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# Risks of Stigmatisation Resulting from Assistive Technologies for Persons with Autism Spectrum Disorder <sup>†</sup>

Fiachra O’Brolcháin <sup>1,\*</sup>  and Bert Gordijn <sup>2</sup>

<sup>1</sup> Marie Curie ASSISTID Fellow, Institute of Ethics, School of Theology, Philosophy & Music, Dublin City University, Dublin 9, Ireland

<sup>2</sup> Institute of Ethics, School of Theology, Philosophy & Music, Dublin City University, Dublin 9, Ireland; bert.gordijn@dcu.ie

\* Correspondence: fiachra.obrolchain@dcu.ie; Tel.: +353-1-700-6571

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**Abstract:** Assistive technologies (ATs) are currently being developed for cohorts of vulnerable people, including persons with autism spectrum disorder (ASD). This paper focuses on the risks that the development of ATs for persons with ASD might lead to increased risks of stigmatisation. Firstly, we assess the ways in which the use of ATs might result in the stigmatisation of users, alongside the corollary question of risks associated with a refusal to use ATs in the event of their being socially expected. Secondly, we focus on the question of whether the “project” of developing ATs for persons with ASD is itself stigmatising, and whether the “project” risks stigmatising persons with ASD by offering “cures”.

**Keywords:** Ethics; Assistive Technology; Autism; Stigmatisation; expressivist objection; social model; medical model

## 1. Introduction

Assistive Technologies (ATs) are now being developed for a variety of vulnerable population groups, e.g., people who have intellectual disabilities, people with autism spectrum disorder (ASD), and the elderly, including persons with dementia. The World Health Organisation (WHO) states that ATs are intended to “maintain or improve an individual’s functioning and independence” as well as to “facilitate participation and to enhance overall well-being” [1]. They are also intended to “help prevent impairments” [1]. Amongst the myriad groups ATs are intended for are persons with ASD. Whilst the hope is that ATs will significantly change the lives of persons with ASD, there is a risk that ATs for persons with ASD might result in stigmatisation.

In this paper we ask whether the development of ATs for persons with ASD could lead to stigmatisation. This inquiry can be broken down into two subsidiary questions, each of which addresses a different aspect of the issue. Firstly, we will focus on the specific ways that the use of ATs might result in users being stigmatised and ways to avoid this problem. Secondly, we will explore whether the “project” of developing ATs for persons with ASD as such is in itself stigmatising.

This must be addressed, as ATs that increase stigmatisation would be contrary to the objectives of the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD), which is intended “to promote, protect and ensure the full and equal enjoyment of all human rights and fundamental freedoms by all persons with disabilities, and to promote respect for their inherent dignity” [2].

Signatories are obliged “to modify or abolish existing laws, regulations, customs and practices that constitute discrimination against persons with disabilities” [2], with discrimination being defined as “any distinction, exclusion or restriction on the basis of disability which has the purpose or effect of impairing or nullifying the recognition, enjoyment or exercise, on an equal basis with others, of all human rights and fundamental freedoms in the political, economic, social, cultural, civil or any other field” [2]. Alongside the commitments to non-discrimination signatories also have a general obligation to the development and use of ATs [2].

Given there are obligations to both promote ATs and to avoid forms of discrimination (including stigmatisation), the question of whether ATs will increase stigmatisation for persons with ASD is timely. We work with the assumption that stigmatisation is a social phenomenon, which can be influenced by the way people think about disability.

