

## INVITED REVIEW

## Neurodivergence-informed therapy

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Email: [r.chapman@shu.ac.uk](mailto:r.chapman@shu.ac.uk)**Abstract**

The neurodiversity movement is a social movement that emerged among autistic self-advocates. It has since spread and has been joined by many with diagnoses of attention-deficit/hyperactivity disorder, dyslexia, and developmental coordination disorder among others. By reconceptualizing neurodiversity as part of biodiversity, neurodiversity proponents emphasize the need to develop an ‘ecological’ society that supports the conservation of neurological minorities through the construction of ecological niches—that is, making space for all. This is an alternative to the drive to eliminate diversity through attempts to ‘treat’ or ‘cure’ neurodivergence. So far, neurodiversity theory has not been formally adapted for psychotherapeutic frameworks, and it is not the role of the therapist to make systemic changes to societal organization. Still, there is room for fruitfully drawing on a neurodiversity perspective for therapists working with neurodivergent people in clinical settings. Here, we draw on the example of autism and synthesize three key themes to propose the concept of neurodivergence-informed therapy. First, the reconceptualization of dysfunction as relational rather than individual. Second, the importance of neurodivergence acceptance and pride, and disability community and culture to emancipate neurodivergent people from neuro-normativity. Third, the need for therapists to cultivate a relational epistemic humility regarding different experiences of neurodivergence and disablement.

The neurodiversity movement is a social justice and civil rights movement led by and for people with neurocognitive, developmental, and psychological disabilities.<sup>1</sup> Neurodiversity theory proposes that divergence from expected functioning (such as autism, attention-deficit/hyperactivity disorder [ADHD], developmental coordination disorder, or dyslexia) are natural variations of human minds, and those who diverge from the norm (neurominorities) are equally deserving of dignity, respect, and accommodation. Views among neurodiversity proponents are varied and the theory underlying the neurodiversity paradigm is still emerging. Neurodiversity started as an identity-based movement which centred neurodivergence at the core of a person's identity. The concept of neurodiversity initially arose among autistic communities in the late 1990s but has since been adopted by many activists and advocates

with other diagnoses, including ADHD, developmental coordination disorder, and dyslexia. In general, though, neurodiversity proponents tend to promote moving towards a non-pathologizing perspective regarding neurocognitive disability that begins with the acknowledgement of neurocognitive diversity as natural, valuable, and in need of support. Proponents also tend to embrace the identity of ‘disability’ even while moving away from notions of ‘illness’ or ‘disorder’. Alongside this, social models of disability tend to be favoured to explain neurodivergent disablement and distress in terms of societal barriers rather than as individual medical problems. The term ‘neurodiversity paradigm’<sup>2</sup> refers to the emerging framework for understanding human mental variation, ability, and disability that the neurodiversity movement is based on. Overall, the shift is away from a medicalized approach that

This invited review is commented on by Bogart on pages 300–301 of this issue.

There is a letter to the editor on this invited review by Scherzer on page 437 of this issue.

**Abbreviation:** ABA, applied behaviour analysis.

associates recovery with functional normalcy, and towards a disability justice paradigm that takes neurocognitive diversity itself to be normal.

While the neurodiversity paradigm has been implemented to some extent into cultural representations, policy, and research, there has been very limited attempt to bring it into clinical practice.<sup>3,4</sup> Most discussions of the neurodiversity concept focus on autism despite the fact that people with a variety of disabilities have adopted the framework.<sup>5</sup> Much of the discussion on neurodiversity, including some of the seminal texts of neurodiversity theory, have been published by activists and advocates in blogs, online magazines, or book chapters rather than in peer-reviewed journals.<sup>2,6</sup> While the concept has been discussed in clinical and academic literature, academic representations often miss the nuances held by proponents.

