

Are the “autistic traits” and “broader autism phenotype” concepts real or mythical?

Author Details.

Nick Chown

Independent scholar

npchown@gmail.com

Abstract

The concepts “autistic traits” and “broader autism phenotype” are not officially recognised by the diagnostic authorities. However, some clinicians and others regard the broader autism phenotype as a sub-clinical presentation of behaviours or traits qualitatively similar to features associated with autism, often referred to as “autistic traits.”

In this research, the origin of the broader autism phenotype concept is considered, the theoretical perspectives on autism and “autistic traits” are briefly reviewed and compared, the statement sets in four instruments used for identifying so-called “autistic traits” are analysed, and the justifications for a broader autism phenotype are reviewed.

The researcher concludes that the concept of “autistic traits” arises from a misuse of language, that the absence of autistic traits indicates that there is no such thing as a “broader autism phenotype,” and that apparent evidence for the existence of a broader phenotype is more likely evidence for the population of autistic people being larger than suspected.

Keywords:

autism, autistic traits, broader autism phenotype, prevalence, screening, screening instruments

Introduction

According to the medical model of disability, autism is a spectrum disorder involving delays in social interaction, social communication and social imagination (Wing and Gould, 1979). The diagnostic criteria in the current fifth edition of the *Diagnostic and Statistical Manual (DSM-5; APA, 2013)* and the eleventh edition of the *International Statistical Classification of Diseases and Related Health Problems (ICD-11; WHO, 2018)* also include restricted and repetitive patterns of behaviour;. The *DSM-5* reintroduces sensory issues as a potential additive diagnostic criterion for autism, and the *ICD-11* followed suit. High levels of anxiety are also very often associated with autism (Kerns and Kendall, 2012; Kerns *et al.*, 2014; Strang *et al.*, 2012) arguably due to autistic people living in a neurotypical world that is very often unfriendly to them (Beardon, 2017)ⁱ. Asperger syndrome (AS) is a *DSM-IV* diagnosis on the autism spectrum that has been absorbed into the over-arching diagnosis of autism spectrum disorder in the *DSM-5*. In this article the term “autism” covers all extant autism diagnosesⁱⁱ.

From a social model perspective, many of the difficulties associated with autism can be regarded as having a societal cause, rather than being the “fault” of the individual as with the medical model. With the social model, the term “disability” is reserved for matters resulting from adverse attitudes towards autistic people and barriers placed in their way by society. As an acknowledgement that not all aspects of disability have a societal cause, Carol Thomas (2004) developed the concept of “impairment effects” to cover aspects of disability that directly arise from the inherent difficulties associated with impairment. Other scholars consider that the difficulties in autism are due to a mix of biological, psychological and social (societal) causes, and subscribe to a biopsychosocial model, such as that adopted by the World Health Organization (Rosenbaum and Stewart, 2004). Proponents of neurodiversity regard autism as cognitive and sensory difference rather than impairment, disability or disorder (Kapp *et al.*, 2013; Milton, 2015). Indeed, there has been a recent call – endorsed by 25 autisticⁱⁱⁱ and non-autistic scholars – for autism to be removed from the existing diagnostic manuals

and included in a proposed new manual of *neurodivergent needs* (Chown and Leatherland, 2018)^{iv}. This reflects their view that the difficulties many autistic people experience have a societal cause.

The study reported here involved the content analysis^v of various autism screening tools consisting of lists of questions or statements designed to identify so-called “autistic traits” and thereby evaluate the likelihood that an individual being screened is autistic. The researcher has looked at these screening tools through a medical model lens deliberately, because “autistic traits” and the “broader autism phenotype” are medical model constructs. Extensive statistical testing of these tools demonstrates that this approach to screening works (Sappok, Heinrich and Underwood, 2015; Schanding, Nowell and Goin-Kochel, 2012), although of course most of the tests could be improved. For instance, Charman and Gotham (2013) point out that screening tools cope less well with the very marginal cases where clinicians most need diagnostic help. Gould and Ashton-Smith (2011), amongst others, have drawn attention to the difficulty girls and women often face in obtaining a diagnosis of autism, pointing out that different presentation in females has implications for the instruments used in the diagnostic process. Many autism screening tools, including the tools reviewed, appear to have a mix of age, cultural, gender and racial biases. Screening tools could be improved by (a) reflecting generic aspects of the lived experience of autism as described by autistic people themselves, and (b) by developing variants that reflect age, cultural, gender and racial differences. Detailed discussion of the fitness for purpose of the screening tools analysed, or of the inherent fitness for purpose of *any* questionnaire-based tools, deserves separate consideration. In this paper, the researcher has only sought to determine whether listed traits are “autistic traits.” Although the underlying efficacy of the tools is not in dispute here, there is evidence that they work not because their originators have identified “autistic traits,” but because of a clustering effect, as will be further discussed.

Many authors refer to “autistic traits,” to a “broader autism phenotype,” or in some cases to both concepts (e.g., Bora *et al.*, 2017; Ozonoff *et al.*, 2014; Wheelwright *et al.*, 2010), although as noted, neither are officially recognised in the *DSM-V* or *ICD-11* (APA, 2013; WHO, 2018). These concepts are connected, because there is supposed to be a wider phenotype, including individuals with “autistic traits” who would not receive a diagnosis of autism (Bora *et al.*, 2017; Landry and Chouinard, 2016; Bishop and Seltzer, 2012). Those people in the broader autism phenotype who do not fit the diagnostic criteria for autism would presumably not be considered autistic. But there are those who question the ability of any of the diagnostic criteria developed to date to identify all autistic people (Beardon, 2018; Hughes, 2015). It is therefore premature to work on the assumption that those who do not apparently meet the criteria are not autistic.

One especially important area relates to a doubt as to the ability of the criteria to encompass female and ethnic minority presentations of autism. For instance, Liz Hughes (2015) has described the extent of the difficulties autistic women have faced in getting their diagnosis, listing 30 alternative diagnoses received by the women who responded to her survey prior to each being diagnosed as autistic, and a study by Begeer *et al.* (2009) reported a bias against ethnic minorities in spontaneous clinical judgements.

Autistic traits

The author’s own research has only uncovered one attempt – by Dawson *et al.* (2002) – at defining “autistic traits.”^{vi} The vast majority of articles that refer to the term apparently do so on the assumption that it will be understood without explanation (for example, Constantino, 2011; Hasegawa *et al.*, 2015). Those authors who refer to specifically “autistic traits” appear to assume that such traits do exist and that this assumption is non-controversial. The validity of vague terms that have not been the subject of vigorous debate is not enhanced by their constant repetition. So-called evidence cannot be valid if it involves dubious, unproven terminology.

Scholars working in the field of autism understand the term “autistic traits” because, as Ludwig Wittgenstein showed us (Wittgenstein, 1958), people learn how to use language in social contexts so that they can understand each other even when terms lack clear definition. The danger here is that we all “understand” what we mean, and so fail to realise that we may be reifying an idea. The author has

even found examples of work by autistic scholars referring to “autistic traits,” which I think indicate immersion in this language game rather than expression of a view on the existence of such traits. For instance, Damian Milton does not usually refer to “autistic traits,” but referred to their amelioration when writing of the “pressure on autistic people to conform and to internalise a deficit model of their own selves” (Milton, 2016). At least one scholar has questioned the validity of the concept of autistic traits, with Luke Beardon (2017: p. 65) having written that “there is no such thing as ‘autistic behaviour.’ In other words, there is no single behaviour or set of behaviours displayed by the autistic person that can’t be seen in [non-autistic people].” One simple question should be enough to make one have second thoughts about the term “autistic traits”: “*If there are traits unique to autism, why is it often so difficult to diagnose?*”

Six candidate autistic traits have been proposed (Dawson *et al.*, 2002): (a) [deficits in] face processing, including eye gaze; (b) [deficits in] social motivation; (c) [deficits in] motor imitation ability, especially imitation of body actions; (d) [deficits or differences in] memory, specifically that which is mediated by the medial temporal lobe–prefrontal circuits; (e) [deficits in] executive function, particularly planning and flexibility; and (f) [deficits or differences in] language ability, particularly those aspects of language that overlap with specific language impairment. Attempts have also been made to describe autistic traits using various screening instruments, such as the Autism Spectrum Quotient (AQ; Baron-Cohen *et al.*, 2001), the Social Responsiveness Scale (SRS; Constantino, 2002), the Social Communication Questionnaire (SCQ; Rutter, Bailey and Lord, 2003^{vii}) and the Broad Autism Phenotype Questionnaire (BAPQ; Hurley *et al.*, 2007).

