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Research on theory of mind in deaf education

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RESEARCH ON THEORY OF MIND IN DEAF EDUCATION

by

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**An Independent Study
submitted in partial fulfillment of the requirements for the
degree of:**

Masters of Science in Deaf Education

**Washington University School of Medicine
Program in Audiology and Communication Sciences**

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Approved by:

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***Abstract:** Prior research has shown that theory of mind (ToM) development is delayed in children who are deaf and hard of hearing. Although research has demonstrated a delay in ToM development in children who are deaf and hard of hearing there are not many suggestions for how ToM is or should be addressed in deaf education. The current research addressed this issue by compiling an extensive literature review and sending 113 surveys' to OPTION schools for the deaf around the country.*

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INTRODUCTION AND REVIEW OF LITERATURE

Typically developing children are able to use their understanding of others' thoughts and beliefs to predict someone's behavior at a young age (Peterson, 2009). Researchers who look at theory of mind (ToM) development are trying to understand children's understanding of themselves and others as mental beings (Milligan, Astington, & Dack, 2007). Peterson and Siegal describe ToM as an awareness of mental states, such as thoughts, beliefs, intentions, memories and desires of ourselves and others, which helps us make sense of and predict behavior (2000). As stated in Peterson, Wellman and Liu, a theory of mind typically develops in children between the ages of 3 to 5 (2005). Research has determined this window by finding that most children fail theory of mind tasks at age three and pass a theory of mind task by ages four or five (Wellman, Cross, & Watson, 2001). This developmental milestone is important because it allows children to navigate the social world. For example, a child with a well-developed ToM will have the skills needed to work and socialize effectively with his or her classmates. According to Astington, children can only interpret the actions of others if they are able to consider the thoughts and wants of others (1998). A child without a fully developed ToM may find it more difficult to understand how others feel, especially if his or her own feelings differ from those of the others..

ToM is often assessed by false belief tasks (Astington, 2001). The standard false belief tasks are designed to create a belief that is contrary to reality. The child is then asked to infer what an individual will believe, do, say or think based on their false belief (Peterson, 2002). The two most common false belief tasks are "change in location" scenarios and the "unexpected contents" task (Muma & Perigoe, 2010). In the "change in location" scene, an experimenter places an object in a specific location while the subject and another child are present. Then the

experimenter leaves the room and the second experimenter moves the object to a different location. The subject is then asked where the first experimenter will look for the object when he or she returns to the room. A child with a fully developed ToM will understand that the other experimenter or character will expect the object to be in its original location. For the “unexpected contents” activity, an “unexpected” object is placed in a familiar container without the subject’s knowledge (for example, scissors placed in a crayon box). The subject discovers the unexpected contents, then is asked what someone else will think is in the familiar box. The child demonstrates an understanding of another’s false belief by expecting them to believe the familiar object would be in the familiar box. If the child believes the other person will know the unexpected contents are in the box (e.g., scissors in the crayon box) they are not demonstrating a ToM by not understanding what another might think.

Studies have found that children who are deaf and hard of hearing are frequently delayed in ToM development (Peterson, Wellman, & Liu, 2005 and Schick, de Villiers, de Villiers, & Hoffmeister, 2007). Some researchers have theorized that language plays an important role in false belief tasks. Schick, de Villiers, and Hoffmeister found that children who were deaf and hard of hearing with hearing parents exhibited delayed development of ToM . This was true of children using ASL or children who were learning listening and spoken language. These researchers used both verbal and non-verbal false belief tasks. For both false belief tasks, children who were deaf and hard of hearing with hearing parents did not perform as well as typically hearing children or other children who were deaf and hard of hearing with parents who were also deaf and hard of hearing. The researchers concluded that children without typical access to language perform poorly on false belief tasks . The researchers also found that vocabulary growth was strongly correlated with false belief task performance.

Theory of Mind is important to children's social development because it is how children can predict others behavior by understand their thoughts, beliefs, and desires. However, the research is varied on what the causes of this delay are in ToM development. The reason that a child may demonstrate a lack of ToM is a developing branch of research in this area.

The Present Study

The purpose of this study was to gain an understanding about the opinion and practices of deaf educators about theory of mind development. A five-question survey created using the Survey Monkey (Beauchemin, 2011, Appendix) addressed social skills instruction, behavior problems, supervision, and theory of mind. The ToM question addressed deaf educators' opinions of ToM development in their students. Today it is becoming more and more important for research to be connected to education. The quality of education may be improved by including educators in educational research. The goal of this survey was to collect information that could be used to influence the behaviors and techniques of educators when implementing social skills instruction. Information about the current practices and opinions of others may help educators to be more aware of ToM development in children who are deaf and hard of hearing. Lastly, the researchers wanted to compare the practices and opinions of educators in OPTION schools for the deaf, and compare them to current research.

The research on theory of mind indicates that more access to typical conversational language contributes to better performance on a theory of mind task (Schick, de Villiers, de Villiers, & Hoffmeister, 2007). If schools are using role-playing games and the teachers are attending recess it was hypothesized that the behavior problems would be less severe. This is because there would be more access to typical conversations throughout the day.

