

**ARTICLE**

# Neurodiversity in the city: Exploring the complex geographies of belonging and exclusion in urban space

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**Abstract**

In this paper I develop an urban social geography of neurodiversity that attends to the plurality of neurodiversity and of neurodiverse experiences of the city. Geographers have remained relatively silent on issues of neurodiversity in the city and, as such, the perspectives and experiences of neurodiverse individuals remain vastly unreported. The city is a crucial spatial context of everyday life for those who are neurodiverse as it can present challenges due to its complex, unpredictable and fluid nature. Drawing on recent calls for the development of a relational geography of disability, this paper explores the intricate geographies of neurodiversity in the city, revealing ways urban spaces become spaces of belonging or exclusion for those who are neurodiverse. Urban spaces are experienced in diverse and complex ways, linked to a multitude of neurological differences and their intersections. The paper reveals social, spatial and temporal practices and processes through which urban spaces acquire meaning for those who are neurodiverse. The research offers important insights for urban planning and policy, particularly in terms of thinking complexly about neurodiversity and associated questions of inclusion and exclusion in the city. The paper concludes with a discussion of some future research directions for an urban geography of neurodiversity.

**KEYWORDS**

autism, belonging, cities of difference, geographies of exclusion, urban social geography

## 1 | INTRODUCTION

Neurodiversity is a broad term used to refer to neurological differences and captures several neurodivergent conditions such as autism spectrum disorder (ASD), attention deficit and hyperactivity disorder (ADHD), sensory processing disorder (SPD), obsessive compulsive disorder (OCD), borderline personality disorder (BPD), seasonally affected depression (SAD), dyslexia, dyspraxia, Tourette's, and so forth (Singer, 1999). The neurodiversity movement emerged in the 1990s, redefining neurological differences as human specificities not to be treated, but respected like other human differences, such as gender, race and sexuality (Ortega, 2013). For many, neurodiversity relates to differences in how the brain responds to, and manages, everyday life, including daily tasks such as meeting deadlines, attending school or work,

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staying focused, accessing public transport, encountering others, and so forth, all of which can be challenging (Bradshaw et al., 2021). Those working on autism and the built environment have identified that people with autism can have a problematic relationship with their surrounding environment, relating mostly to differences in sensory processing (see Tola et al., 2021). Calls have been made to address the 'neurotypical construction of global sensory contexts' (Davidson & Henderson, 2017, p. 85), so that the city becomes a space that normalises and accommodates doing things differently (following Hansen & Philo, 2007). Despite growing interest in autism-friendly cities, there is limited literature on the multiplicity of neurodiversity (beyond autism and sensory sensitivities) or of the embodied reality of neurodiversity in everyday urban life. This paper begins dialogue in these areas.

Over the past three decades, geographical scholarship on the relationship between disability and the city has developed (see Gleeson, 1998; Imrie, 1996; Kitchin, 1998). Inspired by the emergence of the social model of disability, geographers played a pivotal role in understanding the social, attitudinal and physical barriers within 'disablism' urban environments, leading to barriers to participation in everyday life for those with disabilities (Hall & Wilton, 2017; Imrie & Edwards, 2007). Much of this research has focused on physical disabilities and there remains a smaller body of research on intellectual or learning disabilities (Wolch & Philo, 2000, p. 138). Hall and Kearns (2001) noted that we are yet to fully incorporate the intellectual or the mind into conceptualisations of disability (though there are some noteworthy exceptions, e.g., Hall, 2005; Hall & Bates, 2019; Wiesel et al., 2013). Research on deinstitutionalisation and post-asylum geographies has brought attention to the ways those with ID and psychiatric conditions have a greater presence in cities and communities, together with lived experiences of urban space, though even within these areas of geographical research, there has been less attention to neurodiversity in the city. Recent improvements to diagnostic criteria have seen an uncoupling of ID from neurodiversity (Sohn, 2020), as well as neurodiversity separated out from psychiatric conditions, which have long been the focus of post-asylum geographies (see Dear & Wolch, 1987; Parr, 2000). Recognising the historical conflation of neurodiversity with ID and psychiatric conditions is important in both academia and public policy in terms of recognising and responding to diversity. The fact that neurodiversity has been 'caught up' in several different spaces has likely contributed to neurodiversity being more concealed in geographical research. However, with increased awareness of neurodiversity, new research directions are emerging related to cities and built environments; it is now imperative we make space for neurological diversity in geography.

