24*(1), 3-32. https://doi.org/10.1525/aeq.1993.24.1.05x1736t

Fountain, J. W. (1990, 14th March). Dr. Bruno Bettelheim, Child Psychology Expert. *Chicago Tribune*. https://www.chicagotribune.com/news/ct-xpm-1990-03-14-9001210549-story.html

Frazier, T. W., Youngstrom, E. A., Speer, L., Embacher, R., Law, P., Constantino, J., Findling, R. L., Hardan, A. Y., & Eng, C. (2012). Validation of proposed DSM-5 criteria for autism spectrum disorder. *Journal of the American Academy of Child and Adolescent Psychiatry, 51*(1), 28-40.e23. https://doi.org/10.1016/j.jaac.2011.09.021

Frith, U. (1991a). Asperger and his syndrome. In U. Frith (Ed.), *Autism and Asperger Syndrome* (pp. 1-36). Cambridge University Press. https://doi.org/DOI: 10.1017/CBO9780511526770

Frith, U. (1991b). *Autism and Asperger Syndrome* (U. Frith, Ed.). Cambridge University Press. https://doi.org/10.1017/CBO9780511526770

Gaitatzis, A., Johnson, A. L., Chadwick, D. W., Shorvon, S. D., & Sander, J. W. (2004, Nov). Life expectancy in people with newly diagnosed epilepsy. *Brain, 127*(Pt 11), 2427-2432. https://doi.org/10.1093/brain/awh267

Galton, D. J. (1998). Greek theories on eugenics. *Journal of Medical Ethics, 24*(4), 263-267. https://doi.org/10.1136/jme.24.4.263

Gauld, A., & Stephenson, G. M. (1967, May). Some experiments relating to Bartlett's theory of remembering. *Br J Psychol, 58*(1), 39-49. https://doi.org/10.1111/j.2044-8295.1967.tb01054.x

George, R., & Stokes, M. A. (2018). Sexual Orientation in Autism Spectrum Disorder. *Autism Research, 11*(1), 133-141. https://doi.org/10.1002/aur.1892

Gernsbacher, M. A., & Frymiare, J. L. (2005). Does the autistic brain lack core modules? *The journal of developmental and learning disorders, 9*, 3.

Gernsbacher, M. A., Raimond, A. R., Stevenson, J. L., Boston, J. S., & Harp, B. (2018). Do puzzle pieces and autism puzzle piece logos evoke negative associations? *Autism, 22*(2), 118-125. https://doi.org/10.1177/1362361317727125

Gernsbacher, M. A., & Yergeau, M. (2019). Empirical Failures of the Claim That Autistic People Lack a Theory of Mind. *Arch Sci Psychol, 7*(1), 102-118. https://doi.org/10.1037/arc0000067

Gillberg, C. (1998). Asperger syndrome and high-functioning autism. *British Journal of Psychiatry, 172*, 200-209.

Gillespie-Lynch, K., Kapp, S. K., Brooks, P. J., Pickens, J., & Schwartzman, B. (2017, 2017-March-28). Whose Expertise Is It? Evidence for Autistic Adults as Critical Autism Experts [Original Research]. *Frontiers in Psychology, 8*(438). https://doi.org/10.3389/fpsyg.2017.00438

Gotby, V., Lichtenstein, P., Långström, N., & Pettersson, E. (2018, 03/23). Childhood neurodevelopmental disorders and risk of coercive sexual victimization in childhood and adolescence - a population-based prospective twin study. *Journal of Child Psychology and Psychiatry, 59*. https://doi.org/10.1111/jcpp.12884

Gould, S. J. (1981). *The Mismeasure of Man*. Norton.

Grandin, T., & Panek, R. (2013). *The Autistic Brain: Exploring the strength of a different kind of mind*. Ebury Publishing.

Grant, A., Jones, S., Williams, K., Leigh, J., & Brown, A. (2022). Autistic women's views and experiences of infant feeding: A systematic review of qualitative evidence. *Autism, 26*(6), 1341-1352. https://doi.org/10.1177/13623613221089374

Grant, A., & Kara, H. (2021). Considering the Autistic advantage in qualitative research: the strengths of Autistic researchers. *Contemporary Social Science, 16*(5), 589-603. https://doi.org/10.1080/21582041.2021.1998589

Gray, D. E. (2002). 'Everybody just freezes. Everybody is just embarrassed': Felt and enacted stigma among parents of children with high functioning autism. *Sociology of Health & Illness, 24*(6), 734-749.

Green, J. (2021). *Why 'Going Gold' is important on Autism Acceptance Day – 2nd April*. Retrieved 31st October from https://edpsy.org.uk/blog/2021/why-going-gold-is-important-on-autism-acceptance-day-2nd-april/

Griffiths, S., Allison, C., Kenny, R., Holt, R., Smith, P., & Baron-Cohen, S. (2019). The Vulnerability Experiences Quotient (VEQ): A Study of Vulnerability, Mental Health and Life Satisfaction in Autistic Adults. *Autism Research, 12*(10), 1516-1528. https://doi.org/10.1002/aur.2162

Griffiths, T., Christian, B., & Kalish, M. (2008). Using Category Structures to Test Iterated Learning as a Method for Identifying Inductive Biases. *Cognitive Science: A Multidisciplinary Journal, 32*(1), 68-107. https://doi.org/10.1080/03640210701801974

Grinker, R. R. (2008). *Unstrange minds: Remapping the world of autism*. Basic Books.

Grix, J. (2019). *The foundations of research / Jonathan Grix* (Third edition. ed.). Macmillan International Higher Education.

Grzadzinski, R., Huerta, M., & Lord, C. (2013, 2013/05/15). DSM-5 and autism spectrum disorders (ASDs): an opportunity for identifying ASD subtypes. *Molecular Autism, 4*(1), 12. https://doi.org/10.1186/2040-2392-4-12

Guan, J., & Li, G. (2017, May). Injury Mortality in Individuals With Autism. *Am J Public Health, 107*(5), 791-793. https://doi.org/10.2105/ajph.2017.303696

Haddix, M. M. (2012). Talkin' in the company of my sistas: The counterlanguages and deliberate silences of Black female students in teacher education. *Linguistics and Education, 23*(2), 169-181. https://doi.org/10.1016/j.linged.2012.01.003

Hahn, H. (1986). Public support for rehabilitation programs: The analysis of US disability policy. *disability, handicap & society, 1*(2), 121-137.

Hallin, A. E., Garcia, G. D., & Reuterskiöld, C. (2016). The Use of Causal Language and Filled Pauses in Children with and without Autism. *Child Development Research, 2016*, 1-11. https://doi.org/10.1155/2016/8535868

Hammersley, M., & Atkinson, P. (1983). *Ethnography: Principles in Practice*. Routledge.

Hannon, V. (1982). The education act 1981: New rights and duties in special education. *The Journal of Social Welfare Law, 4*(5), 275-284. https://doi.org/10.1080/09649068208414593

Happé, F., Ronald, A., & Plomin, R. (2006). Time to give up on a single explanation for autism. *Nature Neuroscience, 9*(10), 1218-1220. https://doi.org/10.1038/nn1770

Harrington, A. (2012). The fall of the schizophrenogenic mother. *The Lancet, 379*(9823), 1292-1293. https://doi.org/10.1016/S0140-6736(12)60546-7

Hart, B. (2014). Autism parents & neurodiversity: Radical translation, joint embodiment and the prosthetic environment. *BioSocieties, 9*(3), 284-303.