## 2. Methods

This paper is an exercise in applied ethical analysis. We intend to discuss how a technological development, or suite of technological developments, (namely ATs) might risk causing a specific time of harm—that of stigmatisation—to the intended beneficiaries. Given that this paper is an exercise in applied ethical analysis, we do not provide qualitative research, such as interviews with users of ATs. This is not to say that this is unimportant, but that it is not an element of applied ethical analysis. Furthermore, we must use working definitions of concepts such as stigmatisation and conditions such as ASD. We have referred to well-established sources in our attempts to provide useful conceptions for our applied ethical analysis. Working with these concepts, we outline the ways in which ATs might cause persons with ASD to be stigmatised. We have broken this question into two sections—as mentioned above: the ways in which individuals using ATs might be stigmatised directly, and the possible stigmatising effects of the project of developing ATs for persons with ASD as such. In order to address this second question, we make reference to the social and medical models of disability, though we remain neutral in relation to each. In line with the UNCRPD, we hold that stigmatisation is a harm that ought to be avoided and that individual choice should be respected. We believe that by drawing attention to possibly unforeseen risks of stigmatisation and prompting a discussion on this topic, applied ethical analysis can be of benefit to users, developers, and broader society.

This paper proceeds as follows. Following methods, we provide a brief introduction to assistive technologies; overview of the concept of stigmatisation; in Section 4, we offer a working definition and introduction of assistive technologies; in Section 5 we offer a brief overview of disability; in Section 6 we present a working definition of ASD; in Section 7, we discuss the ways in which ATs might result in increased for stigmatisation for persons with ASD; whilst in Section 8, we outline the ways in which “the project” of developing ATs for persons with ASD might itself be stigmatising; in Section 9, we explore this broader issue of the potential stigmatising effects of the project in light of the medical and social models of disability; and finally in Section 10, we offer a discussion.

## 3. Assistive Technologies

Assistive or adaptive technology includes products or equipment that are used to maintain, increase or improve the functional capabilities of individuals with disabilities. Whilst some technologies will focus on enhancing or augmenting a person’s capabilities, others will aim at removing environmental barriers (e.g., changing the means by which people open doors). Research in the US “found that the steadily increasing use of technology was associated with downward trends in the reported rates of disability among people age 65 and over” [3]. There exist both high-tech and low-tech assistive technologies. For instance, Alternative and Augmentative Communication (AAC) involves alternate methods of communicating needs, feelings, ideas, and perceptions through the use of electronic and non-electronic devices that provide a means for expressive and receptive communication for persons with limited or no speech. Specific aids for education and learning include Computer-Aided instruction, prompting devices, personal digital assistant, robots, video modelling,

and visual schedules. Multi-sensory aids also exist, which are used as part of sensory integrative therapy. Aids that are categorised as tactile include deep pressure devices e.g., weighted items such as blankets and vests, tactile brushes and the hug machine. Newer technologies such as electromagnetic devices are also being introduced into therapeutic systems. Other devices might lead to neurofeedback training, transcranial direct current stimulation, and transcranial magnetic stimulation.

Discussions of the use of digital technologies to help persons with learning difficulties has adopted the social model of disability, and hence focused on the context in which learning takes place in educational settings [4]. This move towards the social model when considering technologies that are used in e-learning does encourage engagement with broader societal contexts surrounding the adoption and use of novel technologies. In this paper, we remain neutral regarding the social model and the medical models, both of which will be discussed below.

#### 4. Stigmatisation

A stigma can be considered a mark representing a commonly negatively regarded specific attribute or set of attributes. Stigmatisation can be understood as the act of marking a person or group out by focusing on these attributes. Stigmatisation is often considered as a social phenomenon [5–7]. Stigmatised persons are then likely to suffer discrimination with all of the associated social penalties or psychological harms. Stigma need not arise from any deliberate policy or social decision—it may result due to unconscious social, political or historical processes. However, stigmatisation will often lead to discrimination. Much of modern theorising around stigma stems from Erving Goffman’s work in the 1960s. Goffman initially characterised stigma as “an attribute that is deeply discrediting” and argued that stigmatisation is a social process by which people pass from a normal to a discredited situation. According to Link and Phelan, “stigma exists when elements of labelling, stereotyping, separating, status loss, and discrimination co-occur in a power situation that allows these processes to unfold” [8]. Stigmatisation is a common experience for persons with disabilities: “Stigma, discrimination, and imputations of difference and inferiority are all parts of the social experience of disability” [9]. Stigmatisation is a vague or thick concept. It will not always be clear when a person is being stigmatised, particularly on occasions when the stigma arises as a result of unconscious social, political or historical processes (e.g., institutionalised sexism). Nor will all people realise that they are being stigmatised (a child being bullied might well think their treatment is mere jocular play, or be unaware that they are the subject of jokes amongst their peers). Some individuals or groups might adapt themselves to a stigma, with the result that they no longer recognise the stigma as a stigma.

