

AN EXAMINATION OF THE INFLUENCE OF MIMICRY ON THE PRO-SOCIAL
SHARING OF PRESCHOOLERS

by

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DEDICATION PAGE

I would like to dedicate my thesis to my parents, for their unwavering confidence and continuous support throughout my education. Also, to my fiancé, for the insight and motivation he has provided every step of the way.

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ABSTRACT

The effects of mimicry on pro-social sharing were investigated among 4-year-olds. During the priming phase, the experimenter either copied the actions of the children directly or responded contingently to their actions. The effect of mimicry on sharing behavior was assessed by the children's performance on the resource allocation task. Results indicated that mimicry did not influence sharing above and beyond a positive interaction, with low levels of sharing found in both conditions. Experiment 2 was designed to determine whether the lack of communication during the priming phase of Experiment 1 was responsible for the levels of sharing found. During the priming phase, the experimenter either spoke to the children while they played, or did not. Results indicated that communication did not influence pro-social sharing, as the levels of sharing were no higher than those found in Experiment 1. Other influencing factors such as the nature of mimicry are discussed.

LIST OF ABBREVIATIONS USED

ANOVA	Analysis of Variance
E1	First Experimenter
E2	Second Experimenter
M	Mean
SD	Standard Deviation

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CHAPTER 1 INTRODUCTION

As humans, we are often seen copying the actions of those around us. We begin reproducing the actions of others at a young age and continue to do so throughout our lifespan, despite our increasing autonomy and the advanced behavioral repertoire we acquire as we develop. For example, an infant may try to stack a pile of blocks after watching another child make a tower, and an adult may begin to whisper during a conversation in which their friend is doing the same.

As highlighted by the examples above, there are different ways that we can copy the actions of those in our social environment, and each type of copying behavior may be defined according to the action components we reproduce. Elsner (2007) highlights the following as the various types of copying behavior that can be seen as early as infancy: Imitation, emulation, and mimicry. According to Elsner (2007), *imitation* involves the reproduction of a model's physical movements, as well as an understanding of the goal, or reason behind those movements. In contrast, *emulation*, or *goal emulation* involves reproducing the effects of a model's actions, but through different means than those used by the model. Like imitation, the model's goal is still understood when their actions are emulated. Finally, *mimicry* is said to involve the sole copying of a model's physical movements. Unlike imitation or goal emulation, no understanding of the purpose of the actions is necessary when mimicking the actions of others.

The intentional imitation of another's actions is suggested to function as an important learning mechanism, aiding both cognitive and social development (Uzgiris, 1980). For example, imitating the object-directed actions of another may provide information regarding the affordances of that object as well as the intentions behind the

other's action. Mimicry, on the other hand, at least in adulthood, is suggested to provide more of a social function, serving to foster relationships among those in our social environment (Lakin, Jefferis, Cheng & Chartrand, 2003). In addition, unlike the deliberate nature of goal-directed imitation, mimicry may not occur as a deliberate behavior. In fact, Chartrand and Bargh (1999) argue that mimicry may occur unintentionally, in the absence of any discernible purpose. This non-conscious mimicry, or the "chameleon effect" as it is known, is thought to result from the perception-behavior link (Chartrand & Bargh, 1999), which suggests that the perception of another's behavior increases the likelihood of behaving in a similar manner.

Chartrand and Bargh (1999) provided evidence for this link by demonstrating that adults unintentionally match the behavior of strangers with whom they are interacting. Participants rubbed their face more and shook their foot more in the presence of the confederate who was performing that same action during a task, compared to when confederates were engaging in the other behavior. Moreover, when asked about the behavior of the confederates following the experiment, the participants did not express any awareness of their face-touching or foot-shaking actions. Taken together, these results suggest that adults unconsciously take on the behaviors of others, even in the absence of an intention to do so.