Haslam, N., & Whelan, J. (2008). Human Natures: Psychological Essentialism in Thinking about Differences between People. *Social and Personality Psychology Compass, 2*(3), 1297-1312. https://doi.org/https://doi.org/10.1111/j.1751-9004.2008.00112.x

Hays, S. (1996). *The cultural contradictions of motherhood*. Yale University Press.

The Autism Act 2009 c.15, (2009).

Heasman, B., & Gillespie, A. (2018). Perspective-taking is two-sided: Misunderstandings between people with Asperger's syndrome and their family members. *Autism, 22*(6), 740-750. https://doi.org/10.1177/1362361317708287

Heasman, B., & Gillespie, A. (2019a). Neurodivergent intersubjectivity: Distinctive features of how autistic people create shared understanding. *Autism, 23*(4), 910-921. https://doi.org/10.1177/1362361318785172

Heasman, B., & Gillespie, A. (2019b, 2019-June-11). Participants Over-Estimate How Helpful They Are in a Two-Player Game Scenario Toward an Artificial Confederate That Discloses a Diagnosis of Autism [Original Research]. *Frontiers in Psychology, 10*. https://doi.org/10.3389/fpsyg.2019.01349

Herring, C. (2009). Does Diversity Pay?: Race, Gender, and the Business Case for Diversity. *American Sociological Review, 74*(2), 208-224. https://doi.org/10.1177/000312240907400203

Herwig, C. (2018). Hans Asperger, National Socialism, and "race hygiene" in Nazi-era Vienna. *Molecular Autism, 9*(1). https://doi.org/10.1186/s13229-018-0208-6

Hirvikoski, T., Mittendorfer-Rutz, E., Boman, M., Larsson, H., Lichtenstein, P., & Bölte, S. (2016). Premature mortality in autism spectrum disorder. *British Journal of Psychiatry, 208*(3), 232-238. https://doi.org/10.1192/bjp.bp.114.160192

Hofstra, B., Kulkarni, V. V., Munoz-Najar Galvez, S., He, B., Jurafsky, D., & McFarland, D. A. (2020). The Diversity–Innovation Paradox in Science. *Proceedings of the National Academy of Sciences, 117*(17), 9284-9291. https://doi.org/10.1073/pnas.1915378117

Holmes, A. G. D. (2020). Researcher Positionality - A Consideration of Its Influence and Place in Qualitative Research - A New Researcher Guide. *Shanlax International Journal of Education, 8*(4), 1-10. https://doi.org/10.34293/education.v8i4.3232

Honeybourne, V. (2018). *The Neurodiverse Classroom: A Teacher's Guide to Individual Learning Needs and How to Meet Them*. Jessica Kingsley.

Hopper, L. M., Flynn, E. G., Wood, L. A. N., & Whiten, A. (2010). Observational learning of tool use in children: Investigating cultural spread through diffusion chains and learning mechanisms through ghost displays. *Journal of Experimental Child Psychology, 106*(1), 82-97. https://doi.org/10.1016/j.jecp.2009.12.001

Hoppitt, W., & Laland, K. N. (2013). *Social Learning: An Introduction to Mechanisms, Methods, and Models*. Princeton University Press.

Horner, V., Whiten, A., Flynn, E., & de Waal, F. B. M. (2006). Faithful replication of foraging techniques along cultural transmission chains by chimpanzees and children. *Proceedings of the National Academy of Sciences, 103*(37), 13878-13883. https://doi.org/10.1073/pnas.0606015103

Howlin, P., Baron-Cohen, S., & Hadwin, J. (1999). *Teaching Children with Autism to Mind-Read: A Practical Guide*. Wiley.

Huerta, M., Bishop, S. L., Duncan, A., Hus, V., & Lord, C. (2012). Application of DSM-5 Criteria for Autism Spectrum Disorder to Three Samples of Children With DSM-IV Diagnoses of Pervasive Developmental Disorders. *American Journal of Psychiatry, 169*(10), 1056-1064. https://doi.org/10.1176/appi.ajp.2012.12020276

Hughes, J. E. A., Ward, J., Gruffydd, E., Baron-Cohen, S., Smith, P., Allison, C., & Simner, J. (2018). Savant syndrome has a distinct psychological profile in autism. *Molecular Autism, 9*(1). https://doi.org/10.1186/s13229-018-0237-1

Hupp, S. (Ed.). (2019). *Pseudoscience in Child and Adolescent Psychotherapy: A Skeptical Field Guide*. Cambridge University Press. https://doi.org/Doi: 10.1017/9781316798096.

Huws, J. C., & Jones, R. S. P. (2011, 2011/06/01). Missing voices: representations of autism in British newspapers, 1999–2008 [https://doi.org/10.1111/j.1468-3156.2010.00624.x]. *British Journal of Learning Disabilities, 39*(2), 98-104. https://doi.org/https://doi.org/10.1111/j.1468-3156.2010.00624.x

Ingstad, B., & Whyte, S. R. (2007). *Disability in local and global worlds*. Univ of California Press.

Isaacs, S. S. F., Brown, S. C., & Thouless, R. H. (1941). *The Cambridge evacuation survey: a wartime study in social welfare and education*. Methuen & Co. Ltd.

Jabr, F. (2012). Redefining autism: Will new DSM-5 criteria for ASD exclude some people. *Scientific American*.

James, W. H. (2014). An update on the hypothesis that one cause of autism is high intrauterine levels of testosterone of maternal origin. *Journal of Theoretical Biology, 355*, 33-39. https://doi.org/10.1016/j.jtbi.2014.03.036

Jarrett, S. (2021). *Those They Called Idiots: The idea of the disabled mind from 1700 to the present day*. Reaktion Books LTD.

Jaswal, V. K., & Akhtar, N. (2019). Being versus appearing socially uninterested: Challenging assumptions about social motivation in autism. *Behavioral and Brain Sciences, 42*, e82, Article e82. https://doi.org/10.1017/S0140525X18001826

Johnston, D., & Swanson, D. (2006). Constructing the “Good Mother”: The Experience of Mothering Ideologies by Work Status. *Sex Roles, 54*(8), 509-519.

Kanner, L. (1943). Autistic disturbances of affective control. *Nervous Child, 2*(3), 217-250.

Kanner, L. (1949). Problems of nosology and psychodynamics of early infantile autism. *American journal of Orthopsychiatry, 19*(3), 416.

Kapp, S. K. (2019, 06/09/19). How Social Deficit Models Exacerbate the Medical Model: Autism as Case in Point. *Autism Policy & Practice, 2*(1), 3-28.

