
35 Language in Autism: Pragmatics and Theory of Mind

Jennifer Barnes and Simon Baron-Cohen

It has been suggested that the skills required to interpret social interaction are the same skills necessary for understanding the fictional content of narratives (e.g., movies, books, storytelling, or theater; Mar, 2004; Mar, Oatley, Hirsh, de la Paz, & Peterson, 2006; Oatley, 1994, 1999). Although film-production and book writing are only seen in some cultures, across cultures humans engage in storytelling (Scalise Sugiyama, 1996). In this chapter, we examine narrative production and comprehension in terms of cognitive mechanisms that subserve pragmatics.

First, we review theories that look at narrative in terms of ability to empathize with and ascribe mental states to others in the social world. Then, we examine narrative comprehension and production in a clinical population with deficits in social cognition and pragmatic communication—individuals with autism spectrum conditions (ASC). Finally, we present the results of a study that examines the way that individuals with and without ASC view film clips and produce narratives about what they have viewed.

NARRATIVE, PRAGMATICS, AND SOCIAL COGNITION

NARRATIVE AND PRAGMATICS

Narratives are, by definition, created for an audience: films are made to be seen, books are made to be read, and stories are told specifically to listeners. For this reason, there is an inherent connection between the study of how we create and understand narratives and pragmatics (the study of language as used in a social context). Narrative competence—defined as the ability to both tell and understand stories—requires an understanding not only of the events and characters in a story, but also of the relationship between the person creating the narrative and the audience who will receive it. Storytellers must be sensitive to the information that their audience needs to understand and enjoy the story, while readers or listeners need to attend to the details that a narrative's creator intended to be the center of focus. For this reason, some theorists have suggested that the pleasure we derive from reading or viewing fiction is related to our interaction

both with the fictional characters and with the unseen author telling the story (Carroll, 2004).

NARRATIVE AND THEORY OF MIND

Pragmatic communication, narrative competence, and everyday social functioning all require an advanced ability to consider the minds of others. This ability to imagine the thoughts, beliefs, knowledge, emotions, goals, and desires of others is referred to as employing a “theory of mind” (ToM; Baron-Cohen, 1995). A storyteller must “mind-read” his or her audience to know what information to provide to guide their understanding of a story (Colle, Baron-Cohen, Wheelwright, & van der Lely, 2007). Simultaneously, understanding a movie or book requires the ability to ascribe mental states to the narrative’s characters (Keen, 2006; Losh & Capps, 2003; Tan, 1996; Zunshine, 2006). Here, we briefly review empirical research that examines the connection between ToM and the ability to both produce and understand narratives in a variety of media.

NARRATIVE PRODUCTION AND THEORY OF MIND

A variety of experiments have attempted to directly examine the relationship between ToM and the ability to produce coherent narratives. Younger children, who generally perform poorer on tests that require conceptualizing the beliefs of others, produce narratives that are skewed toward actions, rather than thoughts, and narratives that integrate thoughts with actions only develop with age (Pelletier, 2004). Similarly, children with Williams syndrome, a condition marked by hypersociality and associated with intact social cognition (Gosch & Pankau, 1997; Tager-Flusberg, Boshart, & Baron-Cohen, 1998) use more narrative techniques aimed at audience engagement than do typically developing controls (Losh, Bellugi, Reilly, & Anderson, 2000). Consistent with the theory that ToM development is related to narrative competence, a direct correlation has been found (after controlling for age) between the ability to pass classic mentalizing tasks and the level of narrative sophistication (as measured by the number of techniques used to engage a listener) in typically developing, low-income, African American preschoolers (Currenton, 2004). Among children with ASC, performance on ToM tasks is also correlated with achievement in narrative production (Capps, Losh, & Thurber, 2000). This body of research strongly supports the idea that the ability to produce coherent narratives is directly related to the ability to conceptualize the mind of the listener.

