THE PROSOCIAL BEHAVIOUR OF SHY CHILDREN

by

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Abstract

Shyness appears to be a major barrier to prosocial behaviour in young children, making them less likely to help, share with, comfort, or cooperate with people in need. In this dissertation, I explore the root causes of shy children’s lower rates of intervention and seek to identify the conditions in which they will be less likely, or slower, to intervene than their not-shy peers. I begin, in Chapter 1, by critically reviewing the current literature, synthesizing findings into three main implications, and identifying major issues that should be addressed in future research. In Chapter 2, I address one of these issues: that past research has primarily framed shyness as a factor that affects children’s motivation to intervene without considering its effect on their understanding of how to do so. In that chapter, I describe a study we conducted to test how preschool children would respond to prosocial tasks that varied systematically in their complexity and social engagement demands. Chapter 3 addresses two other limitations in the current literature: that past research has focused on how shy children react to prosocial situations in the lab, involving only adults, and that many studies have measured the broader construct of social withdrawal as a proxy for shyness. For that study, we examined how children would respond to an experimenter in a structured individual setting compared to their peers in a naturalistic, daycare group setting. We measured shyness by observing how often they displayed reticent behaviour during a free-play period, which is a specific type of social withdrawal that has been linked to anxiety in past research. Finally, in Chapter 4, I review the practical implications of our findings and raise important questions for future research.
Co-Authorship

Tara Karasewich prepared the four manuscripts that make up this dissertation and conducted the main data analysis and interpretation for the studies described in Chapters 2 and 3. This work was completed under the supervision of Dr. Valerie Kuhlmeier.

An earlier draft of the manuscript for Chapter 2 was prepared in collaboration with Nina Buchenrieder, Dr. Kristen Dunfield, Cameron Hines, Dr. Valerie Kuhlmeier, and Sylvia Pinheiro. The authors made the following contributions:

- **Study design**: Nina Buchenrieder, Dr. Kristen Dunfield, Tara Karasewich, Dr. Valerie Kuhlmeier, & Sylvia Pinheiro
- **Data collection**: Nina Buchenrieder
- **Figure illustrations**: Sylvia Pinheiro
- **Supplemental analyses**: Cameron Hines & Tara Karasewich
- **Manuscript review**: Nina Buchenrieder, Dr. Kristen Dunfield, Dr. Valerie Kuhlmeier, & Sylvia Pinheiro
Acknowledgments

Thank you to my supervisor, Dr. Valerie Kuhlmeier, for always being someone that I can turn to for guidance, a sympathetic ear, and enthusiastic support. You’ve seen me through so many years of (what did not always feel like) steady progress, and you’ve broadened my outlook in immeasurable ways.

Thank you to my academic sister and collaborator, Dr. Kristen Dunfield, for being a constant role model and stepping in to help me overcome many challenges. You’ve been a second mentor to me and allowed me to make your lab a second home.

Thank you to my committee members, Drs. Tom Hollenstein and Wendy Craig, for all of your insights and for challenging me over the years to refine my ideas into a clearer, sharper, picture. Thank you to my examiners, Drs. Kristy Timmons and Louis Schmidt, for your valuable questions and comments during my defense, which has encouraged me to see my work from new angles. And thank you also to Dr. Fran Bonier for acting as our chair.

The research studies that form such a large part of this dissertation would not have been possible without the work and support from members of the Social Cognition Lab at Queen’s and the Concordia Social Cognitive Development Lab. For the study in Chapter 2 (dubbed the “COMFORT” study, behind the scenes), I thank my co-authors – Nina Buchenrieder, Dr. Kristen Dunfield, Cameron Hines, Dr. Valerie Kuhlmeier, and Sylvia Pinheiro – as well as Ellen Babb, Noelle Baird, Wongel Bogale, Olivia Holden, Humza Mallick, Montana Shore, Erica Stone, Hannah Taalman, and Debra Torok. For the study in Chapter 3 (“RETICENT”), I thank my collaborators – Drs. Kristen Dunfield, Valerie Kuhlmeier, and Nasim Tavassoli – as well as Maxine Iannuccilli, Cameron Hines, Sara Jones, Sarah Kalaouze, Dr. Astrid Kleis, Laura Pareja
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List of Abbreviations

-2LL ........ -2 Log Likelihood

CBQ ........ Children’s Behavior Questionnaire

CCTI ........ Colorado Childhood Temperament Inventory

CSPS ........ Child Social Preference Scale

EAS ........... Emotionality, Activity, and Sociability Temperament Survey

ECBQ ....... Early Childhood Behavior Questionnaire

ICC .......... Intraclass Correlation Coefficient

OSF .......... Open Science Framework

RSA .......... Respiratory Sinus Arrhythmia
Chapter 1:

When is Shyness a Barrier to Prosocial Behaviour?

A Critical Review of the Current Literature
**Introduction**

“One o’clock in the afternoon came, and went.

Two o’clock in the afternoon came, and went.

And then three o’clock, the party time, came.

And went!

But poor Little Miss Shy didn’t! She couldn’t!”

– Roger Hargreaves, *Little Miss Shy*

Little Miss Shy is a character ruled by her anxiety. She blushes whenever anyone speaks to her, hides when the mail carrier comes to the door, and spends days fretting over an invitation to a party that she ultimately decides to turn down. Although Little Miss Shy is written in an exaggerated way to entertain young readers, she does fit a definition of *shyness* that is used by many researchers: the tendency to feel anxious around other people and to withdraw from social situations (e.g., Coplan & Armer, 2007; Poole et al., 2017b; Rubin & Asendorpf, 1993). Shy individuals show various forms of social withdrawal throughout the lifespan. Shy toddlers will cling or stay close to their parents in the presence of strangers (e.g., Calkins & Fox, 1992; Grady & Karraker, 2014). Shy preschoolers tend to passively watch their peers instead of joining in on their games (e.g., Coplan et al., 1994; Grady et al., 2012; Henderson et al., 2004). Shy children and adolescents speak less during school activities, like presentations and groupwork (e.g., Crozier & Badawood, 2009; Jones & Gerig, 1994; Lund, 2008). Shy adults tend to be unassertive when interacting and disclose less about themselves to their romantic partners (e.g., Davila & Beck, 2002; Luster et al., 2013). Finally, shy individuals of all ages appear to be less *prosocial*
than their not-shy peers (e.g., Eisenberg et al., 1996; Hammond & Carpendale, 2015; Karasewich et al., 2019; Zoccola et al., 2011).

*Prosociality* is a specific type of social interaction in which an individual acts with the intent to benefit another, in response to an apparent need (e.g., Brownell et al., 2009; Dunfield & Kuhlmeier, 2013; Eisenberg & Mussen, 1989). Different types of need require different interventions: you can *help* someone meet an instrumental goal, *share* a desired resource with a person who is lacking it, *comfort* someone feeling emotional distress, or *cooperate* with another person to reach a joint goal (Dunfield, 2014; Svetlova et al., 2010; Warneken & Tomasello, 2007). Most research has focused on direct forms of prosocial behaviour, but prosociality can also be *indirect* – such as when a child informs a teacher about an incident of bullying in order to help the victim (e.g., Karasewich et al., 2019; Lambe & Craig, 2020; Novick & Isaacs, 2010; Paulus et al., 2017). Although prosociality is characterized by benefits to others, the intervener can also benefit by gaining a positive reputation among their peers, having their acts reciprocated, or forming closer social bonds (Hawley, 2014; Nowak & Sigmund, 2005). These positive effects can be seen fairly early in development. In middle childhood, for example, children who have a reputation for being prosocial tend to be popular among their classmates (Greener, 2000; Warden et al., 2003). When they reach adolescence, prosocial individuals are more likely to report having close and supportive friendships (Cillessen et al., 2005; Padilla-Walker et al., 2014).

Engaging in prosocial behaviour requires two components: the motivation to intervene and an understanding of the other person’s need. The *motivation* to intervene can take many forms, including feeling sympathy for someone’s plight, wanting to do what is ‘right’, hoping to gain a reward or avoid punishment, or simply enjoying the opportunity to interact (Eisenberg et
Understanding a prosocial situation involves recognizing the problem the person in need is having, how that problem may be solved, and what agency one has to enact the solution (Dunfield, 2014). Many of the socio-cognitive skills that support the different types of prosocial behaviour (e.g., goal understanding, theory of mind, etc.) emerge in early childhood, which makes it a significant period for prosocial development (Caputi et al., 2012; Imuta et al., 2016; Kärtner et al., 2014; Paulus et al., 2015). In this chapter, I explore how shyness may affect young children’s prosocial behaviour – both their motivation to intervene and their understanding of how to do so – by synthesizing findings in the current literature, highlighting issues that muddy our interpretations, and offering suggestions for future research.

A Research Synthesis

The prosocial behaviour of shy children has been examined in several empirical studies over the past few decades, which I have summarized in Table 1.1. The twelve studies included here meet the following criteria: each one 1) focuses on early childhood (i.e., participants were younger than six years old), 2) measures a construct that fits the definition of shyness used within this dissertation, 3) measures at least one of the four types of prosocial behaviour defined above, and 4) tests for a unique relation between shyness and prosociality. One of the primary reasons that I excluded certain studies from this table was that the authors cast a wider net when they operationalized their constructs of interest. For example, prosociality is sometimes defined to include being generally kind and considerate of other people (e.g., the Strengths and Difficulties Questionnaire: Goodman, 1997; the Child Behavior Scale: Ladd & Profilet, 1996), whereas I have chosen to focus specifically on children’s responses to others’ needs. Similarly,
shyness can be measured as a facet of broader constructs – in particular, *behavioural inhibition* (e.g., the Infant-Toddler Social and Emotional Assessment: Carter et al., 2003; the Short Temperament Scale for Children: Prior et al., 1989). Behavioural inhibition, and its potential to both complement and complicate shyness research, will be discussed later in this chapter (see Box 1.1). For a full list of the studies and measures that were excluded from Table 1.1, see Table A1 in Appendix A.
### Table 1.1

*The Relation Between Shyness and Prosocial Behaviour in Young Children*

<table>
<thead>
<tr>
<th>Study</th>
<th>Age (Mean)</th>
<th>Problem(s)</th>
<th>Interactive Partner(s)</th>
<th>Prosocial Response(s)</th>
<th>Shyness Measure(s)</th>
<th>Finding(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schuhmacher et al. (2017)</td>
<td>1.5 years</td>
<td>a. Out-of-reach object (3 tasks)</td>
<td>Recipient: - Experimenter (warm-up)</td>
<td>a. Help (direct): retrieve rulers; clothespins; erasers</td>
<td>ECBQ</td>
<td>Shyness was not related to helping or comforting</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. Damaged object (2 tasks)</td>
<td>Mediator: (potential) - Mother</td>
<td>b. Comfort (direct or indirect): give physical affection, try to get mother to act, offer new toy, or fix toy car; teddy bear</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grossmann et al. (2020)</td>
<td>1.5 years</td>
<td>Out-of-reach object (2 tasks)</td>
<td>Recipient: - Experimenter</td>
<td>Help (direct): retrieve pen; ball</td>
<td>ECBQ</td>
<td>Shyness was not related to helping</td>
</tr>
</tbody>
</table>
Hammond & Carpendale (2015) 1.8 years

- a. Dropped object (3 tasks)
- b. Obstacle
- c. Out-of-reach object

Recipient:
- Experimenter (warm-up)

- a. Help (direct):
  - Experimenters
  - pick up *plate; clothespin; spoon*
- b. Help (direct):
  - open *closed door*
- c. Help (direct):
  - retrieve *blanket*

1. Response to stranger:
   - Approach

Shyness was not related to whether a child helped

- Shyer children needed more prompting to help

Young et al. (1999) 2.0 years

Injury (2 tasks)

Recipient:
1. Experimenter
2. Mother

1. dComfort (direct):
   - give physical affection, offer toy, or express sympathy for *hurt finger/knee*
2. dComfort (direct):
   - give physical affection, offer toy, or express sympathy for

2. Response to stranger:
   - Approach
   - Speech
   - Affect

Shyer children were less likely to comfort the experimenter

- Shyness was not related to comforting mothers
Allen et al. (2018)

1. 2.1 years
   - Dropped object
     - Recipient:
       - Experimenter
         - 2 conditions:
           - Unfamiliar (no warm-up)
           - Familiar (warm-up)
     - Help (direct):
       - pick up clothespin
   - Response to stranger:
     - Approach

2. 2.1 years
   - Dropped object
     - Recipient:
       - Experimenter
     - Help (direct):
       - Approach

Beier et al. (2017)

3.2 years

a. Out-of-reach object
   - Recipient:
     - Experimenter 1
       - warm-up
     - Mediator:
       - required
     - Experimenter 2
       - warm-up
   - Help (direct):
     - retrieve pen (non-social)

b. Missing information (2 tasks)
   - Mediator:
     - required
   - Experimenter 2
     - warm-up
   - Help (direct):
     - tell Exp. 2 that Exp. 1 wants her attention

Parent-report:

- EAS
  - Buss & Plomin (1984)

Shyer children needed more prompting to provide social help.
<table>
<thead>
<tr>
<th>Study</th>
<th>Age</th>
<th>Task</th>
<th>Recipient</th>
<th>Help</th>
<th>Response to two strangers:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Karasewich et al. (2019)</td>
<td>3.5 years</td>
<td>Out-of-reach object</td>
<td>Recipient:</td>
<td>Help</td>
<td>4Response to two strangers:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Experimenter 1 (warm-up)</td>
<td>(indirect):</td>
<td>Speech</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mediator:</td>
<td>get someone to retrieve <em>toy duck on a high shelf</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Experimenter 2/Experimenter 3 (no warm-up)</td>
<td></td>
<td></td>
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<tr>
<td>Xiao et al. (2019)</td>
<td>1. 3.5 years</td>
<td>Injury</td>
<td>Recipient:</td>
<td>dComfort (direct or indirect):</td>
<td></td>
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<tr>
<td></td>
<td>2. 4.5 years</td>
<td>(longitudinal)</td>
<td>- Experimenter (warm-up)</td>
<td>give physical affection, verbally soothe, offer toy, try to get mother to act, or suggest how to heal <em>hurt foot</em></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Mediator:</td>
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<td></td>
<td>- Mother</td>
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soothe, offer toy, try to get mother to act, or suggest how to heal hurt elbow

Farver & Branstetter (1994) 4.1 years

Crying (naturalistic)
Observed causes:
- Injury or accident
- Peer teasing, rejection, or aggression
- Dispute with peer
- Reprimand/discipline by adult
- Separation from adult
- Unclear

Recipient:
- Peers

Comfort (direct or indirect):
give physical affection, verbally soothe, try to resolve problem, or try to get teacher/another peer to act

Teacher-report:
- Social competence with peers
Howes (1988)

Shyer children were less likely to provide indirect comfort (e.g., tell someone why peer is crying)

Stanhope et al. (1987) 4.3 years

a. Dropped objects
b. Missing information (2 tasks)

Recipient:
a. Experimenter (warm-up)
b. Experimenter (warm-up)

a. Help (direct):
pick up stickers
b. Help

Parent-report:
- Labelling question:
  “[Are they] primarily outgoing or

Shy children were less likely to help the experimenter

Shyness was not related to other (direct) forms of comforting
c. Mess
d. 6 scenarios:
   - Mess
   - Missing information
   - Lost object
   - Injury
   - Desired resource
   - Dropped objects

c. Experimenter (warm-up)
d. Mother, peer, other relative

c. Help (direct):
   - “Experimenter:
     - Teach how pen works; how to open trunk

d. Help, Share, and Comfort (direct):
   - Parent-report:
     - Helpfulness at home

Stanhope et al. (1987) primarily shy when meeting new people?”

MacGowan & Schmidt (2021b)

1. 4.5 years Dropped objects (2 tasks) Recipient: Help (direct): Parent-report: Shyer children (measured at all three timepoints) needed more prompting to help at 5.5 years
2. 5.5 years 
3. 6.5 years (longitudinal) 
   Recipient: pick up roll of tape; paperclips (at 5.5 years)
   Response to evaluation: 
   - Speech
   Parent-report: 
   - ¹CCTI
   Rowe & Plomin (1997) (composite)

☐ When controlling for shyness at 5.5 years, shyness at 4.5 years did not
<table>
<thead>
<tr>
<th>Study</th>
<th>Age</th>
<th>Type</th>
<th>Recipient</th>
<th>Comfort (direct):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kienbaum et al. (2001)</td>
<td>1. 5.6 years</td>
<td>Injury - Puppet</td>
<td>a. Comfort give physical affection or express sympathy for hurt side</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. 5.5 years</td>
<td>Damaged object</td>
<td>b. Comfort give physical affection or express sympathy for burst balloon</td>
<td></td>
</tr>
<tr>
<td>Asendorpf (1993)</td>
<td>1. Experiment 1</td>
<td>Inhibition to strangers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Experiment 2</td>
<td>Shyness was not related to comforting</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- a. In memory of a recent event due to physical pain
- b. In response to non-social threat

**Notes:**

- Here I am using the term *interactive partner* to refer to anyone with whom the child may interact while intervening, which could include the *recipient* of the prosocial act (i.e., the person in need) or a *mediator* (i.e., someone other than the person in need, through whom the child intervenes).

- For ease of comparison, I have labelled any construct that measures *feeling anxious and/or behaving in a withdrawn way in social situations* as ‘shyness’ within this table. Some authors used another label for this construct: 1 sociability (reverse); 2 behavioural inhibition; 3 warm-up time; 4 social inhibition; 5 hesitant; 6 inhibition.

- It was not reported whether children were given a warm-up period with the experimenter(s) prior to the prosocial task(s).

- These authors used other labels for the prosocial responses they measured. For ease of comparison, I have labelled *intervening to meet another person’s instrumental need* as ‘helping’, *giving up a material resource to someone who desires it* as ‘sharing’, and *attempting to relieve another person’s emotional distress* as ‘comforting’ within this table.
I propose that three major implications can be drawn from the research to date. First, shy children are less likely to intervene on behalf of unfamiliar people. In Young and colleagues (1999), shyer toddlers were less likely to comfort an experimenter when she feigned an injury, but they comforted their own mothers just as often as their less-shy peers. Similarly, shy children in Stanhope and colleagues (1987) infrequently provided help to an experimenter in lab-based tasks, but were reported to be quite prosocial at home by their mothers. Finally, in the first of two experiments, Allen and colleagues (2018) found shyer children to be less likely to help an experimenter if they had not been given the chance to warm up with her prior to test. The second major implication is that shy children are less likely to intervene in highly socially engaged ways. In Farver and Branstetter’s (1994) naturalistic observations, shyer children were less likely to comfort a crying peer by telling someone else what was going on, but were just as likely as other children to try to comfort their peer directly. We found a similar effect in Karasewich and colleagues (2019); shy children were less likely to intervene in an indirect helping task that involved asking one of two actors to get a toy off of a high shelf for the experimenter. Finally, in Beier and colleagues (2017), shyer children showed a delay in helping an experimenter get someone’s attention, but were very quick to retrieve a pen for her. The third major implication of the current literature is that shy children need more time and/or prompting to intervene. In Hammond and Carpendale (2015), the experimenter had to give shyer toddlers a greater number of cues, ranging from drawing attention to his problem to making an explicit verbal request, before they would help him. Shyer children also needed more prompts in the social helping task of Beier and colleagues’ 2017 study and took longer to help the experimenter in MacGowan and Schmidt (2021b).
These implications, however, are not supported by every study in the current literature. Two of the studies listed in Table 1.1 found no evidence for a relation between children’s shyness and their prosocial behaviour (i.e., Grossmann et al., 2020; Schuhmacher et al., 2017). In Xiao and colleagues’ 2019 study, children’s level of shyness was not related to their comforting behaviour when both measures were taken at three years, but it was related to their comforting a year later. MacGowan and Schmidt (2021b), in contrast, did not find a longitudinal relation between shyness at four years and helping a year later after they controlled for shyness at five years. Kienbaum and colleagues (2001) found no significant relations in their second experiment and only an indirect relation (between shy boys’ comforting and their teachers’ level of warmth) in their first experiment. Finally, Allen and colleagues (2018) failed to replicate their shyness effect in their second experiment. Thus, taken together, findings from past research reveal a complex picture that our field is just starting to piece together. In the next two sections, I explore what these findings reveal about shy children’s motivation to intervene and their ability to understand prosocial situations. I then propose important questions for future research.

**Shyness and the Motivation to be Prosocial**

The research findings highlighted above may reflect a reluctance or unwillingness on the part of shy children to interact with people when they are feeling anxious. Whenever an anxious child perceives, even unconsciously, that a situation contains a potential threat, they will be compelled to withdraw from it (Green & Phillips, 2004; Nesse, 2005). In the introduction to this chapter, I described some of the ways that shy individuals withdraw from social situations, which range from avoiding an interaction entirely to engaging with others in inhibited ways (e.g., speaking less during conversations). Shy children’s responses to prosocial situations reflect a
similar range; they tend not to act in tasks that seem particularly risky (e.g., when it would mean interacting with a stranger; Young et al., 1999), but will intervene when it can be done with minimal social engagement (e.g., when they just need to pick up an object; Grossmann et al., 2020). In this section, I will examine how the three implications I have drawn from the current literature support the hypothesis that shyness affects children’s motivation to be prosocial and what this means for future research.

Implication 1: Avoiding Unfamiliar People

Unfamiliar people are a major source of anxiety for shy children, particularly in early childhood (e.g., Kagan et al., 1988b; Schmidt & Poole, 2019; though for shyness effects in familiar social contexts, see Crozier & Badawood, 2009 and Gazelle & Ladd, 2003). Many common shyness measures for this age group focus on how children behave in the presence of strangers, either by relying on their parents’ recollections through questionnaires or by observing children’s reactions directly (e.g., the Early Childhood Behavior Questionnaire: Putnam et al., 2006; a modified Strange Situation: Calkins & Fox, 1992). In prosocial situations, there are multiple ways that a shy child may encounter an unfamiliar person; this person may be the recipient (i.e., the person in need of the child’s intervention), a mediator (i.e., someone with whom the child may interact in order to intervene), or a bystander\(^1\) (i.e., someone who is nearby but not interacting with the person in need).

\[^1\] I have separated mediators from bystanders here to look at the different ways that strangers can be a source of anxiety for shy children, but bystanders can be mediators too. Even a bystander who could not solve the person in need’s problem can be considered a potential (though ineffective) mediator, because young children may still try to get them involved. This is why, in Table 1.1, both Experimenters 2 and 3 are listed as mediators for Karasewich and colleagues’ (2019) indirect helping task when only one was physically able to provide help; children could (and some did) ask the other to intervene.
As noted above, three studies in the current literature have found shy children to intervene less often on behalf of unfamiliar recipients (i.e., Allen et al., 2018: Experiment 1; Stanhope et al., 1987; Young et al., 1999). There is less clear evidence of a shyness effect around unfamiliar mediators, as none of the studies that used mediators varied their level of familiarity. It is of note, however, that shyness had a negative effect on children’s interventions in both Karasewich and colleagues’ (2019) indirect helping task (i.e., asking an unfamiliar experimenter to get a toy from a high shelf) and Beier and colleagues’ (2017) social helping task (i.e., getting the attention of a familiar experimenter). Finally, no study to date has tested whether the presence of bystanders has a stronger effect on shy children’s interventions than their not-shy peers. A 2015 study by Plötner and colleagues did examine the bystander effect in five-year-olds, but they did not measure shyness. In that study, most children helped the experimenter when they were alone in the room with her and when two unfamiliar children were present who could not intervene, but they were less likely to help if those children could intervene. These results point to diffusion of responsibility having a strong influence on young children – that, like adults, they will feel less motivated to act when others can intervene just as well as they could (Latané & Darley, 1970). The question remains, though, whether shy children will experience the bystander effect to a greater extent, given their motivation would be affected by both a lack of responsibility and feelings of anxiety. I will be exploring this possibility in Chapter 3.

Researchers have several options for testing the impact of familiarity on shy children’s interventions. First, people that the shy child already knows can be recruited for prosocial tasks. So far, only Young and colleagues (1999) have used this method directly. In that study, children’s mothers were trained to feign an injury so that comparisons could be made between how the child responded to their mother versus an experimenter. Two other studies in the current
literature turned mothers into potential mediators by allowing them to stay in the testing room with their child, but they did not examine children’s indirect interventions separately, so it is unclear whether shy children were more likely to intervene through a familiar person (Schuhmacher et al., 2017; Xiao et al., 2019). A goal for future research should be to test how other familiar people, who do not have the same level of authority and dependability that many parents do, influence shy children’s interventions. If shy children are also found to intervene more often on behalf of familiar peers or their siblings, that would provide stronger evidence that it is the comfort of familiarity driving this effect. Recruiting young confederates can be challenging for lab-based research, however. When Plötner and colleagues piloted their 2015 study, for example, they found five-years-old to be the youngest age at which their child confederates had the acting skills and inhibitory control needed to play the role of bystanders, and these children were actors used for multiple participants rather than friends or siblings who were trained on the spot. Children do not have to be conscious confederates in prosocial tasks, however; researchers could set up situations that cause familiar peers to be in need and then observe children’s reactions. For example, in Hepach and colleagues’ 2017 study, an experimenter presented pairs of toddlers with a game involving a ball that ‘accidentally’ rolled out of one child’s reach and settled near the other child, who thus had the opportunity to return it.

Not all prosocial behaviours can realistically be tested this way, of course. It would be unethical, for example, to set one child up to be distressed to give another child the opportunity to provide comfort.

A second option for testing familiarity effects is to vary the child’s exposure to experimenters before the prosocial task. Starting with a warm-up period, for example, can give shy children some time to get to know an experimenter and feel more comfortable around them.
If authors do not report whether participants warmed up with the experimenter(s) in their tasks (see the ‘Interactive Partners’ column in Table 1.1), interpreting findings becomes more difficult. Indeed, it has been recommended that all studies of prosocial behaviour include details about warm-up periods, regardless of whether the study is examining shyness, as this will give readers a better idea of the social context surrounding children’s interventions (Barragan & Dweck, 2014; Martin & Olson, 2015). Warm-ups periods can also be designed to systematically vary children’s familiarity with different experimenters. For example, in Allen and colleagues (2018), each child warmed up with an experimenter for twenty minutes\(^2\) before having the opportunity to help either the same experimenter or one they had never seen before. In Karasewich and colleagues’ (2019) indirect helping task, one experimenter warmed up with the child for six minutes (on average) and then two other experimenters appeared with no warm-up; at test, the familiar experimenter needed help that the child could only provide by asking one of the unfamiliar experimenters.