The traits proposed by Dawson *et al.* – such as deficits in executive function and social motivation – are supposed deficits in autism, and not associated with neurotypicality without any co-morbid pathology. So when Wheelwright *et al.* (2010) write that autistic traits are distributed amongst the general population, it is likely that they refer to the trait descriptions in the AQ developed by Simon Baron-Cohen’s team. If this was not the case, the implication would be that the executive function difficulties and (lack of/reduced) social motivation supposedly associated with autism are also observed in the neurotypical population. There appears to be no unambiguous definition of “autistic traits,” which should be a requirement for valid conclusions to be drawn about a supposed wider spread of these traits amongst the general population.

Although the concept of autistic traits does not enable easy diagnosis of autism, as it should if traits are unique to autism, it forms the basis for the so-called broader phenotype. There have been many reports of autistic traits in the general population (e.g., Ingersoll *et al.*, 2011; Sucksmith, Roth and Hoekstra, 2011). However, all these studies do is evidence that the same traits can be found in individuals both with and without a diagnosis of autism (which is what one would expect of *human* traits), and that these traits are often found in relatives of autistic individuals (which could just as easily imply further autism in these families than a broader phenotype). Jaswal and Akhtar (2019, p. 31) point out in their study of social motivation in autism that “most of the unusual behaviors documented in autism have also been documented among non-autistic children and adults ... When non-autistics engage in these behaviors, they are not attributed to deficits ... to the contrary, they are often considered to be adaptive responses to a particular situation.” Jaswal and Akhtar consider, as does the author, that many behaviours are adaptive responses for autistic people too, but generally interpreted as pathological because they do not fit the majority behavioural pattern.

There is also a hypothesis that autistic traits are an aspect of personality distributed amongst the general population. Austin (2005: p. 452) considers that the “Big Five”^{viii} model of personality can explain the personality characteristics of the broader autism phenotype. Wakabayashi, Baron-Cohen and Wheelwright (2006) suggest that autistic traits are independent of the five-factor model dimensions, arguing that autistic traits represent a sixth personality factor. A link between autism and personality disorders has been proposed by Lugnegård, Hallerbäck and Gillberg (2012). However, the author argues for a clear distinction between autism, personality traits and personality disorders. Following the likes of Happé and Frith (2006), Mottron *et al.* (2006) and Murray, Lesser and Lawson

(2005), this means regarding autism as cognitive and perceptual difference, not an aspect of personality, disordered or otherwise^{ix}.

Autistic perspectives on “autistic traits”

The researcher asked members of a secret Facebook group^x of autistic autism researchers (with 120 members) what they think of the “autistic traits” concept. Twenty responses were received. Key points raised by respondents included the following (some are extracts in view of space restrictions). All respondents have been anonymised except for two who asked to be named.

Table 1: Some responses to survey of autistic autism researchers (r=20)

Key point	Comment
Lack of definitions of psychological terms	“I'd say, don't assume the word ‘trait’ means the same thing to all people. My consistent frustration with psychologists is that they don't define their terms, and assume we are all using a word the same way.”
A misleading but useful concept	“I think it's a useful but misleading concept. Yes, 'autistic traits' in the sense you define probably don't exist, or barely, in the same way that as Beardon says, there's no such thing as 'autistic behaviours'... Maybe 'autistic traits' isn't the right term for them, but I do think there's something to be salvaged there. There's potential for talk in terms of traits or tendencies to counteract this, at least a bit.”
Different discourses relating to autistic traits	“It just struck me: there are different discourses of autistic traits. There is a dominating medical one which is being used to formally define/diagnose people as autistic. There are different ‘lay’ or ‘community’ discourses who may or may not overlap. There are constant epistemic battles between in within communities - what to include or not as ‘autistic traits.’ So it is a matter of who and where "autistic traits" are being debated.”
No such thing as “autistic traits” in accordance with this definition	“Using your definition ^{xi} , I'd say there's no such thing as autistic traits, or autism traits. They don't exist. I don't think there are any universal traits of the type you describe. There's no such thing as an action that's unique to autism. It doesn't exist. Everyone stims, but we only call it that and pathologize it when certain ND [neurodiverse] people do it.” (Alyssa Hillary, University of Rhode Island)
Inhabiting the intersection between the real world and the ideological world	“It is question again of medical vs phenomenological or other model. I do not think ‘traits’ is a bad word in itself but it is prone to abuse in either direction. I inhabit an intersection between the pragmatic world of survival as neurobiologically atypical, and the ideological world where I would be free to be as I am without impediment.”
Autistic traits as “family resemblances”	“I take it they mean something more along the lines of Wittgensteinian family resemblance features than necessary and sufficient conditions.”
An “autistic flavour” to the behaviours of autistic people	“Hans Asperger wrote of an ‘autistic flavour’ to the behaviours of autistic people. He didn’t reduce it to a specific set of behaviours.”
Universal experiences of autism, not universal traits	“...we do think about experiences which are universal. Things like the double empathy problem. Things like Yergeau's demirhetoricity. These experiences are truly universal for us, including among nonspeaking autistic people and autistic people with I/DD labels. Like you will not find universal traits. The trait level is too fine. We are people.” (Rua Mae Williams, University of Florida)
Insufficient traits displayed <i>at time of assessment</i> to be autistic (italics added)	“When my son went through the assessment process first time round his report read ‘exhibits several autistic traits but not significantly impaired enough to warrant a diagnosis’ - so in that medical scenario ‘traits’ were understood to be behaviours associated with the diagnostic criteria (bollocks that that is) which have to be numerous and ‘impairing’ enough

to impact significantly - or else you are not autistic...yeah right.”

Other respondents simply agreed with the position that there are no unique “autistic traits” as defined by autistic people, although there are certain universal experiences in autism. It is important also to acknowledge environmental effects. In relation to what he calls the “golden equation” (AUTISM + ENVIRONMENT = OUTCOME), Beardon (2019) writes that autism impacts each individual differently and is dependent on the nature of the environment they are in at any particular time. For example, the son of the last quoted respondent in *Table 1* eventually received a diagnosis of autism despite previously being told by a clinician that he was “not significantly impaired enough to warrant a diagnosis,” because he did not display sufficient traits in the assessment session to be autistic.

Broader Autism Phenotype

The concept of a broader phenotype of autism has been said to derive from observations made by the two clinicians who identified autism all those years ago, Hans Asperger and Leo Kanner. Both Asperger and Kanner reported behavioural features in the parents of the children they had seen in their clinics that were similar in kind to those of their autistic children (Sucksmith *et al.*, 2011). Sucksmith *et al.* (*ibid.*: pp. 4-5) write that “thus from a very early period, observations suggested that the expression of autistic traits extends beyond the clinical boundaries of autism to include a mild subthreshold expression in relatives.” As many autistic people say, autism can only appear “mild” to those who are not autistic. From a scholarly perspective, let me quote Beardon (2017: p. 11) who, with acknowledged sarcasm, writes of “the dreaded ‘mild autism’? Being just a teeny bit autistic? Hardly autistic at all? Just having a cheeky splash of autism?” Being “higher functioning” intellectually may actually increase the anxiety and stress of being autistic in a neurotypical world due to greater understanding. It is the author’s view that the so-called “mild subthreshold expression” is actually a reflection of a higher prevalence of autism.