NARRATIVE COMPREHENSION AND THEORY OF MIND

Engaging in fictional narratives is often conceptualized as practicing the skills necessary to function socially in the real world (Oatley, 1999; Zunshine, 2006). Some have suggested that a drive toward narrative might even be the product of

evolution (Cosmides & Tooby, 2000; Scalise Sugiyama, 2003). In one experiment, Mar and colleagues (2006) found that individuals with a greater drive toward fiction (as measured by a familiarity with fiction authors) scored higher on self-reported empathy and interpersonal perception. Of interest, the drive toward fiction was correlated with performance on a test of real-world social ability, the “Reading the Mind in the Eyes” Test (Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001). In this task, individuals are asked to look at pictures of the eye region of the face and choose one of four multiple-choice terms to describe the emotion or mental state depicted by the expression in the eyes of the picture.

The “Reading the Mind in the Eyes” Test was developed specifically for use with populations with ASC (Baron-Cohen et al., 2001; Baron-Cohen, Wheelwright, & Jolliffe, 1997). ASC are characterized in part by significant social impairments and language and communication delays (APA, 1994). Individuals with ASC have deficits in ToM (Baron-Cohen, 1995; Baron-Cohen, Leslie, & Frith, 1985) and pragmatic communication ability (Happé, 1995; Tager-Flusberg, 2000). For this reason, the study of narrative comprehension and production has been a central focus in autism research in the past decade.

NARRATIVE PRODUCTION IN AUTISM

Because ASC are characterized in part by specific deficits in ToM, which plays a key role in narrative and pragmatic communication, many experiments have investigated the abilities of children and adolescents with ASC to create spoken narratives. In one experiment, when asked to produce fictional narratives, children with ASC produced shorter narratives that contained fewer imaginative elements than neurotypical controls; however they produced real-life, event-based narratives of similar length to control children (Craig & Baron-Cohen, 2000). Other researchers have attempted to focus on narrative ability, rather than imaginative ability, by attempting to minimize the burden of creating content. Typically, these studies elicit storytelling by showing children either a wordless picture book or some kind of live action display, such as a puppet show, and ask them to retell the story they have just seen (Capps et al., 2000; Diehl, Bennetto, & Young, 2006; Losh & Capps, 2003; Loveland, McEvoy, Tunali, & Kelley, 1990; Pelletier, 2004; Tager-Flusberg & Sullivan, 1995). Participants’ responses in these experiments were then coded for length, syntactic complexity, accuracy in recalling key details of the story, and the number and range of techniques used to engage the listener in the story.

Although most experiments have found no difference in the length or syntactic complexity of narratives produced by children with autism and controls, recent research has revealed important differences in the ways children with and without ASC construct narratives for their audience. For example, while children with ASC use mental state terms as frequently as controls, they are more likely to simply label mental states, rather than drawing connections between mental states and their causes or effects (Capps et al., 2000), and are less likely to organize their

narratives coherently around significant story events (Diehl et al., 2006). These results suggest that in addition to providing important indices of social cognitive abilities in autism, analyzing autistic narratives may also be relevant to the weak central coherence theory of autism (Frith, 1989). This theory proposes that individuals with ASC perceive local details very well, but have difficulty seeing the global big picture. In the examples given above, narrative organization depends on an individual's ability to separate unimportant details or story events from those that define the meaning of the scene, and to recognize mental states within a larger web of social interaction. Weak central coherence might lead individuals with ASC to create narratives more grounded in detail, and less focused on key story events.

Interestingly, however, in addition to producing narratives of the same length and syntactic complexity as controls, children with ASC have been shown to have no difficulty incorporating the theme or gist of the story into their narratives (Losh & Capps, 2003; Diehl et al., 2006). A variety of researchers have interpreted this, along with the presence of mental state terms in the narratives of children with ASC, as suggesting that the differences seen in narrative production are not based on comprehension, but rather on decreased sensitivity or attention to the type of information the listener needs. Monitoring the informational needs of one's listener is, of course, an aspect of ToM (Baron-Cohen, 1988). Consistent with this ToM hypothesis, children with autism use a smaller range of evaluative techniques designed at drawing the reader into the story, such as character voices, sound effects, and intensifiers, than do typical controls (Losh & Capps, 2003).