Warm-ups are not the only periods in which children can get to know an experimenter (Martin & Olson, 2015). Both of the studies just described provided additional interactions with the ‘unfamiliar’ experimenters, which complicates the current interpretation of their results. In their second experiment, for example, Allen and colleagues (2018) added a period between the warm-up and prosocial task in which the experimenter (familiar or unfamiliar), who would later be in need, offered the child a sticker. This change alone eliminated the effect of familiarity found in their first experiment and led the authors to suggest that shyness was not driving the

\(^2\) In Table 1.1, I noted that Allen and colleagues (2018) measured shyness through ‘warm-up time’ – to be clear, their warm-up period was 20 minutes for all children. When they use the label ‘warm-up time’ in their analyses, they are referring to how quickly each child first approached the experimenter during that warm-up period.
results. However, the gift of the sticker could have made children feel more comfortable around the unfamiliar experimenter. Although the gift of the sticker took less time than the warm-up period used in the first experiment, it involved the experimenter making a kind gesture that may have shown children she could be trusted. Karasewich and colleagues (2019) used a similar interaction: when the unfamiliar experimenters came into the room, they each gave the child toys from the shelf that the familiar experimenter would later struggle to reach. This interaction was designed, in part, to show that the unfamiliar experimenters could reach the shelf (before one was physically blocked from doing so), but it is possible children also learned that the unfamiliar experimenters were friendly. Given that Karasewich and colleagues found a shyness effect and Allen and colleagues did not, it may be that a short, kind interaction with an unfamiliar person reduces shy children’s anxiety when social demands are low: while shy children may feel comfortable enough to return a dropped clothespin, soliciting help from someone else could still be too difficult. This is an idea that should be explored in future research, but these studies demonstrate that it is important to consider the nature of children’s prior interactions with an experimenter and not just the amount of time they spend together.

Finally, researchers should move outside of the lab to study familiarity effects. Whatever methods are used to increase familiarity in the lab, it is still an environment with unfamiliar people. It is even possible that our samples have fewer shy children than the general population; if a parent knows their child is often upset or scared by new people, they may be reluctant to sign-on for lab-based studies. Getting more diverse samples is just one benefit to conducting research in other settings. For example, if shy children are less anxious in more familiar environments (e.g., Asendorpf & Meier, 1993; Sulik et al., 2013; but see: de Haan et al., 1997; Kagan et al., 1988a), introducing them to an unfamiliar person in those environments could elicit
reactions that are closer to how they would typically respond. Finally, it would be easier to
examine how the presence of multiple familiar people affect shy children’s interventions in
places where they already congregate, like daycares and schools. So far only one study in the
current literature has directly examined shy children’s prosocial behaviour outside of the lab (i.e.,
Farver & Branstetter, 1994; but see also the parent-report measure in Stanhope et al., 1987). I
will be attempting to fill this gap with the study described in Chapter 3.
Acting withdrawn around unfamiliar people is not a behaviour that is unique to shy children. Individuals with an inhibited temperament have a low threshold for feeling anxious, which has been linked to a highly reactive amygdala, the part of the brain responsible for detecting threat and triggering fight, flight, or freeze responses (Clauss et al., 2014; Davis, 1992; Kagan et al., 1988a; Scarpa et al., 1997; Schwartz et al., 2003). At preschool age, inhibited children show *behavioural inhibition*: they tend to withdraw from any situation involving an unfamiliar person (e.g., a strange experimenter), thing (e.g., a moving toy), event (e.g., a sudden noise), or setting (e.g., a new daycare; Bishop et al., 2003; Calkins & Fox, 1992; Gensthaler et al., 2012; Kagan & Snidman, 1991). Thus, the key difference between measures of behavioural inhibition and shyness is context: inhibited children will withdraw from many different forms of novelty, while shy children show *social* withdrawal in particular.

Inhibited children can certainly be shy as well, and there is a reliable association between an inhibited temperament and shyness across the lifespan (e.g., Kagan et al., 1988a; Neal & Edelmann, 2003; Schwartz et al., 1999; Volbrecht & Goldsmith, 2010). However, measures of shyness and behavioural inhibition should not be treated as interchangeable. First, not all inhibited children will continue to be shy through adolescence and adulthood; an inhibited temperament is a genetic *predisposition* for trait anxiety of all types, not just social (e.g., Hirshfeld et al., 1992; Prior et al., 2000; Rosenbaum et al., 1988). Whether an inhibited child will remain shy in adulthood depends greatly on their early social environments (Karasewich & Kuhlmeier, 2020; Schmidt et al., 2005; Vertue, 2003). For example, being rejected by peers and having parents who are intrusively controlling are two environmental factors associated with
more stable shyness (e.g., Asendorpf, 1990b; Rubin et al., 2002). There is also some evidence to suggest that the different facets of behavioural inhibition are actually independent of each other; despite how behavioural inhibition measures are often used, some inhibited children withdraw mostly around non-social novelty, while (shy) others withdraw mostly around strangers (e.g., Dyson et al., 2011; Geng et al., 2011; Poole et al., 2017a). Thus, a child who shows ‘non-social’ behavioural inhibition will not necessarily be shy as well.

For these reasons, it is important for researchers to separate behavioural inhibition and shyness in their analyses, and I have thus excluded any prosocial studies that mixed the two constructs from this review (see Table A1 in Appendix A). It is likely, though, that researchers interested in prosocial behaviour could gain new insights by comparing the impact of shyness and behavioural inhibition, particularly the non-social facets of the latter. Are there any prosocial interventions that shy children are more likely to provide than (non-socially) inhibited children, such as retrieving a novel object for a person in need? Do inhibited and shy children show similar patterns of intervention in familiar environments, like at home? How do shyness and behavioural inhibition uniquely relate to prosociality, and to each other, across development? These questions and many more could be explored in future research that considers shyness and behavioural inhibition as two distinct constructs.
Implication 2: The Ease of Innocuous Interventions

A common form of social withdrawal is to be minimally engaged while interacting. For example, when a shy individual is involved in a conversation, they may say just enough to fulfill their ‘part’ or only nod along to others’ points (Arkin et al., 1986). This inhibited interaction style can be labelled innocuous sociability because it allows shy individuals to present themselves as polite and friendly while staying “out of the social spotlight” (Leary & Kowalski, 1995: p. 170). Innocuous sociability is protective; if you say and do little around others, they will be less likely to target or judge you (Arkin, 1981; Pontari & Glenn, 2012, but see: Leary & Buckley, 2000). In research on prosocial behaviour, there are many interventions young children enact that could be labelled innocuous prosociality. For example, retrieving a toy for an experimenter is a helping behaviour that tends to be low in social engagement; it can be done with little or no contact (e.g., quickly handing over the toy or moving it within reach) and it does not require the child to say anything to the person in need (e.g., Grossmann et al., 2020; Warneken & Tomasello, 2006). In contrast, having to ask someone else to retrieve a toy for an experimenter is a more engaged helping behaviour (e.g., Karasewich et al., 2019; Paulus et al., 2017). There are two (not mutually-exclusive) approaches that researchers can take to examine social engagement effects in their samples: 1) setting up situations that vary in task demands and 2) evaluating how each child chooses to intervene.

I will be using the term ‘task demands’ in this section to refer to any aspects of a prosocial situation that may encourage or require children to intervene in a particular way. The indirect helping task described above is an example of a task that is high in social engagement demands (Karasewich et al., 2019). First, there was an explicit prompt to encourage a specific, highly engaged, response: “[Child’s name], can you ask her to get the duck?” With this prompt,
the experimenter in need was directly asking the child to get someone to help and even implying who they should ask (i.e., one of the unfamiliar experimenters, who were both women). Second, the child’s parent was not in the testing room; the unfamiliar experimenters were the only ones available who could help. Finally, asking one of the experimenters to act was the only response that counted as ‘helping’ for this task. Although some children did try to help in other ways—jumping for the (too high up) toy, trying to leave the room to ask their parent, or suggesting another way to get it (e.g., “…we just need a chair to climb on”)—the task did not end until the child asked an experimenter to help or 30 seconds had passed. Beier and colleagues (2017) had similar demands in their social helping task, which included a prompt that encouraged a highly engaged intervention (i.e., “Hey, [Child’s name], can you tell [Experimenter 2] that I need her?”). Shyer children struggled in both of these socially demanding situations.

When designing prosocial tasks, researchers should consider how different aspects of the situation may demand more or less social engagement of children who intervene. Systematically varying such task demands provides a means of assessing their impact on shy children. In the current literature, only Beier and colleagues (2017) directly compared social and non-social tasks; although shyer children in their sample took longer to help an experimenter get someone’s attention, they quickly helped in the more innocuous way of picking up a pen she had dropped. Stanhope and colleagues’ (1987) lab-based helping tasks also varied, with two that were fairly innocuous (i.e., picking up stickers and cleaning a mess) and two that seemed to require more engagement (i.e., teaching an experimenter how a pen works and how to open a trunk), but because they only examined how shyness related to a composite helping score, we do know how

3 Although we did not count these responses as prosocial, we did include them as ‘other’ responses in our data, which are publicly available on the Open Science Framework at https://osf.io/6ue5v/
much the shyness effect they observed was driven by the latter. I will attempt to examine the influence of task demands more directly in Chapter 2.

Another way that researchers can examine the effects of social engagement demands on prosocial behaviour is to evaluate how children choose to intervene when they have multiple options. For example, in their naturalistic study, Farver and Branstetter (1994) categorized children’s prosocial responses toward a crying peer as either ‘commenting’ (i.e., telling someone why they are crying), ‘mediating’ (i.e., taking action to resolve the problem), or ‘comforting’ (i.e., hugging or patting the peer, offering them an object, or apologizing to them)\(^4\). These categories allow us to get some sense of shyer children’s preferences regarding socially engaged interventions (i.e., they were less likely to intervene by telling others what was wrong, or ‘indirect comforting’). However, the last category combines behaviours that it may be more informative to consider separately. In particular, offering someone an object (e.g., a toy) to make them feel better is relatively innocuous; like retrieving an out-of-reach object, this is an intervention that can be done with minimal contact and without saying anything to the person in need. In comparison, telling someone you feel sorry for them or going into their personal space to hug or pat them would involve more social engagement. Future research that categorizes children’s interventions by how much the child engages with another person would help us determine what level of engagement becomes ‘too much’ for shy children to act.

\(^4\) These category names are the original ones that Farver and Branstetter gave to each behaviour. In Table 1.1, I instead classified all three behaviours as ‘comforting’, because they all involve the child attempting to relieve a peer’s emotional distress. The authors also had a fourth ‘prosocial’ category that I have excluded from this review because it did not meet this definition: ‘approaching’ the crying peer to merely observe them.
Implication 3: Prompting Compliance

Picture prosocial motivation as a balance scale: when the scale is weighted on the left, a child is unlikely to intervene on behalf of a person in need, while if it is weighted on the right, they are likely to act. The previous two sections of this chapter focused on the left side, showing how shy children’s anxiety urges them to withdraw from prosocial situations. In this final section, I will be focusing on the right: how the expectations of an authority figure may make shy children feel more motivated to be prosocial than they would be otherwise. That is, if a child perceives that an adult (e.g., their parent, their teacher, or an experimenter) expects them to intervene on someone’s behalf, they may feel compelled to comply (Bar-Tal, 1982; Eisenberg et al., 2016; Nucci & Weber, 1995; Paulus, 2018). The claim here is not that shy children alone will be influenced by authority figures, but rather that it is important to consider the role of compliance when evaluating their prosocial behaviour. When an authority figure expects a shy child to intervene, that may be enough to compel them to act despite their anxiety.

There is some evidence in the current literature to suggest that adults can encourage shy children to intervene by showing they expect the child to act. For example, shyer toddlers in Hammond and Carpendale (2015) needed more prompts before they would help an experimenter in various tasks. The experimenter gave up to eight prompts per task: the first few prompts drew the child’s attention to his problem (e.g., “I need to open the door”), the next involved making gestures to imply he wanted the child to do something (e.g., alternating his gaze between the child and the door), and the final prompts were direct verbal requests for the child to intervene (e.g., “Can you open the door?”). Beier and colleagues (2017) provided similar prompts in their social helping task: the experimenter in need first tried to get the other experimenter’s attention (i.e., “Psst! [Experimenter 2], over here!”), then she provided more information about her
problem (i.e., “… can’t you hear me?” and “… I have something to show you!”), before she addressed the child (i.e., “[Child’s name], I don’t think that [Experimenter 2] can hear me”), and finally asked the child to intervene. Again, shyer children took longer to respond, and they were especially likely to need the final, direct request for intervention, if they helped at all. The later prompts in these two studies removed any doubt about the experimenters’ expectations – they clearly wanted the child to help – and that may be what pushed shy children into action.

There is a lot we do not know about how prompts affect shy children’s motivation to be prosocial. For example, explicit prompts are not always enough to get shy children to intervene (e.g., Allen et al., 2018; Karasewich et al., 2019), so future researchers should examine what factors determine when the motivation to comply will win out over the motivation to withdraw. One such factor may be the amount of time given between prompts, which has varied in the current literature. Would shy children intervene more often in tasks that make them very anxious (e.g., the recipient is unfamiliar, intervening would take a lot of social engagement, etc.) if they were given more time to decide to act after each prompt? Finally, it is important to note that no study has examined how shy children respond to adults in need compared to their peers. Given that peers do not have the same level of authority as adults, which does appear to affect children’s prosocial motivation (Eisenberg et al., 1985), I would expect shy children to intervene less, overall, on behalf of their peers than adults. I will be exploring this possibility in Chapter 3.

**Shyness and Understanding the Prosocial Situation**

It makes intuitive sense that shy children would be less willing to intervene when they are feeling anxious around others, but could they also be less able? Does shyness affect children’s ability to understand prosocial situations – to figure out what is wrong, work through possible
solutions to the person’s problem, and recognize what they could do to solve it, themselves?

Hammond and Carpendale (2015) assessed toddlers’ ability to understand others’ internal states (i.e., their perceptions, thoughts, and feelings) by asking mothers to report their everyday use of certain words (e.g., sad, want, remember, tired, etc.), but neither shyness nor helping related to this measure. Young and colleagues (1999) coded children’s attempts to understand why a person in need was upset (e.g., looking at their mother’s injured finger and then her face; asking if the experimenter was “Hurt?”), but again found no relation between these attempts and either shyness or comforting. In contrast, MacGowan and Schmidt (2021b) did find that shyer six-year-olds made fewer attempts to understand a person’s distress. In an earlier study that used similar measures, MacGowan and Schmidt (2021a) found this relation to be moderated by resting respiratory sinus arrhythmia, such that shyer children were only less likely to engage in this ‘hypothesis testing’ when they had low RSA. Because RSA has been linked to self-regulation (Thayer et al., 2012), this finding can be interpreted to mean that having high RSA allows shy children enough control over their anxiety that they can work to understand others’ problems. These four studies are currently the only ones to have approached the question of whether shy children differ in their understanding of prosocial situations.

There is evidence to suggest that shy children differ in how they process social situations, more broadly. For example, shy children seem to be biased to attend to social threats, from which they have difficulty shifting their attention away. LoBue and Pérez-Edgar (2014) tasked young children with finding target images in different arrays: a happy face among angry faces, an angry face among happy faces, a snake among frogs, and a frog among snakes. They found a strong bias toward social threats in shy children; although the not-shy group also took longer to detect a happy target among angry faces than the reverse, the effect was larger for the shy group.
In contrast, both groups showed the same bias toward threatening snakes over non-threatening frogs. Pérez-Edgar and Fox (2005) found a similar result when they added a socially threatening outcome to a neutral attention task. They first gave their participants the Posner cued attention task, in which three boxes are displayed on a screen and the child must identify a target that appears in one of the outer boxes after a random cue highlights any of the three (Posner & Cohen, 1984). They then modified the task to include a points system: if the target appeared in a box labelled with a plus sign, the child could get points for finding it quickly, but if it appeared in a box labelled with a minus sign, they could lose points for not finding it quickly enough. Children were told that they would have to give an embarrassing speech if they did not perform well and they were all given negative feedback (i.e., that they had lost points) at regular intervals throughout the task. With this looming social threat, shy children were found to attend more to cues in the threatening ‘minus’ box.

Shy children also seem to differ in their theory of mind abilities. Strand and colleagues (2008), for example, found that shyer children had trouble recognizing negative facial expressions (in particular, ‘anger’), but were just as accurate as their less-shy peers in recognizing ‘happy’ expressions and predicting how others would feel in certain situations (e.g., “How will Kim feel when her daddy goes away on a trip?”). Gal-Szabo and colleagues (2019) found that shyer children recognized others’ positive and negative emotions, but had trouble predicting situation-specific ones; the latter effect was moderated by effortful control. In Colonnesi and colleagues’ 2017 study, parent-reported shyness was linked to poor performance on ‘basic’ theory of mind tasks (i.e., recognizing emotions, representing imagined scenarios with real objects, and differentiating reality from non-reality), but was unrelated to more ‘complex’ tasks (i.e., understanding others’ thoughts and false-beliefs). One way to interpret these findings
is that shyness has a negative impact on theory of mind development: shy children tend to withdraw from social situations, which may limit their opportunities to learn about others (Leary & Buckley, 2000). The reverse could also be true, however. Children who struggle to ‘read’ others will feel uncertain and overwhelmed in social situations (Gal-Szabo et al., 2019). The relation between theory of mind and shyness may thus be reciprocal (Suway et al., 2012). As another layer of complexity, some studies have actually found shyer children to be more advanced in their theory of mind abilities. For example, Wellman and colleagues (2011), proposed that shy children’s reticence allows them to learn about others through passive observation. Finally, Lane and colleagues (2013) found the relation to be quadratic: shy children from China, but not the United States, tended to have poor theory of mind abilities if they were more reactive on physiological measures and advanced theory of mind if they were non-reactive.

These findings from the broader literature could reasonably extend to shy children’s prosocial interventions. After all, individuals need to first process prosocial situations before they can intervene. This is reflected in children’s attention: when presented with a prosocial problem, they typically look toward the person in need (e.g., an experimenter), the source of the problem (e.g., her bare, shivering arms), and likely solutions (e.g., a blanket nearby; Köster et al., 2019; Hepach et al., 2016). There is also a reliable link between prosocial behaviour and theory of mind abilities that involve understanding others’ emotions (see Imuta et al., 2016, for a large meta-analysis). If shy children do differ in how they process and understand prosocial situations, that would add greater nuance to the three implications I have drawn about their interventions.
Implication 1: *Attending to Unfamiliar People*

In the motivation section above, I speculated that shy children’s anxiety will make them too *intimidated* to intervene around unfamiliar people, and thus, they would be reluctant to intervene not only on a stranger’s behalf (which is supported by past research: Allen et al., 2018; Stanhope et al., 1987; Young et al., 1999), but also when they have to act *through* a stranger or in their mere presence. I will now propose an alternate, though not mutually-exclusive, hypothesis: that shy children have trouble *understanding* prosocial situations that involve unfamiliar people. That is, because shy children are biased to attend to social threats (LoBue & Pérez-Edgar, 2014; Pérez-Edgar & Fox, 2005), they may be less attentive to other important aspects of a prosocial situation when a stranger is nearby. If a shy child is preoccupied watching a stranger, it could take them a long time to notice that someone else is in need. If the stranger is the one in need, a shy child may not be able to disengage from them long enough to find a solution to their problem. This could be tested in future research by tracking children’s gaze during prosocial tasks. For example, I would expect shy children to take longer to first look at someone in need than their not-shy peers whenever a stranger is present to draw their attention. I would also expect shy children to look most often at the stranger, and so spend less time looking at other people (e.g., a familiar experimenter in need) or objects (e.g., a desired toy) that could be relevant to the prosocial situation.

**Implication 2: *Easy Interventions***

In the review of the current literature above, I noted that shy children seem to prefer more *innocuous* interventions over ones that involve a lot of social engagement. However, this effect could be reframed to focus on a different aspect of the prosocial situation: the complexity of the problem to be solved. Shy children seem to respond more readily to simple prosocial tasks than
more complex ones. Though picking up an object for an experimenter is certainly innocuous, it is also a very obvious response to seeing her reach for it (e.g., Beier et al., 2017; Grossman et al., 2020). The solution in Karasewich and colleagues’ (2019) indirect helping task was less obvious; children had to first recognize that they could not reach the toy themselves, then figure out who could reach it from the people nearby, and finally decide how to approach that person to get them to intervene. Beier and colleagues’ (2017) social helping task had a similar level of complexity; at the start of the task, children had to figure out why the second experimenter (who was turned away) may not be responding to the first experimenter (who was speaking in a raspy voice).

Future research should attempt to disentangle how complexity and social engagement demands affect shy children’s interventions. Would shy children still be less likely to intervene in social tasks that are very simple? Would they struggle with complex tasks, even when social demands are low? I will be making a first attempt at answering these questions in Chapter 2.

Implication 3: Prompts as Guidance

Finally, I ended the motivation section by acknowledging the role of compliance in early prosocial behaviour; authority figures can sometimes compel shy children to intervene despite their feelings of anxiety. Shy children seem particularly likely to intervene when experimenters provide explicit prompts for what they expect them to do (e.g., “Can you open the door?”: Hammond & Carpendale, 2015; “Can you tell [Experimenter 2] that I need her?”: Beier et al., 2017). It is unclear, however, what drives this effect: were shy children moved by the expectation implied by these prompts or the information they provided? Both studies used multiple prompts that could have scaffolded children’s interventions: first clarifying the experimenter’s problem, then pulling the child in, and finally telling the child how to help (see Brownell et al., 2013; Svetlova et al., 2010). Researchers should carefully consider what their
prompts tell the children in their samples – are they getting hints about the prosocial problem, the experimenter’s expectations, or both? Directly comparing how shy children respond to each type of prompt would give us insight into their true impact. For example, separate groups of children could receive a prompt for compliance (e.g., “[Child’s name], can you help me?”), a prompt giving guidance (e.g., “Oh, I need someone to [clear solution]!”), or a mix of the two (e.g., “[Child’s name], can you [clear solution]?”). Giving only one prompt per task would also allow us to examine the impact of time; if shy children still take longer to intervene, it would suggest they need extra time to work out a solution (when none is given) or work up the nerve to act (when one is).

Measuring Shyness in Early Childhood

The ideas I have proposed thus far rest on a precarious assumption: that social withdrawal in early childhood always reflects feelings of anxiety. At the start of this review, I set out to dissect past research on shy children’s prosocial behaviour and provide guiding questions for the future. The majority of this literature, however, has not tested shyness directly. The sixth column of Table 1.1 includes many measures of shy behaviour: taking a long time to approach someone (e.g., Allen et al., 2018), choosing not to speak when prompted (e.g., Karasewich et al., 2019), clinging to a parent (e.g., Hammond & Carpendale, 2015), etc. Yet, only one of these measures captures shy feelings: crying or fretting in the presence of a stranger (i.e., Young et al., 1999).

Some of the parent-report questionnaires listed in Table 1.1 do ask about children’s anxiety (e.g., CBQ: “My child sometimes seems nervous when talking to adults s/he has just met,” Rothbart et al., 2001; ECBQ: “When approaching unfamiliar children, how often did your child seem uncomfortable?” Putnam et al., 2006), but I hesitate to categorize them as absolute measures of
shyness because they do not specify how parents should determine what their children are feeling. We cannot be certain that parents will interpret such questions as intended or that they will draw the same conclusions from their children’s behaviour that trained researchers would (Goldsmith, 1996; Schwarz & Oyserman, 2001; Seifer et al., 2004; Spooner et al., 2005). Thus, I suggest that the majority of studies in the current literature have not included a definite measure of children’s anxiety around others.

Why is this a problem? Shy children do show social withdrawal, and the effects shyness appears to have on prosocial behaviour are forms of withdrawal, such as when shy children intervene in minimally engaged ways (i.e., ‘innocuous prosociality’). The problem is that anxiety is not the only cause of social withdrawal. There are many reasons that someone may be withdrawn around others, such as: being tired or in a bad mood, following cultural norms, or having no interest in interacting (Rubin et al., 2009; Coplan et al., 2014; Xu et al., 2007). The latter describes the general attitude of unsociable children, who tend to be uninterested in other people and prefer solitary activities over social ones (see also social disinterest and introversion: Carlyn, 1977; Coplan et al., 2004). Although unsociability and shyness are considered separate traits, an individual can be both at once (Asendorpf, 1990a; Coplan et al., 2013; Nelson, 2013; Poole & Schmidt, 2019; Spangler & Gazelle, 2009). Some shy children may even start to prefer solitary activities after learning to use them to cope with their anxiety (e.g., reading a book to distract from peers who are playing somewhere else in the room; Asendorpf, 1991; Henderson et al., 2004). Below, however, I will be focusing on unsociable children who are not-shy and shy children who are not-unsociable, to discuss the unique influence each trait may have on their interventions.
That the current research on prosocial behaviour has, for the most part, not distinguished between shyness and unsociability complicates how we interpret the findings. In particular, I suspect that mixing these groups together has weakened or masked many shyness effects in past research. Children who are unsociable and not-shy should not be compelled to withdraw from prosocial situations: they would not have anxiety pulling them away from the person in need or the other people involved. I would thus not expect unsociable children to intervene less around unfamiliar people or show only innocuous prosociality, as I would shy children. Unsociable children could be somewhat less motivated to intervene, if they view prosocial problems as (unwanted) opportunities to interact, but there are many other factors that could get them to act in any given situation (e.g., feeling sympathy or hoping for a reward: Eisenberg et al., 2016; Paulus, 2014). Overall, I would expect unsociable children to be just as willing to intervene as other children who are not-shy. The line between shy and unsociable children may become more blurred when we examine their prosocial understanding. Although they would not share shy children’s preoccupation with social threat, unsociable children may still differ in how they attend to prosocial tasks. That is, because unsociable children lack interest in other people, they may attend more to objects in the prosocial environment than to the person in need or any potential mediators (Coplan, 2000; Jennings, 1975). Unsociable children may also have difficulty understanding others’ emotions and therefore their needs. If social withdrawal itself leads to poor theory of mind, by limiting a child’s opportunities to learn through interaction, then all withdrawn children should have difficulty reading other people (but see: Lane et al., 2013).

There are a few different ways that early childhood researchers can measure shyness and unsociability as separate constructs. One option is to have parents complete a questionnaire that includes subscales for both shyness and (in)sociability (e.g., ECBQ: Putnam et al., 2006; EAS:
A questionnaire that was actually designed for this purpose is the Child Social Preference Scale (Coplan et al., 2004). The CSPS includes seven items that assess ‘conflicted shyness’ (e.g., “My child seems to want to play with others but is sometimes nervous to”) and four items that assess ‘social disinterest’ (e.g., “My child often seems content to play alone”). Something to note here is that, like the shyness measures I highlighted previously, the CSPS includes some items that rely on parents to interpret how their children are feeling, which could introduce bias to the results (Goldsmith, 1996).