This narrative review brings together activist literature with academic literature from a range of disciplines (philosophy, psychology, sociology, disability studies), to help clarify the relevance and utility of neurodiversity for clinical and therapeutic practice. It begins with how neurodiversity has been defined before going on to cover epistemological and theoretical shifts associated with neurodiversity theory. The review then covers practical issues relating to neurodiversity throughout in relation to therapeutic practice. While it follows the existing literature in focusing on autism, it also uses autism as an example to consider broader implications relevant for a range of diagnoses. In this article, we use identity-first language ('autistic people') to refer to (members of) the autistic community as opposed to person-first ('people with autism'). This is done because among neurodiversity proponents, identity-first language tends to be the autistic community's preference,<sup>7,8</sup> while person-first language may accentuate stigma by positioning the person as someone who could exist without autism, instead of autism being fundamental to them.<sup>9,10</sup>

Disabled groups and other minorities have a distinct history of resisting and reconceptualizing medicalized conceptions of impairment, pathology, and functioning. These include sexual minorities<sup>11</sup> and the deaf community for example,<sup>12</sup> both of which influenced neurodiversity proponents. While neurodiversity paradigm literature is underdeveloped when it comes to disabilities other than autism, it is increasingly applied to a range of diagnoses from dyslexia to borderline personality disorder.<sup>13</sup> Hence, while we focus on autism here, we propose this as a rough blueprint for applying a neurodiversity paradigm approach more broadly. At the same time, it should nonetheless be noted that autistic people have an elevated chance of experiencing anxiety, mood, and trauma disorders according to a meta-analysis of 96 studies.<sup>14</sup> Further, autistic people are substantially more likely than their non-autistic counterparts to die early by suicide according to a large cohort-based study.<sup>15</sup> Thus, when it comes to mental health, autistic people form a vulnerable population in their own right for whom what we call neurodivergence-informed therapy may be highly beneficial.

### What this paper adds

- Neurodiversity theory can help therapists support neurodivergent clients.
- Neurodivergence-informed therapy helps shift to a relational rather than individual conception of dysfunction.
- Disability pride may be helpful for cultivating neurodivergent thriving.

## DEFINING NEURODIVERSITY

The concept of neurodiversity first arose among autistic disability rights advocates. Martijn Dekker recalls the idea first emerging in early online autistic communities:

A new idea came up in the group, based on the evidence and lived experience that autistic brains are wired differently from the mainstream on a fundamental level. Biological diversity of all kinds is essential to the survival of an ecosystem—so why should neurological diversity, which is one aspect of biological diversity, be any different?<sup>16</sup> (p. 46)

While the term was coined by Judy Singer, the first time the term appeared in print is in the journalist Harvey Blume's 1998 *Atlantic* article 'Neurodiversity'.<sup>17</sup> Blume used the term to advocate moving away from notions of 'normal' and 'abnormal' cognition, and instead towards viewing cognitive functioning as being more specialized. Singer's understanding of neurodiversity, published in 1999, focused on reinterpreting diagnostic classifications as minority identities in order to cultivate disability rights and justice.<sup>1</sup> Both of these early formulations influenced subsequent discourse and have since blended together.<sup>5</sup>

In 2012, Walker distinguished between the pathology paradigm and the neurodiversity paradigm.<sup>2</sup> The pathology paradigm is the dominant paradigm encompassing medicalized approaches to cognitive, learning, and developmental disabilities across the psychological sciences. It is defined by the reliance on a relatively restricted norm when it comes to cognitive functioning. Under the medicalized model, deviation from the norm is considered as disorder, disease, or dysfunction and there is a focus on remediation, prevention, and cure.<sup>18,19</sup> By contrast, the neurodiversity paradigm conceptually frames cognitive diversity itself as normal, rather than viewing it from the assumption that there is enough uniformity across the species to justify the use of a species-norm.

Walker also summarized neurodiversity paradigm terminology that has been widely (but not universally) adopted by neurodiversity proponents. On the neurodiversity paradigm, people are either closer, albeit in an endless variety of ways, to

being more 'neurotypical' or more 'neurodivergent', depending on how well they conform to normative expectations of a given society. Some neurodivergent groups form 'neurominorities', which refers to minority neurocognitive groups who are disadvantaged in a particular society. This reconceptualizes disabilities such as autism, ADHD, and developmental coordination disorder in line with how cultural, ethnic, and sexual minorities are conceptualized. Walker's framework helped develop the philosophical basis of the movement and allow the neurodiversity concept to be utilized beyond the autistic community for those with other diagnoses.<sup>20</sup>

In the academic literature, social and relational models of disability have also been applied to neurodivergent disablement and distress to clarify to what extent such issues are caused by environments.<sup>21</sup> This challenges the framing of neurodivergent cognition as inherently harmful and disordered, and aids understanding of how to alleviate distress and disablement by removing systemic barriers. More recently, Chapman suggested an 'ecological' model of mental functioning to help facilitate neurodiversity paradigm research.<sup>22</sup> This model looks at mental functioning as relational, and arising either between different embodied minds or between embodied mind and environment, rather than being reduced to individual ability. Part of the point of this model is to orientate research away from more individualistic framings that measure and rank abilities in relation to a broader functional norm, allowing greater recognition of minority (alternate) forms of functioning.

