

Running head: MORAL REASONING: THE ROLES OF SOCIAL ANXIETY AND TOM

Moral Reasoning: The Roles of Social Anxiety and Theory of Mind in Preschoolers

By

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# MORAL REASONING: THE ROLES OF SOCIAL ANXIETY AND TOM

## Abstract

Mature moral reasoning, which begins developing in the preschool period, requires the consideration of the motivating intention and outcome of an action. Therefore, moral reasoning is related to the ability to consider mental states (theory of mind) as this understanding is needed in order to accurately understand and interpret intention. Another factor that has been implicated in one's ability to accurately interpret intention is social anxiety as it has been found to be related to different socio-cognitive variables (e.g., threat biases, ToM, interpretations of intention and ambiguous situations). Thus, the goal of my study was to examine the relations among social anxiety, theory of mind, and moral reasoning. As data collection was not possible due to social distancing, my thesis will outline the planned methods and analyses and will examine the potential interpretation for finding, and failing to find, support for my hypotheses.

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Table of Contents

Title page.....	i
Abstract.....	ii
Acknowledgements.....	iii
List of Tables.....	vi
List of Figures.....	vii
List of Appendices.....	viii
Introduction.....	1
Moral Reasoning: Intention and Outcome.....	4
Moral Reasoning and Theory of Mind.....	16
Social Anxiety.....	28
Social Anxiety links to Moral reasoning: Theory of Mind, Intention and Threat Perception.....	35
General receptive language skills.....	48
Present Study.....	48
Hypotheses.....	53
Method.....	56
Participants.....	56
Procedure.....	57
Familiarization Trial.....	58
Moral Judgment Task.....	59
First-order False Belief.....	66
Second-order False Belief.....	67

## MORAL REASONING: THE ROLES OF SOCIAL ANXIETY AND TOM

Morally Relevant Theory of Mind.....	68
Preschool Anxiety Scale.....	69
Peabody Picture Vocabulary Test – Fifth Edition.....	70
Planned Analyses.....	71
Unexpected Circumstances.....	71
Preliminary Analyses.....	71
Adult Data.....	74
Main Analyses.....	78
Discussion.....	94
Relation Between Social Anxiety and Moral Reasoning.....	96
Social Anxiety and its Relation to ToM.....	105
ToM and Interpretations of Intention as Serial Mediators.....	110
Age-related Changes in Moral Reasoning.....	119
Limitations and Future Directions.....	122
Conclusions.....	127
References.....	129
Appendices.....	139

**List of Tables**

Table 1. Moral Judgment Task Story Examples with Questions.....	61
Table 2. Means and Standard Deviations for Adult and Child Performance on the Moral Reasoning Task.....	75
Table 3. Hierarchical Regression Analyses Examining ToM Variables as Predictors of Social Anxiety.....	87

**List of Figures**

Figure 1. Conceptual Model Connecting ToM and Moral Reasoning to Social Anxiety  
and its Development in Young Children.....50

Figure 2. Diagram of the Hypothesized Serial Multiple Mediation Model..... 89

**List of Appendices**

Appendix A: Familiarization Trial.....	139
Appendix B: Story Themes.....	141
Appendix C: Example of Story Photos.....	143
Appendix D: First-Order False-Belief Protocol.....	149
Appendix E: Second-Order False-Belief Protocol.....	151
Appendix F: Morally Relevant Theory of Mind Protocol.....	153
Appendix G: Preschool Anxiety Questionnaire - Social Anxiety Subscale.....	155
Appendix H: Story Orders.....	156
Appendix I: Department of Psychology Approval Emails.....	157
Appendix J: Informed Consent form for Parents or Guardians.....	159
Appendix K: Informed Consent form for Program Director.....	163
Appendix L: Informed Consent form for Adult Participants.....	167
Appendix M: Ethics Clearance Certificates.....	170

## Introduction

Moral reasoning is an important skill which is needed to understand and evaluate a wide variety of situations within our complex social world. For example, imagine a child is building a tower of blocks and someone comes to help but accidentally knocks the tower over. The child will then have to decide how to react to this situation. If the child is only considering the negative outcome, they may be very angry at the person who knocked the blocks over and react negatively towards them. However, more mature moral reasoning requires one to take into account the intention of another person, who engages in an action, as well as the resulting outcome (Zelazo, Helwig, & Lau, 1996). Thus, in the previous example, if the child had mature moral reasoning abilities, they would consider that this person was trying to help and therefore be more forgiving and understanding of the person and the situation. Moral reasoning begins to develop in preschool and early childhood, with younger children focusing more on outcome and older children considering intention as well as outcome when making moral judgments (e.g., Armsby, 1971; Berndt & Berndt, 1975; Cushman, Sheketoff, Wharton, & Carey, 2013; Nelson, 1980; Nobes, Panagiotaki, & Bartholomew, 2016). Studies have found that children as young as three years of age begin to consider intention when making moral judgments and that this skill continues to develop with older preschool aged children more reliably using intention information (Berndt & Berndt, 1975; Nelson, 1980; Nobes et al., 2016), thus affecting how they interpret behaviours and views that differ from their own and resulting in more tolerant moral judgments (Wainryb & Ford, 1998).

As mature moral reasoning involves the consideration of intention, it thus requires an understanding that others have thoughts and beliefs that differ from one's own. This ability to consider mental states is referred to as theory of mind (ToM), or social cognition, and also develops throughout the preschool period (see Wellman, Cross, & Watson, 2001 for a meta-analysis of the development of belief reasoning). Not surprisingly, studies have found a positive relation between moral reasoning and ToM (e.g., Baird & Astington, 2004; D'Esterre, Rizzo, & Killen, 2019; Fu, Xiao, Killen, & Lee, 2014; Killen, Mulvey, Richardson, Jampol, & Woodward, 2011; Lane, Wellman, Olson, LaBounty, & Kerr, 2010). Therefore, this is an important ability implicated in the development of moral reasoning.

While researchers have learned about young children's moral reasoning and its relation to ToM, relatively little attention has been paid to social factors which may impact moral development, such as social anxiety. It is important to not only examine typically developing children, but also different subgroups of children as their moral reasoning abilities may develop differently. For example, various studies on the relation between ToM and social anxiety have found differing results depending on which ToM task is used (Banerjee & Henderson, 2001; Colonna, Nikolic, de Vente, & Bögels, 2017; Suway, Degnan, Sussman, & Fox, 2012). One group that, to the best of my knowledge, has not been examined in regards to moral reasoning, are socially anxious children.

Social anxiety is a form of anxiety that involves feelings of worry and fear surrounding social situations, especially when these situations are novel, unfamiliar, or the person is concerned about being negatively evaluated (Crozier & Alden, 2001).

Social anxiety can be described as a trait with some people generally experiencing more feelings of social anxiety than others (Leary, 1983). When social anxiety is very severe it may lead to the avoidance of social situations and can disrupt everyday functioning (Crozier & Alden, 2001; McNeil, 2010). Social anxiety often involves worries about what others may think and about being negatively evaluated by others (Crozier & Alden, 2001), so researchers have examined whether it is therefore related to ToM.

Studies on social anxiety and related constructs have found mixed results in regard to their relation to ToM, depending on which tasks are used and whether they involve emotional components (Banerjee & Henderson, 2001; Colonnese et al., 2017; Suway et al., 2012). In addition, research has found that children with social anxiety are more likely to interpret ambiguous situations as threatening (Barrett, Rapee, Dadds, & Ryan, 1996; Muris, Luermans, Merckelbach, & Mayer, 2000; Muris, Merckelbach, & Damsma, 2000) and some studies have found that anxious children are more likely to interpret unintentional or accidental acts as intentionally hostile (Bell-Dolan, 1995). This bias to view situations and intentions as threatening, and possible relations to ToM ability, may affect how socially anxious children judge moral situations. Thus, it is important to further investigate how social anxiety and moral reasoning may be related. This is the focus of the current thesis.

To begin, I will review research examining young children's moral development, focusing on their use of intention and outcome information in moral reasoning. I will then describe ToM and its relation to moral reasoning, followed by a section on social anxiety and possible links to moral reasoning such as, ToM and interpretations of intentions, and threat perception bias. Following this, I will describe the current study,

hypotheses, planned analyses and potential patterns of results, Finally, I will discuss interpretations and implications for the different potential findings.

### **Moral Reasoning: Intention and Outcome**

The literature on moral reasoning focuses on factors involved in making mature moral judgments. In these studies children are typically told stories about a character with either a positive, negative, or neutral intention, who engages in a behaviour that results in either a positive, negative, or neutral outcome for another character (e.g., Berndt & Berndt, 1975; Cushman et al., 2013; Helwig, Zelazo, & Wilson, 2001; Nelson, 1980; Zelazo et al., 1996). For example, a child may hear about a character with a positive intention and a negative outcome, such as: Character A wants to help his friend with her craft by putting some glitter on it (positive intention), but then he drops all the glitter and ruins his friend's picture (negative outcome). Or, they may hear about a character with a negative intention and a negative outcome, such as: Character A wants to ruin his friend's picture, so he drops glitter all over it (negative intention) and now his friend's picture is ruined (negative outcome). Children are then asked to make moral judgments, such as answering whether Character A was 'being good' or 'being bad'. Researchers are particularly interested in comparing children's responses across story types, and stories in which the valence of the character's intention and outcome do not match, in order to determine which factors most influence their judgments. For example, in the above stories, researchers would compare children's ratings in stories where either the intention or outcome are matched, but the other is not. For example, they would see if children's ratings were more positive in the story where the intention was positive, but the outcome was negative, compared to the story where both the outcome and intention

were negative. If the ratings were more positive for the main character in the first story, relative to the one in the second, it could be inferred that the children were focusing more on intention than outcome. Researchers find this to be the case going from the preschool to school-aged years (Berndt & Berndt, 1975; Cushman et al., 2013, Nelson, 1980; Nobes et al., 2016). The goal of much of this research has been to examine how children's moral judgments shift from outcome-based to intent-based throughout development, as well as other factors that may be involved in moral judgment such as foreseeability, severity of the action and unusual/noncanonical situations (Armsby, 1971; Cushman et al., 2013; Helwig et al., 2001; Nelson, 1980; Nobes et al., 2016; Zelazo et al., 1996).

This developmental shift to intent-based moral judgment was originally studied by Piaget (1932/1965) who proposed that children were not able to take intention into account until the age of seven or eight years. He found that children under seven years of age judged a character, who engaged in an unintentional act that resulted in a more severe outcome (e.g., making a large ink stain), more negatively than a character who intentionally engaged in an act that resulted in a less severe outcome (e.g., making a small ink stain). Thus, he concluded that children at this age were exclusively focusing on outcome. However, his research included stories that were very complex and did not clearly differentiate accidental from purposeful actions. For example, the ink stain story mentions how the child wanted to play with a pen and then made a small ink blot on a tablecloth, which could be seen as him either purposefully or accidentally making a stain while playing with the pen. More recent studies have modified or created stories intended to be clearer and vary systematically, in terms of intentions and outcome (including the severity of the outcome; Andrews et al., 2015), to determine when the

developmental shift in moral reasoning occurs. Generally, these studies have found the shift to occur at a younger age than Piaget claimed.

For example, Armsby (1971) conducted a study in which he modified Piaget's original stories, for six- to ten-year old children, to create story pairs that clearly differentiated accidental from intentional behaviours and that were provided in written form they could read, to reduce short-term memory demands. Armsby (1971) also varied outcome severity to determine how this would affect moral judgments as Piaget's (1932/1965) original stories only included one very large difference in outcome severity. Armsby (1971) found that even the youngest children were able to make judgments based on intention about 75% of the time compared to 95% for the older children. The six-year-old children were less likely to consider intention the greater the severity of the accidental act compared to the purposeful act. This effect was mixed for eight-year-old children and the 10-year-old children's moral judgments were not affected by outcome severity. Therefore, with modified stories that more clearly differentiate accidental from purposeful actions and reduced memory demands, Armsby (1971) found that younger children can begin to incorporate intention into their considerations of moral judgment and that outcome severity also plays a role. However, the stories as well as the questions asked to the children were not clearly explained in this article. In addition, it would be much more difficult for the youngest children to read these stories as they are just learning to read, compared to the older children. This could have added difficulty to the task for the younger children thus making it more difficult for them to succeed. It would be important to further modify this task to lessen the demands put on younger children.

Since this study, researchers have investigated whether even younger children can begin to make intent-based judgments.

Nelson (1980) conducted a study in which children were presented with four different stories which systematically varied positive and negative intentions and outcomes (e.g., both positive, both negative, one negative and one positive) that were either only verbally presented, presented with pictures implicitly demonstrating intention (through the character's facial expression), or with pictures explicitly demonstrating intentions (e.g., cartoon-like representation of the goal connecting to the character's head). The children were then asked whether they thought the character was good, bad or just okay. If they chose good or bad, they were then asked to point to one of three faces to judge how good the character was, and then to point to one of three faces to judge how bad the character was, thus creating a 7-point scale. The first face on both the 'good' and 'bad' scales each represented an identical neutral face (neutral response). The results indicated that children as young as three do have the ability to consider intention, although less consistently than older children, and that the children who were shown pictures explicitly depicting the intention of the character were more influenced by intention information than those who were only presented with the stories verbally.

Other studies have also found that preschool-aged children can begin to consider intention, but that a developmental shift occurs throughout this period with older preschoolers using intention information more reliably (Berndt & Berndt, 1975; Cushman et al., 2013; Nobes et al., 2016). For example, in a study by Berndt and Berndt (1975), preschool to fifth grade children were presented with videos and stories with characters who varied in motive (e.g., wanting a toy airplane) and intention (e.g., accidentally versus

intentionally pushing a child into blocks to get the plane) while the outcome was always negative. The children were then asked to judge the intentions and morality of the character, and whether they thought the characters were 'good' or 'bad' (Berndt & Berndt, 1975). The results indicated that preschool children were able to distinguish accidental from intentional actions some of the time but, that this was more consistent in older children. The results for moral judgments differed depending on motive, intention and age. When the motive was positive and the act was unintentional, the moral ratings became more positive as age increased. In contrast, when the motive was negative and the act was unintentional, moral ratings became more positive between second and fifth grade. No significant age differences were found when the act was intentional. Therefore, these results suggest that the ability to incorporate intention information into moral judgments develops and becomes more consistent throughout childhood, thus demonstrating a developmental shift towards intent-based judgments.

A positive aspect of this study was their inclusion of a wide age-range, thus allowing them to observe this developmental shift in moral reasoning. However, the stories and videos in this study only depicted children who were physically harmed. Although the characters were only slightly harmed, this could still be worrisome or stressful to young children, especially when it is depicted in a setting that they could perceive as familiar. In order to avoid this concern, it would be beneficial to focus on the destruction of an object rather than physically harming a character (e.g., knocking down a tower of blocks versus pushing someone into a tower of blocks).

There have been, however, some findings that children continue to heavily rely on outcome information when making moral judgments even past the preschool years. In a

study by Helwig et al. (2001), children aged three, five and seven years, as well as adults, were told stories in which one character, with either a positive or negative intention, engages in an action (e.g., gives the other character a pet) that results in either a positive or negative outcome for another character (e.g., character likes or does not like the pet). The children were then asked acceptability questions, such as “Is it okay for Larry to give Lewis a tarantula?” and “How good is it for Larry to give Lewis the tarantula (spider)? Is it really, really good, or just a little good or just okay?” (p. 71). Children were also asked about how much punishment to assign the character, with questions such as, “Should (e.g., Larry) get in trouble” and “A little trouble or a lot of trouble?” (p. 71). At least one study has found that children demonstrate greater sensitivity to intention in their answers to punishment questions than to moral judgment questions (Zelazo et al., 1996), while others have found them to be very consistent with one another (Vendetti, Kamawar & Andrews, 2019).

It was found that children aged three-, five- and seven-years, and adults relied more often on outcome information than on intention information when making acceptability judgments of story characters. This study also found that when assigning punishment, adults relied on intention, or a mix of intention and outcome information, whereas the five- and seven-year-olds relied on outcome, and the three-year-olds tended to not ascribe any punishment. Using similar methods Zelazo et al. (1996) also found that the majority of both children and adults primarily focused on outcome when making acceptability judgments.

Together these studies demonstrate that even older children and adults may still heavily rely on outcome as opposed to intention information when making moral

judgments in terms of act acceptability. However, when assigning punishment, older participants begin to incorporate intention and often employ a conjunction rule (if both outcome and intention are negative, then assign punishment). Therefore, Zelazo et al. (1996) suggest that moral reasoning may differ depending on how it is assessed. In addition, it is possible that the wording of the moral judgment questions used in these studies led the participants to focus on outcome rather than intention. Asking if it was okay for a character to have engaged in an action (that lead to a negative outcome) may lead the child to focus their judgment on the outcome itself instead of considering the character's intended outcome.

More recently, Cushman et al. (2013) attempted to explain children's reliance on outcome information when making moral judgments, such as the findings in Helwig et al.'s (2001) study, and to examine how the information considered when answering questions about punishment differs from the information considered when making moral judgments. They propose that adults have a two-process model of moral judgment where there is an interaction and competition between causal attributions of harmful outcomes and mental state information (i.e., intentions). According to the authors, these are two independent processes that can be in conflict with each other. For example, if someone accidentally causes harm to another, or if someone attempts to harm another but does not succeed, these situations would create competition between the two processes because the intention information would differ from the outcome information. Cushman et al. (2013) propose that adults' moral judgments focus more on intention, or the person's mental state, whereas their assignments of punishment focuses more on the outcome and whether or not it resulted in harm. However, they argue that young children have a one-process

model that does not differentiate between attributions of harmful outcomes and mental states, and therefore they rely more on outcome information. The authors also propose a constraint hypothesis whereby they expect that as children begin to focus more on intention, and these processes differentiate, punishment ascriptions become influenced by what they deem to be morally wrong (i.e., their moral judgments) while their moral judgments become more focused on intention.

To test this model and the constraint hypothesis, Cushman et al. (2013) conducted a study where they presented four- to eight-year-old children with two stories, one depicting accidental harm (e.g., “One boy accidentally steals an apple after it rolls into his shopping basket when he isn’t looking.”, p. 10) and one depicting attempted harm that was unsuccessful (e.g., “Another boy attempts to steal an apple, but it rolls out of his shopping basket when he isn’t looking.”, p. 10). Children also received two unambiguous stories as a preliminary method check with one being positive (e.g., “a boy throws a ball in the bin where it belongs and succeeds in putting it away.”, p. 11) and one being negative (e.g., “a boy throws a ball at a mirror intending to break it and succeeds in breaking it”, p. 11). The purpose of this check was to make sure the children understood the type of stories and questions by using more straightforward, unambiguous stories matching in intention and outcome.

The test stories varied in theme across participants, however each child heard two stories using the same theme (e.g., they received both of the apple stories). The researchers then asked the children to make moral judgments, as well as judge whether they thought the character should be punished. The order of the questions and stories were counterbalanced. Cushman et al. (2013) found that the results for the second story

children heard (regardless of which type of story it was) were less reliable and difficult to interpret, and therefore focused on the results from the first story presented to each child.

The results indicated that even the youngest children (four-year-olds) can consider both intention and outcome as they rated attempted, but unsuccessful, harms more negatively than the preliminary check story depicting a positive intent and outcome, and rated accidental harm more positively than the preliminary check story depicting a negative intent and outcome. They also found a negative correlation between age and moral judgments of accidental harm, thus demonstrating a developmental shift from outcome to intent-based judgments.

As evidence for their two-process model, they found that children aged five years and over relied more on outcome information for assignments of punishment, whereas their moral judgments relied more on mental state information (i.e., characters' intentions). Finally, they found that moral judgment ratings mediated children's punishment ascriptions and that children were less likely to assign punishment when they were asked the question about moral judgment before being asked to assign punishment. They argue that this supports the constraint hypothesis as the moral judgment ratings are influencing punishment ascriptions (Cushman et al., 2013).

Cushman et al. (2013) propose a possible two-process model to explain this shift as well as differences between ratings of moral judgments and punishment ascriptions, however, their theory refers to adults whereas adults were not tested in their study. In addition, they did not vary story themes within participants which can be very confusing to young children. They may mix up the contents of the different stories if the theme is the same. For example, many participants heard the story of a boy who accidentally stole

the apple and then very shortly after heard the story about another boy who attempts to steal an apple but is unsuccessful. These stories use the same theme and are very similar, thus the child may confuse the two characters and their actions thus affecting the results. This may in part explain why the researchers were only able to obtain reliable and interpretable data for the first story presented to children; the matching story themes may have affected the overall reliability of the results as only one story could be used in analyses.

Helwig et al.'s (2001) and Zelazo et al.'s (1996) findings that children and adults rely heavily on outcome information contrasts with the other studies presented that have found evidence of a developmental shift to intent-based moral judgments beginning when children are quite young. A possible explanation for these divergent findings is presented in a recent study by Nobes et al. (2016). They aimed to replicate these early studies and introduce a change to the methods. More specifically, they modified how moral judgment questions were asked, in order to determine whether this change would affect the results. The authors suggest that the previous studies did not have acceptable wording for their questions as they could be interpreted as focusing more on outcome, thereby skewing the results. For example, in Helwig et al.'s (2001) study the children were asked questions such as "Is it okay for Larry to give Lewis a tarantula?" (p. 71), and "How good is it for Larry to give Lewis the tarantula (spider)? Is it really, really good, or just a little good or just okay?" (p. 71). The questions in Zelazo et al.'s (1996) study followed this same format. Nobes et al. (2016) argue that questions such as this can be interpreted as more focused on the outcome of the action as they describe the action and refer to the character who was affected by it, rather than focusing on the character

engaging in the action and what their intentions were. To test the possibility that the wording of the questions may have influenced participants' responses in the previous studies, Nobes et al. (2016) presented four- to eight-year-old children, as well as adults, with four stories: two from Helwig et al. (2001) and two from Zelazo et al. (1996). The selected stories depicted accidental and attempted harm, such as the story about a character who gives a pet to another character. For two of the stories the participants were asked two moral judgment questions that were more focused on outcome (as in the original studies), one drawn from Helwig et al. (2001) and one drawn from Zelazo et al. (1996). For the other two stories they were asked rephrased questions more focused on the *agent*; for example, "Is Anne good, bad or just okay?" (Nobes et al., 2016, p. 192). All children also were asked questions regarding punishment (e.g., "Should Ethan get in trouble? A little trouble or a lot of trouble?" p. 202).

Nobes et al. (2016) found that when asked the rephrased questions, children over five years of age, and adults, relied more on intention when making moral judgments. In contrast, four- and five-year-olds relied on outcome and intention equally. They also found that the responses to the punishment questions were consistent with the moral judgment responses. For example, if a child relied on intention information when making a moral judgment than they were more likely to rely on intention when assigning punishment. Finally, they found that when asked whether they thought a character should be punished if the character's parents knew their intention, the majority of the four- and five-year-olds changed their punishment ratings to be intention-based.

With this study we can see the importance of the wording of moral judgment and punishment ascription questions as they can affect the results and lead children to focus

more on a specific factor when making judgments. In addition, these findings cast doubt on Helwig et al.'s (2001) and Zelazo et al.'s (1996) findings that children make primarily outcome based judgments, and suggest that, contrary to Cushman et al. (2013)'s findings, punishment ratings follow moral judgment ratings in terms of whether they are outcome- or intention-based. However, in Nobes et al.'s (2016) study, the moral judgment question was always asked first, whereas in Cushman et al.'s (2013) study, question order was counterbalanced. This could be why children's punishment scores matched their moral judgment scores so closely. The children in Nobes et al.'s (2016) study may have chosen a strategy for the first question, focusing more on either intention or outcome, and then employed this same response strategy for the second question. In this case, the answer to the punishment questions would closely match the answer to the moral judgment question only because it is always presented second and influenced by the first question asked immediately before. Given that the authors did not counterbalance their questions, we cannot know if this was the case.

Overall these studies suggest that children as young as three years of age can begin to consider intention when making moral judgments and that throughout preschool there is a developmental shift toward a more consistent intention-based approach to moral reasoning, though the literature on punishment ascription is less clear. This research also demonstrates that it is important to consider the order and wording of moral reasoning and punishment questions as these may affect the results. These factors are considered in the current thesis proposal.

As mature moral reasoning requires the ability to consider someone's intention, an important area of study includes the role of ToM, because in order to understand

intention one must have an understanding that people have mental states, and that those mental states are relevant to the morality of a given action. Research on moral reasoning and its relation to ToM will be described in the next section.

### **Moral Reasoning and Theory of Mind**

ToM is a metacognitive skill that involves the understanding that people have mental states with differing thoughts, beliefs, desires, intentions, and emotions (Wellman et al., 2001). It refers to a wide range of inter-related skills, with development beginning in infancy and continuing for many years. ToM can, among other things, help one to make sense of others' behaviour by considering their beliefs. For example, this would allow one to understand why someone is looking for their keys in the drawer (which is where they think they are) when the keys are on the table (which is where they actually are). ToM also enables one to make reasonable predictions about how someone may act in the future by considering their beliefs and desires. For example, if someone says they are hungry (desire food) and that they believe there is food in their backpack, this aspect of ToM would allow one to reasonably predict that the person would look in their backpack. In the case of moral reasoning, understanding an actor's intentions will help make clear the distinction between bringing about some outcome purposely versus accidentally. Thus, ToM is relevant to moral reasoning as mature moral reasoning requires one to understand others' intentions and use that information when forming moral judgments.

ToM is often studied in preschoolers using false belief tasks which measure children's ability to understand that others can have beliefs that are different from what is really true, and that people act according to those beliefs. Therefore, if a child can

understand that someone can hold a belief that contradicts reality, and what the child knows to be true, than this can be interpreted as the child having an understanding that people (or story characters) have their own minds, thoughts and mental states (Wellman et al., 2001; Wimmer & Perner, 1983).

In the standard (first-order<sup>1</sup>) false belief task children are told a story about a character who leaves an object in one of two places, such as a cupboard (Wellman et al., 2001). The first character then leaves, and a second character comes and moves the object to the second location, such as the fridge. The first character then comes back to look for the object. At this point the children are asked where the first character will look for the object. If they say the character will look in the first place, where he originally left it, than this is interpreted as the child being able to consider the character's (false) belief when predicting their behaviour. If the child answers with the second location, where the object was moved to when the first character was gone, than that is taken as evidence that the child is not considering the character's mental states, but is instead appealing to reality to make their prediction. Research has found that success on this task develops throughout the preschool period with children typically performing quite well around 4.5- to 5-years of age (Wellman et al., 2001).

