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Reading Between the Lines:
An Intervention Tool for Teaching Theory of Mind
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Abstract

Theory of mind (ToM) is a growing area of interest for speech language pathologists working with children with pragmatic language deficits, especially those with autism spectrum disorders (ASD). Narrative intervention has been a particularly fruitful avenue for encouraging ToM development. This project attempts to compile the best strategies for ToM intervention into a program centered on picture books; to justify the tool according to evidence-based practice guidelines; and to assemble background information, materials and instructions to make it accessible to clinicians. Research about ToM's characteristics, its role in ASD and its impact on language are reviewed, and strategies for ToM intervention, including guidelines for assessment, are discussed. Reading Between the Lines was developed with school-aged children with ASD in mind, but may be of use to clinicians working with children of varied ages, diagnoses and levels of ToM development.

Reading Between the Lines:

An Intervention Tool for Teaching Theory of Mind

Introduction

Theory of mind (ToM) is an awareness of and ability to predict mental states. It is the understanding that, beside the physical world, there is a mental one consisting of thoughts, beliefs, ideas and emotions. Even though these things are intangible and invisible, they can be explained, inferred or predicted, because they are influenced by actions, people and events in the physical world. Moreover, they in turn impact the physical world. An understanding of the existence of ideas and emotions, how they are influenced and how they in turn influence behavior is essential in order to understand human behavior and to interact with others.

ToM is a subset of empathy. Dvash and Shamay-Tsoory (2014) define two interrelated kinds of empathy: affective empathy, which involves feeling an appropriate emotional response to another person's emotion, and cognitive empathy, or ToM, which involves understanding or predicting another person's perspective.

ToM has in turn been divided by many researchers (see Dvash and Shamay-Tsoory, 2014 for a review) into affective ToM and cognitive ToM. Affective ToM is the awareness of and ability to infer emotions, while cognitive ToM is the awareness of and ability to infer beliefs and knowledge. ToM can also be divided into intrapersonal ToM, which is concerned with one's own mental states, and interpersonal, or social, ToM, concerned with the mental states of others (Tine & Lucariello, 2012).

The first signs of a developing ToM are precursor skills, which include following eye gaze, establishing joint attention, imitation, pretend play, and emotion recognition (Fletcher-Watson et al., 2014). By about 4 to 5 years of age, children acquire the ability to understand first-

order beliefs – that is, to infer what another person must be thinking (Wellman, Cross & Watson, 2001). An important type of first-order belief that emerges during this time is false belief (FB), the understanding that people can hold beliefs that are contrary to reality, and that different people can hold different beliefs. The greatest growth in ToM development occurs between about 6 and 7 years of age (Muris et al., 1999; Perner & Wimmer 1985). During this time, the ability to form second-order beliefs – inferences about one person’s beliefs about another’s beliefs – emerges (Perner & Wimmer, 1985). More advanced aspects of ToM develop as children mature, including the ability to recognize more complex emotions in facial expressions (Baron-Cohen et al., 1997), to understand higher-order ToM beliefs (ie. “He worried that she thought that he knew that...”), and to understand figurative language such as metaphor, sarcasm and irony.

None of this, of course, occurs independently. ToM is influenced by, contributes to, and develops in conjunction with academic performance, social skills, language and cognition. ToM development should therefore be understood within the broader context of a child’s overall social, emotional, and cognitive development. As ToM research has expanded over the past thirty years, the role of ToM in all of these areas has been a point of interest to psychologists and to speech language pathologists (SLPs).

ToM and Autism Spectrum Disorders

Lack of ToM is a well-documented phenomenon in individuals with autism spectrum disorders (ASD). The fifth edition of the Diagnostic and Statistical Manual of Mental Disorders defines ASD as the presence of “persistent deficits in social communication and social interaction” and “restricted, repetitive patterns of behavior, interests, or activities” (American

Psychological Association, 2013, p. 50). Lack of ToM is believed to explain the social, communicative, and imaginative abnormalities associated with the disorder.