MATERIALS AND METHODS

Participants

A total of 113 surveys were sent to supervisors and lead teachers of OPTION schools for the deaf in 14 states. OPTION Schools Inc. is an organization of private or independent schools that collaborate to provide the best listening and spoken language education for children who are deaf and hard of hearing (OPTION Schools Bylaws, 2010).

Participants were selected using the websites of OPTION schools. Respondents represented educators from a variety of geographic regions and levels of experience in oral deaf education. All participants were female supervisors or lead teachers in OPTION schools, working with children who are deaf and hard of hearing, from birth to 12 years.

Measures

The research team designed a survey of five questions about social skills instruction and ToM development (see appendix). The survey was designed to be short in order to get a higher response rate. The research team determined that participants would be able to complete the survey in five to fifteen minutes. The goal of the survey was to give the researchers a better understanding of the current approach to social skills instruction in oral schools for the deaf. Another purpose of the survey was to determine the respondents' opinion about theory of mind development in children who are deaf and hard of hearing. The first four questions were multiple-choice options. Following each question, space was provided for respondents to make additional comments. The last question was a short response style question that addressed the topic of ToM development in children who are deaf and hard of hearing. See the appendix for the specific wording and purpose of each question.

Procedure

Surveys were created and distributed through Survey Monkey (Survey Monkey), a private company designed to provide software for creating, sending and analyzing web-based surveys. Participants received an e-mail message that explained the topic of the survey, the source of the survey, and provided a link to the survey on Survey Monkey. The survey and e-mail message were approved by the Human Research Protocol Office of Washington University in St. Louis. The participants' responses were submitted and recorded anonymously through Survey Monkey. The survey remained open for one month, then was closed to responses and the data collected was analyzed for trends.

Comments were also examined individually to understand the current opinions and practices of respondents regarding social development, specifically ToM, in OPTION schools. Some answers to multiple-choice questions were compared in order to determine any trends in the data for the population surveyed.

RESULTS

Of 113 e-mails, four e-mail addresses were found to be "no longer in use," and one potential participant declined to receive the survey. Of the remaining 108 messages, 27 recipients completed the survey. This was a response rate of .2389. The results were analyzed using the software provided by the PRO Feature plan on Survey Monkey.

First, the results for each individual question were analyzed. Then responses to the questions about behavior problems (question 4) were compared to the responses to the questions about supervision (question 3), and the instruction (question 2) to identify any trends within the data. Information gathered from short-response questions and comments added to multiple-

choice responses are addressed in the discussion as a way to further understand the results.

The first question addressed direct instruction and social development (see Table 1). Direct instruction is one way to address social skill development in children who are deaf and hard of hearing. The purpose of question one was to determine how prevalent direct instruction of social skills is in OPTION schools. All 27 participants responded to the first question. Of those 27 respondents, 89%, or a total of 24 reported that they use direct instruction to teach social skills. The remaining three respondents indicated that they do not currently use direct instruction for teaching social skills.