Kapp, S. K., Gillespie-Lynch, K., Sherman, L. E., & Hutman, T. (2013). Deficit, difference, or both? Autism and neurodiversity. *Developmental Psychology, 49*(1), 59-71. https://doi.org/10.1037/a0028353

Kashima, Y. (2000a). Maintaining Cultural Stereotypes in the Serial Reproduction of Narratives. *Personality and Social Psychology Bulletin, 26*(5), 594-604. https://doi.org/10.1177/0146167200267007

Kashima, Y. (2000b). Recovering Bartlett's social psychology of cultural dynamics. *European Journal of Social Psychology, 30*(3), 383-403. https://doi.org/https://doi.org/10.1002/(SICI)1099-0992(200005/06)30:3<383::AID-EJSP996>3.0.CO;2-C

Kasirer, A., Adi-Japha, E., & Mashal, N. (2020, 2020-October-27). Verbal and Figural Creativity in Children With Autism Spectrum Disorder and Typical Development [Original Research]. *Frontiers in Psychology, 11*. https://doi.org/10.3389/fpsyg.2020.559238

Kawa, S., & Giordano, J. (2012). A brief historicity of the Diagnostic and Statistical Manual of Mental Disorders : Issues and implications for the future of psychiatric canon and practice. *Philosophy, Ethics and Humanities in Medicine : PEHM, 7*, 2. https://doi.org/10.1186/1747-5341-7-2

Kenny, L., Hattersley, C., Molins, B., Buckley, C., Povey, C., & Pellicano, E. (2016). Which terms should be used to describe autism? Perspectives from the UK autism community. *Autism, 20*(4), 442-462. https://doi.org/10.1177/1362361315588200

King, C., & Jeynes, T. (2021). Whiteness, madness, and reform of the Mental Health Act. *The Lancet Psychiatry, 8*(6), 460-461. https://doi.org/10.1016/s2215-0366(21)00133-4

King, C., & Murphy, G. H. (2014). A Systematic Review of People with Autism Spectrum Disorder and the Criminal Justice System. *Journal of Autism and Developmental Disorders, 44*(11), 2717-2733. https://doi.org/10.1007/s10803-014-2046-5

Kirkham, P. (2017). 'The line between intervention and abuse' – autism and applied behaviour analysis. *History of the Human Sciences, 30*(2), 107-126. https://doi.org/10.1177/0952695117702571

Kläsi, J. (1922). Über die Bedeutung und Entstehung der Stereotypien. *Journal for Psychiatry and Neurology, 15*.

Kliewer, C., & Biklen, D. (2001, 03/01). "School's Not Really a Place for Reading": A Research Synthesis of the Literate Lives of Students With Severe Disabilities. *The Journal of The Association for Persons With Severe Handicaps, 26*, 1-12. https://doi.org/10.2511/rpsd.26.1.1

Klin, A., Jones, W., Schultz, R., & Volkmar, F. (2003). The enactive mind, or from actions to cognition: lessons from autism. *Philosophical Transactions of the Royal Society of London. Series B: Biological Sciences, 358*(1430), 345-360. https://doi.org/10.1098/rstb.2002.1202

Klin, A., Jones, W., Schultz, R., Volkmar, F., & Cohen, D. (2002). Visual Fixation Patterns During Viewing of Naturalistic Social Situations as Predictors of Social Competence in Individuals With Autism. *Archives of general psychiatry, 59*(9), 809. https://doi.org/10.1001/archpsyc.59.9.809

Komeda, H. (2015). Similarity hypothesis: understanding of others with autism spectrum disorders by individuals with autism spectrum disorders. *Front Hum Neurosci, 9*, 124. https://doi.org/10.3389/fnhum.2015.00124

Komeda, H., Kawasaki, M., Tsunemi, K., & Kusumi, T. (2009). Differences between estimating protagonists' emotions and evaluating readers' emotions in narrative comprehension. *Cognition and Emotion, 23*(1), 135-151.

Komeda, H., & Kusumi, T. (2007). The emotional process in narrative comprehension: the situation model construction based on the reader-protagonist interaction. *Japanese Psychological Review, 50*, 163-179.

Komeda, H., Tsunemi, K., Inohara, K., Kusumi, T., & Rapp, D. N. (2013). Beyond disposition: the processing consequences of explicit and implicit invocations of empathy. *Acta Psychologica, 142*(3), 349-355.

Koudenburg, N., Postmes, T., & Gordijn, E. H. (2011). Disrupting the flow: How brief silences in group conversations affect social needs. *Journal of Experimental Social Psychology, 47*(2), 512-515. https://doi.org/10.1016/j.jesp.2010.12.006

Krieger, A. A. R., Möller, C., Zmyj, N., & Aschersleben, G. (2016, 2016-June-28). Tom Is Not More Likely to Imitate Lisa Than Ying: The Influence of a Model's Race Indicated by Physical Appearance on Children's Imitation [Original Research]. *Frontiers in Psychology, 7*. https://doi.org/10.3389/fpsyg.2016.00972

Krishnan, V., Stoppel, D. C., Nong, Y., Johnson, M. A., Nadler, M. J. S., Ozkaynak, E., Teng, B. L., Nagakura, I., Mohammad, F., Silva, M. A., Peterson, S., Cruz, T. J., Kasper, E. M., Arnaout, R., & Anderson, M. P. (2017). Autism gene Ube3a and seizures impair sociability by repressing VTA Cbln1. *Nature, 543*(7646), 507-512. https://doi.org/10.1038/nature21678

Kusow, A. M. (2003). Beyond Indigenous Authenticity: Reflections on the Insider/Outsider Debate in Immigration Research. *Symbolic interaction, 26*(4), 591-599. https://doi.org/10.1525/si.2003.26.4.591

Kyngäs, H. (2020). Qualitative Research and Content Analysis. In (pp. 3-11). https://doi.org/10.1007/978-3-030-30199-6_1

Leadbitter, K., Buckle, K. L., Ellis, C., & Dekker, M. (2021). Autistic Self-Advocacy and the Neurodiversity Movement: Implications for Autism Early Intervention Research and Practice. *Frontiers in Psychology, 12*.

Legard, R., Keegan, J., & Ward, K. (2003). In-depth Interviews. In J. Ritchie & J. Lewis (Eds.), *Qualitative Research Practice: A guide for Social Science Students and Researchers*. Sage.

Leslie, A. M., & Frith, U. (1988, 1988/11/01). Autistic children's understanding of seeing, knowing and believing [https://doi.org/10.1111/j.2044-835X.1988.tb01104.x]. *British Journal of Developmental Psychology, 6*(4), 315-324. https://doi.org/https://doi.org/10.1111/j.2044-835X.1988.tb01104.x

Leveto, J. A. (2018). Toward a sociology of autism and neurodiversity. *Sociology Compass, 12*(12), e12636. https://doi.org/10.1111/soc4.12636

Lidstone, D. E., Miah, F. Z., Poston, B., Beasley, J. F., & Dufek, J. S. (2020, 2020/05/01/). Manual dexterity in children with autism spectrum disorder: A cross-syndrome approach. *Research in Autism Spectrum Disorders, 73*, 101546. https://doi.org/https://doi.org/10.1016/j.rasd.2020.101546

Lindgren, B.-M., Lundman, B., & Graneheim, U. (2020, 05/01). Abstraction and interpretation during the qualitative content analysis process. *International Journal of Nursing Studies, 108*, 103632. https://doi.org/10.1016/j.ijnurstu.2020.103632

Linneman, R. D. (2001). *Idiots: Stories about mindedness and mental retardation*. Lang.

Litner, W. B. (2022). My Kids Have Invisible Disabilities & Other Parents Judge Me — Hard. *sheknows*. https://www.sheknows.com/parenting/articles/2681656/invisible-disabilities-kids/

Lord, C., Petkova, E., Hus, V., Gan, W., Lu, F., Martin, D. M., Ousley, O., Guy, L., Bernier, R., & Gerdts, J. (2012). A multisite study of the clinical diagnosis of different autism spectrum disorders. *Archives of general psychiatry, 69*(3), 306-313.