Another option is to observe children’s behaviour around peers, as I will do in Chapter 3. When shy children are given free rein to play in a group setting (e.g., at daycare), they tend to only watch others play instead of joining in or playing by themselves (e.g., Coplan et al., 2004; Gal-Szabo et al., 2019). This reticent behaviour may be a consequence of shy children having difficulty shifting their attention away from threat; they become too preoccupied by their peers, and the anxiety warning against them, to find something else to do (Henderson et al., 2004). In contrast, unsociable children tend to engage in a lot of solitary play and seem especially likely to choose ‘passive’ activities, like reading or putting together a puzzle (Coplan et al., 1994; Rubin & Asendorpf, 1993; but see: Coplan et al., 2001). It is important to note that these behaviours may only distinguish between shyness and unsociability in early childhood; as they get older, and find new ways to cope with their anxiety, shy children may start to engage in more passive solitary activity (Asendorpf, 1991).

Finally, shy children can be identified by measuring their physiological reactions to stress (i.e., somatic anxiety). Compared to their not-shy peers, shy children should show faster arousal of the sympathetic nervous system when they encounter social threat (e.g., a stranger enters the room) and slower regulation by the parasympathetic system when that threat disappears (e.g., the
stranger leaves; Davis, 1992; Hastings et al., 2005). These physiological differences should be seen at baseline as well, because shy children have a lower threshold for anxiety. However, children who have an inhibited temperament show this lower threshold as well (e.g., Kagan et al., 1988a; Scarpa et al., 1997), and thus baseline measures of reactivity should be combined with other measures that include social threat to capture shyness itself (e.g., MacGowen & Schmidt, 2021a). Although measures of physiological reactivity to stress can be used to identify shy children, they will not necessarily detect unsociable children. If a non-reactive child tends to be socially withdrawn, they could be unsociable, but they could also be following cultural norms (e.g., Lane et al., 2013) or have another reason to withdraw. Shyness and unsociability do seem to have distinct neurological patterns, however, in older children and adults (e.g., Tang et al., 2016; Schmidt & Fox, 1994).

Conclusion

In this chapter, I drew three major implications about shy children’s prosocial behaviour from past research: that they are less likely to intervene on behalf of unfamiliar people, that they are more likely to intervene in innocuous ways, and that they need more prompting to intervene. I then explored what these findings could tell us about shy children’s prosocial motivation – that their anxiety may make them less willing to intervene. From this perspective, shy children may be less prosocial around strangers because they see them as potential threats, they may show a preference for innocuous interventions because they feel safer interacting in less engaged ways, and they may respond more often when prompted because a sense of obligation can override their anxiety. Although the current prosocial literature has focused on shyness as a motivational barrier, shy children may differ in their prosocial understanding, as well – they may be less able
to recognize prosocial problems or their solutions. From this perspective, shy children may be too preoccupied by strangers to notice other aspects of a prosocial situation, they may be more prepared to engage in simple interventions that happen to be innocuous, and they may need prompts to give them hints about how to intervene. I have thus identified several questions that should be addressed in future research, to disentangle shy children’s prosocial motivation and understanding. I ended this chapter by highlighting a major issue in past research: that most studies have measured social withdrawal as a proxy for shyness, which may mask its true effects. In particular, children who withdraw because they are unsociable should be just as willing to intervene as children who are not-shy. It is thus important for future research to differentiate shyness from unsociability, to more accurately capture how anxiety affects children’s interventions.

I address some of the questions I have proposed in this review in the next two chapters. Chapter 2 examines how two particular aspects of prosocial situations – social engagement demands and complexity – may uniquely affect shy children’s interventions. That is, we attempted to disentangle shy children’s motivation to intervene from their understanding of how to do so by testing how they would respond to four tasks that systematically varied in social demands and complexity. We addressed two main research questions in this study: 1) will shy children be less willing to intervene in highly social tasks, even when the problem to be solved is very simple, and 2) will shy children struggle to intervene in very complex tasks, even when it requires minimal social engagement? Chapter 3 examines shy children’s prosocial behaviour in two very different contexts: a structured individual setting, where they could intervene on behalf of an experimenter in typical (lab-based) tasks, and a naturalistic group setting, where they could intervene on behalf of their peers whenever the opportunity arose from an everyday activity. The
two main research questions we addressed in this study were: 1) will shy children be just as likely to intervene as their not-shy peers when they are alone with an experimenter, in order to comply with her expectations, and 2) will shy children be less likely to intervene than their not-shy peers when they are in a group of other children, from being anxious about acting in front of bystanders? These studies expand our understanding of shy children’s interventions and provide new directions that can be explored in future research.
Chapter 2:

Shyness as a Barrier to Prosocial Behaviour:

Disentangling Task Complexity from Social Demands
Introduction

In Chapter 1, I reviewed past literature examining the prosocial behaviour of shy children, who tend to feel anxious around other people and to withdraw from social situations (Coplan & Armer, 2007; Rubin & Asendorpf, 1993). I described this research as a mixed bag, with some studies suggesting that shy children will intervene only under certain conditions (e.g., in familiar social settings or after receiving multiple prompts), while others found no shyness effects at all (Hammond & Carpendale, 2015; Schuhmacher et al., 2017; Young et al., 1999). In this chapter, I present a study we conducted to examine this topic from two angles: the motivation to intervene on behalf of a person in need and the understanding of how to do so (Dunfield, 2014; Eisenberg et al., 2016; Martin & Olson, 2015; Paulus, 2014). Specifically, we tested how preschool children ranging in shyness would respond to four prosocial tasks that varied in social engagement demands and complexity, which are two factors that have often been conflated in past research (e.g., Beier et al., 2017; Karasewich et al., 2019).

Prosocial situations can vary greatly in the amount of social engagement they encourage from, or even require of, children who want to intervene. Most out-of-reach object tasks, for example, are very low in social engagement demands: the child does not need to speak or come into contact with anyone to help the person in need, but can instead just hand the object over to them or move it closer (e.g., Dunfield & Kuhlmeier, 2013; Pettygrove et al., 2013; Warneken & Tomasello, 2006). Previously, I labelled such minimally engaged interventions ‘innocuous prosociality’, because they can be done without drawing a lot of attention to the intervening child. We can thus expect shy children to feel more motivated to act prosocially whenever social engagement demands are low as compared to when these demands are high (but see: MacGowan & Schmidt, 2021b). This prediction is supported by Beier and colleagues (2017), in which shyer
children readily helped an experimenter in an innocuous out-of-reach object task (i.e., picking up a pen that had fallen from her desk), but needed more prompting to help her in a highly social task (i.e., getting someone else’s attention). Similarly, Karasewich and colleagues (2019) found shy children to be less likely to help in an out-of-reach object task that was modified to be very socially demanding (i.e., asking an unfamiliar adult to get the experimenter’s toy from a high shelf). In the present study, we categorized the social engagement demands of our tasks by whether or not they encouraged children to approach the experimenter while intervening. Thus, our highly demanding ‘social-centred’ tasks consisted of problems within the experimenter’s personal space, while our less demanding ‘object-centred’ tasks involved at least one object that was more distant from her. We also examined how children intervened, when they chose to do so. In particular, we expected shyer children to focus on objects while intervening (i.e., to be ‘object-oriented’) instead of focusing on the experimenter herself (i.e., ‘social-oriented’).

Prosocial tasks can also vary in their complexity. For a child to intervene effectively, they must first understand what problem the person in need is having and then come up with a solution that they could, realistically, enact (Dunfield, 2014). Helping others to meet their instrumental goals tends to be a simple task for young children. Most helping problems have one clear solution, with any variability in response constrained by the goal needing to be met. Take, for example, a teacher who needs a book from the far side of their desk: a child could help by either handing it to them or pushing it closer, but both actions necessarily carry out the same ‘retrieve book’ solution. In contrast, there are many potential ways that a child could comfort someone experiencing emotional distress (e.g., verbal reassurance, physical affection, the repair of something broken, etc.), so there is no uniquely ‘correct’ or ‘obvious’ response to that type of problem. For a child to provide comfort, they must also be able to recognize when another
person is upset, and this ability emerges later in development than the goal-understanding required for helping (Hoffman, 1982; MacGowan & Schmidt, 2021b; Rosenqvist et al., 2014; Sommerville & Woodward, 2005; see also Paulus et al., 2013). It is unsurprising, then, that preschool children have been found to more readily help others than comfort them in laboratory settings (e.g., Dunfield & Kuhlmeier, 2013; Radke-Yarrow et al., 1976; Svetlova et al., 2010). Complex prosocial problems may be especially difficult for shy children, who have been found to differ in how they process social situations, more broadly, and in what they understand of others’ mental states (e.g., Gal-Szabo et al., 2019; LoBue & Pérez-Edgar, 2014). We explored this possibility in our study by comparing children’s responses to helping and comforting tasks.

The distinction I have just made between helping and comforting is actually oversimplified. Not all helping problems have a solution that would be obvious to young children. In Karasewich and colleagues’ (2019) study, for example, there was no way that a child could help the experimenter on their own. Because the toy that the experimenter wanted was on a high shelf, children could only help her indirectly, by first determining who could reach the shelf and then asking that person to intervene. Recognizing why someone is in need of help can also be fairly complex. To understand why the experimenter in Beier and colleagues’ (2017) social helping task was failing to get someone’s attention, children had to first recognize that she could not raise her voice (she was speaking in a raspy whisper) and that the other person was not looking at her. Both of these helping tasks could be considered more complex than the ones that have been directly compared to comforting tasks in past research (e.g., Chernyak et al., 2018; Dunfield et al., 2011). They are also, as highlighted above, both higher in social engagement demands, which is a major issue for interpreting their findings. We cannot know whether the shyness effects found in these studies were the result of shy children being reluctant to intervene
in highly social ways, having trouble figuring out what to do, or some combination of both. In
the present study, we designed our prosocial tasks to vary *systematically* in social engagement
demands and complexity. Thus, our social-centred helping problem was made to be just as
simple as our object-centred one, while our comforting problems were meant to be more obscure.

To summarize, in this study we examined 3.5- to 4.5-year-old children’s willingness and
ability to respond prosocially in four within-subjects tasks. These tasks were designed to vary in
social engagement demands (i.e., ‘object-centred’ vs. ‘social-centred’ problems) and complexity
(i.e., simple helping vs. more complex comforting problems). We measured prosociality in
multiple ways, including frequency, spontaneity, and type of response. Shyer children were
predicted to engage in prosocial behaviour more frequently and spontaneously in the object-
centred tasks than the social-centred tasks. Further, we predicted that all children in the sample
would find it easier to help the experimenter than to comfort her, but that this would be
especially true of shyer children. Finally, we expected shyer children who did intervene to use
fewer ‘social-oriented’ strategies and more ‘object-oriented’ ones.

**Methods**

**Participants**

Participants were 42 preschool children (19 male; 23 female), with an average age of 47.7
months (range: 42-54 months). Nine additional children were tested but excluded from the final
analysis due to experimenter error (4), equipment failure (1), and participant factors (4); see
Table B1 in Appendix B for further detail. Sample size was assessed by conducting a post-hoc
power analysis in G*Power 3.1.9.2 (Faul et al., 2007). With an *alpha* of 0.05 and an effect size
of .36, which was found in a prior study assessing the correlation between shyness and
comforting behaviour in preschool children (Young et al., 1999), power was calculated to be 0.79 for a sample size of 42 participants. We found similar results by plotting a sensitivity power curve (see Figure B1 in Appendix B). Families were recruited from Kingston, a small city in Canada that has a predominantly White and middle-class population. All children were given a small gift at the end of the study to thank them for participating. This study was conducted with approval from the Psychology Research Ethics Board at Queen’s University (Appendix B).

Procedure

Attachment Q-Sort and the Shyness Subscale

While children participated in the experimental paradigm, their mothers completed a computerized version of the Attachment Q-Sort in a separate room (version 2.1.2: equivalent to the paper version 3; Soria, 2015; Waters, 1995), which was then used to create a shyness subscale. A research assistant explained the Q-Sort instructions and provided help when requested, but the task was otherwise completed independently. On the computer, mothers were shown 90 cards with statements describing a young child’s behaviour (e.g., “Child is lighthearted and playful most of the time”; “Child easily becomes angry with toys”) and were asked to create nine piles of 10 cards each, from most uncharacteristic of their child (pile 1) to most characteristic (pile 9; see Figure B2 in Appendix B for the labels of the other piles). At the end of the sort, mothers were asked to review and confirm their choices.

The Attachment Q-Sort can be used to calculate scores of attachment security by correlating the rater’s choice of pile for each item to a ‘criterion sort,’ which was constructed by averaging the ratings of eight experts for a hypothetical ‘most securely attached’ child (Waters & Deane, 1985; Waters, n.d.). Using this method, security scores can range from -1.00 to 1.00, with larger positive correlation coefficients indicating more secure attachment. In our sample,
attachment was found to be restricted to higher security: scores ranged from .20 to .66, with a mean of .47 and a standard deviation of .11. Due to this restricted range, attachment security will not be featured in our main analyses.

We used the Attachment Q-Sort to create an ad-hoc ‘shyness’ subscale from items that describe the child behaving in withdrawn ways around other people (e.g., “Child’s initial reaction when people visit the home is to ignore or avoid them, even if he eventually warms up to them”) or the opposite (e.g., “Child laughs and smiles easily with a lot of different people”). Following the procedure described by Waters (n.d.), we first identified 14 items from the original 90-item scale that could be labelled as either shy or not-shy (reverse-coded) behaviours and then removed 5 items that showed only moderate inter-item correlations within our sample. The final 9-item subscale has high internal consistency (Cronbach’s alpha = .810). A shyness score for each child was calculated by summing the mother’s sort-value (i.e., 1-9) for each item of the subscale, with higher scores indicating that the child displays shy behaviours more often than not. Table B2 in Appendix B lists the 9 items that were used in the final Q-Sort shyness subscale and the 5 items that were removed. Although we did not look at Waters’ (1987) original rationale for each Q-sort item when creating the shyness subscale, it is interesting to note that he considered 11 of the 14 items we tested (6 of which were included in the final subscale) to be either items that mask the purpose of the Attachment Q-Sort from raters or ones that discriminate between attachment security and temperament.

**Prosocial Tasks**

In the testing room, children completed four prosocial tasks that varied in a 2 (type: help, comfort) x 2 (cause of the problem: object, social) design. Helping tasks were characterized by instrumental need: the experimenter had a goal-directed problem that she could not complete on
her own. Comforting tasks were characterized by emotional distress: the experimenter was upset after an unfortunate event. In social-centred tasks, the source of the experimenter’s problem was within her personal space, so the child would have to focus on (and potentially come in contact with) the experimenter herself to respond effectively. In object-centred tasks, the experimenter’s problem involved a target object(s) that was outside of her personal space, allowing the child to respond while focusing solely on that object(s).

In each prosocial task, described more fully below and in Figure 2.1, the experimenter gave up to three cues to prompt the child to respond, spaced approximately 5 seconds apart for a total of 15 seconds. For all of the prosocial tasks, the experimenter began by stating her problem (cue 1), then provided detail to clarify her problem (cue 2), and finally asked the child directly if they could intervene (cue 3). Each task ended if the child performed a prosocial act at the highest level of engagement for that task (i.e., picking up the target objects in the helping tasks and approaching the experimenter to provide physical comfort in the comforting tasks). The order of the prosocial tasks (Tables B3 and B4 in Appendix B) was counterbalanced, with approximately half of the sample receiving a helping task first ($n = 22$) and half receiving a comforting task first ($n = 20$). Two individuals acted as the experimenter for approximately half of the sample each (i.e., 23 vs. 19 participants).

Helping: Object-centred. The object-centred helping task began with the experimenter ‘accidentally’ spilling a bucket of Lego bricks onto the floor and saying, “Whoops, I spilled the bricks!” as the first cue for the child to act. If the child did not respond within the first 5 seconds, the experimenter gave the second cue: she put two of the bricks back into the bucket and reached for some further away, while prompting, “I can’t reach them all!” As a final cue, after 5 more seconds, she asked the child, “Is there something you can do?” If the child did not help within 15
seconds or only picked up some of the bricks, the experimenter moved to pick up the rest herself and said, “It’s okay, I’ve got them.” If the child did start to help, the experimenter left them to pick up the rest of the bricks alone, under the pretense that she had to put away another toy.

**Helping: Social-centred.** The social-centred helping task began with the experimenter putting on a jacket because she felt “a little chilly.” She then ‘realized’ that there was a square sticker stuck to the back of the jacket and said, “Whoops, I think I have something on my back!” as the first cue for the child to act. The experimenter ‘struggled’ to reach for the sticker while waiting for the child to respond and gave the second cue, “I can’t reach it!” if they did not respond within the first 5 seconds. The final cue, “Is there something you can do?” was given 5 seconds later. If the child did not respond within 15 seconds or only made a verbal helping response (e.g., by identifying where the sticker was on her back), the experimenter took off the sticker herself and said, “It’s okay, I’ve got it.”

**Comforting: Object-centred.** The object-centred comforting task began with the experimenter bringing out a toy dog to show the child, which she described as her favourite toy. She then ‘noticed’ a rip in the dog’s paw. In a sad tone of voice, the experimenter said, “Oh no! My dog! I ripped my doggy!” as the first cue for the child to act and put the toy on the table in front of the child while covering her face with her hands. If the child did not respond within the first 5 seconds, she gave the second cue, “Oh no, I’m really sad!” and after 5 more seconds, she gave the final cue, “Is there something you can do?” If the child did not respond within 15 seconds or only made a verbal comforting response (e.g., by suggesting that they ask the child’s parent to sew the rip), the experimenter ‘realized’, “Oh we can push the stuffing back inside! See it’s all better now,” and put the toy away.
Comforting: Social-centred. The social-centred comforting task began with the experimenter going into an adjoining room to get more toys. On the way back, the experimenter hit her knee on the doorframe and said, “Ouch,” in a pained tone of voice while sitting down and rubbing her knee. She then said, “Oh, my knee! I banged my knee!” as the first cue for the child to act. She gave the second cue, “Ouch, that really hurts!” if the child did not respond within the first 5 seconds. The final cue, “Is there something you can do?” was given after 5 more seconds. If the child did not respond or only made a verbal comforting response (e.g., by suggesting they get a bandage for her knee), the experimenter rubbed her knee again and said, “Oh, I am all better now! I just had to rub it.” If the child offered to give physical comfort to the experimenter but did not move to do so, she asked, “Can you give it a try?” to prompt them further.

Figure 2.1

The Four Prosocial Problems
Note. In the object-centred helping task (A), the experimenter spilled a bucket of Lego bricks on
the floor and struggled to reach the bricks that were not near to her. In the social-centred
comforting task (B), the experimenter hit her knee on a doorframe and then sat and rubbed the
injury in distress. In the social-centred helping task (C), she realized that there was something
stuck to the back of her jacket and struggled to reach it. In the object-centred comforting task
(D), she showed distress after discovering that her favourite toy dog had a rip in one leg.
Illustrations by Sylvia Pinheiro.

Delay Games

The experimenter and child played four ‘delay’ games in between the prosocial tasks, to
give the tasks a more naturalistic appearance. The first game, which acted as a warm-up period
for the child, involved completing a puzzle. On average, children spent 6.15 minutes completing
the puzzle with the experimenter (range: 3.08-10.90 minutes). In the second game the
experimenter and child built a tower together out of the same Lego bricks that would then be
used in the object-centred helping task. The third game was “Memory”, in which the child and
experimenter took turns picking up animal cards laid upside-down on the table to try to find
matching pairs. The final game was “tic-tac-toe”, in which the child and experimenter took turns
putting their symbol on a 3x3 grid to try to make a horizontal, vertical, or diagonal line of 3
symbols in a row, which they played for two or three rounds.

Coding and Interrater Analyses

Video recordings of the test sessions were transcribed and all behaviours were coded by
two independent raters who overlapped on over 25% of the sample, which was used to calculate
interrater reliability/agreement. Disagreements in ratings were resolved by the principal
investigator.5

5 Coding for this study was completed at two separate time-points. In our pre-registration on OSF (osf.io/y25a8), we
explain which measures were coded originally (i.e., before pre-registering) and which we coded more recently. We
also outline changes made to the analysis plan since the pre-registration in a document on the project’s main page
(osf.io/ykzs9).
Responses to the prosocial tasks were first categorized on ordinal scales of increasing engagement with the experimenter. The levels of each scale are summarized in Table 2.1, below. There were three categories of non-prosocial responses that a child could make in any of the four tasks. First, at the lowest level of engagement, a child could not respond at all (e.g., watching the experimenter without doing or saying anything). The next level of engagement, an ‘empty response,’ indicated that the child spoke during the task but did not address the experimenter’s problem (e.g., “I see puppets!”; “What is this [marking] on the table?”). Finally, a ‘concerned response’ indicated that the child spoke to the experimenter about her problem but did not offer a solution (e.g., “I know those kinds of things, they hurt really bad”; “Are you upset?”). A concerned response (a form of hypothesis testing: Zahn-Waxler et al., 1992) can be considered one step away from prosocial behaviour – the child recognizes that something has happened to the person in need, but may not understand what their problem is or how to intervene (Edwards et al., 2015; Knafo et al., 2008; Liew et al., 2011; MacGowan & Schmidt, 2019; Young et al., 1999).

‘Prosocial responses’ varied by task but always required that the child try to solve the experimenter’s problem. In all four tasks, the lowest level of prosocial response that the child could make was to provide verbal help or comfort (e.g., “It will feel better in a few days”; “You can tape it”). The highest level of prosocial response for three of the tasks was to approach the experimenter to physically solve her problem: in the social-centred helping task, children could take the sticker off of the experimenter’s jacket for her, in the object- and social-centred comforting tasks they could give her a hug or other form of physical affection, and in the social-centred comforting task they could also kiss or rub the experimenter’s knee to make it feel better. The object-centred helping task did not have an equivalent level of engagement; physically
helping the experimenter by picking up (at least some) of the spilled Lego bricks did not require approaching her, so it was categorized at the same level of engagement as verbal helping.

Similarly, trying to fix the broken toy in the object-centred comforting task by pushing the stuffing back inside was categorized as the same level as verbal comfort.

Table 2.1

Coding Level of Engagement in the Prosocial Tasks

<table>
<thead>
<tr>
<th>Response Type</th>
<th>Lego</th>
<th>Sticker</th>
<th>Broken Toy</th>
<th>Hurt Knee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Prosocial Responses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No response</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Empty response</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Concerned response</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Verbal help/comfort</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Prosocial Responses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical help: Pick up bricks</td>
<td>3</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Physical comfort: Fix toy</td>
<td>--</td>
<td>--</td>
<td>3</td>
<td>--</td>
</tr>
<tr>
<td>Physical help/comfort: Approach experimenter</td>
<td>--</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

Interrater reliability (i.e., intraclass correlation) was strong for categorizing level of engagement in all four tasks (object-centred helping: .848; social-centred helping: 1.000; object-centred comforting: .935, social-centred comforting: .956). Because each verbal response could be categorized in one of three ways (i.e., empty\(^6\), concern, or comfort), we also examined

\(^6\) For these interrater analyses, children who made no response at all were included in the same category as empty verbal responses.
the raters’ codes for verbal responses separately. In both comforting tasks (very few children in
our sample responded verbally to either helping task), interrater agreement for distinguishing
between the three types of verbal response was moderate (object-centred comforting: $K = .660, p
< .001, 78.6\%$ agreement; social-centred comforting: $K = .490, p < .001, 84.4\%$ agreement).
Given the fairly high percent agreement between the raters here, these lower Kappa values likely
reflect unbalanced marginal totals (Feinstein & Cicchetti, 1990), particularly in the
social-centred comforting task, where both raters used the ‘empty’ code far more often than the
other two codes.

The raters also identified when the child gave their highest level of response to each of
the prosocial tasks (i.e., at the first, second, or third cue), if they responded at all. This code was
used to create a measure of spontaneity for prosocial acts: helping and comforting responses that
occurred at the first cue were considered ‘most spontaneous,’ responses at the second cue were
‘moderately spontaneous,’ and responses at the third cue were ‘least spontaneous.’ Interrater
reliability (i.e., intraclass correlation) for identifying when the highest response occurred was
strong in all four tasks (object-centred helping: .960, social-centred helping: .838, object-centred
comforting: .902, social-centred comforting: .751).

Initial review of the data revealed little variance in children’s helping behaviour (i.e.,
most children physically helped the experimenter in both the object- and social-centred helping
tasks). In contrast, children’s comforting behaviour was far more varied. We thus focused on the
two comforting tasks to examine children’s prosocial behaviour more closely. Specifically, raters
categorized children’s verbal responses during the comforting tasks as being either
object-oriented in content (i.e., the comment was focused on an object relevant to the situation,
like the toy or a band-aid), social-oriented (i.e., the comment was focused on the experimenter’s
feelings), or irrelevant to the situation (i.e., empty). Interrater agreement for identifying the orientation of verbal responses was moderate in both tasks (object-centred comforting: $K = .653$, $p < .001$, 81.0% agreement; social-centred comforting: $K = .394$, $p < .001$, 81.3% agreement).

Once again, these lower Kappa values seem to be caused by unbalanced marginal totals.

We combined the verbal and physical comforting codes in order to identify comforting strategies the children used: either object-oriented (e.g., saying “I can get a band-aid” or fixing the broken toy) or social-oriented (e.g., saying “It’s okay” or kissing the experimenter’s knee). Children often made more than one comforting response to a single task, but because we were interested in whether shyness interferes with using social-oriented strategies specifically, we prioritized those responses. That is, any social-oriented comforting response earned the social-oriented strategy label, while the object-oriented strategy label was given to children who made only object-oriented responses (see the supplemental spreadsheet “Coding Summary for the Comforting Tasks” at our OSF page (osf.io/ykzs9) for further detail).

In Appendix B, we describe additional coding that we used to create an observational measure of shyness from children’s speech behaviour in the first, warm-up, delay game (i.e., the puzzle). This measure was based on prior research that found shy children to speak less during social interactions and, in particular, make fewer spontaneous utterances than not-shy children (e.g., Crozier & Badawood, 2009; Rezendes et al., 1993; but see: Coplan et al., 2004). Because we made the decision to examine the effect of shyness on children’s prosocial behaviour after the data were collected, the two individuals who acted as the experimenter, for approximately half of the sample each, were not given instructions on what or how much to say during the delay games. When we compared the two experimenters’ speech by the transcribed number of utterances each made per second during the puzzle game in an independent t-test, we found a
difference that was not statistically significant but that we felt was large enough to make
interpretation of children’s own speech behaviour difficult ($t(40) = 1.78, p = .082$). Thus, we
consider our examination of the relation between children’s observed shyness and their responses
to the prosocial tasks exploratory and complementary to our parent-report measure (i.e., the Q-
Sort shyness subscale). We describe analyses that used parent-reported shyness below and
analyses using observed shyness in Appendix B.