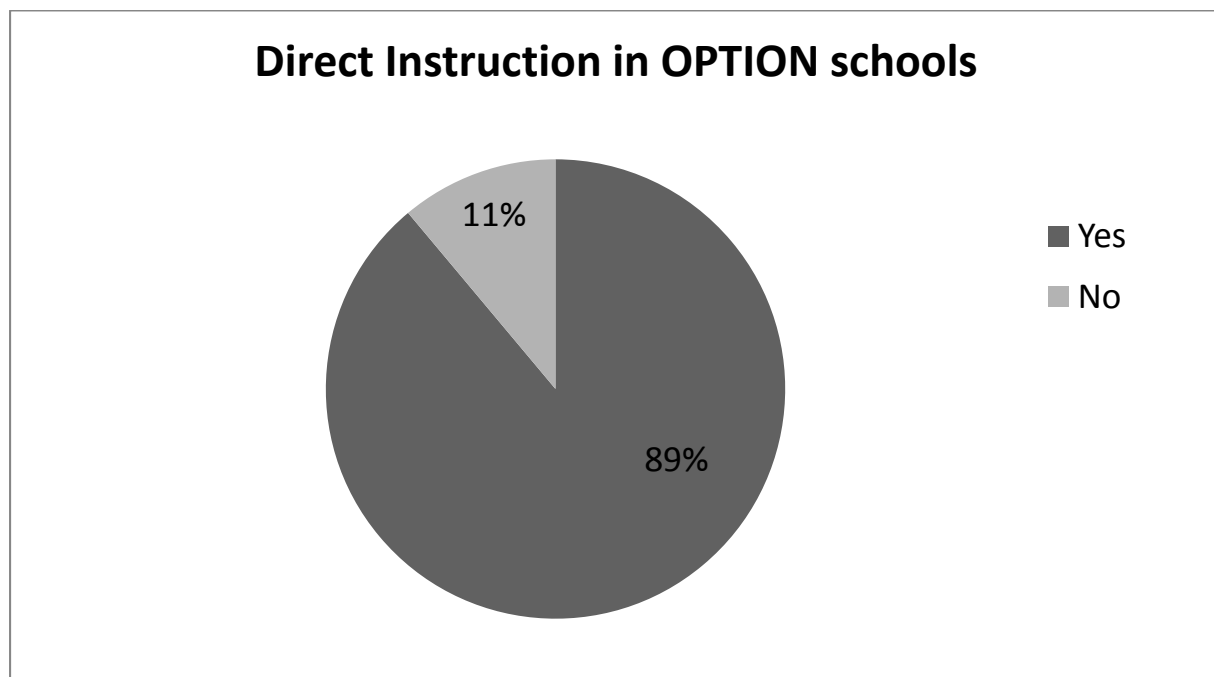


Table 1: Percentage of OPTION schools surveyed who use direct instruction to teach social skills

The second question addressed the method of direct social skills instruction used in the participant's schools (see Table 2). Twenty-five of the 27 respondents answered the second question. Of these 25 respondents, 84% reported using role-playing to teach social skills, 68% reported using social skill games, 8% reported using flash cards, and 4% reported using none of the above resources. The question allowed participants to select multiple responses. Results show

that most OPTION schools are using multiple means of direct instruction to teach social skills.

While most of the respondents selected role-playing and social skill games, only two participants designated flash cards, and only one selected none of the above.

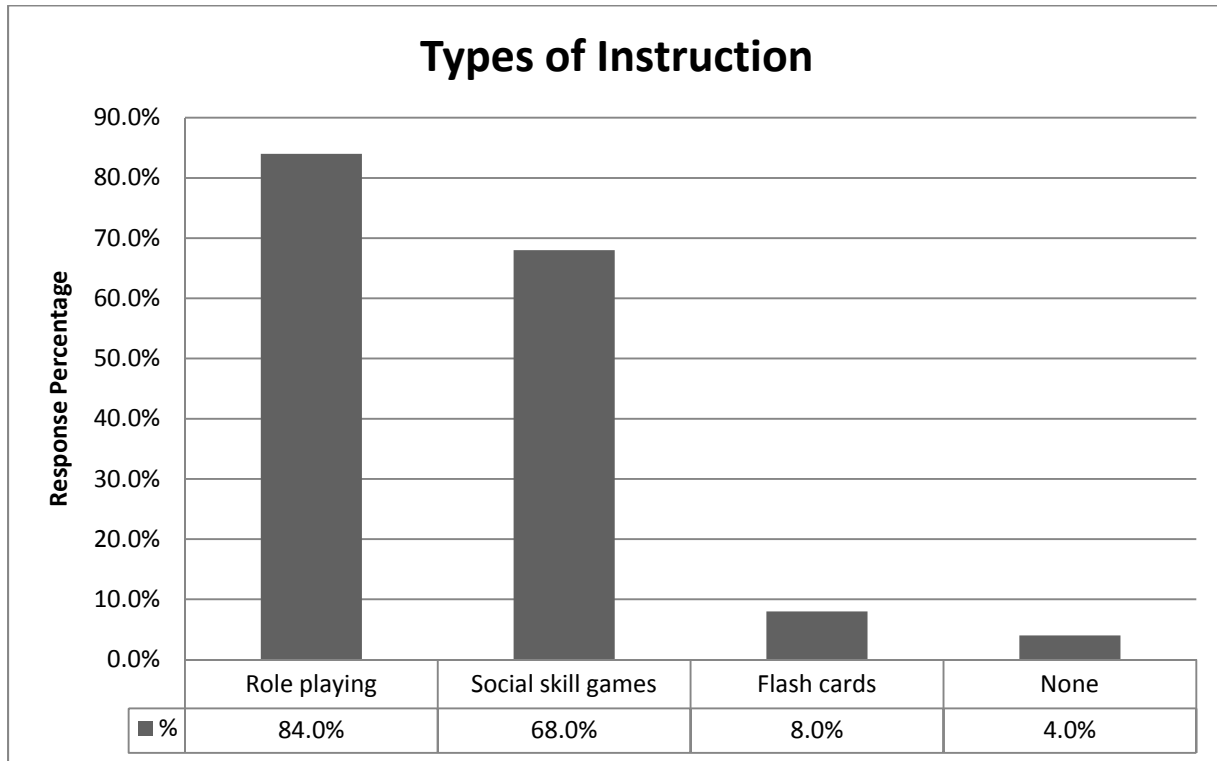


Table 2: The types of instruction used to teach social skills in surveyed OPTION schools for children who are deaf and hard of hearing

The third question addressed supervision of children during recess (see Table 3). The possible responses were: teacher’s aides, classroom teacher, or both. All 27 participants answered this question. The majority of respondents reported that both teachers and teacher’s aides supervise their students at recess. Eight respondents reported teacher’s aides were the sole supervisor of recess. The fewest number of responses indicated that teachers were sole supervisors of recess. Based on these results, the majority of OPTION schools for the deaf surveyed use both teachers and teacher’s aides to supervise recess.