It can be useful to distinguish between psychological and normative stigmatisation, e.g., psychological stigmatisation is when someone feels stigmatised whereas normative stigmatisation is when someone has good reasons to feel that they are stigmatised. A decent society will not put in place institutions that stigmatise people—that will give them good reasons to feel stigmatised. It follows then that stigmatisation will often hinge on perceptions of the stigma. When a mark is commonly perceived as a stigma, it is likely to have negative effects or cause others to think negatively of that trait or attribute. The flipside then is that something that was once a stigma may cease to be a stigma. The consequence of all this is that the way in which a society collectively perceives and thinks about something—about what is and is not a stigma—will have practical implications. Moreover, people with ASD are frequently subject to stigmatisation [10].

#### 5. Disability

As the World Health Organisation points out, “disability is part of the human condition” [11]. Any person, at some point in their lives is likely to be disabled in some sense and dependent on others, as discussed extensively by philosophers such as Martha Nussbaum [12] and Alasdair MacIntyre [13]. Nonetheless, philosophical focus on disability is a relatively recent phenomenon, due to an absence of scientific categories that facilitated thinking about variations in human being [9]. Political philosophers have focused on disability as a primary source of unearned disadvantages as well as “a source of

both discrimination and oppression” [9]. Disability is often framed by one of two models—the social and the medical model. The medical model of disability views disability “disability as a negative variation from the physical norm that necessarily disadvantages the physically distinct subject’s life and life quality” [14], whilst the social model focuses on socially constructed barriers and oppressive social norms that turn impairments into disability [15] and rejects “any idea of normality, which is regarded as an ideological construction” [16]. Disability studies, as a distinct field, has emerged in recent decades [17], which, although varied and interdisciplinary is united by a “rejection of any model of disability that locates (the problem of) disability within the person” [17]. Disability is viewed (in the main) “as a social issue: (the problem of) disability is firmly positioned in terms of barriers in the social world, not ‘problems’ within the individual” [14]. The strong social model has been challenged as well, with scholars such as Tom Shakespeare arguing that “people are disabled by society and by their bodies and minds” [18]. In this paper, we aim to remain neutral regarding these two models—both will be discussed below in relation to the questions regarding the stigmatization of persons with ASD as a result of the development and use of ATs.

## 6. Autism Spectrum Disorder

The American Psychiatric Association’s DSM-5 states that people with ASD tend to exhibit the following traits: inappropriate responses in conversations, misreading of nonverbal cues, difficulty in building age-appropriate friendships, dependency on routines, high sensitivity to environmental changes, and intense focus on inappropriate items [19]. It is also worth noting that “the symptoms of persons with ASD will fall on a continuum, with some individuals showing mild symptoms and others having much more severe symptoms” [19]. Persons with ASD can be characterised, according to DSM-5, as possessing deficits in communication and social interaction, repetitive and restrictive patterns of behaviour, interests and activities; with symptoms present early in development, likely to cause significant impairment in social, occupational or other significant areas of functioning, with the caveat that intellectual disability or global developmental delay does not better explain these characteristics [19]. The conceptualisation of ASD has also changed over the last twenty years—it has “shifted from being a rare disease to a broad syndrome and from a psychiatric disorder to a genetic disease involving an atypical development of the nervous system” [10]. Most research into ASD is based in either the cognitive or the biogenetic paradigm—the former characterizes ASD as an information processing deficit related to brain structure, whilst the latter paradigm reduces “the mind to biology” [20]. Both perspectives are considered to be constructing “a distinct, ontologically different, autistic subject position” [20].