**Results**

We pre-registered the analysis plan for this study at the Open Science Framework
(osf.io/y25a8). We have also made the data and statistical analysis available on the project’s
main page (osf.io/ykzs9).

**Prosocial Behaviour**

Table B4 in Appendix B shows how many participants, divided by gender of the child,
were given each testing order (A or B) and paired with each experimenter (1 or 2). There were
no significant gender or order effects in how children responded to the prosocial tasks.
Children’s responses in the two helping tasks and the object-centred comforting task were not
affected by the experimenter with whom they were paired, but an experimenter effect was found
in the social-centred comforting task. That is, children who were paired with Experimenter 1 ($n = 23; Mdn = 3$) responded to the social-centred comforting problem with a higher level of
engagement, on a scale including both prosocial and non-prosocial responses, than those who
were paired with Experimenter 2 ($n = 19; Mdn = 1$): *Mann-Whitney U = 114.50, p = .007.*
Comparing Performance on the Prosocial Tasks

We observed a relatively high frequency of prosocial behaviour in our sample, with all children acting prosocially in at least one of the four tasks. Figure 2.2 below and Table B5 in Appendix B provide a summary of the prosocial and non-prosocial responses that children gave in each task, arranged by level of engagement. One task yielded fewer prosocial acts than the others: only 40.5% of the sample acted prosocially in the social-centred comfort task, compared to 88.1% in the object-centred comforting task, 95.2% in the social-centred helping task, and 100% in the object-centred helping task.

Figure 2.2

Observed Level of Engagement in the Prosocial Tasks

Note. Children’s responses to the four prosocial tasks categorized by level of engagement. Non-prosocial responses include: no response, an empty verbal response, and a concerned response. Prosocial responses include: verbal intervention or physical intervention without approaching the experimenter, and physical intervention while approaching the experimenter. Note that approaching the experimenter was not necessary in the object-centred helping task.
We further categorized children’s comforting into the type of strategy they used in each task. For the object-centred comforting task, where the experimenter was upset about her broken toy, a binomial test found that the number of children who used an object-oriented strategy (e.g., pushing the stuffing back inside; \( n = 26 \)) compared to a social-oriented one (e.g., saying “It’s okay”; \( n = 11 \)) was greater than what would be expected by chance (\( p = .020 \)). In contrast, when the experimenter hurt her knee in the social-centred task, the number of children who used an object-oriented strategy (e.g., suggesting they get a band-aid; \( n = 8 \)) compared to a social-oriented one (e.g., giving her knee a kiss; \( n = 9 \)) did not differ (\( p = 1.000 \)).

As detailed in Table 2.2, in three of the four tasks, children were quite spontaneous when acting prosocially: in the object-centred helping task, social-centred helping task, and object-centred comforting task, more than half of the children who intervened did so at the first cue (i.e., when the experimenter merely stated her problem). Children were less spontaneous in the social-centred comforting task: among the children who comforted the experimenter when she hurt her knee, only 35.3% did so at the first cue, while 52.9% did not comfort until the third cue (i.e., when the experimenter asked the child directly if they could intervene).

Table 2.2

<table>
<thead>
<tr>
<th>Spontaneity of Prosocial Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spontaneity</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Least spontaneous (3rd cue)</td>
</tr>
<tr>
<td>Object-Centred Helping</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>15</td>
</tr>
<tr>
<td>26</td>
</tr>
<tr>
<td>( n = 42 )</td>
</tr>
<tr>
<td>Object-Centred Comforting</td>
</tr>
<tr>
<td>9</td>
</tr>
<tr>
<td>7</td>
</tr>
<tr>
<td>21</td>
</tr>
<tr>
<td>( n = 37 )</td>
</tr>
</tbody>
</table>
We examined the spontaneity of children’s prosocial behaviour more closely by conducting the Friedman test, which is an alternative to a repeated measures ANOVA suited to ordinal data. Spontaneity of prosocial behaviour varied significantly across the four tasks: $\chi^2(3) = 13.48$, $p = .004$ ($n = 16$). Post-hoc Wilcoxon signed-rank tests using a Bonferroni corrected $\alpha$ of .008 revealed a significant difference between children’s spontaneity in the object-centred helping and social-centred comforting tasks ($z = -2.74$, $p = .006$) and a marginally significant difference between the social-centred helping and social-centred comforting tasks ($z = -2.60$, $p = .009$).

**Parent-Reported Shyness**

Because we created shyness scores by summing parents’ ratings on 9 items in the Attachment Q-Sort, scores on this subscale could range from 9 (i.e., a rating of ‘1’ on all items in the subscale) to 81 (i.e., a rating of ‘9’ on all items). In our sample, shyness scores were less extreme, but still varied: the lowest score was 20 and the highest was 63 ($M = 37.74$; $SD = 11.77$). These scores were approximately normally distributed and did not vary significantly based on the gender of the child, the order of the prosocial tasks, or the experimenter paired with the child.

**Shyness and Prosociality**

To examine the relation between children’s shyness and their performance in the four different prosocial tasks, we tested the relation between shyness and *spontaneity* in all four tasks. When examining *whether* children acted (frequency) and *how* they did so (types of responses),

<table>
<thead>
<tr>
<th>Social-Centred Comforting</th>
<th>9</th>
<th>2</th>
<th>6</th>
<th>$n = 17$</th>
</tr>
</thead>
</table>

*Note: the counts in this table represent the number of children in each task that intervened prosocially at the specified cue*
however, we found little variation in either helping task (i.e., most children physically helped the experimenter), so we have focused on the comforting tasks alone for those analyses.

**Helping: Object-centred and Social-centred**

In the object-centred helping task, we did not find a significant relation between children’s scores on the Q-Sort shyness subscale and how spontaneously they helped the experimenter ($n = 42$): Kendall’s $\tau_b = -.11, p = .403$. Similarly, in the social-centred helping task, we did not find a significant relation between children’s scores on the Q-Sort shyness subscale and spontaneity ($n = 40$): $\tau_b = -.09, p = .490$.

**Comforting: Object-centred**

In the object-centred comforting task, we used a binomial logistic regression to examine whether scores on the Q-Sort shyness subscale would predict which children comforted. This analysis was not significant: $\chi^2(1) = 1.52, p = .217, OR = 0.01$. We also used logistic regression to examine whether shyness would predict which of the children who comforted ($n = 37$) used a social-oriented strategy, as opposed to an object-oriented one, yet no relation was found: $\chi^2(1) = 1.91, p = .167, OR = 55.42$. We did, however, find a significant relation between shyness and spontaneity of comforting in this task: $\tau_b = -.29, p = .027$. That is, among the 37 children who comforted the experimenter when she was distressed over her broken toy, higher scores on the Q-Sort shyness subscale were moderately associated with less spontaneous comforting (i.e., the child acted only after many cues were given).

**Comforting: Social-centred**

In the social-centred comforting task, we used a binomial logistic regression to examine whether scores on the Q-Sort shyness subscale predicted which children comforted, and did not find a statistically significant result: $\chi^2(1) = 0.25, p = .620, OR = 0.68$. In a separate logistic
regression, we examined whether shyness would predict which of the children who comforted \((n = 17)\) used a social-oriented strategy, as opposed to an object-oriented one. This analysis was also not significant: \(\chi^2(1) = 0.90, p = .342, OR = 8.85\). Finally, there was no significant relation between shyness and the spontaneity of children’s social-centred comforting \((n = 17)\): \(\tau_b = -.21, p = .308\).

**Discussion**

The main goal of our study was to examine whether shy children differ in their motivation to act on behalf of a person in need and/or their understanding of how to do so. Specifically, we examined two factors that may prevent shy children from intervening: social engagement demands and the complexity of the problem to be solved. Because these factors have been conflated in past research (e.g., Beier et al., 2017; Karasewich et al., 2019), we set up our prosocial tasks to vary in the focus of the experimenter’s problem (i.e., object- vs. social-centred) and the type of intervention required (i.e., helping vs. comforting). Although this study had significant limitations, which I discuss below, our findings provide valuable insights into approaches that could be used to disentangle the prosocial motivation and understanding of young children, shy and not-shy alike, in future research.

Of the four prosocial tasks that we gave to the 3.5- to 4.5-year-old children in our sample, the social-centred comforting task stood out for its apparent difficulty. Only half as many children intervened when the experimenter was distressed after hitting her knee than in any of the other three tasks. Interventions were also less spontaneous in the social-centred comforting task: around half of the children who comforted did so only at the third cue, while most children required just one cue to act in the other tasks. Even the 16 children who intervened in all four prosocial situations acted less spontaneously in the social-centred comforting task compared to
the two helping tasks. These findings are unsurprising, given past research has found that preschool children help more often than they comfort and are more likely to comfort someone upset over a damaged object than an injury (e.g., Dunfield et al., 2011; Dunfield & Kuhlmeier, 2013; Kienbaum et al., 2001). What is surprising, however, is that responding to the injured experimenter, a complex and highly socially demanding task, was not more difficult for the shyer children in our sample. The only shyness effect that we found was in the object-centred comforting task, where children who scored more highly on the Q-Sort shyness subscale provided comfort less spontaneously. Shyer children were just as likely as less-shy children to be spontaneous when intervening in the object-centred helping, social-centred helping, and social-centred comforting tasks, and in both comforting tasks shyness had no bearing on whether children comforted or which strategy they used.

One explanation for the lack of shyness effects observed in this study is that we did not have a good representation of shy children in our data. That is, it would be more accurate to consider the shyness subscale we created from the Attachment Q-Sort a measure of social withdrawal, since most of its items (Table B2 in Appendix B) refer to behaviours associated with shyness rather than feelings.\(^7\) It is actually quite common for prosocial behaviour researchers to use social withdrawal as a proxy measure for shyness (e.g., latency to speak to or approach an experimenter: Allen et al., 2018; Hammond & Carpendale, 2015; Karasewich et al., 2019; MacGowan & Schmidt, 2021b). A problem with this method is that shy children are not the only ones who withdraw from social situations. Young children can, for example, be disinterested in

\(^7\) There is one item in the subscale (#12) that does explicitly refer to how children feel in social situations. This item presents its own challenge for interpretation, however, because it goes beyond shyness to measure behavioural inhibition. I discuss this issue further in Appendix B, where I have also conducted supplemental analyses that confirm it has not affected our results.
other people (i.e., unsociable) without also feeling anxious around them (Coplan & Amer, 2007; Rubin et al., 2009), and some parent-report measures clearly separate these two constructs (e.g., CSPS: Coplan et al., 2004; ECBQ: Putnam et al., 2006).

Many of the behaviours described in our shyness subscale are just as likely to be displayed by unsociable children. As examples, avoiding visitors (i.e., item #50), refusing to talk to strangers (#15), and being slow to smile (#7) could all indicate either that a child is anxious around other people or merely lacks interest in them. If scores on the Q-Sort shyness subscale reflected unsociability rather than shyness for even part of our sample that would complicate how we interpret our results. In particular, we would not expect unsociable children to be affected by social engagement demands – they should be just as willing, or unwilling, to intervene in highly social ways as innocuous ones (e.g., Asendorpf & Meier, 1993; Coplan et al., 2004). Using a social withdrawal measure for shyness may have thus masked meaningful differences in how shy children responded to the social-centred comforting task, and in the strategy they used to intervene in either comforting task. It should be noted, however, that three of the five items removed from the subscale for having lower inter-item correlation within our sample are very clear measures of unsociability (Waters, 1987): they describe a child who is less interested in people than their own toys (i.e., item #76), activities (#58), and other things (#5). This suggests that mothers interpreted the nine items that were included in the final subscale as distinct from pure social disinterest.

If we do take the shyness subscale at face value, it is interesting to note that no child scored within the top 20%. This restricted range was not due to shyer children being excluded from the analyses; we only excluded one child for not assenting to participate (Table B1). Instead, it may be that parents of very shy children are reluctant to bring them to a lab-based
study, since would likely feel uncomfortable in the unfamiliar social setting. The shyness scores in our sample were, however, just as restricted at the other end of the scale, so it may just be a quirk of the sorting system, with mothers prioritizing other Q-Sort items when forming their ‘extreme’ piles. It is also worth asking whether our testing situation was too comfortable.

Although shy children tend to be anxious around unfamiliar people and intervene less on their behalf, they can be made to feel more at ease with relatively short, positive interactions (Allen et al., 2018; Stanhope et al., 1987; Young et al., 1999). Our study included a moderately long warm-up period prior to the prosocial tasks, which could have made shyer children feel comfortable enough to come to the experimenter’s aid. The experimenter effect we observed in the social-centred comforting task further highlights the dynamic, interpersonal nature of prosociality (Barragan & Dweck, 2014; Kuhlmeier et al., 2020; Martin & Olson, 2015).

Our findings also, necessarily, reflect the design of our tasks. We attempted to use four prosocial problems to disentangle the potential impacts of social engagement demands and complexity on shy children’s interventions. Our intention was to vary these two factors systematically: to have one task that was both simple and low in social demands (i.e., object-centred helping), one that was both complex and highly demanding (i.e., social-centred comforting), and two that were in-between (i.e., social-centred helping and object-centred comforting). We were most interested in how shyer children would perform in these last, in-between tasks. Would they hesitate to help in a straightforward way if it meant entering someone’s personal space? Would they struggle to figure out how to comfort even when they could do so from a safe distance? While we did find answers to these questions, it is not entirely clear how they apply to shy children’s prosocial motivation and understanding, more broadly.
The shyer children in our sample had no problem providing social-centred help. In fact, children’s performance, overall, did not differ between the two helping tasks: they were just as likely to help, and to help spontaneously, when the experimenter had a sticker on her jacket as when she spilled Lego bricks on the floor. We could take this finding to mean that the shyness effects observed in other socially demanding helping tasks (i.e., Beier et al., 2017; Karasewich et al., 2019) were actually due to their complexity, but that would be a mistake. It is far more likely that our social-centred helping task was not as demanding as we intended it to be. That is, although the experimenter’s problem was within her personal space and thus encouraged children to approach her while intervening, it also involved a target object. Shyer children were likely able to focus on the sticker itself and quickly remove it, without feeling taxed by being in close contact with her. This task could thus be considered more similar to the two object-centred tasks than the social-centred comforting task. We should, however, question whether the object-centred tasks were equivalent to each other in social demands. Although the spilled Lego bricks and broken toy were both objects a child could focus on while intervening, there was more potential for them to engage with the experimenter while providing comfort. We did not even have a fourth level of engagement in the object-centred helping task; there was no reason for a child to approach the experimenter while they picked up the bricks, especially after she moved to put another toy away. In contrast, offering the experimenter a hug or another form of affection could reasonably make her feel better about her toy.

On the surface, the potential to be more engaged while intervening does not sound much like a social ‘demand.’ Can we really be sure, however, that all of the children in our sample understood that they had other options? One of the main reasons we consider comforting problems to be complex for young children is that there is not one clear solution, but rather many
different ways they could respond to the person in distress. Indeed, the children in our sample showed a greater variety of responses to the two comforting tasks, and we were able to categorize their interventions in multiple ways: by form (i.e., verbal or physical), strategy (i.e., object- or social-oriented), and the specific words spoken or actions taken (see the coding summary at our OSF page for more detail). Overall, children’s comforting responses in the object-centred task were less engaged than the social-centred task: no child approached the experimenter to comfort her about her broken toy, and the majority used an object-oriented strategy while intervening. We did, however, find that shyer children provided comfort less spontaneously in this task. Again, we could take this finding to mean that complexity is the greatest barrier to shy children’s interventions. This assumes, however, that we were successful in isolating complexity from social engagement demands, but that very complexity may have made it more difficult for shyer children to initially see that they could comfort innocuously – that trying to fix the toy would be enough to make the experimenter feel better. Future researchers interested in the prosocial decision-making of young children, shy and not-shy alike, should thus consider how a child’s motivation to intervene may actually depend on their understanding of what can be done.

No matter how we explain shyer children’s slow response to the experimenter breaking her toy, it is still puzzling that we did not see a similar shyness effect when she hurt her knee. It is certainly not the case that the object-centred comforting task was more socially demanding. The social-centred task, after all, had no real equivalent to the broken toy, a concrete object sitting right in front of the child – instead, most of the children who used an object-oriented strategy to comfort the injured experimenter did so in an abstract way, like offering to get her a band-aid. The prosocial problem here seemed to pull children’s focus to the experimenter
herself, and some did engage with her to the highest extent by approaching her to kiss her hurt knee. There was one exception: one child focused on the door to the room, which he opened wide to show how the experimenter could have avoided getting hurt. We did not anticipate this type of response, especially given that the experimenter bumped into the frame of the door while it was already ajar (see Table B5 in Appendix B for further detail on our coding). It is important to note, however, that prosocial situations involving an injury can include tangible objects. Experimenters in other studies, for example, have simulated pinching their fingers in clipboards, dropping baskets on their toes, or hitting their thumbs with toy mallets (Eisenberg et al., 2019; Laible et al., 2021; Liew et al., 2011; MacGowan & Schmidt, 2021b; Young et al., 1999). All of these comforting problems could be considered object-centred versions of our injury-based task.

A better explanation for the lack of shyness effects in our social-centred comforting task is that children of this age will struggle to comfort an injured person regardless of their level of shyness (but see: Young et al., 1999). After all, only 17 children comforted the experimenter when she hurt her knee, despite most of the sample intervening in all of the other tasks. It seems likely that our two comforting tasks were not equal in complexity. In the social-centred task, children had to think of a way to either soothe the experimenter or heal her injury, but in the object-centred task, they did not need to know how to personally soothe her if they could think of a way her toy may be fixed (Dunfield, 2014; Hoffman, 1982). Thus, while neither problem had an obvious solution, as shown by the variety in children’s responses, fixing the broken toy seems to have been a more accessible solution. In hindsight, a more equivalent counterpart to our social-centred problem would have been an injury-based task involving a tangible object. For example, MacGowan and Schmidt (2021b) examined shy children’s (non-prosocial) empathic responses to an experimenter who ‘pinched’ her finger in a clipboard. At six-years-old, shyer
children in their sample were less likely to engage in hypothesis testing (e.g., asking about what happened, pushing down on the clipboard, etc.), which may suggest that they had trouble recognizing she was upset. This relation was not longitudinal, however: shyness measured at four- and five-years-old did not predict hypothesis testing at six. In our own study, we may have been able to get a more nuanced picture of what children understood about the experimenter hurting her knee if we had examined their non-prosocial behaviours to the same depth as we had their interventions.

**Conclusion**

In this study, we sought to explore how particular aspects of a prosocial situation may affect shy children’s motivation to intervene and their understanding of how to do so. We thus set out to design four prosocial tasks that varied in both social engagement demands and complexity. Based on previous research (e.g., Beier et al., 2017; Karasewich et al., 2019), we expected shyer children to be less motivated to intervene in social-centred tasks that encouraged them to engage at a higher level with the person in need. We also expected shyer children, in particular, to have trouble figuring out how to comfort an experimenter who was experiencing emotional distress. Our findings subverted our expectations in interesting ways. The shyer children in our sample did not differ in how often they intervened or the type of response they made, in any of the four prosocial tasks. The only shyness effect that we observed was in the object-centred comforting task, in which shyer children were slower to comfort the experimenter after she broke her toy. Although our shyness measure was almost entirely limited to socially withdrawn behaviours, this limitation is not the only explanation for our findings. It seems likely that our social-centred helping task was too simple to be socially demanding – shyer children
may have shown more reluctance to act if her problem could not have been solved so quickly. In turn, the complexity of the object-centred comforting task may have made it appear more socially demanding – shyer children may have taken longer to intervene because they did not realize, at first, that they could act through the broken toy. Our study thus reveals further challenges that researchers face in detangling how these two factors may affect children’s willingness and ability to intervene, whether they are shy or not.
Chapter 3:

Shyness as a Barrier to Prosocial Behaviour:

The Role of Compliance and the Bystander Effect
Introduction

In my dissertation thus far, I have identified many methodological concerns for researchers interested in the prosocial behaviour of shy children. In Chapter 1, I highlighted patterns in the current literature that could limit the reach of its findings. I addressed one of these limitations in Chapter 2, by attempting to differentiate between prosocial motivation and understanding – when shy children intervene less than their peers, is it because they are unwilling to engage with others, uncertain what to do, or a combination of both? In this chapter, I present a study we conducted to address another major issue in the current literature: that most of our evidence comes from laboratory-based studies involving adults, which may not fully reflect the everyday experiences of shy children. By moving into a daycare setting, we were able to test preschool children in two distinct contexts: traditional structured tasks, where they could be prosocial toward an experimenter, and a more naturalistic task, where they could be prosocial toward their peers.

That naturalistic methods play an essential role in psychological research is certainly not a new idea. In 1977, for example, McCall argued that experimental methods alone cannot answer some of our most important research questions; when we carefully control events in the lab, we are only testing whether certain outcomes can occur, not whether they do occur in the real world. While these lab-based studies provide a great deal of control to researchers, they cannot fully capture how people navigate the complex and unpredictable situations they encounter in everyday life (Osborne-Crowley, 2020). Naturalistic methods can be used to complement such research, by challenging and contextualizing the evidence we have found (Dahl, 2017; Olson & Dweck, 2008). Prosocial behaviour researchers have been employing naturalistic methods for decades, by: asking parents or teachers to report how often children intervene through
questionnaires, training parents to observe, interpret, and record their everyday activities, and directly observing children interact with family, friends, or strangers (e.g., Dahl, 2015; Demetriou & Hay, 2004; Eisenberg et al., 1981; Iannotti, 1985; Tavassoli et al., 2019; Zahn-Waxler et al., 1992). These practices, however, are rarely used to study the prosocial behaviour of shy children, who are (by definition) highly sensitive to their social contexts. When Farver and Branstetter (1994) observed preschool children at their daycares, they found shyer children to be less likely to provide indirect comfort to their peers (i.e., tell someone else why a peer is crying). Stanhope and colleagues (1987) found shy children to be rated as fairly prosocial at home by their mothers, despite helping an experimenter less often in the lab. No other study, to my knowledge, has examined shy children’s interventions in naturalistic contexts. Our study thus contributes to this small literature by observing children in a daycare setting.

Many children spend a significant amount of their daily lives around other children – their siblings at home, classmates at school, peers on the playground, etc. Yet, most of the opportunities for prosocial behaviour that we construct in the lab involve only adults (but see: Hepach et al., 2017; Plötner et al., 2015). We should not assume that children will respond to their peers in the same way that they respond to the experimenters and other adults in such studies. For example, when Eisenberg and colleagues (1985) interviewed preschool children about their prosocial acts, they found that they were more likely to report feeling motivated by perceived need when it came to their peers and authority when it came to their teachers. This suggests that children will intervene on an adult’s behalf as a form of compliance, in order to gain praise or avoid punishment from someone who has authority over them (Bar-Tal, 1982; Eisenberg et al., 2016; Paulus, 2018). This motivation to comply can be enough to compel even shy children to intervene, under the right conditions (e.g., Beier et al., 2017; MacGowan &
Schmidt, 2021b). Thus, we may not be able to extend what we learn about how shy children respond to adults in need to situations involving their peers: a shy child who feels so obligated to comply with an experimenter that they intervene despite their anxiety will not necessarily act on behalf of a peer in similar circumstances. Yet, only one study has examined shy children’s reactions to the needs of their peers (i.e., Farver & Branstetter, 1994). The present study is a first attempt to test whether shy children differ in their prosocial behaviour toward their peers and an adult experimenter.

We know from a long line of research with adults that the mere presence of other people can make it less likely that someone will intervene on behalf of a person in need (see Fisher et al., 2011 for a meta-analytic review). This is known as the bystander effect and there are many different reasons that it occurs (Latané & Darley, 1970; Latané & Nida, 1981). For example, a person may feel less obligated to intervene if they are just one of many who could (i.e., diffusion of responsibility; Barron & Yechiam, 2002; Wiesenthal et al., 1983). They may also feel too anxious to intervene when others are nearby (e.g., Schwartz & Gottlieb, 1980; Zoccola et al., 2011). Plötner and colleagues (2015) observed the bystander effect in five-year-old children. Participants were seated at a desk alone or beside two unfamiliar confederates. These bystander children varied in their ability to help the experimenter: in one condition, they were blocked in their seats and thus unavailable to intervene, while in the other they were just as free to move as the participating child. Children in the available bystander condition were less likely to help the experimenter than children in both of the other conditions. The authors interpreted their findings to mean that diffusion of responsibility, rather than shyness, causes the bystander effect at this age: because they were just as likely to help when there were unavailable bystanders as when they were alone, participating children must not have felt too anxious to act in front of others.
This study did not, however, examine shyness at an individual level. Because shy children experience both a lack of personal responsibility and feelings of anxiety around others, they should be especially prone to the bystander effect. We tested this idea through our naturalistic task, where children could be prosocial toward their peers in a group setting.

Studying children in naturalistic settings is a good way to capture broad social dynamics – how they interact with others and react to them, in prosocial situations and outside of them. In this study, we leveraged the daycare environment to measure shyness. That is, we recorded how often each child showed reticence during a free-play period: standing apart from the other children in their group, while only watching the activities of others or being unoccupied (e.g., Asendorpf, 1991; Rubin, 2001). Reticence is a form of social withdrawal that has been linked to anxiety in young children, and thus may be used to differentiate shy children from those who withdraw for other reasons (e.g., Coplan et al., 2004). For example, children who lack interest in social interaction (who are ‘unsociable’) tend to choose activities they can do alone (e.g., reading) instead of engaging with others (e.g., Coplan et al., 1994; Rubin & Asendorpf, 1993). Shy children do neither – they become so preoccupied by the potential social threats in their environment (i.e., their peers) that they can do nothing else but watch others (Henderson et al., 2004). In this way, observing children around their peers may provide us with a more accurate gauge for shyness than other social withdrawal-based measures, which are common in the current literature (e.g., Allen et al., 2018; Beier et al., 2017; Karasewich et al., 2019; MacGowan & Schmidt, 2021b; and Chapter 2 of this dissertation). We thus used a free-play period to measure shyness in the present study. We also examined level of engagement with peers, to test whether children who interacted more often during free-play would also engage in more prosocial interactions in the later tasks.
To summarize, in this study we examined the prosocial behaviour of 3- to 7-year-old children in two contexts: structured individual tasks, where they could intervene on behalf of an experimenter, and a more naturalistic group task, where they could intervene on behalf of their peers. In the structured tasks, children were presented with six scenarios, one at a time, in a controlled setting. These tasks were designed to replicate past laboratory-based research with this age group and examine how children would respond to particular helping, sharing, and comforting problems (e.g., Dunfield & Kuhlmeier, 2013; Warneken & Tomasello, 2006). In the naturalistic task, small groups of children were given wooden blocks to build towers and we recorded how they responded to any prosocial opportunities that arose. We expected these two contexts to have different effects on children’s motivation to intervene. In the structured tasks, they should have felt more motivated, overall, to be prosocial toward the experimenter, in order to comply with her authority. In contrast, they should have felt less motivated to be prosocial toward their peers – both from lacking the obligation to comply and from feeling less personal responsibility to act in the presence of others. We predicted that children who behaved more shyly around their peers during the free-play period would intervene less often, but that we would be more likely to see this shyness effect in the naturalistic task, where shyer children would feel particularly hesitant to act in front of bystanders. Finally, we tested whether children who engaged more often with their peers would also intervene more often in the prosocial tasks.