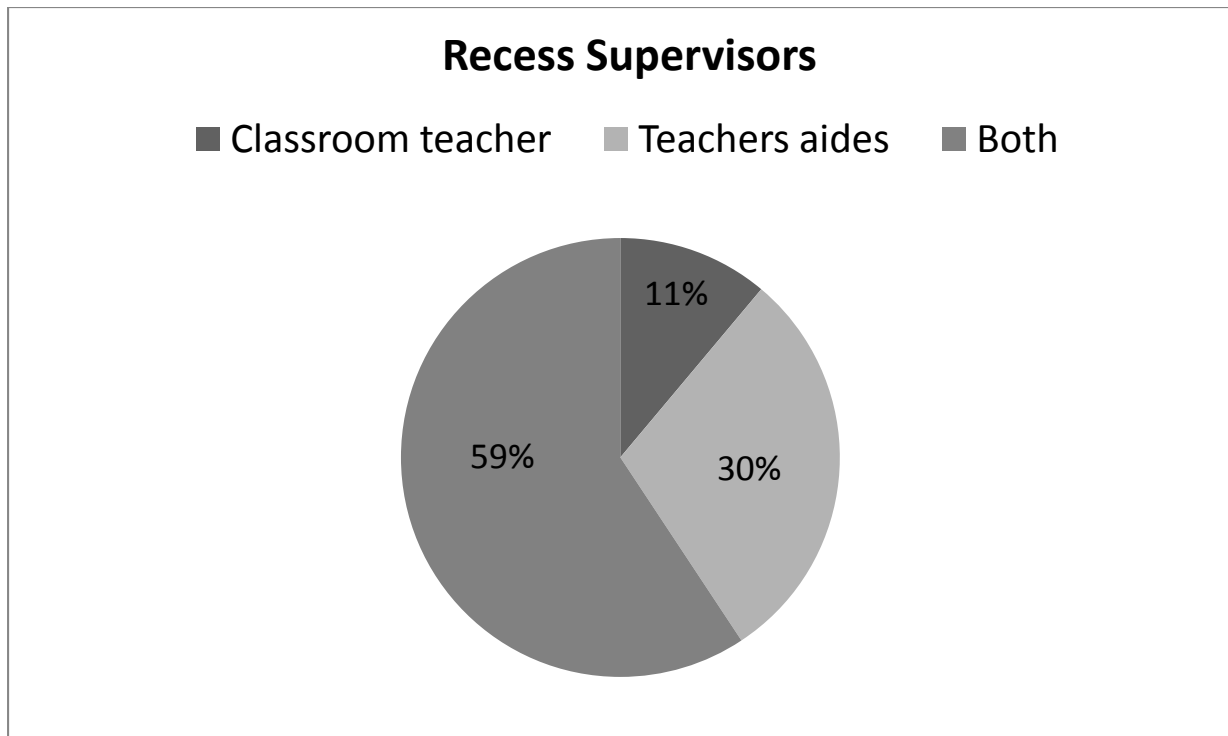


Table 3: Supervisors of children during recess at surveyed OPTION schools.

The fourth multiple-choice question on the survey was designed to obtain an understanding of typical behavior problems found in OPTION (see Table 4). Only 16 of the participants responded to this question. The four possible responses were hitting/kicking, name-calling, gossip, and avoiding participation. The respondents were asked which of these behavior problems occurred on a daily basis. Respondents could select any responses that applied. Of the 16 respondents, the majority (62.5%) reported that “avoiding participation” was the most frequently occurring behavior problem. The least frequently occurring behavior problem was gossip, selected by 12.5% of respondents. The other two options, name-calling and hitting /kicking were equally represented. Of the 16 respondents, 31.3% indicated that name-calling and hitting/kicking were dealt with on a daily basis. These results can help to understand what types of behavior problems are common in OPTION schools.