Partly as a result of enlarged definitions of ASD and partly as a result of better observation, the prevalence of ASD appears to have increased. “Over the last 20 years there has been a huge expansion in the number of people receiving the diagnosis autistic spectrum disorder/Asperger’s syndrome in Europe and the USA—up to 1000%, according to some estimates” [21]. According to the Center for Disease Control and Prevention, autism affected 1 in 166 children in the United States in 2004—in 2009, the number was 1 in 110 [22]. The increased diagnosis of ASD has led to the creation of groups promoting greater research into ASD. Advocacy groups such as Autism Speaks are

“dedicated to promoting solutions, across the spectrum and throughout the lifespan, for the needs of individuals with autism and their families through advocacy and support; increasing understanding and acceptance of autism spectrum disorder; and advancing research into causes and better interventions for autism spectrum disorder and related conditions” [23].

Other groups have argued that ASD is simply one way of being as opposed to another. This claim has emerged from what is called the neurodiversity movement. Focusing on the diversity of our species’ minds and brains, the movement holds that there is no one standard neurological state for a human being and defends the claim that conditions such as autism spectrum disorder are simply natural

variations in the human genome and thus do not require a cure. Alongside the descriptive claim about the fact of neurodiversity, there is a corollary normative claim that demands rights and recognition for people with atypical neurological conditions [24]. Indeed, the neurodiversity movement, which began in the 1990s, has been predominantly led by people with ASD who contend that “their condition is not a condition to be treated and, if possible, cured, but rather a human specificity (like sex or race) that must be equally respected” [25]. Silberman notes that the neurodiversity movement does not want to view ASD as a mistake of nature that requires a solution or elimination, but instead calls for society to “regard it as a valuable part of humanity’s genetic legacy while ameliorating the aspects of autism that can be profoundly disabling without adequate forms of support” [26]. The neurodiversity movement opposed ideas (backed by groups such as Defeat Autism Now! and Autism Speaks) that autism needed to be cured. Neurodiversity advocates, such as Jim Sinclair hold “that having autism—or “being autistic”, the phrase preferred by its adherents—was but one more way of being human” [22]. In tandem with these ideas, has been the emergence of ideas of “autistic culture” which some are likening to the emergence of Deaf communities [27]. Recent discussions around the anthropology of autism have focused on “the role social context plays in the identification and treatment of autism” [28]. We will address the role of technology in relation to this below.

## 7. Stigmatisation as a Result of ATs

In this section, we discuss two ways that stigmatisation could occur as a due of the use of ATs, though we begin by illustrating that rapid developments in technologies might reduce the visibility of ATs. It is currently commonplace for people to use multiple gadgets and devices, and the use of assistive technologies will become much more routine throughout aging societies. Innovative new technologies will continue to transform rich societies and their members. Healthcare plans will be increasingly custom-made, based on data gathered by devices. Gadgets will monitor people’s diets, exercise, sleep and stress and provide feedback and assistance for their users. As the internet-of-things (in which devices talk to each other and gather data continuously) matures, the physical and social structure of societies may become flexible enough to respond to each individual, as each individual will be connected through their use of a huge number of devices and technologies that will gather information that will shape societal responses to them. From this perspective then, a person with ASD using an assistive device will no more stand out than any other person using such devices. The abundance of ATs (and other gadgets) available in a technologically-saturated society is likely to reduce the potentially stigmatising effects of ATs for persons with ASD, if only due to the fact that using ATs will be so commonplace. However, there might still exist a risk of stigmatisation when the ATs of persons with ASD differentiate their users.