More recently there has been research to suggest that, despite our tendency to copy the actions of others without conscious intentions, there are factors that may influence this behavior. Lakin and Chartrand (2003) examined whether adults unintentionally use mimicry to their advantage, in order to achieve interpersonal goals. Half the participants were given a goal to affiliate with a stranger: consciously, through

explicit instructions to get along with the interaction partner, or unconsciously through subliminal priming in which participants were repeatedly presented with words associated with the concept of affiliation, e.g.: affiliate, friend. The other half were not given a goal to affiliate. Instead of being presented with words relating to the concept of affiliation, participants in the conscious-affiliation goal group as well as those in the no-goal group were presented with the following words: neutral and background. Following the presentation of stimuli, participants were then asked to remember the actions of a confederate while watching them on a live feed. Those with an explicit goal to affiliate were told that they would be interacting with the confederate following the task. During the feed, the confederate could be seen touching her face and the dependent measure of the study was the number of times the participants mimicked this face-touching behavior.

Lakin and Chartrand (2003) found that those with a goal (either conscious or unconscious) to affiliate with the confederate mimicked their face-touching action more than those who were not given a goal to affiliate. Furthermore, there was no difference between the amounts of mimicry performed by those in either goal condition (conscious or unconscious). These findings suggest that interpersonal goals, such as the desire to affiliate, influence our tendency to mimic the actions of others. In other words, we may mimic the actions of others in order to benefit future social interactions.

With evidence to support the occurrence of both intentional and unintentional mimicry, the focus turns to addressing the benefits of this behavior. What happens when we copy the actions of others? How does this impact our social interaction? What is there to be gained from mimicry?

Based on their findings suggesting adults mimic the physical behaviors of others, Chartrand and Bargh (1999) examined the effects of mimicry on social interaction. In this study, adult participants were to complete a task with a confederate. During their interaction, the confederate either mimicked the behavioral mannerisms of participants or did not. Following completion of the task, participants were asked to report how much they liked the confederate and how smoothly they felt the interaction had gone.

Participants who had been mimicked reported liking the confederate more than those who had not been mimicked. Similar results were also found regarding ratings of the interaction; participants who had been mimicked reported that the interaction had gone more smoothly than those who had not been mimicked. These findings suggest that mimicry increases liking for people who copy our behavior and results in more positive perceptions of the social interaction (Chartrand & Bargh, 1999). In support of this notion, it has been argued that the sharing of bodily states results in similar conceptualizations (e.g., affective states, cognitions) among the partners in an interaction, leading to feelings of affiliation for those who mimic (Stel, Blascovich, McCall, Mastop, van Baaren & Vonk, 2010). In addition, Lakin, Jefferis, Cheng and Chartrand (2003) have argued for a bi-directional relationship between mimicry and affiliation, such that mimicry increases feelings of affiliation between partners in an interaction, which increases the likelihood of further mimicry.

In order to determine whether mimicry could impact behavior as well as emotions, van Baaren, Holland, Steenaert and van Knippenberg (2003) investigated whether mimicry would influence the actions of others during a social interaction. In one study, groups of customers interacted with a confederate waitress who either repeated the

orders of the group members word for word (mimicry condition) or confirmed their order using affirmative statements (e.g., “okay!”; non-mimicry condition). The dependent measure was the size of the tip left by each group following their meal, and it was hypothesized that the tips for the verbal mimicry condition would be larger than those for the non-mimicry condition. van Baaren et al. (2003) found that, as predicted, the average tip size of groups subjected to verbal mimicry was higher than that of those in the non-mimicry condition. These findings suggest that mimicry may result in behavioral consequences, such as making people more generous towards those who mimic them.

A second study was conducted to determine whether the verbal mimicry actually increased tip size, or whether a lack of mimicry may have decreased tip size. Prior to the second study, a baseline measure of tip size was recorded for the waitress to determine her average tip size without mimicry. In addition, to ensure that the increase in tip size was due to the verbal mimicry and not a result of the customers’ perception of the waitress’ understanding, the waitress also wrote down the customers’ orders in both conditions.

Results indicated that those in the mimicry condition tipped their waitress more often than those in the non-mimicry condition. Furthermore, the size of tip given by the customers who were mimicked was larger than the tip given by those who were not mimicked, replicating the findings from the first study. Most importantly, there was no difference between the sizes of the tip left by the customers in the non-mimicry condition and the baseline average the waitress received prior to the study, suggesting that mimicry in fact increased the size of the tip. These findings suggest that mimicked individuals

become more generous towards those who copy their behavior, demonstrating the behavioral consequences of mimicry in a social interaction.