To develop the geographies of neurodiversity, I consider recent developments from the geographies of disability to help frame emerging research. Imrie and Edwards (2007, p. 634) argue for the need to develop geographical research that moves beyond dualisms or static categories like social/medical, disabled/non-disabled, inclusion/exclusion to capture complex, fluid identities and 'shifting socio-spatial positions'. They argue that theoretical developments might consider 'the specific values and contexts of conduct, the diversity of lived encounters, and embodied experiences, of disability, and the temporal/spatial fluidity of (disabled people's) identities' (Imrie & Edwards, 2007, p. 635). In a similar vein, Hall and Wilton (2017) call for the development of a relational geography of disability. They argue that the relational turn, and non-representational theory, have aided geographers to understand 'social environments not as pre-determinedly exclusionary and oppressive ... but rather as contexts in which people engage and perform their embodiment and in so doing re/produce and transform both themselves and their surroundings' (Hall & Wilton, 2017, p. 728). Using this lens enables us to 'imagine bodies (both impaired and non-impaired), objects and spaces engaged in shifting relations that have the capacity to produce both exclusionary and/or enabling arrangements' (Hall & Wilton, 2017, p. 728). Hall and Wilton (2017, p. 733) note that non-representational theory offers an understanding of space and place as fluid, encountered and performed, which pushes beyond static representations of a space as either inclusionary or exclusionary, and helps us to think through the practices and processes through which spaces *become* inclusionary or exclusionary (or both) through assemblages of bodies, emotions, encounters within specific contexts or spaces (Hall & Bates, 2019).

In this paper, I contribute to recent thinking about difference and disability in the city by considering diverse embodiment of neurodiversity, the varied lived experiences of neurodiversity in urban space, and the ways neurodiversity finds expression in and through urban spaces in complex ways. Using a relational lens, the paper reveals the complex, and often hidden, urban and social worlds that neurodiverse individuals inhabit, and the diverse ways in which urban spaces become inclusionary or exclusionary for those who are neurodiverse. In this paper, I argue for the need to consider the multitude of neurological differences and their intersections—a plurality to neurodiversity—and thus a need to conceptualise neurodiversity as more-than autism and more-than sensory. This framing allows us to consider more complexly the ways urban spaces can become inclusive or accessible for neurodiversity.

Following this introduction, the paper is structured into four sections. First, I review key literature on neurodiversity and the built environment, identifying current gaps in knowledge, considering the characteristics of cities and urban life that create challenging environments for those who are neurodiverse. This is followed by a discussion of the ways neurodiversity makes us rethink ways of doing research and how neurotypicality can be embedded in research methods

and design. Analysis of the findings is then elaborated, which draws out diverse embodiment of neurodiversity in urban space and examples of spaces becoming inclusionary and exclusionary. I end with a discussion of future research directions, identifying possible ways of approaching research, both conceptually and methodologically, through neurodiverse frames.

## 2 | TOWARD AN URBAN GEOGRAPHY OF NEURODIVERSITY

There is a growing literature on autism-friendly built environments. The work can be categorised into several thematic areas: housing design and adaptation for adults with autism (e.g., Mostafa, 2010); inclusive school and classroom design for autistic children (e.g., Tufvesson & Tufvesson, 2009); home space for families of children with autism (e.g., Nagib & Williams, 2018); sensory sensitivities in children as related to schools and built environments (e.g., Piller & Pfeiffer, 2016); and design of dedicated outdoor environments for children or adults with autism (e.g., Gaudion & McGinley, 2012). Tola et al. (2021) conducted a scoping review of research into autism-friendly built environments, with most contributions from architecture and urban design (see also Kinnaer et al., 2016). They noted that studies in this area ‘focused almost exclusively on closed or devoted spaces’, with a disproportionate amount of work on designing spatial requirements for autism-friendly learning spaces to meet the specific (spatial) needs of schoolchildren with ASD (Tola et al., 2021, p. 13; see also Mostafa, 2014). They also note that there are relatively few studies on autistic adults and the built environment, with only a few papers on housing or residential spaces (Tola et al., 2021). One of their final conclusions is that there were no studies on the (re)design of the urban environment (Tola et al., 2021). It is critical to note that work from built environment disciplines has yet to consider neurodiversity beyond autism. As the urban professions begin to consider the requirements for autism-friendly cities, it becomes imperative that we develop an understanding of the multiplicity of urban experiences for those who are neurodiverse and that these experiences inform the planning of urban environments, not solely the design of individual buildings or spaces.