A recent experiment with adults with high functioning autism (HFA) or Asperger syndrome (AS) also supports this claim. Colle and colleagues (2007) presented adults with HFA/AS the same wordless picture book used in the experiments described above. Participants were asked to look through the book and then tell a story based on the pictures. The results showed that while subjects in the ASC group had no impairments in general storytelling ability, they did demonstrate specific deficits with regard to using two types of phrases that take into account the listener's needs. For example, temporal adverbs and other terms that reference time provide the listener with a frame of reference in which to consider the events of the story. By using these terms, a storyteller can move the reader temporally through the story, increasing their understanding of the story events and their connections to each other. Similarly, a skilled storyteller avoids using ambiguous pronouns that might confuse their audience, but favors using pronouns in disambiguated cases to avoid the unnecessary repetition of a given noun phrase, offering the listener more variety and engaging them further in the story. In Colle et al's (2007) experiment, participants in the ASC group used fewer temporal adverbs and fewer anaphoric pronouns, while using more confusing, ambiguous pronouns than typical controls. The authors interpret these deficits as reflecting larger deficits in pragmatic communication that may partially explain difficulties that ASC individuals have with engaging others in conversation.

Taken together, the studies outlined above provide strong evidence that people with ASC show impairments in the realm of narrative production, and these deficits appear to be specific to pragmatics (Baron-Cohen, 1988). In order to tell an engaging story, you need to take into account what the listener knows (Astington, 1991) and what kind of presentation they will find interesting. Subtle deficits in ToM affect an individual's ability to do this.

NARRATIVE COMPREHENSION IN AUTISM

In exploring the social deficits that individuals with ASC show in real-world social situations, many researchers use visual or written narrative stimuli as a stand-in for the actual social world. For this reason, many studies that test social cognition in autism use narratives and may therefore be examined as testing narrative comprehension as well. For example, Happé (1994) presented children with autism or learning difficulties, and typically developing children, with a series of stories that probed the participants' understanding of literally untrue utterances (e.g., pretense, sarcasm, and deception) within a given context. For each story, participants were asked to explain why a character had said something that was literally untrue. For example, in one story, a girl named Anna is playing inside and breaks a vase. Knowing that her mother will be angry with her for breaking the vase, Anna tells her mother that the dog did it. Children with ASC were more likely than either control group to give incorrect (e.g., "Anna was joking") rather than correct (e.g., "Anna lied so that she wouldn't get in trouble") explanations. While this result certainly reflects a deficit that could affect real-world social processing and functioning, it also shows an interesting deficit in narrative comprehension—namely that individuals with ASC, in interpreting the situations incorrectly, seem to be missing out on the core meaning that the scenes are *intended* to portray.

In a related experiment (Baron-Cohen, 1997), children were asked why the experimenter produced utterances such as "This is a shoe" while he was pointing at a cup. While typically developing 2 year olds spontaneously said it was because the experimenter was *joking* or *pretending* (thus referring to his mental state), children with autism said it was because the experimenter was wrong (simply referring to the mismatch between the word and its referent). This failure to monitor mental states in communication was also evident in a test of understanding Gricean Maxims. Gricean Maxims are implicit rules that speakers follow to be cooperative in conversation (Grice, 1957), such as "Be truthful," or "Be relevant," or "Be Informative." In a related experiment, children were presented with two possible answers to a question and were asked, "Which one said something silly?" For example, in answer to the question "Where do you live?" the two answers might be "I live in England" versus "I live on the moon." Four-year-old typically developing children were much more accurate in identifying the inappropriate answer compared to young children with autism (Surian, Baron-Cohen, & van der Lely, 1996), reflecting the typically developing child's sensitivity to a speaker's *intentional* violations of a listener's *expectations*—the

mental states of the interlocutors; and reflecting the deficit in this skill in children with autism.