A more advanced aspect of ToM is second-order belief reasoning. While in first-order false belief tasks children have to think about a character's beliefs, second-order reasoning requires children to think about a character's beliefs about another character's

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<sup>1</sup> Such tasks are known as 'first-order' belief tasks as they have one level of belief recursion. For example, the child has to be able to have a thought like: "Sally thinks the object is in the cupboard". In contrast, 'second-order' belief tasks require another level of belief recursion, resulting in thoughts like: "Sally thinks that Billy thinks the object is the cupboard".

beliefs. In second-order false belief tasks children are told a story such as, character A puts an object in one of two locations. Then character B moves the object to the other location. However, unbeknownst to character B, character A sees him move the object. The child is then asked a question such as, where does Character B think that Character A will look for the object. In this task B would have a false belief about what A knows and therefore, children would need to take this false belief into account and think about what B knows about A's mental state/knowledge. Children usually succeed at this task by around 5.5 years of age (e.g., Sullivan, Zaitchik, & Tager-Flusberg, 1994).

As mature moral reasoning requires an ability to understand another's intention, researchers have begun to look at how ToM relates to moral reasoning. Baird and Astington (2004) found that four- and five-year-old children's performance on first-order false belief tasks were significantly and positively correlated to their moral judgment and punishment scores on a moral reasoning task similar to the ones described in the previous section. In addition, Lane et al. (2010) conducted a longitudinal study with preschool-aged children that looked at emotional and false-belief understanding and their relation to moral reasoning. They presented children with prosocial dilemmas where the needs of one character (protagonist) conflict with the needs of another character. For example, in one story a boy has to decide between going straight to a birthday party, so he is not late, or stopping to help someone who has fallen and hurt their leg, which would be in conflict with arriving on time to the party. The results indicated that when faced with these dilemmas, children with higher emotional understanding and false belief understanding were more likely to demonstrate a higher level of moral reasoning that did not involve a "concern for [the] protagonists' own needs" (p. 18).

More recently, Vendetti et al. (2019) investigated children's understanding of different kinds of truths and lies to see how they related to ToM. Lies were defined as the act of intentionally making a false statement (that the speaker knows to be false) in order to deceive and instill this false belief in another. Lies therefore require false belief understanding, as it involves instilling a false belief in another, as well as moral judgments as the implications of lying can vary (lying to be polite versus lying to cover up a misdeed). In addition, identifying a lie requires theory of mind as one must consider the intent behind the act of making a false statement. In this study the researchers looked at two different kinds of lies: lying about a misdeed and lying to be polite.

The authors found that first-order false-belief ability contributed to the accurate identification of the truths and lies, whereas second-order false belief ability contributed to moral judgment and punishment ratings of lies. Those children with higher second-order false belief had more negative moral judgments and assigned more punishment for the lies. Further, the researchers found that overall, children's moral judgments were very consistent with the amount of punishment ascribed to the story characters.

Thus far, studies suggest that ToM is implicated in mature moral reasoning. Children with greater false belief reasoning abilities are able to use more mature moral reasoning skills in the context of typical moral reasoning stories, prosocial dilemmas and lies. However, It is worth noting that these studies assessed ToM using standard false belief tasks, and not ones that involved social-emotional or moral considerations. Killen et al. (2011) argue that in the standard false belief task there is no real social connection between characters. For example, in these standard false-belief tasks there is no need to consider the relation between characters in terms of how one character's actions may

affect the other. These standard tasks are more focused on physical objects and locations, and the knowledge that one character witnessed something another character did not witness. They argue that a task that includes social relations between the characters would allow for the examination of how different types of knowledge are applied in a more complex and interactional setting. They explain that children's false belief reasoning may differ in a morally relevant context, for example, children may have more difficulty identifying the false belief of a transgressor versus a character whose belief does not impact any other characters. They further argue that it is important to look at children's ability to apply their false belief reasoning in a context that also requires the consideration of moral reasoning, rather than only looking at skills in a more targeted way, as this would be more representative of the complexities found in everyday life. Therefore, the authors wanted to investigate children's performance on a ToM task that had more of a social and morally relevant context where moving the object results in a negative experience for the owner of the object. This, they argue, creates a scenario that is more focused on the characters' feelings and desires, and how one character's false belief affects another character (creating victim and transgressor). Therefore, this could lead to a better indication of the relation between moral reasoning and children's false belief reasoning ability compared to the standard false belief task. Thus, Killen et al. (2011) developed a morally relevant ToM task (MoToM) which they argue would be a better indicator of the relation between ToM and moral reasoning.

In order to test their hypothesis, 3.5 to 7.5-year-old children heard a story about a character (A) who throws away a bag not knowing that it contained another character's (B) cupcake. This story creates a relationship between the characters, that of accidental

transgressor and victim, which in turn involves more of a social-emotional and morally relevant context (e.g., B will likely be sad, and it is not nice to throw away someone's cupcake, respectively). This task was embedded in their moral reasoning task, therefore children were asked to make moral judgment and asked questions about A's beliefs. More specifically, they were asked questions requiring them to consider another's mental state: a contents false belief question (e.g., "What did Josh, the boy who threw out the paper bag, think was in the bag?", p. 8, with the correct answer being 'trash'), a location change false belief question (e.g., ("Now Tommy wants to eat the cupcake that he brought in from home...Where will Tommy look for his cupcake?", p. 8), and a question about intention (e.g., "When Josh threw out the bag, did he think he was doing something that was alright or not alright?", p. 8) which used a Likert scale ranging from not alright (1) to all right (4). Children were also asked questions about moral evaluations (e.g., "When Josh threw out the bag, was he doing something that was alright or not alright?", p. 8), which used the same Likert scale mentioned above, punishment ascription (added in experiment 2; e.g., "Do you think Josh should get in trouble for throwing the bag away?", p. 19; Likert scale ranging from no punishment, 0 to a lot of punishment, 2), the emotional state of character B (e.g., "How will Tommy feel about losing his cupcake?", p. 8; using the Likert scale), and how character B would feel about character A (e.g., "How will Tommy feel about Josh?", p. 8; also used Likert scale). It should be noted that these latter two questions are not typical in the research examining young children's moral reasoning, but were added in order to obtain additional information on how children would interpret the social and moral aspects of this situation. The children in this study also received standard false belief tasks and a moral transgression task.

Killen et al. (2011) found that children were more likely to succeed on the contents false belief question in the standard false belief task compared to the contents false belief question in the MoToM task. This was interpreted to mean that perhaps children have more difficulty understanding a person's false belief when it leads a character to engage in an action that results in a negative outcome for another character (i.e., the victim). The authors explain that this character can then be seen as a transgressor which may make it more difficult to interpret their false belief and may require the child to inhibit their moral judgment of the character.

The researchers also found that the children who failed the contents false belief question in the MoToM task, rated character A's intention more negatively and gave higher punishment ratings than those who passed. Those who passed this task rated the intention of the character more positively than they rated the moral evaluations of the action. Most children judged that the victim would feel bad about losing the cupcake and that he would feel bad about the transgressor. In other words, the victim would be upset with the transgressor. This pattern was interpreted to mean that children's judgments may be more focused on outcome.

Overall the researchers suggest that interpreting intentions involves the consideration of social, cognitive, and moral factors surrounding the context of a situation. They suggest that additional factors such as negligence (failing to take precautions or steps to avoid the negative outcome) should also be investigated. False belief understanding may be a first important ability needed to accurately interpret intentions and make moral judgments, however, there may be other important factors to further investigate as most children still viewed the act as wrong.

This study provides evidence for a positive relation between ToM and moral reasoning (though more so with the MoToM than the standard false belief tasks), and provides a new way to study and examine these topics with the addition of a MoToM task, which incorporates more of a social and emotional component to the standard false belief task. However, there are some limitations that are worth considering. One had to do with the wording of the moral judgment question, as it differed from those used in most studies on moral reasoning, which typically ask whether a character was being good or bad. By asking if the action was alright or not alright, the question could be interpreted as more focused on the outcome. The child may think it was not alright as it would make the other character unhappy. On the other hand, when asking if a character was being good or bad, this could be seen as more focused on the character and what intentions they had. For example, the child may be more likely to think the character was being good because they were trying to help clean up. This could be why even the children who accurately interpreted the character's intentions still concluded that the act was wrong. It would be important to use a similar task but change the wording of the questions in order to see if the results would differ. The current study addresses this concern by using questions more focused on the *agent* (questions asking whether the character 'was being good' or 'being bad'), as examined in Nobes et al.'s (2016) study.

In addition, in Killen et al.'s (2011) study, in the MoToM task it is assumed the child knows the character thought the bag was trash, however, there is no evidence in the story that makes this a clear, justified false belief. In their key story, the participant has to draw an inference about what the protagonist thought was in the box, as no reason was given for why they had the false belief that they did. This stands in contrast to the

standard false belief tasks in which there are clear details about why the character has the belief that they do, which is originally true, but becomes false after someone moves an object in their absence. The current study will address this limitation by altering the MoToM story to make clear that the character had reason to expect a bag to contain trash, but then hold a false belief. This will be accomplished by having the contents of the bag replaced when the character is not in view of it.

A final critique of this study is that there may be a stronger relation between false belief reasoning and moral reasoning when using the MoToM task simply because the former is embedded in the accidental transgressor story. The child can only succeed at this story if they also understand the embedded false belief as this is needed to accurately interpret the characters intentions; in other words, to understand that the character did not throw away the cupcake on purpose, but was trying to help clean. Therefore, only children who understood the false belief in the accidental transgressor task would even have the chance to succeed at the moral reasoning questions, which means these questions are not independent of each other. The current study will address this limitation by having an independent measure of MoToM (i.e., not embedded in the moral reasoning task).

More recently, Fu et al. (2014) conducted a similar study in order to investigate how the MoToM task, as well as the standard first- and second-order false belief tasks contribute to moral reasoning in four- to seven-year-old children in China. This study used the same MoToM task, embedded in an accidental transgression story, as Killen et al. (2011) with a few minor modifications to make them more appropriate for the participants (e.g., character names were changed). The results indicated that there was a

positive relation between age and interpretations of intention for the accidental transgression included in the MoToM story (Fu et al., 2014). They also found that the MoToM false belief questions and the second-order false belief task were significant and unique predictors for the evaluations of intention in the accidental transgression story. However, the standard first-order false belief tasks did not significantly and uniquely contribute to this prediction when all the variables were included in a hierarchical regression. In other words, those who performed better on the second-order false belief, as well as those who performed better on the morally embedded first-order false belief task, were more likely to rate the characters' intentions more positively. However, there were no significant findings for the MoToM and standard false belief tasks and their relation to moral evaluations of the act. As with Killen et al.'s (2011) study, the wording of the moral evaluation question may be putting emphasis on the outcome as opposed to the character's intention, thereby affecting the participants' ratings.

The results of this study suggest that using a MoToM task may be a better predictor of one's ability to interpret intentions, however the same critiques mentioned in regard to Killen et al.'s (2011) study can be applied here. Therefore, to test the claim that performance on the MoToM is a better predictor of moral reasoning than standard false belief it would be beneficial to create a MoToM task that is distinct from the moral reasoning stories (as will be done in the current thesis). In addition, the children were only told the one accidental transgressor story which limits the ability to test for the reliability of children's performance on this task.

A very recent study also employed a MoToM task when looking at the relation between ToM and children's evaluation of intentional versus unintentional false

statements about a character's claim to resources. D'Esterre et al. (2019) tested four- to 10-year-old children's moral reasoning using a story in which one character either intentionally or unintentionally falsely claims ownership of resources that another character had a rightful claim to. For example, in the story one character would have access to a required resource (drink to bring on a fieldtrip) while the other would not. The character with access to this drink would then either pack the drink to bring to school (intentional) or forget to pack it, in which case his mom would pack it without him knowing (unintentional). When at school, the teacher tells the class she brought two extra drinks for those who did not have any. The character that did not have a drink asked for one (rightful claim), as did the character who did have a drink, either knowingly (which is a false claim) or unknowingly. This story also included an embedded ToM questions about what resources the main character, and the teacher, thought that the main character had, (e.g., "What does Sam think that [he/she] has in [his/her] backpack?" and "What does the teacher think that Sam has in [his/her] backpack?"; D'Esterre et al., 2019, p. 58). The children were also given a separate standard false belief task. The results indicated that older children were more likely to pass the embedded ToM task than were younger children, and that those who did pass this task evaluated the unintentional transgressor more positively than they did the intentional transgressor, and evaluated the unintentional transgressor more positively compared to those who did not pass (D'Esterre et al., 2019). Those who failed the MoToM task did not differentiate between the intentional and unintentional transgressors in terms of moral evaluations, attribution of intentions, assignment of punishment or teacher's expected punishments. Finally, they found that the MoToM task was better

able to predict moral evaluations, attribution of intentions, and teacher's expected punishments above and beyond the prototypic ToM task, and was able to uniquely account for a significant amount of the variance for the assignment or punishment scores. They interpreted this to mean that the MoToM task directly assesses a child's understanding of another's mental state within a moral context and that it would be important to consider this task when examining ToM in these types of complex social contexts. This finding, compared to Killen et al. (2011) and Fu et al.'s (2014) studies demonstrates that the MoToM is not only a better correlate of moral reasoning, but that it accounts for variability above and beyond the standard false belief tasks. However, the MoToM questions used in this study were also embedded in the moral reasoning task, therefore this study is open to the same critique as the previous two studies.

In sum, these studies demonstrate that ToM, especially in terms of false belief understanding, is related to children's ability to consider intention when making moral judgments. In addition, the MoToM is a newer task that may be a better correlate of children's moral reasoning. Belief reasoning is therefore an important aspect of ToM which is implicated in moral development. However, less attention has been paid to other factors that could affect children's moral reasoning. One such factor is social anxiety. It is a good candidate to examine in relation to moral reasoning because it is related to ToM and interpretations of intention (Banerjee & Henderson 2001; Bell-Dolan, 1995; Colonnese et al. 2017), and may therefore affect how anxious children think about moral situations. Next, I will review social anxiety and related constructs, and how social anxiety may be related to moral reasoning by reviewing the literature on threat perception

and ToM, with a particular focus on the relation between social anxiety and rating others' intentions.

### **Social Anxiety**

Social anxiety is often described as a form of anxiety, which itself is a negative physiological and psychological response, specifically centered around and triggered by social situations (e.g., Crozier & Alden, 2001; Henderson, Gilbert, & Zimbardo, 2014). It involves feelings of worry, apprehension, and avoidance of social situations, especially when these situations are novel, unfamiliar or when there are concerns about potentially being negatively evaluated by others (Crozier & Alden, 2001). Social anxiety is thought of as a temporary state that everyone experiences in response to certain situations, as well as a trait where some people may be more prone to feeling socially anxious or have, in general, higher social anxiety than others (Leary, 1983). Social anxiety is a normal human reaction that most people experience throughout their lives and can be viewed as a continuum with some people rarely feeling socially anxious and others having an extreme fear of social interactions (McNeil, 2010). However, when social anxiety is very extreme and disrupts everyday functioning, social anxiety disorder may be diagnosed.

A couple of studies have examined the prevalence and subtypes of anxiety specifically in the preschool age group, demonstrating that anxiety, and social anxiety specifically, is apparent and measurable at this young age. Spence, Rapee, McDonald, and Ingram (2001) conducted a study looking at anxiety in preschool aged children, 2.5 to 6.5 years old, to examine if anxiety symptoms present in this age group (assessed by parent-report) fall under distinct subtypes in line with different anxiety disorders found in adults. Using exploratory and confirmatory factor analysis, they found that a five-factor

model was the best fit to the data and that social anxiety had enough significant unique variance to consider it distinct and thus justifying the need to study it independently from other forms of anxiety, such as generalized anxiety or separation anxiety (Spence et al., 2001). They also found that one of the most prevalent anxiety symptoms for this age range was social fears with the specific content varying with age. For example, fear of being left with a babysitter was most common for three-year-olds while fears regarding performance and looking 'stupid' in front of others were common for the older preschoolers. The authors explain that this could suggest a development of processes related to self-consciousness.

Another study which examined the prevalence of anxiety disorders in four- to seven-year-old children found that about a quarter of the participants had clinically high levels of anxiety, with social phobia being the most prevalent (Paulus, Backes, Sander, Weber, & von Gontard, 2015). Edwards, Rapee, Kennedy, and Spence (2010) conducted a factor analysis and looked at psychometric properties of the revised preschool anxiety scale (PAS-R) used to assess anxiety symptoms in preschool aged children. This parent-report questionnaire includes items such as "Worries that he/she will do something to look stupid in front of other people" and "Has difficulty stopping him/herself from worrying" (p. 404) which the parents would then rate in terms of how much it describes their child on a scale from 0 (not at all true) to 4 (very often true). They found that internal consistency was acceptable for each scale, that correlations between the revised preschool anxiety scale and the emotion symptoms subscale of the strengths and difficulties questionnaire were moderate to high, and when comparing data from two

different time points (12 months apart), all correlations were significant, thus suggesting stability. Therefore, the results suggest that this is a valid and reliable tool.

The researchers also found that a four-factor model was the best fit for the data. They identified anxiety as a higher-order factor with four sub-factors, including generalised anxiety, social anxiety, separation anxiety and specific fears. In addition Ooi et al., 2017 found results consistent with Edwards et al. 2010. They found high internal consistency for the PAS-R in preschool to school age children, and found a significant positive correlation between this measure, other measures of maternal-rated emotional symptoms involving anxiety, and teacher-report measures of anxious behaviours with peers, thus demonstrating convergent validity. Overall, the research on preschool social anxiety has found that young children do have feelings of social anxiety and that these differ from general feelings of anxiety.

It is important to note that shyness and behavioural inhibition are two constructs that overlap with social anxiety as all these terms derive from the same underlying concept of fear and anxiety towards social situations (Coplan & Rubin, 2010). Shyness involves feelings of social anxiety as it refers to apprehension, timidity, discomfort and wariness about social situations often accompanied by reticent and withdrawn social behaviours and is often viewed as more of a temperamental construct but can also be described as a temporary state (Crozier & Alden, 2001; Leary, 1983; Coplan, Prakash, O'Neil, & Armer, 2004). Given that shyness has been found to be highly correlated with measures of social anxiety, they may not be discrete constructs (Pilkonis, 1977a, as cited in Crozier & Alden, 2001).

On the other hand, behavioural inhibition (BI) is a broader temperamental construct referring to how young children react in novel and unfamiliar situations (Kagan, Snidman, & Arcus, 1998). Children who are high in behavioural inhibition react more cautiously, or are more withdrawn, in these types of situations, compared to less inhibited children. Both shyness and BI can result in similar withdrawn and reticent behaviours, with BI encompassing more generally novel situations whereas shyness is more centered on social situations (Kagan et al., 1998). In addition, both shyness and BI have been found to be related to the development of anxiety disorders (Van Ameringen, Mancini, & Oakman, 1998 as cited in Crozier & Alden, 2001). Overall, shyness, BI and social anxiety are similar and overlapping constructs and, for the purpose of this thesis, I will use the term social anxiety to refer to the symptoms of social anxiety including feelings of worry, fear or inhibition surrounding social situations.

A final note to consider on the topic of social anxiety, and its related constructs, is how it develops with age. Socially anxious behaviours in toddlers and very young children are often categorized as a fear of strangers and a general inhibition toward novel social situations (e.g., Coplan & Rubin, 2010). Therefore, with this age group, these behaviours often fall under the broader construct of behavioural inhibition, which I have explained above, or other similar terms such as fearful shyness (Coplan & Rubin, 2010). In a review by Rapee and Coplan (2010) it is explained that temperamental constructs, involving features of fearfulness and inhibition, are expressed under different terms, such as the ones mentioned above, with many overlapping features. They go on to explain that distinguishing these fearful temperament constructs from each other is difficult due to the wide array of conceptually similar terms and inconsistencies in their measurements

across research within the field. Further, these temperamental constructs tend to overlap with conceptualization of the more chronic, life-long anxiety disorders (e.g., social anxiety disorder and generalized anxiety disorder) with a main distinction being that anxiety disorders involve more severe manifestation of extreme symptoms. Rapee and Coplan (2010) explain that it is difficult to assess early symptoms or factors related to these disorders before age of onset, and many theories of the development of anxiety disorders propose a fearful or inhibited temperament as a main contributor creating a vulnerability for these chronic disorders. Therefore, perhaps measurements used to assess inhibited temperament in young children also capture important risk factors, or even early symptoms, of certain anxiety disorders such as social anxiety disorder. Research examining social behaviours specifically, in young behaviourally inhibited children, has found that these children more often engage in reticent and anxious behaviours in preschool and school settings, compared to uninhibited children (Coplan & Rubin, 2010; Rimm-Kaufman & Kagan, 2005), thus displaying what can be considered early socially anxious behaviours. Research has also found that high levels of BI persisting into the preschool years is associated with lower social competence (Bohlin et al., 2005). Children high in BI may have more difficulties with social competence as they are more likely to be inhibited, withdrawn and avoid social situations which could then result in these children experiencing less, or lower quality social interactions, which limits their opportunities to meaningfully engage and develop social skills (Asendorpf, 1990; for a review on temperament and social development see Sanson et al., 2004). Similarly, research by Ooi et al., (2017) looking specifically at preschool- to early school-aged children's level of social anxiety found significant associations demonstrating that

children higher in maternal-rated social anxiety were more likely to experience increased levels of socio-emotional and peer difficulties (parent and teacher reports) at school and outside of school, as well as lower academic performance.

As children age and develop a better understanding of mental states, the concept of 'self', and perspective-taking, they begin to have more complex emotions (such as embarrassment) and fears surrounding social evaluation and what others think of them (Coplan & Rubin, 2010). Therefore, social anxiety symptoms expand to include self-conscious fears and are not just limited to novel social interactions. Children who continue to show elevated signs of wariness, anxiety and withdrawal in response to social situations, along with a fear of social evaluation, are more often described using terms such as conflicted-shyness, anxious-solitude or socially anxious (Coplan & Rubin, 2010).

In a study by Weeks et al., (2009) social anxiety and socio-emotional outcomes were examined in elementary school aged children (7- to 8-year-olds). In this study, children who scored one standard deviation above the mean on a self-report measure of child social anxiety were considered socially anxious and were compared to the other children who were considered non-anxious. Weeks et al. (2009) found that the socially anxious children reported feeling more lonely, were more likely to report disliking and wanting to avoid school and reported engaging in more worrying and self-blame in response to social stressors, compared to the non-anxious children. Also, teachers rated the socially anxious children as less academically skilled compared to the non-anxious children. This study suggests that children with subclinical levels of social anxiety experience multiple negative socio-emotional outcomes.

In addition, school-aged children who continue to withdraw from social interactions may limit their ability to develop social skills, but also begin to experience more peer rejection, as they fall behind their peers in social competence (Karevold et al., 2012; Rubin et al., 2009). This could then limit their positive social interactions, furthering feelings of social anxiety and negative self-perceptions regarding social interactions and social competence (Karevold et al., 2012; Rubin et al., 2009). In some children, these feelings of social anxiety may become very extreme leading to a diagnosis of social anxiety disorder (SAD). In particular, there is quite a bit of overlap between features of shyness and social anxiety disorder with a main distinction being that SAD involves more extreme anxieties that impair one's day-to-day life (Rapee & Coplan, 2010). Often the more severe symptoms of SAD occur in adolescence, however they can also occur in childhood, as diagnoses can be made as early as six years of age (Coplan & Rubin, 2010; McNeil & Randall, 2014). However, even without a formal diagnosis, as demonstrated by Weeks et al. (2009) and Ooi et al., (2017), even subclinical levels of social anxiety can lead to negative socio-emotional outcomes. In addition, early subclinical social anxiety symptoms can lead to the later development and diagnoses of social anxiety disorder or other internalizing problems. For example, Goodwin et al., 2004 conducted a longitudinal study examining the associations between childhood subclinical social anxiety and adult social anxiety symptoms and diagnoses of anxiety disorders and depression. They found that increasing anxious and withdrawn behaviour at eight years of age was significantly associated with increased rates of anxiety disorders, including social phobia (i.e., SAD), specific phobia, any anxiety disorder and depression in adolescence and early adulthood even after controlling for social and family factors

(e.g., childhood abuse, parental history of depression/anxiety, adverse family life events...etc.). This finding is also consistent with research that has found shyness and BI to be associated with the development of anxiety disorders (Van Ameringen, Mancini, & Oakman, 1998 as cited in Crozier & Alden, 2001).

Therefore, as SAD is often only diagnosed in adolescence or early to late childhood, and subclinical social anxiety is often associated with negative socio-emotional outcomes and the later development of clinical diagnoses, it is important to study young preschool-aged children who may display subclinical social anxiety symptoms. This allows us to examine potential pathways and factors contributing to why some inhibited and shy children go on to develop SAD, among other more serious mental health disorders, in late childhood, adolescence, or even adulthood. This could then inform possible preventative measures to help these children gain skills and support them in order to lessen the impact of social anxiety symptoms and prevent the development of more maladaptive cognitions and behaviours.

After briefly overviewing social anxiety, its overlapping terms and its development, I will now review literature on how social anxiety may be linked to moral reasoning by examining social anxiety in relation to interpretations of intention, ToM, and threat perception bias (see definitions below).

### **Social Anxiety links to moral reasoning: Theory of Mind, Intention and Threat Perception**

There has been some research on the relation between ToM and social anxiety with a couple of studies reporting links between social anxiety and certain aspects of ToM. For example, Suway et al. (2012) conducted a longitudinal study on children's BI,

peer interactions and ToM. At two years of age observational data on children's BI and peer interactions were assessed by having the target child interact and work together with another child to assemble a *Mr. Potato Head*. Then at three years of age children completed a series of false belief tasks which progressively increased in difficulty. They found that higher BI was associated with lower levels of ToM ability only when the child also had a higher level of negative peer interactions (e.g. grabbing, demanding or rejecting behaviours during the *Mr. Potato Head* game).

The authors interpreted their findings as indicating that those with high BI are often more cautious and less likely to engage in social situations, thus limiting their opportunities to develop appropriate social skills, and that when this is combined with lower ToM understanding, it may lead to issues such as loneliness and social anxiety. This study only included a measure of BI, however, so it is possible that children high in BI that show more negative peer interactions also have higher social anxiety. Therefore, as planned in this thesis, social anxiety symptoms in young children were to be measured in order to determine whether inhibition and anxiety, specifically surrounding social situations, is related to ToM ability.

In related a study by Colonnesi et al. (2017), 4.5-year-old children's expressions of shyness, level of social anxiety, and theory of mind ability were examined. The children were given two theory of mind subscales: one assessed basic theory of mind abilities (pretense, the difference between reality and non-reality, and recognition of basic emotions) while the other assessed the understanding of false beliefs (like those described above). To assess expressions of shyness, observational data was collected while the child performed a song in front of a small audience, and levels of social anxiety were

assessed using a parent-report questionnaire. The authors found that higher levels of social anxiety and greater frequency of negative expressions of shyness (i.e., negative facial expressions, head aversions) were negatively related to performance on the basic level ToM subscale. However, they did not find a relation between social anxiety and false belief reasoning. The authors interpret this to mean that basic theory of mind understanding is needed to promote social understanding and positive social experiences and that a delay in these basic abilities could increase non-adaptive or problematic social behaviours. However, they explain that perhaps the more advanced ToM tasks, assessing false belief reasoning, did not have a relation with social anxiety as this skill is still developing for children in this age group. Therefore, this skill would not yet play a role in the development of social anxiety. Another possible explanation offered, is that perhaps ToM abilities involving general social understanding, such as recognising emotions and pretense, are better able to predict social anxiety as opposed to more cognitive focused false belief reasoning. This explanation is consistent with the argument made by Killen et al. (2011) about the value of the MoToM.