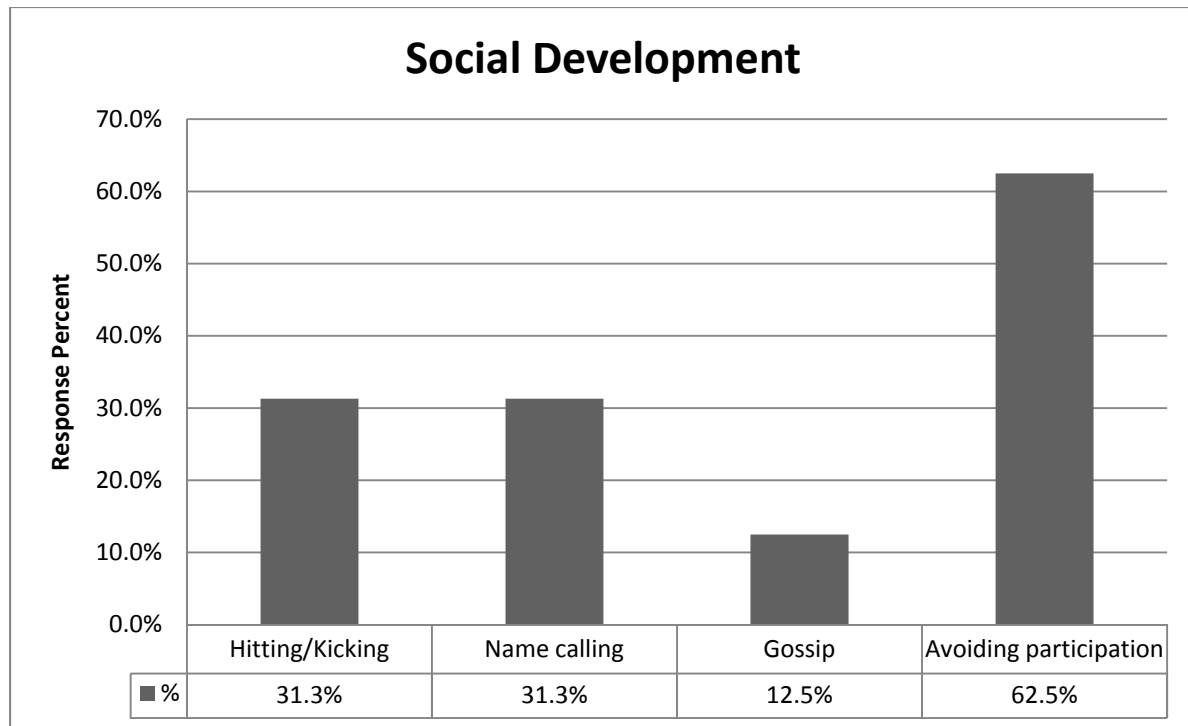


Table 4: Percentage of behavior problems in surveyed OPTION schools .

The fifth question elicited an explanatory response (see Figure 1). All but one of the 27 participants responded to this question. The responses indicated that professionals had multiple viewpoints on theory of mind development in children who are deaf and hard of hearing.

Responses to question 4 (common behavior problems) were correlated to questions 2 (instructional methods) and 3 (recess supervisors) to gain a better understanding of how behavior problems could be affected by instruction and supervision.

Table 5 represents the correlation of social skills instruction methods and common behavior problems. An equal number of participants reported using social skills games and role-playing during instruction. Fewer respondents chose flash cards or indicated that no social skills instruction was given. Of the social skills games and role-playing groups, avoiding participation was the most common behavior problem dealt with in these OPTION schools. However, among the participants who chose social skills games, the behavior problems were more evenly

distributed across categories. There were as many name-calling behavior problems selected as avoiding participation. The behavior problems such as name-calling and gossip both require a higher level of language.