A variety of other experiments have probed social cognition in autism using stimuli taken from television or films. Because film is a multimodal medium, these film stimuli are a closer laboratory approximation of the requirements of real-world processing than are written stories. Across experiments, individuals with ASC show deficits in their ability to ascribe the correct meaning to interactions in films. In the “Reading the Mind in Films” task (Golan, Baron-Cohen, Hill, & Golan, 2006), participants were asked to view short, 20 second film clips and were then given a multiple-choice question that asked them to choose which of four words described a character’s mental state or emotion at the end of the clip. Participants with ASC performed significantly worse than controls to the extent that 90% of participants could be allocated to the correct group based on their performance on this task alone. In a similar study, Dziobek and colleagues (2006) asked participants to view a 15 minute long movie that incorporated classic tests of social cognition, including false belief, faux pas, and sarcasm, as well as ongoing narrative and character interactions. During the course of the experiment, the narrative was stopped 46 times, and participants were asked to answer open-ended questions about characters’ mental states, including their emotions, thoughts, and intentions. Participants with ASC performed significantly worse than controls, showing difficulty in understanding each scene and the characters’ social interactions in terms of underlying mental states. Other studies using film stimuli have obtained similar results (Heavey, Phillips, Baron-Cohen, & Rutter, 2000).

It has been argued that tasks that use dichotomous scoring, where a participant’s answers are coded as either correct or incorrect, do not reflect the demands and subtlety of real-world social interaction (Klin, 2000). In line with this idea, several experiments have used more open-ended methods to investigate the way that individuals with ASC view and understand films. Klin, Jones, Schultz, Volkmar, & Cohen (2002) tracked participants’ eye gaze as they viewed a clip from the film *Who’s Afraid of Virginia Woolf?* and found that individuals with ASC use different scanning strategies when attempting to extract information from film narratives. Individuals in the control group tended to focus on people in the scenes, and specifically on the eye region of their face, whereas people with ASC focused more on objects. When they looked at faces, they spent less time looking at the eye region and more at the mouth. This result is particularly interesting not only in its implications for attentional scanning patterns in the real world, but also in that it reveals a further disconnect between what the scene’s director presumably *intended* to communicate with this social scene, and the information that individuals with autism take from it.

The remainder of this chapter describes an experiment (Barnes, Lombardo, Wheelwright, & Baron-Cohen, 2009) that combines the narrative elicitation method used in studies of narrative production (Colle et al., 2007; Diehl et al., 2006; Losh & Capps, 2003) with the use of complex, naturalistic film stimuli similar to those used in studies of advanced social comprehension (Golan et al., 2006; Klin et al., 2002).

A TEST OF NARRATIVE PRODUCTION AND COMPREHENSION: THE MORAL DILEMMAS FILM TASK

The vast majority of experiments in which participants with autism are asked to produce a narrative based on source material focus on narrative production rather than comprehension. For this reason, the stimuli used to elicit narratives in these experiments tend to be very simple stories, most commonly a wordless picture book about a boy who loses his pet frog and then proceeds to look for the frog in many different places. By asking participants to retell a simple story, these experiments minimize the requirements of narrative comprehension. Not surprisingly, most participants (in both the autism and control groups) show no deficits in grasping the gist of these stories, or attending to the mental states of the main character (Capps et al., 2000; Diehl et al., 2006; Losh & Capps, 2003).

In contrast, however, one previous experiment used participants' narratives to examine their understanding of a more complex film-based narrative. Klin (2000) asked participants to view a short animated movie (taken from Heider & Simmel, 1944), in which a variety of geometric shapes move and interact in ways that can be described with either purely mechanical ("the triangle moved upward") or intentional ("the triangle was being chased by the square") language. In this case, the elicited narratives revealed sharp differences in the way that people with and without ASC viewed the film's content, with individuals on the autistic spectrum tending to view the show more mechanically, producing narratives that contained fewer mental state terms than controls.

These results form an interesting contrast, with individuals with ASC showing different patterns of mental state term production in their narratives depending on the type of stimuli used to elicit narrative production. When asked to retell simple stories, people with ASC do attribute mental states to the story's characters, but they fail to do so with other kinds of stimuli such as moving geometric shapes. What is unclear from this is whether the deficit found in the Klin study reflects the fact that the autistic population under-attribute mental states to film stimuli, or whether it indicates over-attribution of mental states by typical controls.

In order to answer the question of whether these deficits would extend to narratives based on more ecological film scenes, we developed a new task, The Moral Dilemmas Film Task, in which adult participants with AS and HFA were asked to view four brief film clips and write about what they saw (Barnes et al., 2009). Their narratives were then coded for variables related to social comprehension and ToM, and their performance was compared to self-reported empathizing ability and verbal IQ. It was predicted that narratives by people with ASC would be impoverished compared to controls and focus less on mental states, and that different factors might predict spontaneous mentalizing in ASC and control populations, reflecting different strategies in the way that individuals with autism search for and represent meaning in the social world.

