Chapter 11

Towards an Interactive System Eliciting Narrative Comprehension in Children with Autism: A Longitudinal Study

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11.1 Introduction

Research has shown a deficit in the comprehension and creation of narrative in children with autism which impacts on their social skills. Children with autism form a very diverse group; our research agenda is to develop an interactive software system that elicits children’s narrative comprehension while addressing the needs of individual children. This chapter documents progress towards an adaptive interactive software system (in the context of a game) for children with autism, specifically in the context of narrative and social understanding, and presents results from a longitudinal study involving 12 children. The work falls under the umbrella of the Aurora project (Aurora, 2000) which, through focussed studies, investigates the potential enhancement of the everyday lives of children with autism through the use of robots and other interactive systems as therapeutic or educational ‘toys’. A playful context and enjoyment are central to our approach.

11.2 Autism, Narrative and Social Comprehension

Autism is a lifelong pervasive developmental disorder affecting social ability. Although people with autism form a very diverse group, they all exhibit impaired social interaction and communication, and have a limited range of imaginative activities, collectively referred to as the triad of impairments (Frith, 1989; Wing 1996; Powell, 1999). Additionally it is common to find particular sensitivities (Bogdashina, 2003), repetitive behaviour patterns and resistance to change in routine (NAS, 2004). People with autism have great difficulty making sense of the world, in particular the social world. We do not imply that there is no meaning to the lives of people with autism, but that socially constructed meaning is difficult.
The more socially constructed the meaning, the greater the difficulty. Autobiographical accounts such as Grandin (1995) show that people with autism who do live successfully in the, to them bizarre, world of so-called ‘normal people’ do so at least in part by learning explicit rules: for example, remember to look interested when someone is talking to you; or, if someone smiles at you, you should smile back (note that even this apparently simple rule does not always apply).

It is postulated that narrative is central to the construction of social meaning. By fitting events into a narrative pattern we construct and inhabit a meaningful, consistent and predictable world (Bruner, 1986, 1990, 2002; Schank, 1990; Linde, 1993). We develop our sense of self and are able to understand the behaviours of others (people or other agents which we imbue with intent), and to respond in ways seen as meaningful and consistent. Narrative gives a framework for interpreting new events, in particular surprising events or behaviours which do not accord with our expectations, and for fitting them into a temporal framework (Schank, 1990; Bruner, 2002; Porter Abbott, 2002).

It has been shown that children with autism do have some specific difficulties with narrative. Studies using narrative pictures showed references to causality and affect may be missing or inappropriate (Tager-Flushberg and Sullivan, 1995; Capps et al., 2000). Abell et al. (2000) showed, using animated triangles, that children with autism were more likely to attribute inappropriate mental states than typically developing children or those with general intellectual impairment. This impairment in mentalising is often attributed to a deficit in a theory of mind (Baron-Cohen, 1999). However, narrative comprehension may be viewed as causal rather than symptomatic; as being fundamental to the perception, creation and communication of meaning in social interaction (Bruner and Feldman, 1993; Dautenhahn, 2002; Hutto, 2003). Thus we may view difficulties with narrative as underlying the social and temporal difficulties we see in autism.

There are a number of theories of narrative comprehension, but it is clear that each narratee actively constructs an internal representation of the narrative, sometimes called a situation model. The constructionist theory (Graesser and Wienner-Hastings, 1999) predicts that the narratee will make inferences which establish both local and global coherence, and explain events and motivations. Picture narratives are of particular interest to us; in the domain of comics McCloud (1993) refers to our ability to construct a continuous situation model, ‘mentally construct a continuous, unified reality’, from discrete panels. He refers to the space between the panels as central, ‘the very heart of comics’.

What then is narrative? Views vary widely: we are concerned here with simple narratives in which the chronology of the exposition follows the chronology of events in the story; and in which the story follows, or is a simple variation on, a format proposed by Bruner for a “story worth telling” (Bruner, 1986; Dautenhahn, 2002). This format supposes a sequence of events involving purposeful characters. The basic pattern of events comprises: a steady state which establishes a world view; a precipitating event which is some break in the steady state, unexpected by the protagonists, not necessarily by the audience; a restoration in which the precipitating event is resolved and some steady state restored; and a coda which signals that the narrative is at an end. Variations may occur on this skeleton; one