Geographical research on neurodiversity focuses exclusively on autistic identities and/or ASD. Drawing on analysis of autobiographical accounts, Davidson and Smith (2009) challenge the dominant views of sociality for those with ASD through exploration of relationships with the ‘natural’ world. Davidson and Henderson (2010a) explore intersections between autism and sexuality by drawing on analysis of autobiographies from autistic authors to reveal a distinct set of repertoires used to both reveal and conceal sexuality. Similarly, Davidson (2007) explores intersections of gender and autism using autobiographical accounts to reveal the complexity of ASD life-worlds and the social and spatial strategies used to manage norms and expectations in society dominated by neurotypicality (see also Davidson & Tamis, 2016). Geographical research has also considered autistic styles of communication, exploring the role of the internet and digital spaces for political organisation, community formation and awareness raising (see Davidson, 2008; Henderson et al., 2014), while the work of Duignan and Connell (2015) explored the disruptions to home for those living with ASD. One feature of the geographical work to date is the focus on sensory sensitivities for those with autism. Davidson and Henderson (2010b) use autobiographical accounts to unpack the sensory diversity of those with ASD and associated construction and experience of autistic life-worlds. Madriaga (2010) examined the transitions of students with ASD into higher education and their negotiation of university spaces. Interviewees identified inaccessible spaces within their university and particularly found obstacles ‘locating themselves in spaces where other students generally tend to congregate (e.g. student unions, pubs, libraries) due to their sensory impairments’ (Madriaga, 2010, p. 39). Madriaga (2010) identified differences in how each of the students negotiated these challenges and barriers, and these differences reflect the diversity of individuals with ASD. In a similar vein, Davidson and Henderson (2017) explore the sensory city. From the study of 45 autobiographical texts, they draw attention to issues related to urban design and note that many ASD authors often write about feeling ‘out of place’ or alien (p. 76) and that ‘there is a growing awareness of the need for “sensory sensitive” (Grancich, 2014, p. 3) urban spaces to assist those with ASDs and other sensory challenges’ (p. 77). In their work, they address each of the senses—sight, hearing, touch, smell and taste—and note that many authors in their study offer recommendations for making environments ‘less sensorily toxic for those on the spectrum’ (Davidson & Henderson, 2017, p. 85). The rich body of geographical research captures the diverse and complex social geographies of those who are autistic. In this paper, I extend current geographical ideas by pushing beyond autism to consider the multiplicity of neurodiversity and of neurodiverse experiences of urban space, which has yet to receive sustained critique or analysis in the geographical literature.

Within the emerging work on neurodiversity, the city remains under theorised, yet is a crucial spatial context of everyday life. Within urban theory, the city has long been characterised as a diverse and complex space, one that can stimulate

and overwhelm, due to a range of social and spatial characteristics. In *The Metropolis and Mental Life*, Simmel (1903) argued that conditions of urban life, most notably the intensity of sensory stimulation, creates a situation where people shield themselves from a constantly changing environment. Simmel (1903) referred to this as a 'blasé outlook' that results from the constant sensory overload, creating a particular metropolitan psyche (Simmel, 1903), whereby urbanites, at times, withdraw, disengage, disassociate from, or are indifferent to, urban life. In Simmel's work, the city was positioned as opposite to the rural, which was, by comparison, depicted as still or steady.

Depictions of cities as complex places in constant flux has been a core part of urban theory. Indeed, Lefebvre (1996, p. 129) depicted the urban as a place of encounters, a place of 'permanent disequilibrium', 'play' and 'of the unpredictable'. While Thrift (2003, p. 103) illuminates the layers and complexities, however mundane, of being in place in the city, inviting us to consider a walk in the city, noting that here 'place consists not just of eye making contact with other people or advertising signs or buildings but also the sound of traffic noise and conversation, the touch of ticket machine and hand rail, the smell of exhaust fumes and cooking food'. Thrift (2003, p. 103) argued that once we consider place as entangled with embodiment, we 'start to take notice of all kinds of things which previously were hidden from us'. In relation to disability, Hall and Bates (2019, p. 109) noted that the city is a spatial context that can be difficult for people with disability to inhabit, as the 'design, management and commodification of city spaces, means that constant mobility, stimulation and consumption are prioritised over accessibility, stillness, and public spaces'.

Following the work of Simmel, Davidson and Henderson (2017, p. 74) noted that the nature of urban life requires an ability to shift one's sensory processing, but ask: '... what if the shift in sensory processing ... were, in whole or in part, not possible? What if it did not occur naturally?' Many who are neurodiverse can find it difficult, if not impossible, to be 'indifferent' to sensory stimuli (Davidson & Henderson, 2017). Take noise as an example. For those who are neurodiverse it is not loud noises per se that are problematic, though they can be in and of themselves, rather the complexities of noises that the urban environment presents—the combination of sounds of shoes walking on hard flooring, voices/conversations, cutlery clanging, playing of music, and so forth. Those who are neurotypical can filter out some of these noises to, say, focus on conversations, leaving much noise in the background, switching off to aspects of their surrounding environment, or indeed compartmentalising noises. Thinking about neurodiversity more broadly than sensory sensitivities, what if your brain cannot readily compartmentalise the complexities and intricacies of urban life? What if you cannot easily focus on one task over another? What if you cannot easily process the constant changes of urban life, like a bus running late, and thus changes to your daily schedule or usual rhythm? For people who are neurodiverse, it can be difficult to quickly adapt to changing urban environments, taking time to replan one's day, perhaps even abandoning the day altogether. Understanding the intricacies or minutiae of everyday life for those who are neurodiverse, exposes complexities and challenges that urban life presents. A relational lens orientates us to recognise that the city is a challenging environment for those who are neurodiverse, and to consider the processes and practices that assemble or coalesce to make spaces acquire meaning and ultimately to *become* inclusionary or exclusionary (following Hall, 2020).