ToM on its own is insufficient to explain all of ASD's characteristics; executive functioning and central coherence have also been proposed as core deficits (Baron-Cohen & Swettenham, 1997). Executive functioning is an umbrella term for mental processes that enable us to organize thoughts and actions in order to get things done. These include attention, inhibition, goal-directedness, planning and problem solving. An executive functioning deficit is linked with ASD's characteristics of repetitive behaviors (for example, perseverations or strict adherence to routine) and cognitive inflexibility (including deficits in goal-directedness and planning). Central coherence might best be described as "big picture thinking"; it is the ability to integrate information to derive meaning. Its deficit in ASD is linked with abnormalities in perception; individuals with ASD tend to be very detail-oriented and to see objects or events as a series of disparate parts rather than as an organized whole. These three core deficits appear to be independent of each other – that is, one does not cause the others, and all three appear to have distinct etiologies (Baron-Cohen & Swettenham, 1997). However, all three will have interconnected effects on social and academic performance.

It is important to note that individuals with ASD do not appear to be equally deficient in all ToM skill areas. Tine and Lucariello (2012) found that interpersonal ToM ability was significantly lower than intrapersonal ability in individuals with ASD. Cognitive ToM may also be more significantly impaired than affective ToM; Tager-Flusberg (1992) found significant differences between individuals with ASD and the Down syndrome comparison group in the amount and quality of their talk about attention and cognitive states, but not in talk about emotion, desire or perception except when discussing more complex emotions. Other research

has suggested that deficits in emotion processing in autism are present only when dealing with more complex emotions that require an understanding of another person's thoughts, such as surprise or embarrassment – that is, an affective ToM deficit seems to exist only to the extent that it is caused by a cognitive ToM deficit (Blair, 2005).

Other groups display a ToM deficit, including children with developmental delays (DD) due to hearing, speech or physical impairments. However, in these cases a deficit beyond that associated with mental age likely arises from a lack of social and communicative experience; their ToM development, although delayed, follows the normal developmental sequence described above (Falkman, Sandberg & Hjelmquist, 2005). ToM development in children with ASD, in contrast, is thought to follow an abnormal developmental pattern. This distinction is evident at 20 months, when deficits in ToM precursor skills become evident in children with ASD. A study by Charman et al. (1997) found that 20 month olds with autism showed less reaction than those with DD to emotional displays in others, joined in fewer joint attention episodes, and demonstrated weaker ability to imitate than children with developmental delay. Those skills that do eventually emerge may still be abnormal. For example, while normal and developmentally delayed children first imitate gestures or body movements, children with ASD begin by imitating objects (Rogers et al 2010). Individuals with ASD continue to demonstrate unusual social-cognitive skills and abnormal brain functioning even when their brains have otherwise fully developed. Many studies have found abnormal functioning of the amygdala, a region believed to play a role in the social brain, in individuals with ASD (see Baron-Cohen et al., 2000 for a review).

In children with ASD, ToM deficits have been found to be distinct from other areas of cognitive development. For example, a study by Baron-Cohen (1991) found that in individuals

with autism, the social cognitive abilities of relationship recognition, basic reciprocity and making animate/inanimate distinctions were unimpaired. However, numerous studies have demonstrated that children with autism generally lack the social-cognitive skills that are associated with ToM. A few among these studies indicate that children with autism can't differentiate objects from thoughts about objects; they lack a distinction between appearance and reality; they fail to recognize or spontaneously produce mental-state words; they have difficulty understanding complex causes of emotion; and they lack a distinction between intentional and accidental actions (see Baron-Cohen & Swettenham, 1997, for a review). Even high-functioning individuals with autism who pass first and second order ToM tests have been found to have difficulty with more complex tasks, such as reading complex emotion in another person's eyes (Baron-Cohen et al, 1997).

ToM plays a significant role in enabling many social skills. Predicting or understanding the thoughts, emotions or motivations of others is necessary in order to normally engage in what Frith, Happé & Siddons (1994) call "interactive behaviours" – skills that require a working ToM such as initiating conversations of interest to others, choosing appropriate presents, responding to hints and indirect cues in conversation, and expressing ideas in more than one way. Studies have found effects of ToM on joint planning in pretend play, peer social status, and sensitivity to social criticism (see Harwood & Farrar, 2006, for a review). The lack of these skills is believed to result in the impairments in social reciprocity that make up part of ASD's definition and result in the aloofness, awkwardness or one-sidedness in relationships that are often observed in individuals with ASD. It also may explain, to some extent, the communicative abnormalities associated with ASD.

