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**Learning with labyrinths:
Neurodivergent journeying towards new concepts of care and creative pedagogy
through participatory community autism research**

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Abstract

This paper arises from a UK research project, *Playing A/Part*, which explores the identities and experiences of autistic girls through creative practices and the implications for pedagogy. Funded by the Arts and Humanities Research Council, the project was an interdisciplinary collaboration using mixed-measures and a creative and participatory approach to co-produce new knowledge about this under-represented group. The research engaged 77 girls, aged 11 to 16, in a range of educational settings: Special Educational Needs, mainstream, and selective. The focus of discussion is the emergence of the labyrinth as a creative tool for learning and well-being and the implications for care and learning in neurodivergent contexts. After contextualising the study in relation to research on autism and gender, the paper explains how labyrinths offered an appropriate ethical, aesthetic, and sensory space for the creative pedagogic practices within the research programme. The paper also considers the implications of the study for higher education in terms of teaching neurodivergent learners, and research approaches to autism.

Keywords: Autism, adolescent mental health, creative, gender, labyrinths, neurodivergent, practice-research

Introduction

We're trying to get politicians to understand that this [autistic girls] is a group who are massively under diagnosed, but also that there are not the right services out there for them or the awareness, including GPs who don't understand what female autism looks like. (Sarah Wild, Headteacher at Limpsfield Grange, the only UK specialist school for autistic girls, 2016).



In 2018, I met Emma, a 14-year-old pupil at Limpsfield Grange School, a specialist setting for educating autistic girls. Emma was participating in a research project focussed on autism and gender, addressing the issues identified by the school's headteacher in the opening quotation. Emma was attending a drama-based workshop as part of our practice-based research. We were using creative methods to better understand the identities and experiences of autistic girls and how pedagogical models could support their development and well-being. As a collaboration between the School of Arts at the University of Kent and the School of Psychology at the University of Surrey, the aim was to use a novel interdisciplinary approach to engage with an under-represented population in autism research (Bargiela, et al., 2016; Beggiato, et al., 2017; Whitlock, et al., 2020; Wood-Downie, et al., 2021). In describing Emma's perspective, I have referred to transcripts of Interviews and workshop conversations which were used for thematic analysis as well as providing a script for a film animation in which Emma's story was central (Shaughnessy, et al., 2020).

In terms of what autism 'looks like', Emma challenged many of the historical stereotypes of autism. Presenting as an articulate and imaginative adolescent girl. Traditionally, autism is pathologised as a condition that affects more boys than girls and is associated with diagnostic criteria that refer to deficits in language, communication, and 'social' imagination (often observed through pretend play). Emma, however, like many of her autistic peers at Limpsfield Grange, demonstrated a very well-developed capacity for play, immersing herself in fantasy worlds associated with her particular interests (e.g., animals, cartoon characters, science fiction), as well as being an avid reader and creative writer.

On arrival at our first 'creative club' workshop, Emma offered a challenge for the research team, questioning our rationale. She positioned herself outside of the seated group circle, standing rather than sitting, distanced from her peers. Emma was not the only participant to appear disengaged with our circular formation which was intended to flatten hierarchies (between researcher/participant and teacher/pupil). Her rebellion was in some respects the start of our labyrinth journey, although this realisation came later in the process. Refusing the turn taking introductions, Emma staged an intervention, moving into the centre of the circle to address our audience of peers and practitioners. She was suspicious of our practical methods and intentions. She wanted to establish that we were not doing 'therapy' and that she would not be treated like a child. Although interested in working creatively, she also made it clear that she was ambivalent about her diagnosis, later describing autism as being like 'a tar that sticks to me.'

Prior to her transition to Limpsfield Grange (aged 11), Emma's experiences of diagnosis and her various encounters with health and education professionals (as well as her peers) had left her feeling disempowered, misunderstood and with poor mental health (anxiety and depression). She was ambitious to go to university and worried about her future as the school only catered for 11 to 16-year-old girls. She also told us about her autistic brother who was 'nothing like her' and whose diagnosis had been much earlier as he was 'typically autistic' (to use her words). which Emma's story was central (Shaughnessy, et al., 2020).

Emma's experience exemplifies the problem our research was seeking to address: the under-representation and under-diagnosis of autistic girls (and women); the need for increased awareness and recognition of gender differences and diversity in autism (including marginalised genders), and research that focusses on education and care rather than diagnosis and intervention (Pellicano, et al., 2013, 2014). Historically, the priority for autism research and funding has been on causal factors and intervention. Leading educators and advocates have called for more research and new methods dedicated to improving the well-being of autistic people and contributing to better understanding and awareness of neurodiversity (Fletcher-Watson, et al., 2019). Research from the disability field (Mansell & Beadle-Brown, 2012) highlights the importance of engagement in meaningful occupation and community inclusion as key to quality of life.

This article contributes to the knowledge gaps associated with autism, gender, and education through its focus on neurodivergent learning. After an overview of the research context in which the study was situated, there is discussion of the participatory and creative methods and our discoveries about sensory experience and safe space for this under-researched and often mis-understood community. The role of the labyrinth as a tool for working with neurodivergent learners is the focus of discussion with consideration of how this can be used in Higher Education contexts and the implications for pedagogy and care.

Research context

Autism is a rapidly evolving research field with changing diagnostic criteria (Evans, 2017; Rosen, et al., 2021), the rise of the neurodiversity movement (Singer, 1998, 2017; Pellicano & Den-Houting, 2022) and the influence of participatory autism research (Pellicano & Stears, 2011; Fletcher-Watson, et al., 2019; Gowen, et al., 2019; Keating, 2021) contributing to changes in scientific understanding, research approaches, public perception and language (Happé & Frith, 2020).