### 3 | RESEARCHING NEURODIVERSE EXPERIENCES OF THE CITY

The research reported here was designed to give rise to the voices of neurodiverse individuals, to explore diverse embodiment of neurological differences, and to understand how neurodiverse bodies inhabit urban spaces, revealing everyday urban and social geographies. The perspectives and experiences of neurodiverse individuals—in their own words—remains vastly unreported. Researching neurodiversity requires us to rethink research methods. Neurodiversity challenges many of our assumptions about research approaches as it brings to light different ways of understanding and interpreting, including, for example, participants understanding or interpretation of qualitative survey or interview questions. Further, when considering research on neurodiversity, many stereotypes of neurodiversity, or widely held beliefs about preferences and behaviours, have informed a lot of social research to date. One such assumption is a preference for research at a socio-spatial distance, due to differences in social communication. Davidson (2008, p. 802) noted autistic individuals have 'characteristic preferences for communication at a socio-spatial (and minimal temporal) distance'. Thus, surveys, especially those online, have proved particularly popular in building knowledge of neurodiversity across the social and health sciences, yet we have rarely been reflexive on the survey tools themselves, or the limitations of such tools when designed through a neurotypical lens. Geographers have used open-ended surveys in previous research on autism, with Henderson et al. (2014) using an open-ended online questionnaire to explore the role of internet technologies in the lives of autistic individuals. Feedback from participants suggested that their open survey could be improved by consider-

ing ‘conciseness and clarity in communication, as well as direct and literal rather than open and lateral thinking’, while other participants suggested phrasing should be clearer and that the survey could have more structure and direction (p. 506). These reflections suggest that the openness of the survey limited inclusivity for neurodiversity. This feedback highlights the way neurotypicality can dominate research approaches, whereby consideration might not be given to different ways of interpreting or processing questions. Often social research methods use open questions so a range of views can be captured without being prescriptive or ‘leading’ people toward a particular response. However, open and indirect questions like ‘tell me a bit about yourself’ are often unhelpful for those who have difficulties understanding people’s intentions or the information someone might be looking for (Maras, 2019). Research by Maras (2019, p. 3) examined adapting job interview questions for autistic candidates. In their research, they noted that when questions have less structure, particularly those around personal experiences, self-descriptions, and so forth, the questions are often too ambiguous and difficult to interpret for autistic individuals and can therefore limit their ability to formulate a response that best conveys attributes and experiences, among other things. This has a significant bearing on the outcome of the interview. Their findings also show that relatively simple adaptations to questions can improve such outcomes.

Being cognisant of the need to incorporate diverse ways of interpreting and understanding, the survey for the project reported in this paper was designed to be open—to capture the diversity of possible responses—whilst also offering clear guidance on expectations. This included designing the survey with clear signposting for each section to inform participants of the purpose and nature of the questions within each section, as well as the number and type of questions. There were 20 open-response questions (out of 32), which were designed to be direct and to provide general guidance on the content and/or length of responses, for example: could you describe *one* time when you felt out-of-place in the city due to neurodiversity? (Please include relevant details such as location, time, people involved, etc. Please elaborate your answer by writing up to three or four lines, if appropriate.) The survey was broad in scope, aiming to understand a diverse range of urban experiences, as specifically detailed by the participants, to begin to understand everyday urban and social geographies, experiences of inclusion and exclusion, areas for improvement in the urban environment, and so forth. The survey was conducted in October and November 2021 with neurodiverse individuals living in Cork city, Ireland, attending a local higher education institute (HEI) and the research received ethical clearance from the Social Research Ethics Committee at the authors’ HEI. The survey was conducted online (at a time when there were COVID-19 restrictions on in-person or in-situ research) and received 52 responses. There was notable diversity in the survey sample in terms of neurodivergent diagnoses, as well as gender (50% female; 25% male; 21% non-binary) and sexual identities (36.5% heterosexual; 23% bisexual; 15.4% queer). The multiplicity of neurodiversity is evident in the sample with 50% of participants diagnosed with three or more neurodivergent conditions. Autism was one of the most reported diagnoses, with 40% of the participants having been diagnosed with ASD, while 25% of participants were diagnosed with ADHD (as well as other co-diagnoses). Mental health diagnoses were highly prevalent, with 62% of the participants having been diagnosed with a mental health condition (anxiety the most common). The participants in this study would be considered as having ‘lower support needs’ (referred to historically as ‘high-functioning’) (AsIAM, 2022). Given this work is exploratory, this points to the need for future research to engage with those with a range of support needs, including those with higher support needs, as well as carers and families. Approximately 50% of the participants were aged between 18 and 25, with the remaining participants spread across other age cohorts. Just over 80% of the participants were Irish, with others from North America, Europe and Asia. The survey produced important and powerful insights into the embodied reality of neurodiversity in everyday urban life, which is novel as this is one of the first studies to explore the plurality of neurodiversity and the associated urban social geographies. As the results of this study demonstrate in the next section, when carefully crafted, our research can be at once prescriptive and open, and this does not compromise the diversity of responses and/or ‘lead’ people into narrow responses, and can indeed open up our research, making it more inclusive of neurodiversity.