ToM, ASD and Language

The linguistic abilities of individuals with ASD vary greatly. While high-functioning individuals may show little or no language impairment, many never acquire functional language at all. Individuals with autism may exhibit atypical voice quality and intonation patterns (Shriberg et al., 2001) as well as lexical and morphosyntactical problems similar to those found in children with specific language impairments (SLI). In particular, the vocabularies of children with ASD tend to lack mental state words such as “think” or “know” (Tager-Flusberg, 1992). However, many researchers characterize the application of pragmatics as the most significant area of language impairment found in autism (e.g Tager-Flusberg, 2007; Landa, 2000; Baltaxe, 1977). Conversational deficits are correlated with ToM performance, independent of overall language ability (Hale & Tager-Flusberg 2005), and these deficits tend to demonstrate a lack of awareness of language’s social function (although not of its environmental, i.e. practical or descriptive, uses) (Wetherby & Prutting, 1984). Impairments in the narrative abilities of individuals with ASD similarly display a lack of ToM ability and overall social awareness. When producing narratives, children with ASD tend to embed more irrelevant language, treat characters as objects rather than people, be less disposed to see narratives as representing meaningful events, focus on minute details rather than gestalt, make unclear references, and produce shorter stories with fewer causally related events (Petersen et al., 2014). In addition, individuals with ASD have been shown to have difficulty understanding intentionally non-literal statements such as metaphors or sarcasm (Happe, 1994). Underlying all of these deficits is a lack of understanding of the social function of language, which extends beyond the literal meanings of words and requires taking into consideration the listener’s interests and knowledge and the

speaker's intent. For this reason, the role of ToM has been of special interest for researchers studying language impairment in ASD.

Of course, ToM almost certainly is not the only factor that explains the language deficit in individuals with ASD. Executive functioning and central coherence deficits likely also play a role. ToM intervention, therefore, should not be the only focus of language intervention for children with ASD. However, it can be incorporated as an important component of an effective intervention strategy.

ToM Interventions

ToM interventions have been proposed as an alternative or addition to behavior management and personal skills training for children with ASD, with the goal of reducing social and communication deficits. Since ToM is so integrated with other areas of development, improving ToM might improve other developmental areas, and vice versa. ToM interventions are of particular interest to speech language pathologists (SLPs) because of their relationship to language learning.

Many intervention tools and strategies attempt to teach social skills to children with autism from the outside in, by teaching specific social skills and rules by rote. Such intervention tools include *The hidden curriculum* (Myles, Trautman & Schlevan, 2004), which explicitly teaches social skills most children would pick up on intuitively, and script training, which teaches procedures, questions or phrases to be used in social situations, and gradually decreases support until they can be used spontaneously in conversation (Spencer & Slocum, 2011). This outside-in approach can be a functional method of providing children with necessary social skills. However, social skills learned by rote will lack the flexibility of an intuitive social awareness. ToM interventions, in contrast, attempt to reduce the social and communication

deficits of autism from the inside out, teaching the mental processes that underlie social interactions.

Since the social and communication skills associated with ToM develop from the precursor skills described above, targeting earlier skills should theoretically help develop more advanced ones (Fletcher-Watson et al, 2014). A majority of the intervention studies for ToM intervention with children with autism, therefore, have sought to develop these precursor skills. Joint attention in particular has received a great deal of attention. These studies seem promising, having what Fletcher-Watson et al (2014), in a review of ToM interventions, call “modest evidence of intervention success.” Many studies of interventions aiming to develop more advanced ToM skills have taken a developmental approach, starting with basic or preliminary ToM skills and progressing to more advanced ones (see Hadwin & Kovshoff, 2013 for a review).

Language development should play an important role in ToM intervention. A meta-analysis by Milligan, Astington and Dack (2007) found a strong correlation between language ability and false-belief understanding. This correlation was significantly stronger between early language and later ToM skills than between early ToM skills and later language, suggesting that language influences ToM more than ToM influences language. Based on their finding of a significant correlation between language and ToM abilities in preschoolers with SLI, Farrar et al. (2009) recommend intervention that integrates social-cognitive skills with language skills. They recommend using conversation-based standard ToM tasks, practicing joint attention, encouraging the production of mental state terms, and providing opportunities for children to spend time in everyday contexts with peers with normal social and linguistic skills.