Recent scholarship has challenged negative stereotypes of disability and the deficit language of medical models as well as literary and media representations (Murray, 2008). Autistic scholars and advocates conceptualise autism in terms of difference, rather than deficit, as a way of 'being in the world' that is a human variant. The term 'neurodivergent' has emerged as a way of describing neuro-differences (e.g., ADHD, Autism, Dyslexia, Dyspraxia, Tourette's). The concept of the autism spectrum has similarly been called into question as a linear progression based on cognitive functioning. Instead, the spectrum is configured as a circular, multi-faceted model, encompassing capabilities as well as difficulties. There are important pedagogical implications to these changes in understanding of autism which are core to this article, with increased recognition of the need to identify strengths and interests for autistic learners as well as acknowledging different learning styles and communication preferences (Wood, 2019).

A key feature of the changes to autism research and the differences between medical and social models of disability are debates concerning language. For professionals in health and education, person first language (person with autism) has traditionally been considered as the

most respectable terminology, putting the individual before the medical condition. For many autistic advocates, however, identity first language is preferred as autism is experienced as integral to personhood, something that cannot be put down, in the same way we refer to someone being deaf or black, for example. Nevertheless, language continues to be debated across disciplines so that some researchers use a mix of both to fully represent the researched community (Kenny, 2019; Botha, et al., 2021). For the purposes of this article, identity first language is used as this was the preference of the research group we worked with. It is also my preference as the academic lead, a position that has shifted as my research has developed moving from adherence to scientific models (person-first traditions) through to transdisciplinary paradigms in collaborations between different communities of practice (identity first preferences, Pellicano & Den Houting, 2021).

Autism and gender have emerged relatively recently as important and under-researched areas with a proliferation of studies since the pioneering work of Judith Gould and Jacqui Ashton-Smith (2011). They responded to a rapid increase in female referrals, noting differences between autistic girls and boys in terms of communication (superior linguistic abilities), imagination (more elaborate pretend play) and intense interests and routines (e.g., animals). They also identified issues concerning social inclusion and vulnerability, noting high levels of anxiety and depression in this population. This was endorsed in subsequent studies (Dworzynski, et al., 2012; Hull, et al., 2017; Loomes, et al., 2017). Since then, further research has been undertaken, particularly in education contexts, investigating how autistic girls interact, socialise, and develop self-awareness (Sedgewick, 2018; Williams, et al., 2019). Whilst some studies focus on what has been controversially referred to as a 'female phenotype' in research on genes, brain function, and behaviour (Ferri, et al., 2018; Jack, et al., 2021), there has also been increasing attention on mental health issues, particularly the higher prevalence of eating disorders in autistic girls (Mandy & Tchanturia, 2015).

A series of themes emerge from the recent literature on autism and gender, and these are consistent in academic research and in lived experience accounts. Firstly, there is a critique of autistic stereotypes and the male dominated clinical models, particularly the 'extreme male brain theory' (Baron-Cohen, 2002, 2009; Greenberg, et al., 2018) which has perpetuated the popular association of autism with masculinity, potentially contributing to reduced diagnosis in girls and women (Mandy, 2013; Pelphrey cited in Szalavits, 2016; Ferri, et al., 2018). Diagnostic tools have been developed using predominantly male samples, so they lack sensitivity to autistic traits in girls. The development of strategies to conceal difference through masking or social camouflage is arguably the most prevalent theme of the literature on autism and gender (Sedgewick, et al., 2021). This has important consequences for undiagnosed autistic individuals (of all genders), whose efforts to conceal and internalise differences and difficulties (masking) contribute to reduced self-esteem and self-efficacy and can lead to mental health problems (Williams, et al., 2019; Sedgewick, et al., 2021). However, the masking theme has also been critiqued as oversimplified and stereotyped. Some of the characteristics associated with autistic girls, such as being socially shy (affecting communication, peer interaction), anxious (needing structure, routine,

perfectionism), and having intense interests or being highly imaginative, are also associated with traditionally 'female' traits. Moreover, whilst many self-identified autistic women report being aware of their differences and concealing these in order to conform to the structure and expectations of a neurotypical world, there are also Cis-men, trans, and/or non-binary people who discover they are autistic in adult life and who also describe masking or hiding their differences. Gender stereotypes have been prevalent and problematic in autism research, contributing to significant knowledge gaps. In addition to concerns about gender bias in diagnosis, environmental factors have also contributed to the relative invisibility of autistic girls and women. In school contexts, fluid social groupings characteristic of female social interaction create a facilitative social milieu for masking, while boys are more likely to exhibit disruptive behaviours (Williams, et al., 2019).

These changing contexts are evident in the development of the research that led to the *Playing A/Part* project, with its focus on autistic adolescent girls, supported by a Steering Group of autistic women and an Advisory Board of senior researchers in autism and interdisciplinary practices. In a previous project, *Imagining Autism* (AHRC funded 2011-2014), we worked in specialist settings with a gender ratio of 5:1 male to female participants. Many of our participants had high levels of need and several were classified as 'pre-verbal'. What we discovered, however, challenged some of the stereotypes of autism in terms of highly imaginative participants, spiky profiles (rather than low/high ability dualisms), sense of humour and sociality. As our understanding shifted, so did our approach through increasing engagement with the autistic community as practitioners and researchers. The full title for this initial interdisciplinary project was 'Imagining Autism: Drama, Performance, and Intermediality as Interventions for Autistic Spectrum Conditions.' Our increasing discomfort with the term 'intervention' and our research journey as we moved beyond deficit models to embrace difference and neurodiversity paradigms was a process of co-production. This led to 'Autism Re-imagined' in 2017, a Follow-on Funding grant (AHRC) in which a participatory community research model was core to the approach. New training and resources for educators, autistic community cafes and a network of neurodivergent creatives and researchers were the legacy of this work. It was this body of research (using embodied, creative, and participatory community approaches) that laid the foundations for the *Playing A/Part* project. Reflecting on this, the labyrinth seems an appropriate metaphor for our journeying as well as emerging as a practical tool.

