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Abstract

This paper demonstrates that children understand humor from an intentional perspective as young as 2 years. This is interesting from two vantage points. First, the research shows that children understand both humor and intentions separately before understanding humorous intentions, suggesting these two concepts are dissociable. However, the research presented suggests that understanding humorous intentions could be a gateway to understanding intentions in complex ways. Humor is the first type of non-literal communication that children understand from an intentional viewpoint, compared to pretending, lying, metaphor, and irony. Understanding humorous intentions may thus allow children to identify and practice understanding others' mental states in increasingly complex ways.

Keywords: Humor; Joke; Intention; Social cognition; Development

Understanding of Humorous Intentions: A Developmental Approach

Leekam (1991) and Reddy (2001) originally pointed out that humor and social cognition must be linked, even in early development. Both suggest that humor is not only a cognitive, but also a social interaction involving intention understanding; a proposition recently reinforced in the adult literature (de Jongste 2013). To gain a greater perspective of the link between humor and social cognition it is important to look at the question from a developmental viewpoint.

Studies on young children provide several advantages over research with adults. First, in adulthood, socio-cognitive and humor abilities are already well-established, and so can be difficult to disentangle. However, in young children, we can see how more complex processes, i.e., fully intentional humor interactions, emerge from more simple components, e.g., appreciation of humor, understanding of intentions, and parental scaffolding. Second, we can strip down complex processes without worrying about how other complex structures, such as fully developed language systems, might interact. This therefore gives us a more streamline model that could be easier to use in, e.g., computational models. Finally, from a developmental point of view, it is important to see which factors (e.g., cognitive, linguistic, social) are required for a socio-cognitive understanding of humor to come about.

This paper will separately outline the early development of humor, and intentions. It will then show when these two abilities come together, suggesting that children appreciate both humor and intentions before they understand humorous intentions. This paper will also demonstrate mechanisms by which children might come to understand others' humorous intentions, specifically, parental scaffolding. Finally, this paper will suggest that humor may be a gateway to understanding intentions more generally in a complex way.

The Development of Humor Appreciation

Humor appreciation develops in the first year of life. Infants laugh from 3 months (Addyman and Addyman 2013, Mireault et al. 2012). However, initially, infants' laughter is random, and not necessarily related to humor itself (Mireault et al. 2012). Yet as early as 4 months, infants laugh at specific humorous stimuli. Sroufe and Wunsch (1972) had mothers of infants, aged 4-12 months, act as experimenters. Mothers acted out different types of jokes for their infants, and the researchers examined which types of humor made infants laugh at different ages. At 4 months, infants laughed only 10% of the time. However laughter increased to around 37% by 7 months, when infants mostly responded to strange noises (e.g., horse neigh), and tactile events (e.g., blowing raspberries). By 10 months, infants laughed at 43% of the events, in particular at social and visual events, such as their mother crawling, or putting a sock in her mouth.

Peekaboo is also very widespread in the first year (Addyman and Addyman 2013, Macdonald and Silverman 1978, Waters, Matas, and Sroufe 1975, Shultz 1976). It is the most popular way to make infants laugh across nationalities (Addyman and Addyman 2013). It is most effective when done by a parent, instead of a stranger (Waters, Matas, and Sroufe 1975, Macdonald and Silverman 1978). It is almost more effective with a human than a mechanical version of peekaboo (Shultz 1976). This suggests humor is intimately social early on.

Humor continues to develop in the second year, when infants start to appreciate silly actions with objects to a greater extent. At 15 months, infants understand that laughter should be paired with silly actions, such as rubbing a toy cat on one's head (Hoicka and Wang 2011). At 18 months, around half of infants laugh when an experimenter throws an object on the floor, compared to no infants laughing when she interacts with the object appropriately (Esseily et al. in press). From at least 19 months, toddlers will copy silly actions, such as putting boots on their hands (Hoicka and Gattis 2008).

By 4 years, children detect incongruity and resolution in comics. Pien and Rothbart (1976) asked children to decide which comic ending was funnier – one which was only incongruous, and one which had incongruity and resolution. For instance, in one comic, one child points out to another that he is reading an upside-down book. The endings could be that the child puts the book to the side, and sits upside-down (incongruity only), or that he sits upside down, such that the book is now right-side up for the child (incongruity and resolution). Children as young as 4 years thought the latter was funnier, suggesting a sophisticated leap in humor appreciation.

By 8 years, children appreciate verbal humor containing both incongruity and resolution (Shultz 1974). Children were told jokes, and asked to rate which was the funniest ending. There were three choices of endings. For instance, for the riddle, “Why did the cookie cry?” one possibility was “Because he was in the oven” which contains neither incongruity nor resolution. A second possibility was “Because his mother was a wafer” which contained incongruity only. The third possibility was “Because his mother was a wafer so long” which contained both incongruity and resolution. Six-year-olds judge the incongruity-only and incongruity and resolution jokes to be equally funny, and both funnier, than the non-joke options. However, from 8 years, children judged the jokes with both incongruity and resolution as funniest.