#### 4 | EXPERIENCING THE CITY

The everyday experiences of neurodiverse individuals in the city reveal a complex, and often hidden, geography of inclusion and exclusion. This is complicated by unpacking neurodiversity and considering the multiple and diverse experiences of urban space, which are linked to a multitude of neurological differences and their intersections. I begin by working through the complex ways that urban spaces can *become* more enabling, accessible or inclusionary for neurodiverse individuals. I then consider the complex ways that exclusionary and inaccessible urban spaces emerge, specifically considering the multidimensional and layered encounters with public transport spaces.

## 4.1 | Making space for neurodiversity in the city

Focusing on individual, embodied experiences of the city, and considering the relations and encounters that occur within urban spaces, reveals ways in which spaces of the city *become* more inclusionary, accessible or enabling for those who are neurodiverse (following Hall, 2020). In this context, participants spoke to the range of ways they inhabit urban spaces, and the diverse ways socio-spatial characteristics assemble to create a space of belonging:

Before COVID, I had a routine of going to the Starbuck's on Prince's St. on Sundays. It is much quieter than the one on Opera Lane. I could order the same sandwich and drink and I would sit in a dark quiet corner and work for hours.

(Jo, late 30s, female, bisexual, diagnosed with ASD)

I like quiet reading spaces, e.g., upstairs in cafes where I can sit undisturbed for long periods of time and read.

(Jamie, late 20s, non-binary, bisexual, diagnosed with ASD, anxiety, ADHD, OCD, SPD and BPD)

Since the pandemic, I also have really appreciated having 'real-time' data on the number of people in different shops, etc. so that I know when to avoid them.

(Lucy, late 20s, female, queer, diagnosed with ADHD, anxiety, OCD and Tourette's)

I feel comfortable often in a few specific shops such as *sostrene greene* or *tiger* because of the predetermined pathway that everyone has to follow because it makes for a much more familiar experience, as well as *Waterstones* in particular because it has such soft lighting and minimal noise as well as soft carpets which eliminate stepping noises.

(Ava, early 30s, female, heterosexual, diagnosed with ASD, anxiety, depression, SPD, phobia and SAD)

Using a relational lens helps to reveal the ways spaces are inhabited differently, together with the social (avoiding others), spatial (lighting, design, etc.) and temporal (days of week or times of day) characteristics that coalesce to make urban space less challenging for those who are neurodiverse. Rather than viewing all cafes and retail spaces as static—all inherently exclusionary or inaccessible—the findings reveal that when viewed relationally, neurodiversity can find expression in urban spaces. Neurodiverse individuals engage and perform their embodiment to transform urban space into something meaningful or accommodating, by selecting spaces—familiar spaces—that can counter the challenges of unpredictable, complex urban environments.

Thinking relationally about neurodiverse encounters allows a focus on the types of encounters that occur in urban space, their affects, and the significance of quite straightforward acts (Hall & Bates, 2019), like ordering coffee. Differences in social communication can make the act of ordering coffee challenging for some who are neurodiverse, due to the complex interactions of seemingly mundane components—verbalising the order, conversations with staff, encountering others, knowing where to stand when waiting for the coffee, music playing, beans grinding. However, Alex, speaks to the familiarity afforded in being a 'regular' at a café:

The barista in the cafe I go to knows my order, and I know a lot of the people who go there frequently, even though I don't speak to them I like seeing the same faces.

(Alex, late 20s, diagnosed with ASD)

The interactions with the barista, the presence of familiar people, all combine or assemble, to create a meaningful space for Alex. While the café might present as a challenging context, due to the complexity of social, sensory and material environments, the mundane interactions that occur within urban spaces are significant as they can enable a space to be transformed and acquire feelings of belonging.

The experience described below by Riley draws attention to the ways different neurodiverse conditions intersect and how this creates not only distinct embodiment of neurodiversity, but also distinct experiences of urban spaces:

I enjoy shopping in the city if I have headphones and already know the layout of the shops I will visit. I avoid busy days and times of day. I do not eat anywhere that does not post their menu online as my sensory needs

are quite specific and I need time to read the menu and make a decision before I actually go to the restaurant. I usually have a plan before coming to the city of where I will go and when.

(Riley, 17–21, bisexual, diagnosed with ADHD, dyslexia and SPD)

The socio-spatial characteristics of urban spaces desired by those who are neurodiverse are varied and relate to a range of neurological differences and their intersections. Riley's experience of the city highlights the intersections of ADHD, dyslexia and SPD, as they describe the ways they engage and perform their embodiment of neurological differences and thus transform their surroundings (Hall & Wilton, 2017). As noted earlier, the complexities of urban life can present challenges when moving through urban spaces with neurodiversity. Like Riley, Shane describes his use of technology to enable distinct negotiation of urban spaces linked to intersections of ASD, OCD and SPD:

I rely heavily on Google maps when in Cork City as I'm not from there. I need to extensively plan out what I'm doing and where I'm going. I get frustrated and/or disorientated very easily and if I realise I've gotten turned around then I can get quite upset. All of this is worse tenfold if I do not have ear/headphones.

