

The Comprehension of Humorous Materials by Adolescents with High-Functioning Autism and Asperger's Syndrome

David M. Emerich,^{1,5} Nancy A. Creaghead,² Sandra M. Grether,² Donna Murray,³ and Carol Grasha⁴

This study investigated the ability of adolescents with Asperger's syndrome or high-functioning autism and an age-matched group of typical adolescents to comprehend humorous materials. The analysis of humor focused on picking funny endings for cartoons and jokes. As expected, the adolescents with autism had significantly poorer comprehension of cartoons and jokes. Both groups had more difficulty with the joke than the cartoon task, but when compared with the typical group, the adolescents with autism performed significantly poorer. Examination of the error patterns revealed that subjects with autism had difficulty handling surprise and coherence within humorous narratives.

KEY WORDS: Autism; Asperger's syndrome; humor; cartoons; jokes.

INTRODUCTION

Research suggests that laughter and the development of humor are related to intellectual, social and emotional development (McGhee, 1979). Most research has focused on the role of cognitive processes in the development of humor comprehension. An appropriate response to a humorous stimulus is determined by several factors. Zigler, Levine, and Gould (1967) stated that the response depends on the demand that the stimulus makes on cognitive abilities. Comprehension of humor is also influenced by the linguistic form. Several researchers have developed a hierarchy of riddle types for children

ages 6 to 12 years (Fowles & Glanz, 1977; Shultz & Horibe, 1974). The types of linguistic ambiguity in these riddle types include phonological, lexical, surface structure, and deep structure. A child with delayed language skills may have difficulty comprehending linguistic humor, especially surface and deep structure riddles, because of the cognitive and linguistic demands.

Research suggests a parallel relationship between children's development of humor and their development of metalinguistics skills (de Villiers & de Villiers, 1978; Horgan, 1981; van Kleeck, 1984). The role of metalinguistic abilities becomes apparent when analyzing the process of comprehending a joke. When hearing a punch line, the listener discovers a surprising ending based on the normal course of events. An incongruity is created, and the listener tries to resolve it by tying the punch line coherently to the body of the joke. This involves reviewing the information provided and realizing that it can be interpreted in more than one way (Suls, 1972). It also involves flexibility in thinking to modify the original interpretation. Deficits in metalinguistic skills may be associated with difficulties with humor comprehension (Sotto, 1994; Spector, 1990). Considering the role of linguistic manipulation

¹ Kenton County Public Schools, Erlanger, Kentucky.

² Department of Communication Sciences and Disorders, University of Cincinnati, Cincinnati, Ohio.

³ Kelly O'Leary Center for Autism Spectrum Disorders, Cincinnati Children's Hospital Medical Center, Cincinnati, Ohio.

⁴ Division of Developmental Disabilities, Cincinnati Children's Hospital Medical Center, Cincinnati, Ohio.

⁵ Correspondence should be addressed to David M. Emerich, 357 Marble Cliff Dr., Lakeside Park, Kentucky 41017; e-mail: emericdm@isoc.net

and the need for metalinguistic awareness in creating humor, verbal IQ may give an accurate prediction of how a child performs with humor.

Deficits in integrating information across narratives and drawing inferences have also been found to affect understanding of humor (Bihrlle, Brownell, Powelson, & Gardner, 1986; Brownell, Michel, Powelson, & Gardner, 1983; Ozonoff & Miller, 1996). Social deficits may also contribute to impairment in humor behaviors (Masten, 1986).

On the basis of the requirements for humor comprehension, it is a reasonable hypothesis that individuals with Asperger's syndrome or high-functioning autism may have difficulty with humor comprehension. Ozonoff, Rogers, & Pennington (1991) found that both groups have deficits in executive functioning, which includes cognitive flexibility. They also have literal interpretations of what they hear or read and exhibit socially inappropriate behaviors (Attwood, 1998; Schopler & Mesibov, 1992). Humor tasks may prove to be difficult, as both groups have shown an impaired ability to generate the same quality of answers as typical children when under duress (Turner, 1999).

McGhee's (1979) developmental model has been used in research with individuals with autism. Van Bourgondien and Mesibov (1987) categorized the jokes told by adults with high-functioning autism based on this four-stage model. The majority of the subjects' jokes were similar to those of late preschoolers or early school-aged youngsters. However, some adults with high-functioning autism were capable of telling and comprehending higher-level humor. Thirty-five percent (35%) of the jokes were rated at Stage 4, the beginning stages of creating genuine jokes/riddles; and 16% were categorized as containing content often associated with adolescent or adult humor.