The Development of Humor Production

Not only do children appreciate humor from a young age – they also produce humor early on. Based on observations and parent reports, Reddy (2001) found that from 8 months, most infants repeat strange actions, such as splashing, pulling faces, and making snoring sounds, when their parents or others laugh. Parents report that most infants joke in the first year, with peekaboo being the most prevalent form of humor (Hoicka and Akhtar 2012).

In the second year, most parents report that children start to do silly actions as jokes, e.g., making funny faces, or spinning on the floor (Hoicka and Akhtar 2012), and this is supported by similar findings in observational studies of 1-year-olds in a nursery setting (Loizou 2005). Most 1-year-olds are also reported to chase and tickle as a joke (Hoicka and Akhtar 2012). While observation suggests 1-year-olds are capable of producing humor that involves misusing objects, e.g., jokingly wearing an apron as a skirt (Loizou 2005), and experimental research shows children copy silly actions with objects, such as putting a boot on their hands (Hoicka and Gattis 2008), most parents report that 2-year-olds produce such humor, while this is not the case for 1-year-olds (Hoicka and Akhtar 2012). As well as misusing objects, Hoicka and Akhtar (2012) found that from 2 years, most children say silly things as a joke, such as cats having five legs. This marks a change in humor, from being based on the body alone, to being based on human conventions, including artefacts and language.

Observation and experimental research further support the view that children misuse objects and say silly things as jokes as young as 2 years. In an observation of 23 2-year-olds joking around with their parents for 10 minutes, most 2-year-olds misused objects, while some also said silly things (Hoicka and Akhtar 2012). In an experimental setting, after an experimenter modelled jokes where she gave the wrong object (e.g., a spoon instead of a toy pig), or mislabeled objects (e.g., calling a cup an “oogle boo”), 2-year-olds went on to produce novel jokes following the same form (Hoicka and Akhtar 2011). Three-year-olds further build their humor repertoire by mislabelling jokes, e.g., calling a duck a cat. This was found through both parent report and observations (Hoicka and Akhtar 2012).

The Emergence of Intention Understanding in Toddlers

Children begin to understand others' intentions from a young age. In a seminal study, Meltzoff (1995) found 18-month-olds already understand that others act intentionally. An

experimenter showed toddlers either (1) a complete action with a novel object (e.g., removing the end from a dumb bell); (2) a failed attempt with a novel object (e.g., pulls on the end of the dumb bell, but it does not come off); or (3) holding the dumbbell (a control condition). Alternatively, toddlers were given objects without any social demonstration (another control condition). On average, children produced the complete action 80% of the time in the complete action and failed attempt conditions. In contrast, children in the control conditions only did so 20% of the time. Meltzoff suggested children imitated the experimenter's intended actions in the first two conditions to achieve the same goals. It was not about blindly copying, or else children would not have completed the actions in the failed attempt condition. According to Meltzoff, this suggests children understand others' intentions from at least 18 months.

Later research found children understand others' intentions even earlier. Carpenter, Akhtar, and Tomasello (1998) demonstrated novel actions on novel objects for 14- and 18-month-olds. The novel objects had various features, e.g., a ring that could be pulled on a rope, and a plank of wood that could be flapped. Each object also had an opaque property, for instance, a light could turn on. The experimenter showed children two actions on each box, after which the opaque property would display itself. However, the intentional cues given for each action varied. For one group of children, for instance, the experimenter said "There!" when she moved the ring on the rope, and "Whoops!" when she flapped the wood on the box, after which the light turned on. For another group, the pattern reversed. The experimenter said, "Whoops!" when she moved the ring on the rope, and "There!" when she flapped the wood, after which the light came on. Toddlers were significantly more likely to copy the action paired with "There!" only, avoiding the action marked with "Whoops!" regardless of what the actions were. This suggests children as young as 14 months understand when other act intentionally versus accidentally.

Even without verbal cues, 14-month-olds can infer intentions. Gergely, Bekkering, and Kiraly (2002) tested infants on the classic head touch task. An experimenter has a novel object, a light box, that lights up when pressure is applied. However, when showing the child how to use the object for the first time, she bends over, and applies pressure to the box with her head, turning on the light. Fourteen-month-olds tend to copy this behavior, even though using one's hand would be easier. This suggests toddlers assume the act was intentional, and that that is the way to use the box. However, when the experimenter had an alternative reason to use her head, i.e., she was cold, and so her hands were busy holding a blanket around her, children no longer copied the head-touch movement. Instead, they used their hands. The authors suggest the infants did so because in this case, the head-touch action was incidental, as her hands were in use, and so not the intended way to do things.