The results of this study demonstrate that mimicry not only can change the behavior of those whose actions are copied, but the behavior seems to be changed in a specific way. The increase in generosity seen in participants who had previously been mimicked suggested that mimicry may enhance pro-social tendencies, influencing the pro-social orientation of those who are mimicked by another during social interaction.

van Baaren, Holland, Kawakami, and van Knippenberg (2004) further investigated the pro-social consequences of automatic mimicry in a series of studies. For their first experiment, participants were invited to participate in a marketing study with the task of rating various advertisements in front of a confederate. During the task, the confederate mimicked the posture and body orientation of half the participants. Following completion of the task, the confederate left the room to retrieve materials for a second task. After returning to the testing room, the confederate accidentally dropped six pens and the helping behavior of the participants was recorded. It was found that participants who had previously been mimicked by the confederate were more likely to pick up the dropped pens compared to those who had not been mimicked. These findings suggest that mimicry resulted in higher levels of pro-social behavior, compared to the no mimicry condition, making participants who were mimicked more helpful toward the individual who had mimicked their behavior.

van Baaren and colleagues (2004) conducted a second study to address whether mimicry leads to higher levels of pro-social behavior as a result of a special bond between the partners in this type of interaction, or if mimicry influences the pro-social

tendencies of those mimicked in a more general sense. In the case of the latter, people other than the mimicker should profit from the pro-social behavior of the mimicked individual. This time, the person who “accidentally” dropped the pens was not the person who previously mimicked the actions of the participants. Results showed that participants who had their body orientations mimicked by the first confederate were more likely than those who had not been mimicked to help the new confederate. Therefore, it can be concluded from these results that mimicry may affect people more diffusely, leading to a more general pro-social orientation.

In their final study, van Baaren et al. (2004) examined whether the general pro-social orientation created by an interaction involving mimicry would prompt participants to donate more money to charity than others who had not been mimicked. Following completion of the advertisement task, during which the postures and body orientations of half the participants were mimicked by the first confederate, one of the confederates returned to administer the second task. At this time, the participants were paid for their participation. The second task required participants to fill out a questionnaire regarding a specific charity, and participants were given the opportunity to donate money to this charity following the study. Results indicated that participants who had been mimicked donated more money to the charity than those who had not been mimicked. Furthermore, the amount of money donated did not differ between participants depending on the confederate administering the second task.

Most recently, Guéguen, Martin and Meineri (2011) further examined the relationship between mimicry and helping behavior and demonstrated that those who are mimicked are more likely to comply with an explicit request for help. A confederate

paired up with each of the participants to complete a task. The confederate copied the posture and body orientation of half the participants while they provided their opinion on several photographs. Following this task, the confederate informed the participants that they needed a stranger to proofread an assignment and made an explicit request to the participants for help.

Guéguen et al. (2011) found that participants who had been mimicked by the confederate were more likely to comply with their explicit request for help than those who had not been mimicked; the participants who had been mimicked were more likely to agree to proofread the confederate's assignment. The results of this study support the findings of previous studies suggesting mimicry leads to higher levels of pro-social behavior, in comparison to those who have not been mimicked (van Baaren et al. 2003; van Baaren et al. 2004). In addition, these findings demonstrate that the effect of mimicry can also be extended to explicit verbal requests for help, making mimicry a powerful influence on human behavior.

Taken together, these findings support the notion that having one's behaviors copied by a partner during a social interaction leads to higher levels of pro-social behavior, making them more likely to help their partner following the interaction. Furthermore, van Baaren and colleagues (2004) demonstrated that individuals other than the interaction partner involved in the mimicry can also benefit from the pro-social behavior of the mimicked person. This suggests that mimicry may result in a more general pro-social orientation, rather than just creating a special bond between the partners involved in the interaction as suggested previously (van Baaren et al., 2003).

As summarized by the literature presented above, there is research to suggest that mimicry has a positive influence on the social interaction between two individuals, impacting the feeling one has for those who copy their behavior as well as their pro-social tendencies toward them. In other words, relationships have been found between mimicry and affiliation (Chartrand & Bargh, 1999), as well as mimicry and pro-social behavior (van Baaren et al. 2003, 2004; Gueguen et al. 2011). The majority of the research has investigated this social phenomenon among adults, whereas only a few studies have examined whether there are similar relationships in infancy and childhood. This research is presented in the following sections.

