

Development of symbolic play through the use of virtual reality tools in children with autistic spectrum disorders

Two case studies

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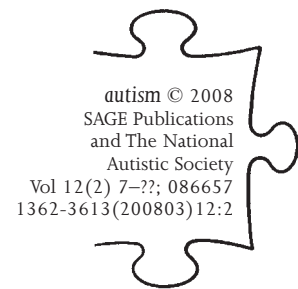
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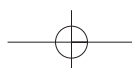
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ABSTRACT Difficulties in understanding symbolism have been documented as characteristic of autistic spectrum disorders (ASDs). In general, virtual reality (VR) environments offer a set of potential advantages for educational intervention in ASD. In particular, VR offers the advantage, for teaching pretend play and for understanding imagination, of it being possible to show these imaginary transformations explicitly. This article reports two case studies of children with autism (aged 8:6 and 15:7, both male), examining the effectiveness of using a VR tool specifically designed to work on teaching understanding of pretend play. The results, confirmed by independent observers, showed a significant advance in pretend play abilities after the intervention period in both participants, and a high degree of generalization of the acquired teaching in one of them.

KEYWORDS
autism;
imagination;
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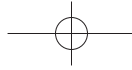
Virtual reality

Computer programs are increasingly being used in clinical practice for psychological and medical rehabilitation in children (Schneider, 1998) and also in educational practice (Alcantud, 2000; Griffiths, 1997; Riva et al., 1998). It has been claimed that virtual reality (VR), like other computer based programs, provides a particularly facilitatory environment for people with autistic spectrum disorders (ASDs) in that it offers structure, visual mediation of learning, opportunities for repetition, affective engagement and, additionally, control of the learning environment (e.g. Strickland et al., 1992). Murray (1997) argues that IT is an effective, comfortable, facilitative and emotionally engaging context for learning in individuals with autism. It is likely, though as yet unproven, that VR will share those characteristics of IT and have enhanced effects (especially in terms of generalization) because of its greater capacity to engage and direct attention, offer control of the environment, and engage the participants emotionally. Thus, there are good a priori reasons for using VR as a vehicle for teaching individuals with ASD through this medium.

The authors have developed a VR-based learning environment where a shopping activity is recreated. Within this learning environment, the tool



Figure 1 Snapshot of the tool '*I am going to act as if . . . ?*'



HERRERA ET AL.: SYMBOLIC PLAY THROUGH VIRTUAL REALITY
'I am going to act as if . . .' (Herrera et al., 2004: see Appendix 1), aimed at facilitating understanding of imagination in people with ASD, has been developed. Imagination is a core difficulty in ASD (Wing and Gould, 1979), and it has been recommended that interventions in ASD should concentrate on such fundamental aspects of functioning (Rutter, 1996) rather than on general cognitive gains.

Imagination and the autism spectrum

Difficulties and delay in understanding symbolism, especially in relation to symbolic play, have long been documented as characteristic of people with ASD, and as possibly contributing to social difficulties (Jordan, 1999; 2003): social/emotional development and the cognitive development of play influence each other through a transactional process. Thus there are social, communicative and cognitive consequences of failure to engage in play (Jordan and Libby, 1997; Sherratt and Peter, 2002) and addressing this problem is likely to have considerable and ecologically valid benefits. Powell and Jordan (1994) have argued for the effectiveness of a cognitively based curriculum for children with autism, and texts for teaching play cognitively have been developed (Howlin et al., 1999). VR offers a further opportunity for a cognitive approach to the understanding and manipulation of symbols.

Imagination involves conscious dissociation from reality and the mental manipulation of the environment and imaginative behaviour involves spontaneity, intention rather than response, and creativity. Play involves the first two of these characteristics and symbolic play all three; thus, symbolic play is often characterized as imaginative play. Leslie (1987) has defined pretend play as covering both functional play (using objects, including miniatures or toys, as if they were the object they represent) and symbolic play (using objects as if they were something else, had imaginary properties, or were different from the way they are). Leslie suggests that the autistic difficulty lies in understanding and using symbolic play with its associated need for mental state understanding, whereas functional play should be unaffected. Experimental and clinical evidence for this is confused and contradictory, in part because of the failure of many studies to distinguish the symbolic from the functional aspects of pretend play (Jarrold et al., 1993).

Attempts to teach pretend play to children with ASDs have usually found that such play can be copied or even cued, but that it does not have the qualities of spontaneity, intention and creativity that distinguish imaginative play (Jarrold et al., 1996; Libby et al., 1998). This has led to the suggestion that play deficits in ASD may result not from fundamental difficulties in symbolism, but from generativity problems arising from executive functioning faults. Sherratt (2002) was able to teach all five children