*Design of ATs.* Silvers notes there “is a widespread social habit of rejecting individuals with disabilities based on their intimate ties with the products of technology. Assistive technology professionals ought to be aware of this familiar reaction, and most are” [29]. As it stands persons with ASD do not stand out visually, but the wholesale uptake of ATs would alter this if the ATs used were visually distinctive, creating a scenario in which the societal rejection Silvers outlines become more likely. This will of course depend on the design of the ATs. This does not appear to be a major concern however, as this issue is easily avoidable. ATs ought to be designed so that they should be usable for all people “without the need for adaptation or specialised design” [2]. This would presumably include making products innocuous, thus reducing the risk of stigmatisation. Indeed, developers of ATs will often look towards adapting existing technologies (such as tablets or iPhones) for assistive purposes. Whilst the avoidance of stigmatisation may not be the driving force behind Universal Design (which aims to remove barriers), it is, at least, useful in avoiding ATs being stigmatising.

*Refusal to Use ATs.* There is still a further danger of stigmatisation: not as a result of using ATs but due to a refusal or reluctance to use them. According to Silvers, “returning differently functioning individuals to species typicality therefore may seem to contribute to the general welfare, which aligns

with the value engineering ethics places on preserving the public good" [29]. Although the scenario is speculative, it is possible that in a future in which AT use is commonplace, those who do not wish to use ATs might be perceived as refusing to adapt and therefore as resisting preserving some notion of public good. If behaviours associated with ASD are known to have a somewhat available technological "solution", those exercising the choice to resist or abandon such technologies might find themselves stigmatised. This will be especially hard for anyone who cannot afford to purchase such ATs or who refuses, for whatever autonomous reason (e.g., principles relating to privacy or autonomy, religious beliefs, lack of competency), to utilise ATs. None of this is to justify such stigmatisation or imply that there is an obligation to use ATs, but that there exists a risk that refusal to use them might result in stigmatisation.

## 8. Stigmatisation as a Result of the Development of ATs

Let us move on to the claim that the project of developing ATs for persons with ASD (hereafter, "the project") might be stigmatising. In the past technological innovations designed to help certain societal groups were received negatively by members of those groups and by others. There is a risk ATs might also be received in this way. The introduction of foetal screening and selection services gave rise to the so-called "expressivist objection" [30] as these services allowed prospective parents to select not to have children with disabilities.

According to the "expressivist objection" [30] foetal screening and selection services prompt societal disparagement concerning the lives, value, and experiences of persons with disabilities [31], (cf. [32]). Similarly, the development of cochlear implants that could be used to enable deaf people to hear sounds has also raised concerns regarding the normalising effect of the technology and the negative impact it would have on the Deaf community [33]. Likewise, the development of ATs for persons with ASD could be seen as vulnerable to a version of the expressivist objection. Plainly, the development of ATs does not suggest that persons with ASD should not have been born (as some critics of the foetal screening and selections services argue vis-à-vis selecting against fetuses with disabilities), but the endeavour to develop ATs for persons with ASD appears to presuppose or endorse the idea that ASD involves a deviation from some sort of norm (e.g., species typicality), and is thus undesirable. As such, the development of ATs for persons with ASD can be seen as expressing societal disparagement towards the lives, value, and experiences of persons with ASD.

From this perspective, then, the development of ATs might be stigmatising at a societal level, in that it results from and further reinforces views about ASD as something negative that ought to be cured. If we accept the premise that stigmatisation is a social phenomenon, the way in which "the project" is framed is significant. The project is likely to be viewed through either the prism of the medical or the social model of disability.

## 9. Models of Disability

The medical model of disability views disability as something that ought to be cured or removed. "The medical model understands a disability as a physical or mental impairment of the individual and its personal and social consequences. It regards the limitations faced by persons with disabilities as resulting primarily, or solely, from their impairments" [9]. The medical model of disability defines "disability as a negative variation from the physical norm that necessarily disadvantages the physically distinct subject's life and life quality" [14]. Implicitly, this account rests on the idea of a species norm, which assumes that there exist biological facts about what is normal for a species (e.g., the way the species functions) and that these can "be used as a standard against which to measure the characteristics of a particular organism" [34].