Over and Carpenter (2009a) recently examined the influence of affiliation on the pro-social behavior of infants. In this study, 18-month-olds were primed with one of four images designed to evoke either affiliation or individuality. In the together condition, infants were shown a picture with two small dolls standing face-to face in the background. In the alone condition, one of the dolls was removed, leaving a single doll standing in the background. In the baseline condition, the two dolls were replaced by two small stacks of blocks. This condition was designed to achieve a baseline measure of the infants' helping to determine whether affiliation increased helping or if individuality decreased helping. In the back-to-back condition, the two dolls were facing away from each other. This condition was designed to determine whether the presence of two dolls was enough to influence the helping behavior of the infants.

After being shown the pictures, the infants were asked to play with a second experimenter. The second experimenter briefly left the room and returned with a bundle of sticks (similar to van Baaren et al., 2004), which she accidentally dropped when

kneeling down at a table. Infants were given the opportunity to spontaneously help this experimenter before more explicit verbal requests for help were made. Over and Carpenter (2009a) found that infants in the together condition were more likely to spontaneously help the experimenter than those in any of the control conditions. Furthermore, infants in the together condition were more likely to help during any point of the helping phase. There was no difference in helping between the baseline and the alone conditions suggesting that the affiliation prime was responsible for increasing the pro-social helping behavior, rather than the individuality prime decreasing it. Also, there was no difference between the baseline and the back-to-back condition suggesting that the mere presence of two dolls did not influence the helping behavior. As these findings suggest, priming with affiliation increases the pro-social behavior of infants, making them more helpful towards others. These findings provide the first evidence for the notion that affiliation influences the pro-social tendencies of young children as it does in adults.

Most recently, Carpenter, Uebel and Tomasello (2013) tested whether being mimicked promotes pro-social behavior in infants. In addition, they investigated whether infants behave pro-socially in a general manner after having their actions mimicked, or if this higher level of pro-social behavior is only experienced by those who copied their actions.

In their study, 18-month-old infants were either mimicked or not by an experimenter; then their helping behavior was assessed when either the experimenter (E1) or another adult (E2) needed assistance. The experimenter copied both the physical and verbal behaviors of each child in the mimicry condition during the priming phase,

while the infants were free to explore the testing room. For example, if the infants climbed over the table or walked around the room, the experimenter immediately did the same. In contrast, in the contingency condition, the experimenter performed a pre-determined match for each of the infants' behaviors, in a temporally contingent manner. For example, when the infants sat down, the experimenter stood and bent over to look at what the infant was doing. If the infant vocalized, the experimenter responded in an affirmative manner (e.g. "yes, that's right!"). The subsequent helping phase consisted of two tasks: the "sticks test" (closely replicating the task used in van Baaren et al, 2004) followed by the "cabinet test" (used in Warneken & Tomasello, 2006). Infants were randomly assigned to one of two conditions, depending on which adult would require assistance during the helping phase. For infants in the E1 condition, the adult needing help was E1; for those in the E2 condition, it was another familiar experimenter (E2).

During the "sticks test", infants watched as either E1 or E2 entered the room carrying a box and a handful of sticks. The adult showed the objects to the infants and proceeded to "accidentally" drop the sticks as they sat at the table. During the "cabinet test", infants watched as the adult approached a cabinet, arms occupied with the objects, demonstrating their desire to put the objects away. In order to measure the helping behavior of the infants, a standardized timing procedure (similar to Warneken & Tomasello, 2006) was used for both tasks, in which time was given for the infants to help spontaneously, before more explicit requests for help were given.

Carpenter et al. (2013) found that infants whose actions had been mimicked by the experimenter during the play phase were more likely to help in either task during the helping phase, suggesting that infants in the mimicry condition engaged in more pro-

social behavior than those in the non-mimicry condition. Furthermore, the authors reported that the infants were as equally likely to help E2 as they were to help E1, suggesting that mimicry influenced the pro-social tendencies of the infants in a general sense, as was seen in adults (van Baaren et al., 2004). These findings replicate those of van Baaren and colleagues within a younger population, providing evidence for the relationship between mimicry and pro-social behavior, even in infancy.