Admittedly, there is reason for such findings to be called into question. It is difficult to determine whether language indeed influences ToM abilities themselves, or whether it merely

influences performance on ToM tasks, which necessarily involve language. It may be, for example, that a child understands the concept of false belief but fails a false belief test because she struggles with the syntactic complexity of “When Sally comes back, where will she look for the cookies?” Nevertheless, at the very least, language training can serve the academic goal of improving comprehension and performance on similar tasks related to mental states, such as narrative skills and reading comprehension.

One form of language intervention believed to improve ToM is training on sentence complements, sentences with a main clause and an embedded proposition (e.g. “She wondered if it was going to rain”). Understanding sentence complements requires understanding that what is stated, desired or believed (here, “it was going to rain”) is distinct from reality. Such training has been shown to improve performance on false belief tasks in children 3-4 years old (Hale & Tager-Flusberg, 2003; Lohmann & Tomasello, 2003). A study by de Villiers and Pyers (2002) indicated that understanding of sentence complements predicts false belief ability. The authors suggest that children can be taught sentence complements with communication verbs like “say” or “tell” (e.g. “He told me he can walk through walls.”) most easily, and that sentence complements can in turn be used to teach mental state verbs like “think” or “know” (e.g. “He thinks he can walk through walls.”). Using sentence complements with communication verbs as a bootstrap to understand sentence complements with mental state verbs can be particularly important for children with ASD, who frequently lack mental state verbs in their lexicons and demonstrate a lack of understanding of mental states in their ToM abilities (Tager-Flusberg, 1992).

Sentence complement training facilitates discourse about false belief and mental state terms, which is important for ToM development. Falkman, Sandberg and Hjelmquist (2005)

found that social interaction facilitates ToM development; they found that children with cerebral palsy, who had limited social interaction because of their impairment, had delayed ToM over and above what could be attributed to the mental delays caused by the condition. The researchers hypothesized that it is not language skill directly, but rather language experience obtained from social interaction, that leads to ToM development. The more children communicate in social situations, the more they are called upon to discuss mental states – what they think, feel, believe, wonder, wish, like, etc. – and to think from another person’s perspective. Family talk about feelings and causality and cooperative interaction with siblings are both correlated with performance on social cognition tasks, according to a study by Dunn, Brown, Slomkowski, Tesla, and Youngblade (1991), although no causal relationship has yet been established.

Stories also provide good material for discourse on mental states and false belief. Peskin and Astington (2004) altered the text of story books that contained ToM concepts, reading one group of typically developing kindergarteners a version rich in explicit, explanatory mental state terms while the second group was read the original version. Interestingly, the latter group improved on false belief tasks more than the former, perhaps because not having mental state concepts clearly explained required more active engagement of the children’s ToM. Although this was the case with typically-developing children, results might be different for children with a ToM impairment such as ASD, who often lack the ability to make assumptions about mental states on their own. In any case, exposure to stories that involved ToM concepts resulted in a significant improvement on false belief tasks in both groups. In a study by Appleton and Reddy (1996), three-year-olds were shown videos depicting false belief stories, followed by non-corrective discussion of the videos. These children showed greater improvement on false belief tasks than children who were only read picture books, without discussion. A study by Guajardo

& Watson (2002) found that preschool-aged children who participated in an intervention involving reading storybooks, discussing the mental states of its characters, and reenacting the stories, resulted in a greater improvement in performance on false-belief tasks than a no-intervention control group. Similarly, a study by Dodd, Ocampo and Kennedy (2011) compared children with ASD who participated in a six-week narrative intervention program that targeted perspective-taking abilities with those in a narrative intervention program that did not focus on perspective taking. The perspective-taking program involved making inferences about characters, identifying different emotions the characters experience, and practicing story retell from different characters' perspectives. In the post-test, children in this intervention showed greater improvement in perspective taking, as well as in the number and variety of mental state terms they used, than those in the non-perspective taking intervention.

These studies, and the latter two in particular, highlight several important strategies for narrative intervention. First, in both Guajardo and Watson and Dodd, Ocampo and Kennedy's studies, children were asked to retell the stories they had heard. As mentioned above, narrative skills can be an area of weakness for individuals with ASD, because they require many skills associated with ToM, such as explaining human behavior, understanding cause and effect relationships, and tailoring information to the listener's needs (Petersen et al., 2014). Working with children on retelling stories can be an effective strategy for developing these skills. Narrative skills play an important role in normal ToM development. They normally begin to emerge during the preschool years from precursor ToM skills, as well as from other pragmatic and linguistic skills (Pearson & de Villiers, 2005). As they develop, narrative skills help develop true ToM abilities over the next few years.