We tested 28 individuals with ASC and 28 neurotypical controls. The individuals in the ASC group were diagnosed with either HFA or AS. Individuals

with HFA and AS have average or above average intelligence, but like others on the autistic spectrum, they have significant social impairments. AS is differentiated from autism by the absence of any delays in language acquisition and development (Schoper, 1985). The ASC and control groups were matched for age (ASC: mean = 30.29, $sd = 7.78$; control: mean = 30.21), sex (14 males and 14 females in each group), and Verbal IQ (ASC mean = 116.29, $sd = 10.75$; control mean = 116.93, $sd = 8.79$).

All participants were asked to complete three tasks: the empathy quotient (EQ), the verbal subtests of the Weschler Abbreviated Scale of Intelligence (WASI; Wechsler, 1999), and the film-based task designed for this experiment, the Moral Dilemmas Film Task. The EQ is a 40-question self-report questionnaire tapping cognitive and affective empathy (Baron-Cohen & Wheelwright, 2004). It asks questions geared at gauging an individual's ability to recognize and correctly respond to the emotions of others. Verbal WASI scores were used to match the ASC and control groups on verbal ability, and both Verbal IQ and EQ scores were compared to participants' performance on the Moral Dilemmas Film Task. It was hypothesized that if individuals with ASC and neurotypical individuals used different strategies to understand film narratives, the complexity of their narratives might be predicted by different factors.

THE MORAL DILEMMA'S FILM TASK

This test asks participants to view four short naturalistic film clips taken from a modern American television show (*House*) and write about what they saw. Each clip lasted between 30 seconds and 2 minutes, contained two characters (one male and one female), and depicted a self-contained story arc with a beginning, a middle, and an end. Because all four clips were taken from the same television show, they are similar in style and content, but each clip features different characters and a different moral dilemma.

We chose to use clips that featured moral dilemmas as the central conflict in an effort to encourage participants to pay attention to the characters' mental states and emotions, which play a key role in dilemmas of this kind. For example, in one scene, a bouncer at a club must decide whether or not to sneak in a homeless woman who cannot afford the entrance ticket. While the external conflict is clear (the woman says she wants to go into the club, the man demands the money and she admits to not having it), understanding the scene as a whole (particularly the outcome) requires conceptualizing the bouncer's inner debate weighing his obligation to fulfill the requirements of his job and the woman's obvious desperation. In a second clip, the external conflict exists because a young cancer patient asks her doctor to kiss her, so that she experiences what this feels like just once before she dies. In order to fully understand why the doctor eventually accedes to her request, a viewer must consider not only the external debate between the two characters, but also the doctor's internal debate about the medical ethics of the situation and his feelings about the girl's belief that she is dying and the role that plays in her request. In this way, each of the four clips required participants

to pay attention to the characters mental states and emotion to fully understand the content of the scene.

Before beginning the film task, participants were asked to create a control narrative. In this condition, participants were told to write for “about five minutes” about something that they found interesting. After completing their interest narratives, participants moved on to the film portion of the task, where they were asked to watch each of the four film clips and spend “about five minutes” writing about what they saw. Ultimately, each participant produced five written narratives: one interest narrative, and four film-based narratives. We scored the following variables.

Narrative Length: All narratives were coded for length (in words). It was predicted that individuals with ASC might take less away from the highly mental scenes and therefore produce film-based narratives that were significantly shorter than controls and also impoverished compared to their own interest-based narrative.

Narrative Comprehension: Participants’ four film-based narratives were coded for the number of references a participant made to either objects or a character’s mental state, with a *mental state* being defined as a “cognitive, affective, perceptual, or attentional state” (Baron-Cohen et al., 2005). Because individuals with ASC have been shown to have deficits in their understanding of film-based characters’ mental states (Dziobek et al., 2006; Golan et al., 2006) and have viewing patterns that are skewed toward objects, rather than people (Klin et al., 2002), we predicted that individuals with ASC would produce narratives that included fewer mental state terms and more references to objects.