Banerjee and Henderson (2001) also found that only certain ToM tasks were related to social anxiety in children. In this study six- to 11-year-old American and English children completed a standard second-order false belief task, a 'faux pas' task, a self-presentation display task, as well as measures of social anxiety, social behaviour and negative affective states. The 'faux pas' task was a social cognition task which involved understanding intention within a social-emotional context. Children were told stories in which one character unintentionally says something that upsets another character (Banerjee & Henderson, 2001). They were then asked questions about this 'faux pas'

including a question on the character's intention (e.g., whether the first character meant to upset the second character). The self-presentational display task involved stories in which characters chose to use deception to present themselves in a way that differs from how they truly feel or what they truly think (e.g., not crying after getting hurt). Children were then asked to explain why these characters chose to present themselves in this way. This task requires children to understand and explain the social evaluation motives behind these self-presentation displays, and thus also involved more of a social-emotional context than the standard false belief that does not require one to think about how another person perceives someone or the intentions surrounding a person's act and how it affects others.

Banerjee and Henderson (2001) found that performance on the 'faux pas' task and the self-presentation display task were significantly, and negatively, correlated with social anxiety. They also divided children into high and low negative affect, with those rating themselves as experiencing more negative emotions and affective states, such as feeling worried or embarrassed, rated as high in negative affect. They found after grouping the children, that there was only a significant negative correlation between social anxiety and the two above mentioned tasks, for the high negative affect group. However, no significant relation was found between social anxiety and a second-order false belief task.

Typically, children around the age of six years would be expected to succeed on second-order false belief tasks (Sullivan et al., 1994); however, the results did not indicate ceiling effects even though this study included children up to 11 years of age. As this study was done with slightly older children, it would be valuable to look at a

preschool age sample to determine if a similar pattern of results can be found in terms of understanding intention.

Based on the findings of these two studies, one might conclude that social anxiety may not be related to standard false belief tasks as they do not require one to have an understanding of the social relations or emotions between characters. Socially anxious children may have difficulty with ToM reasoning when it is embedded in tasks focused on social relations and emotions between characters, such as how one character's action, and the intentions behind them, may make another character feel. It may be the case that these socially embedded situations add greater difficulty to theory of mind reasoning because social situations elicit an anxious response in children with social anxiety. This could interfere with cognitive abilities as this kind of anxious response is characterized by hyperarousal, the activation of the fight or flight response, and has been shown to be related to atypical activation in certain brain regions involved in social and emotional processing (de Vente, Majdandžić, & Bögels, 2014; Syal & Stein, 2014). A false belief task centred on more physical aspects of a situation, such as standard false belief tasks which requires children to track where an object is moved, may be more straightforward and easier for socially anxious children as it does not focus on the inter-relations among characters. Therefore, it would be beneficial to use a task such as the MoToM when examining the relation between social anxiety and ToM.

A small number of studies have examined forms of anxiety in children and how they relate more specifically to the understanding and interpretation of intention in various scenarios. For example, Bell-Dolan (1995) conducted a study in which fourth- and fifth-grade children were shown videotapes of peers interacting, where one character

engages in a behaviour that results in a negative outcome for another character, such as a one character knocking down another character's tower of blocks. The first character's intention was varied across different videos with each child seeing each video. They portrayed the different intentions by using social cues such as facial expressions. The intention and associated cues were either purposeful and hostile (e.g. character laughs about knocking over blocks), nonhostile and unintentional (the article did not specify these cues) or completely ambiguous (no cues to indicate the intention of the character).

The children were then asked a series of questions about "whether he or she thought the provocateur acted mean (hostile) or not mean (non hostile)" (Bell-Dolan, 1995, p. 5). The children also completed a self-report anxiety scale. The results indicated that children high in anxiety were more likely to interpret the unintentional act as hostile (i.e., report that the character was acting mean) compared to those low in anxiety. This task appears to be very similar to moral reasoning tasks as it involves judgments about the intent behind an act resulting in a negative outcome. The authors interpret this to mean that even when an act is accidental or unintentional, children with more anxiety are more likely to view it as purposeful and done with hostile intent and that this kind of misinterpretation could be related to threat perception biases in anxious individuals. However, in this task, social cues were used to portray intention rather than stating what a character was thinking or what the character knows, which is typical in moral reasoning tasks. Focusing only on more subtle social cues could make the task more difficult, however the children in this study were older than the children in the proposed study. Thus, it would be important to be more direct with the intention information given to preschool-aged children.

Further support for this finding comes from Dineen and Hadwin (2004) who presented six- to eight-year-old children with stories, accompanied by pictures, where two characters were involved in a negative, positive, or ambiguous social situation. Children were asked to choose between two alternative interpretations, neutral or negative, about how one character in the story would interpret the intention of the other character, as well as how they would interpret the intentions of another character from their own perspective. For example, they heard a story in which a character waved to another character who did not wave back. They then had to decide between interpreting that the character “Doesn’t want to wave” or “Hasn’t seen him” (p. 510) from both their perspective and from that of a story character. The authors also collected parent- and self-reports of anxiety (among other variables).

The results indicated that parent-report ratings of anxiety were positively related to the number of negative interpretations made for the character, though not the self, chosen for the ambiguous stories. Interestingly, there were no significant findings for self-report anxiety, or self-judgment interpretations, and anxiety. The authors interpreted this to mean that self-report measures of anxiety may be less reliable in children therefore it would be beneficial to include parent reports, especially for younger children. In addition, when the child is making interpretations for themselves, from a third-person point of view of the situation, they may have a more idealistic view of what they themselves would do and think in these situations. The authors suggest that when making self-judgments, children with anxiety may not show interpretation biases as they are attempting to maintain control by ignoring negative thoughts about themselves, but still attribute negative thoughts to others as this could increase their sense of self-control.

The results for self-judgment interpretations may have differed using a more naturalistic task where the child is actually in the situations, although this would have ethical implications. A final factor to consider about these two studies is that they examined general anxiety as opposed to social anxiety, therefore the relation between interpretations of intention and anxiety may be stronger when looking at anxiety specifically centred around social situations, as these tasks involved reasoning about social interactions between two people. It is important to look at these specific forms of anxiety as they can affect cognitions differently.

Another line of research on social anxiety has examined its relation to maladaptive cognitions, with most of this research having been done with school-aged children (e.g., Barrett et al., 1996; Muris, Luermans, et al., 2000; Muris, Merckelbach, et al., 2000). One example of a maladaptive cognition, that could be implicated in children's ability to accurately interpret intentions, is biases in perceiving threats. Threat perception biases can be attentional and interpretational; meaning that people with higher social anxiety are thought to have higher threat perception (i.e. more likely to attend to threats) and are more likely to interpret ambiguous situations as threatening (Muris, Merckelbach, et al., 2000). For example, Barrett et al. (1996) found that when presented with socially ambiguous situations, seven- to 14-year-old children high in anxiety were more likely to interpret them as threatening, compared to children who were not high in anxiety (i.e., the control group). For example, one of the ambiguous social situations went as follows "You see a group of students from another class playing a great game. As you (your child) walk over and want to join in, you notice that they are laughing." (p. 192). Children were asked "What do you think is happening?" (p. 191) and were given a

forced choice between two threat and two neutral interpretations and asked “Which of the following explanations do you think is most likely?” and “What would you do about it?” (p. 191). Anxious children tended to interpret threat in these situations (e.g. think the children are laughing at them) whereas children low in social anxiety were less likely to interpret threat. In addition, children with social anxiety disorder were more likely to interpret threat in social situations, compared to physical situations, and were more likely to indicate that they would be avoidant of social situations (e.g., they would indicate that they would not join other students playing). Thus, this study demonstrates that those with social anxiety are more likely to interpret threat, especially in social situations, and that this affects how they respond; making them more likely to avoid these situations altogether.

More recently, Muris, Merckelbach et al. (2000) conducted a study with eight- to 13-year-old children in which they used a diagnostic interview to identify socially anxious children and control group children. Children from these two groups were then presented with socially ambiguous situations, such as inviting friends to a birthday party, along with one threatening social situation, such as a story about a mean classmate. The stories were presented one line at a time and the child was asked, after each line, whether this was a ‘non-scary’ or ‘scary’ story. The children were told to indicate as soon as possible whether they thought this story was a scary story. As the stories progressed with each line, they could be perceived as more ‘threatening’ for someone with social anxiety. This allowed the researchers to determine each child’s threshold (how many lines before they thought the story was scary) and frequency of threat perception (how many lines did they consider threatening). Children were also asked to rate how threatening they

thought the story was going to be, what they thought would happen at the end, and how they would feel if they were in that situation.

The researchers found that children in the social anxiety group had significantly lower thresholds for threat perception, had higher threat perception and threat ratings, and were more likely to interpret the ambiguous situations as threatening compared to control children. They also had higher scores for negative feelings and cognitions when asked how they would feel in these situations. These results suggest that compared to children with typical levels of social anxiety, children with high social anxiety interpret ambiguous social situations as more threatening.

The authors interpreted their findings to mean that children with social anxiety have threat schemas that are more sensitive and thus more easily interpret actions or behaviours as threats. This cognitive bias may further maintain anxious thoughts and behaviour. However, as mentioned by the authors, one experimenter administered both the stories as well as the diagnostic interview, which was administered after. This could be problematic as the experimenter may recall how certain children performed on the stories task which could bias the results of the interview. However, the children were also given questionnaires to assess anxiety, to which the researcher was blind, and they followed a similar pattern of results to the interview data, thereby alleviating some of the concern about experimenter bias. In addition, the stories in this study were centered around situations where one needs to talk to or meet people, which limits their applicability to other kinds of social situations, such as a social conflict between two characters. It would therefore be beneficial to have ambiguous stories that vary in terms of social situations. For example, it would be important to see how socially anxious

children respond to an interpersonal situation where someone's intention motivating an action, is ambiguous. Questions such a study could address include: How would a child interpret a situation where someone accidentally knocks down their tower of blocks? Would they see this person as threatening and the action as purposeful, or would they see it as an honest mistake? These questions are the type that will be addressed in the current thesis proposal.

Muris, Luermans, et al. (2000) used a similar paradigm with eight- to 13-year-old children, but also included stories that were non-threatening, though still focused on social interactions such as playing with a familiar peer, and looked at general trait anxiety and social anxiety. The results indicated that anxiety scores were significantly and positively related to threat perceptions, threat ratings, frequency of threat interpretations, negative feelings and cognitions, and early detection of threat for both the ambiguous stories and the non-threatening stories. They also found that when controlling for trait anxiety, social anxiety was still significantly related to the threat measures, but this was not the case for trait anxiety when controlling for social anxiety. Thus, these biases may be more specific to social anxiety when using stories centred on social situations. Similar to the previous study, the authors interpreted this to mean that children with social anxiety have biases in terms of threat perceptions and interpretations and that this may even extend to clearly non-threatening situations. However, the non-threatening situations in this study were still focused on interacting with others, in a clearly friendly setting, which may still be quite threatening to someone whose anxieties are centred around social interactions.

Overall, these studies suggest that social anxiety begins to develop during the preschool period and that young children are more likely to interpret social situations as threatening, even if they are not, or are simply ambiguous. Given that socially anxious children have threat biases and are more likely to see threat, it is reasonable to consider the possibility that they interpret negative intentions (i.e., threats) in a variety of situations that have some negative component, such as where someone's behaviour results in an outcome that is detrimental for another person or themselves. This may result from the fact that they are more likely to see someone as threatening and interpret their intentions accordingly, particularly in a situation that is embedded in a moral and social context, as their anxious response may inhibit ToM abilities, whereas purely cognitive ToM would be otherwise intact. If this is the case, it could cause problems for children in social situations as misunderstandings could be interpreted as more threatening and hostile and could further a child's anxiety surrounding social situations leading to further avoidance. If children are avoiding these situations, they would then have less experience with social interactions, which could result in further issues with ToM ability and understanding others' mental states. This, combined with a lack of adequate social skills, could lead to increasing anxieties surrounding social situations. What may start out as a performance issue for TOM ability could turn into a competence issue if these children are not interacting with others and start to fall behind their peers in regard to developing advanced TOM abilities. Furthermore, as explained previously, a lack of social skills and appropriate interactions with others often leads to peer rejection and victimization (Karevold et al., 2012; Rubin et al., 2009). This contributes to cognitive

biases and the view that social interactions are threatening and will not end positively, thus contributing to feelings of social anxiety.

Therefore, in children who are already predisposed to be more socially anxious or inhibited, morally relevant situations and the lack of understanding of intentions/mental states could be one step, early on in an inhibited/anxious child's life, that may contribute to a potential pathway toward the development of negative cognitions and poorer social skills. It would thus be important to study this so that we could help prevent the worsening of social anxiety symptoms. Early education on intentions, intention cue information and the understanding of others' mental states, as well as helping socially anxious children to better understand negative morally relevant situations they face, could help prevent or reduce early negative experiences and misunderstandings. Therefore, it is very relevant to study social anxiety in the context of moral reasoning and situations requiring one to consider the intentions of others.

Overall, these studies demonstrate that children with higher social anxiety and general anxiety have a greater likelihood to perceive threats and are less accurate at interpreting accidental or ambiguous intentions (i.e., they are more likely to interpret them as hostile or a threat). We also know from this research that children with high social anxiety struggle with ToM tasks that involve considering emotions and stories about how one character makes another character feel, whereas when the standard false belief tasks are centred around an object's location and less focused on what characters think of each other, the relation to social anxiety is less clear. Therefore, it would be important to further investigate how children with social anxiety perform on a standard false belief task, versus a MoToM task that is embedded in a social-emotional context.

Given that an accurate assessment of someone's intentions are needed for mature moral reasoning, it is therefore possible that social anxiety could be related to poorer moral reasoning abilities.

### **General receptive language skills**

As the ToM tasks and moral reasoning tasks are highly verbal and involve reading stories to children and asking them questions, performance may be affected by language skills. Therefore, children will receive an abbreviated version of the PPVT-V (Dunn, 2019), a standardized measure of receptive vocabulary, which will allow us to control for general language ability.

### **Present Study**

The main goal of the present study was to investigate the potential relation between moral reasoning and social anxiety in four- to six-year-old children. While there is a great deal of work examining moral development, not much is known about its development in children with social anxiety. It is important to look at this sub-population of children to better understand the implications of social anxiety, as research has demonstrated that children with higher social anxiety display greater difficulty in understanding others' intentions (Bell-Dolan, 1995; Dineen & Hadwin, 2004) and mental states (Banerjee & Henderson, 2001; Colonna et al., 2017), both of which may impact their evaluation of others in moral situations which could in turn affect the development of social anxiety.

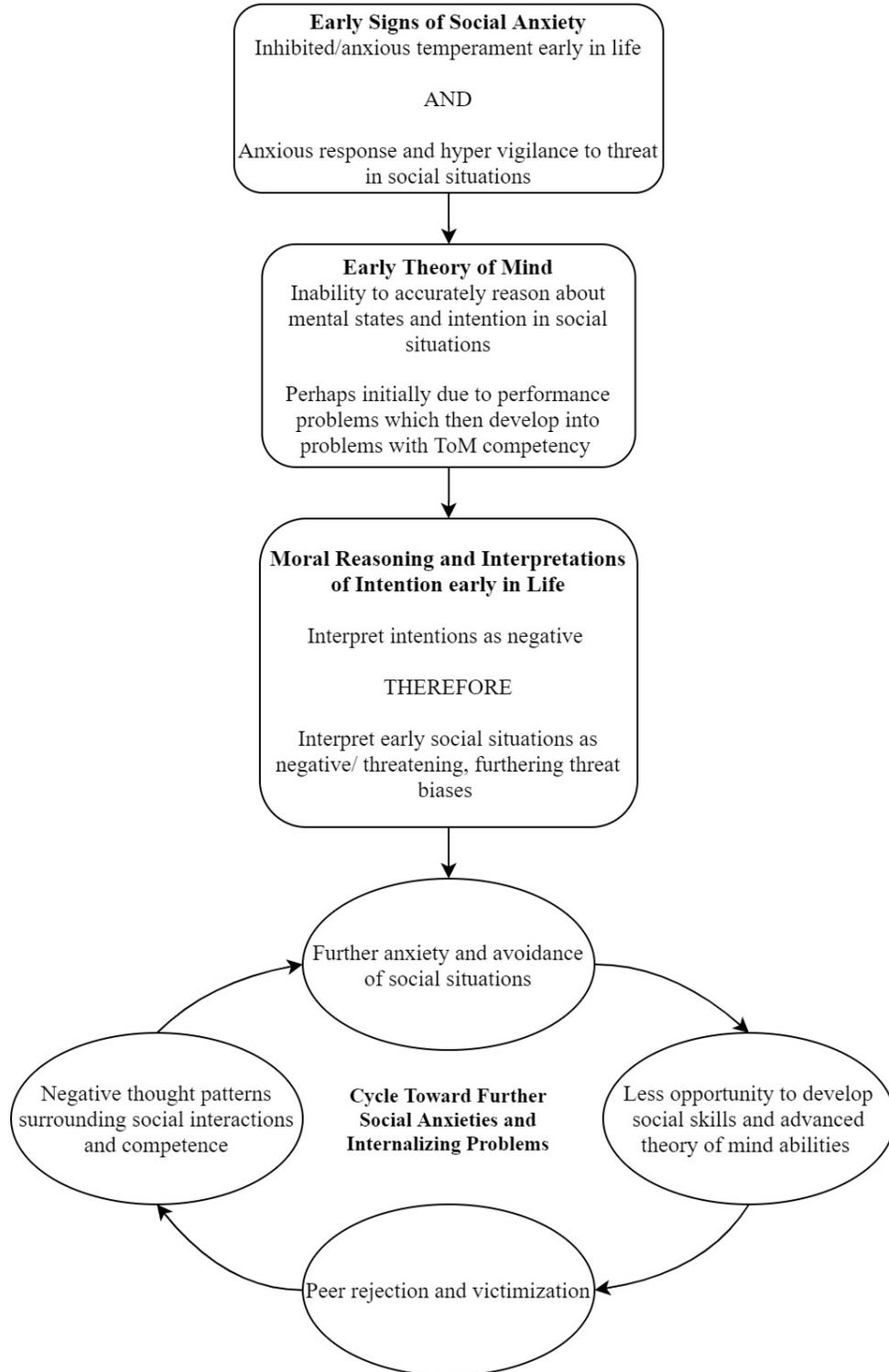
I propose a conceptual model explaining the potential mechanism which I think could be at play, in terms of the possible connections among early symptoms of social anxiety, theory of mind, and moral reasoning (see Figure 1). The model first depicts a

linear relation where early signs of social anxiety, such as a more inhibited or anxious temperament, in very young children, combined with an anxious response towards social situations, leads to deficits in theory of mind (ToM) abilities. Even if these children have the same early understanding of ToM as their peers, it is possible they would not be able to actually employ these abilities when faced with highly anxiety-evoking situations. A state of hyper-arousal and focus on potential threat may adversely affect their ability to use ToM skills accurately when reasoning about others' mental states and intentions. Thus, deficits in ToM could begin as performance issues which could then develop into competence issues (this will be explained in more detail when going over the 'cycle' aspect of this model).

As socially anxious children have more opportunities to interact with peers (e.g., daycare, preschool), this ToM performance problem could then lead to issues in negatively interpreting social situations that involve a moral component or "misunderstandings" early in life. As these children would struggle with interpreting mental states, and could become hyper-vigilant to threat, and therefore would be more likely to focus on the threatening aspects of a situation and interpret a person's intention according to these more salient threatening or negative aspects. For example, if the outcome of a situation is negative, such as another child knocking over the child's tower of blocks, then the more socially anxious child would focus on this negative or threatening outcome and assume the intention was also negative (e.g., they did it on purpose), even if social cues or context information suggest otherwise (as these are less salient). As socially anxious children are more likely to interpret intentions as negative, these children are expected to feel as though these early morally relevant social situations

**Figure 1**

*Conceptual Model Connecting ToM and Moral Reasoning to Social Anxiety and its Development in Young Children*



are negative and threatening (according to how they interpret them) and so begin to build up a repertoire of ‘threatening/negative’ social interactions. This would then feed into negative cognitive schemas and threat biases surrounding social interaction.

This step in the model then leads to a cycle<sup>2</sup> resulting in the development of more severe social anxiety and mental health problems, that includes a worsening of social anxiety, and the avoidance of social interaction which would then lead to fewer opportunities to develop social skills. This pattern could perhaps even inhibit the development of more advanced ToM abilities, resulting in problems with ToM competence, which feed back into the cycle. The few social interactions the child does experience may not be positive if they are highly anxious and already struggling with ToM stemming from either performance or competence issues. As previously mentioned, when these children begin to fall behind their peers in social skill development then this typically results in peer rejection and victimization, which in turn affects the socially anxious child’s thought patterns and cognitive schemas surrounding their social competence and social interactions (Karevold et al., 2012; Rubin et al., 2009). This feeds back to the first point in the cycle, continuing a spiral toward further internalizing problems as children develop (Rubin et al., 2009). Therefore, it is important to examine the linear pathway proposed above (Figure 1), as it could be one contributing risk factor implicated in the cycle and development of social anxiety.

As was planned for this thesis, the first step in examining the validity of the ideas presented in this conceptual model would be to determine whether the first three

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<sup>2</sup> This cycle can be seen as the beginnings of more complex cognitive-behavioural and interpersonal models of social anxiety disorders (for an overview of these models see Wong et al., 2014)

variables, early social anxiety symptoms, ToM ability within a social context, and reasoning in early moral situations, are significantly inter-related in young children who are beginning to interact more often with their peers (i.e., a preschool population).

First, to investigate the relation between social anxiety and moral reasoning, I had planned to recruit 80 four- to six-year-old children from daycares and schools. However, due to the COVID-19 pandemic, face-to-face data collection was not possible (see Appendix I for departmental approval to complete my thesis as I have). The participants would have completed a moral judgment task (comprised of six stories with different themes and characters with varying intentions and negative outcomes). Each child would have received two stories for each kind of intention cue option: intentional/purposeful, unintentional/accidental, and ambiguous. After hearing the stories, the children would have been asked questions about the character's intention (such as whether they acted 'on purpose' or 'by accident'), asked to make moral judgments (such as how 'good' or 'bad' a character was), and to make decisions about how much 'trouble' the character should be in (i.e., punishment). The parents would have been asked to complete questionnaires about their child's social anxiety. Preliminary data was collected with an adult sample of 19 participants. The adult participants completed the moral judgement task as a manipulation check, in order to ensure that the stories and questions made sense and followed the expected pattern of results for those with mature moral reasoning ability. The methods used for the adult participants were able to be adapted and done over the phone with a PowerPoint slideshow (containing the story photos) to accompany the stories.

The secondary goals of the proposed study are to determine whether false belief reasoning mediates the relationship between moral reasoning and social anxiety, and whether the relationship between false belief and social anxiety differs depending on the type of false belief task. To explore these goals, participants would have received standard first-order false belief tasks, second-order false belief tasks, and MoToM tasks (i.e., separate from our moral reasoning task; drawn from Sobers, Andrews, Jerome, Halliday & Kamawar, 2018). I would have then conducted analyses to determine whether false belief understanding, as well as intention accuracy, mediated the relation between social anxiety and moral reasoning. Children's PPVT scores would have been used to control for general language ability.

### **Hypotheses**

My first set of hypotheses focused on the relation between social anxiety and moral judgment. Previous research has shown that children high in anxiety are less accurate at interpreting intention when the outcome is negative and the act is either unintentional (Bell-Dolan, 1995) or ambiguous (Dineen & Hadwin, 2004), as they are more likely to interpret them as intentional. Therefore, if they view these acts as intentional and the outcome is negative, then it is also likely that moral judgment and punishment scores will also be related to social anxiety. I predict significant partial correlations, controlling for age and language, between social anxiety and moral reasoning variables. More specifically, I predicted that for the ambiguous and intentional stories:

- a) Social anxiety would be significantly and negatively correlated with moral judgement scores, when controlling for age and language.

b) Social anxiety would be significantly and positively correlated with intention accuracy/ interpretations (higher scores indicate intention questions were more often responded 'on purpose') and punishment scores when controlling for age and language.

And for the Intentional stories:

c) Social anxiety (higher scores indicate intention questions were more often responded 'on purpose') would be significantly and positively correlated to interpretations of whether the character intentionally upset the other character (intention-emotion question; there is no story information that clearly states intention information about bringing about an emotional outcome), after controlling for age and language. However, it is hypothesized that social anxiety will not be significantly correlated to any of the other moral reasoning dependent variables in this condition as the intention of the action itself is clear and in line with the outcome (i.e., both the intention and the outcome are negative).

The second set of hypotheses are that the MoToM will be a better predictor of social anxiety than the standard false belief tasks, More specifically, I predict that MoToM will be a better predictor as this task involves emotions embedded in a moral context, whereas as the standard false belief task is centred around an object and less focused on how a character's actions and false beliefs affect the emotions of another. Research has shown that ToM tasks that involve more emotion are negatively related to social anxiety whereas standard false belief tasks are generally not related (Banerjee & Henderson,

2001; Colonnesi et al., 2017). The specific hypotheses are as follows, when controlling for age and language:

- a) MotoM would be a significant predictor above and beyond the first and second-order false belief tasks.
- b) Standard first and second-order false belief tasks would not significantly predict social anxiety above and beyond MoToM.

The third set of hypotheses examine ToM and intention accuracy/interpretation as mediators to the relation between social anxiety and moral reasoning, and aims to test some of the initial steps in the conceptual model presented above (Figure 1). I predict that ToM and intention accuracy/interpretation will both mediate the relation between social anxiety and the moral reasoning dependent variables (punishment and moral reasoning scores). I predict that there will be a serial mediator effect wherein the first mediator, ToM ability, will affect the second mediator, intention accuracy/interpretation. Therefore, the specific hypotheses are as follows:

- a) The specific indirect effect through the mediators in serial ( $M_1 = ToM$   $M_2 =$  intention accuracy/interpretations) would be significant, in the accidental and ambiguous moral reasoning conditions.
- b) For the ambiguous and accidental conditions, no other direct or indirect effects would be significant while the indirect effect of serial mediation is included in the model. Therefore, I expect a full serial mediation effect.
- c) As stated above, I predict no correlations will be found for the moral reasoning variables in the intentional condition (with the exception of responses to the intention-emotion question), therefore the intentional

condition would not be included in analyses for these hypotheses and I would predict no significant indirect or direct effects.