Methods

Participants

The sample used in this study was part of a larger cross-cultural project (see Tavassoli et al., 2022). Our participants were 128 children (66 male; 62 female), with an average age of 54
months (range: 34-83 months; see Table C5 in Appendix C for age broken down into years). The data were collected at 10 daycares in Montréal. Participating children were tested in small groups for two-thirds of the study procedure. The number of groups observed at each daycare ranged from 1-5, with an average of 3 groups per daycare and a total of 29 groups. The average group size was 4.7 children (range: 3-7 children). For a detailed breakdown of the size, gender composition, and age range within each peer group, see Table C1 in Appendix C. One additional group was tested but excluded from the final analyses because one child had previously been tested with a different group. We used data that was collected for this child from his first group, and then excluded data from the other two children entirely. Twenty-five additional children were excluded because they did not have complete data (for further detail, see Figure C1 in Appendix C). At the end of the study, all children were given a small gift to thank them for participating. This study was conducted with approval from Concordia University’s General Research Ethics Board (Appendix C).

**Procedure**

At the start of the study, participating children were randomly put into small groups by the experimenter and brought, one group at a time, to a designated play area that was separated from the rest of their daycare classmates. The peer groups were observed during two periods: free-play and a tower building task. Each child was then tested individually (on a different day) in structured prosocial tasks. Task instructions were given in English, French, or a mix of both, depending on children’s comfort levels with each language. Two cameras were used to film all study procedures. For the group observations, the cameras were placed on tripods at opposite ends of the designated play area. Where needed, to get the least obstructed view of what children
were doing, a research assistant would pick up one of the cameras to circle the area, but would return it to the tripod if her presence seemed distracting.

**Free-play Period**

The group observations began with a free-play period that was, on average, 10.48 minutes long (range: 9.53-12.94 minutes). Children were given no instructions for what they should do during this time, except to stay within the designated play area. They were also not given any toys, books, or other play material.

**Tower Task**

Immediately following the free-play period, the experimenter put a 150-piece wooden block set in the middle of the designated play area and told the group, “Build the tallest tower you can.” No other instructions were given, and the experimenter merely repeated herself if any child asked for clarification. It was thus up to the participants to decide whether they should each build a tall tower on their own or collaborate together. Each group was given approximately 10 minutes to build their tower(s).

**Structured Tasks**

The structured tasks were conducted in a separate room within each daycare. Children were tested individually by the experimenter, who sat across from them at a table for most of the tasks. A bag of study material and a bucket of wooden blocks sat on the floor by the experimenter’s chair. This period began with a short warm-up, which took on average 5.33 minutes (range: 3.22-7.58 minutes) and consisted of the experimenter and child putting together a puzzle. The experimenter then presented the child with six prosocial tasks, one after the other, in 30-second trials. The trials alternated between responsive and spontaneous tasks. On responsive trials, the experimenter had a clear problem to which the child could respond: she
needed help achieving a goal that she could not meet on her own, she needed the child to share when she received less of a resource than they did, and she needed comfort when she became upset by an unfortunate event. Similar set-ups were used on spontaneous trials, but the experimenter did not have a clear problem that would require a response. The six trials given to each child were taken from a larger bank of twelve consisting of six responsive tasks (two each of helping, sharing, and comforting) and their corresponding spontaneous tasks, which involved the same materials and basic actions. Thus, all children experienced the following six scenarios, but for each scenario half of the sample received the responsive version and half the spontaneous version.

**Helping: Block task.** At the start of the block task, the experimenter grabbed a handful of wooden blocks from the bucket by her chair. She told the child, “Look! I’m building a tower” and stacked three or four blocks on top of each other on a corner of the table near the child. In the responsive version of this task, the experimenter then ‘accidentally’ dropped another block off the edge, said, “Oops!” and reached for it. Because the block was too far away from where she was sitting, she needed the child to help by retrieving it for her. In the spontaneous version of the task, she looked at the last block, said, “Hmm, not this one,” and purposefully tossed it over the edge of the table.

**Helping: Door task.** At the start of the door task, the experimenter looked down at her bag of materials and bucket of blocks and said, “I’m going to put these away.” In the responsive version of this task, she awkwardly picked up both the bag and bucket in her arms, then walked to a closed door and struggled to open it with her elbow. She thus needed the child to help by opening the door. In the spontaneous version of the task, she only picked up the bucket with one hand and said, “Hmm,” as though lost in thought while she stood by the door.
**Sharing: Sticker task.** At the start of the *sticker* task, the experimenter looked into her bag and ‘found’ two opaque containers: “What do I have here? Look what I’ve found.” She opened one container for herself and then opened the second container and put it in front of the child. In the responsive version of this task, the experimenter’s container was empty, while the child’s container had four stickers inside. When she opened her empty container, the experimenter showed it to the child and said, “Look what I have,” in a disappointed tone of voice. She thus needed the child to share some of their stickers with her. In the spontaneous version of the task, both containers had two stickers each, so when the experimenter showed the child her container, she said, “Look what I have,” in a neutral tone of voice.

**Sharing: Popcorn task.** The *popcorn* task followed the exact same procedure as the *sticker* task, but with popcorn inside the containers.

**Comforting: Teddy bear task.** At the start of the *teddy bear* task, the experimenter took a teddy bear out of her bag, showed it to the child, and said, “My teddy! My favourite teddy!” She then hugged it to her chest while saying, “I love him so much!” Finally, she brought the bear to the table and moved him around in a playful manner, before leaving him in the centre, within reach of the child. In the responsive version of this task, the bear’s arm came off while the experimenter was playing with it. She looked surprised and said, “Oh no! My teddy! What happened?” in a sad tone of voice. In the spontaneous version of the task, the bear’s arm did not come off.

**Comforting: Knee task.** At the start of the *knee* task, the experimenter told the child, “I’m going to put these things away,” referring to the study material by her chair. While getting up from the table, she banged her knee on its edge. In the responsive version of this task, she said, “Oh no! My knee!” and bent down to rub it, as though she was in pain. In the spontaneous
version of the task, she only said, “Oh!” in a neutral tone of voice, then bent down to look more closely at the table.

In all scenarios, the child was given 30 seconds to respond after the experimenter completed the above actions. In responsive trials, the experimenter looked at the source of her need (i.e., the fallen block, the closed door, her empty container, her broken teddy bear, or her hurt knee) and made an appropriately sad or frustrated facial expression for the first 15 seconds. She then alternated her gaze between the source of her need and the child for the remaining 15 seconds. The same procedure was used in the spontaneous trials, but the experimenter was making a neutral or content facial expression instead. A trial ended when the child solved the experimenter’s problem or acted similarly in the spontaneous trials (e.g., picking up the fallen block and putting it on the table, in either version of the block scenario), made it impossible to solve the problem (e.g., ate all of their popcorn instead of sharing), became distressed, or the 30 seconds elapsed.

The order of the six trials was counterbalanced, but the last two were fixed: the last trial was always the door scenario, because it involved the experimenter putting away the study material (i.e., the bag and/or the bucket) and the second to last trial was always the knee scenario, where she first got up to put things away. Each child was randomly assigned to one of eight counterbalancing orders (see Tables C2 and C3 in Appendix C).

**Coding and Interrater Analyses**

Video recordings of each study period were coded by two independent raters using the software Interact (Mangold International, 2016). A primary rater coded all videos within a period and a secondary rater coded at least 20%, for comparison in interrater reliability/agreement analyses. Disagreements in ratings were resolved by the principal
investigator. Different pairs of raters coded children’s behaviour in the free-play period and in the two prosocial periods.⁸

**Free-play Behaviour.** Children’s behaviour throughout the free-play period was categorized as either solitary, social, or uncodable. A child was considered ‘solitary’ whenever they were totally alone (i.e., standing, sitting, lying down, or moving around while being physically apart from the other children in their group) and they were not interacting with any of their peers. Because each daycare varied greatly in how much space they could provide for the designated play area, we did not specify just how far apart a child needed to be for their behaviour to count as solitary. Instead, the raters were instructed to look for peers who were clustering together and judge whether or not the child was part of a cluster (see Figure 3.1 below). Whenever the child was physically close to or interacting with at least one peer (e.g., talking or listening to them, playing a game together, etc.), they were considered ‘social.’ Finally, a child was considered ‘uncodable’ whenever the rater could not determine whether they were being solitary or social (e.g., they were out of frame of both cameras) or they were distracted by an adult in the room (e.g., the experimenter or a daycare worker). The latter case included situations in which a child spoke to an adult, listened to them speak, watched them engage in an activity, or came into physical contact with them. It did not include the child looking at an adult who was doing nothing to draw their attention – such as when children stared at an unmoving camera or the experimenter passively standing behind it. Interrater reliability (i.e., intraclass correlation) was strong for these three categories of free-play behaviour (solitary: .972; social: .986; uncodable: .822).

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⁸ Coding for this study was completed at two separate time-points. In our pre-registration on OSF ([osf.io/36qgu](http://osf.io/36qgu)), we explain which measures were coded before pre-registering and which were coded after.
Figure 3.1

Coding Free-play Behaviour: Identifying ‘Clusters’ of Children

Note. An illustration representing four children in the free-play period. On the far left, one child (A) is standing alone, while two children on the far right (C and D) are standing next to each other. The final child (B) is between them. Looking at this scene as a whole, it is clear that C and D are clustered together: they are therefore both being social. In contrast, neither A nor B are part of a cluster; although B is closer to the other children than A, they are both standing physically apart from their peers. We would, however, need more context than a still image to establish whether A or B’s behaviour is solitary. If A and B were talking to each other, for example, they would be categorized as social despite the distance between them.

Source for images: Sketchify. Distributed under Canva’s Free Media License. Original images have been cropped and edited together.

All solitary behaviour was further categorized into one of three codes. A solitary child was considered ‘active’ whenever they were engaging in a purposeful activity (e.g., dancing, talking to themselves, running around, stretching, looking out a window, etc.). Active solitary behaviour had a clear goal or focus to it: the child was either entertaining themselves or exploring their environment, separately from their peers. In contrast, a solitary child was
considered ‘reticent’ whenever they were unoccupied (e.g., fidgeting, walking around aimlessly, staring into space, etc.) or only watching what their peers were doing (i.e., onlooking; Asendorpf, 1991; Rubin, 2001). Finally, a solitary child’s behaviour was considered ‘unclear’ whenever the rater was certain that they were alone but could not determine whether they were being active or reticent (e.g., the child was facing away from both cameras). Interrater reliability was strong for both active and reticent solitary behaviour (ICC = .949 and .984, respectively), but poor for unclear solitary behaviour (ICC = .004). It should be noted that the unclear solitary code was very rare (0.07% of the primary rater’s codes, on average) and tended to be used more often by the secondary rater (1.52%), who, by design, had less experience identifying the different behaviours.

In our pre-registration, we defined ‘social’ behaviour as only the interactions a child had with one or more of their peers. This left an unintentional gap in our codes that would have made being near a peer without interacting considered ‘uncodable’. We thus expanded our definition to include any time the child was physically close to a peer and then further categorized social behaviour into one of three codes. A social child was considered ‘engaged’ whenever they were clearly interacting with at least one of their peers, no matter how physically close they were to each other. A social child was considered ‘detached’ whenever they were sitting, standing, or lying down near a peer, but clearly not interacting with anyone. Detached behaviour could be considered a social parallel to reticent behaviour: whenever children were being detached, they were doing nothing (i.e., unoccupied) or watching other children (i.e., onlooking) while hanging around each other. Finally, a social child’s behaviour was considered ‘unclear’ whenever the rater was certain that they were with a peer, but it was not clear whether they were being engaged or detached (e.g., two children were in a cluster, facing away from the cameras).
Interrater reliability was strong for engaged social behaviour \((ICC = .969)\), moderate for detached social behaviour \((ICC = .682)\), and poor for unclear social behaviour \((ICC = .151)\). Like the unclear solitary code, the unclear social code was very rare and tended to be used more often by the secondary rater: it represented only 0.14% and 0.26% of each rater’s respective codes.

For our analyses, we were primarily interested in children’s \textit{reticent} behaviour. We used this code to create a \textit{shyness} score for each child, based on past research that has found reticence around peers (both familiar and unfamiliar) to be linked to feelings of anxiety in young children (e.g., Coplan et al., 1994; Coplan et al., 2004; Henderson et al., 2004). The shyness score was calculated to reflect how much of the free-play period a child spent being \textit{unambiguously} reticent. That is, we divided the amount of time each child displayed reticent behaviour by the total free-play period (~10 minutes) minus any time the child was marked as either ‘uncodable’ or ‘unclearly solitary.’ We created an \textit{engagement} score for each child, following a similar procedure: dividing the amount of time they showed engaged social behaviour by the total free-play period minus any time they were marked as ‘uncodable’ or ‘unclearly social.’

**Naturalistic Prosocial Behaviour.** The tower task provided children with a naturalistic setting in which they could be prosocial toward their peers. When coding this period, the raters first identified instances of need, by marking whenever a child in the group appeared to have a problem, based on their facial expressions (e.g., frowning), verbal remarks (e.g., “I need…”), or actions (e.g., reaching for a far-away block). Each need was then categorized by type. If a child could not complete a goal on their own, their need was considered ‘instrumental’ (i.e., they needed \textit{help}). If a child could not acquire a desired resource, their need was considered ‘material’ (i.e., they needed someone to \textit{share} with them). Finally, if a child was sad or upset, their need was considered ‘emotional’ (i.e., they needed \textit{comfort}). Some needs were classified as more than
one type. For example, if a child started to cry because they did not have the right block to complete their tower, their need would be considered both emotional and material.

The raters then coded how every other child within the group responded to each instance of need. Non-prosocial responses were categorized into one of three types. If a child did not appear to notice that their peer was in need (e.g., they were turned away), they were considered ‘unaware’ of the situation. If a child should have noticed the problem (e.g., they were turned toward their peer) but said and did nothing, they were ‘non-responsive.’ Finally, if a child moved away from the peer in need, mocked them, said, “No,” or argued why they would not intervene, they were ‘denying’ intervention. Any attempt a child made to verbally or physically solve the peer’s problem was considered ‘prosocial.’ Prosocial responses were further categorized into one of four types: a child could ‘help’ support a peer to meet an instrumental goal (e.g., retrieving a block they had dropped), ‘share’ a desired material resource (e.g., giving up some of their own blocks), ‘comfort’ a peer who was distressed (e.g., telling them not to be sad), or ‘cooperate’ to meet a joint goal (e.g., building a tower together).

Children’s responses in the tower task did not have to match their peers’ needs in order to be considered prosocial. For example, a child who was having trouble building their tower without it falling down would be coded by the raters as having an instrumental need, but another child in the group may perceive their frustration with the tower as distress and offer them a comforting hug instead of help rebuilding it. Children could also act prosocially in the absence of a need identified by the raters. For example, if a child’s tower fell down and they showed no outward signs of having a problem (e.g., their facial expression did not change), this would not be coded by the raters as an instance of need, but another child offering to fix the tower would be coded as a prosocial (helping) response. These spontaneous interventions (i.e., acting without an
obvious preceding need) were coded by type in the exact same way that *responsive* interventions (i.e., acting in response to an obvious need) were.

In the subset of the sample used to calculate interrater agreement, there were 123 instances of need identified by both raters and 27 identified by only one. The latter cases were judged by the principal investigator and each rater then coded the instances they missed to provide complete data for the following analyses. Interrater agreement was nearly perfect for categorizing each type of need as instrumental, material, emotional, or a combination\(^9\) \(K = .916, p < .001, 95.0\%\) agreement). There was strong agreement for categorizing the type of response (i.e., unaware, non-responsive, denying, or prosocial) every other child within the group made to these needs \((K = .772, p < .001, 85.7\%\) agreement). Finally, agreement for categorizing children’s responsive and spontaneous prosocial behaviours by type (i.e., helping, sharing, comforting, or cooperating) was nearly perfect \((K = .983, p < .001, 98.9\%\) agreement). Because we are most interested in how often children intervened on behalf of their peers, overall, we have summed all of their prosocial acts – both responsive and spontaneous, of any of type – into one *naturalistic prosociality* score.

**Structured Prosocial Behaviour.** The structured tasks provided children with six opportunities to engage in prosocial behaviour toward the experimenter, in a one-on-one setting. The raters coded children’s behaviour within each task into one of six categories. Five of these categories were non-prosocial. If a child said and did nothing during a trial, they were ‘not acting.’ If a child tried to leave the testing room or actually did leave, they were ‘escaping.’ If a child started to cry, self-soothe, or act aggressively, they were ‘showing distress.’ If a child

\(^9\) In this subset of the sample, there were only two combined types of need coded by one or both raters: 1) instrumental and emotional, and 2) material and emotional. These combinations were treated as a separate categories when calculating interrater agreement.
moved away from the experimenter, persistently looked away from her, or said, “No,” they were ‘denying’ intervention. A child could also deny particular interventions: keeping the wooden block instead of giving back it to the experimenter, eating all of the popcorn in their container, and taking the experimenter’s teddy bear for themselves were considered ‘denying’ behaviours. Finally, if a child asked the experimenter about the situation, but did nothing about it, they were ‘showing concern.’ A child was categorized as ‘prosocial’ whenever they made a verbal or physical attempt to solve the experimenter’s problem in the responsive trials or performed the same actions in the spontaneous versions of those trials. Interrater agreement for categorizing children’s behaviour in the structured tasks was moderate ($K = .672, p < .001$, 78.5% agreement).

Because each responsive trial was designed to make the experimenter’s problem quite explicit, the type of prosocial behaviour a child performed was determined by the task itself rather than being categorized by the raters. Thus, any intervention in the block and door tasks was considered ‘helping,’ any intervention in the sticker and popcorn tasks was considered ‘sharing,’ and any intervention in the teddy bear and knee tasks was considered ‘comforting.’ These same labels were used in the spontaneous versions of the trials. For example, telling the experimenter “It’s okay!” after she banged her knee was considered a comforting response no matter how she had reacted (i.e., upset or neutral) to the incident.

When we pre-registered this study, we planned to create a structured prosocial score for each child by simply summing the number of tasks in which they intervened, with scores ranging from 0 to 6. Due to experimenter error, however, some children did not receive all six tasks; the experimenter missed one task when testing five children and she gave three children the same version for both tasks of one type (e.g., two spontaneous sharing tasks; for full details, see Table C3 in Appendix C). To account for these errors, we have transformed the structured prosocial
scores into percentages, by dividing the number of trials in which the child intervened by the number of trials they received and multiplying by 100. Thus, children who were correctly given all six tasks had their score divided by six, children who were only given five tasks had their scores divided by five, and children who were given the same version of one task type had the second task dropped and their scores divided by five. Structured prosocial scores can thus now range from 0% to 100%.

Results

We pre-registered the analysis plan for this study at the Open Science Framework (osf.io/36qgu). We have also made the data and statistical analysis available on the project’s main page (osf.io/89cnp/).

Free-play Period

When we gave the children in our sample time to play freely with their peers, they tended to show a high level of social engagement. The average child displayed ‘engaged social’ behaviour for 72.37% ($SD = 24.38$) of the total free-play period, ‘detached social’ behaviour for 8.16% ($SD = 13.99$), ‘reticent solitary’ behaviour for 7.56% ($SD = 15.68$), ‘active solitary’ behaviour for 6.77% ($SD = 11.51$), ‘unclear social’ behaviour for 0.42% ($SD = 1.19$), ‘unclear solitary’ behaviour for 0.02% ($SD = 0.20$), and ‘uncodable’ behaviour for 4.71% ($SD = 5.40$).

Shy Behaviour

We created a shyness score for each child using the reticent code, with the total free-play period minus any time in which it was ambiguous whether or not the child was being reticent (i.e., they were marked as ‘unclearly solitary’ or ‘uncodable’) acting as the denominator. Shyness scores for most children were quite low ($M = 7.97; SD = 16.55$), with 34% of the sample
displaying no shy behaviour at all during the free-play period. We found five very shy children to be outliers in our sample (i.e., their z-scores were above the criterion of +/- 3.29: Tabachnick & Fidell, 2013). To retain these data, we winsorized their scores to 3 standard deviations away from the mean (Field, 2013). Even after winsorizing the outlier scores, the shyness scores had a substantially skewed and peaked distribution (skew = 13.43, kurtosis = 19.39; both well beyond the criterion of +/- 2.33: Tabachnick & Fidell, 2013), which we made approximately normal through a logarithmic transformation (skew = 1.41, kurtosis = -2.32). Shy behaviour did not vary significantly by age or gender.

Engaged Behaviour

We created an engagement score for each child using the engaged code, with the total free-play period minus any time it was ambiguous whether or not the child was being engaged (i.e., they were ‘unclearly social’ or ‘uncodable’) as the denominator. All of the children in our sample showed at least some engaged behaviour and the average engagement score was quite high ($M = 76.21$, $SD = 25.51$). There were no outliers in our data, but the engagement scores did have a negatively skewed and peaked distribution (skew = -6.69, kurtosis = 3.26). The distribution became approximately normal after we applied a logarithmic transformation (skew = -1.86, kurtosis = -1.59). Engagement scores did not vary by gender, but there was a significant age effect, with older children displaying more engaged social behaviour: $r = .44$, $p < .001$.

Shy and Engaged Behaviour

Because the shyness and engagement scores were both created from parts of the same whole (i.e., children’s behaviour during the limited free-play period) and are likely to be strongly opposing, we tested for multicollinearity before including them in subsequent analyses. There was a moderate degree of correlation between the shyness and social scores ($r = -.50$, $p < .001$),
which did not go beyond our set criterion of +/- 0.7 (Laerd Statistics, 2018). The collinearity tolerance value was also insignificant (*Tolerance = .75, which is higher than .10: Laerd Statistics, 2018). We thus do not need to be concerned about multicollinearity when conducting analyses that include both the shyness and engagement scores.

**Tower Task**

In the naturalistic tower task, our raters identified a total of 778 instances in which a child was clearly in need of intervention by their peers. Children rarely reacted to these explicit needs by being prosocial. As seen in Figure 3.2 below, when averaging across the entire sample, children were most often unaware of their peers’ needs (*M* = 12.98, *SD* = 9.91) and when they did notice, they were more likely to not respond (*M* = 5.08, *SD* = 3.27) or deny intervention (*M* = 2.84, *SD* = 3.10) than to intervene (*M* = 1.70, *SD* = 2.21). This does not provide a full account of children’s interventions during the tower task, however, because they could also act prosocially when peers were not obviously in need. Still, the average child intervened *spontaneously* only 1.89 times (*SD* = 2.89) during the tower task. Figure 3.3 breaks down children’s interventions (both responsive and spontaneous) by type, showing that it was more common for children to help and cooperate with their peers than to comfort or share with them. This pattern of intervention echoes past research that has found young children to respond to some prosocial problems more readily than others (e.g., Dunfield & Kuhlmeier, 2013; Svetlova et al., 2010), but it also reflects the particularities of our task. That is, building towers out of blocks is a *goal-oriented* activity that lends itself to instrumental (helping and cooperating) problems. With plenty of blocks to go around and nothing designed to be upsetting, the tower task was not set up to provide as many opportunities for sharing or comforting (Tavassoli et al., 2022).
Figure 3.2

Reactions to Peers in Need

Note. Children’s reactions to the explicit needs of their peers, as identified by the raters. Error bars represent standard errors.
Figure 3.3

Prosocial Behaviour Toward Peers

Note. Children’s prosocial behaviour toward their peers. Responsive and spontaneous have been collapsed together in this graph. Error bars represent standard errors.

We created a naturalistic prosocial score for each child by simply summing their responsive and spontaneous interventions together. The average child intervened on behalf of their peers 3.59 times ($SD = 4.44$); however, a fairly large portion of the sample (33.6%) did not intervene even once. One very prosocial child was found to be an outlier in our data and was thus winsorized to a score 3 standard deviations away from the mean. The naturalistic prosocial scores had a significantly skewed and peaked distribution (skew = 6.18, kurtosis = 2.43), which we made approximately normal through a square root transformation (skew = 2.21, kurtosis = -2.12).
To conduct analyses using the naturalistic prosocial scores, we must consider the context in which children could intervene. That is, children’s interventions in the tower task should have depended, in part, on the peer group to which they were assigned; after all, a child whose peers only rarely showed explicit need would have had fewer opportunities to engage in responsive interventions than a child whose peers were often in need. Indeed, intraclass correlation calculated through the unconditional means (null) model confirmed that 11.2% of the variance in children’s naturalistic prosocial behaviour occurred across the peer groups (Peugh, 2010). We have thus used multilevel modelling to examine factors that could predict children’s naturalistic prosocial behaviour, while nested within these groups. We took a sequential model building approach, which allowed us to assess each additional predictor’s impact on model fit through the $\chi^2$ likelihood-ratio test. These models are summarized in Table 3.1, below. In order to meet the normality of residuals assumption, the transformed naturalistic prosocial behaviour scores have been used as the outcome variable in all models.

Table 3.1

<table>
<thead>
<tr>
<th></th>
<th>Predicting Naturalistic Prosocial Behaviour: Multilevel Models</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model</td>
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<tr>
<td></td>
<td></td>
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<tr>
<td>---</td>
<td>-------</td>
</tr>
<tr>
<td>Null Model</td>
<td>--</td>
</tr>
<tr>
<td>Model 1</td>
<td>Gender</td>
</tr>
<tr>
<td></td>
<td>Age</td>
</tr>
<tr>
<td>Model 2</td>
<td>Gender</td>
</tr>
<tr>
<td></td>
<td>Age</td>
</tr>
<tr>
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<td>Shyness</td>
</tr>
<tr>
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<td>Gender</td>
</tr>
<tr>
<td></td>
<td>Age</td>
</tr>
<tr>
<td></td>
<td>Shyness</td>
</tr>
<tr>
<td></td>
<td>Engagement</td>
</tr>
</tbody>
</table>
We tested for gender and age effects in Model 1, where both were significant predictors. On average, girls engaged in more prosocial acts than boys and older children intervened more often. Model 1 was a significantly better fit for our data than the reduced (null) model.