It is ironic that a belief in the existence of a broader phenotype depends on “autistic traits” being normally distributed amongst human beings, when these very same traits are why autism is pathologised. The definition of “autistic traits” put forward by Dawson and her colleagues (Dawson *et al.*, 2002) refers to matters that would presumably *not* be generally accepted as being normally distributed amongst the general population^{xiii}. And, by definition, traits observed in the neurotypical population cannot be “autistic traits” if by that is meant uniquely autistic behaviour. There appears to be a fundamental failure of logic in regarding trait X as an aspect of pathology in autism but not as pathological in the general population. Or is that some scholars of autism regard autistic traits in the general population as being a small amount of pathology within that population? If this is the case, one has to ask how much pathology is “allowed” before neurotypicality becomes autism? It can be argued, and is argued by proponents of neurodiversity, that “difference” is part of the human condition. So a confused muddling of natural difference and pathology may be at work here. The point is that a trait cannot be “pathology” in autism and other neurological conditions but “difference” in all other human beings. As some traits seen in the general population are qualitatively and/or quantitatively different in autism, there only *appears* to be a broader autism phenotype. This is a chimera arising from a category mistake relating to the concept of so-called “autistic traits.”

The term “broader autism phenotype” is applied to individuals with behavioural and cognitive traits similar to but supposedly milder than those observed in autism (Miles, 2011). For example, Sucksmith *et al.* (2011: p. 360) describe the broader phenotype by pointing out that “genetic relatives of people with autism often show milder expression of traits characteristic for autism.” Bishop *et al.* (2004: p. 1431) also stress the aspect of “mildness” in relation to the broader autism phenotype when writing that “the concept of the ‘broad phenotype’ of autism refers to the finding that relatives of autistic people often have mild forms of autistic-like characteristics, such as social and communicative difficulties.” Wheelwright *et al.* (2010) state that the broader autism phenotype is qualitatively similar to but milder than the diagnosed autism phenotype. They also write that the milder characteristics of the broader phenotype were first described by Leo Kanner (1943). The researcher’s own analysis of the parents referred to by Kanner in his original paper whom Wheelwright and her colleagues are likely to be referring to leads us to conclude that his descriptions are just as likely to be of autism than

of some apparently “mild” manifestation of so-called autistic traits that do not justify a diagnosis of autism.

Donald Grey Triplett (Donald T.)

Donald T. was Leo Kanner’s first case study in the seminal 1943 paper on what we now call autism. Donald had been institutionalised by his parents, but at Kanner’s urging was outplaced with a foster family, eventually returned home, and ended up having a positive outcome – college, employment and an active social/community life – given the time period. Kanner (1943: pp. 218-219) wrote the following about Donald’s father:

“The father, whom Donald resembles physically, is a successful, meticulous, hard-working lawyer who has had two ‘breakdowns’ under strain of work. He always took every ailment seriously, taking to his bed and following doctors’ orders punctiliously even for the slightest cold. When he walks down the street, he is so absorbed in thinking that he sees nothing and nobody and cannot remember anything about his walk”

It has been argued that being meticulous and hard-working are human traits often seen in autistic people that make them excellent employees, as long as suitable reasonable adjustments are made where necessary (Beardon, 2019). Beardon (*ibid.*: p. 92) provides the following case study:

“Bob is a very serious, goal-oriented autistic employee who has a high degree of focus within his work and is attending a team meeting, for which he has been responsible for drawing up an agenda. As usual, Bob has meticulously emailed all those invited to the meeting to ask for their agenda items, and has calculated to the minute how long each item needs.”

There is a reported tendency for autistic people to be strict rule-followers which could explain the father’s apparently excessively strict compliance with doctors’ orders, and the meticulousness of the autistic employee in seeking agenda items. The absorption in thinking to the extent that nothing else penetrates the intense thinking state of Donald T.’s father, and the high degree of focus of the autistic employee, can be explained by the monotropism theory of autism, which proposes that autism involves a narrow field of attention in comparison to the typical wider attention generally seen in human beings (Murray, Lesser and Lawson, 2005). Although the gap between Kanner’s article and Beardon’s book is more than 75 years, the similarities between them are clear to see.

One has to ask why Kanner’s comments about Donald’s father are “personality quirks,” while the son’s traits are pathological? Is this distinction based on cultural assumptions from the time period: e.g., if Donald’s father is a reliable breadwinner, could that have been enough to make him “not pathological” in the 1930s/40s—and would it be enough now? Or was it Kanner’s assumption that Donald could only meet his criteria of “normalcy” with the right intervention that made his behaviours appear pathological rather than just unusual?

Autism screening tools and autistic traits

The investigation of autistic traits reported on here covers three of the four instruments included in the comparison of broader autism phenotype self-report screening tools undertaken by Ingersoll (2011) and her colleagues, i.e., the AQ, BAPQ, and SRS. The SCQ was excluded from the detailed review for reasons that will be explained. These tools seek to screen for autism by identifying behaviours the authors of the instruments associate with autism. The significant differences between the behaviour sets in the four tools is indicative of a lack of consensus on what behaviours are supposed to be “autistic.”

The AQ self-report questionnaire covers social interaction/ communication (e.g., “I find social situations easy” and “other people frequently tell me that what I’ve said is impolite, even though I think it is polite”), repetitive behaviours (e.g., “I prefer to do things the same way over and over again”), special interests (e.g., “I tend to have very strong interests which I get upset about if I can’t pursue”) and sensory sensitivities (e.g., “I often notice small sounds when others do not”). In addition,

the AQ includes statements on related areas, such as difficulty with/lack of interest in reading fiction, making friends and changes to routines.

Unlike the AQ, the SRS is an instrument focused solely on the social aspects of autism, and has to be administered by a professional, with the statements rated by a parent, caregiver or teacher rather than the individual himself or herself. The SRS also differs from the AQ in seeking to provide a continuous measure of social ability instead of an indication of autism.

The SCQ is a parent-report screening measure that supposedly “taps the symptomatology associated with autism spectrum disorder” (Rutter, Bailey and Lord, 2003). Despite its title, the SCQ covers social interaction, social communication and repetitive behaviours but, unlike the AQ, it does not include sensory sensitivities. Whilst the SCQ provides a cut-off score, with the AQ a score of 32 or more is simply a strong indicator of autism: scores of <32 may be false negatives and scores of >32 may be false positives (Baron-Cohen *et al.*, 2006).

The BAPQ was designed to identify individuals within the broader phenotype on the basis of a set of personality and language traits (aloofness, difficulties with pragmatic language and rigidity). This instrument has been said to have “demonstrated convergent validity with direct clinical assessment of the broader autism phenotype using interview, clinical assessment, informant report and consensus ratings by trained raters” (Ingersoll *et al.*, 2011, p. 1647).

The AQ, BAPQ, SCQ and SRS have been the subject of statistical testing that support their use in screening for autism (e.g. Baron-Cohen *et al.*, 2001 in relation to the AQ). The tools in this context may be useful, but there is no evidence that the efficacy of these tools as demonstrated by the test results is evidence in support of the existence of a broader autism phenotype. It could equally be evidence that the autistic population is significantly larger than is generally thought to be the case. No study was located that reports analysis of the individual traits embedded within these screening tools to determine if there are real “autistic traits” or simply human traits, some of which are associated more with autism than with the general population. The effectiveness of any self-report tool also depends on the ability of the person completing it to be self-reflective. Although self-awareness in autism can be an issue, the fact that these tools appear to work effectively suggests that it is not a major issue in this context. The results obtained from self-report screening tools will also reflect the extent to which the individual lives in an autism-friendly or autism-unfriendly environment^{xiii}.