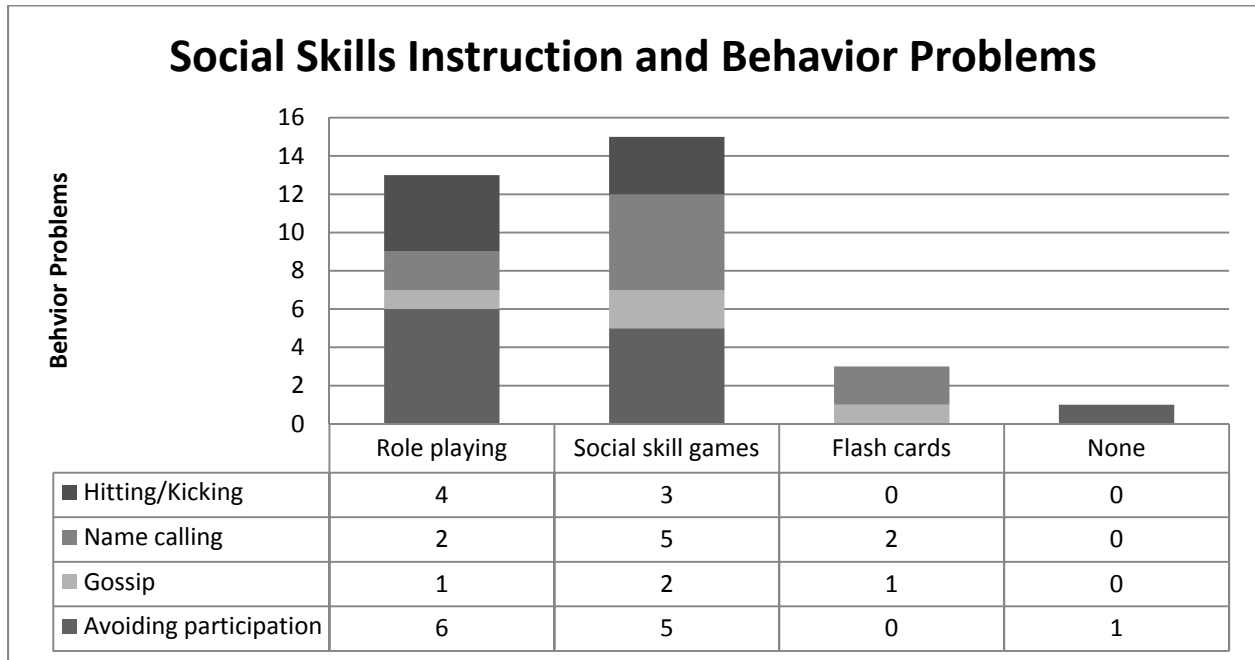


Table 5: Social skills instruction and behavior problems

Lastly, the research examined who was supervising children at recess and some of the typical behavior problems observed. (see Table 6). The results show that the most common form of supervision is both teachers and recreation aides. Again, the behavior pattern shows that avoiding participation was the most common behavior problem in most of the schools surveyed.

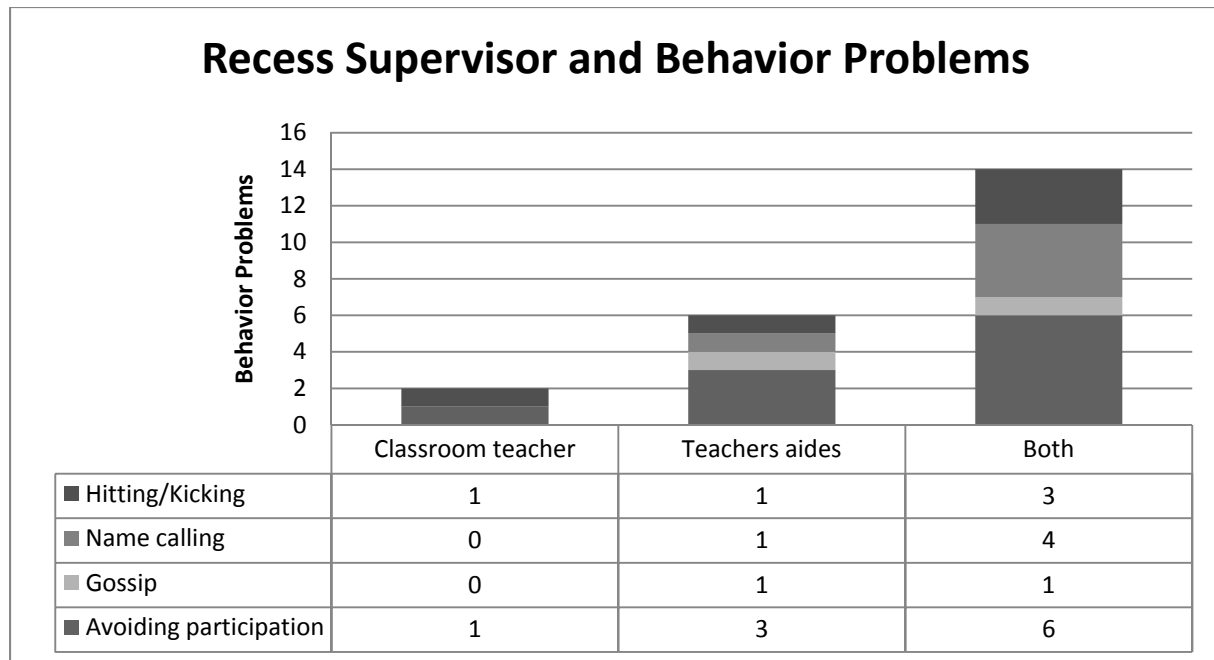


Table 6: The recess supervisor results compared to common behavior problems

DISCUSSION

The software provided by Survey Monkey (www.surveymonkey.com) analyzed the data for this study. The researchers were satisfied with the results analysis provided by Survey Monkey, but there may be a possibility of further analysis of these results.

The survey's first question addressed direct instruction in OPTION schools for children who are deaf and hard of hearing. It was a multiple-choice question that asked professional deaf educators if they use direct instruction to teach social skills. It is common in OPTION schools for children who are deaf and hard of hearing that social skills are taught using a direct instruction approach. This means that the information is provided in a structured setting, and repeated until the child is able to understand the material. A majority of respondents indicated that direct instruction is used for social skill development.

One respondent who did not use direct instruction commented, “Indirect social skills are taught in small groups, but direct instruction is focused on more isolated language skills” (respondent 10). It is true that children of the deaf are often delayed in language development and need direct instruction in order to improve. If small groups are created to talk about social skills then it could be considered direct instruction.

Just as children who are deaf need direct instruction on language, they would need this to develop socially, because they do not over hear language or social cues. Hearing another talk about thoughts and ideas is a factor in the development of a ToM. If children who are deaf and hard of hearing can be directly exposed to this type of self-talk perhaps, they can better develop a ToM, which may help them better understand others socially.