Narrative Production: We were interested in examining the degree to which participants used language—and specifically adverbs—that indicated a richness in mental state understanding. In previous experiments, the use of emphatic markers has been identified as an evaluative storytelling technique, used to “pull” a reader or listener into a narrative (Reilly, Klima, & Bellugi, 1990). Here, we looked at the kinds of terms participants used to modify mental states or emotions. Specifically, we coded for the presence or absence of what we call *quantity* and *apparency* modifiers.

Quantity Modifiers were defined as any term applied to a mental state or emotion in order to indicate the degree to which that emotion was felt. For example, modifiers that indicate quantity could be applied to the term “happy” to differentiate between someone who is “really happy,” “somewhat happy,” “a little bit happy,” “extremely happy,” and “the happiest woman in the world.” In this way, use of these terms allows a participant to indicate nuances of a single emotion.

Apparency Modifiers were defined as any term applied to a mental or emotional state that indicated the obviousness of that state. In other words, the terms referred to as “apparency modifiers” indicate how *apparent* it is that an individual is thinking or feeling a certain way. Words like “obviously,” “clearly,” and “visibly” can be applied to mental state terms to indicate the certainty with which the participant attributed a given mental state to an individual in the film. It was hypothesized that even if individuals with ASC produced narratives with

equivalent numbers of mental state terms as controls, they might differ in the degree to which they used adjectives that indicated high level of confidence in those attributions.

RESULTS OF THE BARNES AND COLLEAGUES EXPERIMENT

While the neurotypical and ASC groups did not differ based on the lengths in words of narratives they produced in response to the open prompt, “Write about something that interests you,” across the four film-based narratives, participants in the control group produced significantly more words than participants in the autism group (ASC: mean = 364.21, $sd = 98.91$; control: mean = 521.75, $sd = 155.84$; $t(54) = 4.51$, $p < .001$). Additionally, while individuals in the control group generally produced film-based narratives similar in length to their response to the open prompt, the individuals in the ASC group produced film-based narratives that were significantly shorter than their responses to the open prompt (interest narrative: mean = 124.04, $sd = 45.61$; average film-based narrative: mean = 91.05, $sd = 24.73$; $t(26) = 3.975$, $p < .001$).

Across the four film-based narratives, individuals in the control group produced significantly more total mental state terms than those in the ASC group (control: mean = 30.82, $sd = 12.27$; ASC: mean = 20.86, $sd = 24.73$; $t(54) = 3.096$, $p = .003$), but the two groups did not differ in the frequency with which they referenced objects. In other words, while the vast majority of individuals in both groups showed a bias for talking about mental states over objects in their film-based narratives, this bias was significantly stronger in the control group control bias: mean = 25.29, $sd = 12.79$; ASC bias: mean = 16.79, $sd = 13.65$; $t(54) = 2.404$, $p = .02$).

Twenty-four out of 28 controls used quantity modifiers, such as “really” or “a little” to indicate degrees of mental state terms, compared to only 15 out of 28 individuals in the ASC group. A two-tailed chi-square revealed that this difference was significant $\cdot \chi^2(1, N = 56) = 6.842$, $p = .019$). Similarly, while 20 out of 28 controls, used words like “obviously” and “clearly” to modify mental state terms in their narratives, only three individuals with ASC did so ($\chi^2(1, N = 56) = 21.323$, $p < .001$).

Within the control group, there was no correlation between verbal IQ and any outcome measure, such as total number of mental state words in their film-based narratives. In contrast, within the ASC group, verbal IQ was correlated with the number of mental state terms included in film-based narratives ($r(26) = .496$, $p = .007$), but was not related to the length of these narratives as a whole. Conversely, while no correlation was found in the ASC group between an individual’s EQ score and the total number of mental state terms produced, there was a significant correlation between these variables in the control group ($r(26) = .461$, $p = .013$).