“Autistic traits” as measured by the Autism Spectrum Quotient

Baron-Cohen *et al.* (2001: p. 6) wrote of the need for “a short, self-administered scale for identifying the degree to which any individual adult of normal IQ may have ‘autistic traits’ or what has been called ‘the broader phenotype’ ... This would be useful for both scientific reasons (e.g., establishing who is ‘affected’ and who is not, or the degree of caseness of an individual, in scientific comparisons), and potentially for applied reasons (e.g., screening for possibly affected individuals to assist in making referrals for a full diagnostic assessment).” The Autism-Spectrum Quotient (AQ) was developed for these reasons. Items for the AQ were chosen from the domains in the “triad of impairments” (Wing and Gould, 1979), and from “areas of cognitive abnormality in autism.”

The AQ consists of 50 statements designed to screen for autism. The statements are focused on five different areas of functioning: attention to detail, attention switching, communication, imagination and social skills (Austin, 2005). The individual completing the AQ has to state whether they “definitely agree,” “slightly agree,” “slightly disagree,” or “definitely disagree” with each statement: a four-point Likert scale that eliminates an equivocal answer. Each response is scored, and an overall score of 32 or above is said to indicate that a person may be autistic, pointing in the direction of obtaining a formal diagnosis if an individual wishes to know for certain. As with any tool of this nature, there is a risk of false negatives and false positives; however, the AQ is used regularly for screening and research purposes in the United Kingdom and elsewhere.

The AQ^{xiv} statements that the author considers to capture behaviours and preferences often (but not always) associated with autism are presented in *Table 2* in **bold type**: these are either statements that relate to so-called “autistic traits,” where the expected response if autism is present is agreement, or where the expected response is disagreement because the trait is the “opposite” of the expected response in autism. Statements relating to matters that are too often seen in the neurotypical population to be in any way indicative of autism (e.g., whilst a small number of autistic individuals are fascinated by dates, many neurotypical people are difficult to prise away from social media) are in ordinary type. The author argues that *none* of the statements – including those in bold type – can be taken as supporting a case for a broader autism phenotype, because *all* the behaviours/traits included in this tool can be seen in the neurotypical population, as well as in conditions such as anxiety disorders, depression, obsessive-compulsive disorder and attachment disorders—all of which can co-exist with autism, and indeed all of which are diagnosed in non-autistic people. The next paragraph provides one example of what is meant by so-called “autistic traits” also being seen in the majority population.

Item number 28 of the AQ – “I usually concentrate on the whole picture, rather than the small details” – is presumably a reflection of the original version of central coherence theory (Frith and Happé, 1994), which proposed that autistic people are good with details but have difficulty getting the gist of a situation. So the designers of the AQ presumably sought to use a negative response to this statement as one potential indication that the person completing the tool is autistic. The later version of central coherence theory (Happé and Frith, 2006) argued that a detail-focused processing style is a cognitive preference in autism, not a weakness. There is no evidence that a detail-focused cognitive style is unknown in neurotypical populations; likewise, autistic individuals exist who are strong with detail *and* excellent strategic thinkers, eminently capable of seeing the “big picture.” Whilst a negative response to this statement can be included in a cluster of indications of autism, such a response is not a reflection of an “autistic trait.” If there is both autism and a broader phenotype, one would expect to see some measure of what supposedly divides these two categories, e.g. severity or impact. But how specific and reliable are any of the tests at measuring severity/impact? For example, no test includes the impact of environment on expression of traits, which is a crucial factor (Beardon, 2019).

Table 2: Examples of statements from the Autism Spectrum Quotient

28. I usually concentrate more on the whole picture, rather than the small details.
29. I am not very good at remembering phone numbers.
30. I 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 am often the last to understand the point of a joke.

Autistic traits as measured by the Broad Autism Phenotype Questionnaire

The Broad Autism Phenotype Questionnaire (BAPQ) was designed to measure the broader autism phenotype in adults. The authors regard the broader phenotype as “a set of personality and language characteristics that reflect the phenotypic expression of the genetic liability to autism, in non-autistic relatives of autistic individuals. These characteristics are milder but qualitatively similar to the defining features of autism” (Hurley *et al.*, 2007: p. 1679).

The BAPQ includes 36 statements designed to evaluate the factors of aloofness, rigidity and pragmatic language difficulties^{xv}. Each statement needs to be rated on a six-point scale between “very rarely” and “very often.” In their study of the application of the BAPQ to 86 parents of autistic children and 64 control parents, Hurley and his colleagues instructed participants about to complete the questionnaire to consider their behaviour during the majority of their adult life rather than at

specific times, and consider interactions in general rather than special relationships. The sets of AQ and BAPQ statements are very similar, although some BAPQ statements are autism-unfriendly (e.g., ‘I am “*in-tune*” with the other person during conversation’; ‘I have to *warm myself up* to the idea of visiting an unfamiliar place’; and ‘People get frustrated by my unwillingness to *bend*’ [author’s italics]). There is not space here to discuss the correct approach to language use in these tools in depth^{xvi}. However, autistic people may have difficulty with some aspects of language pragmatics. Some autistic children are delayed in their use of language, and that delay may have a continuing effect into adulthood in certain respects. This can be reflected in an extreme literalness in their use of language, and difficulty with ambiguous and metaphoric language. The general advice is to avoid using irony, sarcasm, figurative language, rhetorical questions, idioms, or exaggeration. Whilst many autistic people will not have difficulty with “in-tune,” “warm myself up,” or “unwillingness to bend,” some may wonder why they are being asked about a musical instrument, being cold, or not wishing to lean over something. It is surprising that autism researchers are unaware of readily available advice of this nature. The use of **bold type** and ordinary type here mirrors their usage in relation to the AQ. And, as with the AQ, all the behaviours/traits can be seen in the neurotypical population as well as in autism.

Item number 23 from the BAPQ, “I am good at making small talk,” is presumably included to screen out people who answer in the negative, because a tendency to be poor at small talk is associated with autism. Small talk can indeed be a difficulty in autism, especially during the formative years. As one of a cluster of indications of autism, it is a justifiable inclusion within this screening tool. But there are many autistic people who are excellent at small talk and neurotypical individuals who are not good at it, so it is hard to conceptualise it as an “autistic trait.”

Table 3: Examples of statements from the Broader Autism Phenotype Questionnaire

19. I look forward to trying new things
20. I speak too loudly or softly
21. I can tell when someone is not interested in what I am saying
22. I have a hard time dealing with changes in my routine
23. I am good at making small talk
24. I act very set in my ways
25. I feel like I am really connecting with other people
26. People get frustrated by my unwillingness to bend

“Autistic traits” as measured by the Social Responsiveness Scale questionnaire

The third measure of autistic traits to be analysed is the Social Responsiveness Scale questionnaire (SRS; Constantino, 2002). Constantino *et al.* (2003: p. 427) write that “studies of the broader autism phenotype, and of subtle changes in autism symptoms over time, have been compromised by a lack of established quantitative assessment tools. The Social Responsiveness Scale ... is a new instrument that can be completed by parents and/or teachers in 15–20 minutes.” The SRS prioritises evaluation of “a child’s ability to engage in emotionally appropriate reciprocal social interactions” (*ibid.*, p. 428). Other aspects of autism are measured in relation to impairment of normal reciprocal social behaviour.