The second question was included in the survey in order to understand what type of direct instruction was being used in the OPTION schools for the deaf and hard of hearing. It is common to use direct instruction to teach social skills. Some types of direct instruction such as role-playing, and social skills game can be used for more natural learning of social skills. The flashcards are another way to provide direct instruction of social skills, but it is less natural. A majority of respondents used social skills games and role-playing to provide instruction for social development (see Table 2). Only a few respondents were using flash cards for their direct instruction method. interaction. By demonstrating self-talk, the teacher can help the child understand the thoughts of others. This is a very important skill for false belief understanding and therefore ToM development. Not all of the teachers for the deaf can be with the children during recess and lunch. It is important that these teachers remember to provide natural interactions for the children when they are in the classroom. Many studies have shown that natural conversation about mental states is beneficial to ToM development (Brown, Donelan-

McCall, & Dunn, 2008) . There are many different materials for social instruction. Some respondents reported using books, flash cards, and incidental learning. Many participants talked about modeling behavior, and requiring children to imitate. Social skills and ToM are not easily explained to children who are deaf and hard of hearing because it is abstract. When teachers of the deaf are providing modeling and imitation for social skills, they need to make sure the children understand the reasons behind everyone's actions. Understanding that behaviors have a purpose will help children understand that someone's behavior is guided by their beliefs.

The third question asked the respondents who supervised their children during recess. Most of the OPTION schools for children who are deaf and hard of hearing have both teachers' aides and teachers attending recess. Others had teacher's aides only at recess. Even though there were more OPTION schools using both recreation aides and teachers it was more common for recreation aides to supervise children than just teachers alone. The incidental social learning opportunities are many during this time of the day. Having teachers supervise this part of the day might provide children more exposure to social skill development. Having this in mind, the researchers suggest that having a teacher of the deaf during recess and other social activities is very important to the children's social development. The way ToM may develop is by talking about the mental state verbs or thinking verbs while having conversation. During recess times the children are interacting with each other a lot, this is when the teacher of the deaf can use their expertise to provide incidental social skills instruction. It is very positive to see that most of the OPTION schools for children who are deaf and hard of hearing mostly use both teachers and recreation aides to supervise recess.

Understanding typical behavior problems can be a way to understand how social skills are developing. Typically, children who are deaf and hard of hearing have a delay in language

development. The behavior problems such as gossip and name-calling require more language. Understanding that others have feelings is an important skill to ToM development. This was the question with the least responses. A limitation to this question was referring to the behavior as ‘problems’ perhaps this lead to a negative connotation to the question. However, the 16 respondents still provided a window into what behavior problems are found in the OPTION schools. It is interesting that avoiding participation, hitting, and kicking were the most common behavior problems. These types of behaviors require much less language. In many studies, language has been shown to be a strong predictor of ToM. The more language and vocabulary that the children are able to learn the better they can do with ToM skills. In addition, an understanding ToM allows children the ability to understand social situations. You cannot tell a child they ‘hurt someone’s feelings’ if they do not understand other children’s thoughts.

Table 5 compares behavior problems and types of social skills direct instruction. The interesting aspect of these results indicated that behavior problems were more varied when schools were using social skills games or role-playing. This chart shows perhaps a positive impact of social skills games on behavior, and social development. Language is required to call someone a hurtful name, or talking about someone. These behaviors also require an understanding of another’s feelings in order to hurt them. Direct instruction using social skills games or flash cards helps the children practice the language they need to successfully manage a social situation. However like any skill carry over is needed for a child to make the correct social decision outside of the direct instruction. The research has shown that the more children are exposed to conversation and mental state verbs the more developed their theory of mind will be. During times of the day when there is not direct instruction, it is very important to have an educator who understands their students’ language ability and knows what to hold them

accountable. With an understanding of the child's language, the deaf educator will have a better chance involving the child in appropriate social conversation.

Lastly, the research focused on who was supervising children at recess and what some of the typical behavior problems were. A graph was used to cross-reference the results (see Table 6). The results show that the most common form of supervision is both teachers and recreation aides. Again, the behavior pattern shows that avoiding participation was the most common behavior problem in most of the OPTION schools for the deaf surveyed. Even though more respondents chose both it was interesting to see how the behavior problems evened out in the 'both' group.

The second cross reference and the last table (see Table 6) was a comparison between who supervised the children at recess and the common behavior problems. The most common form of supervision was both teachers and recreation aides supervising recess, and the most common behavior problem was avoiding participation. Similar to the direct instruction cross reference table there was one area where the behavior problems were more even. In this cross reference table, the researchers found that when both teachers and recreation aides supervised recess the behavior problems were evened out. Evened out implies that the behavior problems were similarly as likely as the other. In these supervisory situations, avoiding participation was seen as often as name-calling. While none of these behaviors is good behaviors less physical and more language based misbehaving is a positive result. It shows that these children may be using language as opposed to physical reactions. The use of a classroom teacher during recreational times is most likely beneficial for these children. A classroom teacher is more familiar with their language level, and what these children will be able to understand socially. These times during recess and lunch are when children need to be able to use pragmatic language appropriately in

order to play with their friends. The teachers who are familiar with their language levels can better support these conversations. The research indicates that access to conversations about what another is thinking can be beneficial to the development of a theory of mind.