In relation to ASD, the medical model conceives of ASD as a condition in need of a cure. Take for example the advocacy group Autism Speaks, which characterizes autism as an illness and states that children with autism are missing [35] i.e., the children have been "taken" by ASD (though the original

page has been removed [36]. The implication is that the “real” child is present but that ASD prevents that “real” child from interacting with the world.

Given that those who hold the medical model view the aim of medicine and medical technologies as being “to restore the disabled person as closely as possible to normality, understood as species typicality” [29], those who agree with the medical model will have no problem with the project. The technologies will help persons with ASD function in the world the way “neurotypicals” do. According to Wheeler, “medical conceptualisations of AS (Asperger’s syndrome) have led to it being viewed as a deficit, a ‘pervasive developmental disorder’ that should be diagnosed and treated to allow the person to function in ‘normal’ society” [37]. ATs are being designed to allow the person to better function in “normal” society. The creation of ATs for persons with ASD is focused on persons considered to deviate from some “species norm” and implies that they require technologies to help them function in society and in the world. This development could be seen, then, as equivalent with research into novel vaccines or innovative oncological treatments. The issue of stigmatisation would be unlikely to be a major consideration within this framework.

The social model of disability, which has been accepted by the United Nations in its Convention on the Rights of Persons with Disabilities [2], concentrates on socially constructed barriers and oppressive social norms which transform impairments into disability [15] and rejects “any idea of normality, which is regarded as an ideological construction” [16]. The social model of disability relies on a distinction between impairment and disability, with disability being seen as the result of oppressive and unjust structures rather than the result of individual impairment, which is the physical (or cognitive) state of being. Impairment then is a characteristic of those who are disabled but is not the cause of their disability, according to proponents of the social model (the cause being society). “The social model understands disability as a relation between an individual and her social environment: the exclusion of people with certain physical and mental characteristics from major domains of social life. Their exclusion is manifested not only in deliberate segregation, but in a built environment and organized social activity that preclude or restrict the participation of people seen or labelled as having disabilities” [9].

This approach is favoured by disability activists, who view disability as the result of social barriers and social oppression, rather than (physical or cognitive) impairment. Oliver (2013), in a paper looking back on 30 years of the social model notes “Armed with the idea that we needed to identify and eradicate the disabling barriers we had in common, the disabled peoples’ movement forced the media to change their images of us, transport providers to open up many of their services to us, public buildings to become much more accessible and the legal system changed to make it illegal to discriminate against us” [15]. For people who hold this perspective, then, the priority for social policy is not to “cure” disability, but to change society at a structural level. Talk of a cure is considered stigmatising in that it pathologises impairment, which is better understood in terms of difference rather than deficit [18].

The social model has been criticised for denying or denigrating impairments by placing all its emphasis on the social factors of disability. It has also been criticised for “severing the connection between impairment/biology/medicine, on the one hand, and disability, on the other” [38]. However, Oliver argues that it was never intended to deny the reality of impairments, but rather to shift the focus to social problems. The social model, according to Oliver’s formulation, did not call for the abandonment of the medical model (or individual model as he referred to it). “At no point did I suggest that the individual model should be abandoned, and neither did I claim that the social model was an all-encompassing framework within which everything that happens to disabled people could be understood or explained” [15]. The social model is best viewed as suggesting that the central question of disability is a social one and denying that impairments should be considered to be the cause of disabilities. Others have noted that “impairment is only ever experience in a social context” [18], and shown that the two categories are difficult to disentangle in practical terms. If we are to be consistent with regard to the ideas of social construction, we need to consider that impairment as a

category might also be socially constructed. If this is so, we must consider the role of technology and technological systems (including systems constituted by or made for) in constructing impairment.

The development of ATs for persons with ASD presupposes that technological devices can persons with ASD live more readily in society as it is currently constructed e.g., by neurotypicals. Instead of removing the barriers that evolved in less inclusive eras, ATs appear to adopt the medical model, providing technological devices to alter and organise the behaviour of persons with ASD. The project appears to offer technological help rather than societal change, and thus reinforcing the otherness of persons with ASD, i.e., arguably pathologising their impairments and stigmatising them.