Narrative intervention can also include role playing as a form of retelling, as in Guajardo and Watson's study. The importance of role playing should be examined with some caution. A thorough review of the evidence (Lillard et. al., 2012) failed to find a causal relationship between pretend play and most areas of a child's development. However, this does not mean that pretend play is unimportant altogether. The review did find a possible causal relationship between pretending and narration, and a possible bidirectional causal relationship between pretending and language. Although no causal relationship between ToM and language was found in the review, both appeared to be mediated by a third factor, which the authors hypothesized was adult interaction with the child. Furthermore, pretend play is useful because it engages a child with what they are learning. Thus, as Guajardo and Watson's study demonstrates, role playing can be a good medium for teaching about perspective-taking and other ToM concepts.

Finally, narrative intervention can include the identification of emotions within a story and the analysis of cause and effect relationships. Dodd, Ocampo and Kennedy used an adapted form of the Story Grammar Marker Character Map (Moreau & Fidrych, 1994) to train children with ASD on these skills in their study. Another strategy that involves both of these aspects is the use of thought-bubbles to pictorially represent what characters are thinking and feeling. Providing children with worksheets with thought bubbles and speech bubbles from a story's characters to be filled in creates a visual representation of what is taking place in character's heads and how that differs from or influences how they feel, speak or act. A pair of studies by Wellman et al. (2002) found that training using thought-bubbles helped improve performance on false-belief tasks in children with autism.

The use of comic strip conversations (Gray, 1994) is a strategy that incorporates the use of speech and thought bubbles in depicting a child's experience and the thoughts and words of

those around him. Comic strip conversations are drawn by the child with the help of a caretaker, teacher or interventionist. A similar strategy is the use of social stories (Gray, 2010), stories written by a parent, teacher or interventionist that describe a child's experience, the thoughts and emotions of those involved, and its consequences. These stories are then read by the child and the story's author. Both of these strategies have the goal of developing ToM, and there is some evidence that they do so, as they have been shown to improve social skills in children with ASD (e.g. Hutchins & Prelock, 2013).

Limitations of ToM intervention research to date.

In a recent literature review of interventions targeting ToM in children with autism, Fletcher Watson et al. (2014) found that most intervention studies so far have shown failure for improvements in ToM skills to generalize to other contexts outside of treatment. This has been the greatest limitation of ToM intervention research. Garcia Winner (2014) suggests that the ability of individuals with autism to understand the mental states of characters in stories may be very different from their ability to understand and respond to the mental states of real people in real time, because they may have difficulty responding quickly as well as dealing with the emotional load of the situation. This may contribute to the failure to generalize.

Several possible strategies have been proposed to combat this difficulty. Fletcher Watson et al. (2014) propose that broad-based, multi-modal interventions might be more helpful than interventions focused solely on developing ToM skills. Generalization may be improved by an emphasis on social and conversational interactions, which research has shown to be important in normal ToM development (Appleton & Reddy, 1996; Clements, Rustin, & McCallum, 2000; Guajardo & Watson, 2002). Guajardo & Watson (2002) suggest that using storybooks to provide examples in multiple contexts of the ToM concepts being taught may aid in generalization.

Focus on a child's unique strengths and areas of interest may also make intervention more effective (Hutchins & Prelock, 2008).

It is also important to note that intervention takes some time to show significant effects (e.g. Hutchins & Prelock, 2013) and that its effect may decrease or disappear when intervention stops (e.g. Guajardo & Watson, 2002). It is therefore important that intervention be regular and ongoing.

Finally, note that the development of effective ToM strategies is ongoing and still relatively young. The meta-analysis of Fletcher Watson et al. (2014) concluded that currently, although models for intervention abound, it is difficult to assess which are effective because there is a lack of both quantity and quality of evidence. Nevertheless, ToM intervention holds promise as a means of developing social and linguistic skills. It is reasonable to hope that by integrating ToM instruction with other aspects of language intervention and carefully tailoring instruction to each child's specific needs, clinicians can successfully help children improve on ToM-related tasks, at the very least on an academic level.