The fourth set of hypotheses focus on age-related differences in moral reasoning ability. Research has found a developmental shift from outcome-based to intent-based moral reasoning throughout the preschool period (Armsby, 1971; Berndt & Berndt, 1975; Cushman et al., 2013; Nelson, 1980; Nobes et al., 2016). Therefore, I hypothesize that:

- a. The five and six-year-old children's ratings of punishment will be more negative and their ratings of moral judgment will be more positive, than will the four-year-olds' ratings in the stories where the action is accidental; and
- b. There will be no age-related differences in the intentional condition as the intention will not be in conflict with the outcome.

## **Method**

### **Participants**

I had planned to recruit 80 four- to six-year-old children from daycares in the Ottawa area. I had also planned to add New Brunswick as a data collection area and would have recruited participants from schools and daycares. I planned to obtain informed consent from the daycares and schools<sup>3</sup> as well as the parents of participating children. I would have asked children for verbal assent before beginning testing sessions and the child would have been informed that they may withdraw participation at any time. If a child ever appeared uncomfortable, the testing would have been discontinued.

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<sup>3</sup> New Brunswick would have been added as a data collection area in a change-to-protocol form for my approved ethics application. I had begun contacting school boards in NB to determine what protocols they had regarding research and data collection.

With teacher approval, each child would have been given stickers after each testing session and additional stickers would have been provided for any members in their class who did not participate in the study. The participating daycare or school classroom would have received an age-appropriate book after all the participants from their facility finished testing to thank them for their participation.

I was able to recruit 19 adult participants by word-of-mouth and adapting the adult methods to be done over the phone and using PowerPoint. This sample provides an adult comparison on the moral judgment task in order to ensure that the stories and questions elicit the expected responses. Adults are expected to be accurate on all intention questions and to make moral judgments and assign punishment in line with the intention for each story, therefore it is expected that moral judgments will be more negative for the intentional condition, trend toward neutral in the ambiguous condition, and be more positive for the accidental condition. Assignment of punishment is expected to be greater for the intentional condition, lower for the ambiguous condition, and the lowest in the accidental condition.

### **Procedure**

Each child would have received two one-on-one testing sessions with a researcher in a quiet space of the daycare or school. Each testing session would have lasted 15 to 20 minutes and all tasks would have followed a fixed order as this is standard practice used to keep the procedure consistent for all participants in order to examine individual differences (see Carlson & Moses, 2001). The first session would have included: a familiarization trial for the moral judgment task, two stories from the moral judgment task, first-order false belief tasks and two additional moral judgment stories. The second

session would have included: second-order false belief tasks, two stories from the moral judgment task, morally relevant ToM tasks, and a receptive vocabulary measure (PPVT).

### **Familiarization Trial**

All child participants would have first received two familiarization stories, accompanied by pictures to familiarize them with the types of moral judgment and punishment questions that will be used in the main stories task. This trial would have also allowed us to determine whether the children could answer questions both in the positive and negative, and whether they were able to correctly evaluate characters engaging in ‘good’ and ‘bad’ actions in straightforward scenarios. Additionally, the familiarization trial would have allow us to ensure that the participants were able to comprehend the stories at the appropriate level to be able to complete the main stories tasks.

These familiarization stories depict a character who performs a stereotypically ‘good’ or ‘bad’ action (Andrews, 2015; see appendix A). As an example, in the good story children would have heard “This is Harper and this is Morgan. Harper is drawing a picture with her crayons. Then she sees that Morgan doesn’t have anything to colour with so Harper decides to share her crayons with Morgan. Now Morgan can draw a picture.” (p. 36). Children would have then been asked a series of questions: comprehension questions, (“Were they eating a snack? Did Harper share her crayons with Morgan?”, p. 36); moral judgment questions (“Think about Harper. Was Harper being good? Was Harper being bad?”, if ‘yes’ for either, it is followed with, “How good/bad? A little or a lot?”, p. 36); and punishment questions (“Think about Harper. Should Harper get in trouble?” If ‘yes’, this is followed with, “How much? A little or a lot?”, p. 37). If

children answered the comprehension questions incorrectly than they would have been given feedback and the relevant story details would have been repeated (this happens twice). Testing would then continue even if they answered incorrectly.

### **Moral Judgment Task**

The stories were modified from Gardiner & Kamawar (2018) to fit the goals of the current study. In total, there are six trials, consisting of two stories per intention type. All stories were matched in terms of outcome (negative) and accompanied by photos of dolls enacting the situation. Only one type of outcome was included in order to reduce the number of stories. Negative outcomes, as opposed to positive or neutral, were chosen because based on the literature review looking at interpretations of intentions and threat biases in relation to anxiety (Barrett et al., 1996; Bell-Dolan, 1995; Dineen & Hadwin 2004; Muris, Luermans et al., 2000; Muris, Merckelbach, et al., 2000), it is expected that those high in social anxiety may differ from those low in social anxiety when a situation can be viewed as negative or threatening. Two of the stories involve characters who acted intentionally, two include characters who acted unintentionally, and two involve actions for which the intention was ambiguous as no clear intention information was given. There are six different story themes (i.e., contents) and no child would have heard two stories with the same theme (Appendix B). This was done as to not confound story content with intention type.

The order in which the stories would have been presented would have varied across participants. There are two orders in which the story themes would have been presented. Within each order there are three combinations of story theme crossed with intention information such that all story themes appear in every intention condition across

participants. Further, within the combinations the order of the intention conditions would have varied across participants (see Appendix H). See Table 1 for a sample story task and questions.

The structure of the stories are identical. In all stories, the main character is first introduced and then described as engaging in an action. Then a second character is introduced with a description of what they are doing. Following this, information of the first character's intention is given. In the intentional condition, it is made clear that the first character is aware of the second character and wants to engage in an action that will cause a negative outcome for them. In the unintentional condition, it is made clear that the first character is not aware of the second character and the outcome is not intentional.

Table 1

*Moral Judgment Task Story Examples with Questions*

<b>Components</b>	<b>Water Hose Story: Intentional</b>	<b>Water Hose Story: Accidental</b>	<b>Water Hose Story: Ambiguous</b>
<b>Introduction of Main Character in Story Context</b>	Karli is playing with a hose in her backyard and splashing water around	Karli is playing with a hose in her backyard and splashing water around.	Karli is playing with a hose in her backyard and splashing water around
<b>Introduction of Secondary Character</b>	This is Sam. Sam is playing in her backyard.	This is Sam. Sam is playing in her backyard.	This is Sam. Sam is playing in her backyard.
<b>Intention Cue</b>	Karli sees Sam and wants to splash her with water	Karli does not see Sam. Karli just wants to keep splashing water.	Karli is looking at the hose.
<b>Outcome of Action</b>	Look some of the water went over the fence and splashed Sam	Look some of the water went over the fence and splashed Sam	Look some of the water went over the fence and splashed Sam
<b>Negative Emotional Outcome</b>	Sam is sad, now she has to get dry clothes.	Sam is sad, now she has to get dry clothes.	Sam is sad, now she has to get dry clothes.
<b>Comprehension Question</b>	1a) Think about Karli. Was she in her own backyard? 1b) Think about Sam. Did Sam get splashed with water? 1c) Was Sam happy or sad about getting splashed with water?	1a) Think about Karli. Was she in her own backyard? 1b) Think about Sam. Did Sam get splashed with water? 1c) Was Sam happy or sad about getting splashed with water?	1a) Think about Karli. Was she in her own backyard? 1b) Think about Sam. Did Sam get splashed with water? 1c) Was Sam happy or sad about getting splashed with water?

<b>Intention Question</b> <b>[Intention Block]</b>	2a) Did Karli get water on Sam on purpose or by accident? 2b) Did Karli make Sam sad on purpose or by accident?	2a) Did Karli get water on Sam on purpose or by accident? 2b) Did Karli make Sam sad on purpose or by accident?	2a) Did Karli get water on Sam on purpose or by accident? 2b) Did Karli make Sam sad on purpose or by accident?
<b>Moral Judgment Question</b> <b>[Moral Judgment Block]</b>	3a) Was Karli being good? If Yes: How good? A little or a lot? 3b) Was Karli being bad? If Yes: How bad? A little or a lot?	3a) Was Karli being good? If Yes: How good? A little or a lot? 3b) Was Karli being bad? If Yes: How bad? A little or a lot?	3a) Was Karli being good? If Yes: How good? A little or a lot? 3b) Was Karli being bad? If Yes: How bad? A little or a lot?
<b>Punishment Question</b> <b>[Punishment Block]</b>	4a) Should Karli get in trouble? If yes: How much trouble? A little or a lot?	4a) Should Karli get in trouble? If yes: How much trouble? A little or a lot?	4a) Should Karli get in trouble? If yes: How much trouble? A little or a lot?

In the ambiguous condition, no information about knowledge or intention is given. The first character's action and the resulting negative outcome for the second character are then described (this is the same for all intention types). Finally, the negative emotional effect of the action on the second character is described. It is also important to note that the intention information in the intentional stories is specifically about bringing about a particular physical outcome, and does not specify that the transgressor meant to upset the other character (i.e., bring about an emotional outcome), however the intention of the action (e.g., spraying them with water) and outcome of this action (e.g., they get sprayed with water and are wet) are clear. Likely the intention regarding the other character's emotion will be in line with the intention of the action, however there may be more variability in responses when asking about the intention regarding the other character's emotional state as the information presented does not clearly indicate this. This would likely only be the case for participants with more mature moral reasoning, such as the adult sample, as they would be more sensitive to intention information. For a complete list of stories with all cue options, and example photos, see Appendices B and C. After each story children would have been asked a series of questions. The first questions would have checked comprehension to ensure relevant story details were understood and if any were answered incorrectly than the relevant details would have been repeated, and the question will be asked again. This would have been repeated up to three times, after which testing would have continued, though data for that story would not have been analysed for that child as it would not have been clear that they understood the story.

I would have then asked questions regarding the main character's intention (many drawn from Gardiner, 2017). The child would have been asked about the intention of the act, such as "Did Karli splash the water in her backyard on purpose or by accident?" and "Did Karli get water on Sam on purpose or by accident?" (p. 123). They would have also been asked intention questions regarding the emotional reaction of the second character, such as "Did Karli make Sam sad on purpose or by accident?" (p. 123). The order of the options 'on purpose or by accident' would have been counterbalanced across participants. For each question, children would have received a score of one if they answered 'on purpose' and 0 if they answered 'by accident'. Each story of the same type would have been summed out of two for each intention question. A score of two on either intention question would indicate that the participant responded 'on purpose' to that question in both stories of the same type. A score of one would indicate in one story the participant responded with 'on purpose' while in the other they responded with 'by accident' and a score of zero would mean that they chose 'by accident' in both stories on the given intention question (either intention-action or intention-emotion. A score of 0 on both intention questions in the accidental condition would mean the child was accurate in their interpretation of intention. The ambiguous condition does not have a correct or incorrect answer to the intention questions. A score of two in the intentional condition for the intention-action question would mean the child was accurate. The intention-emotion question does not have a clear correct or incorrect answer.

All children would have received the comprehension and intention questions (in that order) before being asked to make moral judgments and assign punishment. The order of the moral judgment and punishment questions would have been counterbalanced

between participants with half receiving the moral judgment block first and half receiving the punishment block first.

The moral judgment questions are as follows: (1) “Was Karli being good?”, if answered affirmatively, the following will be asked “How good? A little or a lot?” (Gardiner, 2017, p. 123); and (2) “Was Karli being bad?”, if answered affirmatively, it will be followed with, “How bad? A little or a lot?” (p. 123). The order of the ‘good’ versus ‘bad’ questions would have been counterbalanced across participants, with half receiving ‘good’ first and half receiving ‘bad first’.

Children’s answers on the good moral rating question would have been scored from 0 (‘no’ to the good question) to 2 (‘yes’ to the good question, followed by a rating of ‘very good’). Their answers to the bad moral rating question will be scored from 0 (‘no’ to the bad question) to -2 (‘yes’ to the bad question, followed by a rating of ‘very bad’). These scores will then be summed, yielding moral ratings ranging from -2 to 2 for each story, and stories of the same intention type would be summed for a total score ranging from -4 to 4 for each intention condition (e.g., the moral rating scores for the two intentional stories would have been summed, etc.). It is worth noting that children’s ratings could have yielded neutral ratings (i.e., of 0). These scores would have been used in the analyses.

The punishment question would have involved asking children whether the main character should get in trouble; for example, “Should Karli get in trouble?”. If children answered in the affirmative, they would have then heard, “How much trouble, a little or a lot?” (Gardiner, 2017, p. 123). This would have resulted in punishment ratings varying

from 0 (no punishment) to 2 (a lot of punishment). A summed punishment rating ranging from 0-4 each story type would have been computed and used in the analyses.

### **First-order false belief.**

Participants would have received two first-order false belief tasks (see Appendix D). The first would have been a change of location task adapted by Vendetti, Kamawar, and Andrews (2019) from Wimmer and Perner (1983). For this task children would have been told a story about a character who leaves an object in one location which is then moved to another location by a second character without the first character's knowledge. As an example: "Jill was playing with a ball. When she was done playing with it, she put it in the white box and then she went outside (...) While Jill was outside, her friend Peter came along. Peter found the ball in the white box and he played with it for a while. When he was done, he put it in the polka dot box and then he went home for lunch." (Vendetti et al., 2019, p. 827). The children would have then been asked a memory question about where the object was placed by the first character, and then a reality question about where the object is currently located. Finally, the children would have then been asked a question regarding the false belief of the first character: "Look Jill is back and she wants to play with that ball again. Where will Jill first look for the ball?" (p. 827). Children would have received a score of one if all three questions are answered correctly, otherwise they would have received a 0.

The other first-order false belief task would have been an unexpected contents task adapted by Vendetti et al. (2019) from Gopnik and Astington (1988). In this task children would have been shown a cardboard Crayola box and asked what they thought was inside. A researcher would have then opened the box revealing a toy pig, instead of

the expected crayons and would have said: “Look at that, it’s really a pig inside!” (Vendetti et al., 2019, p. 827). The researcher would have then placed the pig back inside the box, closed the lid and asked the child: “What is in the box?” (reality question, p. 827) and “What did you think was in the box, before we opened it?” (false belief-self, p. 827). Finally, children would have been asked about what another child will think when they are shown the box, namely, “What will s/he think is inside the box before s/he opens it?” (false belief-other, p. 827). If the reality questions were answered correctly, then the child would have received a score of one for each false belief question answered correctly. The scores across the two tasks would have been summed for a total first-order false belief score ranging from 0-3. This score would have been used in the analyses.

### **Second-order False Belief**

Children would have received two second-order false belief tasks (Appendix E; Loke, 2010; Sullivan et al., 1994; Vendetti et al., 2019). In the first task children would have heard a story in which two characters know the true location of an object that has been moved, however, one character has a false belief about the knowledge the other character has of the location of the object. For example:

Molly and Andrew are doing their homework in the kitchen. Molly made some cookies for them to share. Andrew wants to eat the cookies now, but Molly doesn’t want to. Molly needs to ask her dad a question about her homework. She puts the plate of cookies in the fridge and leaves the room. While Molly is gone, Andrew gets the plate of cookies and eats one of them. Then he puts the plate of cookies in the cupboard. Molly is finished asking her dad a question

and she comes back. She sees Andrew putting the plate of cookies in the cupboard. Molly watches Andrew, but Andrew does not see Molly. (Gardiner, 2017, p. 48).

After hearing the story children would have been asked memory questions about where the object was initially and where the object actually is. Children would have then been asked about one character's first-order beliefs: "Does Molly know where the cookies are now?", and the second-order false belief question "Where does Andrew think Molly will look for the cookies?" (p. 48). If the child answered all the questions correctly than they would have received a score of one, otherwise they would have received a 0.

The second task would have followed the same structure and scoring as the first, but the theme and character names would have been different (see Appendix E). The scores from these two tasks would have then been summed, thus the scores for second-order false belief would have varied from 0 to 2. This score would have been used in the analyses.

### **Morally Relevant Theory of Mind**

Participants would have received two morally relevant ToM false-belief tasks following identical structures and scoring (Appendix F). These tasks were from Sobers, Andrews, Jerome, Halliday and Kamawar, (2018). In these tasks children are told a story with accompanying pictures about a character who throws out what they think is just trash (false belief), but actually contains an object that is important to another character (modified from Killen et al., 2011). For example, in one story they hear:

Zach and his brother Adrian are having popsicles together at a birthday party.

After they're done eating them, they sit down at the craft table to make a craft.

Zach and Adrian each wrap their finished popsicle sticks into a napkin to throw in the garbage later. Adrian gets up to go to the bathroom. While Adrian is gone, Zach finishes his craft and decides to use his napkin to keep it safe. So, he takes out the popsicle stick and wraps his craft inside. Then Zach leaves to go put his popsicle stick in the garbage. While he's gone, Adrian comes back from the washroom and goes back to the craft table. He gets his wrapped popsicle stick to throw it in the garbage. Adrian notices Zach's napkin on the table, and wants to help tidy up, so Adrian grabs it and throws it in the garbage too." (Sobers et al., 2018).

After hearing the story children would have been asked about the false belief of the character who throws away the object ("What did Adrian think was in the napkin?") and about reality ("What was really in the napkin?"). The child would have needed to answer both of these questions correctly to receive a score of 1, otherwise they would have received a 0. They would have then been asked about where the other character will look for his object ("Where will Zach first look for his craft when he comes back?") and where the craft really is ("Where is his craft?"; Sobers et al., 2018) and once again would have received a one if both questions were answered correctly and a 0 if any were answered incorrectly. These would have then been summed for a MoToM False belief score ranging from 0 to 2. Performance on the two tasks would have then been summed for a total MoToM false belief score ranging from 0 to 4, to be used in analyses.

### **Preschool Anxiety Scale – Social Anxiety Subscale**

The parents of the participating children would have received the social anxiety subscale of the preschool anxiety scale (parent report; Appendix G; Spence et al., 2001).

This subscale consists of 6 items from the preschool anxiety scale, and parents would have been asked to rate how well each item describes their child on a 4-point scale with 0 being not true at all and four being very often true. The items would have then been summed to create a social anxiety score ranging from 0 to 24. This score would have been used in the analyses.

**Peabody Picture Vocabulary Test – Fifth Edition (PPVT-V; Dunn, 2019).**

Given that general language ability would have been used as a control, and not for diagnostic purpose, an abbreviated version of the PPVT-V would have been administered to reduce testing time (Skwarchuk, Sowinski, & LeFevre, 2014 as cited and used in Vendetti et al., 2019). All children would have started at the starting point for five-year-olds (item 26) and testing would have gone as instructed by the testing manual. This task is a standardized measure of receptive vocabulary and consists of presenting children with four pictures on a single page and asking them to indicate which picture best fits a word said by the researcher. Each word said by the researcher corresponds to a new page of four pictures. Children would have received multiple practice trials and feedback if needed, and regardless of performance on these practice trials, children would have proceeded with testing beginning at item 26. The words are organized into blocks of about twelve items with each new block increasing in difficulty. If basal is not reached in the block for five-year olds than the researcher would have gone to the block for four-year-olds as a starting point. The task would have been stopped when the child makes eight or more errors in a single block or reached the block for ages 14 to 16 years 11 months. Children's scores would have been calculated by subtracting the number of

errors from the highest numbered item administered. This score would have been used in the analyses.

### **Planned Analyses**

#### **Unexpected Circumstances**

In February, I received ethics clearance to begin this study (CUREB-B, #112222, Appendix M). I began recruitment at a number of daycares in the Ottawa area, with consent forms sent out and recruitment about to begin. However, everything was shut down due to SARS-CoV-2. Given the situation, and the necessary social distancing measures put in place, it was not possible to test participants, and therefore not possible to run the planned analyses. It is worth noting that the proposed study will be completed by Deepthi Kamawar's lab as soon as it possible to directly interact with participants again. In addition, the planned methods and analyses will be pre-registered with OSF after receiving feedback from the thesis defense. Given the current situation, the Chair of Psychology (Dr. Joanna Pozzulo) and the Graduate Supervisor of Psychology (Dr. Michael Wohl) both indicated to my supervisor (Dr. Deepthi Kamawar) that I could proceed with my thesis by examining the potential interpretation for finding, and failing to find, support for my hypotheses (see Appendix I for screenshots of the department approval emails). The results and discussion sections are in line with this plan.

#### **Preliminary Analyses**

Before testing the hypotheses, preliminary analyses would have been conducted to check for significant gender or order effects in the moral reasoning stories task. To test for this, I would have run a mixed-design MANOVA to see if there were any significant story order, question order, story theme, or gender effects. Before running the analyses, I

would have, first checked the required assumptions. In addition, when checking assumptions for each set of analyses, sensitivity analyses would have been conducted to determine if the pattern of results differed after addressing violations in assumptions or potential outliers. In addition, if outliers were found to be influential in any analyses, then I would have winsorized the data. This involves replacing outliers with the next highest score that is not an outlier. Specifically, I would have replaced influential outliers with a score that is three standard deviations away from the mean (Fields, 2013, p.198). This would have therefore maximized power as cases would not have been excluded.

**Assumptions.** To begin, in order to meet the assumption for multivariate normality, I would have checked P-P plots and run Kolmogorov-Smirnov tests for the residuals of each dependent variable. This would have checked for univariate normality of the residuals which is a condition that must be met to achieve multivariate normality (Fields, 2013, p. 642). In addition, I would have collected roughly equal sample sizes for each between-subjects condition and I would have collected a large enough sample size to ensure the between-subjects error terms had at least 20 degrees of freedom, or at least a total N over 40 and at least 10 participants per group, as this would have ensured robustness to violations of multivariate normality (Tabachnick & Fidell, 2013, p. 253).

Following this I would have tested for homogeneity of covariance by running a Levene's test of homogeneity of variance within each of the dependent variables used in this analysis (story/intention cue orders, gender, age). If the groups had equal sample sizes than the analysis would be robust to violations of this assumption. If I was not able to collect equal sample sizes and found violations in either multicollinearity or homogeneity of covariance, then I would have equalized sample sizes by random deletion

of cases in groups (or cells) with larger sample sizes as long as the samples were large enough to maintain power (Tabachnick & Fidell, 2013, p. 254). Sensitivity analyses would have then been run to determine if the pattern of results was the same with and without the random deletion of cases. If it were to be the same than the original sample size would be included in the analyses. In addition, I would have used Hotelling's  $T^2$  statistic if there were violations to homogeneity of covariance for any of the variables with only two groups and with roughly equal sample sizes, as it would ensure robustness to this assumption (Fields, 2013, p.643). Finally, I would have checked for sphericity in the within-subjects (intention cue condition) variable by running Mauchly's test. If sphericity were to be violated than I would have used the Bonferroni method to control for type 1 error (Fields, 2013, p.547). If these planned analyses would not have accurately addressed violations of assumptions, then alternate analyses would have been considered.

**Preliminary mixed-design MANOVA.** The mixed-design MANOVA would have consisted of four dependent variables (Intention-emotion, intention-action, moral judgement and punishment scores). The independent variables would have included intention cue condition (intentional, ambiguous, accidental) as a within-subjects variable, and four between-subjects variables capturing the different story/question orders, as well as gender (Male, Female), and age (four, five, and six years). The four story/question order variables would have included: (1) whether participants heard the moral judgment question before or after the punishment question; (2) whether the participants were asked if the character was 'being good' before or after being asked if the character was 'being bad'; (3) whether the intention question phrasing used 'on purpose' or 'by accident' first; and (4) finally, the order in which the participant received the stories (there were two

possible story theme orders in which each had three different intention cue order combinations). This analysis would have tested for any main effects of gender and story/question orders, as well as checking for interactions between these variables, and between these variables and intention cue condition, or age group. Significant interaction effects would have shown whether only certain order combinations significantly differed from the rest, whether only certain intention cue conditions or age groups had order effects, whether order effects differed by gender, whether intention cue condition or age significantly differed by gender, or any other more specific order or gender effects that a main effect analyses would not reveal. If any main effects or interactions were significant for gender or story theme/intention cue condition order, then they would have been included in the main analyses. More specifically, if a main effect of gender was found then it would have been included as a variable of interest (between-subjects), whereas if there was a main effect of story order or any significant interaction involving story order then it would have been included as a control variable in the main analyses. Wherever appropriate, the data would have been collapsed for the main analyses.

### **Adult Sample**

In addition, adult responses on the moral reasoning tasks would have been compared to child responses to ensure that the questions and stories used elicited the expected responses from a population with mature moral reasoning ability. The adult sample included 19 friends and relatives with ages ranging from 18 to 64 years (nine female). None of these adults were aware of the specific details of the study before participating. Table 2 includes the means and standard deviations for each moral

Table 2

*Means and Standard Deviations for Adult and Child Performance on the Moral Reasoning Task*

Dependent Variable	Intention cue condition					
	Intentional		Accidental		Ambiguous	
	Adult	Child	Adult	Child	Adult	Child
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Intention – Action (0-2)	2.00 (0.00)		0.05 (0.23)		0.16 (0.37)	
Intention – Emotion (0-2)	1.05 (0.85)		0.05 (0.23)		0.16 (0.37)	
Moral Judgment (-4 to 4)	-1.89 (1.66)		1.26 (1.79)		1.21 (1.62)	
Punishment (0-4)	2.21 (0.98)		0.47 (0.84)		0.47 (0.77)	

N = 19

reasoning variable in each condition for the adult participants. It is important to note that higher scores for the intention variables indicate a higher likelihood of interpreting intention as 'purposeful'. This table would have also included the means and standard deviations for the child participants had their data been collected.

In the intentional condition adults were expected to accurately interpret the intention of the act as purposeful, to rate moral judgements lower than in the other conditions, and to rate the punishment higher than the other conditions. The means in Table 2 generally follow this pattern. The mean responses to the intention-emotion question were around the mid-point of the range (0-2). This is as expected as the stories did not contain information about whether the character purposely wanted to make the other character upset or whether they knew the act would upset the other character. Therefore, participants were more varied in their responses.

For the accidental condition, almost all the adults accurately interpreted the intention of the act and the intention regarding emotion, as accidental. Only one participant on one of the accidental stories, responded with 'purposeful' to the two intention questions. When looking at Table 2, it is clear that the mean moral judgement rating was positive and higher, and the punishment score lower, in the accidental condition than the intentional condition which was as expected. Finally, adult mean responses for the ambiguous condition seemed to be quite similar to responses for the accidental stories.