Our participatory practices were informed by an ecological framework, foreshadowing our later discovery in *Playing A/Part* of the all-encompassing environment of the labyrinth as a space to learn. In *Imagining Autism* our ecological approach explored the engagement of autistic children with the material environment, social and peer interactions and imaginative play. The ecological approach stresses the importance of viewing development, conceptions of identity, agency, sense making and sense of self as the outcome not just of one factor (such as cognition or biology) but of a network of dynamic mutual interactions between individual subjectivities, other people, and the material and sensory aspects of the environment (Gibson, 2000; Tringham & Shaughnessy, 2018). This can be allied with what is referred to as the 'relational'

approach in participatory arts and which recognises agency as being constructed through subjectivity, intersubjectivity and environmental relations (Harpin & Nicholson, 2016). This contributed to the conceptual and creative framework for *Playing A/Part*. The Psychology lead for the *Playing A/Part* project, Emma Williams, had used a related approach in researching how autistic pupils made sense of themselves in school settings (Williams, et al., 2019). This identified three 'intermeshing aspects of experience contributing to many autistic pupils having low self-esteem, viewing themselves as "different" in a negative way'. The themes identified were subjective experience of difficulties linked to being autistic; interpersonal relationships, particularly with peers; and the accessibility of physical and sensory aspects of the school environment. Subsequent research on *Playing A/Part*, highlighted the prominence of sensory issues for the autistic girls in the study, this being one of the most central themes emerging through the interviews, focus groups and practical workshops. Sensory sensitivity was only identified in DSM-5 as core to the diagnostic criteria yet for many autistic people it is fundamental to their experience of difference (Shaughnessy, 2020). Aversion to bright light, acuity to sound, intolerance of particular smells and textures (especially in relation to food) were identified as key features triggering shutdown and meltdown and impacting on learning environments. In one example, an aversion to the sound and texture of paper caused a puppet workshop to be abandoned even though this had been successful with other groups in the project. However, sensory seeking, a corollary of sensory avoidance was often associated with intense interests and creative preferences. Hence, a young person with strong auditory sensitivity might react negatively to sounds, pitches or volume but could also be extremely musical. All of this has important implications for learning environments. The acutely felt and continual need for safe space, experiences of fear and hiding contribute to high levels of anxiety for autistic learners. Moreover, this is indicative of the extent to which anxiety is produced by the environment as an external factor impacting on autistic individuals. We should note here the important shift between anxiety as a psychological symptom that is isolated within the individual, to anxiety often being caused by external factors impacting upon individuals, and which it is in our power to change. Such insights have important implications for professionals in education and health. The need, as this article will argue is to reconsider traditional paradigms for learning and care.

Research approach

Participatory and socially engaged arts are increasingly used as creative tools for experience-based research design, particularly with disenfranchised groups. As modes of creative enquiry between participants and artists (as makers, editors, and observers), participatory arts explore narratives of individual, community and cultural identity and are reported to have positive impacts on well-being (Fancourt & Finn, 2019). Drama-based approaches are gaining traction in autism research with several eminent psychologists using practice-based methodologies for empirical studies (O'Sullivan, 2015). Theatre and media technologies have also been shown to have benefits for autistic learners (Gabriel, et al., 2015; Keay-Bright & Howarth, 2012) and dramatherapy is reported to improve mental health for autistic young people (Haythorne &

Seymour, 2017). Improvisation techniques are associated with an emerging approach which involves 'meeting autistic individuals where they are, rather than trying to 'fix' them' (Lerner, 2017). Nevertheless, a 2015 survey reported a 'dearth of evidence-based studies of drama and autism' (O'Sullivan, 2015).

Involving community members in research processes is important to ensuring outcomes are relevant, yet the UK has been criticised as being close to the 'bottom of the ladder' for participatory autism research, leaving autistic people and their families 'disenfranchised' from research processes (Pellicano, et al., 2014). This contributes to misconceptions about autistic experience and structures for education and support. For example, it is often assumed that low arousal learning environments are more appropriate for autistic young people because of sensory sensitivities but this fails to recognise that autistic learners can be sensory seeking (hypo sensitivity) as well as sensory averse (hyper), so understanding sensory preferences can be key to identifying learning styles and preferences. This was evident in the *Playing A/Part* project and in our previous research with autistic children in primary schools (*Imagining Autism*) (Beadle-Brown, et al., 2017).

The *Playing A/Part* project sought to address knowledge gaps in autism studies through its focus on gender, lived experience and creative pedagogy using an interdisciplinary and ecological approach. Hence our focus was on care and learning in a context of shifting paradigms to 'neurodiversity in autism science' (Pellicano, 2022: 302).

Our objectives were to co-produce and evaluate a programme of participatory arts workshops for autistic girls and adolescents. The workshops were designed to elicit rich information about the identities and experiences of participants through embodied multimodal approaches. Such approaches are appropriate to the complexities of adolescent experience, offering opportunities to learn new expressive vocabularies and for participants to have agency through opportunities for choice in the creative media used and through co-production. A highly experienced team of creative practitioners with specialisms in peer education, applied drama, music, movement, and interactive media worked with a diverse range of students in different educational settings across the project. Preliminary workshops at Limpsfield Grange School (phase 1) explored safe space through den-building, installation, site-responsive work, and, importantly, labyrinths; identities and persona were investigated through mask-making and puppetry, alongside storytelling through improvisation with objects, props, and costume. Sound walks, film, and photography were used to explore sensory experience, and a programme of play-based introductory movement exercises was developed by a neurodivergent practitioner, specialising in Feldenkrais. The psychology team tested a range of evaluation measures to examine the efficacy of the arts practices in relation to self-perception, self-esteem, mental well-being, and creativity. They quickly discovered the value of incorporating creative approaches into interviews, using drawing and sensory profiles, also noticing how doing creative activities before interviews 'opened up' the participants to talking about themselves (Williams, 2020). The workshop programme was adapted into an online version when the Covid-19 pandemic caused schools to close, disrupting the phase 2 workshop delivery and data collection. These resources

were finally tested as a hybrid model when the schools re-opened with creative practitioners running a six-week programme of online sessions for participants in their group 'bubbles' in schools which psychologists evaluated (phase 3) using new and established measures.