Reading Between the Lines

Importance and Goals

As discussed above, ToM is augmented by language ability; therefore SLPs can play an important role in facilitating ToM development. ToM in turn plays a role in improving language pragmatics, an important facet of an SLP's scope of practice that has significant social and academic implications for the child. According to ASHA, one responsibility of a school-based SLP is to "address personal, social/emotional, academic, and vocational needs that have an impact on attainment of educational goals" (American Speech-Language-Hearing Association [ASHA], 2010). Socially, ToM development can help individuals understand the thoughts and

behaviors of others and respond appropriately. Academically, ToM helps students understand narratives and reflect on their own knowledge and thought processes.

The present project attempts to provide SLP clinicians with a tool to help children achieve these social and academic goals. Reading Between the Lines attempts to integrate many of the ToM-teaching strategies mentioned above, using picture books as a framework for intervention. As described above, there is some evidence that narrative intervention is successful in teaching ToM concepts. Furthermore, as Garcia-Winner (2014) notes, individuals with ASD (and indeed, many individuals without autism as well) tend to be more competent at understanding the thoughts and behaviors of characters in stories than they are at understanding real life events in the moment. Stories may therefore serve as a stepping stone, helping children with ASD understand ToM concepts in a way they are not able to in real time. While real examples from the child's life may ultimately be more effective in generalizing results, storybooks may prove useful in introducing mind-reading strategies in an accessible and engaging fashion. Clinicians can then apply the strategies developed using this tool to real-life situations. They may also serve as a way to "validate the voyeuristic ability" of children with autism, helping them to relate to others, albeit in a more removed fashion (Garcia-Winner, 2014). Narrative intervention as a strategy for ToM development has the added benefit of strengthening emergent literacy skills.

Using Reading Between the Lines

Reading Between the Lines was developed with school-aged children with ASD in mind. However, it could be adapted for use with older or younger individuals, or for individuals with ToM deficits unrelated to ASD. Regardless, in order to be an appropriate part of evidence based practice, the outlines provided here and the strategies they represent must be adapted to each

child's individual needs. It is therefore important to first assess a child's ToM and linguistic abilities.

ToM assessment

ToM assessment should look at a child's cognitive, affective, interpersonal and intrapersonal ToM abilities and seek to understand their relative strengths and weaknesses in each subtype. This may involve specific tests such as those described below, but should also involve observation of the child and information provided by those who know the child best (Hutchins & Prelock, 2008).

Assessing ToM ability can begin early; the first sign of a ToM deficit is the absence of precursor skills. Baird et al. (2000) used the Checklist for Autism in Toddlers (CHAT) to assess pretend play and joint attention skills at 18 months, and found that the absence of these skills was a predictor of autism.

Most traditional ToM tasks assess cognitive interpersonal ToM. These tests usually assess a child's ability to distinguish between appearance and reality, or between belief and reality. Two commonly used forms of the latter, known as false belief tests, are the unexpected location test (often called the Sally-Anne test) and the unexpected contents test (often called the Smarties test). Children typically perform worse than chance on such tests at age 3, but should be nearly perfect at them by age 5. By age 6, children should perform better than chance on second-order tasks, in which a child is asked to think about what one person thinks about another person's mental state, and their performance should improve over the next few years (Miller, 2006). However, as Hutchins and Prelock (2008) note, such tests provide information on only small aspects of what is really a very complex and multifaceted construct. Research suggests that cognitive interpersonal ToM skills are the area of greatest weakness for children with ASD (Tine

& Lucariello, 2012; Tager-Flusberg, 1992); however, it is important to assess all facets of ToM to determine the individual needs of each child.

More advanced assessments are necessary to evaluate higher-level ToM, especially since some high-functioning individuals with ASD are able to pass even second-order ToM tests but fail more advanced ones (Baron-Cohen et al 1997). Pons, Harris & de Rosnay (2004) outline a battery for assessing the affective abilities of children between 3 and 11 years. Happe's "Strange Stories" (1994) use stories with non-literal statements to assess children's ability to interpret the thoughts and emotions of story characters in a variety of contexts. The ToM Test developed by Muris et al. (1999) measures precursor, basic, and higher-level ToM skills. However, while these tests touch on cognitive, affective, interpersonal and intrapersonal skills, they do not clearly distinguish between these subtypes. Unfortunately, a standardized assessment to individually assess each of these subtypes does not yet exist (Westby & Robinson, 2014).