Understanding Humorous Intentions

While infants understand that people can act intentionally as young as 14 months (Carpenter, Akhtar, and Tomasello 1998, Gergely, Bekkering, and Kiraly 2002), what is less clear is whether young children understand that people can have different types of intentions. While past research focussed on children's understanding of intentions to do typical or correct actions (Reid et al. 2009, Carpenter, Akhtar, and Tomasello 1998, Meltzoff 1995, Gergely, Bekkering, and Kiraly 2002), little research examined whether children understand that people can intentionally do the wrong thing, or something that is technically incorrect, or breaks convention. Humor is an excellent example of this type of more complex intention (Hoicka and Gattis 2008, Hoicka, Jutsum, and Gattis 2008), and may mark the first time children understand that people can do the wrong thing on purpose. While other forms of non-literal communication, including pretending, lying, metaphor, and irony, all involve technically doing or saying the wrong thing, humor, at its most basic, may be cognitively

easier to understand, and more socially and emotionally rewarding (Hoicka and Gattis 2008, Hoicka, Jutsum, and Gattis 2008).

Infants may start to understand something about humorous intentions as early as 15 months. Hoicka and Wang (2011) tested infants on a violation of expectation looking time paradigm. In this experimental design, infants tend to look longer at situations which are out of the ordinary, compared to normal situations. In this study, the experimenter gave either humorous vocal cues (laughter and funny tone of voice), or sweet vocal cues (Awww! And sweet tone of voice). She then either performed a funny action (e.g., stroking her head with a toy cat), or a sweet (and normal) action (e.g., stroking a toy cat normally). When the experimenter first gave sweet cues, infants looked longer when the experimenter then acted in a silly versus normal way. This is not surprising, as stroking a toy cat on one's head is fairly unexpected. However, when the experimenter first gave humorous cues, the pattern reversed. Infants instead looked longer at the normal, sweet action, suggesting perhaps they expected the experimenter to do something funny, and were perplexed when this did not occur. One possible explanation for these results is that 15-month-olds understand humorous intentions, and so expected that if someone expresses an intention to be humorous, they should follow through with a humorous action. Likewise, if someone expresses an intention to be normal, they should follow through with a normal action. However, it is also possible that infants responded without fully understanding the intentions. Infants may have expected that humorous actions follow laughter and funny voices, without tracking the experimenter's mental states.

From 2 years, children's understanding of humorous intentions is more clear cut. Hoicka and Gattis (2008) showed children between 19 and 36 months a technically wrong action. The action might be something like putting on a hat, but pulling it over her eyes. For half the children, the experimenter then laughed, signalling she intended to joke. For the other

half of the children, the experimenter said, “Whoops!” as though she made a mistake. Children were then given the object and told, “Now you try.” Children 25 months and up were significantly more likely to copy the action when cued as a joke, and to correct the same wrong action when cued as a mistake. This suggests children tried to match their actions to the experimenter’s intentions. They wanted to joke when the experimenter joked, but do the right thing when the experimenter was trying to act sincerely (but failed). However, children under 25 months did not distinguish the cues. Instead, they copied and corrected at random. Thus, from 25 months children understand that people can intentionally do the wrong thing as a joke, and match that intention. The age differences found in this study are interesting, as infants appear to appreciate humor to some extent as early as 4 months (Sroufe and Wunsch 1972, Mireault et al. 2012), and understand basic intentions as early as 14 months (Carpenter, Akhtar, and Tomasello 1998, Gergely, Bekkering, and Kiraly 2002), but do not combine these abilities to fully understand humorous intentions until 25 months. This suggests an initial dissociation between humor appreciation and intention understanding that later combines to form a richer understanding of both humor and intentions.

A further study bolstered findings by Hoicka and Gattis (2008). Hoicka and Akhtar (2011) extended the previous study in two ways. First, they were concerned that children may have copied actions marked with laughter, and corrected actions marked with “Whoops!” because they matched by emotion, rather than intention. That is, children may have wanted to do the happy action, and avoid the unhappy action. Second, they wanted to discover whether children would not only copy jokes, but continue along with the intention, and make up their own jokes following the same joke format. This would show children understood humorous intentions in a deep way, not based only on responding to cues. In their study, 30- and 36-month-olds saw a series of wrong acts. In one part of the study, this involved a confederate giving an experimenter the wrong object to the one requested. For instance, if the

experimenter asked for the car, the confederate would give her a book instead. For half the children, the confederate, experimenter, and parent would all laugh, showing the intention was to joke. For the other half of children, the confederate said, “There!” the experimenter said, “Alright!” and the parent said, “Ok!” as though the act was sincere, and everyone was happy about it. Therefore in the joke condition, the cues matched the action, whereas in the sincere condition, it looked like the confederate made a mistake, but was unaware. After six trials, children had a chance to copy the same jokes, and then later, to continue the game with six more pairs of familiar objects not previously modelled by the confederate. Children in the humorous condition were more likely to give the wrong object, not only for the modelled trials, when children could have simply copied, but also in the additional trials, when children had to come up with new jokes on their own. In contrast, children in the sincere condition tended to give the correct objects throughout, suggesting they matched the intention to act sincerely.