Discussion

The trouble with circles

Our first meeting at Limpsfield Grange School involved a meeting between the researchers, the creative practitioners and our steering group of autistic women. We gathered in a portacabin in the grounds of the school used for extra-curricular activities. Pool tables, a fridge, television, and oversized bean bags contributed to the informality of the space. Whilst we welcomed an environment associated with play, there were concerns about the bright fluorescent light, the cool temperature, and a distinctive smell, combining wood, plastic and a slight mustiness. We sat in a circle to introduce ourselves. The circle is frequently used in creative and therapeutic contexts as a means of equalising power structures and facilitating co-production as a group or ensemble. However, it quickly became evident that there was discomfort in the room. Some people sat facing away from the circle, one person indicated she preferred not to speak, whilst another spoke at such length, we had reached the coffee break without getting beyond the introductions. It felt tense, uncomfortable, and chaotic. There was something wrong with the environment and the dynamics, but at the time we had no idea what it was. True to the labyrinth experience that became a logo for the project, we would realise towards the end of the process the complexities of the identities at play that morning, as the journey through the project led to recognition of undiscovered neurodivergence for some of our team. Later that afternoon, we met our first group of potential participants in the school gym after school. The gym felt dark and cold on a November evening, so we turned on heaters, organised benches and tables with creative materials and assembled gym mats as a loose circle configuration to introduce ourselves. A similar atmosphere developed around a very loosely configured circle with some of the girls facing away and Emma standing outside. Finally, I noticed a participant doodling in her new project diary 'I don't like circles.' I think I heard one of the autistic practitioners acknowledge this by saying 'nor do I', a perception endorsed by the project Steering Group who provided invaluable advice and feedback throughout the process.

Circles, it transpired, can be a difficult space for many autistic and neurodivergent people; there maybe nowhere to hide, eye contact can feel enforced. They may produce anxiety through enforced turn-taking; they can be associated with getting things wrong in name games or ball games; they maybe exposing, humiliating and a space that is often more associated with fear than togetherness. So, in relation to the conceptual framework of participatory arts and our understanding of agency as being produced through interactions between the environment, social interaction and sensing subjectivity, our drama circles were not compatible with our research objectives.

Labyrinths and learning

The idea of labyrinths as a potential solution was suggested by the autistic author, Katherine May, a consultant on the project, with extensive experience of teaching creative writing in higher education. The process of walking a labyrinth offers a reflective space, individually and in a group. It is considered a metaphor for a life journey, used in secular and spiritual settings, and found in ancient and contemporary objects and architecture (Saward, 2002; Sellers & Moss, 2017). Historically, labyrinths have functioned as a meditative space with walking labyrinths frequently located in churches, most notably at Chartres Cathedral. Although there are numerous labyrinth configurations, the two primary ones are the Chartres medieval pattern and the classical labyrinth, both of which are found in places associated with meditation, learning and self-development. In contemporary contexts labyrinths are increasingly found in university teaching and counselling settings, functioning as an educational and therapeutic resource. In *Learning with the Labyrinth* (Sellers & Moss, 2016) examples from Higher Education include using the labyrinth for teaching in health care, social work, creative writing, and dance.

For our purposes, an important feature is the unicursal path which distinguishes a labyrinth from a maze: this means there is no potential for taking the wrong path or getting lost as the circular, non-linear structure involves only one way in and out as an orientating and embodied experience. As is often said, a maze is entered to lose oneself and a labyrinth to find oneself (Artress, 2006: 302). For the autistic girls we were working with, this contributed to the labyrinth being a safe creative space. By designing a portable painted labyrinth floor cloth (classical pattern), we were also able to use the labyrinth as a time-out and thinking space, a function also supported by finger labyrinths. These smaller handheld versions are tactile structures with embedded patterns (e.g., made from wood, clay, felt), functioning rather like the sensory fidget toys or 'stim tools' (our term) which the participants used for focus or calming. Finger labyrinths can have a similar function to these stimulating resources which use a range of sensory materials to promote thinking and sense making through movement (see below). As our research findings slowly emerged, we were to return over and over again to the labyrinth: its material reality in our workshops encouraging both flow and focus, the control and conversely the freedom it offers over the immediate sensory surroundings. Also, the particular sociality offered by a space that both separates and connects; in all these ways it is the labyrinth which came to embody the heart of

Playing A/Part.

The labyrinth activities engaged participants aesthetically and intellectually as well as affectively. An introductory labyrinth session offered a rich historical context (PowerPoint presentation), moving gradually into a creative experience. We hung the gym walls with large drawings of labyrinths, also using lighting and cloths decorated with UV paint to create an immersive environment. Participants traced these physically with their fingers, their bodies shifting through large arm movements. This embodied approach complemented the subsequent drawing activities. We learned to sketch individual labyrinths according to a seed pattern at the centre of

every labyrinth; a step-by-step diagrammatic approach using a template (Trimingham, et al., 2023). This did not require drawing ability and enabled everyone to learn a new skill at a similar pace. Starting with the simplest '3 circuit' design, some of the participants progressed to more complex patterns. The labyrinths could then be decorated and personalised (Sellers & Moss, 2016). It was also an activity where it was difficult to fail which is important for young people who may have histories of experiencing failure and/or struggle with perfectionism. Moving from individual to small group work, participants drew larger labyrinths on floor sheets before we moved to the creation of a group labyrinth, using rows of upturned white paper coffee cups. Starting with the seed patterns and working outwards with each participant contributing cups, we built the labyrinth in the same way it had been drawn, according to the classic pattern. Finally, electronic tea lights were placed on alternate cups and the room was darkened. When one of the participants commented on the flickering lights hurting her eyes, another put the lights under the cups, creating a softer effect. As Melissa Trimingham, the lead for the creative practice in the *Playing A/Part* project, has written:

The result is such a beautiful image yet very simple that somehow epitomises neurodivergent creativity. A perhaps familiar space is perceived as totally different: senses are sharpened by something so appealing, intriguing and transforming. I have known at least one life utterly changed by a meditative walk around the space of a labyrinth. (Trimingham, et al., 2023)

In subsequent sessions we worked with a creative writing consultant and labyrinth expert, Sonia Overall, to build a labyrinth in the grounds of Limpsfield Grange School. This was in connection with a programme of work on Shakespeare's *The Tempest* where the labyrinth outside was Prospero's Island and activities using the labyrinth explored questions about identities and experience in relation to the text such as choosing one of the question cards and reflecting on it from a character's or personal perspective. Examples included 'make three wishes' and 'who might oppose or help you?' The themes of this play had already been identified during a labyrinth exercise as justice, control, freedom, forgiveness, and difference connecting powerfully to the experiences of this community of autistic girls.

Labyrinths can be made from a range of materials: stones, books, shoes etc as appropriate to the group. Once a labyrinth is made in whatever form (floor cloth, installation, finger labyrinth), it offers wealth of learning opportunities as a space for holding and working through ideas. Walking a labyrinth (or using a finger labyrinth) is an opportunity to think about questions, prompts and stimuli and to process these individually, without being influenced by others. Yet being part of a group activity engaged with the labyrinth can be important to the learning experience. The sense of individual and group space was reinforced through the creation of place holders which participants personalised using fabric strips, yarn, natural elements, and tags. Each walked the labyrinth to locate their own spot where each individual could stop, sit, think, write and use as their own. The place holders were used on the floor cloth during journaling activities

as well as being a private space that could be used whenever time out was needed. Prompts explored journeying and identities, such as questions about the contents of an imaginary backpack for life on an island. Inventing spells that could transform something from negative to positive was an example of a group activity that fostered a sense of community identity, a feature reported on positively by focus groups.

Neurodivergent cognition

The labyrinth resources resonated with autistic students in a diversity of settings in ways that suggest a potential synergy with neurodivergent cognition: the thinking and feeling states described by autistic people in scholarship as well as narrative accounts. These features can be considered in relation to the diagnostic criteria but move beyond them, offering depth of insight as neurodivergent descriptors. Key features are (i) thinking being shaped by focussed interests (monotropism), flow states and attention to detail, (ii) feeling and affective experience being impacted by sensory awareness (hyper and hypo sensitivities), and (iii) communication being linked to autistic sociality (double empathy theory) (Milton, 2012). These are consistent themes in autistic writing (by autistic people) and in autism research although they are differently inflected according to the context in which the writing is produced. Hence some features have been identified as both strengths and deficits (e.g., intense interests being associated with ability and talent as well as being evidenced as 'restrictive' behaviour in diagnostic accounts). The labyrinth offered a medium that was appropriate for the neurodivergent 'bodymind' through movement-based processing (whether walking, tracing fingers or moving in other ways) which can facilitate mental focus and flow and can also be linked to stimming (see below). It also works within a particular time space through being 'in the moment,' thereby supporting presence as a meditative and mindful activity. If set up appropriately it will be a safe sensory environment (which the individual chooses to access) and can also be attuned to sensory preferences (e.g., sound or light labyrinth installations). Finally, it is a space in which the individual can be simultaneously independent and part of a group (sociality). These neurodivergent features, held and nurtured within the enigmatic space of the labyrinth, are now considered in more detail before discussion of how this can be conceptualised in relation to 4E cognition (embodied, embedded, enacted, extended) as a framework for understanding the labyrinth and neurodivergent learning. In terms of 4E theory, meaning making is understood as emerging through mind-body-world interactions. This means that neurodivergent sensory, perceptual, and physical differences (feeling, thinking and sense-making) influence learning with critical implications for pedagogic practice.

The model of the mind as an 'interest system', or 'monotropism' (Murray, et al., 2005; Murray, 2019) rests on the well-documented capacity for autistic and associated neurodivergent thinkers (e.g., people with attention differences/ADHD) to become hyper-focussed on a particular topic or preference and for this to direct their attention almost exclusively. As the autistic advocate and teacher Fergus Murray has written,

Different interests are salient at different times. In a monotropic mind, fewer interests tend to be aroused at any time, and they attract more of our processing resources, making it harder to deal with things outside of our current attention tunnel (2019: 44).

This feature can impact on learning positively or negatively. If interests are considered as restrictive, they become associated with barriers to normative models of learning as the individual may be difficult to engage in the required curriculum and easily distracted by the pull to attend to their particular interest at the time (as these do change according to circumstances and the life course). There has been a lot of attention to the difficulties associated with what is referred to as 'executive functioning' as a feature of neurodivergent cognition (Kenny, et al., 2016). Many of these challenges can be connected to monotropism, such as staying on task (if attention is diverted by the pull to interests-based thinking), time-management (e.g., more time needed for processing and also losing sense of time whilst absorbed in pursuit of interests); adjusting to change (e.g., resistance to change or difficulty with stopping an activity or preference to pursue continuing and habitual interests). This can also contribute to language and communication as the autistic tendency to focus on literal meanings or words rather than sentences is a feature of monotropism. What this means is that monotropism is not a problem but presents an opportunity and this can be harnessed through interest-led learning (Wood, 2019). In the *Imagining Autism* project, we became increasingly aware of the importance of an interest-led approach and incorporated it into our training and practice, 'following the children's cues.' We met Patrick, an autistic 9-year-old in a special school who had a passion and skill for drawing cartoons, yet this had been discouraged by his teachers as a distraction from learning. Yet, these cartoons were used by Patrick as a sense-making activity, a way of processing and commenting on his affectual and perceptual experience as evident in the drawings he produced arising from the *Imagining Autism* environments. In another example, an educational psychologist worked with us to enable Harry, a pre-verbal participant, to explore our environments through photography (Trimingham & Shaughnessy, 2018).