An important limitation of the study by Carpenter et al. (2013), however, is the lack of a measurement of affiliation. Without this measure, it cannot be determined whether higher levels of affiliation for the experimenter resulted in more helping behaviors following the episode of mimicry. Chartrand and Bargh (1999) have shown that mimicry leads to feelings of affiliation for the mimicker in adult populations, but it is still unclear whether this effect occurs in young children; the direct relationship between mimicry and affiliation has yet to be demonstrated in this population.

The purpose of the current study was to determine whether mimicry leads to higher levels of pro-social sharing behavior in preschool-aged children. Does mimicry make young children more likely to engage in pro-social sharing with the person who mimicked their behavior? As a subsidiary question, if mimicry does influence sharing behavior, what is the role of affiliation in this relationship? Does mimicry also result in higher levels of affiliation between a child and their interaction partner?

In order to address the research questions outlined above, the physical behaviors of four-year-old children were either mimicked or not by an experimenter during a social interaction (priming phase). A mimicry condition was designed to allow the experimenter to copy the exact actions of the children while playing with a set of toys. In addition, a

contingency (control) condition was designed to provide the same structure of interaction, however the mimicry was replaced by the experimenter performing different, but temporally contingent actions while playing with the children.

The mimicry performed by the experimenter in the mimicry condition was overt and was intended to be obvious, as opposed to the subtle or non-conscious mimicry studied previously in adult populations. Over and Carpenter (2009b) suggested that this overt type of mimicry serves a similar social function in young children as the unconscious mimicry does in adults, and the effectiveness of overt mimicry in infancy was recently demonstrated by Carpenter et al. (2013), therefore a similar method was employed in the current study. Unlike previous studies however, the current study did not involve the use of verbal mimicry. In fact, there was no verbal component to the social interaction between the experimenter and the participants. This was done to ensure that the experimenter could control their responses to the children based on the condition to which they were assigned. Eliminating the possibility for verbal communication ensured that the participants within each condition would have a similar interaction with the experimenter, and that the presence or absence of mimicry was the only variant between the conditions.

Pro-social sharing was chosen as the pro-social behavior to investigate in the current study as previous studies have investigated helping behavior and generosity in adult populations (van Baaren et al., 2003; 2004; Gueguen et al., 2011) as well as helping behavior in young children (Carpenter et al., 2013). The current study was designed to expand our understanding of the types of pro-social behavior influenced by mimicry by examining whether sharing behavior is also affected. In order to assess the impact of the

mimicry on pro-social sharing behavior, a sharing task based on the resource allocation paradigm was administered to each child. Within the resource allocation paradigm, children are typically asked to make decisions regarding the distribution of resources between themselves and a partner. This task has been used widely to investigate pro-social development and has been successful in assessing sharing behavior in young children (Moore, 2009; Williams & Moore, 2010; 2013).

Four-year-olds were chosen as the target age group because previous research has shown that children of this age do not show a preference for sharing with one partner over another (Williams & Moore, 2010). This is important as we did not want the unfamiliarity of the experimenter to impact the children's sharing behavior. In addition, the resource allocation task has been successfully used in previous research to assess sharing behavior in children of this age (Moore, 2009; Williams & Moore, 2010; 2013).

In order to determine whether the effects of mimicry were specific to pro-social sharing behavior or if mimicry influences behavior more generally, a non-social control task was added. The delay of gratification task was chosen as the measure of non-social behavior as the task involves making decisions about the self only, differentiating it from social tasks involving both the self and other. Moreover, the design is quite similar to that of the resource allocation (sharing) task, allowing for an easy comparison of how each task is affected by the experimental manipulation.

As we were interested in the possibility that affiliation may play a role in influencing the pro-social behavior of those who are mimicked, several measures were designed in order to assess the children's feeling of affiliation, as expressed in liking, towards the experimenter following the priming phase. Did the children like playing with

the experimenter enough to warrant future interaction? Following completion of the tasks during the testing phase, children were given the opportunity to interact with the experimenter who mimicked their actions once more, and their behaviors during this interaction were assessed as a measure of affiliation. Affiliation was measured by assessing specific behaviors: whether or not the children chose to sit close to the experimenter, whether they shared one of two toys they were given, and whether they initiated conversation with the experimenter.