It is important to keep in mind that language ability may affect performance on ToM tasks. Manipulating or simplifying language can help reduce this effect. If this is the case, improving mental state vocabulary may be a good goal for intervention in addition to goals directly relating to pragmatics. Because of the close interrelationship between language and ToM development, assessing a child's language ability is also important for ToM assessment and intervention.

Language assessment

As discussed above, ToM intervention will be most effective for individuals with language ability. The strategies described here are specifically targeted at children with the language level of a typical six or seven year old, as this is the age at which the greatest increase in ToM development occurs (Muris et al., 1999; Perner & Wimmer 1985). If language is a good

predictor of ToM ability as suggested above, it follows that the language ability of a six or seven year old is necessary to develop the ToM of a typical child at that age.

Comprehensive language assessment batteries such as the Clinical Evaluation of Language Fundamentals (CELF) or Comprehensive Assessment of Spoken Language (CASL) may be used to achieve such an assessment. These tests measure both expressive and receptive syntactic, lexical, morphological and pragmatic skills, and compare them to those of typically developing children. Another method of assessment that may be particularly useful for clinicians looking to use Reading Between the Lines is the Systematic Analysis of Language Transcripts (SALT). This software analyzes a transcription of a language sample, and provides extensive information on the sample's characteristics. When a language sample is transcribed into SALT, the clinician can look at the child's linguistic ability relative to typically developing peers in a number of different areas, and can even code to be able to assess specific features of interest, such as clause subordination or the use of mental state terms. A narrative sample would be particularly helpful for the purposes of Reading Between the Lines. A classic material for prompting a narrative from a child is *Frog, Where Are You?*, a wordless picture book by Mercer Mayer (1969). Mayer's *Boy, Dog, Frog* series consists of five additional wordless books that would be useful for use assessing a child's progress throughout intervention.

Performing these measures of assessment should enable a clinician to form a picture of a child's ToM and linguistic abilities and needs. Based on these, a clinician should form specific goal for both a child's ToM and language progress. These goals can be used to select the picture books and associated activities would be most useful and that are within the child's ability.

SLPs should keep in mind that other variables in addition to ToM and language skills will influence a child's performance and ability to learn. For example, a child with very weak

executive functioning may have trouble attending to intervention. The SLP may want to assess a child's executive functioning and central coherence abilities as well, and to take note of a child's interests and preferences. In short, the SLP should try to gain as complete an understanding of the child as possible in order to cater to his or her individual characteristics and needs.

Picture books

The picture books selected for this project were intended for children roughly from kindergarten through second grade (Scholastic, 2015). They were chosen because they feature specific ToM concepts. In accordance with a developmental strategy for teaching ToM, the books have been ordered from those focusing on the simplest ToM learning goals to more complex ones. The books chosen are:

- *Peanut Butter Rhino* by Vincent Andriani

Learning goal: What we know depends on our perspective.

- *The Kissing Hand* by Audrey Penn

Learning goal: Identifying with characters in a story.

- *The Snowman* by Raymond Briggs

Learning goal: Making inferences about thoughts and emotions.

- *A Porcupine Named Fluffy* by Helen Lester

Learning goal: Language can differ from reality.

- *Tacky the Penguin* by Helen Lester

Learning goal: Expectations can differ from reality.

- *Chrysanthemum* by Kevin Henkes

Learning goal: People can have different thoughts about the same thing.

Components

For each picture book, the following components are outlined. Clinicians are encouraged to select those questions and activities that best reflect the goals they have set for their client.

Learning goal. For each book, a ToM concept is highlighted that the book illustrates particularly well. The books have been ordered from those with simpler learning goals (those normally achieved by typically developing children earlier on) to more complex ones. This concept will be highlighted in the intervention activities described, although other ToM and linguistic concepts will also be addressed. As discussed above, ToM is integrated with other areas of development, and emerging ToM skills will likely generalize best when integrated with other aspects of ToM development.

Questions. For each book, questions have been developed to help the child think about ToM concepts evident in the book. These questions should serve as prompts for discussing mental state terms and concepts with the child, while and/or after reading the story. For each question, the ToM understanding necessary to answer the question, and the age at which this understanding typically develops, are listed. These ages are based on Westby and Robinson's (2014) summary of typical ToM development. Clinicians should feel free to choose those questions most in line with their individualized learning goals, to create their own questions, and to rephrase the questions as necessary according to the child's linguistic ability. Even when they are rephrased, children may not be able to answer some or all of the questions on their own. Clinicians should help children with these questions not simply by explaining the correct answer, but more importantly by modeling how to think through the question and arrive at an answer. Sample prompts have been provided for each question to help guide clinicians through these scaffolded discussions.