In the second part of the study, the confederate verbally mislabelled familiar objects, e.g., calling a spoon an “oogle boo”. Cues were the same as the previous trials. Again, children in the humorous condition were more likely to mislabel the familiar objects themselves when it was their turn, and continued to mislabel the new familiar objects not modelled by the confederate. Additionally, children never used the same silly word as the experimenter, and always invented their own. For instance, one child called a cup a “goojooboojoo”, even though that word was never used in the experiment. This suggests children understood the intention behind joking so well they could come up with their own jokes to match the intention of the game. In contrast, children in the sincere condition tended to label objects correctly. This study therefore shows children were not just copying jokes because people were happy- or else they would have also copied wrong actions in the sincere

condition. Additionally, this study shows children understood what joking was about – in this case, mislabeling objects – as they were able to make up their own jokes.

Further research on laughter strengthens the interpretation that children distinguish jokes from mistakes. Bainum, Lounsbury, and Pollio (1984) observed 3-, 4-, and 5-year-olds in a daycare setting. They found that children most frequently laughed when they themselves or others produce intentional jokes, far more often than when they themselves or others unintentionally produced wrong acts. Therefore in their day to day interactions, children respond appropriately to jokes and mistakes.

As mentioned earlier, other forms of non-literal communication offer themselves to children's understanding of complex intentions. However past research suggests humor is the earliest form that children understand. For instance, using a similar imitation paradigm, Rakoczy, Tomasello, and Striano (2004) found that children distinguish pretending and mistakes, but not until 3 years, although with extensive training, they can do this at 2 years (Rakoczy, Tomasello, and Striano 2006). Children also distinguish intentions to lie and mistakes from 3 years (Siegal and Peterson 1996, 1998), but no studies have found this ability earlier. Research suggests children understand metaphor from 4 years (Pearson 1990, Özçaliskan 2005). Finally, while observation suggests 4-year-olds respond appropriately to irony to some extent (Recchia et al. 2010), experimental evidence suggests children do not fully understand intentions to be ironic until 10 years (Glenwright and Pexman 2010, Pexman et al. 2005). Therefore humor may provide the first instance in which children understand that people intentionally do the wrong thing, or break convention. Future research should examine whether understanding humorous intentions scaffolds these later developing types of complex intentions.

Parental Scaffolding of Humorous Intentions

Parents scaffold children's understanding of others' humor very early on. Mireault et al. (2012) asked parents to make their infants laugh for 10 minutes each month from 3 to 6 months. They found that throughout, parents used clowning, or silly acts, such as pulling faces, or making raspberries, to make their infants laugh. Furthermore, they most often paired these acts with smiling or laughter. This could serve as a bridge to help infants understand that unusual acts are funny. Indeed, while 3-month-olds tended to laugh randomly, and not necessarily in relation to parents' clowning, by 6 months, infants were likely to laugh specifically when parents clowned around.

In later infancy, parents' cues help infants to determine whether to treat an unusual act as funny or not, such as putting a red ball on one's nose, pressing it, and saying "beep". In experimental tasks, either an experimenter modelled the strange actions for 6- and 12-month-olds (Mireault et al. 2014), or a parent did so for 5- and 7-month-olds (Mireault et al. 2015), after which the experimenter or parent would either laugh, or show neutral affect. Experimenters' and parents' laughter encouraged infants to increase and/or maintain their own smiling towards the absurd events, while an experimenter's or parents' neutral expression made infants more like to cease smiling.

Parents offer a variety of complex cues in the second year to scaffold humor understanding as well. When parents read a humorous versus sweet book to their 18- to 24-month-olds, parents used more disbelief statements (Hoicka, Jutsum, and Gattis 2008). For instance, if a parent joked, "The ducks says moo", they might follow it up with a disbelief statement such as, "Ducks don't really say moo." This in effect explains the jokes for the toddlers, who might otherwise think they are learning new, true information. It could also show toddlers that people say things wrong on purpose, explaining this in a detailed way.