As this was the only data I was able to collect, I decided to run a one-way repeated measures MANOVA to get a general idea about the pattern of results comparing the adult participants' responses across the intention cue conditions. However, it is

important to note that the adult data violated the assumptions for this analysis as the variability was very low in most cases and almost all variables violated normality at  $p < .001$  when running Kolmogorov-Smirnov tests. Mauchly's test of Sphericity indicated that responses to the Intention-action and Intention-emotion questions violated sphericity,  $X^2(2) = 0.54, p = .005, X^2(2) = 0.393, p < .001$ . As the purpose for these analyses was to get a general idea of adult responses, I decided to continue with the analysis. Therefore, these analyses were conducted to get an idea of possible condition differences and as an addition to the preliminary check of the story conditions, and should be interpreted accordingly. Greenhouse-Geisser was used when reporting the results as it is more robust to violations of sphericity.

The omnibus test indicated significant differences between conditions, for intention-action,  $F(1.37, 24.64) = 338.87, p < .001, \eta^2 = .95$ , intention-emotion,  $F(1.25, 22.40) = 17.41, p < .001, \eta^2 = .492$ , moral judgement,  $F(1.61, 29.03) = 35.83, p < .001, \eta^2 = .666$ , and punishment ascriptions,  $F(1.80, 32.24) = 32.56, p < .001, \eta^2 = .644$ . Post-hoc analyses were then conducted and the pattern of results suggested that for responses to both types of intention questions, participants were more likely to respond 'by accident' in the ambiguous and accidental conditions compared to the intentional condition, all  $p < .001$ . In addition, moral judgement ratings were significantly lower and punishment ascriptions were significantly higher in the intentional condition than both the accidental and ambiguous conditions, all  $p < .001$ . The results did not suggest any significant differences between the ambiguous and accidental conditions.

Overall, the pattern of results depicted by the means in Table 2 and the exploratory repeated-measures MANOVA suggest that the intentional and accidental

stories seem to be clear to adults. For these two intention cue conditions only one participant was inaccurate in their response to the intention-action question in only one of their stories. In addition, there was a significant difference in moral judgement ratings and ascriptions of punishment when comparing the intentional and accidental condition and the mean moral judgement rating and punishment score are in line with what is expected across these two conditions. The ambiguous stories seem to be interpreted very similarly, and follow a similar pattern of results, to the accidental stories. The pattern of results suggests that the adult responses to these two conditions do not significantly differ. However, when selecting a response to the intention question, some participants indicated they would have responded with “I don’t know” if given the option, and/or had a harder time choosing an answer, in the ambiguous condition. Thus, adults seemed to interpret the ambiguous stories as accidental when given a forced choice. However, this data is only descriptive, and the analyses must be interpreted with caution as the assumption of normality was significantly violated. It would be important to examine a sample of child responses to this task to determine how they interpret the ambiguous task.

### **Main Analyses**

**Hypotheses Set 1.** The first set of hypotheses included predicted relations between social anxiety and the different moral reasoning variables by condition. The predictions were that social anxiety would be related to lower moral judgements, higher punishment ratings and a higher likelihood of interpreting the intention as purposeful in the ambiguous and accidental condition and, for the intentional cue condition, only a significant positive relation would be found for responses to the intention-emotion question (higher likelihood of responding with ‘on purpose’). It was predicted that the

other variables in the intentional condition would not be significantly related to social anxiety. To test these hypotheses, I would have run partial correlations controlling for age (in months) and language. Before running these analyses, I would have checked that all assumptions were met.

**Assumptions.** To begin, I would have checked for the assumption of linearity by examining the scatterplots for each pair of variables to check whether the data appeared to have a linear relation and to note potential outliers. Sensitivity analyses would have been conducted with and without the outliers to determine if they produced the same pattern of results and influential outliers would have been winsorized. If any relation between variables clearly did not appear to be linear than they would not be included in these analyses. I also would have examined zero-order correlations between each pair of variables I plan on testing, to examine their relations when not controlling for language or age, and to inform whether they should be included in the partial correlation analyses. I would have then checked for normality by examining histograms, identifying and winsorizing univariate outliers, and running Kolmogorov-Smirnov tests for each variable included in these analyses. However, with larger sample sizes these analyses are more robustness to assumptions of normality (Tabachnick & Fidell, 2013). If the assumption of normality was significantly violated than I would have used bootstrap confidence intervals as these are more robust to violations of assumptions (Fields, 2013).

**Partial Correlations.** Unless excluded when checking the assumptions, I would have run a correlational analysis which included the variables of interest. This would have allowed me to examine the 12 partial correlations of interest, namely the relations between social anxiety and each moral reasoning dependent variable (responses to the

intention questions, moral judgment ratings and punishment scores), separately for each condition (accidental, intentional and ambiguous). Age (in months) and general language ability (PPVT-V) would have been included as control variables. As the hypotheses and analyses were planned ahead of time (i.e., a priori predictions), to control for family-wise error without being too conservative, I would have simply used a more stringent critical  $p$ -value of .01 to indicate a significant difference. Results in support for this first set of hypotheses, would have shown that: for the accidental and ambiguous condition, social anxiety would have been significantly and positively related to responses to both intention questions (greater likelihood of responding with ‘on purpose’) and moral judgment ratings, whereas the relation between social anxiety and punishment scores for these conditions would have been significant and positive. In addition, even in the intentional condition, social anxiety would have been significantly and positively related to responses to the intention-emotion question as there were no clear cues in any of the stories regarding whether the main character meant to upset the other character. Further, there would have been no significant differences in the intentional cue condition between social anxiety and responses to the intention-action question, moral judgement ratings or punishment scores as the intention of the action leading to the outcome was clearly stated.

However, as an alternate pattern of findings, I could have found significant relations between social anxiety in the intentional cue condition: positive partial correlations for responses to the intention-action and punishment scores, and a negative partial correlation for the moral judgement ratings. These potential results may indicate

that even in the matched intention outcome stories, children with social anxiety are more sensitive to threat or negative aspects and thus answered the questions accordingly.

Another alternative would have been findings of non-significance between some of, or all, the variables in any condition. This would go against the hypotheses and could suggest social anxiety is not related to moral reasoning or that our tasks and measures were not able to capture a significant relation due to how I operationalized the constructs. Another possibility for this pattern of results could be issues with power if I were not able to attain a diverse range of social anxiety scores. If no relations were found during these analyses, this may have affected the mediation analyses (third set of hypotheses) as there would have been no significant relation between social anxiety and moral reasoning variables. This set of analyses would have been excluded in this case and analyses would have been more focused on relations between ToM and moral reasoning, and ToM and social anxiety, separately. If zero-order correlations were significant, but partial correlations were not, another alternative analysis could have been to examine whether age has a moderation effect on the relation between social anxiety and moral reasoning as social anxiety symptoms can differ over development. It would have also been possible to find a pattern of results where social anxiety is significantly related to moral reasoning, but in the opposite direction than those predicted. This would partially support the hypotheses regarding significant relations between social anxiety and moral reasoning but would contrast the specific predictions made.

**Hypotheses Set 2.** The second set of hypotheses focused on which theory of mind task was a better predictor of social anxiety. It was predicted that the MoToM would be a significant predictor above and beyond the other standard ToM tasks and that these

standard tasks would not significantly predict social anxiety above and beyond the MoToM. To test these hypotheses, I would have run a set of hierarchical regressions controlling for language and age (in months), including the MoToM, first-order, and second-order theory of mind scores as predictors with social anxiety as the outcome variable. In addition, these analyses would have helped to inform which ToM variable should be included as a mediator in the mediation analyses (third set of hypotheses). Before running the hierarchical regression, I would have first checked the assumptions pertaining to hierarchical regression analyses.

**Assumptions.** I would have examined zero-order correlations between all variables used in these analyses to examine their bivariate relations. I would have examined scatter plots for each predictor with the dependent variable as well as each predictor with every other predictor to ensure the relations between variables were linear. I would have also saved the standardized residuals and unstandardized predicted values for a preliminary regression with all variables included. To check for constancy of variance I would have examined scatter plots of the residuals against the predicted values, as well as the residuals against each predictor. If the variance did not appear constant then I would have run the Brown-Forsythe tests, which is a modification of the Levene's test, in order to determine if the variance significantly differed depending on the value within each predictor variable. To check the assumption of normality, I would have examined the normal Q-Q plot and Kolmogorov-Smirnoff test of the residuals. In addition to the residual plots, I would have looked at a box plot of the residuals to identify potential outliers. To assess the magnitude of the influence of any potential outliers and to determine whether they should be winsorized, I would have used Cook's distance values

and examined their corresponding percentiles from the  $F(5, n-5)$  distribution with an alpha of .05 (Kutner et al., 2005, p. 404) and conduct sensitivity analyses. I would have checked the strength of the zero-order correlations between predictors, as well as the variance inflation factors for all target variables to check for multicollinearity. If the data was either nonlinear, not normal, or did not have constancy of variance, then I would have determined if applying transformations to the outcome variable and/or any predictor variables, would have remedied these violations of assumptions and run sensitivity analyses to determine if the pattern of results differed after transforming the variables. Chosen transformations would be dependent on which of these assumptions were violated and the shape and direction of the data (Kutner et al., 2005, p. 129 - 134). If this did not address the violations than I would have used bootstrapped confidence intervals to increase the robustness of the regression analyses (Fields, 2013). To address potential violations of multicollinearity, if any predictor variable other than the MoToM was found to be a highly multicollinear variable, than I would have considered removing it from the analyses. If two variables were too highly correlated than I would have removed one from the analyses based on aspects such as the importance of the predictor in the analyses, the reliability of the data collected and the strength of the relation to social anxiety. If these planned analyses did not address violations of these assumptions, then I would have considered alternate analyses.

**Hierarchical Regressions.** Table 3 includes all the planned hierarchical regressions including which variables are entered on each step. A critical p-value of .01 would have been used for more conservative significance testing of the 12 planned regression analyses. Within each analysis I would have compared the changes in R-

squared to determine which ToM task contributes the most unique variance above and beyond the other tasks. I would have followed this by running follow-up regressions to compare AIC values as this statistic is more conservative with models that include more predictors, compared to the change in  $R^2$ , and could therefore give further insight on whether it may be beneficial to include MoToM as a sole ToM predictor rather than including multiple ToM predictors in a model pertaining to social anxiety. I would have run four hierarchical regressions and would have included the PPVT-V and age (in months) as control variables (always entered as the first step, Table 3). The first three analyses include in Table 3, examine which of these three ToM tasks (variable included on step three) adds significant unique variance to social anxiety, while controlling for language, age (first step) and controlling for both of the other theory of mind variables (second step). The fourth regression would have tested whether or not the two standard first- and second-order ToM measures together (step three), account for significant unique variance above and beyond the MotoM (step two) and age and language (step one).

The pattern of results that would support my hypotheses would show a large and significant  $R^2$  change when the MoToM is included on the second or third steps. Regression four would have been of particular interest as a significant  $R^2$  change would indicate that the MoToM adds a significant unique amount of variance above and beyond both of the other ToM tasks. Further support for my hypotheses would have been shown if the first and second-order ToM predictors were shown to have added only small, and non-significant, changes to  $R^2$  changes when either or both were included on the third step (Regressions two and three). This would indicate that they do not account for a

significant amount of unique variance above and beyond the MoToM and could be excluded from the model. If this pattern of results were found, I would expect that the AIC statistics would align well with the  $R^2$  change findings. The AIC is more conservative with more predictors and is a measure of model fit with lower AIC values indicating better model fit (Fields, 2013, p. 324). Therefore, based on the  $R^2$  results, I would run a couple of follow-up multiple regressions with differing numbers and combination of the significant predictors to compare AIC. This is not a significance test and would not inflate error rates. For example, I could run a regression with just the MoToM and compare its AIC to a regression with both the MoToM and the first and second order ToM tasks.

Comparing AIC would be most relevant if I were to find that more than one ToM variable had significant  $R^2$  change, when entered on the third step, as it would allow me to examine the data using a statistic that is not as generous to models with more predictors. If the AIC and  $R^2$  change were to offer differing inferences, I would have included both to inform which ToM variable should be included in the mediation analyses and which model of social anxiety seemed most relevant in regards to both theory and statistical conclusions. For example, if all ToM variables contributed unique variance above and beyond each other, I would look to see which predictors had a higher  $R^2$  change (in the Hierarchical regressions) and would then compare which models (follow-up multiple regression analyses), with differing amount/combination of predictors, had a lower AIC. If the MoToM had a greater  $R^2$  change when included after the other predictors, but the AIC was lower in a model with both the MoToM and second-order ToM compared to a model with just the MoToM (or any other combination

of variables) then I would have used the MoToM in the mediation analyses, but concluded that the better model of social anxiety included both the MoToM and second-order ToM as predictors. Therefore, this pattern of findings would have partially supported my hypotheses in that the MoToM would have been a significant predictor above and beyond the other ToM tasks. However, it would have not supported the hypothesis that the standard ToM tasks are not significant predictors above and beyond the MoToM. In this case, I would have concluded based on my data, that the MoToM should not be included as the sole ToM predictor for this model of social anxiety.

Another possible finding is that some or all variables would not be significant predictors of social anxiety. If no ToM task were to be a significant predictor of social anxiety or significantly related to social anxiety, then this would not be included as a mediator in the next analyses. If social anxiety was found to be related to moral reasoning variables and intention, but not ToM, then the next set of analyses would have been adjusted to look at simple mediation rather than a serial multiple mediation.

Table 3

*Hierarchical Regression Analyses Examining ToM Variables as Predictors of Social Anxiety*

			Standardized Coefficients	R <sup>2</sup>	R <sup>2</sup> change	F change
Hierarchical Regression 1	1	PPVT-V, Age				
	2	First-order ToM, Second-order ToM				*
	3	MoToM,				*
2	1	PPVT-V, Age				
	2	First-order ToM, MoToM				*
	3	Second-order ToM				
3	1	PPVT-V, Age				
	2	Second-order ToM, MoToM				*
	3	First-order ToM				
4	1	PPVT-V, Age				
	2	MoToM				*
	3	First-order ToM Second-order ToM,				

\*Predicted significant results

**Hypotheses Set 3.** The third set of hypotheses involved a serial multiple mediator model with the prediction that the relation between social anxiety and moral reasoning is mediated by intention accuracy/interpretation which itself is mediated by ToM. To test this model, I would have conducted a series of serial mediation analyses using PROCESS (Hayes, 2013), with one for each dependent variable (moral judgement, punishment) in each condition (Accidental, intentional, ambiguous).

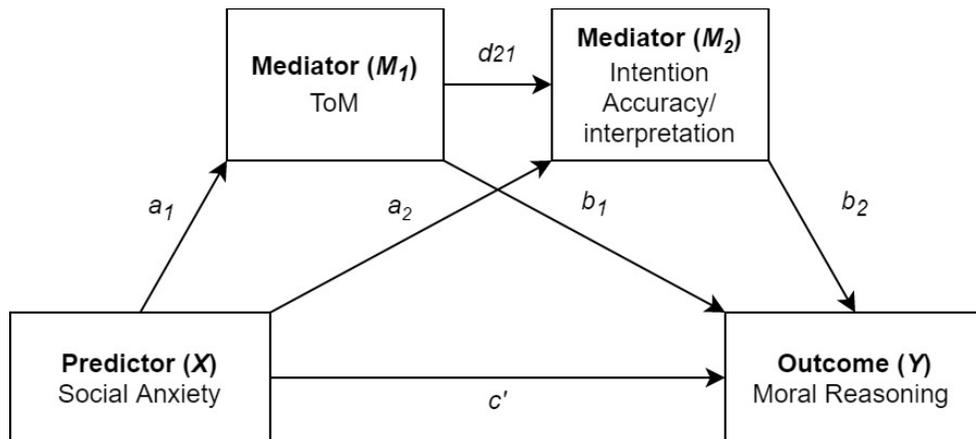
**Assumptions.** As these mediation analyses involve running multiple regression analyses, I would have used the same process and tests described for testing the assumptions of hierarchical regressions, but with the target variables for these analyses. The variables would include ToM as the first mediator variable, Intention as the second mediator variable (for each condition), social anxiety as the predictor variable, and moral judgement/punishment ascriptions for each condition as outcome variables (done in separate analyses). The specific variables chosen for ToM and Intention accuracy/interpretation will be explained in more detail when going over the analyses. When checking these assumptions, I would have run multiple preliminary regressions in order to save the residuals and predicted values for each pathway leading to the outcome and mediator variables for each planned analyses (see Figure 2 for pathways). I would have then used the same process as described for the hierarchical regressions, to check the assumptions for each of these sets of residuals. The serial multiple mediation regression analyses would have used bootstrapped confidence intervals as suggested by Hayes (2013) and would have been robust to assumptions of normality. If concerning violations were found, data transformations would have been considered (as explained for the hierarchical regression analyses). If these do not address violations, then I would have

considered not running some of the analyses. For example, if data from the intentional condition violated assumptions, then I would have considered not running the analyses for this condition but would have still run the analyses for the other conditions. If none of the analyses could be conducted than I would consider alternate analyses.

**Serial multiple Mediator model.** A graphical presentation of the indirect and direct effects between social anxiety and moral reasoning can be found in Figure 2.

**Figure 2**

*Diagram of the Hypothesized Serial Multiple Mediation Model*



The serial mediation analyses using PROCESS (Hayes, 2013) would have tested specific indirect effects and direct effects for the relation between social anxiety and moral reasoning. The indirect effects these analyses would have tested would have been: 1) social anxiety on moral reasoning through ToM ( $a_1b_1$ ); 2) social anxiety on moral reasoning through intention accuracy/ interpretation ( $a_2b_2$ ); 3) social anxiety on moral reasoning through ToM and intention accuracy/ interpretation in serial ( $a_1d_{21}b_2$ ). Unless the assumptions were not met for certain conditions or DVs, in order to test this model in each condition and for both moral reasoning DVs, a total of 18 indirect effects would

have been tested. However, if the moral reasoning DVs for one of the conditions were not found to be significantly correlated with social anxiety when testing the first set of hypotheses, then this condition would not be included in the mediation analyses. For example, if social anxiety was not related to moral reasoning performance in the intentional condition then no mediation analyses would have been run for the intentional condition. Similarly, if no relation was found for social anxiety with either punishment or moral judgement scores than mediation analyses would have only been run for the DV that was significant. A critical p-value of .01 would have been used for more conservative significance testing of the mediation analyses. As explained in the previous analyses, one of the ToM measures would have been chosen as  $M_1$  based on the results from hypotheses set 2 and based on theory. Either the ToM variable that accounts for the most unique variance would be chosen, or, after checking correlations, if the ToM tasks explain a lot of overlapping variance than they would have been combined to create a composite score.  $M_2$ , intention accuracy/ interpretation, would have either been a summed score from responses to the two intention questions for both stories of the same intention type, or one of the questions would have been chosen for these analyses based on the partial correlations. If responses to both intention questions were significantly correlated in the same direction with social anxiety, when controlling for language and age, then they would have been summed into one score. If only one was found to be significantly correlated, then that one would have been chosen for these analyses. If neither were significantly correlated than a simple mediation model with only ToM would be examined, rather than a multiple mediator model.

The pattern of findings in support of these hypotheses, for both the punishment and moral reasoning DVs, would demonstrate a significant indirect effect of Social anxiety on Moral reasoning through ToM and intention accuracy/ interpretation in serial ( $a_1d_2b_2$ ) in the ambiguous and accidental conditions, and no significant direct effect of social anxiety on moral reasoning when these mediators are included in the regression model. If my first set of hypotheses were to be correct then the intentional cue condition would not be included in these analyses as, in this condition, I expect all children would succeed and show no effect of social anxiety (intention-action information is clear and leads to outcome) with the exception of responses to the intention-emotion question. However, if a relation is found then I would expect that the above pattern of results would also be found for the intentional condition. Further, if all indirect effects were to be significant than this could suggest that each pathway contributes to the relation between social anxiety and moral reasoning and would still support my hypotheses.

An alternative pattern of results that I could find would be a non-significant indirect effect of serial mediation, but a significant indirect effects of either or both: 1) social anxiety on moral reasoning through ToM ( $a_1b_1$ ); 2) social anxiety on moral reasoning through intention accuracy/ interpretation ( $a_2b_2$ ) indicating simple mediation effects. Another potential finding would be results indicating a significant direct effect of social anxiety on moral reasoning, when mediators are included in the model, as well as significant indirect effects which would suggest partial mediation effects. Alternatively, if I find a significant direct effect and no significant indirect effects, then this could indicate that ToM and Intention accuracy/ interpretation do not mediate the relation between social anxiety and moral reasoning.

To be noted, the patterns of results (like those I have mentioned) may vary, for each different condition and moral reasoning DV resulting in many different combinations of protentional findings for these analyses. For example, I may only find significance for the indirect effect of serial mediation for the ambiguous conditions, or for only punishment scores, but not moral judgement scores. However, In the discussion section I will focus on interpreting results that clearly support my hypotheses, and those that do not, but will only briefly discuss some of the findings that may partially support my hypotheses.

**Hypotheses Set 4.** The fourth set of hypotheses involved looking at age related changes in moral reasoning. It was predicted that four- and five-year-old children would perform better than three-year-old children in the accidental condition, but that performance would be the same for each age group in the intentional condition with the exception of responses to the intention-emotion question. No predictions were made for the ambiguous condition. To evaluate these hypotheses a mixed MANOVA would have been conducted to determine whether the moral reasoning variables differed by age group. Assumptions would have been checked for this analysis.

**Assumptions.** These assumptions would have been checked and potential violations would have been addressed using the same analyses and plans as outlined for the assumptions of the preliminary MANOVA analyses.

**Mixed-design MANOVA Examining Age.** The dependent variables for this MANOVA would have been the four questions used in the moral reasoning tasks. Age would have been included as a between-subjects variable with three groups (four-year-olds, five-year-olds and six-year-olds), and intention cue condition would have been

included as a within-subjects variable (intentional, accidental, and ambiguous). If the findings were in support of the hypotheses, I would expect to find a significant interaction between age and intention cue condition. More specifically, this interaction would have indicated these significant differences for the five- and six-year-old children, compared to the four-year-old children, in the accidental, but not the intentional, condition: more accurate interpretations of intentions, higher moral judgement scores and lower punishment scores. As there were no predictions for the ambiguous condition, based on the adult data, findings could be similar to those found for the accidental condition. Similarly, findings of significance or non-significance for responses to the intention-emotion condition in the intentional condition would have been more exploratory and did not have any specific predictions.

However, it is possible that responses to the intention-emotion question could have led to findings of significant age-related differences for the other questions in the intentional cue condition. If older children are more sensitive to intention information than the ambiguity of this question may lead them to answer differently than younger children who are not as sensitive to intention-cue information. This may also be the case for the ambiguous condition. If this were the case, then there could have been a significant main effect of age with no interaction, and perhaps not even a significant main effect of condition. In other words, the older children could have been more accurate in their interpretations of intentions, shown significantly higher moral judgement scores and significantly lower punishment scores in all conditions, compared to the younger children.

It is also possible that the results would have found different age effects than specific predictions outlined in the hypotheses. The results could indicate significant differences between each age group indicating that six-year-old children out-perform five-year-olds who, in turn, out-perform the four-year-old children. Alternatively, the results could have indicated significant differences between the four- and six-year-old children, but not the five-year-olds.

As with all the planned analyses, it is possible that no significant differences regarding age (main effect or interaction) would have been found. Even if there were a significant main effect of condition, if there were no significant interaction, then this would indicate that all the children were performing relatively the same, regardless of age, on the moral reasoning task. For example, perhaps all children succeed at the intentional condition but perform worse on the other conditions. These findings would not support the hypotheses as there would be no significant age-related differences on the moral reasoning task.

The discussion section will discuss interpretations of findings of significance and of non-significance for each set of hypotheses and analyses outlined in this results section. Patterns of findings in partial support of hypotheses will only be discussed if particularly relevant based on theory.

### **Discussion**

The goal of the present study was to examine the relations between social anxiety, ToM and moral reasoning in four- to five-year-old children. More specifically, this research aimed to determine whether social anxiety in preschool-aged children was related to the ability to accurately interpret and use intention information to make moral

judgements. To examine this ability in the current study, I had planned to use stories where the intentions motivating characters' actions were either ambiguous or accidental while the outcomes of these action were always negative. Performance on the questions which followed the stories (e.g., moral judgements) was to be compared to performance on stories in which the act was clearly intentional and thus not in contrast with the negative outcome. A second goal was to determine whether theory of mind (ToM) was related to social anxiety using a variety of false belief measures, and to specifically examine whether the MoToM, a theory of mind task with more social-emotional and moral context, would be a better correlate of social anxiety than standard first- and second-order false belief tasks. A third aim was to examine ToM and intention accuracy/interpretation as serial mediators of the relation between social anxiety and moral judgment/punishment ascriptions in the moral reasoning stories. A final goal was to replicate age-related changes in moral reasoning suggesting a developmental shift toward more consistent intention-based moral reasoning during the preschool period (Armsby, 1971; Berndt & Berndt, 1975; Cushman, Sheketoff, Wharton, & Carey, 2013; Nelson, 1980; Nobes, Panagiotaki, & Bartholomew, 2016).

Although data collection was not possible due to the COVID-19 pandemic, it provided the opportunity to expand upon planned analyses and include specific and thorough plans for the data, preliminary analyses and assumptions. Therefore, a new goal of this thesis is to pre-register the study with OSF before collecting the child data in order to move toward an open science framework and help reduce potential bias. I plan to do this after receiving feedback from the thesis defense. This discussion will go over the potential findings that would have been in clear support of my hypotheses as well as

potential findings that would not have supported my hypotheses, in order to discuss interpretations and implications for both these possibilities. Additionally, a few findings that would have partially supported my hypotheses will be discussed briefly.

### **Relation Between Social Anxiety and Moral Reasoning**

The first set of hypotheses examined relations between social anxiety and the moral reasoning variables (intention questions, punishment ascriptions, moral judgements) in each condition. It was predicted that higher social anxiety would be significantly related to a higher likelihood of responding with ‘on purpose’ to both intention questions, lower moral judgement ratings, and higher punishment ascriptions. It was specifically predicted that these significant relations would be found in the accidental and ambiguous conditions, but not for the intentional condition with the exception of responses to the intention question asking about whether the first character meant to upset the second character (intention-emotion). Even in the intentional condition social anxiety was predicted to be significantly related to a higher likelihood of responding with ‘on purpose’ to this intention-emotion question as the intentional story did not contain clear information indicating whether the first character’s goal was to upset the second character. Children more sensitive to intention information may interpret that aspect of the outcome as accidental.

To test these hypotheses, partial correlations controlling for age and language would have been run. For each intention question (emotion/action, for each condition), a score of two would have indicated that for both stories of that type the intention was interpreted as purposeful. A score of one would indicate that one story was interpreted as purposeful and one as accidental, and a score of zero would indicate that both stories

were interpreted as accidental. Therefore, this set of hypotheses would have been supported if significant positive partial correlations had been found between social anxiety and responses to both the intention questions in the accidental and ambiguous conditions. This pattern of results would have suggested that those with higher social anxiety were more likely to interpret the action as purposeful when the intention information within the story was ambiguous, and were more likely to be inaccurate in identifying the intention of the protagonist in stories where the intention information clearly conveyed that the act was accidental.