There has been little analysis of how to incorporate neurodiversity theory into clinical practice. In their recent *Lancet* comment, psychiatrists Ed Sonuga-Barke and Thapar try to make certain suggestions of how to incorporate the neurodiversity concept into clinical practice and argue that the key implication would be to shift the focus to environmental interventions:

The focus [would be] shifted to the environment, with a strong focus on adapting environments in schools, the workplace, and other settings (e.g., organised social and leisure groups and clubs) to make them more neurodiverse-friendly and change the attitudes of neurotypical people. This intervention focus would include setting a societal agenda that focuses on adjusting environments to better suit those who are different. This approach contrasts with the expectation of the specialist clinician fixing or removing a deficit. The paradigm could emphasise more societal and public health responsibilities for supporting neurodiversity, including dealing with stigma, stereotypes, and discrimination via public education, training, policy, and legislation.<sup>3</sup> (p. 2)

## EPISTEMOLOGY

On a traditional medical approach to mental disorder, the trained researcher or clinician is the expert who is trained

predominantly within a medical tradition and gains such expertise through education and specific training. This approach contrasts with standpoint epistemology<sup>23</sup> which suggests that knowledge is also socially situated and that social factors can influence our ability to know things—an epistemology associated with the neurodiversity paradigm.<sup>24</sup> For marginalized groups, the key implication of standpoint epistemology is that people in marginalized positions have greater access to knowledge and understanding relevant to their subordination than those in more privileged situations—including those such as medical professionals who might have vital clinical expertise from training and practice, but no personal experience.

Taking a standpoint epistemology approach contrasts with how, within the pathology paradigm, neurodivergent people have often been framed as lacking in insight and self-awareness in relation to neurotypical experts. This is sometimes linked to what are viewed as cognitive deficits, such as theory of mind deficits. This includes the argument that autistic people are somehow lacking in epistemic authority to describe the experience of being autistic.<sup>25</sup> Despite such claims, Gillespie-Lynch et al. found in a survey-based study of 636 people (309 of whom were autistic) that autistic people tended to have a less stigmatizing and more scientifically grounded understanding of autism than non-autistic controls,<sup>26</sup> as standpoint epistemology would suggest.

A shift towards incorporating standpoint epistemology has been implemented in neurodiversity paradigm research. Damian Milton argued that autistic people are routinely 'frozen out of processes of knowledge production'<sup>27</sup> (p. 800) and that the 'involvement of autistic scholars in research and improvements in participatory methods can thus be seen as a requirement, if social research in the field of autism is to claim ethical and epistemological integrity'.<sup>27</sup> (p. 796) In recent years, research in line with the neurodiversity paradigm has either relied on neurodivergent participation to help formulate hypotheses and design studies, or has been carried out by neurodivergent neurodiversity researchers.<sup>28</sup> Standpoint epistemology is also relevant for clinical settings. Autistic scholar Nick Walker urges therapists to recognize that:

Neurotypical privilege means that neurotypical people interacting with autistic people—particularly when the neurotypical people in question are in positions of professional authority—have the luxury of never having to address or even acknowledge their own empathy deficits or poor communication skills, because they can blame all failures of empathy, understanding, and communication on the alleged deficits of the autistic people.<sup>29</sup>

The claims of standpoint epistemology give reason to think that at least some clinical training will be not just irrelevant but unhelpful, especially if it is used to dismiss the perspective and knowledge which comes with being neurodivergent. This is supported by a report from Hallett and Kerr which found

that 'autism specialism amongst practitioners often aren't a guarantee of positive experiences, and in fact may lead to the opposite if outdated or inaccurate information about autism was being used'.<sup>30</sup>