Why are complex forms of humor challenging for individuals with autism? Most research has emphasized that individuals with autism have an impairment of coherence, including difficulties in integrating content across narratives and discourse (Ozonoff & Miller, 1996). This explains some of the responses of individuals with autism when asked to pick humorous endings to jokes. Non sequitur endings or incorrect endings that are unrelated to the content of the joke were preferred by adults with high-functioning autism (Ozonoff & Miller, 1996). In particular, individuals with autism seem to enjoy slapstick comedy (Ricks & Wing, 1975) and often incorrectly choose humorous non sequitur endings (Ozonoff & Miller, 1996). However, Ozonoff and Miller (1996) also discovered that subjects with autism picked straightforward endings that did not make a joke hu-

morous. This implies that adults with high-functioning autism may not achieve a feeling of surprise if and when they understand the punch line. If they do achieve a feeling of surprise, it may not be converted to one of humor.

Previous research on adults with high-functioning autism has indicated that some impairment exists in their use and comprehension of humor. The goal of this study was to investigate the ability of adolescents with Asperger's syndrome or high-functioning autism and age-matched typical adolescents to comprehend humorous materials. This research focused on the ability to pick humorous endings to jokes and cartoons.

METHOD

Subjects

The subjects were eight adolescents with Asperger's syndrome or high-functioning autism, ranging in age from 11 to 17 years ($M = 13.4$). Five male and three female subjects with autism participated in the study. Diagnosis was reported by parent/guardian(s). Two of the subjects with autism had coexisting conditions (Obsessive Compulsive Disorder, Attention Deficit Hyperactivity Disorder). Subjects were recruited through the Autism Society of Cincinnati and from the caseloads of speech-language pathologists in public schools or private practice.

Eight subjects with no known history of language or cognitive disorders or autistic-like difficulties were drawn from the general population. Subjects were age and gender matched to the subjects with autism.

The Peabody Picture Vocabulary Test-III (PPVT-III) was administered to all subjects to obtain an estimate of "verbal ability" (Dunn & Dunn, 1997, p. 2). Based on a mean of 100 and standard deviation of 15, the range of standard scores for subjects with autism was 75 to 155 ($M = 103.1$; $SD = 26.7$). The range for the typical group was 106 to 131 ($M = 116$; $SD = 8.7$). There was a mean difference between groups of 13 points. No significant difference between groups for standard scores or raw scores was revealed by *t*-tests.

Materials

Ten three-frame sets of cartoons with captions were either copied or adapted from the "Garfield" comic strip by Jim Davis. Ten short story jokes (1-5 sentences), drawn from a published collection (Moulton, 1942) and Internet sources, were also used. Five ending choices for each task were either copied or created. The endings included a funny correct ending (FC)

that is both surprising and coherent, and thus humorous; a straightforward ending (SF) that is coherent but not surprising, and thus not humorous; a humorous non sequitur ending (HNS) that is surprising and humorous but not coherent—“slapstick” humor; an associative non sequitur ending (ANS) that is related to an element of the story and surprising but is neither humorous nor coherent; and a neutral non sequitur ending (NNS) that is surprising but neither humorous nor coherent and on an unrelated topic.

One other researcher independently categorized each ending choice for both tasks. Interjudge agreement for the cartoon task was 96% and 93% for the joke task. Three other outside researchers independently reviewed each cartoon and joke and the endings before testing. Changes were made to tasks based on the individual comments of the outside researchers.

Stimuli were piloted with graduate students from different disciplines. The cartoon task was administered to 18 graduate students. Those cartoons that were missed by six or more students (33%) were modified or excluded. The joke task was given to 14 graduate students. Those jokes that were missed by four or more students (29%) were modified or excluded. Individual comments were taken into consideration.

Procedure

The subjects participated individually in one testing session. The testing took place at locations convenient for the subjects, including home (11 adolescents), school (four), and clinic (one). Practice items with feedback were provided for both tasks. The body of the jokes and cartoons and the possible endings were read by the examiner. However, many subjects chose to read them on their own. In that case, the examiner asked the subject to read aloud, to detect reading errors.

Cartoon Task

Subjects were presented with the first two frames of each cartoon. The five ending types were then pre-

Table I. Mean Number of Errors and Standard Deviations for Selection of Correct Endings for Cartoons and Jokes by Subjects with Autism and Typical Subjects

	Autism		Typical	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Cartoon and Joke	8.88	5.30	3.13	1.89
Cartoon	3.50	3.12	1.25	1.04
Joke	5.38	2.97	1.88	1.13

sented in a numbered sequence on the table. Subjects were instructed to pick “the correct funny ending” to the cartoon.