There is increasing evidence of the benefits of interest-led pedagogies for autistic people (Huntley, et al., 2019; Wood, 2019; Davey, 2020). Pursuing interests is associated with flow states and can positively impact on mental well-being and self-efficacy, particularly when this results in high levels of achievement. If the interest system is considered as expansive rather than restrictive, associated with depth and rigour (more than) instead of narrowness and limitation (less than), this shifts the discourse and the pedagogical approach from deficit to difference. Even the terminology 'special interests' has somewhat condescending, infantilising and ableist associations. The 'detail focussed processing style' previously aligned with 'weak central coherence' has been challenged and re-evaluated as superiority in local processing and as a 'bias' rather than a deficit (Happé & Frith, 2006, 2020).

These shifting terminologies and understanding of autism in terms of neurodivergence have implications for education and child development. There is increasing recognition of differences in play being a platform for learning so that following the interests of the autistic child

and learning how to identify and scaffold their cues positively impacts on development (Davey, 2020). The arts as a vehicle for play based activities have been identified as a 'latent opportunity' for developmental science (Goldstein, et al., 2017), with several psychologists who specialise in autism research using creative practices (particularly drama and music) as research tools (Corbett, et al., 2014; Lerner, et al., 2011). Engaging in creative and play-based activities are opportunities to explore sensory preferences, to understand more about autistic attention and to discover how interest led approaches can inform learning. As an activity that facilitates focus, flow, and free creative thinking, the labyrinth is a resource that complements an interest model of learning, supporting the benefits of monotropism as a learning style.

Sensory differences are the second core feature of autistic cognition that labyrinth both supports and draws attention to and is also linked to monotropism as Murray articulates:

Conversely, if we can't tune an input out, it is often experienced as horribly intrusive. I think this is from a combination of discomfort at our attention being constantly pulled away from where we want it to be, with the tendency to feel something strongly if it's present in our awareness at all. Our brains throw a lot of resources at whatever our focus is on, which accounts for both the intensity of conscious awareness and the pain of distracting stimuli we can't filter out. There is likely a developmental aspect to this: neural pathways that receive a lot of stimulation grow stronger, so perhaps autistic people are prone to long-term hyper-sensitivity in senses receiving intense attention, and under-sensitivity in channels we regularly tune out. (Murray, 2019: 46)

Sensory preferences however, correlate with learning styles and can be an important part of a strength-based pedagogy (Ockelford, 2013; Conn, 2019). In *Playing A/Part* we developed sensory profiles as part of the initial interview process, a resource that was stimulated by the creative workshops. Participants were given a 'sensory map' with six blank 'bubbles' to fill out or to use as a visual prompt in responding to this question: 'Some autistic people have different sensory needs or experiences relating to light, noise, taste, smell, touch and texture. Do you have any?' It was observed by Emma Williams, the lead psychologist for the project, that 'it was often easier to get the girls to expand in this situation compared to when we just asked the question. Some girls, though, did not appear to need the map so much and seemed happy to talk at length about each aspect of the sensory, just glancing at the map as a prompt to see what aspect of their experience to talk about next'.

One of the project's preliminary findings is the significance of the sensory experience for autistic girls as this has been identified as a core theme emerging from the thematic analysis and the workshop activities. This involved learning through positive and negative experiences such as the need to adjust the flickering lights in the labyrinth installation. However, having made a labyrinth floor cloth as a 'time out' reflective space, it was noted that several girls would use the labyrinth for 'stimming' whilst walking or sitting, often with a stim tool. Stimming refers to self-sensory stimulation whereby the individual engages in a sensory activity that is pleasurable,

calming or distracting, helping them to filter adverse or invasive sensory elements such as bright light, loud or high-pitched sounds, bright colours or patterns, and strong smells. The role of proprioception (sense of movement, action, location) and its regulatory role in sensory processing is prevalent in autistic accounts of experience. Kate Ross's 'sensory seeking, avoiding and feedback' is a particularly insightful account (Ross, 2018). Fergus Murray also offers a very cogent and concise articulation:

Often, if we get overloaded, it helps to have controlled or predictable input. Stimming, flapping, rocking and humming provide something we can do and feel without having to think about it, and can make it much easier to filter, to focus on something else, or to deal with feelings of overwhelm. (Murray, 2019: 46)

Whilst working with finger labyrinths in a creative writing activity, stim tools provided a breakthrough. Participants were encouraged to use the finger labyrinth whilst thinking about their personalities and 'name' poems. The introduction of sensory finger rings (in different colours) with the invitation to use this as a thinking tool alongside finger walking to touch and trace the carved wooden labyrinth path produced what we refer to as a 'significant moment' due to shared attention or a shift in understanding. I would demonstrate the finger walking whilst wearing one of the wire rings and when the bag was offered, the girls moved forward as a group to seize the rings, choose a colour, and then became engrossed in the finger labyrinth activity, taking it in turns to do the journey and sometimes returning to the board as they worked on their poems.