(Shane, 17–21, male, queer, diagnosed with ASD, OCD, phobia, SPD and nyctophobia)

Technologies (i.e., headphones, google maps, websites for menus) can offer more enabling experiences of the city, whereby those who are neurodiverse can make use of technologies in various ways to transform the city into a space of belonging. Different technologies can make the city a space that bodies can move through more easily, or a space that is more accessible (Hall, 2020; Hall & Bates, 2019).

Participants in the study identified a range of spatial tactics used to carefully plan engagements with urban space. Neurodiverse engagements with the city are not particularly straightforward or spontaneous, as these responses demonstrate:

I live in the city centre, so I have to be there. My walking through it is always the same path. I try to avoid going out of my apartment at certain times to avoid crowds. I walk on the same side of the street, and I do this at the same time everyday.

(Jo, late 30s, female, bisexual, diagnosed with ASD)

I work in the city so it is hard to avoid going in. It is planned to a tee when I go in beside this. I generally won't go somewhere unless I know exactly what I am doing and for how long. It means that I don't go out with friends often as they prefer to improvise but I can't.

(Mark, early 20s, male, gay, diagnosed with ASD and OCD)

I live two miles from a city centre but really only go in if I have to. By far the most common reason would be to visit a restaurant or cinema with my partner. Both are very deliberate purposes and, with being seated, don't involve 'bumping into people' either literally or metaphorically.

(Luke, late 30s, male, gay, diagnosed with ADHD)

The responses demonstrate distinct spatialised expressions of neurodiversity. These do not solely relate to sensory sensitivities in the urban environment, but intersect with a range of neurological differences, such as differences in executive functioning (e.g., walking on the same side of the street at same time of day) and/or differences in social interactions (e.g., avoiding 'bumping into people'). The variety of instances of micro-planning reveal the ways neurodiverse individuals carefully negotiate urban spaces. Such negotiations of urban space are largely invisible. The responses highlight diverse and unique spatial and temporal practices that can transform cities into spaces of belonging for neurodiversity.

The practices and processes by which urban spaces become spaces of and for neurodiversity can be overlooked if we rely on a static representation of the city as inherently exclusionary. The discussion in this section reveals how spaces that enable more stillness, predictability or familiarity within a city that is layered, complex and challenging, are important for those who are neurodiverse. Reducing some of the layers of complexities within urban spaces (e.g., developing familiarity with café staff or shop layouts, predicting temporal flows of people, or certain types of lighting or flooring, etc.), enables spaces to become spaces of belonging for neurodiversity. It is when these complexities cannot be reduced, altered or predicted, that urban spaces can become more exclusionary.

## 4.2 | Urban spaces becoming exclusionary

As noted earlier, the city can be a complex and challenging environment for people who are neurodiverse. In this section, I work through some examples of the diverse ways in which urban spaces become exclusionary for those who are neurodiverse, considering intersections of identity, and thus, individual, and embodied experiences of spaces becoming exclusionary. The examples also reveal the ways that interactions of embodiment and emotions can coalesce to make spaces acquire meaning (Hall & Bates, 2019). The complexities and challenges of public spaces were an important focus for many participants. John described one experience of urban space becoming exclusionary:

I get the bus from my home county to Cork every Sunday. On the Sunday of Halloween, two of my friends invited me to go to a pub in the city after I got off the bus, and they said they'd meet me at the pub. I was already familiar with how busy the city can get on weekends, but it doesn't help when thousands of drunk students and adults alike are wandering the streets at 10 pm screaming at the top of their lungs. While on the way to the pub, a group of drunk people around my age caught me off guard when they'd grabbed my shoulder to get me to join them singing. The combination of them singing in my ear and being touched so aggressively made me tear up, but I couldn't have a breakdown in the middle of the street so I'd laughed along and said I'd had to go. I did eventually break down in a quiet alleyway on the way to the pub. I wouldn't blame them for it because of course, they're only having fun and they'd never have assumed I was ASD.

(John, 17–21, male, heterosexual, diagnosed with ASD, ADHD and Tourette's)

John speaks to the intersections of neurodiversity as experienced in public spaces that are often complex, layered and 'unpredictable' (Lefebvre, 1996), together with the emotional dimensions to such experiences. John's response also reveals the importance of considering intersectional identities and diverse individual embodiment, as we see the ways perceived gender norms can make public space become more exclusionary, where he felt he could not display emotion in public, and that was something he had to confine to a private space. For John, the suppressing of emotions, the invisibility of neurodiversity, the sensory aspects (physical touching, screaming) and socio-spatial characteristics (loud, large crowds) assemble in such a way that his urban experience acquires feelings of discomfort, of exclusion, invisibility, and of non-belonging.