Joke Task

After hearing and/or reading the body of the joke, the subjects were presented with five endings typed on white index cards. The subject was instructed to choose “the correct funny ending.”

Incorrect responses were counted, and the mean number of errors for each group and each task were determined.

RESULTS

Tables I and II show the means and standard deviations for all measures.

Cartoons and Jokes: Autism versus Typical

A *t*-test for independent means revealed a significant difference ($t(14) = 2.890, p < .05$) between the mean number of errors of typical adolescents and adolescents with autism for both tasks combined. Adolescents with autism had a higher mean number of errors (8.88) than did the typical group (3.13).

Cartoons: Autism versus Typical

A *t*-test for independent means revealed no significant difference ($t(14) = 1.938, p > .05$) between the mean number of errors of typical adolescents and adolescents with autism for the cartoon condition.

Table II. Mean Number of Times Each Ending Was Selected by Subjects with Autism

Ending	Autism	
	<i>M</i>	<i>SD</i>
Cartoon		
Straightforward	1.88	2.17
Humorous non sequitur	.38	.74
Associative non sequitur	1.13	1.13
Neutral non sequitur	.13	.35
Joke		
Straightforward	1.38	2.13
Humorous non sequitur	2.75	2.92
Associative non sequitur	.75	.89
Neutral non sequitur	.50	.54

Jokes: Autism versus Typical

A *t*-test for independent means revealed a significant difference ($t(14) = 3.114$, $p < .01$) between the mean number of errors for typical adolescents and adolescents with autism on the joke condition. Subjects with autism had a greater mean number of errors (5.38) than did the typical subjects (1.88).

Typical: Jokes versus Cartoons

Paired samples *t*-test revealed no significant difference ($t(7) = -1.667$, $p > .05$) between the number of incorrect answers on the two humor tasks for the typically developing adolescents.

Autism: Jokes versus Cartoons

Paired samples *t*-test revealed no significant difference ($t(7) = -1.770$, $p > .05$) between the number of incorrect answers on the two humor tasks for the adolescents with autism.

Autism: Endings for Cartoons

A one-way ANOVA revealed a significant difference ($F(3) = 3.011$, $p < .05$) among the alternative endings chosen by the subjects with autism on the cartoon task. The straightforward ending was chosen most often, whereas the humorous non sequitur ending was chosen least often.

Autism: Endings for Jokes

A one-way ANOVA revealed no significant difference ($F(3) = 2.298$, $p > .05$) among the alternative endings chosen by the subjects with autism on the joke task.

DISCUSSION

This study found that the comprehension of humorous materials (cartoons and jokes) by the adolescents with autism was significantly poorer than that of their peers who are typically developing.

The adolescents with autism performed significantly poorer on the joke task, but not on the cartoon task. This finding is not surprising, as the joke task was a more abstract task. When subjects' error patterns were analyzed, a significant difference emerged in the relative frequency of incorrect endings chosen for the cartoon task. The straightforward ending was chosen most frequently for the cartoon condition. Although the

difference was not significant, subjects with autism chose the humorous non sequitur endings most frequently for the joke condition. Ozonoff and Miller (1996) also found a significant preference among their subjects with autism for choosing straightforward and humorous non sequitur endings. Both error types are consistent with impairment in cognitive flexibility. Neither requires a reevaluation of the beginning of the cartoon/joke. The straightforward ending is coherent with the rest of the cartoon/joke. The humorous non sequitur ending is funny on its own, without any need to revise original assumptions. These endings may be chosen by subjects who have difficulty abandoning initial impressions and shifting to new interpretations of the material (Ozonoff & Miller, 1996). Based on these ending preferences, the subjects with autism in this study had difficulty with both surprise and coherence aspects of humor. It appeared they could manage either demand individually, but could not handle both simultaneously, as found in the Ozonoff and Miller (1996) study.

Caution should be taken in generalizing the results of this study because of the small sample ($n = 8$). Great variability exists among adolescents with autism and Asperger's syndrome, as confirmed by the different ability levels exhibited by subjects in this study. Another issue is that the deficits of the subjects may not be so much related to humor as with difficulty in generating answers under duress. This study did not control for IQ, which may be an important contributing variable to the results. However, past studies have reported conflicting results regarding the relationship between humor abilities and IQ (Brodzinsky & Rightmyer, 1980).

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