The labyrinth also offers a distinctive form of social space in contrast to the drama circle whereby individual as well as group identity can be supported simultaneously. There is freedom to sit in a space of one's own (e.g., through using personalised place markings), facing in any direction, whilst also participating in a group configuration. This sense of needing personal space alongside community identity is a contributory factor to autistic sociality as a further feature of social cognition and an area in need of more investigation (Heasman & Gillespie, 2018; Crompton, et al., 2020; Fox, 2020). Whilst stereotypes of autism emphasise solitariness and isolation, the testimonials of autistic people indicate the importance of belonging to and socialising with others, a feature of the monotropism theory of group understanding and communication.

All of this can be conceptualised in relation to 4E cognition (Newen, et al., 2018) as a means of understanding the relations between neurodivergent learning preferences and labyrinths as a potential resource. In discussing the value of creative practices, we often talk about embodied or tacit knowledge. This can be broken down into four interacting elements whereby understanding and sense making is created through the body and physical experience (embodied), environmental interactions and affordances (embedded), action and perception (enacted), and connections beyond the individual to the social and interpersonal (extended). In terms of embodied cognition, it is evident throughout autistic accounts of lived experience as well as

autism research the extent to which proprioception, the nervous system and sensory motor learning impact on development. As I have discussed, sensory differences play a critical role in facilitating or inhibiting learning and are important to understanding and harnessing an individual's strengths. A number of experimental studies examining embodiment in creativity have explored the role of movement in enhancing divergent and convergent thinking (Malinin, 2019). Walking has a long history in creativity and performance, from Greek theatre to contemporary walking art and ambulatory theatre (Avery & Whybrow, 2012). Aristotle's peripatetic school was so named because he walked with his students while philosophising. In relation to autism, walking, running. And jumping are linked to sensory feedback, thinking states and processing. For example, in Naoki Higishada's *The Reason I Jump*, he describes the sensation:

But when I'm jumping, it's as if my feelings are going upward to the sky. Really, my urge to be swallowed up by the sky is enough to make my heart quiver. When I'm jumping, I can feel my body parts really well, too—my bounding legs and my clapping hands—and that makes me feel so, so good. (Higishada, 2013: 76-77)

We saw this in the playground at Limsfield Grange, which we would walk through on our way to the Playing A/Part workshops. The play in this unique setting seemed appropriate to the project title. There was a sense of being together and apart, occasional clusters of small groups and numerous individuals doing their own thing (reading, walking, stimming) in an environment where this felt ok. Our autistic participant Emma, for example, walked around the perimeter, sometimes with a strong stride sometimes more slowly but always looking absorbed, purposeful, and content in her own space. She often talked whilst walking and did finger stims as she moved. In the workshops and in an interview she described her sense of difference in playgrounds at mainstream schools, feeling the odd one out but being happy in her own space and needing the time to herself: Her words are used in the film animation arising from the project, *I feel Different*. 'At 7, I didn't care about being different; whenever the kids were in the playground, I paced around, thinking my thoughts. I wasn't lonely but the grown-ups tried to coerce me into playing with the others.' (Shaughnessy, et al., 2020).

The playground context is pertinent to embedded cognition, the ways in which environments (physical and social) shape and are shaped by the actors who inhabit them. In research on Roman labyrinth mosaics and movement, Rebecca Molholt observes that as 'floor decoration, the labyrinth can reinterpret the space it defines, and walking across these spaces helps to construct the bather as a heroic athlete' (2011: 211). Tim Ingold's writing on labyrinths, lines, feet, and learning (2016) as well as artisans and craft (2020) and their emergent system of relationships and interactions resonates with our experience of co-production and the use of labyrinths in Playing A/Part. Hence conversations and collaborations through the process of art making contributed to group and individual perceptions of both neurodivergent identity and creativity. Labyrinth walking is oriented towards attention rather than intention and knowledge is a relational process involving perceivers and the perceived (Ingold, 2016).

The labyrinth also contributed to enactive cognition as a space in which people can 'regulate their interactions with the world in such a way that they transform the world into a place of salience, meaning and value' (Thompson & Stapleton, 2009: 25). Participants found different ways of moving on the labyrinth, spontaneously or prompted. Some danced or ran on the labyrinth and another walked backwards in a characteristically playful performance of difference. Toe walking (associated with autistic children), and being barefoot were also popular choices, which also resonates with Ingold's observations on shoes (2011) and our *Imagining Autism* training where we explore the pleasures of toe walking (Shaughnessy, 2016). In *The Tempest* workshops, we imagined how different characters might walk and explored how this movement connected with thinking and feeling states, using the project journals for reflective writing or drawing in our labyrinth places. The final E in 4E cognition refers to extended cognition, thinking as distributed beyond the body; cognitive processes unfold over time, engaging the body, other people, and resources in environments shaped by socio cultural practices. This seems particularly appropriate to the sharing that concluded the labyrinth workshops at Limpsfield Grange. 'This Island's Mine' was a participatory and promenade piece, loosely based on *The Tempest* as a creative stimulus which the girls had made their own. The form of performance for this event challenged divisions between audience and performer as we moved together in an improvised boat on a journey to Prospero's Island. The small audience were the headteacher, a pastoral care worker, autistic artists and an unexpected guest visiting the school residences (who turned out to be an inspector). From the dancing with spirits that opened the piece, through a storm and spells sequence (plastic cloths waved over the audience and percussion) and a voyage from the school gym to the labyrinth outside (a place of enchantment and transformation) we moved together as a group.