Importantly, autistic people are often subjected to epistemic injustices whereby, as described above, they are constructed as lacking epistemic authority<sup>25</sup> and treated as unreliable narrators to their own experiences.<sup>31</sup> A particularly insidious example of this can relate to autistic people's experiences of gender, for example. In a study of five independently recruited cross-sectional clinic-based cohorts (614 860 people), it was found that transgender and/or non-binary people are 3 to 6 times more likely to be autistic compared to neurotypical people.<sup>32</sup> A separate study in the New York University Child Study Center cohort ( $n = 1605$ ) showed that autistic participants ( $n = 492$ ) were 7.7 times more likely to endorse items relating to gender variance.<sup>33</sup> Further, systematic reviews on this overlap appear to suggest a robust finding that these communities heavily intersect.<sup>34</sup> Yet, it has been argued that gender affirmation of autistic people should be delayed or is denied by medical professionals and clinicians on the basis of being autistic, whereby their gender is reduced to a manifestation of repetitive and restricted interests.<sup>35</sup> By denying epistemic agency to neurodivergent people, clinicians can compound the effects of trauma, minority stress, and marginalization. Learning from the neurodiversity paradigm would include cultivating epistemic humility on the part of neurotypical researchers and clinicians. Further, in a qualitative study of 17 autistic people discussing their experiences of therapy, participants appreciated and desired this form of epistemic humility from therapists including tentative interpretations of neurodivergence.<sup>36</sup> With such factors in mind—as Ho argues is the case when it comes to disability more generally—cultivation of epistemic humility on behalf of neurotypical therapists may help foster a two-way collaborative approach between practitioners and patients.<sup>37</sup>

## ONTOLOGICAL STATUS OF DYSFUNCTION

A key difference between a medicalized approach and the emerging neurodiversity approach regards how the latter reinterprets cognitive or communicative dysfunctions as being *relational* rather than intrinsic to neurodivergent people.<sup>22,38</sup> One way this can occur is between different individuals with sufficiently different cognitive styles. An example of a relational dysfunction between individuals is empathy-based problems associated with autistic people. Empathy deficits and dysfunction have been seen as individual, stemming from deficits that are located within autistic brains or minds. However, autistic neurodiversity proponents<sup>20,39,40</sup> have suggested that the problem is a two-way problem between the autistic side and the non-autistic side. Milton suggested that in fact many autistic people likely have developed a greater understanding of the neurotypical social world than the other way around.<sup>40</sup> By the same token, neurodiversity proponents have also emphasized the relational nature of

functions, for instance, in emphasizing how increased cognitive diversity can increase group functioning even if the same cognitive traits that contribute to this are associated with individual disability.<sup>22</sup>

Another way dysfunction can be relational is when dysfunction emerges between the individual and the environment. This fits with interactional or relational models of disability which frame disablement as a relational problem rather than being intrinsic to individual abilities. Neurodiversity paradigm research that focuses on the environment has found that autistic stress and reduced well-being is associated with societal barriers. For example, in a study of 58 autistic people, it was found that social support characteristics, rather than disability characteristics, significantly predicted a large proportion of quality of life scores.<sup>41</sup> Further, in a study of 111 autistic people, exposure to discrimination and victimization, and processes of internalization of such marginalization, predicted a large proportion of both well-being and psychological distress scores.<sup>42</sup> These quantitative findings are supported by exploratory qualitative findings analysing issues of an autistic magazine which found a specific focus on social-environmental barriers to autistic well-being.<sup>43</sup> Neurodivergent access to therapy may be stifled because of the exclusionary communicative practices and sensory environments of therapeutic settings<sup>30</sup> yet lack of engagement due to these barriers may be regarded as non-compliance or non-cooperation.

Similarly, enablement may also be understood as relationally produced and upheld—therefore a successful clinical relationship should be built upon an accessible environment (including as access needs shift), a collaborative relational experience, and epistemic humility that acknowledges the limitations of non-insider knowledge. Singer proposed that a neurodiversity approach should include cultivating ecological niches to help enable neurodivergent individuals and groups—that is, making space for everyone regardless of how they experience life.<sup>1</sup> Accessibility between person and environment should always be retained as a central tenant—autistic clients may be less able to benefit from therapy if they are disabled by the sensory environment,<sup>30</sup> and thus catering to sensory experiences with adjustments to light or sound is important. Successful examples of this include autism inclusive hours in cinemas or shops where adjustments are made to sensory environments. Other neurodiversity proponents have also associated this approach with universal design, which means making environments and processes which cater to all people and minds.<sup>44</sup>