The 65 statements in the SRS are rated on a four-point scale: “Not True,” “Sometimes True,” “Often True” and “Almost Always True.” Due to copyright restrictions none of the statements can be included here. However, following the same pattern of analysis used for the AQ and BAPQ above, it was concluded that the statements can again be divided between those considered indicative of autism (either as written or as their opposite), and those that relate to personality, which could apply (either as written or amended) to neurotypical people as well as to autistic individuals.

“Autistic traits” as measured by the Social Communication Questionnaire

The fourth measure of autistic traits analysed is the Social Communication Questionnaire (SCS; Rutter, Bailey and Lord, 2003). Rutter and his colleagues write that the SCQ was originally designed as a companion to the Autism Diagnostic Interview-Revised (ADI-R), which provides an individual’s

developmental history relevant to autism, and that “the SCQ items were deliberately chosen to match the ADI-R items that were found to have discriminative diagnostic validity” (*ibid.*: p. 1).

There are 40 items in this parent-report questionnaire, each requiring a “yes” or “no” response. As with the AQ, an individual’s score above or below a cut-off score provides an indication as to whether an individual is likely to be autistic. The SCQ is described as being suitable for all autistic individuals above four years of age, as long as their mental age exceeds two years. It is difficult to see how a questionnaire can be suitable for children as defined *and* adults, although presumably the authors would only recommend its use with adults with a very severe comorbid intellectual disability^{xvii}. This is a quite different instrument from the AQ, BAPQ and SRS designed to screen for autism in very young children. In view of the unsatisfactory response from the organisation responsible for the SCQ regarding the age issue, the SCQ has been excluded from the review.

Discussion.

The authors of the three reviewed screening instruments appear to have taken for granted the existence of a broader autism phenotype and taken steps to develop a means of measuring it. However, no explanation as to how the statements/questions in the screening instruments were actually developed have been located, only opinions as to the validity of the instruments following testing.

The fact that screening tool questions/statements apply in some form to both autistic and non-autistic individuals is not inconsistent with the existence of a broader phenotype. However, this situation could also indicate a wider prevalence of autism than is generally understood to be the case. To summarise the key points presented above:

- (a) Some behaviours/traits are *associated* with autism, although it is doubtful that any are *specific* to autism (behaviours/traits specific to autism are theoretically possible but the researcher has not yet identified any traits or behaviours captured by questions/statements on the three tests analysed that are absolutely unique to autism);
- (b) However, if it is accepted that some behaviours/traits are *specific* to autism, they then could not, by definition, apply to the neurotypical population—and hence could not be taken as supporting a spectrum of “autistic traits” in the general population;
- (c) If some behaviours/traits are *specific* to autism, it should not be difficult to diagnose autism, as a clinician would simply need to look for these traits;
- (d) If a behaviour/trait is seen in both the autistic and neurotypical populations, further evidence would be needed before one could reliably conclude that it implied a spectrum of “autistic traits” in the general population rather than behaviour/trait commonality across all human neurotypes.

These statements suggest that the screening tools analysed here do not currently support the existence of a broader autism phenotype based on a spectrum of “autistic traits” across the general population.

In practice, the term “broader autism phenotype” is applied to individuals with behavioural and cognitive traits similar to but supposedly milder than those observed in autism, and which are said to be continuously distributed throughout the general population. It has been said that broader autism phenotype characteristics were first observed by Leo Kanner. The researcher’s analysis^{xviii} of all the parents referred to by Kanner in his original paper who could be regarded as examples of a broader autism phenotype, is that the descriptions are just as likely to be of autism than of some apparently “mild” manifestation of so-called autistic traits that do not justify a diagnosis of autism. In fact, the researcher finds it just as easy to believe that a Kanner patient parent such as the father of Donald T.

was himself autistic. Of course, there is no proof of this, but then neither is there any proof that Kanner unknowingly recorded characteristics of a broader autism phenotype^{xix}. It is not necessary to dispute that traits associated with autism are seen in relatives of those diagnosed with autism, but the researcher's perspective on this is that human traits, albeit sometimes expressed in a qualitatively and/or quantitatively different way, are observed in the general population as well as in autism. The researcher therefore does not assume that there is a broader autism phenotype consisting of individuals with too few characteristics of autism to actually be autistic, i.e., to meet diagnostic criteria for autism, and instead hypothesises that the current diagnostic criteria are not sensitive enough to identify all individuals who are autistic. This is no less likely to be correct than are the proponents of a broader autism phenotype to be correct. Evaluation of behavioural traits alone cannot be sufficient to determine with absolute certainty whether or not someone is autistic. A full clinical review would be required to be reasonably sure^{xx}. Ideally, individuals should be assessed in a variety of different environments.

Is there a boundary between an individual being autistic and not being autistic depending on how many "autistic traits" they have or how severe such traits appear to be? Nobody knows of course, but the associated concepts of "autistic traits," and a "broader phenotype" of people with "autistic traits" that are not enough in terms of number/severity for the individual to actually be autistic, do not appear to be supported by clear evidence. The researcher's view is that an individual is either autistic or they are not, and that the dividing line between these states does *not* depend on the sum of so-called "autistic traits." It is therefore likely that many undiagnosed family members of diagnosed individuals are also autistic.

Finally, the researcher would like to challenge researchers to respond to the following questions:

- What evidence (if any) is there for the existence of traits specific to autism that can justify the use of the term "autistic traits"?
- Is it possible to be a "little" autistic or is there a definite boundary between autism and neurotypicality?
- If there is no definite boundary between autism and neurotypicality, what makes the difference between being in a broader phenotype and justifying a diagnosis?
- If there is a definite boundary between autism and neurotypicality, what causes a person to "jump the gap" from insufficient traits to a diagnosis?
- Taking the answers to the four questions above into account, does the concept of a broader autism phenotype seem more or less valid?

Conclusion

There are traits that when clustered together provide an indication of autism. But evidence suggests that these are a cluster of *human* traits, not traits unique to autism. No traits unique to autism emerged from this review of screening instruments, only traits that may be qualitatively and/or quantitatively different in autism and which may indicate autism when clustered together. There is no problem when people talk about the clustering of human traits indicative of autism, only if they imply that some traits are unique to autism. A screening tool can work well if it brings together a cluster of the traits associated with autism but that doesn't make any one of the traits in the tool an "autistic trait". Following on from this, there is no acceptable evidence for the existence of a "broader autism phenotype." (The view that "we're all on the spectrum somewhere" is wrong. The so-called broader phenotype is a chimera arising from one or both of two category mistakes: (1) reifying human traits, that when clustered together are indicative of someone being autistic, as "autistic traits"; and (2) regarding certain human traits as pathology in neurodivergent people but as difference in the rest of the general population.

If a trait is unique to autism then it stands to reason that anyone with it must be autistic. But if that was the case, then diagnosis of autism would be a simple matter (Beardon, 2017), and the medical profession knows it is anything but simple. Medical professionals diagnose by looking for a cluster of *human* behavioural traits which appears to lead many of them, and others, into thinking that having some limited number of these traits implies a broader autism phenotype.

The linguistic bewitchment that Ludwig Wittgenstein and other philosophers have cautioned against is at play here. Wittgenstein wrote: “The results of philosophy are the uncovering of one or another piece of plain nonsense and of bumps that the understanding has got by running its head up against the limits of language” (Wittgenstein, 1958: § 119). He was concerned about confusion caused by failing to spot nonsense in plain sight. In this case, “human traits indicative of autism” are mistakenly referred to as “autistic traits,” and then the simple fact that all human beings have human traits results in belief in a broader autism phenotype. Instead, many individuals who might currently be thought to be in a broader phenotype are in fact autistic, and the prevalence of autism is greater than most researchers think it is.