**Naturalistic Prosociality and Free-play Behaviour**

We continued our sequential multilevel modelling approach (see Table 3.1) to examine how children’s behaviour during the free-play period related to their prosocial behaviour toward peers. We first added shy behaviour as a predictor in Model 2. We expected that shyer children would be less prosocial in this group setting, based on the assumption that being surrounded by other children would make them feel anxious as well as less personally responsible for intervening (Barron & Yechiam, 2002; Zoccola et al., 2011). This is not what we found, however; shyness was not a significant predictor in Model 2, while gender and age remained significant. Overall, Model 2 was not a better fit for our data than Model 1. In contrast, when we added engagement as a predictor in Model 3, we *did* find it to be significant. Children who engaged with their peers more often in the free-play period were more likely to intervene on their behalf in the tower task that followed. Engagement also seemed to account for the age effect in the naturalistic prosocial scores; with engagement included in the model, age was no longer significant. Model 3 was a better fit for our data than Model 2.

---

<table>
<thead>
<tr>
<th>Model 4</th>
<th>Gender</th>
<th>Age</th>
<th>Shyness</th>
<th>Engagement</th>
<th>Structured prosociality</th>
</tr>
</thead>
<tbody>
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<td>122</td>
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<tr>
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<td>92.04</td>
</tr>
<tr>
<td></td>
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<td>1.32</td>
<td>119.99</td>
<td>.189</td>
<td>119.99</td>
</tr>
<tr>
<td></td>
<td>0.02</td>
<td>2.80</td>
<td>122</td>
<td>.006</td>
<td>122</td>
</tr>
<tr>
<td></td>
<td>&lt; .01</td>
<td>0.47</td>
<td>118.86</td>
<td>.641</td>
<td>118.86</td>
</tr>
</tbody>
</table>

*The change from the reduced model is significant at $\alpha = 0.05$*
Structured Tasks

The two figures below summarize children’s responses to the structured tasks, separated by whether the child received the responsive version (i.e., the experimenter had a clear problem: Figure 3.4) or the spontaneous version (i.e., she did not have a clear problem: Figure 3.5) for each one. It is readily apparent that the children in our sample had different reactions to responsive and spontaneous trials; they were far more likely to intervene when the experimenter had a clear need than when she did not, which replicates past research (e.g., Dunfield & Kuhlmeier, 2013; Warneken & Tomasello, 2006). Children’s responses also varied by task. The block helping task had the highest rate of intervention: collapsing across responsive and spontaneous trials, we found that 65.3% of children retrieved the block for the experimenter. The task with the next highest intervention rate was the door helping task (43.3%), then the teddy bear comforting task (32.0%), the sticker sharing task (16.5%), the popcorn sharing task (15.1%), and finally the knee comforting task (7.8%). This pattern of intervention aligns well with past research, which has found preschool children to be very helpful but share and comfort less often, and to have particular difficulty comforting someone who is injured (e.g., Dunfield & Kuhlmeier, 2013; Kienbaum et al., 2001; Svetlova et al., 2010; see also Chapter 2 of this dissertation).

\[10\] Note that most of the helping tasks that have been used in past studies (and the two we used here) are fairly simple and centred around objects. I discussed how children respond to other types of helping tasks in Chapter 2.
Figure 3.4

*Behaviour in the Responsive Trials*

![Bar chart showing the number of children for different behaviors in the six structured tasks.](chart)

*Note.* Children’s behaviour during the responsive versions of the six structured tasks. Although we intended to give each task to exactly half of the sample, experimenter errors in counterbalancing (see Table C3 in Appendix C) resulted in the following *Ns: block: 65, door: 63, sticker: 67, popcorn: 59, teddy bear: 64, knee: 64.*
Figure 3.5

Behaviour in the Spontaneous Trials

Note. Children’s behaviour during the spontaneous versions of the six structured tasks. Although we intended to give each task to exactly half of the sample, experimenter errors in counterbalancing (see Table C3 in Appendix C) resulted in the following Ns: block: 59, door: 64, sticker: 60, popcorn: 67, teddy bear: 64, knee: 64.

We created a structured prosocial score for each child by adding up the number of tasks in which the child intervened (both responsive and spontaneous trials) and dividing that sum by the number of trials they received (to account for counterbalancing errors). The average child intervened in 29.97% of the structured tasks (SD = 17.97). Only a small portion of the sample (6.3%) did not intervene in any task. There was no significant gender effect in the structured prosocial scores but there was an age effect. That is, older children tended to intervene more often: Kendall’s $\tau_b = .19$, $p = .004$. In Tables C6 and C7 in Appendix C, we report the number of children who intervened in each task separated by their age in years. Note that we have provided
this information for descriptive purposes only, as our sample was not evenly distributed within the age bins. We explore potential order effects in Appendix C.

**Structured Prosociality and Free-play Behaviour**

We used ordinal regression to examine how children’s behaviour during the free-play period related to their prosocial behaviour toward the experimenter. We ran two separate models, with shyness included as a predictor in the first and both shyness and engagement as predictors in the second. Age was also included as a predictor in both models, to account for its significant relation to the structured prosocial scores. These models are summarized in Table 3.2, below. In Model 1, we did not find shyness to be a significant predictor of the structured prosocial scores. We were not surprised by this result; we expected shy children (and not-shy children as well) to be more motivated to intervene on behalf of the experimenter, in order to comply with her authority. Interestingly, we did find engagement to be a significant predictor in Model 2. Children who had engaged more often with their peers during the free-play period were more likely to intervene on the experimenter’s behalf in the structured tasks. Engagement also accounted for the age effect in the structured prosocial scores; while age was a significant predictor in Model 1, it lost its significance when engagement was added in Model 2.

**Table 3.2**

<table>
<thead>
<tr>
<th>Model</th>
<th>b</th>
<th>Wald’s $\chi^2$</th>
<th>df</th>
<th>$p$</th>
<th>OR</th>
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</thead>
<tbody>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>1.04</td>
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<tr>
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<td>1.00</td>
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<tr>
<td>Model 2</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>.378</td>
<td>1.02</td>
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<tr>
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<td>1</td>
<td>.135</td>
<td>1.03</td>
</tr>
<tr>
<td>Engagement</td>
<td>0.02</td>
<td>5.42</td>
<td>1</td>
<td>.020</td>
<td>1.03</td>
</tr>
</tbody>
</table>
As seen in Figures 3.4 and 3.5 above, children’s rates of intervention varied greatly among the six structured tasks: they were more likely to intervene in the block helping, door helping, and teddy bear comforting tasks than they were in the sticker sharing, popcorn sharing, and knee comforting tasks. To explore whether shyness and engagement have an impact on prosocial behaviour in these specific scenarios, we have conducted separate binomial logistic regression analyses for each one (see Table 3.3, below). Here, we are looking only at the children who received the responsive version of each task, as children only rarely intervened when the experimenter had no explicit need in the spontaneous trials. We did not perform an analysis for the block task because all but one child helped the experimenter in the responsive version.

Neither shyness nor engagement significantly predicted which children intervened in any of the five remaining tasks. We did, however, find a marginally significant, and unexpectedly positive, shyness effect in the knee comforting task: $\chi^2(1) = 3.59, p = .058, OR = 2.04$. There was thus a trend for shyer children to be more likely to comfort the experimenter when she banged her knee.

**Table 3.3**

<table>
<thead>
<tr>
<th>Task</th>
<th>N</th>
<th>b</th>
<th>Wald’s $\chi^2$</th>
<th>df</th>
<th>p</th>
<th>OR</th>
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</thead>
<tbody>
<tr>
<td>Help-Door</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<tr>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Share-Sticker</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<td>0.03</td>
<td>1</td>
<td>.874</td>
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<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Share-Popcorn</td>
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<td></td>
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<td>0.39</td>
</tr>
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<td></td>
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</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comfort-Teddy</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
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<td>.267</td>
<td>0.82</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>0.02</td>
<td>1</td>
<td>.899</td>
<td>0.97</td>
</tr>
</tbody>
</table>
Counterbalancing errors resulted in different numbers of children receiving the responsive version of each task (see Table C3 in Appendix C for details).

*We used the transformed shyness scores for this test, in order to meet the linearity of logit assumption.

**Structured and Naturalistic Prosociality**

In the Tower Task section above, we built sequential multilevel models (Table 3.1) to examine which factors would predict children’s naturalistic prosocial behaviour, nested within their peer groups. We left off on Model 3, which found gender and engagement to be significant predictors, while age and shyness were not. As a final step in our modelling, we have added the structured prosocial scores as a predictor in Model 4, which was not significant. Children who intervened more often on the experimenter’s behalf in the structured tasks were not more likely to intervene on behalf of their peers in the tower task. Adding the structured scores had no real impact on the model: gender and engagement remained significant, while age and shyness remained insignificant. Model 4 was thus not a better fit for our data than Model 3.

**Discussion**

The main goal of our study was to examine how shyness affects children’s interventions in two distinct contexts: a naturalistic group setting, where they could intervene on behalf of their peers, and a structured individual setting, where they could intervene on behalf of an experimenter. We thus contrasted prosocial situations that children could encounter in their everyday lives against the highly controlled, adult-oriented situations that have dominated lab-based research in the past (but see: Farver & Branstetter, 1994; Stanhope et al., 1987).
Although we found significant effects for how often children engaged with peers and *not* how shy they were around them, our findings highlight the need for more naturalistic methods to be used in future research with young children, to better capture both the complexities of prosocial situations in the real world and the interpersonal dynamics that play into them.

The set-up of our naturalistic task was quite simple: groups of children were told to build a tall tower from blocks and then observed at work for ten minutes. When their peers were in need during this time, children seldom responded by being prosocial; they were most often unaware of their peers’ problems and whenever they did notice, they were more likely to not respond or deny intervention instead. Some children acted prosocially when their peers had no apparent need, but these spontaneous interventions were rare. The structured tasks followed a traditional lab format (e.g., Beier et al., 2017; Dunfield et al., 2011; Stanhope et al., 1987; Warneken & Tomasello, 2006), with the experimenter setting up different scenarios in which a child could be prosocial toward her. Our results replicated past research that has found children of this age to intervene more often in response to a clear need (i.e., the responsive trials) and when presented with certain types of problems over others (i.e., our two helping tasks and the *teddy bear* comforting task vs. the two sharing tasks and the *knee* comforting task; Dunfield & Kuhlmeier, 2013; Kienbaum et al., 2001; Svetlova et al., 2010; Warneken & Tomasello, 2006; and Chapter 2). Finally, we did not find any shyness effects; children who behaved more shyly around their peers were just as likely to intervene on their behalf and on behalf of the experimenter as children who were less shy. In contrast, children who were highly engaged with their peers were more likely to intervene in both contexts.

We anticipated that children’s prosocial motivation would vary between the two tasks. That is, we expected all children to feel less motivated in the naturalistic setting, where any one
of their peers could intervene in their stead, than they would feel in the structured setting, where
the experimenter’s authority would compel them to act (Eisenberg et al., 1985; Plötner et al.,
2015). Our results provide support for this assumption. Children did not intervene very often in
the tower task: the average child responded prosocially to only 7.5% of their peers’ explicit
needs, and they acted spontaneously prosocial only once or twice. Thirty-four percent of our
sample did not intervene even once during this task. There was a comparatively higher rate of
intervention in the structured tasks – the average child acted prosocially toward the experimenter
on 30% of the trials, which jumps to 53% for the trials in which she had an explicit need.
Ninety-four percent of our sample intervened on at least one of the responsive trials. Our design
does not, however, allow us to examine the unique impacts of authority and the presence of
bystanders on children’s motivation. To fully disentangle these factors, we would need to
replicate both of our tasks with the opposite recipients. If it was compliance and not the
individual setting that prompted the higher response in the structured tasks, then children should
be less likely to intervene on behalf of a peer in those same scenarios. If it was the bystander
effect and not their peers’ lack of authority that caused the lower response in the naturalistic task,
then they should be just as unlikely to intervene on behalf of adults in a group setting. These are
questions that should be explored more in future research.

Testing children at their daycares gave us an opportunity to study their broader social
dynamics. At the start of the study, we observed children in their groups during a ten-minute
free-play period. We calculated two scores for each child from their behaviour here: how
engaged they were with their peers and how shy they were around them. We measured shyness
by tracking how often children showed reticence during this period (i.e., being alone and
unoccupied or merely watching the activities of others: Asendorpf, 1991; Rubin, 2001).
Reticence has been reliably linked to anxiety in past research and seems to reflect shy children’s struggle to pull their attention away from social threat (e.g., Coplan et al., 1994; Coplan et al., 2004; Henderson et al., 2004). This is an improvement over some of the shyness measures that have been used in the current literature, which do not differentiate between children who withdraw due to anxiety from those who withdraw for other reasons (e.g., social disinterest; Allen et al., 2018; Beier et al., 2017; Karasewich et al., 2019; MacGowan & Schmidt, 2021b; and Chapter 2). In our two prosocial tasks, we found shyer children to intervene just as often as children who were less shy. This lack of shyness effects is particularly surprising in the naturalistic task, where we assumed that the presence of peers would invoke a sort of stage fright in shyer children, about having to intervene in front of others, and thus make them especially prone to the bystander effect (e.g., Schwartz & Gottlieb, 1980; Zoccola et al., 2011). Before we can draw any firm conclusions from our findings, however, we need to evaluate whether we had a good representation of shyness in our sample.

Conducting research in daycares and other naturalistic settings can make it easier to recruit diverse samples (Gross et al., 2001; Sugden & Moulson, 2015). For our purposes, parents of very shy children may be less likely to ‘opt-out’ of studies that are run at their child’s daycare than they would be to ‘opt-in’ to studies at unfamiliar labs, knowing their child would feel uncomfortable. In our sample, however, high scores on the shyness measure were fairly rare. On average, children displayed reticent behaviour for only 7.6% of the free-play period. This is quite a bit lower than the averages reported in other studies, which range between 15% and 20% for four- and five-year-old children (Asendorpf, 1991; Coplan et al., 1994; Rubin et al., 2002). One potential explanation for this difference is that we had a broader age range in our sample. Shy children tend to show less reticent behaviour as they get older, likely because they learn new
ways of coping with their anxiety (Asendorpf, 1991). We did not, however, find shyness scores to vary with age. A more plausible explanation is that shy children show less reticent behaviour around their daycare classmates. The three studies cited above all observed children when they were around one or more peers they had never met before, which can increase anxiety in shy children (e.g., Kagan et al., 1988b). Coplan and colleagues (2004) did find reticence around familiar peers to be linked to anxiety, but they did not provide descriptive information against which we could compare our own sample. It is thus possible that the shyer children in our study felt comfortable enough around their peers to both engage in less reticent behaviour and more prosocial behaviour than they would have otherwise.

There are a few other ways that our reticent-based shyness measure differed from past research. Because we made the decision to examine shyness after the data had already been collected\(^\text{11}\), we were limited to coding videos of a warm-up period that was considerably more constrained than the free-play periods in other studies. For example, children were not given play material for this warm-up, in order to avoid influencing how they would behave in the tower task that followed it (e.g., Barragan & Dweck, 2014; Over & Carpenter, 2009). They thus did not have the option to engage in what has been called \textit{passive} solitary behaviour (i.e., playing quietly on their own by reading a book, doing a craft, putting together a puzzle, etc.), which has been linked to \textit{unsociability} (Coplan et al., 1994; Rubin & Asendorpf, 1993; but see: Coplan et al., 2001). This leaves open the possibility that children in our sample showed reticence when they were \textit{not interested} in interacting with their peers rather than anxious – that they hung around instead of being active because they wanted to be alone but could not find something solitary to

\footnote{Archival data was used for this project because the Covid-19 pandemic restricted the type of data that could be collected at that time.}
do. Relatedly, our free-play period was also constrained in the amount of space provided, which varied based on the rooms available at each daycare. In some cases, the designated play area was quite small, which blurred the line between solitary and social behaviour. That is, some children may have stood close to their peers out of necessity rather than choice, which makes it difficult to interpret our lack of shyness effects. Had these children been free to move further away, they may have scored higher on our shyness measure.

The spacing limits for the free-play period are less of a concern for the engagement measure, which was based on how often children interacted with their peers, not where they were in relation to them. Any two children who were talking or playing together would have been coded as ‘engaged’, whether they were right next to each other in a small breakroom or metres apart in a gymnasium. When we pre-registered the study, we used the term ‘social behaviour’ to refer to engagement alone. The detached social code was a later addition, to allow us to categorize children who were physically close to their peers but not interacting. It is this detached behaviour that is difficult to interpret in small spaces, where we cannot be certain whether that child would have still chosen to hang around their peers in a larger area or would have been reticent instead. Engaged behaviour is not so ambiguous: a child who scored highly on our engagement measure was clearly receptive to interacting with their peers. In our analyses, we found highly engaged children to be more prosocial toward their peers in the tower task and the experimenter in the structured tasks. This may suggest that engaged children are better able

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12 Note that our engagement score is not a measure of sociability. Because we were coding from video recordings that had limited audio and visuals, we could not reliably capture behaviours that would differentiate children who were interested in interacting (e.g., how often they invited their peers to play) from those who only tolerated it (e.g., how often they followed others’ leads; Coplan et al., 2004).
to interpret others’ mental states – including both their desires to interact and their needs (e.g., Dunn, 1994; Imuta et al., 2016). This is a dynamic that should be explored in future research.

In this study, we examined children’s interventions in contexts at both ends of the motivation spectrum: a group setting, where all children would feel less responsible for aiding their peers, and an individual setting, where they would feel obligated to comply with the experimenter’s authority. What we did not consider, however, were the ways in which these contexts could affect children’s understanding of the prosocial situations they encountered. That is, our two prosocial tasks had vastly different levels of environmental load (Cohen, 1978; Osborne-Crowley, 2020). The structured tasks were very controlled – the child was alone with the experimenter, who guided them through each scenario one at a time, while putting away study material whenever they were finished with it. The naturalistic task, in contrast, was rather chaotic – the child was building a tower while surrounded by peers doing the same, with some engaging in conversation as well, and at any given time any one of those peers could have been in need. With so much extra stimulation dividing their attention, it makes perfect sense that children were most often unaware of their peers’ needs during the tower task; there was just too much going on for them to notice every problem that arose. High environmental load is yet another explanation for the bystander effect (Darley & Latané, 1970; Korte, 1980). Future research that explores how shy children’s interventions are affected by more everyday experiences, like the presence of bystanders, should thus test both their prosocial motivation and understanding.
Conclusion

In this study, we moved out of the lab to examine the prosocial behaviour of shy children in a more naturalistic, daycare, setting. Based on prior research (e.g., Eisenberg et al., 1985; Plötner et al., 2015), we expected all children to be highly motivated to intervene in our experimenter-run structured tasks, which mimicked the prosocial situations they would typically see in the lab, and less motivated to intervene in our peer-group tower task, which was a more everyday activity from which prosocial situations could arise naturally. Although we did see more children intervene in the structured tasks, and at a higher rate, it is not entirely clear what caused this difference: are children more likely to be prosocial when the recipient is an adult rather than a peer, when they are alone rather than in a group, or both? Future research should also explore how these different contexts affect children’s prosocial understanding.

Moving into a daycare setting allowed us to observe how children behaved around their peers in non-prosocial situations as well. Specifically, we looked at how often they engaged in social interaction during a free-play period and how often they withdrew to be reticent. Our finding that highly engaged children were more likely to intervene on behalf of both their peers and the experimenter suggests that there is a root cause linking engagement with prosociality. Our finding that shyer children were not less likely to intervene in either context was surprising, particularly for the group task. If we take the latter result at face-value, it would suggest that shyer children, despite their anxiety, are not any more susceptible to the bystander effect – at least, when they are around familiar peers. Familiarity with their groups could also explain how little reticent behaviour the children in our sample showed, on average. We should, however, be cautious when interpreting these results, given the constraints of our free-play period. Had we given children toys, books, and other play material and a wide open space to explore, we could
have been more confident in our coding scheme’s ability to differentiate between shy and unsociable behaviour, and between shy and detached behaviour. These are important considerations for future research that seeks to expand our understanding of shy children’s everyday prosocial behaviour.
Chapter 4:

General Discussion
Introduction

The overarching goal of my dissertation was to explore the conditions in which shy children are less likely to be prosocial than their not-shy peers. I began, in Chapter 1, by systematically reviewing the current literature and highlighting several methodological issues that complicate how we interpret research findings. I then tackled some of these issues with two empirical studies. First, in Chapter 2, I attempted to disentangle the effects that the social engagement demands and complexity of a prosocial problem have on shy children – their motivation to intervene and their understanding of how to do so. Then, in Chapter 3, I moved out of the lab to examine shy children’s interventions in two contexts – traditional structured tasks, where they were alone with an experimenter, and a more naturalistic task, where they were among a group of their peers. Despite their limitations, these studies provide important insights, which I describe in the next section. Box 4.1 that follows lists various questions I have posed throughout my dissertation to help guide future research. Finally, I describe two broader limitations that may impact my work and the literature as a whole.

Practical Implications

Prosocial Motivation and Understanding

In Chapter 1, I pulled out three main implications from the current body of research on shy children’s prosocial behaviour: compared to their not-shy peers, shy children 1) are less likely to intervene on behalf of unfamiliar people, 2) are less likely to intervene in socially engaged ways, and 3) need more prompting in order to intervene. I then explored what each of these implications may suggest about their motivation to intervene and their understanding of how to do so: 1) shy children may be less motivated to intervene around strangers because they
see them as a potential threat, but monitoring that threat could also steal their attention away from the prosocial situation and limit their understanding (e.g., LoBue & Pérez-Edgar, 2014; Schmidt & Poole, 2019), 2) they may feel more comfortable intervening in innocuous ways, but they may also respond more readily to simple, easy-to-understand prosocial problems that allow for innocuous solutions (e.g., Beier et al., 2017; Grossman et al., 2020), and 3) certain prompts may compel them to act by making it clear what is expected of them, or provide them with hints about what they can do to provide aid (e.g., Beier et al., 2017; Hammond & Carpendale, 2015). In these and other ways, shy children’s prosocial motivation and understanding have been conflated in past research.

In Chapter 2, I examined shy children’s motivation to intervene and their understanding of how to do so by varying two particular aspects of prosocial situations: their social engagement demands (affecting motivation) and complexity (affecting understanding). In this study, we presented preschool children with four tasks that varied in the type of problem the experimenter was having (i.e., simple helping versus complex comforting problems) and its cause (i.e., object-centred problems involving a target object versus social-centred problems within her personal space). Thus, the experimenter needed object-centred help when she spilled Lego bricks on the floor, social-centred help when she had a sticker stuck to the back of her jacket, object-centred comfort when she broke her favourite toy, and social-centred comfort when she hurt her knee. We found one effect of shyness, whereby shyer children took longer to comfort the experimenter in the object-centred task. In hindsight, it seems likely that our tasks were not evenly split among the two dimensions. Our social-centred helping task was less socially demanding than we intended it to be, with children able to remove the sticker without spending much time in contact with the experimenter. In contrast, our social-centred comforting task was more complex than we
intended, with most children struggling to respond to someone who is injured, no matter their level of shyness. Still, our findings provide an important insight: that the complexity of a prosocial problem may itself contribute to its perceived social demands. That is, shyer children may have been slower to comfort in the object-centred task because they did not immediately recognize that trying to fix the broken toy, an innocuous intervention, was an option. Future research that seeks to disentangle shy children’s prosocial motivation and understanding will have to contend with this possibility (see Box 4.1, below).

**Prosocial Behaviour in Everyday Settings**

In Chapter 1, I summarized twelve studies that have examined the prosocial behaviour of shy children – eleven of which were conducted in a laboratory setting. Only Farver and Branstetter (1994) ventured out of the lab, to record how preschool children at a daycare would react to seeing their classmates cry. Stanhope and colleagues (1987) also tried to capture how shy children intervene in everyday settings, but they did so indirectly, through a parent-report measure. Restricting research to lab settings can minimize the complexities of the real world (Dahl, 2017). Life outside of the lab is messy; in ordinary prosocial situations there may be distractions in the surrounding environment, bystanders who could intervene instead, a person in need who does not clearly articulate their problem, etc. (e.g., Korte, 1980; Osborne-Crowley, 2020; Plötner et al., 2015). Past research has also focused on how shy children react to adults in need (with the exception again of Farver & Branstetter, 1994), despite same- or similar-aged peers playing a significant role in the daily lives of many young children. Given the authority adults typically have, intervening on their behalf is likely a form of compliance that young children would not extend to their peers (Bar-Tal, 1982; Eisenberg et al., 1985; Eisenberg et al.,
Thus, we may not be able to apply much of what we have learned in past research to how shy children intervene in naturalistic settings.

In Chapter 3, I compared shy children’s interventions in a highly controlled individual setting, where they could intervene on behalf of an experimenter, to a more naturalistic group setting, where they could intervene on behalf of their peers. In this study, we visited children at their daycares and divided them into small groups. We observed each group during a free-play period and then gave them a simple task: build a tall tower(s) from wooden blocks. This task mimicked children’s everyday play activities and provided space for prosocial situations to arise naturally (e.g., children could help their peers fix fallen towers, share their blocks, etc.). Later, we tested each child individually with six structured tasks that provided distinct opportunities to help, share with, and comfort an experimenter, which mimicked the prosocial situations that are typically used in lab-based studies (e.g., Dunfield & Kuhlmeier, 2013; Svetlova et al., 2010; Warneken & Tomasello, 2006). We expected children, overall, to be more motivated to be prosocial toward the experimenter than their peers, and we did find a higher rate of intervention in the structured tasks. There were, however, many more distractions in the naturalistic task, and children rarely noticed when their peers were in need. Children’s level of shyness did not determine how often they intervened, even in the naturalistic task, where we thought shyer children would feel particularly anxious about acting in front of their peers (e.g., Schwartz & Gottlieb, 1980; Zoccola et al., 2011). If we take our results at face value, this would suggest that shyer children are no more likely to be affected by the presence of bystanders than their less-shy peers – at least, when those bystanders are familiar to them. Future research that examines shy children’s everyday prosocial behaviour should take into account children’s level of familiarity with the people involved, both the person in need and anyone else nearby (Box 4.1).
Measuring Shyness: Social Withdrawal

In Chapter 1, I highlighted a problematic trend in the current literature: that researchers looking into the prosocial behaviour of shy children often measure social withdrawal as a proxy for shyness. Although withdrawing from social situations is a common way that shy children cope with their anxiety, they are not the only children who withdraw. In particular, it can be difficult to differentiate children who are anxious around others from those who merely lack interest in them (i.e., unsociability; Coplan et al., 2014), and I would not expect these groups to show the same patterns of prosocial intervention. A stranger in need, for example, would have a better chance of being aided by an unsociable child than a shy child (e.g., Allen et al., 2018; Young et al., 1999). Thus, when we do not distinguish between the different causes of social withdrawal to narrow in on anxiety, we can weaken the true effects of shyness in our research.