The project presupposes that persons with ASD require assistance or treatment. This can be read as implicitly endorsing social norms that see ASD as undesired deviation from the norm; thereby promoting stigmatisation. From this perspective, ATs are being designed so as to make persons with ASD resemble “neurotypicals” in behaviour and social interaction. Rather than evolving society so that it adapts to the complete range of human variability, devices are created to change people so that they are in line with social norms. There is good reason to be cautious of such a project, as similar arguments have been utilised egregious ways in recent Western history (e.g., the view that homosexuality was a mental disorder—homosexuality only completely disappeared from the DSM in 1987) [39].

## 10. Discussion

The project of developing ATs for persons with ASD does not present many problems of stigmatisation when examined through the medical lens. However, the social model has become dominant and from this perspective, the project might be problematic. The project certainly does assume that “neurodiverse” persons would benefit from being more like neurotypicals or at the very least being able to fit in to the neurotypical world. If we are to be optimistic, we would see the development of ATs as a form of social change that helps to remove barriers between persons with ASD and neurotypicals, by helping persons with ASD overcome their impairments (e.g., communication difficulties). This does not mean that ATs will remove the existing stigmas that exist for persons with ASD nor does it necessarily suggest a shift in attitudes towards such people. Challenges in battling stigmatisation and discrimination will not disappear altogether.

This is not to deny that persons with ASD should have choices regarding their use of ATs. The issue of individual choice does not solve the problem. The choice to use or not use ATs exists as a result of technological and market forces (i.e., the choice is a social construction). The existence of a market providing such choices implies that ASD, as a condition or family of conditions, is an impairment. However, if we accept that disability is a social construction, there is little reason not to think that the concept of impairment is also, to some degree, socially constructed as mentioned earlier. Nor does it make sense to ignore the role of technology and markets in creating and framing people’s perspectives on themselves or any conditions they might have. There is a risk that the development of technologies can create a need for those technologies. In terms of persons with ASD, if many make use of ATs, more will people will think they need them. So rather than society adapting to their needs, a technological solution is provided by markets for needs that were, in some cases, created by markets.

Framing (via the markets) ASD as an impairment (i.e., socially constructing ASD as an impairment) might in itself might be seen as stigmatising, for if we believe the neurodiversity movement’s claims that ASD is simply an example of the diversity of human minds and ways of beings, viewing it as an impairment medicalises something that is simply a natural variation of human being. This can be seen as stigmatising. The issue of choice does not help resolve this, as the framing of choices (and the creation of the market) is a social construction of the ways the condition is viewed. The project is providing a choice that constructs ASD a medical condition or an impairment, which from the neurodiverse perspective is stigmatising (As pointed out in an early review of this paper, this has some similarities with a discussion relating to ADHD, where rather than adapting schools to be friendly to and tolerant of children with ADHD, we are treating children with ADHD with medicine. In line with the our argument above, the market of ADHD drugs might be seen as stigmatising, while still leaving

individuals free to use them. In essence a technological solution is offered to manage the behavior of people, rather than adapting the environment to include them.)

Much will depend on the development of the technologies and whether they constitute a “cure”, and on whether ASD is considered an impairment or an example of neurodiversity. Many ATs will be designed only to interact with certain symptoms of a condition, rather than addressing the condition as such. For instance, Chris Abbott has provided a useful taxonomy of digital technologies designed for children with learning difficulties [4]. Whilst some ATs will obviously only impact specific traits, the fast pace of technological development should spur consideration of the ultimate goal of these technologies as a whole in relation to ASD. The promise of technological “cures” or methods of ameliorating some of the problems encountered by persons with ASD is likely to encourage further development. It behoves us, as a society to question the long-term goals of this development.