Acknowledgements.

I wish to acknowledge extremely helpful contributions made by two anonymous reviewers (appointed by a different journal), who are an autism specialist of 20 years’ standing, and a clinician of 30 years’ standing. I also want to thank the editor of *Autism Policy and Practice*, Mitzi Waltz, for her insightful suggestions which further improved this paper, and my friend and colleague Liz Hughes for a comment that reminded me of Wittgenstein’s counsel about bewitchment by language.

References.

- American Psychiatric Association (1994) *Diagnostic and Statistical Manual of Disorders, Fourth Edition (DSM-IV)*. Washington, DC: American Psychiatric Association.
- American Psychiatric Association (2013) *Diagnostic and Statistical Manual of Disorders, Fifth Edition (DSM-5)* Washington, DC: American Psychiatric Association.
- Asperger, H. (1991) “Autistic psychopathy in childhood” (trans. Frith, U.) In: Frith U. [Ed.] *Autism and Asperger Syndrome*. Cambridge: Cambridge University Press. doi: 10.1017/CBO9780511526770.002.
- Austin, E. J. (2005) “Personality correlates of the broader autism phenotype as assessed by the Autism Spectrum Quotient (AQ),” *Personality and Individual Differences*, 38(2): 451-460. doi: 10.1016/j.paid.2004.04.022.
- Baron-Cohen, S. (1997) *Mindblindness: An Essay on Autism and Theory of Mind*. Cambridge, MA: MIT Press.
- Baron-Cohen, S. (2002) “The extreme male brain theory of autism,” *Trends in Cognitive Sciences*, 6(6): 248-254. doi: 10.1016/S1364-6613(02)01904-6.
- Baron-Cohen, S. (2010) “Empathizing, systemizing, and the extreme male brain theory of autism,” *Progress in Brain Research*, 186: 167-175. doi: 10.1016/B978-0-444-53630-3.00011-7.
- Baron-Cohen, S., Hoekstra, R.A., Knickmeyer, R. and Wheelwright, S. (2006) “The autism-spectrum quotient (AQ)—adolescent version,” *Journal of Autism and Developmental Disorders*, 36(3): 343. doi: 10.1007/s10803-006-0073-6.
- Baron-Cohen, S., Leslie, A.M. and Frith, U. (1985) “Does the autistic child have a ‘theory of mind’?,” *Cognition*, 21(1): 37-46. doi: 10.1016/0010-0277(85)90022-8.

- Baron-Cohen, S., Wheelwright, S., Skinner, R., Martin, J. and Clubley, E. (2001) "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. doi: 10.1023/A:1005653411471.
- Beardon, L. (2017) *Autism and Asperger Syndrome in Adults*. London: Sheldon Press.
- Beardon, L. (2019) "Autism, masking, social anxiety and the classroom," in: Lawrence, C. [ed.] *Teacher Education and Autism: A Research-Based Practical Handbook*. London: Jessica Kingsley Publishers: 29.
- Begeer, S., El Bouk, S., Boussaid, W., Terwogt, M.M. and Koot, H.M. (2009) "Underdiagnosis and referral bias of autism in ethnic minorities," *Journal of Autism and Developmental Disorders*, 39(1): 142. doi: 10.1007/s10803-008-0611-5.
- Bishop, S.L. and Seltzer, M.M. (2012) "Self-reported autism symptoms in adults with autism spectrum disorders," *Journal of Autism and Developmental Disorders*, 42(11): 2354-2363. doi: 10.1007/s10803-012-1483-2.
- Bölte, S., Poustka, F. and Constantino, J.N. (2008) "Assessing autistic traits: cross-cultural validation of the social responsiveness scale (SRS)," *Autism Research*, 1(6): 354-363. doi: 10.1002/aur.49.
- Brooks, R. (2019) *The Trauma and Attachment-Aware Classroom*. London: Jessica Kingsley Publishers.
- Bora, E., Aydın, A., Saraç, T., Kadak, M.T. and Köse, S. (2017) "Heterogeneity of subclinical autistic traits among parents of children with autism spectrum disorder: Identifying the broader autism phenotype with a data-driven method," *Autism Research*, 10(2): 321-326. doi: 10.1002/aur.1661.
- Charman, T. and Gotham, K. (2013) "Measurement issues: Screening and diagnostic instruments for autism spectrum disorders—lessons from research and practise," *Child and Adolescent Mental Health*, 18(1): 52-63. doi: 10.1111/j.1475-3588.2012.00664.x.
- Chown, N. and Leatherland, J. (2018) "An open letter to Professor David Mandell Editor-in-Chief, *Autism* in response to the article 'A new era in Autism'," *Autonomy, the Critical Journal of Interdisciplinary Autism Studies*, 1(5). Retrieved from: <http://www.larry-arnold.net/Autonomy/index.php/autonomy/article/view/CO1>
- Constantino, J.N. (2002). *The Social Responsiveness Scale*. Los Angeles: Western Psychological Services.
- Constantino, J.N. (2011) "The quantitative nature of autistic social impairment," *Pediatric Research*, 69(5 Pt 2): 55R. Retrieved from: <https://www.nature.com/articles/pr9201194>
- Constantino, J.N., Davis, S.A., Todd, R.D., Schindler, M.K., Gross, M.M., Brophy, S.L and Reich, W. (2003) "Validation of a brief quantitative measure of autistic traits: Comparison of the Social Responsiveness Scale with the Autism Diagnostic Interview-Revised," *Journal of Autism and Developmental Disorders*, 33(4): 427-433. doi: 10.1023/A:1025014929212.
- Constantino, J.N., Gruber, C.P., Davis, S., Hayes, S., Passanante, N. and Przybeck, T. (2004) "The factor structure of autistic traits," *Journal of Child Psychology and Psychiatry*, 45(4): 719-726. doi: 10.1111/j.1469-7610.2004.00266.x.

Constantino, J.N. and Todd, R.D. (2005) "Intergenerational transmission of subthreshold autistic traits in the general population," *Biological Psychiatry*, 57(6): 655-660. doi: 10.1016/j.biopsych.2004.12.014.

Corbett, B.A., Constantine, L.J., Hendren, R., Rocke, D. and Ozonoff, S. (2009) "Examining executive functioning in children with autism spectrum disorder, attention deficit hyperactivity disorder and typical development," *Psychiatry Research*, 166(2): 210-222. doi: 10.1016/j.psychres.2008.02.005.

Dawson, G., Webb, S., Schellenberg, G.D., Dager, S., Friedman, S., Aylward, E. and Richards, T. (2002) "Defining the broader phenotype of autism: Genetic, brain, and behavioral perspectives," *Development and Psychopathology*, 14(3): 581-611. doi: 10.1017/S0954579402003103.

Frith, U. and Happé, F. (1994) "Autism: beyond 'theory of mind'," *Cognition*, 50(1): 115-132. doi: 10.1016/0010-0277(94)90024-8.

Geurts, H.M., Verte, S., Oosterlaan, J., Roeyers, H. and Sergeant, J.A. (2004) "How specific are executive functioning deficits in attention deficit hyperactivity disorder and autism?," *Journal of Child Psychology and Psychiatry*, 45(4): 836-854. doi: 10.1111/j.1469-7610.2004.00276.x

Gould, J. and Ashton-Smith, J. (2011) "Missed diagnosis or misdiagnosis? Girls and women on the autism spectrum," *Good Autism Practice*, 12(1): 34-41. Retrieved from: <https://www.ingentaconnect.com/content/bild/gap/2011/00000012/00000001/art00005>

Happé, F. and Frith, U. (2006) "The weak coherence account: Detail-focused cognitive style in autism spectrum disorders," *Journal of Autism and Developmental Disorders*, 36(1): 5-25. doi: 10.1007/s10803-005-0039-0.