From a neurodiversity paradigm perspective, beyond focusing on disabling environments and clinician–patient relationships, clinicians may also find it helpful to reconceptualize interpersonal conflicts as relational rather than as stemming from the neurodivergent side. For instance, neurologically diverse family or workplace social and communication problems should be understood as arising from different perspectives between people with different priorities and communication styles, rather than being a product of neurodivergent deficit. Relatedly, Chapman suggested the

concept of ‘neurotype dysphoria’ to acknowledge how an individual’s goals or identity may clash with their neurotype (whether neurotypical or neurodivergent).<sup>45</sup> For instance, an autistic teenager might want to be someone who thrives at neurotypical dominated house parties despite such environments being potentially stifling given their neurotype. In the clinical context, this concept may be helpful for exploring how some neurodivergent people associate harms with their neurotype while refraining from pathologizing the neurotype itself.

## NORMALIZATION

Resistance to normalization is a core feature of neurodiversity advocacy. Steven Kapp and Ari Ne’eman write that while neurodiversity does not necessarily challenge all aspects of a medicalized approach, it certainly ‘challenges the “medical model” that assumes that the goal of service provision or “treatment” is to restore autistic people to “normalcy” [or] indistinguishability from peers.’<sup>46</sup> (pp. 188–9) This relates back to the neurodiversity paradigm’s rejection of species norm as a measure to determine health status, and has important implications for clinical practice.

Clinicians should, to the extent that this is possible, depending on communication difficulties, follow the guidance of the neurodivergent individuals regarding what they are in the therapeutic space for, and why. Doing this itself promotes an epistemic agency. This means that neurodivergent individuals may request help for some emotions or behaviours which are divergent from the norm, but embrace other divergencies as core to their identity and this should be respected. This may stand at odds with the idea of remediation and normalization which sits at the heart of the medical model,<sup>47</sup> and, further, feel alien to clinicians who have been trained to see autism as a set of symptoms which blight individuals instead of core things which constitute them, or even bring joy (such as specialist interests).

One key point of contention in the clinical field has been applied behaviour analysis (ABA), which utilizes a reward system to change behaviours. ABA is the most widely used early autism intervention. However, autistic people have long contested that ABA focuses on the normalization at the expense of autistic thriving and well-being, often addressing behaviours which autistic people themselves find non-problematic. Wilkenfield and McCarthy describe ABA therapy ‘in which the autistic child is rewarded for engaging in activities that make him more normal’.<sup>48</sup> (p. 37) Preliminary research has indicated an association between ABA and trauma. ABA may undermine autistic autonomy and agency by forcing autistic people to ‘camouflage’ (i.e. performing neurotypicality due to pressure to appear more ‘normal’).<sup>49</sup> More generally, camouflaging has been correlated with thwarted belonging and suicidality in a study of 160 autistic people,<sup>50</sup> as well as higher depression in a sample of 111 autistic people,<sup>51</sup> and lower social well-being in a different sample of 111 autistic people.<sup>42</sup> Furthermore,

by encroaching on, or past, autistic people’s boundaries of what therapy should be intended for can further compound the trauma that may have brought them into a therapeutic space to begin with (which, as highlighted above, can come from high exposure to traumatic events and victimization), as it denies agency and respect for boundaries and bodily autonomy in a way original traumas and victimizations do. Chapman and Bovell suggest that the neurodiversity critique of ABA has broader implications for the ethics of intervention, which should focus on neurodivergent flourishing rather than normalization.<sup>49</sup>

## RECLAMATION AND PRIDE

The neurodiversity framework emerged through neurodivergent people reclaiming psychiatric diagnoses such as autism spectrum disorder or ADHD as neurominorities. Neurodiversity proponents sometimes change the terms, as we already noted with regard to using ‘autistic persons’ rather than ‘persons with autism’.<sup>39</sup> Views on the significance of diagnostic classifications vary. Kapp and Ne’eman write: ‘[While we] challenge the idea of exclusive medical authority, we do not reject the utility of the autism diagnosis itself or the well-documented reality that it constitutes a real divergence from “typical” neurology.’<sup>46</sup> (pp. 188–9) Other neurodiversity proponents have developed constructivist analyses of autism that avoid neurocentric commitments, for instance, Chapman’s analysis of autism as a serial collective that is constructed in relation to material disabling barriers.<sup>52</sup>