Lotter, V. (1966). Epidemiology of autistic conditions in young children. *Social Psychiatry, 1*(3), 124-135. https://doi.org/10.1007/bf00584048

Lovaas, I. (1974). *'After you hit a child, you can't just get up and leave him; you are hooked to that kid'* [Interview]. neurodiversity.com. http://neurodiversity.com/library_chance_1974.html

Malterud, K. (2001, Aug 11). Qualitative research: standards, challenges, and guidelines. *Lancet, 358*(9280), 483-488. https://doi.org/10.1016/s0140-6736(01)05627-6

Mandy, W. (2018). The Research Domain Criteria: A new dawn for neurodiversity research? *Autism, 22*(6), 642-644. https://doi.org/10.1177/1362361318782586

Mandy, W. P. L., Charman, T., & Skuse, D. H. (2012, 2012/01/01/). Testing the Construct Validity of Proposed Criteria for DSM-5 Autism Spectrum Disorder. *Journal of the American Academy of Child & Adolescent Psychiatry, 51*(1), 41-50. https://doi.org/https://doi.org/10.1016/j.jaac.2011.10.013

Manouilenko, I., & Bejerot, S. (2015, 03/31). Sukhareva-Prior to Asperger and Kanner. *Nordic journal of psychiatry, 69*, 1-4. https://doi.org/10.3109/08039488.2015.1005022

Massrali, A., Adhya, D., Srivastava, D. P., Baron-Cohen, S., & Kotter, M. R. (2022). Virus-Induced Maternal Immune Activation as an Environmental Factor in the Etiology of Autism and Schizophrenia. *Front Neurosci, 16*, 834058. https://doi.org/10.3389/fnins.2022.834058

Matarazzo, J. D., & Weins, A. N. (1967). Interviewer influence on the duration of interviewee silence. *Journal of Experimental Research in Personality, 2*(1), 56-69.

Matthews, C., Roberts, G., & Caldwell, C. A. (2012). Opportunity to assimilate and pressure to discriminate can generate cultural divergence in the laboratory. *Evolution and Human Behavior, 33*(6), 759-770. https://doi.org/10.1016/j.evolhumbehav.2012.06.004

McConachie, H., Parr, J. R., Glod, M., Hanratty, J., Livingstone, N., Oono, I. P., Robalino, S., Baird, G., Beresford, B., Charman, T., Garland, D., Green, J., Gringras, P., Jones, G., Law, J., Le Couteur, A. S., Macdonald, G., McColl, E. M., Morris, C., Rodgers, J., Simonoff, E., Terwee, C. B., & Williams, K. (2015). Systematic review of tools to measure outcomes for young children with autism spectrum disorder. *Health Technology Assessment, 19*(41), 1-506. https://doi.org/10.3310/hta19410

McGuigan, N., & Cubillo, M. (2013). Information Transmission in Young Children: When Social Information Is More Important Than Nonsocial Information. *The Journal of Genetic Psychology, 174*(6), 605-619. https://doi.org/10.1080/00221325.2012.749833

McGuigan, N., & Graham, M. (2010). Cultural transmission of irrelevant tool actions in diffusion chains of 3- and 5-year-old children. *European Journal of Developmental Psychology, 7*(5), 561-577. https://doi.org/10.1080/17405620902858125

McLaughlin, M. L., & Cody, M. J. (1982). Awkward Silences: Behavioral Antecedents and Consequences of the Conversational Lapse. *Human Communication Research, 8*(4), 299-316.

McPhilemy, C., & Dillenburger, K. (2013). Parents' experiences of applied behaviour analysis (ABA)-based interventions for children diagnosed with autistic spectrum disorder. *British Journal of Special Education, 40*(4), 154-161. https://doi.org/10.1111/1467-8578.12038

McRuer, R. (2010). Reflections on disability in Haiti. *Journal of Literary & Cultural Disability Studies, 4*(3), 327-332.

Mental Deficiency Act 1913 c.28, (1913).

Mental Health Act 1959 c.72 Regnal. 7 & 8 Eliz 2, (1959).

Mercer, J. (2007). The challenges of insider research in educational institutions: Wielding a double-edged sword and resolving delicate dilemmas. *Oxford review of education, 33*(1), 1-17. https://doi.org/10.1080/03054980601094651

Mesoudi, A. (2013). Studying Cultural Transmission within an Interdisciplinary Cultural Framework. In R. F. Ellen, S. J. Lycett, & S. E. Johns (Eds.), *Understanding cultural transmission in anthropology : a critical synthesis* (Vol. 26, pp. 131-147). New York : Berghahn Books.

Meyer, I. H. (2003). Prejudice, social stress, and mental health in lesbian, gay, and bisexual populations: Conceptual issues and research evidence. *Psychological Bulletin, 129*(5), 674-697. https://doi.org/10.1037/0033-2909.129.5.674

Milton, D. (2014). Autistic expertise: A critical reflection on the production of knowledge in autism studies. *Autism, 18*(7), 794-802. https://doi.org/10.1177/1362361314525281

Milton, D. (2019). Disagreeing over Neurodiversity. *The Psychologist, 32*, 8.

Milton, D. E. M. (2012). On the ontological status of autism: the 'double empathy problem'. *Disability & Society, 27*(6), 883-887. https://doi.org/10.1080/09687599.2012.710008

Miton, H., & Charbonneau, M. (2018). Cumulative culture in the laboratory: methodological and theoretical challenges. *Proceedings. Biological sciences, 285*(1879). https://doi.org/10.1098/rspb.2018.0677

Miura, I. (1993). Switching Pauses in Adult - Adult and Child - Child Turn Takings: An Initial Study. *Journal of Psycholinguistic Research, 22*(3), 383.

Morrison, K. E., DeBrabander, K. M., Jones, D. R., Faso, D. J., Ackerman, R. A., & Sasson, N. J. (2020, Jul). Outcomes of real-world social interaction for autistic adults paired with autistic compared to typically developing partners. *Autism, 24*(5), 1067-1080. https://doi.org/10.1177/1362361319892701

Mueller, A. S., Abrutyn, S., Pescosolido, B., & Diefendorf, S. (2021). The Social Roots of Suicide: Theorizing How the External Social World Matters to Suicide and Suicide Prevention. *Front Psychol, 12*, 621569. https://doi.org/10.3389/fpsyg.2021.621569

Muijs, D. (2022). *Doing Quantitative Research in Education with IBM SPSS Statistics* (J. Clark, Ed. 3rd ed.). SAGE.

Nadesan, M. H. (2013). *Constructing autism: Unravelling the'truth'and understanding the social*. Routledge.

National Autistic Society. (2016). *Meltdowns*. https://www.autism.org.uk/about/behaviour/meltdowns.aspx

National Autistic Society. (2019). *Autism Strategy Overview*. Retrieved 20/07/20 from https://www.autism.org.uk/about/strategy/overview.aspx

National Autistic Society. (2023). *Autism assessment waiting times*. https://www.autism.org.uk/what-we-do/news/autism-assessment-waiting-times-2023

National Autistic Society. (2024). *Positive Behaviour Support (PBS)*. https://www.autism.org.uk/advice-and-guidance/topics/positive-behaviour-support-pbs

National Autistic Society, & All Party Parlimentary Group on Autism. (2019). *The Autism Act, 10 Years on: A report from the All Party Parliamentary Group on Autism on understanding, services and support for autistic people and their families in England*. N. A. Society.