Further, a significant negative partial correlation between social anxiety and moral judgement ratings, and a significant positive partial correlation between social anxiety and punishment ascriptions in the ambiguous and accidental conditions, would have supported the hypotheses. This pattern of findings would have demonstrated that children with higher social anxiety scores tended to have lower moral judgement ratings and assigned greater punishment to the protagonists or 'transgressors' in the stories than children with lower social anxiety. If my hypothesis that social anxiety was related to outcome-based moral reasoning were fully supported, it would indicate that social anxiety was not significantly related to responses to the intention-action question, moral judgement ratings or punishment ascriptions in the intentional condition as the intention of the act was clearly portrayed (e.g., wanting to throw a water balloon at another character and get them wet) and in line with the outcome (e.g., water balloon splashes water on the second character and gets them wet). Therefore, most children would respond similarly whether or not they considered intention information.

However, to support the specific predictions, responses to the intention-emotion question would have been significantly and positively partially correlated with social anxiety in the intentional condition. This would indicate that those higher in social anxiety were more likely to interpret that the protagonist's intention was to purposefully upset the second character. This could suggest that children with social anxiety were more focused on outcome information and interpreted intention accordingly whereas, children more sensitive to intention information (mature moral reasoning) would have been more varied in their responses, or more likely to interpret the action as accidental as there was no clear story information indicating whether the protagonist intended to upset the second character. As an example, in one of the stories a character intentionally throws a water balloon at another character to get him wet and the second character was sad that he got wet. The intention of the act is clear, but this first character may have wanted to play and have a water balloon fight rather than intentionally make the second character sad. Therefore, the intention regarding the second character's emotional state is less clear than is the intention to get the second character wet (i.e., the physical outcome).

It was still expected that most children would have rated these intentional stories more negatively in terms of moral judgements and assigned greater punishment, compared to the accidental stories, even if the intention information about the emotional outcome for the second character was not specified. The act itself was clearly intentional and resulted in a negative outcome whether or not the transgressor of the act had any clear intent toward the other characters feelings. In comparison, in the accidental stories the act itself was accidental as the first character was unaware of the second character,

and therefore did not intend to bring about the outcome in any way (e.g., character is throwing water balloons and does not see the second character who accidentally gets splashed by one of the water balloons). Thus, this should lead to more negative evaluations in the intentional condition even if a child has more advanced moral reasoning abilities and is using intention information.

This expected pattern is supported by the adult data for the intentional condition. Participants rated the characters in the intentional stories more harshly and ascribed more punishment to these characters compared to the characters in the ambiguous and accidental stories even though the mean responses to the intention-emotion question suggested about half of the responses chosen were 'by accident' (for the intentional condition). It is expected that within the intentional condition, compared to the accidental condition, that the child sample would have less variability in their moral judgement ratings and punishment ascriptions as they would be more in line with the outcome of the story, regardless of each child's level of social anxiety.

Overall, this pattern of results would have been in support of my first set of hypotheses as it would demonstrate that children with social anxiety had less mature moral reasoning in stories where focusing on intention information, versus focusing solely on outcome information, would have led to different conclusions for moral judgements and punishment ascriptions. Importantly, it would have demonstrated that children higher in social anxiety were more likely to display a bias to interpret intentions as negative when this information was ambiguous (ambiguous condition and story information relating to the intention-emotion in the intentional condition) which would be in line with previous research that has found relations between anxiety/social anxiety and

biases in interpretations of ambiguous situations ( Barrett et al, 1996; Dineen & Hadwin, 2004; Muris, Luermans, et al., 2000; Muris, Merckelbach et al., 2000). Beyond this, these results would have demonstrated that social anxiety was related to poorer accuracy in identifying intention in the accidental story, even though the lack of intention was clearly indicated. This would add evidence to the findings by Bell-dolan (1995) that children high in anxiety were more likely to interpret unintentional acts as hostile.

A possible interpretation for this pattern of results would be that biases in interpreting, perceiving, and focusing on threatening information (Muris, Luermans, et al., 2000; Muris, Merckelbach et al., 2000) may affect socially anxious children's ability to use intention information, even when this information is clear and unambiguous (the accidental condition in my study). As explained in the literature review, research has found that children with anxiety often display threat biases (Muris, Luermans, et al., 2000; Muris, Merckelbach et al., 2000) therefore, these biases may specifically affect situations involving moral reasoning and situations that can be seen as threatening, based on a negative outcome. As it was expected that those with more mature moral reasoning and those focused more on outcome would have responded similarly to the moral judgement and punishment questions in the intentional condition simply by attending to the outcome (i.e., regardless of their ability to consider intention), there were no expected significant differences for the responses to these questions.

However, it is possible that if socially anxious children were more likely to interpret the protagonists' character as intentionally upsetting the second character, then they may have found the intentional stories more threatening than would children lower in social anxiety. Therefore, an alternative finding in partial support of the hypotheses

could have been finding that social anxiety was significantly related to lower moral judgement ratings and higher punishment scores even in the intentional condition. This could suggest that children with social anxiety are more sensitive to the threatening and negative aspects of the intentional stories and perceive the character as very threatening. This could lead them to respond with the lowest moral ratings and highest assignments of punishment in these stories, whereas children lower in social anxiety may be more aware of the fact that the act might not have been done to intentionally upset the other character. Therefore, less socially anxious children may not rate the character as 'bad' and may not assign as much punishment. Such findings would have partially supported my hypotheses that social anxiety was related to moral reasoning above and beyond age. However, the fact that these relations are present in the intentional condition could indicate that socially anxious children have a bias to interpret this kind of situation more negatively than their peers, above and beyond age related-moral development and future research on the relations between moral development and social anxiety could examine how threat perception biases affect these relations by including tasks similar to those by Muris, Luermans, et al. (2000) and Muris, Merckelbach et al. (2000).

The pattern of results that would have not supported the hypotheses would have been if no significant relations between social anxiety and the moral reasoning variables were found. A possible explanation for failing to find support is that social anxiety is not related to moral reasoning. Perhaps socially anxious children find these types of situations stressful but are still able to reason about intention information and make mature moral judgement and punishment ratings. This would go against findings that show biases toward negative or threatening interpretations of ambiguous situations in

anxious/socially anxious children (Barrett et al, 1996; Dineen & Hadwin, 2004; Muris, Luermans, et al., 2000; Muris, Merckelbach et al., 2000). Therefore, failing to find that anxiety is related to moral reasoning abilities, or to the ability to reason about a character's mental state regarding their intention, would suggest that threat biases are not present in a community sample of preschool-aged children. It is worth noting that the youngest age included in these earlier studies was six years, with most including much older children. Therefore, it is possible that biases in interpreting intentions do not arise until socially anxious children begin to develop more self-evaluative, or self-conscious, feelings and experience more peer rejection and victimization. This may be implicated in how they perceive threat in social situations, therefore, these biases may not be present in younger preschool-aged children (like those to be tested in the current work). Future research could address this issue by investigating the relation between social anxiety and moral reasoning with older children. As previously mentioned, such work could also include a specific measure of threat bias to determine whether it is implicated in interpreting morally relevant situations where one must consider another's intention in regards to an outcome that negatively affects another person.

Alternatively, finding no significant relations could be due to the stories used in the moral reasoning tasks. Recall that the stories used involve scenarios between characters where the child (participant) is a third-person observer of this situations and therefore making judgements based on the two characters and not on whether they themselves were in this situation. It is possible that threat biases would not affect moral reasoning abilities in stories removed from the self. For example, in the study by Barrett et al. (1996) examining interpretations of ambiguous situations, stories were phrased in

reference to the self : “You see a group of students from another class playing a great game. As you (your child) walk over and want to join in, you notice that they are laughing.” (p. 192). Thus, it may be that children imagining themselves in a particular situation may give rise to a stronger emotional response, including a greater expression of any biases the child has. Future work could investigate this possibility by including self-referential stories to determine whether threat biases are more apparent when making judgements for the self relative to for others.

It may also be the case that as socially anxious children tend to have lower self-perceptions of their social competence and face more peer rejection and victimization (Karevold et al., 2012; Rubin et al., 2009), they may be more likely to think something negative was done on purpose and see themselves as an intentional victim if they were the one on the receiving end of this behaviour. This effect may not appear when reasoning about another person they know nothing about. However, these findings would be in contrast with Dineen and Hadwin (2004) who found those with anxiety to interpret intentions more negatively when asking a question about other-judgement: “Does Tom think Mary knocked the bricks on purpose or does he think Mary knocked the bricks by accident?” (p. 503) versus self-judgement: “If someone knocked over your brick tower, would you think they knocked the bricks on purpose or they knocked the bricks by accident?” (p. 503). It is important to note that in Dineen and Hadwin’s study the researchers were examining general anxiety, and not social anxiety, therefore it may be the case that social anxiety, as it involves peer rejection and victimization, would lead to more negative interpretations of intention in a story or with questions referring more to the self versus another character.

Another possibility is that the stories are too far removed from how these situations occur, or feel, to children in a naturalistic setting. In the stories used in this study, simple photos of dolls were to be used to portray what happens and to indicate the characters' emotions. Perhaps using videos of live actors, as done by Bell-Dolan (1995), would display the act and emotions more clearly especially in terms of the salience of the negative emotions and threatening aspects of the scenario. This could have resulted in children being more emotionally engaged in the scenario, and in turn, being more likely to answer in a way more consistent with how they may respond in their daily lives. In order to examine threat biases, children would need to experience, to a mild extent, the possible threatening aspects of these stories. However, it may be difficult to balance this with ethical considerations as it would be important not to show a child something that would be too upsetting or stressful. The use of live actors in a video may be a reasonable compromise for this reason.

One possible finding, that would have been in partial support of my hypotheses, would have been if significant relations between social anxiety and moral reasoning were found, but in the opposite direction than those previously mentioned. These findings may indicate that those with social anxiety perform *better* at these types of moral reasoning tasks than children with lower social anxiety. This would have been an important finding as it would have been in direct contrast to previous work, and to the expected results. Such a finding would have to be replicated in future research as it would have partially supported my hypotheses that social anxiety and moral reasoning are related, but would have been in the opposite direction than the predicted relations, and would not have been

in line with the literature and reasoning as to why these two constructs are hypothesized to be related.

In sum, support for the first set of hypotheses would provide evidence that early social anxiety is related to issues with reasoning in morally relevant situations where an act results in a negative outcome. On the other hand, failing to find relations would add doubt to the ideas behind the conceptual model presented in the literature review. This could suggest that these constructs are not related, or that they may be related but not as suggested by the literature review; the constructs may need to be measured using different methods, or they may not be related in this age group. These points will be expanded upon when discussing the limitations and future directions of this study.

### **Social Anxiety and its Relation to ToM**

The second set of hypotheses pertained to the relation between false belief performance, on the MoToM, first-order and second-order false belief tasks, and social anxiety. It was hypothesized that the MoToM would significantly predict social anxiety above and beyond the other two standard ToM tasks, and that these standard tasks would not significantly predict social anxiety above and beyond the MoToM. If the hierarchical regressions would have supported these hypotheses it would have suggested that this ToM task could be used on its own when predicting social anxiety.

Such a finding would have been interpreted to mean that MoToM may be a better predictor of social anxiety than the standard false belief tasks because it involves more social-emotional components as it is embedded in a moral context. This would be in line with studies by Banerjee and Henderson (2001) who found significant relations between social anxiety and ToM tasks involving more social and emotional aspects, but did not

find significance for standard false belief change of location tasks. This would also add to the literature on the MoToM as an important false belief task allowing for the examination the interplay of social cognitive skills in more complex and interactional settings (D'Esterre et al., 2019; Fu et al., 2014; Killen et al., 2011). Another implication of this finding would be that given that social anxiety involves feelings of anxiety in response to social interactions, deficits in ToM abilities may only be present when the context includes more inter-relations between the characters and involves emotional components. This could be due to heightened anxiety in socially embedded situations which could affect social and emotional processing, as well as focus, since an anxious flight or fight response would be activated (de Vente, Majdandžić, & Bögels, 2014; Syal & Stein, 2014).

In addition, Banerjee and Henderson (2001) found that children with social anxiety accompanied by high negative affect were more likely to exhibit poorer performance on ToM tasks involving social-emotional contexts. They suggest that high negative affect, involving feelings of self-blame and low self-esteem, which is often present in those with high social anxiety could affect how the perception of negative emotions making them more salient. They explain that this would then affect the use of cognitive resources that are needed when reasoning about mental state information. Therefore, the complexity of social interactions involving more emotion may add significant difficulty for socially anxious children's ability to utilize ToM skills as they may be expending cognitive resources by focusing on threat or the anxiety and salience surrounding the negative emotions present in the situation. Future work could include measures of affect, as well social anxiety, to examine how these factors relate to different

kinds of ToM tasks that involve more or less social-emotional saliency (e.g., MoToM compared to standard false belief). Measures of the level of state anxiety (physiological or self-report) could also be included in future studies to determine which types of ToM tasks elicit more of an anxious response in participants. Comparisons could then be made as to the extent to which negative affect (e.g., negative self-perceptions) versus an anxious state (hyperarousal, fight or flight like response) are implicated in both social anxiety and its relation to ToM abilities across different types of social situations.

Alternatively, these findings could instead be due to the fact that the MoToM is generally a more difficult task than the typical first-order false belief tasks not only because of the moral context, but because of additional memory demands (i.e., due to greater task complexity). If children with social anxiety are more nervous while being administered the tasks by an adult they do not know, it is possible they would perform worse on the MoToM, relative to children with less social anxiety, simply because it has high memory demands and includes more details to which the child must attend. Poorer performance on this task could therefore be due to being socially anxious in the test situation and not because this task is embedded in a moral situation. However, second-order false belief tasks are more difficult than first-order false belief tasks (including the MoToM), and also involve more story details and memory demands. If the only reason for a relation between the MoToM and social anxiety were due to its memory demands, then the MoToM should not significantly predict social anxiety above and beyond the second-order false-belief task. If the pattern of results would have been as predicted in the hypotheses, with the MoToM significant above and beyond second-order ToM, this interpretation of high memory demands seems unlikely. Therefore, The pattern of

findings in support of the hypotheses would have suggested that children with social anxiety may be able to easily succeed at standard cognitive false belief tasks, but struggle with the added complexity of a moral/social context that is closer to the actual contexts in which they may need to utilize these skills in their everyday lives.

Findings that would not have supported these hypotheses would have been if none of the ToM tasks significantly predicted social anxiety, above and beyond age and language. This could indicate that children with social anxiety do not have deficits in their ToM abilities. Therefore, ToM may not be a link between social anxiety and moral reasoning and would likely not mediate this relation as predicted in the third set of hypotheses. It is possible then that socially anxious children are able to understand differing mental states and perhaps issues with moral reasoning stem from other social or cognitive factors such as misinterpreting social cues or negative biases and schemas of others' thoughts. Alternatively, it is possible that social anxiety is related to certain aspects of ToM, but not false belief reasoning which would contrast the results by Suway et al. (2012) who found significant relations between BI and high negative affect, and performance on a series of false belief tasks. However, this study was done with younger children and examined relations between false belief reasoning and BI/high negative affect, but not social anxiety. Perhaps with older socially anxious/ inhibited preschool-aged children, difficulties in ToM are no longer reflected by false belief tasks but instead related to different measures of ToM. Therefore, it would be important to continue examining tasks measuring different facets of ToM, such as recognizing emotion, interpreting intentions, and pretense as research has found these to be related to social anxiety (Banerjee & Henderson, 2001; Colonna et al. 2017) and it would be important

to determine which aspects of ToM are related specifically to social anxiety, and the potential mechanisms that contribute to these relations compared to other ToM tasks that are not related. It would also be important to look at the relations between these constructs at different ages, or even within large longitudinal studies (this point will be discussed further in the limitations and future directions section of this discussion).

Another possibility for non-significant results could be because the relations would only be found to be significant in a sample which includes children with much higher rates of social anxiety (i.e., including a clinical sample of children diagnosed with SAD) as there would have been a much wider range of social anxiety compared to the planned subclinical sample (this will also be further discussed below when addressing limitations and future directions).

Overall, support for these hypotheses add evidence for the idea that early anxiety in response to social situations could affect young children's ability to reason about another's mental state and would support the first two steps in the conceptual model linking ToM to social anxiety (Figure 1, see page 50). However, findings of significance for both of the more difficult ToM tasks (second-order false belief and MoToM) would suggest that the relation may be due more to memory demands and task performance anxiety than to relations between ToM and social anxiety. Further, finding no relations between these ToM false belief tasks could indicate that these variables are not related to each other. It would be important to conduct further research into different aspects of ToM or research on social schema/ social cue interpretation biases that could be implicated in socially anxious children's social cognitions.

### **ToM and Interpretations of Intention as Serial Mediators**

The third set of hypotheses would have been evaluated using a serial multiple mediator model to test for the relation between social anxiety and moral reasoning (punishment and moral judgement). This would have examined both ToM and intention accuracy/interpretation as mediators of this relation. More specifically it would have examined a pathway starting with social anxiety where ToM abilities affect intention accuracy, which then affects performance on the moral reasoning variables. If the serial mediation analyses would have supported the hypotheses then there would have been a significant full mediation effect for the indirect pathway of the mediators in serial, in both the ambiguous and accidental conditions. This pattern of results for the ambiguous and accidental conditions would suggest a model where social anxiety is related to poorer ToM abilities, which would then be related to more inaccuracy or more negative interpretations of intention in the moral reasoning stories, which in turn would lead to punishment ratings and moral judgements in line with the negative outcome rather than the intention information. There were no predictions for the intentional condition, therefore, it was not expected that a mediation model would be significant for this condition.

If my second set of hypotheses were supported and only the MoToM was included as the ToM variable in the model, then it would also suggest that ToM reasoning specifically within a social-emotional moral context mediates this relation. This pattern of findings would support the first few steps in the proposed conceptual model (Figure 1, p. 50). Interpretations for these findings would bring together the ideas and interpretations discussed so far in this discussion. More specifically, it would support the expectation

that social situations trigger an anxious response in children with social anxiety, and that this anxious state would adversely affect their ability to focus on relevant mental state information in moral situations because they would be utilizing their cognitive resources for focusing on the more salient negative aspects of a situation (such as the outcome). This in turn could negatively affect their ToM ability, which would have been evidenced by poorer performance on the MoToM.

These ToM deficits may strictly be due to performance related anxiety within this type of situation, or due to issues with general competency if a child is not able to focus on relevant information and is then not able to learn from these experiences in order to develop more advanced ToM abilities, as suggested by Banerjee and Henderson (2001). If this is the case, then early difficulties attending to, and processing mental state, information could affect children's later ability to use and understand intention information in the morally relevant situations (in this case, the stories) as they require a more developed consideration of mental states. In addition, socially anxious children tend to interpret situations as negative, as evidenced by the research on threat perception biases and interpretations of ambiguous situations (Barrett et al, 1996; Dineen & Hadwin, 2004; Muris, Luermans, et al., 2000; Muris, Merckelbach et al., 2000). This could encourage hyper focusing on threatening or negative information. This claim would be important to explore further in future research.

Future work could further explore the mechanisms behind this mediation effect in terms of threat biases, the effect of varying physiological and psychological levels of state anxiety within these situations, and whether ToM is affected strictly by performance anxiety in certain situations or whether there are overarching competence issues as well.

This will be expanded upon when discussing limitations and future directions. The potential results of such a study would bring together separate findings in the literature, linking ToM to moral reasoning and to social anxiety, into a cohesive model. It would also expand on previous research by examining the interplay between social and cognitive constructs within moral situations similar to those children may face in their day-to-day lives while interacting with peers.

In addition, it would be important to compare the pattern of findings for the ambiguous and accidental conditions. Comparisons between these two conditions is interesting because the operationalization of the responses to the intention questions differ across these conditions. More specifically, for the accidental cue condition, responses to the two intention questions (the intention emotion and action variables) are measuring intention accuracy. This is because the accidental stories include enough information to lead to a clear and correct answer to for the intention questions (i.e., 'by accident' would be accurate). On the other hand, for the ambiguous cue condition the two types of intention questions are measuring interpretations of intention as the story information does not lead to a clear right or wrong answer. These intention questions in the ambiguous condition examine potential patterns in how the intention in these stories tend to be interpreted. Based on the adult means (Table 2), those with advanced moral reasoning ability may be more likely to interpret the ambiguous stories similarly to the accidental stories as the adult means and standard deviations for each variable in these two conditions are fairly similar.

This gives an idea as to how those with advanced moral reasoning and mature cognitive abilities are likely to interpret a story where the intention is not as clear: they

tend to assume it was accidental. One adult participant specifically mentioned that when not given enough information, they would assume the act was an accident. However, children who are still developing moral reasoning abilities and not yet consistently using intention information may be more likely to rely on the outcome information to inform their decisions rather than consider the ambiguity of whether or not the character acted on purpose or by accident. Therefore, they may tend to interpret these stories as purposeful. I would expect responses to the questions in the ambiguous condition to be more varied in children, as I expect it would be more difficult to consider intention compared to the accidental condition. I expect this would be more difficult because in the ambiguous condition the child would have to consider potential hypothetical possibilities as to the motivation behind the character's action to understand that it could be an accident whereas this is not necessary in the accidental condition as the intention is clear (e.g., they did not see the other character and were just playing). It is possible that even the children who have started to more consistently consider intention information may default back to using outcome information when reasoning about this story when the former is less clear.

In addition, adults are making moral decisions from the position of a mature adult reasoning about a young child who is still developing and learning. Therefore, adults may be more lenient when making their moral judgements or interpreting ambiguous intention information. They may think the characters are just little kids who are less likely to foresee what their actions would lead to (e.g., negative emotional outcome). For example, in one of the stories a character was throwing water balloons at the park and looking at the water balloons. Then, one water balloon bounces off the ground and sprays a second

character. Adults may tend to think that since the character is a young child, it is more likely that they were just playing and not being careful. This interpretation would lead to very similar responses to the accidental story in line with the results for the adult sample. On the other hand, children will see the characters more as peers within their age group and may interpret their acts differently and less leniently. It would be important to compare children's responses on these three conditions after collecting the child data to determine if the responses to the ambiguous condition are too similar to the responses to the accidental condition in the target population.

It is also important to note that, because of the previously mentioned threat biases and biases in interpreting ambiguous situations as negative/threatening, those with social anxiety may be the most likely to rely on the negative outcome information to inform their decisions in this ambiguous condition. Those with higher social anxiety may be the most likely to interpret the act as intentional and interpret the first character as intentionally upsetting the second character, leading to lower moral judgment ratings and higher punishment ratings. With this information in mind, an alternative finding for the ambiguous story type could be a significant simple mediation of interpretations of intention (purposeful or not, as no intention information was given), and not a significant serial mediation. This would provide evidence that issues with interpretations of intention may be due to negative biases or social schemas involving a greater likelihood to see acts as purposeful even if the story context does not provide enough evidence to come to this conclusion. This would also suggest that issues in interpretation of morally relevant situations and the characters' intentions are not necessarily due to an inability or deficit in considering mental state information (ToM).

Additional information can then be gained when examining the accidental cue condition, where the intention to bring about the outcome is clearly indicated (and therefore not ambiguous) and it possible to measure accuracy in participants' answers to the intention question. Findings in support of the serial multiple mediator model in the accidental condition would suggest that, even when given a situation where the intention was clear, socially anxious children who had lower ToM ability were not able to accurately use intention cue information. They were instead more likely to use outcome information to inform their interpretations of intention and decisions regarding moral reasoning. These results tell us a bit more about the relation between social anxiety and moral reasoning as the findings would have suggested that this bias in interpretations of intentions extends beyond ambiguous situations and involves problems incorporating intention information, even when it is clearly indicated within a morally-relevant story. As previously explained, this could be due to an inability to accurately reason about mental states (ToM) when a situation can be perceived as threatening (e.g., negative outcome for the second character).

The pattern of findings that would not have supported the hypotheses would be a failure to find any significant mediation affects, and if the previous sets of hypotheses were supported, then there would be only a significant direct effect of social anxiety on moral reasoning. This could suggest that ToM measured using false belief tasks and intention accuracy are not involved in this relation. Social anxiety could then be interpreted as being related to moral reasoning because those higher in social anxiety would be more likely to have more negative moral ratings and assign greater punishment, even if they know the intention was accidental (or unstated). Perhaps those higher in

social anxiety have more anxiety regarding making mistakes that upset others as they experience more loneliness and peer rejection and a tendency to blame themselves for social failure (Rubin et al., 2009). They may see an accidental action that upsets another person as worse than would children lower in social anxiety, as they would be more concerned with social failures resulting in exclusion or rejection. Also, if a child is very inhibited and cautious, they may not understand how one child could mistakenly ruin another child's toy or art project and thus see this action as more negligent or careless and rate moral reasoning variables more harshly.

Another possible interpretation for finding no significant mediation effects could be due to using a false belief task to measure ToM. Other facets of ToM, not captured by false belief tasks, may still be involved in the relation between social anxiety and moral reasoning. For example, Banerjee and Henderson (2001) found a relations between social anxiety and ToM when using tasks that either involved social misunderstandings, or a 'social faux pas' (faux pas task), or the ability to understand the use of deception to hide an emotional state from another person for the purpose of self-presentation (self-presentational display task). These tasks may be more related to social anxiety as they involve more implications regarding social embarrassment, and self-conscious anxieties. Therefore, these tasks may be implicated in the relation between social anxiety and moral reasoning.

In addition, age may also be a factor for findings of non-significance as feelings of self-conscious anxieties and embarrassment may be more common in slightly older children. Relations between social anxiety and ToM may occur only later into childhood. Future studies could examine the relations between social anxiety and ToM in older

children and during preadolescence using more advanced ToM tasks for this age group. For example, Bosacki and Astington (1999) used ambiguous social vignettes and follow-up interview questions designed to measure preadolescents' ability to conceptualize and reason about characters' mental states using more advanced ToM abilities. They found that the different facets of participants' social understanding (ToM) within the ambiguous social situations were significantly and positively related to peer-rated social interaction skills, when controlling for language, with the empathic sensitivity subscale showing the most robust relation to peer-rated social-interaction skills. The authors interpret this to suggest that those who were assessed to have a better understanding of story characters' mental states and emotions were more likely to be viewed by their peers as being more effective in solving or reacting to social problems. They also suggest that a more sophisticated understanding of others' emotions may play a particularly important role in peer-rated social competence and may be the most salient aspect within social interactions. Therefore, it would be of interest to use this type of social understanding ToM task, especially in regards to reasoning about emotional states, as well as measures of social competence and social anxiety in future research with older children to better understand how social anxiety relates to more advanced mental state reasoning and social competence. These constructs could also be studied for their relations to moral reasoning by including morally relevant stories and questions as well.