While views on the ontological status of disability classifications vary, a core part of reclaiming diagnostic labels is to develop neurodivergent and disability pride. As one autistic advocate writes: ‘By reclaiming autistic, by using it as a symbol of identity and pride, we can broaden public perception of what it means to be autistic’.<sup>53</sup> Neurodivergent reclamation efforts fit with Barnes’s suggestion that disability pride is epistemically liberating for disabled people.<sup>54</sup> Reclaiming disability diagnoses as identities may also be useful for members of marginalized groups who are unable to access official medical diagnosis. In essence, people want to be understood for who and what they are, instead of defined by who and what they are deemed to not be.

Research on autism pride and acceptance is preliminary but promising. Parsloe interviewed autistic people and analysed internet discussion, reporting that autistic people reclaimed normalcy, symptoms, and agency.<sup>55</sup> Cooper et al. found that having a positive autistic social identity protected against mental health problems. Based on this they urged clinicians to help facilitate a positive autistic identity.<sup>56</sup> Botha et al. interviewed 20 autistic individuals and found that they reclaimed ‘autistic’ as part of their identity to help fight stigma.<sup>57</sup> This may be similar to what other minority groups experience. Previous multi-study quantitative research has shown a reciprocal relationship between power and self-labelling with terms previously used in derogatory fashions

whereby increased perception of group power increases an individual's willingness to self-label, but also self-labelling increases the perceived group's power.<sup>58</sup> More broadly, the practice of autism 'acceptance' has recently been associated with increased well-being in both autistic individuals<sup>59</sup> and family members.<sup>60</sup> Further, research by Gwendolyn Barnhart suggested that clinicians found the neurodiversity concept useful for helping their clients cultivate self-esteem.<sup>61</sup>

More positively, to fully incorporate a neurodiversity perspective into therapeutic practice, a focus on neurodivergent pride and disability pride should be explored—including as a way to counteract internalized stigma, which is the internalization of the abundance of negative messages minorities receive about their identity.<sup>62,63</sup> Internalized stigma is particularly insidious in that although it is the result of stigmatizing and marginalizing encounters, it can become self-sustaining even without the presence of these events,<sup>64</sup> and it is particularly predictive of poor mental health and higher psychological distress in autistic people.<sup>42</sup> This move to neurodiversity and disability pride may mirror LGBTQ+ affirmation therapy, which Malyon proposed to shift away from a pathologizing model and towards developing an affirmative sense of LGBTQ+ identity.<sup>65</sup> Further, as Chapman highlights, clinicians may also find the concept 'neurotype dysphoria' useful for understanding neurodivergent distress while moving away from a pathologizing perspective of neurominorities.<sup>45</sup> Future research should focus on cultivating neurodivergent pride and affirmation in therapeutic practice to enable neurodivergent thriving, not just among autistic people but among neurominorities more broadly.

## CONCLUSION

Here, we have focused on autism while also hoping this will serve, to varying extents, as a blueprint for other forms of neurodivergence. Incorporating neurodiversity into therapeutic and clinical practice would require clinicians to cultivate epistemic humility relating to neurodivergent disablement. In their discussion of psychotherapy and disability, Learmonth and Gibson note that 'therapy literature is mostly written by an "us" (therapists), writing about "them" (clients)'.<sup>66</sup> (p. 54) Yet as Walker notes, much of what is 'written or taught about neurodivergence by neurotypical "experts" is just plain wrong and is harmful to your autistic clients'.<sup>29</sup> Clinicians should develop a healthy scepticism to pathology paradigm research, which routinely assumes and reproduces negative biases about neurodivergent populations.<sup>67</sup> More effort should also be made to make clinical training accessible to neurodivergent people, who may be better placed to empathize with neurodivergent clients. In considering neurodivergent people, clinicians should ensure that that agency around which divergencies are addressed or targeted for normalization is always retained in the therapeutic process. Going forward, we propose the development of neurodivergence-informed therapy. By this we (preliminarily) mean therapy

that resists default normalization, is sensitive to neurodivergent perspectives, understands disablement as relational and political, and considers disability as a potential source of community and pride.

## DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

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