The short response question was designed to obtain some information about how professionals involved in deaf education, specifically lead educators in OPTION schools view theory of mind development in children who are deaf and hard of hearing. The short response question asked educators if they believed children who are deaf and hard of hearing were delayed in theory of mind. The researchers also provided a simple definition and age at which ToM is typically developed in order to assist the participants in answering the question.

The responses were varied amongst the participants. It was interesting that not all of the participants believed that children who are deaf and hard of hearing are delayed in ToM development. Again, this belief is contrary to the research found on this topic. The educators that believed there was no delay in ToM gave multiple justifications why they believed this was so. Some teachers who believed there was a delay also gave evidence to back up this belief. There were a few common threads amongst the responses including references to early diagnosis and intervention, language development, cognitive skill, and instruction. Some participants argued that children who receive early amplification, identification, and intervention do not have a difficulty understanding ToM. Other participants had a similar view in that children who have developmentally appropriate language levels do not end up delayed in ToM development. Lastly, other participants said that when a child is cognitively delayed this is when they are also delayed in ToM development. All of the participants were educators in OPTION schools; these schools provide oral deaf education. It is not surprising that many of the participants emphasized direct instruction in social language skills as a way for children to develop a ToM. Most of the research

on ToM proposes that access to conversation could help a child or was deaf or hard of hearing develop a ToM. It was interesting that only one of the participants talked about this aspect of ToM development. This participant explained that because children who are deaf and hard of hearing do not “overhear” conversations they have a resulting delay in ToM. Another interesting response from one of the participants was about siblings. This participant suggested that children who are deaf with older siblings tend not to have as significant of a delay in ToM. The respondent explained this could be because the child who is deaf or hard of hearing will not be “catered to” in a larger family helps them develop a ToM. This is an interesting argument. The respondent believed that first born or only children who are deaf and hard of hearing often exhibit a more significant delay in ToM. This may be due to birth order, or related to access to conversations. Perhaps children in larger families have increased access to conversations, and social interaction. There was a study done on typically developing preschoolers, which found that family background had significant impact in the development of a theory of mind. This study also found that family background was uniquely related to false belief understanding (Cutting & Dunn, 1999). These types of studies could be used to understand how family background may affect the development of ToM in children who are deaf and hard of hearing.

Some limitations to this research was the sample size of only 27 respondents. Perhaps if there were a larger response there would have been more significant results from the study.

Many possibilities for future research were suggested by the survey. Perhaps another social skills survey could be sent out that was more specific about language and ToM development, and the opinions of deaf educators in OPTION schools. There could be a study on birth order and ToM development, asking whether oldest and only children develop a ToM slower than children who are the youngest or middle children. This could even support the

decision that some OPTION schools for the deaf made to include typical hearing children in their preschool classrooms. Perhaps these children will expose children who are deaf and hard of hearing to more conversations. By focusing research on what is happening in schools the researchers can help educators provide research based education.

Although there is some research on ToM in children who are deaf and hard of hearing, there is not much research regarding how schools for the deaf can help children develop a ToM or perhaps appropriate social skills. There are many types of educational placements for children who are deaf and hard of hearing, but the research shows that children who are deaf and hard of hearing with placements in the mainstream are often the most delayed in ToM (Schick, De Villiers, De Villiers, & Hoffmeister, 2007).

It is clear that there are many different reasons deaf educators believe that ToM is delayed in their students. Further research should target which cause is the most likely, language, early intervention, or cognitive ability. This information should help deaf educators support their children's ToM development in and outside of the classroom.

Astington points out that the shift in ToM research is to investigate ways in which children think about themselves and others (2001). ToM can be a way for researchers to understand the thinking process. A relationship between education and research is what educators need in order to provide the best education possible to their students. The research based educational model is what is important to education today. This should be the same in the general education setting as well as in schools like the OPTION schools surveyed in this study.

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APPENDIX: Social Instruction Questionnaire

Survey Questions and Purposes

Survey Question	Purpose
<p>Question 1: Do the teachers at your school give direct instruction about social skills to the students?</p> <p>Yes No</p>	<p>To provide an understanding of deaf educator opinion of ToM development, and children who are deaf and hard of hearing.</p>
<p>Question 2: If yes, please click how many apply.</p> <p> Role Playing Flash Cards</p> <p> Social Skills Games None</p> <p>*If other strategies are used please list:</p>	<p>To provide an understanding of the approach used at OPTION schools to teach social skills using direct instruction.</p>
<p>Question 3: Who typically supervises the children at recess?</p> <p> Classroom teacher</p> <p> Teachers aides</p> <p> Both</p> <p>*If others please explain:</p>	<p>To gain an understanding of who is typically supervising the children during recess at OPTION schools.</p>
<p>Question 4: What behavior problems do you</p>	<p>To get a general understanding of the types of</p>