Another possibility for no significant results could be because the tasks used for moral reasoning, second-order false belief and the MoToM are difficult for younger children in the age range of this study. Differences due to social anxiety may not reach significance if there is too much shared variance with age-related differences in ToM and

moral reasoning. Therefore, it may be beneficial to look at differences in moral reasoning ability for social anxiety by age group and include an older age groups as well (i.e., four-, six-, and eight-year-olds, rather than four- to six-year-olds). This would allow for comparisons between those with higher versus lower social anxiety in age groups that are expected to have mature moral reasoning and ToM abilities in order to determine whether those with higher social anxiety differ from what is typically expected of their age-group in regards to these abilities.

Other alternate findings include patterns of results indicating simple mediation effects other than the one mentioned above, for either or both intention accuracy/interpretations and ToM, with no significant serial mediation effect, for either or both conditions (i.e., accidental, ambiguous). Patterns of findings such as these would suggest that one or both of these variables mediate the relation between social anxiety and moral reasoning, but not in serial. In other words, this would suggest that ToM and intention accuracy are mediators of this relation, but that  $M_1$ , ToM, would not significantly affect  $M_2$ , intention accuracy. Alternatively, the results could have indicated a significant direct effect of social anxiety on moral reasoning, when mediators are included in the model, as well as significant indirect effects. This would have indicated partial mediation through whichever indirect pathways were significant and may have partially supported the hypotheses if the indirect effects of serial mediation were significant. This could be interpreted to mean that the serial effects of ToM and intention accuracy (and any other significant mediation effects) only partially contribute to the relation between social anxiety and moral reasoning. There may be other aspects contributing to this relation and future research could aim to add to this model. For

example, future research could examine other potential mediators and how they would fit into this model, such as the previously mentioned constructs: negative affect, threat perception biases, and different facets of ToM.

To summarize, support for this set of hypotheses would provide initial evidence for the conceptual model linking early social anxiety, ToM, Interpretations of intention, and moral reasoning in preschool aged children. Comparisons between potential results for the ambiguous and accidental conditions would provide insight on the different mechanisms affecting the relations between social anxiety, intention accuracy/interpretations and moral reasoning. Finding no significant mediation effects may suggest that different social-cognitive biases are affecting this potential relation. It would also indicate that further research would be needed using different ToM tasks for different age groups, or analyses examining age as a moderator (possible exploratory analyses for this study).

### **Age-related Changes in Moral Reasoning**

The fourth set of hypotheses were that four-year old children would demonstrate more outcome-focused moral reasoning than would the five- and six-year old children. Findings in support of these hypotheses would be a significant interaction effect (age by condition). Support for this would be that the follow-up analyses would have demonstrated that, in the accidental condition, the four-year-old children would have been significantly less accurate in their interpretations of intentions, have significantly lower ratings of moral judgement, and significantly higher punishment ratings, as compared to the five- and six-year-olds. No differences would have been found in the intentional condition with the possible exception of responses to the intention-emotion

question as there was no clear story information to inform children's responses to this question. No expectations were made for the ambiguous condition and findings for that condition were more exploratory and would not affect support for these hypotheses.

This pattern of findings indicating an age-related difference in the accidental, compared to the intentional, condition would be in line with findings of a shift from outcome-based to intention-based moral reasoning within the preschool age group (Armsby, 1971; Berndt & Berndt, 1975; Cushman et al., 2013; Nelson, 1980; Nobes et al., 2016). It would also support Nobes et al.'s (2016) findings that punishment ascriptions are in line with moral judgements and would contrast Cushman et al.'s (2013) findings that, for children five years and older, punishment ascriptions focus more on outcome than intention information. Overall, these results would suggest that younger preschool-aged children (four-year-olds) are more focused on outcome based information when making moral judgements and ascriptions of punishment, but that this shifts to intention-based judgements toward the end of the preschool period (i.e., around five- and six-years of age).

Findings that would not support my hypotheses would have shown no significant interactions between age and condition, and no main effect of age. This would be in contrast with research suggesting moral reasoning abilities develop throughout the preschool age range (Berndt & Berndt, 1975; Nelson, 1980; Nobes et al., 2016). If children generally performed poorly on the accidental condition task compared to the intentional condition task (main effect of condition) than this would provide evidence that this developmental shift occurs later in childhood as first suggested by Piaget (1932/1965). However, if the results indicate that all children performed relatively well

for the accidental condition then finding a lack of significance would possibly be due to the age-range used in this study. In a study by Nelson (1980) it is suggested that children as young as three begin to incorporate intention information when making moral judgments, and that this ability becomes more consistent with age. Therefore, if my sample of four-year-olds is closer to five than to three, they may be starting to incorporate intention information more consistently and there might not be a big enough effect size to detect a significant difference with these moral reasoning tasks. If this were the case, I would examine the distributions, mean and standard deviations for age in months to see if there was enough variability in age to capture a significant difference. I would also examine what the specific pattern of performance was for the sample to see if they all responded as expected of those with mature moral reasoning, as expected of those with outcome-based reasoning, or somewhere in the middle. Based on the variability and pattern of responses, it may be informative as to whether the sample of this study would have needed more participants of a certain age.

It is possible that the results would have indicated different age-related findings other than the ones previously mentioned. I will briefly mention a couple of these alternative age-related findings in partial support of the hypotheses. For example, the results could have indicated significant differences between the four- and six-year-old children, but not between them and the five-year-olds. This pattern of results would have demonstrated that the oldest group performed significantly better than the youngest group, but that the five-year-old children, in the middle, did not perform significantly better or worse than either group. As another example, the results may have indicated significant differences between each pair of the three age groups, with the older pair in

each group demonstrating better performance. Generally, patterns of findings such as these in partial support of the hypotheses, would not have followed the exact predictions made for this set of hypotheses, but would have still demonstrated an age-related shift in moral reasoning ability within the preschool age group and would have suggested that older preschool-aged children have more advanced moral reasoning abilities than younger preschool-aged children.

### **Limitations and Future Directions**

The current planned study could have had the potential to provide support either for, or against, the hypothesized relations among social anxiety, theory of mind and moral reasoning. The findings could have potentially bridged together these areas of research, as well as attempted to replicate age-related changes in moral reasoning. The study could have also made clear whether the use of standard false belief tasks or the MoToM were more informative in relation to moral reasoning, especially for children with social anxiety. A main limitation for this study is the lack of data. To address this, data will be collected by Dr. Kamawar's lab as soon as face-to-face data collection is possible. However, there are also other potential limitations to this study. I will address them in turn.

One limitation that may have affected performance is that the moral reasoning tasks involved a third-person stories in which children made judgements based on their observations of unknown story characters. While commonly used in research on moral cognition, this type of task is fairly far removed from the moral situations that a child would experience for themselves in their everyday life. In a more naturalistic setting the child would likely know more information about their peers (compared to a neutral story

character), they would be directly involved instead of being an observer, and certain aspects of the situation may be more salient within a first-person perspective compared to reading a simple story with pictures of dolls. Therefore, although this task can inform on possible connections between social anxiety, interpretations of intention, and moral reasoning, it is not clear how generalizable it is to what happens in the 'real world'. Using more naturalistic tasks, combined with the lab-based measure, may offer further insights on how social anxiety and ToM may affect moral reasoning. Perhaps using observational data or diary studies looking at how children behave, interpret intentions, and react to naturally occurring morally relevant situations would be beneficial to include in future research.

Another limitation of the moral reasoning task is that only negative outcomes are used in this study. This decision was made because including different outcomes and varying them alongside the three intention conditions would require many more moral reasoning stories. In the current study there are three types of intention stories that are important in the goal of examining how socially anxious children interpret and use intention information. In addition, each child receives two of each type of story to increase the reliability of their responses. If two outcomes were varied as well, then each child would hear double the number of stories. This would not be feasible as it would be time-consuming to administer these many stories to each child with the other research tasks. Also, the children may become confused or bored when hearing too many similarly formatted stories within a testing session or even across testing sessions. However, future research could examine situations varying in outcome by including fewer intention conditions (decision could be informed by this study) or looking at some variables

between-subject if it is feasible to recruit enough participants for each group. If socially anxious children are more sensitive to threatening information in the stories due to threat biases and hypervigilance to threat, then they may be more accurate at moral reasoning in situations where the intent is negative, but the outcome is positive because in these types of stories the intention is the more threatening aspect. Socially anxious children may not be more likely to make outcome-based judgements, but instead, be more likely to make judgements based on whatever aspect of the story contains threatening/negative information. If this were the case, it would also be important to examine the role of ToM and threat perception biases in relation to these types of stories. Perhaps ToM reasoning is only adversely impacted when there are negative components involved, as in the MoToM, but not the standard false belief measures. In addition, threat biases may be implicated in potential relations between these constructs, however, this was not explicitly measured in this study. Future work could address this by varying outcome (positive, negative) and intention (positive, negative) and adding questions asking about whether or not the child found each story ‘scary’ in the moral reasoning task. They could also include separate measures of ToM and threat perception biases (similar to Muris, Luermans, et al., 2000; Muris, Merckelbach et al., 2000). This would tell us whether the children found certain stories more threatening and how ToM and threat perception biases are implicated in moral reasoning ability. For example, it could answer the question as to whether socially anxious children find a story with a positive outcome and negative intention more or less threatening than a story where the outcome is negative, but the intention is positive. It could also examine which types of morally-relevant situations are related to ToM ability and threat perception biases. For example, it could

tell us whether either, both or neither ToM and threat perception biases contribute to relations between social anxiety and morally reasoning stories where the intent is negative but the outcome is positive, compared to when the intent is positive but the outcome is negative.

As explained in the introduction it would be important to consider whether possible deficits in ToM could be performance based, meaning the child has the appropriate skills but is not able to utilize them in certain situations, or competence based, in which case the child does not have the appropriate skills for their age. However, the methods used in this study are not able to test whether deficits are performance or competence based. It would be important to examine this distinction in future research. Perhaps future studies could examine socially anxious children's false belief reasoning within a more comfortable setting, such as having family-members a child is comfortable with act out the false belief stories, compared to false belief stories acted out by an unfamiliar research assistant. This may allow for the comparison of false belief reasoning in a familiar context versus a more anxiety provoking context. This, accompanied by state anxiety questionnaires, could help to determine if issues with false belief reasoning are present even when the child is less anxious.

Further, research could examine the relation between social anxiety and ToM longitudinally. Time lagged analyses could be included to examine whether the target variables in this study (social anxiety, moral reasoning, ToM) measured at early ages predict these variables when measured at later ages and how these variables change over time. It could also examine how the relation between these variables changes over time. For example, this type of analyses could examine whether possible early differences in

ToM ability increase over time for highly socially anxious children compared to less socially anxious children. In other words, it would examine how these socio-cognitive variables develop overtime in relation to social anxiety symptoms. However, initial studies as the one proposed in this thesis would be important to examine before investing resources into larger scale longitudinal studies as they would help inform on whether there are any relations between these constructs that would be worth investigating longitudinally. It would also inform on which tasks, especially regarding ToM tasks, and which manipulations (e.g., which intention versus outcome conditions) should be selected for different ages and in relation to social anxiety.

Future work could improve on this study by employing multiple measures of social anxiety, as this would allow for more confidence in the reliability and validity of this factor. In future research, when feasible, it would be beneficial to include observational data or even interview data with a trained clinician or research assistant, to ensure accurate measures of social anxiety. Future research may want to include both clinical and community samples to examine the effects of varying degrees of social anxiety on moral reasoning and ToM abilities. Including a clinical sample would allow for a greater range of social anxiety scores that may be more difficult to find using only a community sample. If there is not enough range of social anxiety scores, then it may be more likely to lead to non-significant results. However, an effect may still exist in the population and therefore including a sample with clinical, high subclinical, and low subclinical levels of social anxiety would be beneficial and allow for a greater likelihood to detect a significant effect, if one exists. It would also be informative as to whether this effect only occurs for those with clinically diagnosed social anxiety disorder or whether it

is present in those with high subclinical levels of social anxiety as well. Measures of general anxiety could also be included to examine whether potential relations are specific to social anxiety.

A final limitation to note would be the age-range of four-to-six-year old children included in this study. It would be beneficial to include a wider age range to examine how the relation between social anxiety, ToM and moral reasoning differ in older children that have further developed self-evaluative and self-conscious anxieties and who may have experienced more of the negative effects related to withdrawn or socially anxious behaviour in children (Rubin et al., 2009). Therefore, I plan to change the study design to include participants four to eight years of age and increase the sample size to 120.

### **Conclusions**

Overall, this planned study was designed to bring together areas of research from both cognitive and social developmental psychology to examine the relations among social anxiety, mental state reasoning, and moral reasoning in preschool children. The proposed conceptual model illustrates how these variables may be related early on in life, and potentially implicated in the difficulties socially anxious children face with their peers and their anxieties surrounding social situations. Therefore, this study would be an important first step in testing these potential relations. Future research could continue to test and expand on these ideas and examine interventions to prevent potential pathways contributing to further social anxiety. This would provide information about a specific area in which to help children high in social anxiety to develop a better understanding of moral situations and others' intentions.

I plan on preregistering the study for this thesis after receiving feedback from the thesis defense meeting. Data will then be collected and tested as soon as face-to-face data collection is safe. The more extensive planned analyses included in this thesis will add to the value of the results as decision making regarding statistical analyses and assumptions will be made a priori, before collecting the target child data, thus reducing potential bias and clearly distinguishing a priori versus ad hoc analyses and hypotheses. The potential results, interpretations, and implications of this study, whether in support of or against the hypotheses, can inform researchers about important avenues for future research on social anxiety and its relation to moral reasoning and different aspects of social cognition.

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### Appendix A: Familiarization Trial

(Andrews, 2015)

[Each time a character is mentioned, point to relevant character in illustration]

#### Positive Outcome

This is Harper and this is Morgan. Harper is drawing a picture with her crayons. Then she sees that Morgan doesn't have anything to play with so Harper shares her crayons with Morgan. Now Morgan can draw a picture

#### Comprehension

1. Were they eating a snack? Yes/No  
     [If yes: "Remember, Harper is drawing a picture with crayons"] up to 3X
2. Did Harper share her crayons with Morgan? Yes/no  
     [If no: "Remember, Harper shares her crayons"] up to 3X

#### Moral Judgement

- 1a. Think about Harper. Was she being bad? Yes/No  
     (if yes) How bad, a little or a lot? Little/ a lot
- b. Was Harper being good? Yes/No  
     (if yes) how good, a little or a lot Little/ a lot

#### Punishment

1. Think about Harper. Should she get in trouble? Yes/No  
     (if yes) How much trouble, a little or a lot? Little/ a lot

### **Appendix A: Familiarization Trial (continued)**

#### **Negative Outcome**

This is Jordan and this is Alex. Jordan is playing with a ball. Alex sees the ball and he wants it so, Alex comes along and takes the ball away from Jordan without even asking.

#### **Comprehension**

- |  |                |
|--|----------------|
| 1. Were they flying a kite?  | Yes/ <b>No</b> |
| [If yes: “Remember, Jordan is playing with a ball”] up to 3X           |                |
| 2. Did Alex take the ball from Jordan?                                 |                |
| [If no: “Remember, Alex comes along and takes the ball away”] up to 3X |                |
|  | <b>Yes/No</b>  |

#### **Moral Judgement**

- |   |               |
|---|---------------|
| 1a. Think about Alex. Was he being bad? | Yes/No        |
| (if yes) How bad, a little or a lot?    |               |
|   | Little/ a lot |
| b. Was he being good?                   | Yes/No        |
| (if yes) how good, a little or a lot    |               |
|   | Little/ a lot |

#### **Punishment**

- |  |               |
|--|---------------|
| 1. Think about Alex. Should he get in trouble? | Yes/No        |
| (if yes) How much trouble, a little or a lot?  |               |
|  | Little/ a lot |

**Appendix B: Story Themes**

(modified from Gardiner, 2017)

<b>Story Theme</b>	<b>Water Hose</b>	<b>Glitter</b>	<b>Digging</b>	<b>Ball</b>	<b>Water Balloon</b>	<b>Sandcastle</b>
<b>Introduction of main character in story context</b>	Karli is playing with a hose in her backyard, splashing water around.	Tom is working on a craft in his classroom, using glitter	Felicia is digging with a shovel in her backyard	Joey is playing soccer in his front yard, kicking it around	Liam is at the park playing with water balloons, throwing them around	Mia is at the beach and is digging a hole in the sand
<b>Introduction of secondary character</b>	This is Sam. She is playing in her backyard.	This is Jessie. He put his picture near Tom	This is Becky. She is playing in her backyard with a toy truck	This is Billy. He is playing with toys in his front yard	This is Noah. He is also playing at the park.	This is Emma. She is building a sandcastle at the beach
<b>Accidental cue</b>	Karli does not see Sam. Karli just wants to keep splashing water.	Tom does not see Jessie’s picture. Tom just wants to play with glitter.	Felicia does not see Becky. Felicia just wants to keep digging.	Joey does not see Billy. Joey just wants to keep kicking his ball.	Liam does not see Noah. Liam just wants to throw his water balloons.	Mia does not see Emma. Mia just wants to keep digging in the sand.
<b>Intentional Cue</b>	Karli sees Sam and wants to splash her with water	Tom sees Jessie’s picture and wants to put glitter on it.	Felicia sees Becky toy truck and wants to put dirt on it	Joey sees Billy toys and wants to kick the ball onto them	Liam sees Noah and wants water from the balloon to splash Noah.	Mia sees Emma’s castle and wants to get sand on it
<b>Ambiguous</b>	Karli is splashing and looking at the water	Tom is looking at his picture	Felicia is digging and looking at her dirt pile	Joey is looking at his ball	Liam is looking at his water balloon	Mia is digging and looking at the wet sand
<b>Outcome of action</b>	Look some of the water went	Look, some of Tom’s glitter	Look, some of the dirt went	Look, Joey kicked the ball	Look, the water balloon	Look, some of Mia’s wet sand

	over the fence and splashed Sam	went over on Jessie's picture	over on the fence and landed on Becky's truck	and it landed on Billy's toys	bounced off the ground and got Noah wet	landed on Emma's castle
<b>Negative Emotional Outcome</b>	Sam is sad, now she has to get dry clothes.	Jessie is sad, he does not like glitter on his picture.	Becky is sad, she did not want her truck to get dirty.	Billy is sad, the ball knocked over his toys.	Noah is sad, he did not want to get wet.	Emma is sad, the sand ruined her castle.

**Appendix C: Example of Story Photos**

(Gardiner, 2017)

These example photos are the photos used in story order 1 intention cue combo 1.

**Theme – Intention cue type:** Sandcastle - Intentional



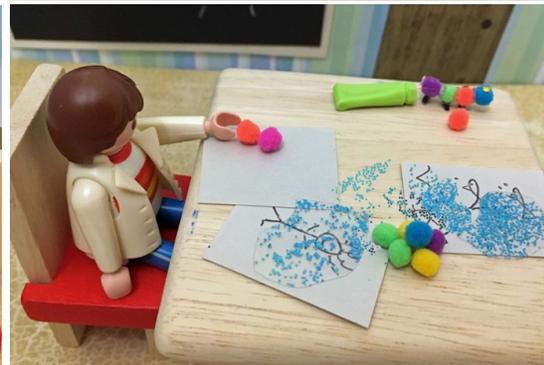
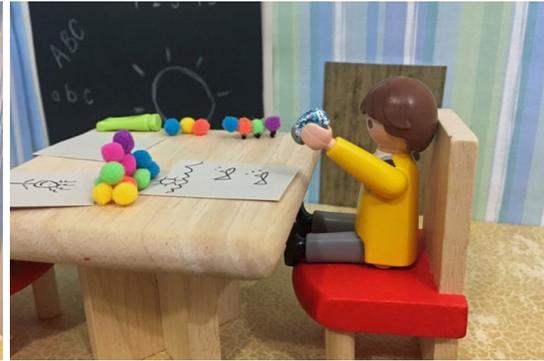
Digging-Intentional



Water Hose – Accidental



Glitter – Accidental



Water Balloon - Ambiguous



Ball – Ambiguous



**Appendix D: First-Order False Belief Protocol**

First-order False Belief – Change of Location (Wimmer & Perner, 1983; Vendetti, 2015)

**Theory of Mind Task (Change of Location)**

I'm going to tell you a story. Listen carefully and then I'll ask you some questions.

This little girl's name is Jill. Jill was playing with a ball. When she was done playing with it, she put it in the white box and then went outside to play. (*Move Jill aside, hidden*).

While Jill was playing outside, her friend Peter came along. Peter found the ball and he played with it for a little while. When he was done he put it in the polka-dot box and then he went away to do something else. (*Move Peter to a different aside location, hidden*).

1. **Where did Jill put the ball?** [white box] [polka dot box]

---

2. **Where is the ball now?** [polka dot box] [white box]

---

**A little while later, Jill came back from playing outside. She wanted to play with the ball again.** (*Position Jill an equal distance from both boxes. Do not orient her towards either box*).

3. **Where will Jill first look for the ball?** [white box] [polka dot box]

---

### Appendix D: First-Order False Belief Protocol

First-order False-Belief – Unexpected Contents (Astington & Gopnik, 1988; Vendetti, 2015)

#### Theory of Mind (Unexpected Contents)

**Look at this** (*show a closed Crayola crayons box*).

1. **What's in here?** [crayons]\_\_\_\_\_

**Let's open it and have a look** (*Open box and show child*).

2. **What is it?** [toy pig]\_\_\_\_\_

**Yah! A toy pig! That's interesting, isn't it? I just put it in this box to keep it safe. Well, let's put him back into the box now ...** (*Put pig back in the box*). *Once box is closed:*

3. **What's in the box?** [pig]\_\_\_\_\_

\*False Belief for self:

4. **What did you think was inside the box BEFORE we opened it?**

[pig] [crayons]\_\_\_\_\_

\*False Belief for other: **Tomorrow I am going to play this game with a brand new friend.**

5. **What will s/he think is inside it BEFORE s/he opens it?**

[pig] [crayons]\_\_\_\_\_

### Appendix E: Second-Order False Belief Protocol

(Loke, 2010; Sullivan et al., 1994; Vendetti, 2015)

#### Theory of Mind (Second-Order False Belief: Cookies)

Use plan toy dolls to act out each bullet point. Directions for researchers appear in italics, in square brackets.

- This is a story about a brother and sister, Molly and Andrew, [*indicate Molly and Andrew*]. They are doing homework in the kitchen.
- Molly made some cookies for them to share, Andrew wants to eat the cookies now, but Molly doesn't want to.
- Molly needs to ask her dad a question about her homework. She puts the plate of cookies in the fridge and leaves the room.
- While Molly is gone, Andrew gets the plate of cookies and eats one of them. Then he puts the plate of cookies in the cupboard. [*Andrew remains standing there while Molly comes back from the other room*].
- Molly is finished asking her dad a question and she comes back. [*Stands behind Andrew*]. She sees Andrew putting the plate of cookies in the cupboard. Molly watches Andrew, but Andrew does not see Molly.

Comprehension Questions:

**1. Where did Molly put the plate of cookies when she left the room?**

[fridge] [cupboard] [IDK]\_\_\_\_\_

**2. Where did Andrew put the plate of cookies?** [cupboard] [fridge] [IDK]\_\_\_\_\_

**3. Does Molly know where the cookies are now?** [yes] [no] [IDK]\_\_\_\_\_

First-order false belief:

**4. Does Andrew know [*point to Andrew*] that Molly [*point to Molly*] saw him**

**[*motion from Molly to John*]?** [yes] [no] [IDK]\_\_\_\_\_

*Story Continues:*

- **A little while later, Molly tells Andrew that they can eat the cookies. She is going to get them.** [*Move Molly so that she is equal distance from the two locations*]

Second-order false belief:

**5. Where does Andrew think [*pointing to Andrew*] that Molly [*point to Molly*] will look for the cookies?** [fridge] [cupboard] [IDK]\_\_\_\_\_

## Appendix E: Second-Order False Belief Protocol

### Theory of Mind (Second-Order False Belief: Book)

*Use Playmobil dolls to act out each bullet point.*

- This is a story about two friends, John and Sophia [indicate John and Sophia].
- John has a new book that he just got. Sophia wants to read John's new book, but he does not want her to.
- John's mum calls him to go downstairs. HE puts the book under his blanket and goes downstairs
- While John is gone, Sophia takes the book and reads it. Then she puts it in John's toy box. [Sophia remains standing there while John comes back from being with his mom].
- John is finished with his mum and comes back. [Stands behind Sophia]. He sees Sophia putting the book in his toy box. John watches Sophia, but Sophia does not see John.

Comprehension Questions:

**1. Where did John put the book before he went downstairs?**

[bed] [toy box] [IDK] \_\_\_\_\_

**2. Where did Sophia put the book? [toy box] [bed] [IDK] \_\_\_\_\_**

**3. Does John know where the book is now? [yes] [no] [IDK] \_\_\_\_\_**

First-order false belief:

**4. Does Sophia know [point to Sophia] that John [point to John] saw her**

*[motion from John to Sophia]?* [yes] [no] [IDK] \_\_\_\_\_

*Story Continues:*

- **A little while later, John tells Sophia that she can read his new book. He is going to get the book for her.** *[Move John so that he is equal distance from the two locations]*

Second-order false belief:

**5. Where does Sophia think [pointing to Sophia] that John [point to John] will look for the book? [bed] [toy box] [IDK] \_\_\_\_\_**

**Appendix F: Morally Relevant Theory of Mind Protocol**  
(Sobers, Andrews, Jerome, Halliday & Kamawar, 2018)

**Morally Relevant Theory of Mind – CRAFT**

(each bullet point corresponds with new picture)

- Zach and his brother Adrian are having popsicles together at a birthday party.
- After they're done eating them, they sit down at the craft table to make a craft. Zach and Adrian each wrap their finished popsicle sticks into a napkin to throw in the garbage later.
- Adrian gets up to go to the bathroom.
- While Adrian is gone, Zach finishes his craft and decides to use his napkin to keep it safe. So, he takes out the popsicle stick and wraps his craft inside.
- Then Zach leaves to go put his popsicle stick in the garbage. While he's gone, Adrian comes back from the washroom and goes back to the craft table.
- He gets his wrapped popsicle stick to throw it in the garbage. Adrian notices Zach's napkin on the table, and wants to help tidy up, so Adrian grabs it
- and throws it in the garbage too.