NHS. (2009). *Adult Psychiatric Morbidity in England - 2007, Results of a household survey*. https://digital.nhs.uk/data-and-information/publications/statistical/adult-psychiatric-morbidity-survey/adult-psychiatric-morbidity-in-england-2007-results-of-a-household-survey

NHS. (2016). *Adult Psychiatric Morbidity Survey: Survey of Mental Health and Wellbeing, England, 2014.* https://digital.nhs.uk/data-and-information/publications/statistical/adult-psychiatric-morbidity-survey/adult-psychiatric-morbidity-survey-survey-of-mental-health-and-wellbeing-england-2014#resources

NHS. (2023a). *Autism spectrum disorder (ASD): Facts and myths about autism*. NHS. https://www.nhsinform.scot/illnesses-and-conditions/brain-nerves-and-spinal-cord/autism-spectrum-disorder-asd#facts-and-myths-about-autism

NHS. (2023b). *Autism Statistics, January to December 2022*. https://digital.nhs.uk/data-and-information/publications/statistical/autism-statistics/january-to-december-2022

Nielsen, M., Cucchiaro, J., & Mohamedally, J. (2012). When the Transmission of Culture Is Child's Play. *PloS one, 7*(3), e34066. https://doi.org/10.1371/journal.pone.0034066

Nordsletten, A. E., Larsson, H., Crowley, J. J., Almqvist, C., Lichtenstein, P., & Mataix-Cols, D. (2016). Patterns of Nonrandom Mating Within and Across 11 Major Psychiatric Disorders. *JAMA psychiatry, 73*(4), 354-361. https://doi.org/10.1001/jamapsychiatry.2015.3192

O'Connor, N., & Hermelin, B. (1991). Talents and preoccupations in idiots-savants. *Psychological Medicine, 21*(4), 959-964. https://doi.org/10.1017/s0033291700029949

O'Connor, R. A. G., Stockmann, L., & Rieffe, C. (2019). Spontaneous helping behavior of autistic and non-autistic (Pre-)adolescents: A matter of motivation? *Autism Research, 12*(12), 1796-1804. https://doi.org/10.1002/aur.2182

Office for National Statistics. (2022a). *Ethnic group, England and Wales: Census 2021*. https://www.ons.gov.uk/peoplepopulationandcommunity/culturalidentity/ethnicity/bulletins/ethnicgroupenglandandwales/census2021

Office for National Statistics. (2022b). *National life tables – life expectancy in the UK: 2018 to 2020*. https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/lifeexpectancies/bulletins/nationallifetablesunitedkingdom/2018to2020

Offit, P. A. (2008). *Autism's False Prophets: Bad Science, Risky Medicine, and the Search for a Cure*. Columbia University Press.

Oliver, M., & Barnes, C. (1998). *Disabled People and Social Policy: From Exclusion to Inclusion*. Addison Wesley Longman.

Olu-Lafe, O., Liederman, J., & Tager-Flusberg, H. (2014). Is the Ability to Integrate Parts into Wholes Affected in Autism Spectrum Disorder? *Journal of Autism and Developmental Disorders, 44*(10), 2652-2660. https://doi.org/10.1007/s10803-014-2120-z

Ordetx, K. (2018). *Teaching the Basics of Theory of Mind: A Complete Curriculum with Supporting Materials for Children with Autism Spectrum Disorder and Related Social Difficulties Ages Approximately 5 to 9 Years* (2 ed.). Jessica Kingsley Publishers.

Owens, J. (2015). Exploring the critiques of the social model of disability: The transformative possibility of Arendt's notion of power. *Sociology of Health and Illness, 37*(3), 385-403.

Pagano, J. A. (1990). *Exiles and Communities: Teaching in the Patriarchal Wilderness*. State University of New York Press.

Paradise, R., & Rogoff, B. (2009, 2009/03/01). Side by Side: Learning by Observing and Pitching In [https://doi.org/10.1111/j.1548-1352.2009.01033.x]. *Ethos, 37*(1), 102-138. https://doi.org/https://doi.org/10.1111/j.1548-1352.2009.01033.x

Pelton, M. K., Crawford, H., Robertson, A. E., Rodgers, J., Baron-Cohen, S., & Cassidy, S. (2020). Understanding Suicide Risk in Autistic Adults: Comparing the Interpersonal Theory of Suicide in Autistic and Non-autistic Samples. *Journal of Autism and Developmental Disorders, 50*(10), 3620-3637. https://doi.org/10.1007/s10803-020-04393-8

Persdotter, J. (2020). Introducing Menstrunormativity: Toward a Complex Understanding of 'Menstrual Monsterings'. In I. T. W. Chris Bobel, Breanne Fahs, Katie Ann Hasson, Elizabeth Arveda Kissling, Tomi-Ann Roberts (Ed.), *The Palgrave Handbook of Critical Menstruation Studies* (pp. 357-374). Palgrave Macmillan https://doi.org/10.1007/978-981-15-0614-7

Peterson, D., Mahajan, R., Crocetti, D., Mejia, A., & Mostofsky, S. (2015). Left-Hemispheric Microstructural Abnormalities in Children With High-Functioning Autism Spectrum Disorder. *Autism Research, 8*(1), 61-72. https://doi.org/10.1002/aur.1413

Pfeifer, E., & Wittmann, M. (2020). Waiting, Thinking, and Feeling: Variations in the Perception of Time During Silence. *Frontiers in Psychology, 11*. https://doi.org/10.3389/fpsyg.2020.00602

Piaget, J. (1923). La pensée symbolique et la pensée de l'enfant. *Archives de psychologie*(18), 273–304.

Pohl, A. L., Crockford, S. K., Blakemore, M., Allison, C., & Baron-Cohen, S. (2020). A comparative study of autistic and non-autistic women's experience of motherhood. *Molecular Autism, 11*(1). https://doi.org/10.1186/s13229-019-0304-2

Pollak, R. (1997). *The creation of Dr. B: A biography of Bruno Bettelheim*. Simon & Schuster.

Posar, A., & Visconti, P. (2017, Jul-Sep). Tribute to Grunya Efimovna Sukhareva, the Woman who First Described Infantile Autism. *Journal of pediatric neurosciences, 12*(3), 300-301. https://doi.org/10.4103/jpn.JPN_46_17

Posar, A., & Visconti, P. (2019). Long-term outcome of autism spectrum disorder. *Türk Pediatri Arşivi, 54*(4), 207-212. https://doi.org/10.14744/turkpediatriars.2019.16768

Premack, D., & Woodruff, G. (1978). Does the chimpanzee have a theory of mind? *Behavioral and Brain Sciences, 1*(4), 515-526. https://doi.org/10.1017/s0140525x00076512

Pring, J. (2023). Watchdog receives hundreds of complaints over Telegraph's 'toxic' benefits article. *Disability News Service*. https://www.disabilitynewsservice.com/watchdog-receives-hundreds-of-complaints-over-telegraphs-toxic-benefits-article/

Prochnow, A. (2014). An Analysis of Autism Through Media Representation. *ETC: A Review of General Semantics, 71*(2), 133-149. https://doi.org/10.2307/24761922

Pruitt, M. M., Rhoden, M., & Ekas, N. V. (2016, 2018/02/01). Relationship between the broad autism phenotype, social relationships and mental health for mothers of children with autism spectrum disorder. *Autism, 22*(2), 171-180. https://doi.org/10.1177/1362361316669621

Purkayastha, P. (2022). *The Legacy of Scientific Racism*. Retrieved 11/11/22 from https://www.laprogressive.com/racism/the-legacy-of-scientific-racism

Quinn, A. (2021). *Autistic and Expecting: Practical support for parents-to-be and health and social care practitioners*. Pavilion.