Physical closeness was chosen as one measure as it has been found to indicate feelings of affiliation and connectedness between partners in an interaction (Ashton-James, van Baaren, Chartrand, Decety, & Karremans, 2007). Ashton-James et al. (2007) found that after having their postures and gestures subtly mimicked by an experimenter, adult participants sat closer to an apparently occupied chair, compared to those who had not been mimicked. It was suggested by the authors that this was due to an adjustment of their self-construal, making these individuals more interdependent as a result of the mimicry.

Sharing of toys was included as another measure of affiliation as it was speculated that if the children felt positive about the experimenter during the priming phase, they would be more likely to give them a toy to play with during this final interaction. This additional sharing measure was also included to provide further evidence for the influence of mimicry on sharing behavior by introducing an implicit measure in contrast to the explicit, direction driven sharing task based on the resource allocation paradigm.

Verbal communication was chosen as an additional measure of affiliation as communication is a major component of social interaction. Therefore, if the children

chose to engage the experimenter in communication it would signify their intention to interact once again. If the children enjoyed the first interaction with the experimenter, it is likely that they would want to continue the interaction.

Finally, as a measure of their emotional reaction to the mimicry, children were presented with the facial affective scale and were asked to report how they felt while playing with the experimenter during the priming phase and how they thought the experimenter felt while playing with them. This measure was included to determine whether the children's level of enjoyment during the priming phase was comparable between the mimicry and contingency conditions.

It was hypothesized that children who had their actions copied by the experimenter while playing with a set of toys would be more likely to share with the experimenter during the sharing task than children who had not had their actions previously copied. No differences were expected between conditions on the delay of gratification task, as mimicry is assumed to influence social behaviors and choosing to delay gratification is an intrapersonal cognitive task. In terms of affiliation, it was expected that children in the mimicry condition would demonstrate more affiliation with the experimenter, compared to those in the contingency condition. That is, those in the mimicry condition would be more likely than those in the contingency condition to sit close to, share one of their toys with, and initiate conversation with the experimenter during their final interaction.

2.1 PARTICIPANTS

Forty 4-year-old children ($M = 4$ years; 6 months, range = 4;0 – 4;11; 20 girls) were included in the final sample ($n = 20$ in each condition). An additional 2 children (2 boys) were excluded from analyses due to refusal to communicate with E2 ($n = 1$) or exclusion for counterbalancing purposes ($n = 1$). Participants were of mixed socioeconomic status and the majority (80%) were Caucasian. Participants were recruited through local daycare facilities throughout the Halifax Regional Municipality as well as through the participant database of the Early Social Development Lab at Dalhousie University. All parents signed a consent form prior to their child's participation. Each child was given a certificate for participation and a small toy as a gift. The study was approved by the local research ethics board.

2.2 MATERIALS

The priming phase of the study involved the use of attractive, age appropriate toys (See Figure 1). There were two identical sets of 10 different toys, one for the child and one for the experimenter. Each set included: (1) a kaleidoscope (4.5cm x 4.5cm x 18cm), (2) pin art (13cm x 9.5cm x 4cm), (3) mini globe light (4cm x 2cm x 10cm), (4) stretchable tube (23cm x 2cm x 2cm), (5) metal slinky (6.5cm x 6.5cm x 5cm), (6) hammer set: hammer (18cm x 6cm x 2cm); base (22cm x 9.5cm x 10.5cm), (7) Mr. Potato Head (13cm x 10cm x 18cm), (8) globe light (8cm x 8cm x 18cm), (9) set of six blocks (each 2.5cm x 2.5cm x 2.5cm), (10) toy train (6cm x 3cm x 3.5cm).