Public transport spaces were identified by participants as complex, layered spaces in everyday urban life. Wilson (2011) noted that 'bus travel is often an intrinsic and necessary aspect of everyday routine and public life' (p. 634), so it is perhaps unsurprising that public transport spaces—buses, specifically—were frequently discussed. In Cork city, buses are the only public transport option as there is no metro or light rail. Public transport, as a public space, is a part of urban life participants were unable to completely avoid, nor control, and 40% of the participants identified transport as one aspect of urban life they found most challenging. Luke and Finn both identify encounters with others on public transport as key to making the space exclusionary:

I take the bus where people typically have their headphones at max volume or just don't use them at all, which is extremely painful for me.

(Luke, late 30s, male, gay, diagnosed with ADHD)

Being surrounded by so many people.

(Finn, early 20s, non-binary, queer, diagnosed with dyspraxia)

For Finn, close physical interactions with other people makes public transport exclusionary, while for Luke, it is the actions or interactions with other people, and their use of technology, that makes public transport acquire negative meaning. Others spoke to the complexities of bus journeys:

I don't understand how transportation works in the city and I'm too afraid to ask, it'll be too much information at once and I'll get overwhelmed and cry.

(Mary, aged 50–65, female, heterosexual, diagnosed with ASD)

... noise levels on trains, timetable delays, business in station ... Being able to buy bus tickets for long journeys by machine in the bus station rather than paying the bus driver directly. It takes most of the stress out of visiting these places.

(Riley, aged 17–21, bisexual, diagnosed with ADHD, dyslexia and SPD)



... I find trying to get my mask and leapcard nerve wracking as I feel everyone is looking at me wanting me to hurry up.

(Kate, early 20s, female, bisexual, diagnosed with ADHD, anxiety and dyslexia)

Participants identified the layers of complexity to the process of using public transport for people who are neurodiverse from buying or paying for tickets, being in bus stations, knowing bus schedules, buses running late or over-capacity, engaging with bus drivers, and encountering other passengers, the complexities of which relate to a multitude of neurological differences, such as differences in processing information, differences in social communication, or differences in sensory processing, among other things. The combination of various particularities of using public transport intensify feelings of exclusion. The responses reveal that the diverse embodiment of neurological differences leads to diverse realities and experiences related to public transport, and thus public spaces like transport spaces become exclusionary to those who are neurodiverse in different ways because of the combination of bodies, emotions and a range of socio-spatial characteristics (see Hall & Bates, 2019).

The complexities of public transport use for those who are neurodiverse saw public transport identified as a space that can quickly become exclusionary and that this can generate emotional responses that assemble to make the space acquire feelings of distress and non-belonging:

But having the bus eireann buses run close to on time at least. If a route is busy at a certain time have more buses on. The uncertainty of being able to get somewhere is stressful, the digital real time screens on stops are helpful but not always accurate and are not on all bus stops.

(Ava, early 30s, female, heterosexual, diagnosed with ASD, anxiety, depression, SPD, phobia and SAD)

During the jazz weekend I had a panic attack on a bus because it was very overwhelmingly full, running at full capacity.

(Emma, aged 17–21, female, lesbian, diagnosed with ASD, anxiety, depression and SPD)

Having anxiety attacks in public from using public transport for the first time. Crying in public as a result.

(Amelia, aged 17–21, female, heterosexual, diagnosed with anxiety)

Public spaces can acquire negative meanings for those who are neurodiverse when we consider the interactions of bodies and emotions in such spaces (Hall, 2020). The responses highlight the anxiety of public transport use for those who are neurodiverse—whether that be related to overcrowded buses, lack of familiarity with using public transport, or the uncertainty of buses not running to schedule. Very distinct bodily responses are generated from feelings of exclusion and non-belonging. Such bodily responses are also occurring *in* public, though this is gendered, as the emotional experiences of stress and anxiety were disproportionately reported by participants who identify as female. While there is considerable literature on gendered exclusions in public space (see Ruddick, 1996 as a start), the intersections of gender and neurodiversity reveal distinct experiences of exclusion that require further unravelling to consider the ways intersecting power-geometries shape experiences of the city and can make urban spaces exclusionary. The emphasis on public transport spaces for the individuals in this study demonstrates the need for research on the urban environment, beyond individual buildings or spaces, as challenges related to public transport have consequences for wider participation in urban life and limit rights to the city.

## 5 | NEURODIVERSE CITIES: REFLECTIONS AND RESEARCH DIRECTIONS

This paper has revealed the complex, intricate and often invisible geographies of neurodiversity in the city. The research has also revealed the plurality to neurodiversity and distinct styles of personal embodiment of neurodiversity in urban space, linked to a multitude of embodied differences. The research demonstrates that neurodiversity is not singular nor one-dimensional—neurodiversity is more than autism and more than sensory. Broader and more inclusive conceptualisations of neurodiversity need to be mobilised in both academic and public discourse. Beyond this, the paper has developed foundations for a relational geography of neurodiversity that considers the complex urban and social worlds that neurodiverse individuals inhabit. This work has revealed how many who are neurodiverse make space for neurodiversity in the city and cope with embodied differences in challenging urban environments and the social, spatial and temporal