Radun, J., Maula, H., Rajala, V., Scheinin, M., & Hongisto, V. (2021). Speech is special: The stress effects of speech, noise, and silence during tasks requiring concentration. *Indoor Air, 31*(1), 264-274. https://doi.org/10.1111/ina.12733

Rawlings, B., Flynn, E., & Kendal, R. (2017). To Copy or To Innovate? The Role of Personality and Social Networks in Children's Learning Strategies. *Child Development Perspectives, 11*(1), 39-44. https://doi.org/10.1111/cdep.12206

Rifai, O., Fletcher-Watson, S., Jiménez Sánchez, L., & Crompton, C. (2022, 09/14). Investigating Markers of Rapport in Autistic and Nonautistic Interactions. *Autism in Adulthood*. https://doi.org/10.1089/aut.2021.0017

Rowe, W. E. (2014). Positionality. In D. Coghlan & M. Brydon-Miller (Eds.), *The SAGE Encyclopedia of Action Research* (pp. 628-628). SAGE Publications Ltd. https://doi.org/10.4135/9781446294406

Rubin, S., Biklen, D., Kasa-Hendrickson, C., Kluth, P., Cardinal, D. N., & Broderick, A. (2001). Independence, Participation, and the Meaning of Intellectual Ability. *Disability & Society, 16*(3), 415-429. https://doi.org/10.1080/09687590120045969

Runswick-Cole, K. (2014). 'Us' and 'them': the limits and possibilities of a 'politics of neurodiversity'in neoliberal times. *Disability & Society, 29*(7), 1117-1129.

Russell, G., Kapp, S. K., Elliott, D., Elphick, C., Gwernan-Jones, R., & Owens, C. (2019). Mapping the Autistic Advantage from the Accounts of Adults Diagnosed with Autism: A Qualitative Study. *Autism in Adulthood, 1*(2), 124-133. https://doi.org/10.1089/aut.2018.0035

Russell, G., & Norwich, B. (2012). Dilemmas, diagnosis and de-stigmatization: Parental perspectives on the diagnosis of autism spectrum disorders. *Clinical child psychology and psychiatry, 17*(2), 229-245.

Russell, G., Stapley, S., Newlove-Delgado, T., Salmon, A., White, R., Warren, F., Pearson, A., & Ford, T. (2022). Time trends in autism diagnosis over 20 years: a UK population-based cohort study. *Journal of Child Psychology and Psychiatry, 63*(6), 674-682. https://doi.org/10.1111/jcpp.13505

Rutter, M. (1972). Childhood Schizophrenia Reconsidered. *Journal of Autism and Developmental Disorders, 2*(4), 315-337.

Rutter, M. (1978). *Diagnosis and definitions of childhood autism* [doi:10.1007/BF01537863]. Plenum Publishing Corp.

Ruzich, E., Allison, C., Smith, P., Watson, P., Auyeung, B., Ring, H., & Baron-Cohen, S. (2015). Measuring autistic traits in the general population: a systematic review of the Autism-Spectrum Quotient (AQ) in a nonclinical population sample of 6,900 typical adult males and females. *Molecular Autism, 6*(1), 2. https://doi.org/10.1186/2040-2392-6-2

Ryan, B., & Gross, N. C. (1943). The diffusion of hybrid seed corn in two Iowa communities. *Rural Sociology, 8*, 15-24.

S., & Berger, H. (1923, February 01). Bücherbesprechungen [journal article]. *Archiv für Psychiatrie und Nervenkrankheiten, 67*(1), 133-136. https://doi.org/10.1007/bf02126515

Sacks, H., Schegloff, E. A., & Jefferson, G. (1974). A Simplest Systematics for the Organization of Turn-Taking for Conversation. *Language, 50*(4), 696-735. https://doi.org/10.2307/412243

Sala, G., Pecora, L., Hooley, M., & Stokes, M. A. (2020). As Diverse as the Spectrum Itself: Trends in Sexuality, Gender and Autism. *Current Developmental Disorders Reports, 7*(2), 59-68. https://doi.org/10.1007/s40474-020-00190-1

Salvesen Mindroom Centre. (2023). *Diversity in Social Intelligence Replication*. https://salvesen-research.ed.ac.uk/our-projects/diversity-in-social-intelligence-replication

Sampier, K. (2008). *Witness: McCarron wanted "perfect life" without daughter*. Gatehouse News Service. http://www.astraeasweb.net/politics/mccarron-trial-03.html

Sanborne, E. (2023, July 11th 2023). US Medical Students Push AMA to Halt ABA Support. Can Psychology Follow? https://autisticphd.com/theblog/ama-policy-stops-aba-supports-autistics/

Sanghera, G. S., & Thapar-Björkert, S. (2008). Methodological dilemmas: gatekeepers and positionality in Bradford. *Ethnic and racial studies, 31*(3), 543-562. https://doi.org/10.1080/01419870701491952

Sarrett, J. C. (2011). Trapped Children: Popular Images of Children with Autism in the 1960s and 2000s. *Journal of Medical Humanities, 32*(2), 141-153. https://doi.org/10.1007/s10912-010-9135-z

Sasson, N. J., Faso, D. J., Nugent, J., Lovell, S., Kennedy, D. P., & Grossman, R. B. (2017). Neurotypical Peers are Less Willing to Interact with Those with Autism based on Thin Slice Judgments. *Scientific Reports, 7*(1), 40700. https://doi.org/10.1038/srep40700

Sasson, N. J., & Morrison, K. E. (2019). First impressions of adults with autism improve with diagnostic disclosure and increased autism knowledge of peers. *Autism, 23*(1), 50-59. https://doi.org/10.1177/1362361317729526

Savarese, R. J. (2010). Toward a Postcolonial Neurology: Autism, Tito Mukhopadhyay, and a New Geo-poetics of the Body. *Journal of Literary & Cultural Disability Studies, 4*(3).

Savin-Baden, M., & Major, C. H. (2013). *Qualitative Research: The Essential Guide to Theory and Practice*. Routledge.

Schönpflug, U. (Ed.). (2008). *Cultural Transmission: Psychological, Developmental, Social, and Methodological Aspects (Culture and Psychology)*. Cambridge University Press.

Schwartz, R. C., & Blankenship, D. M. (2014). Racial disparities in psychotic disorder diagnosis: A review of empirical literature. *World Journal of Psychiatry, 4*(4), 133-140. https://doi.org/10.5498/wjp.v4.i4.133

Sedgewick, F., Crane, L., Hill, V., & Pellicano, E. (2019). Friends and Lovers: The Relationships of Autistic and Neurotypical Women. *Autism in Adulthood, 1*(2), 112-123. https://doi.org/10.1089/aut.2018.0028

Sedgewick, F., Hull, L., & Ellis, H. (2022). *Autism and Masking: How and why people do it, and the impact it can have*. Jessica Kingsley.