1) What did Adrian think was in the napkin? **Popsicle stick/garbage** Craft  
Other \_\_\_\_\_

2) What was really in the napkin? **Craft** Popsicle stick/Garbage  
Other \_\_\_\_\_

3) Where will Zach first look for his craft when he comes back?  
**Craft table/napkin** Garbage Other \_\_\_\_\_

- if **napkin**: Where does he think the napkin is? **Craft table** Garbage other \_\_\_\_\_

\_\_\_\_\_

4) Where is his craft? **Garbage/napkin** Craft table Other \_\_\_\_\_

- if **napkin**: Where is the napkin? Craft table **Garbage** other \_\_\_\_\_

**Appendix F: Morally Relevant Theory of Mind Protocol**  
(Sobers, Andrews, Jerome, Halliday & Kamawar, 2018)

**Morally Relevant Theory of Mind – COOKIE**

(each bullet point corresponds with new picture)

- Shalini and Jennifer are having lunch together at school.
- Shalini finished her lunch and put her water bottle back in her lunch bag. When Jennifer finished her lunch, she put her banana peel inside of her empty chip bag.
- Then, the teacher told everyone that she brought them cookies as a treat. Shalini finishes her cookie and tidies up her desk. She gets up and goes to put her garbage away and wash her hands.
- While Shalini is gone, Jennifer decides to save her cookie for later, so she takes the banana peel out of her chip bag and puts the cookie inside to save it.
- Jennifer picks up the banana peel, throws it away, and goes outside to play. While she's gone, Shalini comes back to the classroom.
- Shalini notices Jennifer's chip bag left on the table, and wants to help tidy up, so Shalini picks it up
- and throws the bag in the garbage.

1) What did Shalini think was in the chip bag?     **Peel/Garbage**     Cookie

Other\_\_\_\_\_

2) What was really in the chip bag?     **Cookie**     Peel/Garbage     Other\_\_\_\_\_

3) Where will Jennifer first look for her cookie when she comes back inside?

**Table/chip bag**     Garbage     Other\_\_\_\_\_

- if **chip bag**: Where does he think the chip bag is?     **Table**     Garbage     other\_\_\_\_\_

\_\_\_\_\_

4) Where is her cookie?     **Garbage/chip bag**     Table     Other\_\_\_\_\_

- if **chip bag**: Where is the chip bag?     **Garbage**     other\_\_\_\_\_

**Appendix G: Preschool Anxiety scale – Social Anxiety Subscale**  
 (Spence, Rapee, McDonald, & Ingram, 2001)

**Preschool Anxiety Scale – Social Anxiety Subscale**  
**(Parent Report)**

Your Name: \_\_\_\_\_

Date: \_\_\_\_\_

Your Child's Name: \_\_\_\_\_

Below is a list of items that describe children. For each item please circle the response that best describes your child. Please circle the **4** if the item is **very often true**, **3** if the item is **quite often true**, **2** if the item is **sometimes true**, **1** if the item is seldom true or if it is not true at all circle the **0**. Please answer all the items as well as you can, even if some do not seem to apply to your child.

	<b>Not True at all</b>	<b>Seldom True</b>	<b>Sometimes True</b>	<b>Quite Often True</b>	<b>Very Often True</b>
1 Worries that he/she will do something to look stupid in front of other people.....	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
2 Is scared to ask an adult for help (e.g., a preschool or school teacher).....	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
3 Is afraid of meeting or talking to unfamiliar people.....	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
4 Is afraid of talking in front of the class (preschool group) e.g., show and tell.....	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
5 Worries that he/she will do something embarrassing in front of other people.....	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
6 Is afraid to go up to group of children and join their activities.....	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>

### Appendix H: Story Orders

Note that there are two story orders (One and Two), and within each, every story theme appears in every intention condition.

#### Order One:

Story Theme	Combo One	Combo Two	Combo Three
Sandcastle Digging	Intentional	Accidental	Ambiguous
Water Hose Glitter	Accidental	Ambiguous	Intentional
Water balloon Ball	Ambiguous	Intentional	Accidental

#### Order Two:

Story Theme	Combo One	Combo Two	Combo Three
Water Hose Glitter	Intentional	Accidental	Ambiguous
Water balloon Ball	Accidental	Ambiguous	Intentional
Sandcastle Digging	Ambiguous	Intentional	Accidental

## Appendix I: Department of Psychology Approval Emails

**Re: Data collection and completion of MA theses**

Deepthi Kamawar <DeepthiKamawar@cunet.carleton.ca>

Sat 2020-03-28 11:36 AM

To: Michael Wohl <MichaelWohl@cunet.carleton.ca>; Joanna Pozzulo <Joanna.Pozzulo@carleton.ca>

Hi Joanna and Michael,

Thank you both for your very quick responses, and your support for my plan. I will reach out to my students' committee members and come up with a plan.

We are all doing well - thank you.

I hope you and your families are all keeping healthy,  
Deepthi

-----  
Deepthi Kamawar  
Associate Professor  
Graduate Supervisor, ICS  
Institute of Cognitive Science and  
the Department of Psychology  
Dunton Tower 2213  
Carleton University  
1125 Colonel By Drive  
Ottawa ON  
K1S 5B6  
deepthi.kamawar@carleton.ca  
Office: 613.520.2600 x7021  
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**From:** Michael Wohl <MichaelWohl@cunet.carleton.ca>

**Sent:** March 28, 2020 11:26 AM

**To:** Joanna Pozzulo <Joanna.Pozzulo@carleton.ca>; Deepthi Kamawar <DeepthiKamawar@cunet.carleton.ca>

**Subject:** Re: Data collection and completion of MA theses

Thank you Joanna. I was in the midst of writing a very similar response. Deepthi, I hope all is well with you and your family. Please let your students know they are free to contact me any time should they have queries.  
Michael

--

Michael J. A. Wohl, Ph.D.  
Professor and Graduate Chair  
Department of Psychology  
Carleton University  
B550 Loeb Bldg.  
Ottawa, ON, CANADA, K1S 5B6

OFFICE: 314G SSRB  
PHONE: 613.520.2600 x 2908 FAX: 613.520.3667  
<https://carleton.ca/bettermentlabs/>

"Your next action could change the world, so make it a good one"

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**From:** Joanna Pozzulo <Joanna.Pozzulo@carleton.ca>  
**Date:** Saturday, March 28, 2020 at 11:22 AM  
**To:** Deepthi Kamawar <DeepthiKamawar@cunet.carleton.ca>, Michael Wohl <Michael.Wohl@carleton.ca>  
**Subject:** Re: Data collection and completion of MA theses

Hi Deepthi,  
Thank you for this. These are certainly unprecedented times and moving forward the word seems to be "flexible".

I don't think we want to hold anyone back. I think your plan is a good one on how to move forward for students in this position. Please meet with the student committees and feel free to move forward in a manner that makes most sense for the students to defend on time.

Please let me know if you have any questions.

Thank you! Hope you are staying well.  
Joanna

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**From:** Deepthi Kamawar <DeepthiKamawar@cunet.carleton.ca>  
**Date:** Saturday, March 28, 2020 at 10:42 AM  
**To:** Joanna Pozzulo <JoannaPozzulo@CUNET.CARLETON.CA>, Michael Wohl <Michael.Wohl@carleton.ca>  
**Subject:** Data collection and completion of MA theses

Hi Joanna and Michael,

I'm sorry if you've sent out information on this and I've missed it -- there have been a lot of emails (as I'm sure you both know).

I am writing to ask if there's a departmental decision regarding MA students who were otherwise on track to be done by the end of this summer, but will not have data given the current situation, as I have MA students to whom this applies. For example, Allie Russell had everything in place and had begun recruitment, but cannot collect data with preschool-aged children. Her study does not lend itself to online data collection (the tasks just don't transfer). Further, she's been admitted to a counselling program in the fall which requires her to have completed this degree. Another student, Ellen Doucet, already began data collection (again, with preschoolers), but had fairly little completed before daycares closed (though, she had a number of participating daycares and many consent forms out). Again, her tasks do not transfer to online collection. I'm sure you get the idea.

My stance on this is if students were doing what they were supposed to be doing (i.e., generally on track), then I do not want to hold them back from graduating on time due to a lack of data, given that the lack of data is not something under their control (no facet-to-face testing is currently possible, and doesn't sound like it will be for some time). I would meet with their committee to discuss an acceptable alternative final product (e.g., writing up the analyses they would have done if they had data, writing a discussion based on having found support for their hypotheses, etc.) that allows them to defend on time.

Thank you,  
Deepthi

**Appendix J: Informed Consent form for Parents or Guardians**

**Children's Representational  
Development Lab**  
[www.carleton.ca/crdl](http://www.carleton.ca/crdl)

Winter/Spring 2017

Dear parent(s) or guardian(s),

As part of a current project on children's cognitive development, we are talking to children to learn about their developing ability to use information about whether someone did something on purpose, or by accident, when making moral judgments of story characters. The study has been approved by the Carleton University Research Ethics Board-B (CUREB-B Clearance number #112222; valid until 01/31/2021). In this letter, we will describe the project and request your permission for your child to participate. The purpose of an informed consent is to ensure that you understand the purpose of the study and the nature of your child's involvement.

Children will hear a number of stories involving characters that are engaging in actions (e.g., splashing water in the yard) that result in something happening to another character (e.g., someone gets wet), or a secondary character's belongings (e.g., glitter gets on artwork). The second character is described as sad because her clothes are wet or her art is ruined. Children are then asked about the story characters (e.g., whether they did something good or bad, or whether the character should get in trouble for what they did). We are interested in what children consider when making judgements about story characters. We will also play language games, and tell children stories and ask them questions about story characters' beliefs or intentions. In addition, you will be asked to complete a questionnaire about your child's level of social anxiety as we will be examining the relation between social anxiety and children's judgments about story characters. Children usually enjoy these kinds of activities and will be given stickers as thanks (even if they stop playing part-way through). We will also provide enough stickers for all children in the participating classrooms to the daycare, so that all children get some, even if they're not participating in our study.

We will meet with each child twice, for approximately 20 minutes each time. Participation in this experiment is completely *voluntary*. Children will be asked if they want to participate, and if they don't, they will not be pressured into participating. The researchers all have current police record checks, and copies of these documents will be provided to the child care centre coordinator before we commence any interviews with your child. The researchers will also be sensitive to the children at all times. Children can stop playing at any time during the session and will still receive their stickers.

The information collected in this study is confidential and will be coded such that a child's name is not associated with their responses. The information provided will be used for research purposes only, and will only be accessible to the researchers directly involved in the project. Individual

participants' data will only be seen by the research team and not made available to anyone else. Reports will be shared, however, in conference presentations and in publications, but no identifying information will be included. The consent form will be kept separate from the data in a locked cabinet and will be destroyed after 2 years. The datafile and hard-copies of data, though they do not include identifying information, are stored on a password protected computer (the datafile) and in a locked room (the hard copies). As soon as we have finished talking with a child, we will remove the file linking the that child's name to their identification number. In other words, it will no longer be possible to identify an individual child's responses (the data will be anonymized). As a result, participants will no longer be able to withdraw their data after that time. We estimate that this will occur approximately 2 weeks after speaking to each child. Analyses presented in presentations or written publications will only contain group data, with no identification of individuals who participated in this study.

The research supervisor of this project is Dr. Deepthi Kamawar and she may be reached at 613-520-2600, ext. 7021 or [deepthi.kamawar@carleton.ca](mailto:deepthi.kamawar@carleton.ca). The primary researcher involved in this project is Allie Russell M.A. candidate, and she can be reached by email at [allierussell@cmail.carleton.ca](mailto:allierussell@cmail.carleton.ca). Additional undergraduate students, Krystal Morrison ([krystalmorrison@cmail.carleton.ca](mailto:krystalmorrison@cmail.carleton.ca)) and Vivian Riggs ([vivianrigg@cmail.carleton.ca](mailto:vivianrigg@cmail.carleton.ca)), will be assisting with this study. This study is funded by the Social Sciences and Humanities Research Council of Canada.

This study has been approved by Carleton University's Research Ethics Board-B (ethics protocol number: #112222) and has been deemed minimal risk. Some participants may find a particular task taxing, which could cause them to become upset. In those rare cases, children are dealt with in a very sensitive manner (told that we're all done, thanked for doing a great job) and taken back to their teachers. We have used similar tasks with approximately 2000 children in the same age ranges over the past 13 years and found this reaction to be extremely rare. Should you have any ethical concerns with the study, please contact the REB Chair, Carleton University Research Ethics Board-B (by phone: 613-520-2600 ext. 4085 or by email: [ethics@carleton.ca](mailto:ethics@carleton.ca)). For all other questions about the study, please contact the researcher.

Your consent is required for your child's participation in this project. Kindly sign the attached consent form indicating whether your child may participate in this research and return it to your child's daycare. If you would like a summary of the research results once the study is completed, please contact Allie Russell. However, please note that individual feedback regarding the children cannot be provided.

Thank you for your consideration.

Sincerely,

Deepthi Kamawar, PhD

Allie Russell, M.A. candidate

**Carleton University Study – Moral Reasoning: The Roles of Theory of Mind and Social Anxiety in Preschoolers**

*The information collected for this project is confidential and protected under the Provincial Freedom of Information and Protection of Privacy Act.*

I have read and understood the request for my child to participate in the study of *Moral Reasoning: The Roles of Theory of Mind and Social Anxiety in Preschoolers*. I have discussed it with my child and ...

I consent to my child's participation in the current study **[please fill out the next page]**

I do not consent to my child's participation in the current study

Child's Name (please print): \_\_\_\_\_

Parent's/Guardian's Name (please print):  
\_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

### Participant Information

If you have consented to your child participating on the previous page, please provide us with the following information about your child and please complete the attached preschool social anxiety questionnaire. Once completed, return the consent form, participant information page and questionnaire in a sealed envelope to your child's teacher. If you have not provided consent, please do not fill out this page or the questionnaire.

**Please note:** your child's name and birth date will be kept separate from their data and consent form, and only researchers directly involved in this project will have access to this information.

Child's Date of Birth: year \_\_\_\_\_ month \_\_\_\_\_ day \_\_\_\_\_

Child's Gender: \_\_\_\_\_

Please indicate the language(s) spoken at home and then please circle the ones that your child is

fluent in: \_\_\_\_\_

---

**Appendix K: Informed Consent form for Program Director**

**Children's Representational  
Development Lab**  
[www.carleton.ca/crdl](http://www.carleton.ca/crdl)

Winter/Spring 2020

Dear Program Coordinator,

As part of a current project on children's cognitive development, we are talking to children to learn about their developing ability to use information about whether someone did something on purpose, or by accident, when making judgments of story characters. The study has been approved by the Carleton University Research Ethics Board-B (CUREB-B Clearance number #112222; valid until 01/31/2021). In this letter, we will describe the project and request your permission for your centre's participation.

Should you wish to participate in the current project, we will provide you with individual informed consent letters to distribute to the parent(s) or guardian(s) of the four- to six-year-old children in your centre. Once consent letters have been returned to you from parents, we will arrange a convenient time for you to have our researchers at your center to talk to the children. The researchers are university students with current police record checks and copies of these documents will be provided to the daycare director before we commence any interviews with the children. The researchers will also be sensitive to the children at all times.

Children will hear a number of stories involving characters that are engaging in actions (e.g., splashing water in the yard) that result in something happening to a secondary character (e.g., someone gets wet), or a secondary character's belongings (e.g., glitter gets on artwork). The actions are then described as having a negative emotional effect on the secondary character (e.g., the character is sad because her clothes are wet). Children will then be asked questions about the story characters (e.g., whether they did something good or bad, or whether the character should get in trouble for what they did). We are interested in whether children consider a character's intention when engaging in an action that results in a negative outcome for second character. We will also play games that measure related skills such as general language ability and the ability to understand beliefs and intentions. In addition, parents will be asked to complete a questionnaire measuring social anxiety in young children, which will be returned with the consent forms in a sealed envelope, as we will be examining the relation between social anxiety and children's understandings of intention. Children usually enjoy these kinds of activities and will be given stickers as thanks (even if they stop playing part-way through). We will also provide enough stickers for all children in the participating classrooms to the daycare, so that all children get some, even if they're not participating in our study.

We will meet with each child twice, for approximately 15 to 20 minutes each time. Participation in this experiment is completely *voluntary*. Children will be asked if they want to participate, and

if they don't, they will not be pressured into participating. Children can stop playing at any time during the session and will still receive their stickers.

The information collected in this study is confidential and will be coded such that a child's name is not associated with their responses. The information provided will be used for research purposes only, and will only be accessible to the researchers directly involved in the project. Individual participants' data will only be seen by the research team and not made available to anyone else. Reports will be shared, however, in conference presentations and in publications, but no identifying information will be included. The consent form will be kept separate from the data in a locked cabinet and will be destroyed after 2 years. The datafile and hard-copies of data, though they do not include identifying information, are stored on a password protected computer (the datafile) and in a locked room (the hard copies). Soon after as we have finished talking to a child, we will remove the information linking that child's name to their identification number. In other words, it will no longer be possible to identify an individual child's responses (the data will be anonymized). As a result, it will no longer be able possible to withdraw their data after that time. We estimate that this will occur approximately two weeks after meeting with each child. Analyses presented in presentations or written publications will only contain group data, with no identification of individuals who participated in this study.

The research supervisor of this project is Dr. Deepthi Kamawar and she may be reached at 613-520-2600, ext. 7021 or [deepthi.kamawar@carleton.ca](mailto:deepthi.kamawar@carleton.ca). The primary researcher involved in this project is Allie Russell, M.A. candidate, and she can be reached by email at [allierussell@cmail.carleton.ca](mailto:allierussell@cmail.carleton.ca). Additional undergraduate students, Krystal Morrison ([krystalmorrison@cmail.carleton.ca](mailto:krystalmorrison@cmail.carleton.ca)) and Vivian Riggs ([vivianrigg@cmail.carleton.ca](mailto:vivianrigg@cmail.carleton.ca)), will be assisting with this study. This study is funded in part by the Social Sciences and Humanities Research Council of Canada, in the form of a scholarship to the main student researcher.

This study has been approved by Carleton University's Research Ethics Board-B (ethics protocol number: #XX-XXX) and has been deemed minimal risk. Some participants may find a particular task taxing, which could cause them to become upset. In those rare cases, children are dealt with in a very sensitive manner (told that we're all done, thanked for doing a great job) and taken back to their teachers. We have used similar tasks with approximately 2000 children in the same age ranges over the past 13 years and found this reaction to be extremely rare. Should you have any ethical concerns with the study, please contact the REB Chair, Carleton University Research Ethics Board-B (by phone: 613-520-2600 ext. 4085 or by email: [ethics@carleton.ca](mailto:ethics@carleton.ca)). For all other questions about the study, please contact the researcher.

Your consent is required for your centre's participation in this project. Kindly sign the attached consent form indicating whether we may provide you with individual consent forms for parents or guardians of children within this age range in your centre. If you would like a summary of the research results once the study is completed, please contact Allie Russell. However, please note that individual feedback regarding the children cannot be provided.

Thank you for your consideration.

Sincerely,

Deepthi Kamawar, Ph.D.

Allie Russell, M.A. candidate

**Carleton University Study – Moral Reasoning: The Roles of Theory of Mind and Social Anxiety in Preschoolers**

*The information collected for this project is confidential and protected under the Provincial Freedom of Information and Protection of Privacy Act.*

I have read the attached description of the study of *Moral Reasoning: The Roles of Theory of Mind and Social Anxiety in Preschoolers* and I understand the conditions of my child care centre's participation.

I understand that the study will require two 15 to 20-minute testing sessions, with willing children of appropriate ages, whose parents/guardians have given written consent for their children's participation in the research project.

Name of Centre: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Name & Title: \_\_\_\_\_

**Appendix L: Informed Consent form for Adult Participants**

**Children's Representational  
Development Lab**  
[www.carleton.ca/crdl](http://www.carleton.ca/crdl)

In this letter, we will describe the project and request your consent to participate. The purpose of an informed consent is to ensure that you understand the purpose of the study and the nature of your involvement. The informed consent must provide sufficient information such that you have the opportunity to determine whether you wish to participate in the study.

**Present study: Moral Reasoning: The Roles of Theory of Mind and Social Anxiety in Preschoolers**

**Research Personnel.** The following people are involved in this study, and may be contacted at any time if you have questions or concerns: Allie Russell ([allierussell@cmail.carleton.ca](mailto:allierussell@cmail.carleton.ca)) and Dr. Deepthi Kamawar (Faculty Sponsor, e-mail: [deepthi.kamawar@carleton.ca](mailto:deepthi.kamawar@carleton.ca)).

**Concerns.** Should you have any ethical concerns with the study, please contact the REB Chair, Carleton University Research Ethics Board-B (by phone: 613-520-2600 ext. 4085 or by email: [ethics@carleton.ca](mailto:ethics@carleton.ca)). For all other questions about the study, please contact the researcher.

**Purpose.** As part of a current project on children's cognitive development, we are talking to children to learn about their developing ability to use intention information in their moral judgments. In order to compare these results to the way that adults respond, we are also collecting data from an adult population.

**Task Requirements.** You will read a number of very short stories involving characters who perform a number of actions. You will then be asked to evaluate the characters in the stories. We are interested in examining the factors that are considered when making these decisions. The testing session will last for approximately 20 minutes.

**Benefits/compensation.** Participation in this experiment is completely *voluntary*. You will receive course credit as compensation for your participation for a course registered with this option. You can stop participating at any time during the session, or omit any questions that you would rather not answer, and will still receive your compensation.

**Potential risk/discomfort.** The study involves no physical or psychological risks for those who take part in it.

**Anonymity/Confidentiality.** The information collected in this study is confidential and will be coded such that a participant's name is not associated with their responses. The information provided will be used for research purposes only, and will only be accessible to the researchers directly involved in the project. The consent form will be kept separate from the data in a locked cabinet and will be destroyed after 2 years. The datafile and hard-copies of data, though they do not include identifying information, are stored on a password protected computer (the datafile) and in a locked room (the hard copies). As soon as we have finished collecting information from all of the participants, we will remove the file linking the participant's names to their identification numbers used in the datafile. At this point, it will no longer be possible to identify an individual participant's responses (i.e., the data will be anonymized). As a result, it will no longer be possible to withdraw your data after that time. We estimate that this will occur approximately two weeks after meeting with each participant. Analyses presented in presentations or written publications will only contain group data, with no identification of individuals who participated in this study.

**Right to withdraw.** Your participation in this study is entirely voluntary. At any point during the study, you have the right to not complete certain questions, or to withdraw without penalty. If you withdraw, you have the right to require that your data be deleted. In all of these cases, you will still receive course credit.

The study has been approved by the Carleton University Research Ethics Board-B (CUREB-B Clearance number #112222; valid until 01/31/2021).

Your consent is required for your participation in this project. Kindly sign the attached consent form indicating whether you consent to participate in this research. If you would like a summary of the research results once the study is completed, please contact Allie Russell. However, please note that individual feedback cannot be provided.

Thank you for your consideration.

Sincerely,

Deepthi Kamawar, PhD

Allie Russell, M.A. candidate

**Present study: Moral Reasoning: The Roles of Theory of Mind and Social Anxiety in Preschoolers****Signatures**

*The information collected for this project is confidential and protected under the Provincial Freedom of Information and Protection of Privacy Act.*

*I have read the above form and understand the conditions of my participation. My participation in this study is voluntary, and I understand that if at any time I wish to leave the experiment, I may do so without having to give an explanation and with no penalty whatsoever. Furthermore, I am also aware that the data gathered in this study are confidential and anonymous with respect to my personal identity. My signature indicates that I agree to participate in this study.*

Participant's Name: \_\_\_\_\_ Participant's signature: \_\_\_\_\_

Researcher's Name: \_\_\_\_\_ Researcher's signature: \_\_\_\_\_

Date: \_\_\_\_\_

## Appendix M: Ethics Clearance Certificates



Office of Research Ethics  
4500 ARISE Building | 1125 Colonel By Drive  
Ottawa, Ontario K1S 5B6  
613-520-2600 Ext: 4085  
[ethics@carleton.ca](mailto:ethics@carleton.ca)

### CERTIFICATION OF INSTITUTIONAL ETHICS CLEARANCE

The Carleton University Research Ethics Board-B (CUREB-B) has granted ethics clearance for the research project described below and research may now proceed. CUREB-B is constituted and operates in compliance with the *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans* (TCPS2).

**Ethics Protocol Clearance ID:** Project # 112222

**Research Team:** Ms. Allie Russell (Primary Investigator)  
Dr. Deepthi Kamawar (Research Supervisor)  
Vivian Rigg (Student Researcher: Undergraduate)  
Krystal Morrison (Student Researcher: Undergraduate)

**Project Title:** Moral Reasoning: The Roles of Theory of Mind and Social Anxiety in Preschoolers

**Funding Source** (If applicable):

**Effective:** February 28, 2020

**Expires:** February 28, 2021.

**Please ensure the study clearance number is prominently placed in all recruitment and consent materials: CUREB-B Clearance # 112222.**

#### **Restrictions:**

This certification is subject to the following conditions:

1. Clearance is granted only for the research and purposes described in the application.
2. Any modification to the approved research must be submitted to CUREB-B via a Change to Protocol Form. All changes must be cleared prior to the continuance of the research.
3. An Annual Status Report for the renewal of ethics clearance must be submitted and cleared by the renewal date listed above. Failure to submit the Annual Status Report will result in the closure of the file. If funding is associated, funds will be frozen.
4. A closure request must be sent to CUREB-B when the research is complete or terminated.



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#### **CERTIFICATION OF INSTITUTIONAL ETHICS CLEARANCE**

The Carleton University Research Ethics Board-B (CUREB-B) has granted ethics clearance for the changes to protocol to research project described below and research may now proceed. CUREB-B is constituted and operates in compliance with the *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans* (TCPS2).

**Ethics Clearance ID:** Project # 112222

**Principal Investigator:** Ms. Allie Russell

**Co-Investigator(s)** (If applicable): **Ms. Allie Russell (Primary Investigator)**

Dr. Deepthi Kamawar (Research Supervisor)

Vivian Rigg (Student Researcher: Undergraduate)

Krystal Morrison (Student Researcher: Undergraduate)

**Project Title:** Moral Reasoning: The Roles of Theory of Mind and Social Anxiety in Preschoolers

**Funding Source:**

**Effective:** June 15, 2020

**Expires:** February 28, 2021.

Upon reasonable request, it is the policy of CUREB, for cleared protocols, to release the name of the PI, the title of the project, and the date of clearance and any renewal(s).

During the course of the study, if you encounter an adverse event, material incidental finding, protocol deviation or other unanticipated problem, you must complete and submit a Report of Adverse Events and Unanticipated Problems Form, found here: <https://carleton.ca/researchethics/forms-and-templates/>

Please email the Research Compliance Coordinators at [ethics@carleton.ca](mailto:ethics@carleton.ca) if you have any questions.

In light of the COVID-19 outbreak, the REB has developed guidance for human participants' research at <https://carleton.ca/researchethics/>. However, the situation is evolving rapidly so please check back regularly to keep up with any ongoing changes to this guidance.