In Chapter 3, we measured shyness by observing how often children showed reticence (i.e., being unoccupied or merely watching their peers) during a free-play period (Asendorpf, 1991; Rubin, 2001). Reticent behaviour is a specific form of social withdrawal that has been linked to anxiety in past research, and it can be directly contrasted with passive solitary behaviour (e.g., reading alone), which has been linked to unsociability (Coplan et al., 1994; Henderson et al., 2004; Rubin & Asendorpf, 1993; but see: Coplan et al., 2001). We were unable to make this contrast in our study, however, because the children in our sample did not have any way of showing passive solitary behaviour. That is, we did not give them any play material for the free-play period – they did not have books to read, puzzles to put together, etc. – so children who did not want to play with their peers may have shown reticence simply because they did not know what else to do. Future research that uses a reticent-based measure for shyness should ensure that children are truly free to withdraw in whatever way that they choose (Box 4.1).
Box 4.1

Questions Posed for Future Research

1. What causes shy children to intervene on behalf of unfamiliar people (e.g., an experimenter) less often than they intervene on behalf of familiar people (e.g., their parents)?
   ➢ Would shy children be more likely to intervene on behalf of familiar children (e.g., siblings, friends, classmates) as well?
   ➢ Would shy children be more likely to intervene on behalf of an unfamiliar person if they were in a familiar social space (e.g., their home) than an unfamiliar one (e.g., a research lab)?
   ➢ Do shy children have more trouble understanding prosocial situations that involve an unfamiliar person (e.g., recognizing the problem or finding solutions) than situations involving only familiar people?

2. How do shy and non-socially inhibited children compare in their reactions to prosocial situations?

3. What level of engagement becomes ‘too much’ for shy children to intervene?

4. How do familiarity and social engagement demands interact to affect shy children’s interventions?
   ➢ How innocuous would an intervention need to be for shy children to act on behalf of/through an unfamiliar person?
   ➢ How familiar would the people involved need to be for shy children to intervene in a highly social way?

5. How do complexity and social engagement demands interact to affect shy children’s interventions?
   ➢ Would shy children be unwilling to intervene in a highly social task that is very simple?
   ➢ Would shy children struggle with a complex task that is low in social demands?
   ➢ Can we fully separate the potential impacts of these factors – will shy children be able to recognize that they can intervene innocuously when a task is complex?

6. What causes shy children to be more likely to intervene when they are given certain prompts?
   ➢ Do prompts increase shy children’s prosocial motivation, by making it clear they are expected to act?
   ➢ Do prompts increase shy children’s prosocial understanding, by providing information about the problem/solutions?
➢ Do shy children actually need more time to intervene compared to their not-shy peers, no matter what prompts they are given?

7. Do shy children experience the bystander effect to a greater extent than not-shy children?

8. Do shy children react to the prosocial situations they encounter in the real world in the same ways they react to the prosocial situations that are presented to them in the lab?
Limitations

Measuring Shyness: Trait or State

Throughout this dissertation, I have defined shyness as an enduring *trait* – shy children tend to feel anxious and withdraw from social situations, which is a pattern they can show into adulthood (e.g., Brook & Schmidt, 2019; Coplan & Armer, 2007; Karevold et al., 2012; Rubin & Asendorpf, 1993). Shyness is not always measured at the trait level, however. Observational methods, for example, can only capture how shy children feel at a particular moment in time: their *state* shyness. Prosocial behaviour researchers have measured state shyness in various ways, such as by recording: how long children take to first approach an experimenter, how much they fret or cry in a stranger’s presence, and whether they speak when prompted (e.g., Allen et al., 2018; Karasewich et al., 2019; Young et al., 1999). The reticent-based measure we used in Chapter 3, where we observed children’s behaviour during a ten-minute free-play period with their peers, would fall into this category, as well. The inclusion of state shyness measures can complicate how we interpret research findings. Although trait shyness will, by definition, make it more likely for a person to experience state shyness, *most* people feel shy *on occasion* (Cheek & Briggs, 1990; Poole & Schmidt, 2022). Thus, a child we observe to be shy at one point in time will not necessarily be shy later.

Relying on state shyness measures is only a problem when we intend to draw trait-level conclusions. If a researcher is interested in how *feeling* shy affects children’s interventions in the *present*, then using a state measure would be appropriate. If they are interested in shy children as a *group*, however, and predicting how they will behave in the *future*, then they should use a trait measure, such as questionnaires that ask parents or teachers to reflect on children’s experiences over the long-term (e.g., Beier et al., 2017; Farver & Branstetter, 1994; MacGowan & Schmidt,
2021b; Schuhmacher et al., 2017; and our Q-Sort subscale in Chapter 2). For our purposes, using a state shyness measure in Chapter 3 was a significant limitation – for half of the analyses, at least. In that study, we coded children’s shy behaviour during a free-play period, which was recorded on the same day as one of our prosocial measures (i.e., the peer-oriented tower task) but not the other (i.e., the experimenter-oriented structured tasks). When we take this timing into account, it becomes more difficult to interpret our lack of shyness effects in the latter. That is, we cannot be certain whether the children in our sample felt just as, more, or less shyly around the experimenter as they did around their peers. Had we measured shyness on both testing days, we would have had more power to say whether feeling shy prior to the structured tasks affected children’s willingness to act on the experimenter’s behalf. In general, the use of under-powered shyness measures – that either mislabel state shyness as trait, fail to differentiate between shyness and unsociability, or draw conclusions about shyness from non-social behavioural inhibition – is a major problem that should be addressed in future research on prosocial behaviour.

**Cross-cultural Considerations**

The current literature on the prosocial behaviour of shy children is notably limited in scope, from a cultural standpoint. The twelve studies I summarized in Chapter 1 (see Table 1.1) all used Western samples: five were from the United States, three from Canada, three from Germany, and one from Australia. With the studies we conducted in Chapters 2 and 3, we have now contributed two more Canadian samples to this list. This is a shyness-specific issue, as the broader prosocial literature has recently expanded its reach to countries in Asia, Africa, South America, and the Pacific Islands (e.g., Aime et al., 2017; Callaghan et al., 2011; Schäfer et al., 2015; Trommsdorff et al., 2007). The sample we used in Chapter 3 was actually drawn from a
larger cross-cultural project comparing preschool children in Canada and Mexico, which was completed by our collaborators at Concordia University (see Tavassoli et al., 2022). The Canadian sample was collected in the city of Montréal, which has a majority White population, while the Mexican sample was collected in the town of Zinacantán, which has a predominantly Indigenous (Tzotzil Mayan) population. We measured shyness in the Canadian sample by coding how often children showed reticence around peers during a free-play period. The decision to focus on the Canadian sample for my dissertation was made for practical reasons, primarily based on time constraints. If we were to expand our coding to the Mexican sample in the future, we would need to contend with potential differences in how shyness is perceived by people in the Tzotzil Mayan culture – and what effects this may have on shy children’s prosocial behaviour.

Shyness is often considered a character flaw in Western individualistic cultures, which value the pursuit of individual goals and taking social initiative, but it may be perceived more positively in collectivistic cultures, which value the pursuit of interpersonal goals and maintaining social cohesion (Greenfield & Keller, 2003; Chen & French, 2008). For example, Chen and colleagues (2006) found that Canadian children were more likely to reject interaction attempts made by highly reticent peers than Chinese children, who were instead more likely to respond positively to them. Hart and colleagues (2000), however, found that Chinese children who were rated as reticent by their teachers were less liked by their peers (as were reticent children in Russia and the United States). Interestingly, the Chinese teachers in this sample did not differentiate between the different subtypes of social withdrawal (i.e., reticent, solitary-passive, and solitary-active) as clearly as their Russian or American counterparts, suggesting that these Western classifications may be less relevant in some cultures. The reverse
can also be true – some classifications that are meaningful in other cultures may be less relevant to Western samples. For example, Xu and colleagues (2007) found Chinese teachers’ descriptions of ‘shyness’ to fall into two distinct categories: what the researchers labelled *anxious* shyness, which is the same basic definition I have been using throughout this dissertation, and *regulated* shyness, which reflects a sort of modesty and restraint around others. These researchers later found evidence for anxious and regulated shyness in South Korea as well, and peers reported liking regulated children more than anxious children in both studies (Xu et al., 2007; Xu et al., 2014). Overall, the results of these studies suggest that we may need to be cautious when applying measures for shyness, and other forms of social withdrawal, that were originally developed using Western samples to other cultures (Rubin et al., 2009).

**Conclusion**

At the start of my dissertation, I described some of the benefits that children can gain from engaging in prosocial behaviour: not only can they provide support to a person in need, but they may also endear themselves to others (e.g., Cillessen et al., 2005; Warden et al., 2003). One of the main reasons for prosocial behaviour researchers to look at shyness, then, is to uncover what prevents shy children from intervening and how to *remove* those barriers. For example, if we find that shy children, in particular, need informative prompts to guide their interventions, this would suggest that extra scaffolding from parents and teachers would help them to develop prosocial skills (e.g., Brownell et al., 2013; Svetlova et al., 2010). But researchers can be interested in how shyness affects prosocial behaviour *without* wanting to change it. We can, for example, view shy children as having a different prosocial *style* that serves an important, protective, function.
When a shy person detects a social threat in their environment – like a peer who may reject them or a stranger who could do harm – they will likely withdraw from the interaction, in order to mitigate those perceived risks (Clark, 2001; Leary & Buckley, 2000). Displaying this sort of caution from an early age can be considered an *evolutionary adaptation*: shyness would have helped our ancestors navigate harsh social environments and maintain their positions within their groups, which was essential to their survival and reproductive fitness (Gilbert, 2014; Leary, 2010; Karasewich & Kuhlmeier, 2020; Schmidt & Poole, 2019; Vertue, 2003). Although most social threats in the modern world do not have the severe, potentially deadly consequences they had for our prehistoric ancestors, we can still be rejected or excluded by others for our missteps during social interactions (Gilbert, 2001; Kerr & Levine, 2008). *Prosocial* situations carry their own risks, including: embarrassment from misinterpreting someone’s needs or overestimating your own abilities, rejection from a person who did not want you to step in, or even physical harm (e.g., when trying to defend someone from an aggressor; Lambe et al., 2019; Liebst et al., 2018; Midlarsky & Hannah, 1985). We can thus view shy children’s hesitance to intervene in certain circumstances as an act of self-preservation. This framing may also apply to how they process situations in which others are in need. That is, if shy children *do* become so preoccupied with monitoring social threats that they fail to recognize when someone is in need or how to intervene, they would be showing an attentional bias that prioritizes avoiding harm (LoBue & Pérez-Edgar, 2014; Pérez-Edgar & Fox, 2005; and see Burack et al., 2016 for a similar argument regarding autistic children).

Whatever motivation a researcher has for examining the prosocial behaviour of shy children, there are many important questions that should be explored in future research, as I have identified in Box 4.1 above. In my dissertation, I took important steps toward answering some of
these questions, by attempting to: disentangle shy children’s motivation to intervene from their understanding of how to do so, examine their responses amid the complexities of the real world, and refine our measures to better identify children who are truly shy around others. These are all goals that should be explored further in future research.
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Appendix A:

Supplemental Material for “When is Shyness a Barrier to Prosocial Behaviour?
A Critical Review of the Current Literature”

Table A1

Measures and Studies Excluded from Table 1.1

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<tr>
<th>Potential Prosocial Questionnaire</th>
<th>Sample Deviant Item</th>
<th>Appeared In</th>
</tr>
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<tbody>
<tr>
<td>Baumrind Preschool Q-Set</td>
<td>“Understands other children’s position in interaction or altercation”</td>
<td>- Howes &amp; Phillipsen (1998)</td>
</tr>
<tr>
<td><em>Prosocial Competence with Peers subscale</em></td>
<td></td>
<td></td>
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<tr>
<td>(created by study authors from original items)</td>
<td></td>
<td></td>
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<tr>
<td>Behavior Assessment System for Children</td>
<td>“Congratulates others when good things happen to them”</td>
<td>- Zarra-Nezhad et al. (2018)</td>
</tr>
<tr>
<td><em>Prosocial Behavior subscale</em></td>
<td></td>
<td></td>
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<tr>
<td>(created by study authors from original <em>Adaptability and Social Skills</em> items)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child Behavior Scale</td>
<td>“Kind toward peers”</td>
<td>- Coplan &amp; Weeks (2009)</td>
</tr>
<tr>
<td><em>Prosocial with Peers subscale</em></td>
<td></td>
<td>- Coplan et al. (2010)</td>
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<td></td>
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<td>- Graham &amp; Coplan (2012)</td>
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<td>- Hipson et al. (2019)</td>
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</tbody>
</table>
Preschool Behavior Questionnaire

*Prosocial subscale*

“Will invite bystanders to join a game”  - Findlay et al. (2006)

Revised Class Play

*Sociability-Cooperation subscale*

“Makes new friends easily”  - Chen et al. (2005)

(created by study authors from original items)

Social Competence and Behavior Evaluation

*Active and Passive Prosocial Behavior with Familiar Peers subscales*

*Active:*

“Initiates or proposes games to children”  - Grady & Hastings (2018)

*Passive:*

“Takes other children and their point of view into account”

(created by study authors from original items)

Social Competence Inventory

*Prosocial Orientation subscale*

“Often able to find solutions or compromises when involved in a conflict”  - Rydell et al. (2005)

Social Skills Rating System

*Cooperation subscale*

“Completes tasks on time”  - Paterson & Sanson (1999)

Strengths and Difficulties Questionnaire

*Prosocial subscale*

“Considerate of other people’s feelings”  - Brajša-Žganec & Hanzec (2014)

- Guedeney et al. (2014)

- Ortiz & Barnes (2019)

Teacher Behaviour Rating Scale

*Prosocial subscale*

“Shows sympathy to someone who makes a mistake”  - Balkaya et al. (2018)
### Teacher Questionnaire

**Prosocial subscale**

“**This child is friendly and nice to other children**”

- Diener & Kim (2004)

### Potential Prosocial Observation

<table>
<thead>
<tr>
<th>Sample Deviant Code</th>
<th>Appeared In</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Active</strong> and <strong>passive prosocial behavior</strong> during drum game</td>
<td>- Grady &amp; Hastings (2018)</td>
</tr>
<tr>
<td><strong>Active</strong>:</td>
<td></td>
</tr>
<tr>
<td>“Spontaneously suggesting fun activities to unengaged children”</td>
<td></td>
</tr>
<tr>
<td><strong>Passive</strong>:</td>
<td></td>
</tr>
<tr>
<td>“Turn taking”</td>
<td></td>
</tr>
</tbody>
</table>

#### Affective and cognitive empathy displayed while an experimenter feigned injury

**Affective**: “Expression of concern for the victim (e.g., facial, gestural, and vocal signals of sympathy and/or sadness)”

- MacGowan & Schmidt (2021a)

**Cognitive**: “Child’s attempts to understand the cause and nature of the victim’s distress... which can be expressed through gaze, verbal inquiries, and physical exploration”

- ¹MacGowan & Schmidt (2021b)

**Prosocial behaviour** during free play with peers

“Inviting a peer to join a play situation”

- Persson (2005)

### Potential Shyness Questionnaire

**Behavioral Style Questionnaire**

**Social Adaptability subscale**

(.created by study authors from original Adaptability, Approach, and Mood items)

“**Take setbacks in stride**”

- ¹Stanhope et al. (1987)
<table>
<thead>
<tr>
<th>Instrument</th>
<th>Subscale</th>
<th>Question</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early Childhood Behavior Questionnaire</td>
<td>Fear subscale</td>
<td>“During everyday activities, how often did your child startle at loud noises (such as a fire engine siren)?”</td>
<td>Gross et al. (2015)</td>
</tr>
<tr>
<td>Infant-Toddler Social and Emotional Assessment</td>
<td>Inhibition to Novelty subscale</td>
<td>“Takes a while to feel comfortable in new places (10 minutes or more)”</td>
<td>Eisenberg et al. (2019)</td>
</tr>
<tr>
<td>Peer Responsiveness and Social Adjustment Scale</td>
<td></td>
<td>“How curious and exploratory is this child with respect to the physical environment and objects in the classroom?”</td>
<td>¹Stanhope et al. (1987)</td>
</tr>
<tr>
<td>Revised Class Play</td>
<td>Shyness-Sensitivity subscale</td>
<td>“Feelings get hurt easily”</td>
<td>Chen et al. (2005)</td>
</tr>
<tr>
<td></td>
<td>(created by study authors from original items)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Potential Shyness Observation</th>
<th>Sample Deviant Code</th>
<th>Appeared In</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavioral inhibition during free-play period</td>
<td>“Latency to approach the stranger and/or touch the novel objects”</td>
<td>Hastings et al. (2005)</td>
</tr>
<tr>
<td>Shy behaviour at start of interview with the experimenter</td>
<td>“Disposed to avoid person or things”</td>
<td>Tan et al. (2020)</td>
</tr>
</tbody>
</table>

¹ These studies do appear in Table 1.1, but I do not report on the analyses that use these measures.
Appendix B:

Supplemental Material for “Shyness as a Barrier to Prosocial Behaviour: Disentangling Task Complexity from Social Demands”

Ethics Approval

This study was originally conducted for an Honour’s thesis project and thus received the following ethics approval from the Psychology Research Ethics Board (Unit REB) instead of the General Research Ethics Board. Unit REB is meant to reduce the volume of GREB applications by focusing on submissions from student researchers.

```
Von: Kate Harkness <harkness@queensu.ca>
An: Nina Buchenrieder <12nb15@queensu.ca>
Betreff: 501 approval

Dear Nina,

I have read and approved your Psyc 501 proposal, and it has received Unit Psy REB ethics clearance, so you may begin.

To satisfy the final step of the Psyc 501 proposal process, please email an electronic copy of the final version of your proposal to Marie Tooley: marie.tooley@queensu.ca. In your message to Marie, please indicate that this is a novel project that has received PsyREB approval. Also, please forward her this email so that she knows that your proposal has been cleared. Finally, please cc the email to me.

Good luck with your project!

________________________________________________________
Kate Harkness, Ph.D., C. Psych.
Professor of Psychology and Psychiatry
Department of Psychology
Queen's University
Kingston, ON K7L 3N6
tel: 613-533-2886
dxon: 613-533-2499
e-mail: harkness@queensu.ca
```
Participants

Table B1

Data Exclusion

<table>
<thead>
<tr>
<th>Source</th>
<th>Description</th>
<th>Number of participants excluded</th>
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</thead>
<tbody>
<tr>
<td>Experimenter</td>
<td>Deviation from script</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Incorrect order of prosocial tasks</td>
<td>1</td>
</tr>
<tr>
<td>Technical</td>
<td>Audio failed to record</td>
<td>1</td>
</tr>
<tr>
<td>Participant</td>
<td>Q-Sort completed incorrectly</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Q-Sort not completed</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Child did not assent to participate</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>9</strong></td>
<td></td>
</tr>
</tbody>
</table>

Figure B1

Sensitivity Power Analysis

Note. Sensitivity power curve showing the power that our sample size \((N = 42)\) would have to detect a range of effect sizes in a correlation analysis, with an alpha of 0.05. Power caps off here at an effect size of 0.53.
Attachment Q-Sort

Sorting Piles

Figure B2

Attachment Q-Sort Piles

1 2 3 4 5 6 7 8 9

extremely uncharacteristic  fairly uncharacteristic neutral  somewhat characteristic fairly characteristic extremely characteristic

Note. Mothers had to sort each card into one of 9 piles, based on how well its description matched their own child’s typical behaviour. Each pile had to contain 10 cards at the end of the sort.

Shyness Subscale

Table B2

Q-Sort Shyness Subscale

Items in the scale

3. When he is upset or injured, child will accept comforting from adults other than mother (R)*

7. Child laughs and smiles easily with a lot of different people (R)

12. Child quickly gets used to people or things that initially made him shy or frightened him (R)

15. Child is willing to talk to new people, show them toys, or show them what he can do, if mother asks him to (R)

48. Child readily lets new adults hold or share things he has, if they ask to (R)

49. Child runs to mother with a shy smile when new people visit the home

50. Child’s initial reaction when people visit the home is to ignore or avoid them, even if he eventually warms up to them

159
66. Child easily grows fond of adults who visit his home and are friendly to him (R)

78. Child enjoys being hugged or held by people other than his parents and/or grandparents (R)

Items removed from the scale

5. Child is more interested in people than in things (R)

56. Child becomes shy or loses interest when an activity looks like it might be difficult

58. Child largely ignores adults who visit the home. Finds his own activities more interesting

67. When the family has visitors, child wants them to pay a lot of attention to him (R)

76. When given a choice, child would rather play with toys than with adults

*(R) denotes items that were reverse-coded

Item #56 does not refer to either social withdrawal or its opposite, but was included as a possible item in the shyness subscale because its use of the word ‘shy’ could have influenced how mothers sorted it. It was not a surprise to find that this item needed to be removed.

Item #12 should actually be considered a measure of behavioural inhibition, because it refers to ‘things’ as well as ‘people’. Removing this item from the scale, however, does not significantly change our results (see below).

Removing Behavioural Inhibition from the Q-Sort Analyses

Although there is clear overlap between behavioural inhibition and shyness in that both inhibited and shy children tend to withdraw from unfamiliar people, these constructs should still be treated as distinct. Behavioural inhibition goes beyond the social context: inhibited children withdraw from all forms of novelty, including unfamiliar objects, events, and settings, as well as people (Calkins & Fox, 1992; Kagan & Snidman, 1991). Shyness, in turn, goes beyond social novelty: shy children will act withdrawn whenever they feel anxious, even around people they know (Crozier & Badawood, 2009; Gazelle & Ladd, 2003). It is important, then, for us to assess
whether the behavioural inhibition item (#12) that was included in our shyness subscale had any impact on our results.

Eight items remain in the Q-Sort shyness subscale when the behavioural inhibition item is removed, so scores can now range from 8 to 72. Internal consistency was slightly lower than the original (Cronbach’s alpha = .780). In our sample, the lowest score on the eight-item subscale was 16 and the highest was 54 ($M = 33.29$, $SD = 10.46$). These scores were approximately normally distributed and there were no gender, order, or experimenter effects.

Shyness measured with the eight-item subscale did not predict which children comforted in the object-centred task ($n = 42$, $\chi^2(1) = 1.37$, $p = .241$, $OR = 0.01$) or the social-centred task ($n = 42$, $\chi^2(1) = 0.50$, $p = .478$, $OR = 0.56$). It also did not predict which of the children who comforted used a social-oriented strategy, as opposed to an object-oriented one, in either task (object-centred: $n = 37$, $\chi^2(1) = 1.62$, $p = .203$, $OR = 25.83$; social-centred: $n = 17$, $\chi^2(1) = 1.35$, $p = .246$, $OR = 15.80$). Shyness here was not related to how spontaneously children intervened in the object-centred helping task ($n = 42$, $r_b = -.11$, $p = .395$), the social-centred helping task ($n = 40$, $r_b = -.07$, $p = .567$), or the social-centred comforting task ($n = 17$, $r_b = -.22$, $p = .287$). It was, however, significantly related to spontaneity in the object-centred comforting task ($n = 37$, $r_b = -.27$, $p = .043$), with higher scores on the eight-item subscale being moderately associated with less spontaneous comforting. Thus, we replicated all of the results we found when we examined how children’s prosocial behaviour related to their shyness measured with the original, nine-item, subscale.
Counterbalancing

Table B3

Task Orders

<table>
<thead>
<tr>
<th>Order</th>
<th>Experimenter 1</th>
<th>Experimenter 2</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: Helping task first</td>
<td>male: 6</td>
<td>male: 5</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>female: 6</td>
<td>female: 5</td>
<td></td>
</tr>
<tr>
<td>B: Comforting task first</td>
<td>male: 3</td>
<td>male: 5</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>female: 8</td>
<td>female: 4</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>23</td>
<td>19</td>
<td>42</td>
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</table>
Responses to the Prosocial Tasks

Table B5

<table>
<thead>
<tr>
<th>Task</th>
<th>Non-Prosocial Responses</th>
<th>Prosocial Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Response Type</td>
<td>n</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Object-Centred Helping</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Concern</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>No response</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Empty verbal</td>
<td>3</td>
</tr>
<tr>
<td>Object-Centred Comforting</td>
<td>No response</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Empty verbal</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Concern</td>
<td>5</td>
</tr>
</tbody>
</table>

*One child who offered verbal comfort in the social-centred comforting task also acted physically, but did not approach the experimenter: he opened the door to the next room wide to show her what she ‘should’ve done’ to avoid hitting the frame. We did not expect this type of physical comfort, but like fixing the toy in the object-centred comforting task, we considered it to be at the same level of engagement as verbal comfort. We also categorized this response as object-oriented (Epstein & Baker, 2019; Henderson & Hollingworth, 1999).

Speech as a Measure of Shyness

Coding of the Child’s Speech

In the fall of 2020, research assistants transcribed the conversations between the experimenter and each child during the puzzle delay game for the purpose of coding the child’s speech for shy behaviours. The transcribers added a new line for each utterance that the
experimenter and child made, with the boundaries of an utterance defined as 3 seconds of silence by the person who had spoken last.

We chose to code speech behaviour in the puzzle delay game, specifically, for a few reasons. First, the puzzle was the very first activity children performed in the study and acted as a warm-up period. Children’s behaviour during the puzzle game thus reflected their initial level of comfort in the testing situation, whereas their behaviour in the later games would have been contaminated by their developing relationship with the experimenter. The quality and length of the conversations observed in the puzzle game also most suited our needs. Children spent much longer making the puzzle with the experimenter than they did playing two of the other games: the average length of the puzzle was 6.15 minutes ($SD = 1.96$; range: 3.08-10.90), while the average length of the tower game was 1.68 minutes ($SD = 0.70$; range: 0.75-4.00) and the average length of tic-tac-toe was 1.61 minutes ($SD = 0.76$; range: 0.42-3.77). Although children played the memory game for a similar amount of time ($M = 4.56$ minutes; $SD = 1.57$; range: 0.57-10.70) that they played with the puzzle, our transcribers noted that the majority of utterances children made when playing memory were merely labelling the animals they saw on the cards (e.g., “A cow”; “Polar bear and a goose”). Conversation during the puzzle was more varied and often went beyond deciding where to put the pieces to discussing the television show Paw Patrol (which was pictured on the puzzle) or even other topics (e.g., “[My teacher] has a dog and it’s really friendly”).

Transcripts of the puzzle game were coded by two independent raters who overlapped on over 25% of the sample, which was used to calculate interrater agreement. Disagreements were resolved by the principal investigator. The raters categorized each of the child’s utterances as either: 1) responsive (i.e., the child was following the experimenter’s lead with their next
utterance), 2) initiating (i.e., the child moved the conversation in a new direction, though they may still be talking about the same broad topic as the experimenter’s last utterance), or 3) irrelevant (i.e., the child’s utterance contained only a gesture, self-talk, or thinking sounds, or had been marked as unclear by the transcriber). The raters agreed on 83.5% of their ratings ($K = .733$, $p < .001$).