Sharma, B. K. (2015). Interactional concerns in implementing group tasks: addressing silence, dominance, and off-task talk in an academic writing class. *Innovation in Language Learning and Teaching, 9*(3), 233-250. https://doi.org/10.1080/17501229.2014.914522

Sheppard, E., Pillai, D., Wong, G. T.-L., Ropar, D., & Mitchell, P. (2016). How Easy is it to Read the Minds of People with Autism Spectrum Disorder? *Journal of Autism and Developmental Disorders, 46*(4), 1247-1254. https://doi.org/10.1007/s10803-015-2662-8

Silberman, S. (2015). *Neurotribes: The legacy of autism and how to think smarter about people who think differently*. Allen & Unwin.

Singer, J. (1998). *Odd People In: The birth of community amongst people on the Autistic Spectrum. A personal exploration of a new social movement based on neurological diversity* University of Technology Sydney]. Sydney.

Singer, J. (2017). *NeuroDiversity, The Birth of an Idea: The ground-breaking sociology thesis that prefigured the last great liberation movement to emerge from the 20th century*. Amazon.

Singer, J. (2022). What is Neurodiversity? https://neurodiversity2.blogspot.com/p/what.html

Singh, J., Hallmayer, J., & Illes, J. (2007). Interacting and paradoxical forces in neuroscience and society. *Nature Reviews Neuroscience, 8*(2), 153-160. https://doi.org/10.1038/nrn2073

Skubby, D. (2012). *A history of medical practices in the case of autism: A Foucauldian analysis using archaeology and genealogy* University of Akron].

Smith DaWalt, L., Hong, J., Greenberg, J. S., & Mailick, M. R. (2019, Oct). Mortality in individuals with autism spectrum disorder: Predictors over a 20-year period. *Autism, 23*(7), 1732-1739. https://doi.org/10.1177/1362361319827412

Smith, L. T. (2012). *Decolonizing Methodologies : Research and Indigenous Peoples*. Bloomsbury Academic & Professional. http://ebookcentral.proquest.com/lib/durham/detail.action?docID=1426837

Smogorzewski, K. (1938). Poland's foreign relations. *The Slavonic and East European Review*, 558-571.

Smukler, D. (2005). Unauthorized Minds: How “Theory of Mind” Theory Misrepresents Autism. *Mental Retardation, 43*(1), 11-24. https://doi.org/10.1352/0047-6765(2005)43<11:UMHTOM>2.0.CO;2

Solmi, M., Song, M., Yon, D. K., Lee, S. W., Fombonne, E., Kim, M. S., Park, S., Lee, M. H., Hwang, J., Keller, R., Koyanagi, A., Jacob, L., Dragioti, E., Smith, L., Correll, C. U., Fusar-Poli, P., Croatto, G., Carvalho, A. F., Oh, J. W., Lee, S., Gosling, C. J., Cheon, K.-A., Mavridis, D., Chu, C.-S., Liang, C.-S., Radua, J., Boyer, L., Fond, G., Shin, J. I., & Cortese, S. (2022). Incidence, prevalence, and global burden of autism spectrum disorder from 1990 to 2019 across 204 countries. *Molecular Psychiatry, 27*(10), 4172-4180. https://doi.org/10.1038/s41380-022-01630-7

Sterwald, C., & Baker, J. (2019). Frosted Intellectuals: How Dr. Leo Kanner Constructed the Autistic Family. *Perspectives in Biology and Medicine, 62*(4), 690-707. https://doi.org/10.1353/pbm.2019.0040

Stubbersfield, J. M., Tehrani, J. J., & Flynn, E. G. (2015). Serial killers, spiders and cybersex : social and survival information bias in the transmission of urban legends. *British journal of psychology., 106*(2), 288-307. http://dro.dur.ac.uk/13051/

Stubbersfield, J. M., Tehrani, J. J., & Flynn, E. G. (2017). Chicken Tumours and a Fishy Revenge: Evidence for Emotional Content Bias in the Cumulative Recall of Urban Legends. *Journal of Cognition and Culture, 17*(1-2), 12. https://doi.org/https://doi.org/10.1163/15685373-12342189

Sultana, F. (2007). Reflexivity, positionality and participatory ethics: Negotiating fieldwork dilemmas in international research. *ACME: An international journal for critical geographies, 6*(3), 374-385.

Tărlungeanu, D. C., Deliu, E., Dotter, C. P., Kara, M., Janiesch, P. C., Scalise, M., Galluccio, M., Tesulov, M., Morelli, E., Sonmez, F. M., Bilguvar, K., Ohgaki, R., Kanai, Y., Johansen, A., Esharif, S., Ben-Omran, T., Topcu, M., Schlessinger, A., Indiveri, C., Duncan, K. E., Caglayan, A. O., Gunel, M., Gleeson, J. G., & Novarino, G. (2016). Impaired Amino Acid Transport at the Blood Brain Barrier Is a Cause of Autism Spectrum Disorder. *Cell, 167*(6), 1481-1494.e1418. https://doi.org/10.1016/j.cell.2016.11.013

Tehrani, J., & Collard, M. (2002, 2002/12/02/). Investigating cultural evolution through biological phylogenetic analyses of Turkmen textiles. *Journal of Anthropological Archaeology, 21*(4), 443-463. https://doi.org/https://doi.org/10.1016/S0278-4165(02)00002-8

Tehrani, J. J. (2013). The Phylogeny of Little Red Riding Hood. *PloS one, 8*(11), e78871. https://doi.org/10.1371/journal.pone.0078871

Tehrani, J. J., & Collard, M. (2013). Do Transmission Isolating Mechanisms (TRIMS) Influence Cultural Evolution? Evidence from Patterns of Textile Diversity within and between Iranian Tribal Groups. In R. F. Ellen, S. J. Lycett, & S. E. Johns (Eds.), *Understanding cultural transmission in anthropology : a critical synthesis* (Vol. 26, pp. 148-164). New York : Berghahn Books.

Terzi, L. (2004). The social model of disability: A philosophical critique. *Journal of applied philosophy, 21*(2), 141-157.

The Education Act 1981 c.60, (1981).

The Education Act 1996 c.56, (1996).

Treffert, D. A. (2009). The savant syndrome: an extraordinary condition. A synopsis: past, present, future. *Philosophical Transactions of the Royal Society B: Biological Sciences, 364*(1522), 1351-1357. https://doi.org/10.1098/rstb.2008.0326

Treweek, C., Wood, C., Martin, J., & Freeth, M. (2019). Autistic people's perspectives on stereotypes: An interpretative phenomenological analysis. *Autism, 23*(3), 759-769. https://doi.org/10.1177/1362361318778286

Tsou, J. Y. (2016). Natural kinds, psychiatric classification and the history of the DSM. *History of Psychiatry, 27*(4), 406-424. https://doi.org/10.1177/0957154x16656580

Tuchman, R., & Cuccaro, M. (2011). Epilepsy and Autism: Neurodevelopmental Perspective. *Current Neurology and Neuroscience Reports, 11*(4), 428-434. https://doi.org/10.1007/s11910-011-0195-x

Tullo, A., Crompton, C., Fletcher-Watson, S., & Axbey, H. (2022). *Image Chain Similarity [Computer Software].* In Zenodo. https://zenodo.org/record/6908258#.YueekHbMKUk

Tye, C., Runicles, A. K., Whitehouse, A. J. O., & Alvares, G. A. (2018). Characterizing the Interplay Between Autism Spectrum Disorder and Comorbid Medical Conditions: An Integrative Review. *Front Psychiatry, 9*, 751. https://doi.org/10.3389/fpsyt.2018.00751

Unknown. (1960, 25th July). Medicine: The Child Is Father. *Time*.