In another study, when parents joked with their 16- to 24-month-old toddlers during play, again, parents increased their disbelief statements, and also decreased their belief statements, i.e., statements suggesting they believed the jokes to be true (Hoicka and Butcher in press). Parents also showed more disbelief and less belief through their actions. For instance, if joking that a toy chicken was a hat, they were more likely to do non-hat actions, such as throwing the object, or making it peck, than if they actually had a hat to play with. Additionally, if joking they were drinking by putting a cup to their elbow, they were less likely to repeat the action than if they drank for real. This study also showed that toddlers responded in similar ways to parents, and that this was guided by parents' cues. For instance, belief language made children more likely to repeat actions, while disbelief language made children less likely to do so, leading children to repeat jokes less often than literal play. Parents' cues thus provide a mechanism by which children learn to distinguish when an act was intentional and true versus intentional and false, aka, a joke.

Parents also give more subtle cues to distinguish joking and literal acts. When parents read a humorous versus sweet book to their 18- to 24-month-olds, they exaggerated their infant-directed speech (IDS) (Hoicka and Gattis 2012). That is, they spoke higher, louder, and slower, which could make the joke easier for the child to understand. They also used a rising linear contour, which made the joke sound like a question, perhaps allowing toddlers to realize the content was meant to be false, and not literal. In a play setting with 16- to 20-month-olds, parents increased their smiling and gaze to their toddler, and decreased their gaze to objects, when joking versus acting literally (Hoicka in press). This could help toddlers focus on the social situation, and avoid learning the information as literally true. Indeed, parents' gaze to the child increased the child's gaze to their parent; parents' gaze to the object increased the child's gaze to the object; and parents' smiling increased children's smiling; suggesting these low-level cues guided children's attention appropriately to distinguish

joking and literal play. Therefore this might help children understand that joking is social and emotionally positive.

The research on parent-child interactions suggests children do not come to understand humorous intentions on their own. Rather, from a very young age, parents scaffold this understanding through cues. These cues (e.g., smiling, laughter) might help toddlers identify when information is meant as a joke rather than sincerely. More complex cues (e.g., disbelief language) may help explain *why* it is a joke, and that it was both intended, but also not true.

Humor versus Other Types of Intentional Wrongness

As mentioned earlier, humor is not the only complex intention involving purposely doing something wrong, unexpected, convention-breaking, and so on. Pretending, lying, metaphor, and irony involve intentionally doing the wrong thing as well (Hoicka and Gattis 2008, Hoicka, Jutsum, and Gattis 2008, Leekam 1991). One question is whether children not only distinguish intentions to joke from mistakes, or unintentional acts; but whether they can also distinguish intentions to joke from these other types of complex intentions. One possibility is children understand people can intend to do the wrong thing, but beyond that, they are not sure why. Therefore they may lump joking, pretending, lying, metaphor, and irony under the same umbrella, assuming they are the same thing. A second possibility is children think whenever someone has any of these types of complex intentions, they always intend to, e.g., joke. So if someone lies, children may think they have purposely said something wrong to amuse others, rather than deceive. Likewise if they pretend. Similarly, children could think people are always lying. So if someone jokes, children may think they have said something wrong to deceive others, rather than amuse them. A final possibility is children distinguish these different types of complex intentions. This would mark a sophisticated understanding of intentions, suggesting children not only understand that people intentionally do technically wrong acts, but also why they do them.

Research finds children distinguish joking and lying relatively late compared to when they understand intentions to lie or joke on their own. As Leekam (1991) points out, while joking and lying both involve intentionally conveying falsehoods, people want their audience to know the information is false when joking, but they want their audience to believe the information is true when lying. Therefore the intentions vary depending on what the speaker intends the audience to believe. This involves children understanding second-order mental states, tracking not only intentions, but others' knowledge and beliefs as well. Leekam (1991) designed an experiment in which 4- and 5-old children were told stories that were similar, but varied on whether the main character intended to joke or lie. In both versions of the story, a child tells his mother he drew a picture he did not actually draw. In the joke version, he tells his mother it was really another child. In the lying version, he does not. Children were then asked which one was joking and which one was lying. Even 4-year-olds could distinguish the two.

When comparing intentions to joke versus pretend, we find children can distinguish these complex intentions even earlier. Hoicka and Martin (in press) set up an experiment in which a first experimenter either consistently joked (e.g., put teacup on head and laughed), or pretended (e.g., put empty teacup to mouth and made sound effects) with 2-year-olds for four trials. Then a second experimenter asked to join in. The first experimenter left, and the second experimenter did two novel joke actions followed by two novel pretend actions, or vice versa. Overall, children objected to or corrected the second experimenter more when the first experimenter had pretended. This suggests children had high standards for how to play the game when pretending was involved, but not when joking, viewing these as two different types of acts. Furthermore, children objected to joke actions more than pretend actions in the pretend condition, but not in the joke condition. One possibility is children just responded to the actions, without actually considering the underlying intentions. Therefore a second set of

conditions was run, which mirrored the first two, but in which the experimenters gave no cues they were joking or pretending. This time, children did not distinguish the conditions, suggesting the intentional cues gave meaning to the actions. Therefore children as young as 2 years distinguish intentions behind joking and pretending.