Hasegawa, C., Kikuchi, M., Yoshimura, Y., Hiraishi, H., Munesue, T., Takesaki, N. and Asada, M. (2015) "Changes in autistic trait indicators in parents and their children with ASD: A preliminary longitudinal study," *Psychiatry Research*, 228(3): 956-957. doi: 10.1016/j.psychres.2015.05.048

Hoekstra, R.A., Bartels, M., Verweij, C.J. and Boomsma, D.I. (2007) "Heritability of autistic traits in the general population," *Archives of Pediatrics & Adolescent Medicine*, 161(4): 372-377. doi: 10.1001/archpedi.161.4.372.

Hughes, E. (2015) "Does the different presentation of Asperger syndrome in girls affect their problem areas and chances of diagnosis and support?," *Autonomy, the Critical Journal of Interdisciplinary Autism Studies*, 1(4). Retrieved from: <http://www.larry-arnold.net/Autonomy/index.php/autonomy/article/view/AR17>

Hurley, R.S.E., Losh, M., Parlier, M., Reznick, J.S. and Piven, J. (2007) "The broad autism phenotype questionnaire," *Journal of Autism and Developmental Disorders*, 37(9): 1679-1690. doi: 10.1007/s10803-006-0299-3.

Ingersoll, B., Hopwood, C.J., Wainer, A. and Donnellan, M.B. (2011) "A comparison of three self-report measures of the broader autism phenotype in a non-clinical sample," *Journal of Autism and Developmental Disorders*, 41(12): 1646-1657. doi: 10.1007/s10803-011-1192-2.

Jaswal, V.K. and Akhtar, N. (2019) "Being versus appearing socially uninterested: Challenging assumptions about social motivation in autism," *Behavioral and Brain Sciences*, 42: e82. doi: 10.1017/S0140525X18001826

Jordan, R., Jones, G. and Murray, D. (1998) *Educational Interventions for Children with Autism: A Literature Review of Recent and Current Research*. London: Department for Education and

Employment. Retrieved from:

https://www.researchgate.net/profile/Dinah_Murray3/publication/267398232_Educational_Interventions_for_Children_With_Autism_A_Literature_Review_of_Recent_And_Current_Research/links/564cbbf008aeafc2aaaf737e/Educational-Interventions-for-Children-With-Autism-A-Literature-Review-of-Recent-And-Current-Research.pdf

Kanner, L. (1943) "Autistic disturbances of affective contact," *Nervous Child*, 2(3): 217-250.

Retrieved from: http://mail.neurodiversity.com/library_kanner_1943.pdf

Kapp, S.K., Gillespie-Lynch, K., Sherman, L.E. and Hutman, T. (2013) "Deficit, difference, or both? Autism and neurodiversity," *Developmental Psychology*, 49(1): 59. doi: 10.1037/a0028353.

Kenny, L., Hattersley, C., Molins, B., Buckley, C., Povey, C. and Pellicano, E. (2016) "Which terms should be used to describe autism? Perspectives from the UK autism community," *Autism*, 20(4): 442-462. doi: 10.1177/1362361315588200.

Kerns, C.M. and Kendall, P.C. (2012) "The presentation and classification of anxiety in autism spectrum disorder," *Clinical Psychology: Science and Practice*, 19(4): 323-347.

doi: /10.1111/cpsp.12009.

Kerns, C.M., Kendall, P.C., Berry, L., Souders, M.C., Franklin, M.E., Schultz, R.T. and Herrington, J. (2014) "Traditional and atypical presentations of anxiety in youth with autism spectrum disorder,"

Journal of Autism and Developmental Disorders, 44(11): 2851-2861.

doi: 10.1007/s10803-014-2141-7.

Ketelaars, C., Horwitz, E., Sytema, S., Bos, J., Wiersma, D., Minderaa, R. and Hartman, C.A. (2008)

"Brief report: Adults with mild autism spectrum disorders (ASD): Scores on the autism spectrum quotient (AQ) and comorbid psychopathology," *Journal of Autism and Developmental Disorders*, 38(1): 176-180. doi: 10.1007/s10803-007-0358-4.

Landry, O. and Chouinard, P.A. (2016) "Why we should study the broader autism phenotype in typically developing populations," *Journal of Cognition and Development*, 17(4): 584-595.

doi: 10.1080/15248372.2016.1200046.

Lugnegård, T., Hallerbäck, M.U. and Gillberg, C. (2012) "Personality disorders and autism spectrum disorders: What are the connections?," *Comprehensive Psychiatry*, 53(4): 333-340.

doi: 10.1016/j.comppsy.2011.05.014.

Mandy, W.P., Charman, T. and Skuse, D.H. (2012) "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. doi: 10.1016/j.jaac.2011.10.013.

Miles, J.H. (2011) "Autism spectrum disorders—a genetics review," *Genetics in Medicine*, 13(4): 278-294. Retrieved from: <https://www.nature.com/articles/gim9201151>

Miller, J.D., Lyman, D.R., Widiger, T.A. and Leukefeld, C. (2001) "Personality disorders as extreme variants of common personality dimensions: Can the five factor model adequately represent psychopathy?," *Journal of Personality*, 69(2): 253-276. doi: 10.1111/1467-6494.00144.

Milton, D. (2011) "An insider's critique of the dominant psychological models of autism." In: Autscape Conference 2011, 22nd-25th Aug 2011, Ackworth. (Unpublished).

Milton, D.E.M. (2016) *Educational Discourse and the Autistic Student: A Study Using Q-sort Methodology* [Doctoral dissertation]. Birmingham: University of Birmingham. Retrieved from: <https://etheses.bham.ac.uk/id/eprint/6505/>

- Mottron, L., Dawson, M., Soulieres, I., Hubert, B. and Burack, J. (2006) "Enhanced perceptual functioning in autism: An update, and eight principles of autistic perception," *Journal of Autism and Developmental Disorders*, 36(1): 27-43. doi: 10.1007/s10803-005-0040-7.
- Murray, D., Lesser, M. and Lawson, W. (2005) "Attention, monotropism and the diagnostic criteria for autism," *Autism*, 9(2): 139-156. doi: 10.1177/1362361305051398.
- Ozonoff, S., Young, G. S., Belding, A., Hill, M., Hill, A., Hutman, T. and Steinfeld, M. (2014) "The broader autism phenotype in infancy: When does it emerge?," *Journal of the American Academy of Child & Adolescent Psychiatry*, 53(4): 398-407. doi: 10.1016/j.jaac.2013.12.020.
- Parente, D.J., Garriga, C., Baskin, B., Douglas, G., Cho, M.T., Araujo, G. C. and Shinawi, M. (2017) "Neurologin 2 nonsense variant associated with anxiety, autism, intellectual disability, hyperphagia, and obesity," *American Journal of Medical Genetics Part A*, 173(1): 213-216. doi: 10.1002/ajmg.a.37977
- Qian, N. and Lipkin, R.M. (2011) "A learning-style theory for understanding autistic behaviors," *Frontiers in Human Neuroscience*, 5(77). doi: 10.3389/fnhum.2011.00077.
- Ritvo, R.A., Ritvo, E.R., Guthrie, D. and Ritvo, M.J. (2008) "Clinical evidence that Asperger's disorder is a mild form of autism," *Comprehensive Psychiatry*, 49(1): 1-5. doi: 10.1016/j.comppsy.2007.06.010.
- Ronald, A. and Hoekstra, R.A. (2011) "Autism spectrum disorders and autistic traits: A decade of new twin studies," *American Journal of Medical Genetics Part B: Neuropsychiatric Genetics*, 156(3): 255-274. doi: 10.1002/ajmg.b.31159
- Rosenbaum, P. and Stewart, D. (2004) "The World Health Organization International Classification of Functioning, Disability, and Health: A model to guide clinical thinking, practice and research in the field of cerebral palsy," *Seminars in Pediatric Neurology*, 11(1): 5-10. doi: 10.1016/j.spn.2004.01.002.
- Rutter, M., Bailey, A. and Lord, C. (2003) *The Social Communication Questionnaire: Manual*. Torrance, CA: Western Psychological Services.
- Sappok, T., Heinrich, M. and Underwood, L. (2015) "Screening tools for autism spectrum disorders," *Advances in Autism*, 1(1): 12-29. doi: 10.1108/AIA-03-2015-0001.
- Schanding, G.T., Nowell, K.P. and Goin-Kochel, R.P. (2012) "Utility of the social communication questionnaire-current and social responsiveness scale as teacher-report screening tools for autism spectrum disorders," *Journal of Autism and Developmental Disorders*, 42(8): 1705-1716. doi: 10.1007/s10803-011-1412-9
- Silberman, S. (2015) *Neurotribes: The Legacy of Autism and the Future of Neurodiversity*. London: Penguin, .
- Strang, J.F., Kenworthy, L., Daniolos, P., Case, L., Wills, M.C., Martin, A. and Wallace, G.L. (2012) "Depression and anxiety symptoms in children and adolescents with autism spectrum disorders without intellectual disability," *Research in Autism Spectrum Disorders*, 6(1): 406-412. doi: 10.1016/j.rasd.2011.06.015
- Sucksmith, E., Roth, I. and Hoekstra, R.A. (2011) "Autistic traits below the clinical threshold: re-examining the broader autism phenotype in the 21st century," *Neuropsychology Review*, 21(4): 360-389. doi: 10.1007/s11065-011-9183-9