processes and practices through which urban spaces become inclusionary or exclusionary. The discussion emphasises the need to take more seriously neurodiverse experiences of the city. Importantly, some of the most intense feelings of exclusion and non-belonging emerged in public spaces of the city and given the centrality of public space to urban policy, this is an area for particular attention. While complex exclusions and politics in urban public spaces are well documented (see Collins & Stadler, 2020), the forms of exclusion experienced by those who are neurodiverse remain largely invisible and undocumented. Given the importance of public space in urban planning and policy in terms of accessibility, inclusion, encounter, health and wellbeing, among other things (see Collins & Stadler, 2020), neurodiversity needs deeper consideration. Importantly, thinking relationally about neurodiversity will aid 'those designing and planning accessible environments to think more complexly about who matters and what makes a space inclusionary' (Hall, 2020, p. 6).

This paper scratches the surface of this research area but raises several important avenues for further research. First, is to continue to document neurodiverse experiences of urban space as related to the diverse embodiment of neurological differences, across the life course. The second is to consider the ways we document such experiences and develop more participatory and embodied methodologies for this work (following Kenna, 2022) as the distinct personal embodiment of neurodiversity in urban space is apparent from this research. It would be imperative that when conducting research with neurodiverse participants, researchers consider the neurotypicality of research methods and reframe research and data gathering through neurodiversity. This might involve different ways of communicating or considering participatory approaches and diverse technologies (e.g., video methods) to capture experience. Adopting participatory research techniques like walking interviews or mobile observation (see Wiesel et al., 2013) might aid inclusion in research processes and take away the formality of face-to-face conversations, bearing in mind possible differences in social communication. Such approaches also enable experience to be captured and understood through a range of movements, expressions and encounters, beyond verbal conversations, emphasising the importance of what is and is not said, including facial expressions, eye contact (or lack of), and so forth (Hall & Wilton, 2017; Wiesel et al., 2013). Relatedly, throughout this paper, many who are neurodiverse have spoken about the ways urban life affects health and wellbeing and associated bodily reactions and emotions. Research in this area thus requires careful ethical consideration, as doing research in situ might put some people in a situation of deep discomfort. Research in this area might contribute to the consideration of 'the role of emotions in shaping, and being shaped by, research encounters' (Laurier & Parr, 2000; Valentine, 2003; Widdowfield, 2000). Laurier and Parr (2000, p. 99) suggest that 'acknowledging emotions and emotional exchanges orientates us differently' and thus might orient our research approaches differently to capture, and care for, such emotions.

Finally, encounters with others are deemed central to urban life, with the transformative potential of encounters between strangers having gained considerable traction in recent years (see Fincher & Iveson, 2008). Given the importance of predictability and routine for many who are neurodiverse, as well as the reported limits to full participation in urban life, questions are raised for the geographies of urban encounter, especially as Young (1990, p. 239) suggested that encounters with difference allows one to be drawn out of 'secure routine' to encounter 'the novel, the strange, the surprising'. The routines of those who are neurodiverse are arguably necessary for inclusion in the urban environment. What if one cannot be drawn outside of their secure routine to encounter those unknown to them? Goffman (1961, p. 7) divided encounter into two broad categories: focused and unfocused interactions. Unfocused interactions involve the mere presence of others/strangers, with focused interactions occurring when 'people effectively agree to sustain for a time a single focus of cognitive and visual attention, as in a conversation, a board game, or a joint task sustained by a close face-to-face circle of contributors'. How might we foster focused, meaningful, transformative encounters when considering neurological diversity, or the different ways brains manage life and interactions with others, which may not allow close contact or a single focus? These are pressing questions for geographers to consider. These questions might also productively overlap with emerging work on social infrastructure in urban geography that is thinking through how and why places like libraries, playgrounds, community centres or cafes matter for the social life of cities, recognising the crucial role of such spaces for how and where we make connections with other people (Latham & Layton, 2019). In this paper, the limits to participation in urban life for those who are neurodiverse were identified and these are worth thinking through in relation to emerging work on social infrastructure, especially as many places like public libraries are introducing initiatives for improving participation of those who are neurodiverse within such spaces (see, for example, the 'autism-friendly hour' in [Cork City Library](#)). The exclusive planning of dedicated time-spaces for neurodiversity, whether visible (through initiatives like an 'autism hour') or invisible (as detailed by many of the participants in this study), sees spatial and temporal limits placed on neurodiversity in the city which can have implications for sociality and encounter, and to being part of the public. This is an avenue for further consideration and research. Continuing research in these and other areas would assist the urban professions as they consider design, planning and policy dimensions to urban and built environments, and that these considerations might diversify beyond autism specifically. Developing a

relational geography of neurodiversity that critically attends to complex intersections and relations of society and space offers important insights and contributions for those wanting to make cities spaces of and for neurodiversity.

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## DATA AVAILABILITY STATEMENT

Data available on request due to privacy/ethical restrictions: The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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