Just as parents may help scaffold children's ability to distinguish joking from sincere intentions, parents also appear to distinguish the differences between intentions to joke and pretend. Not only do parents show more disbelief when joking versus being sincere (Hoicka, Jutsum, and Gattis 2008), they also show more disbelief and less belief through language and actions when joking versus pretending (Hoicka and Butcher in press), suggesting they believe joking to be more wrong than pretending. This makes sense, because while pretending is factually wrong, it is right in one's imagination (Nichols and Stich 2003). This does not need to be the case for joking (Hoicka, Jutsum, and Gattis 2008). Additionally, just as parents use low-level cues such as IDS to distinguish joking and sincere intentions (Hoicka and Gattis 2012), parents of 16- to 20-month-olds also use low-level cues, including increased gaze to child and smiling, and decreased gaze to objects, when joking versus pretending (Hoicka in press). And as discussed earlier, toddlers pick up on these explicit and implicit cues, leading them to also distinguish joke and pretend contexts.

The current research suggests children distinguish intentions to joke and lie from 4 years, and distinguish intentions to joke and pretend from 2 years. However, no research to date has examined whether children distinguish joking and metaphor, nor joking and irony. Future research should examine when and how children distinguish these different types of complex intentions.

Humor and Autism

Autism Spectrum Disorder (ASD) is characterized by a communicative deficit (American Psychiatric Association, 2013). In particular, social cognition can be impaired in

people with ASD (Baron-Cohen, Leslie, and Frith 1985, Perner et al. 1989). It is therefore not surprising that people with ASD may have difficulty understanding humor and humorous intentions, since much of humor requires socio-cognitive skills.

St. James and Tager-Flusberg (1994) observed six children ages 3-7 years diagnosed with ASD, and six children with Down's syndrome (DS). They found children with ASD produced fewer intentional episodes of humor than children with DS, although with the small sample size, the finding was not significant. In a separate study, Reddy, Williams, and Vaughan (2002) found that while children with ASD laughed as much as children with DS, they laughed less at social stimuli, such as funny faces. This suggests that while children with ASD do have a sense of humor, it may not be social in the same way as children with DS, or children with typical development (TD).

Indeed, experimental research shows children with ASD have difficulties in identifying intentions to joke. Children diagnosed with ASD, ages 4-8 years, and children with TD, ages 2-3 years, watched an experimenter mislabel objects (Baron-Cohen 1997). When asked why the experimenter did so, most children with TD suggested the experimenter was joking. In contrast, children with ASD simply stated the experimenter was wrong.

Adults with ASD appreciate several types of humor, including non-verbal puns and semantic humor (Samson and Hegenloh 2010). However these same adults had difficulty understanding humor based on Theory of Mind, where they had to take the perspective of different people. Therefore while adults with ASD have humor, there are fewer types of humor that they can share with others, in particular, socio-cognitive types of humor.

Altogether, this suggests humor can technically be appreciated on one's own, perhaps by noticing incongruities in the non-social world. However, in children with TD an important aspect of humor is that it is shared, and that one can identify when another intends to joke.

This may not be the same for children, or even adults, with ASD, suggesting they may have a different experience of humor.

Conclusions

This paper demonstrates children understand humor from an intentional perspective as young as 2 years. This is interesting from two vantage points. First, the research shows humor and intention-understanding are not always linked, as children appreciate humor and understand intentions separately at earlier ages before combining these two concepts later on. Research on ASD further bolsters the view that humor and intention-understanding are dissociable, but when combined, they provide a richer humor experience. Second, this research suggests understanding humorous intentions could be a gateway to understanding intentions in complex ways. Humor is the first type of non-literal communication children understand from a socio-cognitive viewpoint, compared to pretending, lying, metaphor, and irony, and may provide a stepping stone to understanding social cognition in more complex ways.