DISCUSSION OF THE BARNES AND COLLEAGUES EXPERIMENT

In this study, individuals with and without HFA and AS, conditions marked by social impairments, were asked to view short film narratives and to write a story

retelling what they had seen. While individuals in both groups had no trouble creating narratives on a topic of their own and wrote equal amounts of text in response to the prompt “write about something that interests you,” individuals with ASC created impoverished film-based narratives compared to neurotypical individuals, and compared to their own interest narratives. While ASC and control film-based narratives were equally descriptive of the objects they had seen in the film, people with ASC produced narratives that contained fewer descriptions of the characters’ thoughts, beliefs, emotions, goals, or desires than controls. Further, while individuals with ASC did produce mental state terms in their narratives, they were less likely than controls to describe these mental states in rich ways by using modifiers that indicated nuance, and they were less likely to spontaneously indicate that they were sure of their mental state attributions.

Taken as a whole, these results form a striking picture of differences in the way that participants with and without autism view and understand film scenes they watch. While the content of an individual’s narrative cannot be taken as comprehensive with respect to their understanding, it does provide important insight into the information that stood out in their mind—as significant enough to merit inclusion in their narratives. Just as a filmmaker makes choices about how to frame a shot, or how a particular piece of dialogue should be delivered, in producing their narratives, all participants had to decide which parts of the film they viewed were important enough to be communicated in their retelling of the scene. In producing narratives that were rich with mental state description and showing a strong bias for describing emotions over objects, the neurotypical group showed not only a proficiency at spontaneously thinking about and identifying the unseen thoughts of others, but also a predisposition for communicating that key information to an implied audience. In contrast, though the ASC group did show an overall bias for paying more attention to mental states than object, this bias was weak compared to controls, and their narratives were shorter, more impoverished, and contained less detail than both control narratives and the narratives they are capable of creating when they must only decide what to say, rather than having to decode a social scene and then recreate it on someone else’s behalf.

Of particular interest, to the extent that individuals with ASC and controls did manage to extract mentalistic information from the films and include that information in their narratives, they appeared to be using different techniques with which to do so. The ASC performance on this task was directly related to verbal ability, and suggested that individuals with HFA and AS may rely strongly on verbal information—for example, spoken dialogue—to attribute meaning to the scenes, whereas performance among controls was predicted not by verbal ability but by self-reported empathy. Significantly, in the *Virginia Woolf* study described earlier (Klin et al., 2002), individuals with autism spent more time focused on the mouth region of the face than on the eyes, a region of the face thought to be very important for reading the emotions of others (Baron-Cohen et al., 2001), while individuals in the control group showed the reverse pattern. Taken together with the results on this task, it appears that people with ASC may be using verbal

scaffolding to increase their mentalistic understanding of films. Viewed in the context of pragmatics, individuals with autism may be paying more attention to *what* is said than *how* it is said, a result consistent with previous findings, which catalogue ASC difficulties with sarcasm and deception (Happé, 1994).

SUMMARY AND CONCLUSION

In the previous section, we reviewed a new test of social cognition, the Moral Dilemmas Film Task. Participants with and without ASC viewed short, emotionally charged film clips that centered on moral dilemmas and were asked to write about what they saw. Neurotypical controls and individuals with ASC differed in the amount of text they produced based on the films, the degree to which they showed a bias for mental states over objects in that text, and the degree to which their performance depended on self-reported empathy and verbal intelligence. These results form an interesting complement to the results of the studies outlined in the second and third sections. By combining the methods of previous studies that have examined narrative production and narrative comprehension respectively, the Moral Dilemmas Film Task provides an important window into the way that individuals with autism view social scenes similar to those that they might encounter in real-life.

For example, individuals with ASC often have trouble identifying and responding to the emotions of others in everyday life and may fail to correctly identify the emotions of film-characters in multiple-choice paradigms within a lab setting, and their performance on the Moral Dilemmas Film Task indicates that their spontaneous representations of these scenes might be impoverished. In other words, participants may have difficulty not only because when attempting to identify mental states they often do so incorrectly, but also because they might be less predisposed to seek out this information, or to view it as significant.

While the Moral Dilemmas Film Task is a task that uses film narratives as a proxy for real-world social interactions to probe social understanding in ASC, the results also have interesting implications for the study of narrative cognition more broadly. For example, the study reported here and the experiments with ASC strongly suggest that narrative ability is inextricably tied to ToM ability. Thus, ToM turns out not only to be important for mindreading and predicting what others will do or what they might think, but also for any communicative activity, be it narrative or culture itself.

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