

Designing and evaluating joke-building software for AAC users

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The Standup project has developed and evaluated interactive software which allows children with language and speech impairments to engage in building simple punning riddles. The session will begin with a reflection on the role that humour plays in language development and the difference between humour appreciation and comprehension. The Keyword Manipulation Task (KMT) will be presented as a tool for measuring the understanding of humour. A demonstration of the Standup software will be followed by a discussion of how the software was designed with the help of adults with complex communication needs (CCN) and AAC practitioners. The session will present the results of evaluations of the software with children who have CCN and will conclude with an interactive discussion of the potential use and future development of the software.

Humour and Language Development

Puns, punning riddles and jokes (verbal wordplay) form a natural part of children's discourse. They provide a structure within which words and sounds can be experienced and within which the normal rules of language can be manipulated. Word play is a critical part of language development in children. Typically-developing children enjoy jokes and riddles – they offer an opportunity to practise language, conversation and social interaction skills. In particular, jokes are a type of conversational narrative and, as such, play an important role in the development of storytelling skills. Effective storytelling requires knowledge of, and participation in, topic initiation and change, turn taking, communication breakdown and repair, elaboration and an agreed conclusion (Cheepen, 1998). Some types of structured narrative, e.g. question and answer type jokes, Knock, Knock jokes and many riddles adhere to a strict initiation, turn-taking, and punchline convention. The appreciation and further personal production of humour supports assimilation of conversational skills.

However, children with complex communication needs (CCN) do not always have language play opportunities. Although some clinicians e.g. Musselwhite and Burkhart (2002); and King-DeBaun (1997), have reported on their use of verbal humour as a support for communication skills, there has been little research on the role of humour in AAC or on the relationship between humour comprehension and language abilities of children with CCN.

Humour Comprehension

Word knowledge and complex skills such as the ability to switch a frame of reference are needed to understand the ambiguity found in the majority of verbally expressed humour. A correlation between the ability to report linguistic ambiguities and reading and comprehension skills has been suggested by a number of researchers (Yuill & Easton, 1993; Mahony & Mann, 1992). Ambiguity is often used in verbally expressed humour, especially puns and punning riddles. Laughter (or some appropriate response) occurs when the ambiguity is resolved, that is when the punchline is seen to make sense at some level with the earlier information given in the sentence.

The Keyword Manipulation Task (KMT) has been specifically designed for humour research with children of all abilities and especially those children with expressive language difficulties (O'Mara, 2004). The procedure involves identifying and changing a keyword in a humorous item. The following example illustrates the type of task used in a test situation:

*Policeman to little boy. "We are looking for a thief with a bicycle".
Little boy: "Wouldn't you be better using your eyes?"*

Three distracters (*ears; nose, hat*) and an appropriate alternative (*glasses*) are presented as options to replace the keyword *eyes*. A correct choice from the participant indicates some underlying knowledge of the joke technique because the joke can still rely on the ambiguity of *looking with eyes* (or glasses) or the bicycle. A complete test consists of 10 examples of verbal humour, including riddles and jokes of different types. The questions vary in difficulty by decreasing the semantic differences in keyword alternates. A maximum humour recognition score is 10, with a chance score of 2.5.

Results of ten children with CCN suggest that it is possible to identify humour recognition in these children, although these skills probably evolve more slowly than with typically developing children (O'Mara, 2004). The variability of performance across age suggests that humour recognition is likely to be a reflection of the child's current cognitive and metalinguistic abilities. The general conclusion is that providing access to verbal humour play for children with CCN will narrow the gap of language experience opportunities between children of all abilities.

The Standup Project

Most non-text AAC devices are based on the retrieval of pre-stored linguistic items, e.g. words, phrases and sentences. Even when question type jokes are made available on a device, e.g. "What do you call a judge without fingers? ... Justice thumbs.", the focus is on the order of retrieval and pragmatic use of the joke, rather than on generating novel humour.

The three-year Standup project has focussed on the issue of humour and language play for children with CCN. An interactive software package has been developed to allow users to play with language with the emphasis on allowing the user to build their own novel jokes.

The JAPE program (Binsted et al, 1997) is one of the few successful examples of a working program designed to generate a variety of types of novel punning riddles, i.e. humorous texts in a question and answer form, where the humour arises from some form of linguistic ambiguity within the text. Examples of such jokes produced by Jape are:

"What do you call a murderer with fibre? A cereal killer."

"What's the difference between leaves and a car? One you brush and rake, the other you rush and brake."

"What do you get when you cross a monkey and a peach? An ape-ricot."

Although the processing mechanisms in JAPE which handled that knowledge were crude, highly inefficient, and essentially unusable, the results demonstrated that it is feasible to have software produce punning riddles. These examples of verbal humour have the advantage that, unlike more complex forms of joke, they can be defined in terms of information that is available in a normal lexicon. That is, they do not require arbitrarily complicated deductions about vast amounts of knowledge of the real world.

The STANDUP project has further developed the JAPE software and has designed an interface suitable for children with CCN. The goal was to provide users with the means to construct jokes on topics, using familiar vocabulary, enabling them to experiment with different forms of jokes. The resulting software is interactive, dynamic, flexible and accessible, providing a source of language development and social interaction possibilities that enable the user to go beyond the "needs" and "wants" of assisted communication. In the longer term, it would be desirable to integrate joke-construction mechanisms with other AAC facilities, but the initial aim of the Standup project has been to determine more precisely what these joke construction facilities might or should be, and to explore how they might be used. Adults who use AAC, teachers and therapists were therefore consulted extensively on the design of the prototype user interface (O'Mara et al, 2004).

Evaluation Methodology

A single case study methodology has been followed to evaluate the use of Standup by children with CCN. The methodology is divided into baseline, training and intervention stages. The KMT is used to analyse humour comprehension before and after all stages. Participants are trained to build jokes over five sessions after which they complete set tasks. Analysis focuses on three areas: operational competency (can the user navigate the software to build jokes?), humour comprehension (does the KMT measure change over time?) and ability to build meaningful jokes from a prescribed keyword or topic word. The difficulties encountered during the evaluation and the results will be presented.

Future Work

The current Standup project has focussed on developing software to encourage language play through the building of novel jokes. This session will conclude with a discussion of how this type of technology could be developed for use in interactive voice output communication aids. The issues posed when evaluating the impact of such a system on communicative efficiency will be debated.

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