References

- Addyman, C., and I. Addyman. 2013. "The science of baby laughter." *Comedy Studies* 4 (2):143-153. doi: 10.1386/cost.4.2.143_1.
- Association, American Psychiatric. 2013. *Diagnostic and Statistical Manual of Mental Disorders (5th ed.)*. Washington, D.C.: American Psychiatric Association.
- Bainum, C. K., K. R. Lounsbury, and H. R. Pollio. 1984. "The development of laughing and smiling in nursery-school children." *Child Development* 55 (5):1946-1957. doi: 10.1111/j.1467-8624.1984.tb00436.x.
- Baron-Cohen, S. 1997. "Hey! It was just a joke! Understanding propositions and propositional attitudes by normally developing children, and children with autism." *Israel Journal of Psychiatry* 34:174-178.
- Baron-Cohen, S., A. M. Leslie, and U. Frith. 1985. "Does the Autistic child have a Theory of Mind." *Cognition* 21 (1):37-46. doi: 10.1016/0010-0277(85)90022-8.
- Carpenter, M., N. Akhtar, and M. Tomasello. 1998. "Fourteen through 18-month-old infants differentially imitate intentional and accidental actions." *Infant Behavior & Development* 21 (2):315-330. doi: 10.1016/s0163-6383(98)90009-1.
- de Jongste, H. 2013. "Negotiating humorous intent." In *Developments in Linguistic Humour Theory, 1*, edited by Marta Dynel, 179-210. Amsterdam: John Benjamins.
- Esseily, R., L. Rat-Fischer, E. Somogyi, K. O'Regan, and J. Fagard. in press. "Laughing babies can do it!" *Cognition & Emotion*. doi: 10.1080/02699931.2015.1036840.
- Gergely, G., H. Bekkering, and I. Kiraly. 2002. "Rational imitation in preverbal infants." *Nature* 415 (6873):755-755. doi: 10.1038/415755a.
- Glenwright, M., and P. M. Pexman. 2010. "Development of children's ability to distinguish sarcasm and verbal irony." *Journal of Child Language* 37 (2):429-451. doi: 10.1017/S03050009090009520.

- Hoicka, E. in press. "Parents and Toddlers Distinguish Joke, Pretend and Literal Intentional Contexts through Communicative and Referential Cues." *Journal of Pragmatics*.
- Hoicka, E., and N. Akhtar. 2011. "Preschoolers joke with jokers, but correct foreigners." *Developmental Science* 14 (4):848-858. doi: 10.1111/j.1467-7687.2010.01033.x.
- Hoicka, E., and N. Akhtar. 2012. "Early humour production." *British Journal of Developmental Psychology* 30 (4):586-603. doi: 10.1111/j.2044-835X.2011.02075.x.
- Hoicka, E., and J. Butcher. in press. "Parents produce explicit cues which help toddlers distinguish joking and pretending." *Cognitive Science*.
- Hoicka, E., and M. Gattis. 2008. "Do the wrong thing: How toddlers tell a joke from a mistake." *Cognitive Development* 23 (1):180-190. doi: 10.1016/j.cogdev.2007.06.001.
- Hoicka, E., and M. Gattis. 2012. "Acoustic differences between humorous and sincere communicative intentions." *British Journal of Developmental Psychology* 30 (4):531-549. doi: 10.1111/j.2044-835X.2011.02062.x.
- Hoicka, E., S. Jutsum, and M. Gattis. 2008. "Humor, abstraction, and disbelief." *Cognitive Science* 32 (6):985-1002. doi: 10.1080/03640210801981841.
- Hoicka, E., and C. Martin. in press. "Two-Year-Olds Distinguish Pretending and Joking." *Child Development*.
- Hoicka, E., and S. Wang. 2011. "Fifteen-month-old infants match vocal cues to intentional actions." *Journal of Cognition and Development* 12 (3):299-314. doi: 10.1080/15248372.2010.542215.
- Leekam, S. R. 1991. "Jokes and lies: Children's understanding of intentional falsehood." In *Natural theories of mind: Evolution, development and simulation of everyday mindreading.*, edited by A. Whiten, 159-174. Cambridge, MA: Basil Blackwell.

- Loizou, E. 2005. "Infant humor: The theory of the absurd and the empowerment theory." *International Journal of Early Years Education* 13 (1):43-53. doi: 10.1080/09669760500048329.
- Macdonald, N. E., and I. W. Silverman. 1978. "Smiling and laughter in infants as a function of level of arousal and cognitive evaluation." *Developmental Psychology* 14 (3):235-241. doi: 10.1037//0012-1649.14.3.235.
- Meltzoff, A. N. 1995. "Understanding the intentions of others - Reenactment of intended acts by 18-month-old children." *Developmental Psychology* 31 (5):838-850. doi: 10.1037/0012-1649.31.5.838.
- Mireault, G., S. C. Crockenberg, J. E. Sparrow, K. Cousineau, C. Pettinato, and K. Woodard. 2015. "Laughing matters: Infant humor in the context of parental affect." *Journal of Experimental Child Psychology* 136:30-41. doi: 10.1016/j.jecp.2015.03.012.
- Mireault, G., S. C. Crockenberg, J. E. Sparrow, C. A. Pettinato, K. C. Woodard, and K. Malzac. 2014. "Social looking, social referencing and humor perception in 6- and-12-month-old infants." *Infant Behavior and Development* 37 (4):536-545. doi: 10.1016/j.infbeh.2014.06.004.
- Mireault, G., M. Poutre, M. Sargent-Hier, C. Dias, B. Perdue, and A. Myrick. 2012. "Humour perception and creation between parents and 3- to 6-month-old infants." *Infant and Child Development* 21 (4):338-347. doi: 10.1002/icd.757.
- Nichols, S., and S. P. Stich. 2003. *Mindreading: An integrated account of pretence, self-awareness, and understanding other minds*. Oxford: Clarendon Press/Oxford University Press.
- Ozcaliskan, E. 2005. "On learning to draw the distinction between physical and metaphorical motion: is metaphor an early emerging cognitive and linguistic capacity?" *Journal of Child Language* 32 (2):291-318. doi: 10.1017/S0305000905006884.