We returned, led by Emma playing Prospero, to the darkened gym and Prospero's mysterious cave, beautifully illuminated through technical wizardry, the girls' voices magically triggered by an interactive map. Shakespeare blended with the students' own words: memories, poetry, imaginings, movement, and laughter. Emma had started the term with a serious intervention, questioning whether our intentions were creative or therapeutic. Her critique of the play was part of her performance, particularly the absence of strong women. She talked about a 'kick ass' Miranda and sketched a costume for her, combining a dress with boots. In performance, Emma's Prospero was a serious and forceful presence, draped in a long dark cloak (her design) and always standing apart from the other characters, overseeing their activities. She identified with Prospero as someone with a morality she respected; justice, control, freedom, forgiveness, and difference were themes of this piece, connecting powerfully to the experiences of this community of autistic girls. After the sharing had ended, Emma returned to the practitioner team to deliver a moving thank you, witnessed by the Headteacher who would later refer to it in a keynote lecture on the impact of the project for the school (Wild, 2021). Emma ended with the statement that what the girls knew as 'Creative Club' was, on the whole, 'ok'. Many of us were visibly moved by her journey from scepticism to creative expression, a journey facilitated by the labyrinth.

Whilst Emma and her autistic peers had a shared diagnosis, our research with autistic adolescents in a range of educational settings exposed the diversity of this population with different challenges, communication preferences and learning styles, encapsulated in the project's film animation, *I Feel Different* (2020). The labyrinth offered a structured way of accommodating this diversity, enabling individuals to explore their sense of time, pace, and space (cognitively and physically). As a tool used in meditative practices, the labyrinth disengages the rational mind and facilitates embodied understanding, complementing the creative pedagogies and processes underpinning the project and supporting our objectives in relation to care and learning for this neurodivergent population. In terms of care, preliminary evidence suggests a connection between participants with higher levels of mental well-being and those with higher scores on our creativity measures. In terms of learning, the impact of sensory environments, the importance of understanding and accommodating communication and sensory preferences and the value of an interest led curriculum were core themes emerging from the research. In addition, the labyrinth deepened our understanding of neurodivergent cognition, appropriate conditions for learning and creativity.

Conclusion: Futures of Learning

In considering neuro differences, pedagogy, and care, we need to be mindful of neurotypical structures and discourses and the potential impact on well-being and learning. For neurodivergent young people, developing within neurotypical environments, learning can be compromised through normative assumptions, ableism and a 'special needs' agenda that doesn't equate difference with intelligence and in which the individual continues to be regarded as 'other' and/or lesser. If we genuinely embrace an agenda of difference, the neurodivergent learner can be recognised for capabilities, moving beyond the constraints of 'special needs' which can limit expectations. The value of this approach can be seen in the work of the music psychologist, Adam Ockelford (2013), who suggests that autistic children are affected by what he defines as 'an Exceptional Early Cognitive Environment, similar to that experienced by blind children, and with the same potential to promote high levels of musical interest and development. Citing the relatively high proportion of autistic children with perfect or absolute pitch (1 in 20), he suggests that variances in sensory input during early childhood development create different neural networks. This may well lead to higher levels of sensory awareness, which might then be nurtured as abilities.

In her conclusion to a discussion of embodied creativity and the implications of 4E approaches for creativity research and teaching, Laura Malinin (2019) calls for a reinvention of creativity and new pedagogical paradigms 'First and foremost, a new definition of creativity is needed to describe creativity as a situated practice, emerging through person-environment interactions (material/technological as well as socio-cultural)'.

I suggest that neurodivergence and labyrinth learning offer a model that could inform or transform our understanding of the development of creative expertise and the role of radical or 4E cognition in terms of the body, the socio-material environment, artefacts, and sensing

subjectivity. Perhaps the 4Cs so frequently referred to in 21st century education manifestos (creativity, collaboration, communication, critical thinking) could be reconceptualised in relation to neurodivergence and our learning from *Playing A/Part*. Creativity is indeed 'out of the box' thinking, facilitated through moving, making and doing. Collaboration involves new understanding of sociality, informed by double empathy theory with recognition that one size does not fit all in neurodiverse educational environments. Being aware of sensory differences and how these can inhibit or facilitate learning and developing creative and flexible pedagogies that are responsive to strengths and interests so that neurodivergent students can flourish. Collaboration also involves recognition of the conditions for genuine co-production and the value of this to research with marginalised groups. Communication involves being aware of and encouraging different communication styles and preferences and being mindful of community and cultural codes so that communication doesn't necessitate one group conforming to the norms of another. Finally, critical thinking means being open to disruption and risk, moving beyond habit (in teaching) and always being receptive to the challenge of the 'why', a feature of neurodivergent ethical thinking. This may sometimes mean starting again to work differently.

For autistic youth, the experience of education is frequently identified as a source of stress with learning environments being inappropriate due to sensory triggers, social challenges (bullying, peer group interactions) as well as large groups, course content and delivery. Our research has important implications for pedagogical care. Traditional pedagogical models need to be adapted for neurodivergent learners to create appropriate balance between structured learning frameworks and interest led approaches. Particular care is needed to ensure learning environments are conducive for students with attention to sensory preferences and group work. In terms of practical strategies for autistic students progressing to Higher Education, being aware of and making adjustments to educational environments (in relation to sensory needs), being sensitive to differences in processing (impacts on time), understanding triggers for anxiety (e.g., safe sensory space, time pressures, group situations) can be addressed through structures that, like the labyrinth, facilitate agency and autonomy as well as community. Choosing between exams and course work, offering hybrid modes of learning and examination (in person or online), circulating information and reading materials well in advance, supporting students pursuing specialist interests within the curriculum and maintaining structures that offer stability without rigidity are good practices for care and for learning, potentially benefitting all students.

At the end of a rehearsal for 'This Island's Mine', Emma moved from her position on the outside of the group to deliver the final words of the performance. Lifting her long black cloak, she caused the group to gasp as she destroyed the illuminated labyrinth installation, sweeping the cups away in a powerful gesture of defiance. This became our ending.

Author Biography

Nicola Shaughnessy is a researcher at the University of Kent, specialising in applied theatre, participatory arts, and neurodiversity. Publications include two monographs, two edited

collections as well as numerous articles and chapters. Her grants include leadership of three UKRI funded projects exploring autistic identities and mental health.

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