Thomas, C. (2004) “How is disability understood? An examination of sociological approaches,” *Disability & Society*, 19(6): 569–583. doi: 10.1080/0968759042000252506

Wakabayashi, A., Baron-Cohen, S. and Wheelwright, S. (2006) “Are autistic traits an independent personality dimension? A study of the Autism-Spectrum Quotient (AQ) and the NEO-PI-R,” *Personality and Individual Differences*, 41(5): 873-883. doi: 10.1016/j.paid.2006.04.003.

Wheelwright, S., Auyeung, B., Allison, C. and Baron-Cohen, S. (2010) “Defining the broader, medium and narrow autism phenotype among parents using the Autism Spectrum Quotient (AQ),” *Molecular Autism*, 1(1): 10. Retrieved from: <https://molecularautism.biomedcentral.com/articles/10.1186/2040-2392-1-10>

Wing, L. and Gould, J. (1979) “Severe impairments of social interaction and associated abnormalities in children: Epidemiology and classification,” *Journal of Autism and Developmental Disorders*, 9(1): 11-29. doi: 10.1007/BF01531288.

Wittgenstein, L. (1958). *Philosophical Investigations*, Oxford: Blackwell.

World Health Organization (2018) *International Statistical Classification of Diseases and Related Health Problems* (11th Revision). Retrieved from: <https://icd.who.int/browse11/l-m/en>

ⁱ It is a commonly held belief amongst clinicians that there is a genetic or developmental link between autism and anxiety, as some medical research appears to be suggesting (e.g., Parente *et al.*, 2017). There is no proof yet as to the cause or causes of anxiety in autism. However, I suspect that neurotypical people would be the ones to suffer from high levels of anxiety if they were the 1-2% minority in an autistic world.

ⁱⁱ Autism diagnoses in the diagnostic manuals have included Asperger’s disorder, autism spectrum disorder, autistic disorder, pervasive developmental disorder not otherwise specified (PDD-NOS), and Rett syndrome. Pathological demand avoidance (PDA) is the subject of debate as to whether or not it is part of the autism spectrum, and has not been included in either the *DSM-5* or the *ICD-11*.

ⁱⁱⁱ We use identity-first language as it is generally preferred by autistic individuals (Kenny *et al.*, 2016).

^{iv} The authors stress that a manual of neurodivergent needs should only be deployed if neurodivergent categories such as autism remained within the ambit of disability discrimination and support legislation.

^v Due to space restrictions, we have included extracts of the analysis in this article. The full analysis is available on request from Nick Chown (npchown@gmail.com).

^{vi} Dawson *et al.* (2002) defined the term “broader autism phenotype traits” which was presumably intended to amount to the same thing as “autistic traits.”

^{vii} See: https://www.wpspublish.com/store/Images/Downloads/Product/SCQ_Manual_Chapter_1.pdf

^{viii} The five factors are extroversion, agreeableness, conscientiousness, neuroticism and openness to experience.

^{ix} The author’s position is that autism is *not* a personality domain, rather that all human beings feature somewhere on an extroversion/introversion scale (for example), but *not* on an autism scale. However, cognitive and sensory differences in autism will affect the personality profile of autistic people.

^x As an unfunded independent researcher, the involvement of this group enabled the author to obtain autistic feedback efficiently. The group has to be kept secret as many members do not disclose being autistic for fear of the stigma attached to autism damaging their careers or future prospects.

^{xi} Definition of “autistic traits”: distinguishing features unique to autistic people i.e., excluding features qualitatively and/or quantitatively different in autism than in neurotypicality.

^{xii} For example, executive functioning (EF) deficits are seen in the early years, where they are developmentally appropriate, often return in old age, and are also associated with other neurological conditions. But this is not to say that EF deficits are normally distributed amongst the wider population.

^{xiii} Our adherence to the social model is apparent here, as our view is that there is no autism-friendly society in this neurotypical world.

^{xiv} The Cambridge University Autism Research Centre is the originator of the Autism Spectrum Quotient.

^{xv} We have received permission to reproduce questions from the Broad Autism Phenotype Questionnaire from Dr Joseph Piven of the University of North Carolina School of Medicine (personal communication, Joseph Piven, 22 February 2018).

^{xvi} Autism-friendly versions of the three examples quoted here could read follows: “I can relate to the other person during conversation,” “I take time to get used to the idea of visiting an unfamiliar place,” and “People get frustrated by my unwillingness to compromise.” Use straightforward, non-figurative language.

^{xvii} The researcher has corresponded with the publishers of the SCQ about its use with adults. The initial question was: “we presume the authors would only recommend its use with adults with a severe comorbid intellectual disability.” Their response was: “The Lifetime Form ... frames questions based on whether the behaviors have ever been present and/or if behaviors were present during the time period in which the individual was 4 to 5 years old.” The next question was: “The SCQ is described as being suitable for all autistic individuals above four years of age as long as their mental age exceeds two years. My interpretation of this, because there is no mention of an upper age limit, is that its designers consider it is appropriate for adults as well as for children. If this is the case then presumably it would be inappropriate for ‘high-functioning’ adults i.e. it would only be suitable for children and adults with a severe intellectual disability.” No response was received to this question.

^{xviii} Undertaken in connection with a doctoral thesis a few years ago.

^{xix} Asperger also recorded details of parents of the children he reported on in his original 1944 paper that may suggest that the parents were also autistic. For instance, he wrote that the father of Harro L. “was a strange man, and very similar to his son ... One could make out from what he said that he had nothing to do with anyone in the village where he lived and where he must have been considered highly eccentric. He said himself that he was nervous and highly strung but that ‘he controlled himself to such an extent that he appeared to be indifferent.’ In both the father’s and mother’s families there were said to be many highly strung people.” (Asperger, H. in: Frith, U. [Ed.] 1991: pp. 51-52).

^{xx} The kind of in-depth approach to getting to know their patients that Asperger’s team practised may be an improvement on a relatively short clinical assessment of behaviour (Silberman, 2015).