- Pearson, B. Z. 1990. "The comprehension of metaphor by preschool children." *Journal of Child Language* 17 (1):185-203. doi: 10.1017/S0305000900013179.
- Perner, J., U. Frith, A. M. Leslie, and S. R. Leekam. 1989. "Exploration of the Autistic child's Theory of Mind - Knowledge, belief, and communication." *Child Development* 60 (3):689-700. doi: 10.1111/j.1467-8624.1989.tb02749.x.
- Pexman, P. M., M. Glenwright, A. Krol, and T. James. 2005. "An acquired taste: Children's perceptions of humor and teasing in verbal irony." *Discourse Processes* 40 (3):259-288. doi: 10.1207/s15326950dp4003_5.
- Pien, D., and M. K. Rothbart. 1976. "Incongruity and resolution in children's humor - A reexamination." *Child Development* 47 (4):966-971. doi: <http://www.jstor.org/stable/1128432>.
- Rakoczy, H., M. Tomasello, and T. Striano. 2004. "Young children know that trying is not pretending: A test of the "behaving-as-if" construal of children's early concept of pretense." *Developmental Psychology* 40 (3):388-399. doi: 10.1037/0012-1649.40.3.388.
- Rakoczy, H., M. Tomasello, and T. Striano. 2006. "The role of experience and discourse in children's developing understanding of pretend play actions." *British Journal of Developmental Psychology* 24:305-335. doi: 10.1348/026151005x36001.
- Recchia, H. E., N. Howe, H. S. Ross, and S. Alexander. 2010. "Children's understanding and production of verbal irony in family conversations." *British Journal of Developmental Psychology* 28 (2):255-274. doi: 10.1348/026151008x401903.
- Reddy, V. 2001. "Infant clowns: The interpersonal creation of humour in infancy." *Infance* 53 (3):247-256. doi: 10.3917/enf.533.0247.

- Reddy, V., E. Williams, and A. Vaughan. 2002. "Sharing humour and laughter in autism and Down's syndrome." *British Journal of Psychology* 93:219-242. doi: 10.1348/000712602162553.
- Reid, V. M., S. Hoehl, M. Grigutsch, A. Groendahl, E. Parise, and T. Striano. 2009. "The neural correlates of infant and adult goal prediction: Evidence for semantic processing systems." *Developmental Psychology* 45 (3):620-629. doi: 10.1037/a0015209.
- Samson, A. C., and M. Hegenloh. 2010. "Stimulus characteristics affect humor processing in individuals with Asperger syndrome." *Journal of Autism and Developmental Disorders* 40 (4):438-447. doi: 10.1007/s10803-009-0885-2.
- Shultz, T. R. 1974. "Development of the appreciation of riddles." *Child Development* 45 (1):100-105. doi: 10.1111/j.1467-8624.1974.tb00564.x.
- Shultz, T. R. 1976. "A cognitive-developmental analysis of humor." In *Humor and laughter: Theory, research and applications* edited by A. J. Chapman and H. C. Foot, 11-36. London: John Wiley & Sons.
- Siegal, M., and C. C. Peterson. 1996. "Breaking the mold: A fresh look at children's understanding of questions about lies and mistakes." *Developmental Psychology* 32 (2):322-334. doi: 10.1037/0012-1649.32.2.322.
- Siegal, M., and C. C. Peterson. 1998. "Preschoolers' understanding of lies and innocent and negligent mistakes." *Developmental Psychology* 34 (2):332-341. doi: 10.1037//0012-1649.34.2.332.
- Sroufe, L. A., and J. P. Wunsch. 1972. "Development of laughter in the first year of life." *Child Development* 43 (4):1326-1344. doi: 10.2307/1127519.
- St. James, P. J., and H. Tager-Flusberg. 1994. "An observational study of humor in Autism and Down syndrome " *Journal of Autism and Developmental Disorders* 24 (5):603-617. doi: 10.1007/BF02172141.

Waters, E., L. Matas, and L. A. Sroufe. 1975. "Infants' reactions to an approaching stranger - Description, validation, and functional significance of wariness." *Child Development* 46 (2):348-356. doi: 10.2307/1128127.