Mental state vocabulary words. Words in the story that describe a character's thoughts or feelings, refer to a mental action, or indicate an outward display or consequence of a mental state are listed. These words may be incorporated into a child's goals for lexical improvement. Learning these words is important, since mental state words have been found to be the primary deficit in the lexicons of children with ASD, and because exposure to conversation using mental state words has been found to be correlated with ToM ability. Instructors can highlight these words, physically in the book and/or verbally, while reading the story, and can discuss the meaning of these words with the child.

Sentence complements. The sentences provided (and/or ones like them) can be used to discuss with the child how what one says or thinks might be different from reality. These contrasts between words or mental states and reality should be highlighted while reading or discussing the book. Sentences with communicative verbs (ie. said, told, explained) may be easier to understand than sentences with mental verbs (ie. thought, wondered, felt), and can be used to scaffold these concepts. Pictures with speech and thought bubbles can be used to illustrate sentence complements.

Story retell. Following a reading of the story, the clinician can ask the child to retell the story in their own words. Prompts have been provided. Allow the child to turn the pages and look at the pictures as he or she narrates. Further prompts may be necessary as the child progresses through the story. (For example, "And then what happened?"; "What is happening in this picture?") Clinicians should also ask for more detail as the child tells the story, in order to prompt the child to think about not only the actions, but also the mental states of the characters. (For example, "Did [character] know that was going to happen?"; "How did [character] feel when that happened?") If the child struggles with this activity, the clinician can model story

retell, emphasizing the mental states of the characters and asking the child to contribute details as they go along.

Role play activity. The clinician can guide the child through the role play activity described as an alternative or supplement to narrative retell. These activities are designed to creatively reinforce the concept being taught, and to teach children to think from other perspectives. Symbolic play facilitates adult-child interaction and discussion of mental states, and engages a child with what they are learning. As discussed above, role playing and perspective taking played important roles, respectively, in the intervention studies of Guajardo and Watson and of Dodd, Ocampo and Kennedy, which both resulted in improved performance on ToM tests. As with other activities, instructors may first need to model these activities for the child.

Thought bubble/speech bubble worksheets. Pictures using thought bubbles and speech bubbles can be used in several ways to reinforce the concept being taught. They can illustrate the relationship between appearance and reality (ie. a character looks happy but is really sad); between what is said/thought/felt and reality (ie. a character thinks it is raining but it is actually sunny outside); or between what is said and what is thought/felt (ie. a character says she is going to school but actually plans to go to the park). Templates have been provided for each story, and instructors should help the child fill in the bubbles, or create their own. Ways to pair these worksheets with discussion about the stories have been suggested.

Parent activity. These are included in an attempt to help ToM concepts taught in therapy sessions generalize to real life situations. Activities are designed to be easy for caregivers to incorporate into daily life. This may improve generalization by introducing the same concept taught during therapy sessions in a different context and presented in a new way. Instruction

might also be more meaningful coming from a caregiver than it would from a clinician (Dunn, Brown, Slomkowski, Tesla, & Youngblade, 1991). Parents are also asked to read the story with their child and do an activity related to the story in order to encourage parent-child interaction and to engage the child in the story. Parents should be told not to be discouraged if they have trouble engaging their child in these activities; the goal is to create an environment rich in the discussion of mental states, rather than to achieve a specific response for the child.

Conclusions and Future Study

Making ToM intervention strategies such as those described above accessible to clinicians is an important step in integrating ToM research into standard speech therapy practice. A direction for future research would be to test the clinical validity of the Reading Between the Lines curriculum. Such a study might look at improvements in ToM and language ability in a sample of school-aged children with ASD by comparing narrative samples before and after Reading Between the Lines intervention. Books from Mayer's *Boy, Dog, Frog* series might be used to obtain these samples, and SALT software could be used to analyze them. Clinician feedback about the accessibility and usefulness of the material would also be important to consider. Reading Between the Lines is intended to be easy to adapt to each child's specific abilities and needs, so it would also be interesting to examine the effectiveness of the material for clinical populations other than ASD. Research along these lines would provide further empirical support for the usefulness of ToM as a facet of language intervention.

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