While it is worth remembering that ATs cannot change a person with autism into someone with autism, nor are they intended to do so. The project is not attempting this type of “cure” as such, but in addressing certain challenges of persons with ASD, it risks medicalising the condition further. This raises the question of whether if ATs direct behaviour to such a degree that they profoundly alter it, they might be considered a cure. On the other hand, if all ATs are used for is relatively trivial tasks such as providing reminders, they are unlikely to be viewed as a cure. It is possible to speculate that as technologies develop alongside further research into ASD, such cures might become available. In this scenario, technological developments might emerge that would facilitate the eradication of ASD. Plainly, it is not clear that the development of ATs for persons with ASD will lead to this (speculative) scenario, but its possibility returns us to the questions raised by the expressivist objection. Although the project might be seen as a Trojan horse for such innovations, there is no reason to think that the development of ATs for persons with ASD will result in the gradual disappearance of ASD, so opposing the project is, at this stage, premature. At the very least opposition would deprive persons with ASD of the benefits of ATs.

In deciding their response to the project, critics will have to determine whether the benefits of the technology outweigh the harms. We might find that although the project is considered stigmatising, the benefits of the technologies are so impressive the dangers of stigmatisation will be accepted. When considering the benefits of ATs, it is worth remembering that the benefits are likely to arise for people across the entire autistic spectrum (from high-functioning to those at the opposite end), and (in some cases) their carers. Such wide-ranging benefits might well out-weigh the costs. This appears to be the position of the framers of the UN Convention on the Rights of People with Disabilities, which obliges signatories to “undertake or promote research and development of, and to promote the availability and use of new technologies, including information and communications technologies, mobility aids, devices and assistive technologies . . . ” [2].

The likelihood that ATs will reduce sources of stigma by helping persons with ASD adapt to their communities, along with the UN obligations to promote the use of ATs, suggests that the benefits of the project will, in the medium term, outweigh the negatives. The expressivist argument will only come in to play if the project begins to evolve in the direction of technologies that will result in the eradication of ASD. While the project does not necessarily call for the removal of socially constructed barriers, it does not suggest that ASD is something that can or should be cured, although there remains the risk that the project is medicalising a way of being. To oppose it on these grounds is likely in practical terms to stymie the continued development of ATs for persons with ASD by rendering the research taboo. This is likely to deprive many users and carers (particularly those at the more extreme end of the spectrum) of useful technologies. Nonetheless, proponents of the social model of disability, and those in the neurodiversity movement (who oppose the notion of curing neurodiverse persons) will need to remain wary of the sorts of changes that technological projects, even ones as ostensibly beneficial as the project of developing ATs for persons with ASD, can bring. Ultimately, it will be necessary to decide whether, when, and to what degree a different neurological way of being constitutes impairment; the role of technology and markets in constructing and framing the understanding of impairment and

in constructing the “needs” of those populations; and the role (and the extent of that role) of technology in “curing” impairment, particularly when it might involve radically changing the person.

## 11. Conclusions

This paper has discussed the risks of stigmatisation arising from the development of ATs for persons with ASD. Following brief sketches of stigmatisation as a concept and of ASD, we discussed ways in which ATs might result in stigmatisation for users. The most obvious and easily avoided issue was that ATs might make persons with ASD visually distinctive. We also addressed the issue of persons with ASD being stigmatised for not using available ATs. Following this we looked at the question of whether the project of developing ATs for persons with ASD was itself stigmatising. This related to the “expressivist objection” raised in relation to prenatal testing and to issues raised by the Deaf community in relation to cochlear implants. Whilst the current state of technological development does not appear to pose a threat similar to the expressivist objection, further technological development may suggest that ASD could be subject to a technological cure. Such technological developments would fly in the face of goals of the neurodiversity movement and would need careful consideration. The “project” of developing ATs for persons with ASD must not be considered an end in itself and it remains paramount that substantive discussions regarding the goals of this project continue alongside analyses of the relative harms and benefits of specific technologies.

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