An observed shyness score was calculated for each child by summing the number of responsive utterances they made during the warm-up ‘puzzle’ game and dividing by their total number of utterances (i.e., responsive + initiating; utterances that were coded as ‘irrelevant’ for our purposes were excluded from the calculation). This score was made into a percentage by multiplying it by 100, for ease of interpretation. Low scores on this measure would indicate that the child spent most of the conversation taking initiative when speaking to the experimenter and would be classified as ‘not shy’, while high scores would indicate that the child spent most of the conversation merely responding to the experimenter’s comments and would be classified as ‘very shy’.

In our sample, observed shyness scores ranged from 13.33% to 85.71% ($M = 32.90; SD = 14.49$). Observed shyness did not vary significantly based on the gender of the child, the order of the prosocial tasks, or the experimenter paired with the child.

**Observed vs. Parent-reported Shyness**

We found no relation between children’s scores on the two shyness measures – parent-reported shyness (i.e., scores on the Q-Sort shyness subscale) and observed shyness (i.e., responsive speech behaviour at the start of the study): $r = .14, p = .379, N = 42$. Here, we are reporting the relation between scores on the Q-Sort shyness subscale and a log transformation of observed shyness scores, because the latter distribution was found to be positively skewed and
peaked (skew = 4.61, kurtosis = 5.49; both above the criterion of +/- 2.33: Tabachnick & Fidell, 2013). The transformed observed shyness scores had an approximately normal distribution (skew = 0.93, kurtosis = 0.38).

**Coding of the Experimenter’s Speech**

We decided to examine the experimenter’s own speech behaviour during the puzzle game to determine what effect she may have had on children’s observed shyness. The same coding process was used for the experimenter’s speech, with two independent raters, overlapping on 25% of the sample, categorizing her speech as either: 1) responsive (i.e., the experimenter was following the child’s lead with her next utterance), 2) initiating (i.e., the experimenter moved the conversation in a new direction), or 3) irrelevant (i.e., the experimenter’s utterance contained only a gesture, thinking sounds, or had been marked as unclear by the transcriber). The raters agreed on 79.8% of their ratings ($K = .626, p < .001$).

A ‘taking the lead’ score was calculated for both experimenters in their interactions with the children in their half of the sample ($n = 23; n = 19$) by summing the number of initiating utterances they made in the warm-up game and dividing that by their total number of utterances (i.e., responsive + initiating, with irrelevant utterances excluded from the calculation). The score was made into a percentage by multiplying it by 100. Lower ‘taking the lead’ scores would indicate that the experimenter spent most of the conversation allowing the child to initiate conversation rather than leading herself, while higher scores would indicate that the experimenter mostly tried to lead the conversation. In our sample, ‘taking the lead’ scores ranged from 33.33% to 96.97% ($M = 70.30, SD = 15.25$).
**Experimenter Differences**

In the Coding and Interrater Analyses section in Chapter 2, I described an independent t-test that revealed a marginally significant difference between the number of utterances spoken (per second) by the two experimenters, which motivated us to consider the observed shyness analyses to be exploratory only. This t-test was calculated for the pre-registration we wrote prior to coding the experimenter’s speech and was based solely on transcripts of the game. The number of utterances in this test thus included irrelevant utterances as well. When we re-ran the t-test with only the experimenters’ utterances that would be used in the following analyses (i.e., initiating and responsive) we found a similar result: \( t(40) = 2.25, p = .030, \text{Cohen's } d = 0.74 \). Note that here, we are reporting a log transformation of the number of utterances each experimenter made per second, because we found Experimenter 2’s distribution to be positively skewed and peaked (skew = 3.50, kurtosis = 4.19; both above the criterion of +/- 2.33: Tabachnick & Fidell, 2013). After the transformation, both experimenters had approximately normal distributions (Experimenter 1: skew = -2.01, kurtosis = 0.94; Experimenter 2: skew = 1.33, kurtosis = 0.82).

We also tested whether the experimenters differed in how often they took the lead in the warm-up conversations. An independent t-test did not find a significant difference in the experimenters’ ‘taking the lead’ scores: \( t(40) = 1.43, p = .160, \text{Cohen’s } d = 0.45 \). We did, however, find that the experimenter’s differed in whether their speech behaviour related to the child’s own. For Experimenter 1, children’s observed shyness (log transformed) was significantly related to how often she took the lead in conversations: \( r = .59, p = .003, n = 23 \). For Experimenter 2, children’s observed shyness (log transformed) was not significantly related to how often she took the lead: \( r < .01, p = .989, n = 19 \). Given this discrepancy, we have added
the experimenter paired with each child as a second predictor in all of the analyses in the next section.

**Observed Shyness and Prosociality**

In the following analyses we examine the relation between children’s level of shyness and their performance in the four prosocial tasks. Because there was little variation in whether children helped and how they did so in both helping tasks, we have focused on the comforting tasks for those analyses. We were able to examine the relation between shyness and spontaneity in all four prosocial tasks, however, because children did vary in how spontaneously they helped.

**Helping: Object-centred**

In the object-centred helping task, neither observed shyness scores nor the experimenter paired with the child significantly predicted how spontaneously children helped the experimenter (n = 42): observed shyness: $\chi^2(2) = 5.01, p = .082$; experimenter: $\chi^2(2) = 1.49, p = .476$. Here, we are reporting the results of a multinomial logistic regression, because our data violated the assumption of proportional odds that is required for ordinal regression (i.e., the test of parallel lines: $\chi^2(2) = 8.53, p = .014$). The results of this multinomial regression should be interpreted cautiously, as it involves many observed cells with zero frequencies.

**Helping: Social-centred**

In the social-centred helping task, we used ordinal regression to examine whether children’s observed shyness scores or the experimenter paired with them would predict how spontaneously children provided help (n = 40). Neither predictor was significant in this analysis: observed shyness: $\chi^2(1) = 0.01, p = .905$, OR = 1.00; experimenter: $\chi^2(1) = 1.65, p = .199$, OR = 2.27.
**Comforting: Object-centred**

In the object-centred comforting task, we used a binomial logistic regression to examine whether children’s observed shyness scores or the experimenter paired with them would predict which children comforted the experimenter. Neither predictor was significant in this analysis; observed shyness: $\chi^2(1) = 0.66, p = .416, OR = 1.53$; experimenter: $\chi^2(1) = 1.18, p = .278, OR = 3.71$. Observed shyness and the experimenter also did not predict which of the children who comforted ($n = 37$) used a social-oriented comforting strategy, as opposed to an object-oriented one: observed shyness: $\chi^2(1) = 0.38, p = .541, OR = 0.68$; experimenter: $\chi^2(1) = 1.54, p = .215, OR = 0.37$. Finally, in an ordinal regression examining how spontaneously children comforted ($n = 37$), neither observed shyness nor the experimenter paired with the child was a significant predictor: observed shyness: $\chi^2(1) = 0.31, p = .575, OR = 0.99$; experimenter: $\chi^2(1) = 0.75, p = .388, OR = 1.77$

**Comforting: Social-centred**

In the social-centred comforting task, a binomial logistic regression found that which children provided comfort was not predicted by their observed shyness scores ($\chi^2(1) = 2.00, p = .157, OR = 1.85$), but was marginally predicted by the experimenter with whom they were paired ($\chi^2(1) = 3.63, p = .057, OR = 0.25$). A separate logistic regression examining whether observed shyness and the experimenter predicted which of the children who comforted ($n = 17$) used a social-oriented comforting strategy, as opposed to an object-oriented one, was also not significant; observed shyness: $\chi^2(1) = 0.01, p = .916, OR = 0.88$; experimenter: $\chi^2(1) = 1.23, p = .268, OR = 0.22$. Finally, an ordinal regression found neither observed shyness nor the experimenter paired with the child to predict how spontaneously children comforted ($n = 17$):
observed shyness: $\chi^2(1) = 0.23$, $p = .630$, OR = 1.02; experimenter: $\chi^2(1) = 0.91$, $p = .340$, OR = 0.34.

**Discussion of Speech Analyses**

Children who mostly responded to the experimenter’s comments during the warm-up game, rather than initiating conversation themselves, were just as likely as not-shy children to comfort the experimenter in the object- and social-centred comforting tasks, to use a social-oriented strategy when comforting, and to respond spontaneously in all four prosocial tasks. This is similar to our findings in the main text, where shyness was measured with the Q-Sort shyness subscale, with the exception that parent-reported shyness did relate to how spontaneously children comforted in the object-centred comforting task.

In the Discussion section of the main report we go over different interpretations of our Q-Sort shyness results, many of which would apply to our findings here as well. For example, both measures focus on socially withdrawn behaviours, which can make it difficult to differentiate between shy and unsociable children. That is, while we would expect children who feel anxious around others to initiate conversation less often, we could expect the same from children who lack interest in others (Crozier & Badawood, 2009; Rezendes et al., 1993; Coplan et al., 2004). In addition, both measures had restricted ranges in our sample. Unlike parent-reported shyness, though, scores on the observational measure were not normally distributed: they were positively skewed and peaked around a fairly low mean (32.9%), which shows that a significant portion of children in our sample had low observed shyness scores (i.e., they did often initiate conversation with the experimenter).

There are many possible explanations for why observed shyness scores were lower than expected in our sample. As we discussed in the main text, parents may be less likely to bring
their very shy children to studies in unfamiliar lab settings, which are likely to make their children uncomfortable. It is also possible, however, that there were flaws in our observed shyness measure that muddied the results of our analyses.

This measure was created post-hoc, after the data had already been collected, so the conversation during the warm-up game had no restrictions placed on it. The two individuals acting as the experimenter were not given any directions about what they should say during this time, and they did differ in how much they spoke and how their speech behaviour related to the child’s own. For the experimenter who spoke more, children’s observed shyness scores were directly related to how often she took the lead. This finding makes intuitive sense, given that it is polite for an individual to make a responsive comment whenever someone initiates conversation, however we used a fairly liberal definition of ‘initiating’ when coding: if any part of the child’s utterance moved the conversation forward, even if it was on the same general topic as the experimenter’s last comment, then that utterance was labelled ‘initiating.’ So, we would not necessarily expect to see the number of initiating and responsive comments made by the experimenter and child to show an inverse relation. That children were more responsive when Experimenter 1 took the lead may instead suggest that there were also other qualities of the warm-up conversations that differed between the two experimenters.

Another consequence of adding the observed shyness measure after data collection was that we did not have control over the amount of time the experimenter and child spent playing the warm-up game. For this reason, we calculated observed shyness as the percentage of each child’s utterances that were responsive, rather than using raw scores. Although this choice did make interpreting the observed shyness scores easier in some respects, it does create a problem in cases where a child did not speak very much during the warm-up period. If a child only spoke
a few utterances for the entire game and those utterances happened to be mostly initiating, does that really mean that the child was not shy? Does a lack of chattiness mean that a child was actually very shy (e.g., Rezendes et al., 1993; Schneider, 1999) or could it mean instead that they were too focused on putting together the puzzle to hold a conversation? Although there was a wide range in the number of utterances children spoke during the puzzle game (i.e., from only 5 utterances to 73), there was no clear cut-off point at which we could exclude children for not speaking ‘enough’ to get a more accurate shyness score.

Finally, it is of note that the scores on our two shyness measures – speech during the warm-up and the Q-Sort shyness subscale – did not relate to each other. Although it isn’t uncommon for parent-report and observational measures to differ (possibly due to biases in parent-reporting or to short-term causes of behaviour change, like a child’s mood: Eisenberg, 1992; Seifer et al., 2004), this finding adds to our concern that our speech measure may not have accurately reflected the shyness of the children in our sample.
Appendix C:

Supplemental Material for “Shyness as a Barrier to Prosocial Behaviour: The Role of Compliance and the Bystander Effect”

Ethics Approval

The proposal for this study was reviewed by the Research Ethics Unit at Concordia University, where the data was collected by the Concordia Social Cognitive Development lab.

---

CERTIFICATION OF ETHICAL ACCEPTABILITY
FOR RESEARCH INVOLVING HUMAN SUBJECTS

<table>
<thead>
<tr>
<th>Name of Applicant:</th>
<th>Kristen Dunfield</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department:</td>
<td>Faculty of Arts and Science (Psychology)</td>
</tr>
<tr>
<td>Agency:</td>
<td>Social Sciences &amp; Humanities Research Council Fonds Quebecois de la Recherche sur la Societe et la Culture</td>
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<tr>
<td>Title of Project:</td>
<td>The development of prosocial behavior in naturalistic settings – A cross-cultural comparison of an urban Canadian and rural Mexican context</td>
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<td>Certification Number:</td>
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</tr>
<tr>
<td>Valid From:</td>
<td>May 14, 2021 To: May 13, 2022</td>
</tr>
</tbody>
</table>

The members of the University Human Research Ethics Committee have examined the application for a grant to support the above-named project, and consider the experimental procedures, as outlined by the applicant, to be acceptable on ethical grounds for research involving human subjects.

[Signature]

Dr. Richard DeMont, Chair, University Human Research Ethics Committee
Participants

Figure C1

Procedure and Data Exclusion

Sample Tested ($N = 155$)

Group Assessments ($N = 138$) → Excluded from Analyses

- Absent on test day for the group assessments ($n = 17$)
- A member of the child’s group had already participated with another group ($n = 2$)
- Categorized as ‘uncodable’ for more than 50% of the free-play period ($n = 1$)

Free-play Period → Absent on test day for the individual assessment ($n = 4$)

Tower Task

Individual Assessment ($N = 151$) → Did not assent to complete the structured tasks ($n = 3$)

Structured Tasks

Sample Analyzed ($N = 128$) → Total: 27

Note. Children were observed at 10 daycares in Montréal, Canada.
<table>
<thead>
<tr>
<th>Daycare ID</th>
<th>Group ID</th>
<th>Group size</th>
<th>Gender (male; female)</th>
<th>Age range (months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>4</td>
<td>4; 0</td>
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<td>4</td>
<td>3</td>
<td>2; 1</td>
<td>57-63</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>3</td>
<td>1; 4</td>
<td>54-62</td>
</tr>
<tr>
<td>6</td>
<td>7</td>
<td>3</td>
<td>5; 2</td>
<td>41-51</td>
</tr>
<tr>
<td>3</td>
<td>7</td>
<td>4</td>
<td>2; 2</td>
<td>39-46</td>
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<tr>
<td>8</td>
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<tr>
<td>9</td>
<td>5</td>
<td>1</td>
<td>1; 4</td>
<td>37-60</td>
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<tr>
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<td></td>
<td>[43]</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>4</td>
<td>2</td>
<td>2; 2</td>
<td>57-66</td>
</tr>
<tr>
<td>11</td>
<td>4</td>
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<td>47-69</td>
</tr>
<tr>
<td>4</td>
<td>12</td>
<td>4</td>
<td>3; 1</td>
<td>45-47</td>
</tr>
<tr>
<td>[1]</td>
<td>[1; 0]</td>
<td></td>
<td>[46]</td>
<td></td>
</tr>
<tr>
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<td>51-66</td>
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<tr>
<td>14</td>
<td>4</td>
<td>0</td>
<td>0; 4</td>
<td>43-54</td>
</tr>
<tr>
<td>5</td>
<td>15</td>
<td>3</td>
<td>0; 3</td>
<td>34-43</td>
</tr>
<tr>
<td>16</td>
<td>5</td>
<td>3</td>
<td>3; 2</td>
<td>59-68</td>
</tr>
<tr>
<td>[1]</td>
<td>[1; 0]</td>
<td></td>
<td>[59]</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>4</td>
<td>1</td>
<td>1; 3</td>
<td>46-55</td>
</tr>
<tr>
<td>6</td>
<td>18</td>
<td>5</td>
<td>4; 1</td>
<td>36-64</td>
</tr>
<tr>
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</tr>
<tr>
<td>20</td>
<td>7</td>
<td>4</td>
<td>4; 3</td>
<td>37-57</td>
</tr>
<tr>
<td>21</td>
<td>4</td>
<td>4</td>
<td>1; 3</td>
<td>35-49</td>
</tr>
</tbody>
</table>
*Not all of the children who participated in the group assessments were included in the final analyses (see Figure C1 above) – groups that had at least one excluded participant are represented by two lines within this table: the first line presents the full group details, while the second line identifies only children who were excluded. For example, in Daycare #3, Group #9, one child of the five who played together (female, 43 months old) was excluded from the final analyses.

Due to an organizational error, Group #25 had to be excluded because one child (male, 46 months old) participated in Group #24 as well.

**Counterbalancing of the Structured Tasks**

Table C2 describes the eight orders to which children were randomly assigned for the structured tasks. Table C3 lists demographics and errors that affected ten children. Although we retained these children in our main analyses, we excluded them from the tests looking into order effects, below.
**Table C2**

*Counterbalancing: Task Orders*

<table>
<thead>
<tr>
<th>Trial</th>
<th>Order</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SsA</td>
<td>SsB</td>
<td>SpA</td>
<td>SpB</td>
<td>HbA</td>
<td>HbB</td>
<td>HbA</td>
<td>HbB</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>CtB</td>
<td>CtA</td>
<td>CtB</td>
<td>CtA</td>
<td>SsB</td>
<td>SsA</td>
<td>SpB</td>
<td>SpA</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>HbA</td>
<td>HbB</td>
<td>HbA</td>
<td>HbB</td>
<td>SpA</td>
<td>SpB</td>
<td>SsA</td>
<td>SsB</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>SpB</td>
<td>SpA</td>
<td>SsB</td>
<td>SsA</td>
<td>CtB</td>
<td>CtA</td>
<td>CtB</td>
<td>CtA</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>CkA</td>
<td>CkB</td>
<td>CkA</td>
<td>CkB</td>
<td>CkA</td>
<td>CkB</td>
<td>CkA</td>
<td>CkB</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>HdB</td>
<td>HdA</td>
<td>HdB</td>
<td>HdA</td>
<td>HdB</td>
<td>HdB</td>
<td>HdB</td>
<td>HdB</td>
<td></td>
</tr>
</tbody>
</table>

Scenario: Share ‘Stickers’ = Ss; Share ‘Popcorn’ = Sp; Help ‘Block’ = Hb; Help ‘Door’ = Hd; Comfort ‘Teddy bear’ = Ct; Comfort ‘Knee’ = Ck

Responsive version (i.e., the experimenter showed an explicit need) = A; Spontaneous version (i.e., the experimenter showed no explicit need) = B

**Table C3**

*Counterbalancing: Demographics and Issues*

<table>
<thead>
<tr>
<th>Order</th>
<th>Total participants</th>
<th>Gender (male; female)</th>
<th>Age range (months)</th>
<th>Participants with 5 tasks instead of 6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Number</td>
</tr>
<tr>
<td>1</td>
<td>18</td>
<td>10; 8</td>
<td>37-81</td>
<td>0</td>
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<tr>
<td>2</td>
<td>16</td>
<td>6; 10</td>
<td>43-81</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>16</td>
<td>8; 8</td>
<td>34-83</td>
<td>0</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>
| 4 | 18 | 8; 10 | 36-70 | 3 | - Missing task (H₄B)  
- Missing task (H₃B)  
- Missing task (H₁B) |
| 5 | 15 | 10; 5 | 40-69 | 0 |   |
| 6 | 18 | 9; 9 | 38-73 | 2 | - Missing task (S₃B)  
- Wrong trial type (H₃A)  
(H₃A excluded) |
| 7 | 15 | 9; 6 | 46-75 | 1 | - Wrong trial type (S₃B)  
(S₃B excluded) |
| 8 | 12 | 6; 6 | 37-76 | 0 |   |
| Total | 128 | 66; 62 | 34-83 | 8 |   |

The experimenter made counterbalancing errors with two other children in addition to the eight listed above: one child in order 2 received H₄B in trial 2 instead of 3, S₃A in trial 3 instead of 4, and C₃A in trial 4 instead of 2, and another child in order 7 received the wrong versions of both sharing tasks (i.e., S₃B and S₃A). Because these two children still received both versions for each type of task, we did not need to make any adjustment to their prosocial scores.

We can draw a fairly distinct line between the first and last four orders in Table C2. As explained in the Methods section of the main report, all of the eight orders had to end with the knee comforting task and the door helping task, but the other tasks were somewhat fixed as well. Orders 1-4 all begin with a sharing task, then have the teddy bear comforting task in trial 2, the block helping task in trial 3, and the other sharing task in trial 4. Orders 5-8 all begin with the block helping task, then have the sharing tasks in trials 2 and 3, and the teddy bear comforting task in trial 4. Thus, the positions of the sharing tasks are the only ones that vary within these order groups. Children who received a sharing trial first did not differ from children who received a helping trial first in age, gender, shyness, or their structured prosocial behaviour. They did, however, significantly differ in engagement, with children in the sharing trial first orders (n = 62; M = 0.88, SD = 0.51) tending to be less engaged during the free-play period than children.
who in the helping trial first orders \((n = 56, M = 1.09, SD = 0.58)\): \(t(116) = -2.14, p = .035,\) Cohen’s \(d = 0.38.\)

The counterbalancing orders can also be split by the position of their responsive and spontaneous trials. In orders 1, 3, 5, and 7, the responsive version is used for all tasks that occur on an odd trial and the spontaneous version is used for all tasks that occur on an even trial, while the opposite is true for orders 2, 4, 6, and 8. Children who received responsive odd-trials did not differ from children who received spontaneous odd-trials on any personal factor, but they did differ in their structured prosocial behaviour. The ‘responsive’ odd-trials group intervened on fewer trials \((Mdn = 16.67\%)\) than the ‘spontaneous’ odd-trials group \((Mdn = 33.33\%): Mann-Whitney U = 2.99, p = .003, N = 118.\) On closer inspection, this effect does not actually appear to be the product of which trials were responsive or spontaneous, but rather the tasks themselves. As shown in Figures 3.4 and 3.5 of the main text, the children in our sample did not respond to each task with the same readiness: they intervened more often in the block helping, door helping, and teddy bear comforting tasks, and they were far more likely to act on responsive trials than spontaneous ones. By (unintentional) design, children in orders with spontaneous odd-trials always received the responsive versions of two high-intervention tasks (i.e., door and teddy bear), while children in orders with responsive odd-trials only received the responsive version of one (i.e., block; Table C2). Individual chi-square tests for each task support this explanation (Table C4).
Table C4

Order Effects: Responsive vs. Spontaneous Trials

<table>
<thead>
<tr>
<th>Task</th>
<th>$\chi^2$</th>
<th>$p$</th>
<th>Children who intervened</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Responsive</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>odd-trials</td>
</tr>
<tr>
<td>Help-Block</td>
<td>62.98</td>
<td>&lt; .001</td>
<td>98.4%</td>
</tr>
<tr>
<td>Help-Door</td>
<td>66.01</td>
<td>&lt; .001</td>
<td>6.3%</td>
</tr>
<tr>
<td>Share-Sticker</td>
<td>0.01</td>
<td>.942</td>
<td>15.9%</td>
</tr>
<tr>
<td>Share-Popcorn</td>
<td>0.32</td>
<td>.572</td>
<td>12.7%</td>
</tr>
<tr>
<td>Comfort-Teddy</td>
<td>57.00</td>
<td>&lt; .001</td>
<td>0%</td>
</tr>
<tr>
<td>Comfort-Knee</td>
<td>8.51*</td>
<td>.004</td>
<td>14.3%</td>
</tr>
</tbody>
</table>

Ten children who were affected by counterbalancing errors were excluded from all of these tests ($N = 118$).

*This test should be interpreted cautiously, as more than 20% of the expected cell counts were less than 5.

Age Bins

Table C5

Age Demographics in Years

<table>
<thead>
<tr>
<th>Age Bin</th>
<th>$N$</th>
<th>$M$</th>
<th>$SD$</th>
<th>Gender (male; female)</th>
</tr>
</thead>
<tbody>
<tr>
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<td>2*</td>
<td>2.9</td>
<td>0.06</td>
<td>0; 2</td>
</tr>
<tr>
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</tr>
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<td>4</td>
<td>44</td>
<td>4.5</td>
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<td>22; 22</td>
</tr>
<tr>
<td>5</td>
<td>31</td>
<td>5.4</td>
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<td>7</td>
<td>6.4</td>
<td>0.36</td>
<td>3; 4</td>
</tr>
</tbody>
</table>

*Both 2-year-olds were on the cusp of turning 3 – they were 34 and 35 months, respectively

For descriptive purposes only, we have summarized the number of children within each age bin who intervened in each of the six structured tasks in the tables below, which are separated by whether a child received the responsive version (Table C6) or spontaneous version (Table C7) of that task.
### Structured Tasks

#### Table C6

*Prosocial Behaviour in the Responsive Trials, by Age*

<table>
<thead>
<tr>
<th>Age Bin</th>
<th>Helping</th>
<th>Sharing</th>
<th>Comforting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Block</td>
<td>Door</td>
<td>Sticker</td>
</tr>
<tr>
<td>2</td>
<td>2 / 2</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>4</td>
<td>22 / 22</td>
<td>21 / 22</td>
<td>8 / 24*</td>
</tr>
<tr>
<td>5</td>
<td>14 / 14</td>
<td>15 / 17</td>
<td>9 / 15</td>
</tr>
<tr>
<td>6</td>
<td>3 / 3</td>
<td>4 / 4</td>
<td>0 / 2</td>
</tr>
</tbody>
</table>

*Due to counterbalancing errors, some children did not receive tasks that they should have: one 4-year-old child missed SsA and another 4-year-old missed SpA.

#### Table C7

*Prosocial Behaviour in the Spontaneous Trials, by Age*

<table>
<thead>
<tr>
<th>Age Bin</th>
<th>Helping</th>
<th>Sharing</th>
<th>Comforting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Block</td>
<td>Door</td>
<td>Sticker</td>
</tr>
<tr>
<td>2</td>
<td>--</td>
<td>0 / 2</td>
<td>--</td>
</tr>
<tr>
<td>3</td>
<td>1 / 18*</td>
<td>3 / 23*</td>
<td>0 / 18</td>
</tr>
<tr>
<td>4</td>
<td>9 / 21*</td>
<td>1 / 22</td>
<td>0 / 19</td>
</tr>
<tr>
<td>5</td>
<td>7 / 16*</td>
<td>0 / 14</td>
<td>0 / 16</td>
</tr>
<tr>
<td>6</td>
<td>0 / 4</td>
<td>0 / 3</td>
<td>0 / 5</td>
</tr>
</tbody>
</table>

*Due to counterbalancing errors, some children did not receive tasks that they should have: two 3-year-old children, one 4-year-old, and one 5-year-old missed HbB; one 3-year-old missed HbB; and one 4-year-old missed SpB.