Van Rosmalen, L., Van der Veer, R., & Van der Horst, F. C. (2020, Jun). The nature of love: Harlow, Bowlby and Bettelheim on affectionless mothers. *Hist Psychiatry, 31*(2), 227-231. https://doi.org/10.1177/0957154x19898997

Vellante, M., Baron-Cohen, S., Melis, M., Marrone, M., Petretto, D. R., Masala, C., & Preti, A. (2013). The "Reading the Mind in the Eyes" test: Systematic review of psychometric properties and a validation study in Italy. *Cognitive Neuropsychiatry, 18*(4), 326-354. https://doi.org/10.1080/13546805.2012.721728

Verhoeff, B. (2013, 2013/12/01). Autism in flux: a history of the concept from Leo Kanner to DSM-5. *History of Psychiatry, 24*(4), 442-458. https://doi.org/10.1177/0957154X13500584

Volkmar, F. R., & McPartland, J. C. (2014). From Kanner to DSM-5: Autism as an Evolving Diagnostic Concept. *Annual Review of Clinical Psychology, 10*(1), 193-212. https://doi.org/10.1146/annurev-clinpsy-032813-153710

von-Glasersfeld, E. (1998). Why constructivism must be radical. In M. Larochelle, N. Bednarz, & J. Garrison (Eds.), *Constructivism and Education* (pp. 23-28). https://doi.org/10.1017/CBO9780511752865.003

Wagner, W., Elejabarrieta, F., & Lahnsteiner, I. (1995, 11/01). How the sperm dominates the ovum—Objectification by metaphor in the social representation of conception. *European Journal of Social Psychology, 25*, 671-688. https://doi.org/10.1002/ejsp.2420250606

Wagoner, B. (2017a). Frederic Bartlett. In K. Michaelian & S. Bernecker (Eds.), *Routledge Handbook of the Philosophy of Memory*.

Wagoner, B. (2017b). What makes memory constructive? A study in the serial reproduction of Bartlett's experiments. *Culture & Psychology, 23*(2), 186-207. https://doi.org/10.1177/1354067X17695759

Wakefield, A. J., Murch, S. H., Anthony, A., Linnell, J., Casson, D. M., Malik, M., Berelowitz, M., Dhillon, A. P., Thomson, M. A., & Harvey, P. (1998). RETRACTED: Ileal-lymphoid-nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children.

Walker, N. (2021). *Neuroqueer Heresies: Notes on the neurodiversity paradigm, autistic empowerment, and postnormal possibilities*. Autonomous Press.

Wallis, C. (2006, 30th October). Blame it on the teletubbies. *Time*, *168*(18), 65.

Waltz, M. (2008, 04/01). "Autism=Death: The social and medical impact of a catastrophic model of autistic spectrum disorders". *Journal of Popular Narrative Media, 1*, 13-24. https://doi.org/10.3828/pnm.1.1.4

Waltz, M. (2014). Worlds of autism: across the spectrum of neurological difference. *Disability & Society, 29*(8), 1337-1338. https://doi.org/10.1080/09687599.2014.934064

Warrier, V., Greenberg, D. M., Weir, E., Buckingham, C., Smith, P., Lai, M.-C., Allison, C., & Baron-Cohen, S. (2020). Elevated rates of autism, other neurodevelopmental and psychiatric diagnoses, and autistic traits in transgender and gender-diverse individuals. *Nature Communications, 11*(1). https://doi.org/10.1038/s41467-020-17794-1

Wechsler, D. (2011). *Wechsler Abbreviated Scale of Intelligence (WASI-II)*.

Weekly., R. (2019). US FDA warns of dangers of Miracle Mineral Solution. *Reactions Weekly, 1767*(1), 4-4. https://doi.org/10.1007/s40278-019-66375-y

Weir, E., Allison, C., & Baron-Cohen, S. (2021). The sexual health, orientation, and activity of autistic adolescents and adults. *Autism Research, 14*(11), 2342-2354. https://doi.org/10.1002/aur.2604

Weiss, J. A., & Fardella, M. A. (2018). Victimization and Perpetration Experiences of Adults With Autism. *Front Psychiatry, 9*, 203. https://doi.org/10.3389/fpsyt.2018.00203

Wiemann, J. M. (1977). Explication and Test of a Model of Communicative Competence. *Human Communication Research, 3*(3), 195-213. https://doi.org/10.1111/j.1468-2958.1977.tb00518.x

Williams, S. J. (1999). Is anybody there? Critical realism, chronic illness and the disability debate. *Sociology of Health & Illness, 21*(6), 797-819.

Wing, L. (1980). Childhood autism and social class: a question of selection? *, 137*(5), 410-417. https://doi.org/10.1192/bjp.137.5.410

Wing, L. (1981). Language, social, and cognitive impairments in autism and severe mental retardation. *Journal of Autism and Developmental Disorders, 11*(1), 31-44. https://doi.org/10.1007/bf01531339

Winkielman, P., Schwarz, N., Fazendeiro, T., & Reber, R. (2003). The hedonic marking of processing fluency: Implications for evaluative judgment. In J. Musch & K. C. Klauer (Eds.), *The Psychology of Evaluation: Affective Processes in Cognition and Emotion* (pp. 189-217). Lawrence Erlbaum.

Wolff, S. (1996). The first account of the syndrome Asperger described? *European Child & Adolescent Psychiatry, 5*(3), 119-132. https://doi.org/10.1007/bf00571671

Woods, R., Milton, D., Arnold, L., & Graby, S. (2018). Redefining Critical Autism Studies: a more inclusive interpretation. *Disability & Society, 33*(6), 974-979. https://doi.org/10.1080/09687599.2018.1454380

World Health Organisation. (1993). *The ICD-10 Classification of Mental and Behavioural Disorders: Clinical descriptions and diagnostic guidelines* (2 ed.). World Health Organisation.

World Health Organisation. (2018). *International classification of diseases for mortality and morbidity statistics* (11th ed.) https://icd.who.int/browse11/l-m/en

Yafai, A.-F., Verrier, D., & Reidy, L. (2014). Social conformity and autism spectrum disorder: A child-friendly take on a classic study. *Autism, 18*(8), 1007-1013. https://doi.org/10.1177/1362361313508023

Yu, C. (2021). An Examination of the Institutionally Oppressive White Savior Complex in Uganda Through Western Documentaries [Article]. *International Social Science Review, 97*.

Zeidan, J., Fombonne, E., Scorah, J., Ibrahim, A., Durkin, M. S., Saxena, S., Yusuf, A., Shih, A., & Elsabbagh, M. (2022). Global prevalence of autism: A systematic review update. *Autism Research, 15*(5), 778-790. https://doi.org/10.1002/aur.2696

Zeldovich, L. (2018). How history forgot the woman who defined autism. *Spectrum*. https://www.spectrumnews.org/features/deep-dive/history-forgot-woman-defined-autism/

Zhang, J., Wheeler, J. J., & Richey, D. (2006, 2006-01-01). Cultural Validity in Assessment Instruments for Children with Autism from a Chinese Cultural Perspective. *International Journal of Special Education, 21*(1). http://hdl.handle.net/20.500.12648/2223