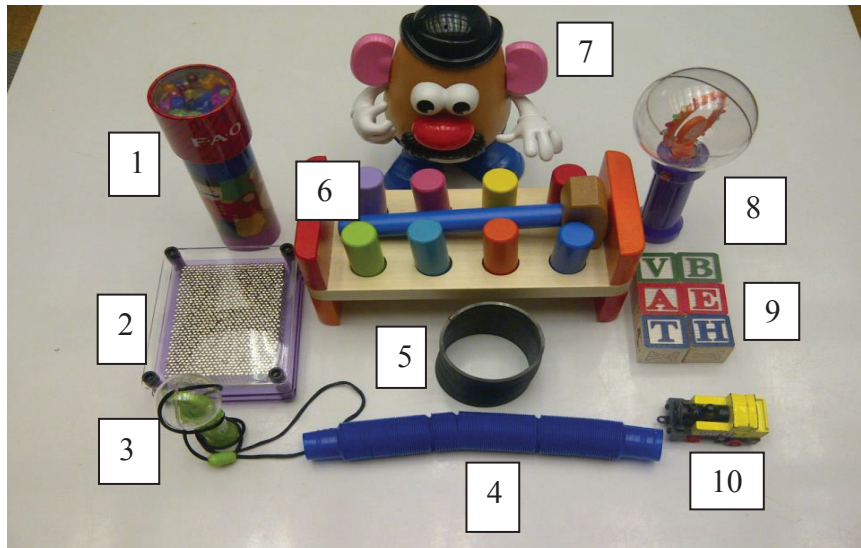


Figure 1. Stimuli used during priming phase. This figure illustrates the set of toys with which the child and the experimenter played during the priming phase. The Experimenter and the child each had their own set of identical toys.

Following the priming phase, participants were presented with two identical 9-point face scales (facial affective scale) as a measure of their emotional reaction to the mimicry; how the participants felt while interacting with the experimenter (See Appendix A), and how they thought the experimenter felt while interacting with them (See Appendix B). The scales ranged from very happy to very sad, with the happiest face representing the highest value.

During the testing phase of the study, participants were administered two tasks: a sharing task, and a delay of gratification task. The sharing task consisted of eight trials, four each of two different trial types: (1) sharing with a cost to self and (2) sharing without a cost to self. The task involved the use of two 6" x 4" blank cards and eight coloured crayons, which were used for the participant's drawings. A boundary was also used to separate the participant's drawings and present the allocation options according to who would receive the resources. The boundary was drawn on an 8.5" x 11" sheet of

paper and it was divided into a 2x3 design, with the drawings placed in the top two sections and the two allocation options presented in the two sections under each drawing. Small brown paper bags were used to hold the resources for the participant and the first experimenter until the end of the experiment. The resources being allocated in this task were rubber frogs, all of which were identical in color for each trial. Color was kept constant to eliminate any bias that might affect the participant's decision making. A response sheet was used by the second experimenter to record the participant's responses on each of the trials.

The delay of gratification task consisted of eight trials of a single trial type: receiving one reward immediately or receiving two rewards later. The delay of gratification task involved the use of a four page laminated sticker book as well as a laminated envelope of the same color and size. The sticker book was used to keep the participant's reward if s/he chose to receive it immediately during the trials, whereas the envelope was used to hold the participant's reward if s/he chose to receive it at a later time. Attractive stickers were used as the reward for this task. The design of the stickers was kept constant within each trial to eliminate any bias that might affect the participant's decision making. A response sheet was used by the second experimenter to record the participant's responses for each of the trials. A child-size table and chair set was used throughout the study. A video camera and tripod were also used throughout the study to record the sessions for which parental videotape consent had been obtained.

2.3 PROCEDURE

The study was completed in either the participant's daycare facility, or in the Early Social Development Lab at Dalhousie University, depending on where the participants were recruited. Once parental consent was obtained, the child was permitted to participate in the study. Because the design of the study was such that the experimenter (E1) could not engage in verbal communication with the participants throughout the experiment, the second experimenter (E2) described the study to the child's caregiver (daycare teacher/parent) and introduced E1 to the child before the experiment began.

Once the child agreed to play, E2 brought the child and E1 into the testing room. E2 told the participants that she had some work to finish before they could play the games, but that s/he could play with E1 while waiting. This was the beginning of the priming phase of the study, and video recording started at this point. E2 pointed to a table containing two identical sets of 10 toys, and told the child to sit at one end and play with the set of toys. The first experimenter was told to sit at the other end of the table and do the same.

During the priming phase of the study, the child's actions with the toys were monitored by the first experimenter and the experimenter's interactions with the toys depended on the condition to which the child was assigned. In the mimicry condition, E1 mimicked the child's physical behaviours with the set of toys. For example, if the child chose to play with the blocks and began stacking them on top of one another, E1 would immediately do the same, in the same manner for the same amount of time as the child. When the child switched toys and began playing with a new one, the first experimenter

would also switch toys, always choosing the same toy and playing with it in the same manner as the child.

In the contingency condition, E1 responded contingently to the child's physical behaviours with the set of toys. For example, if the child chose to play with the blocks and began stacking them on top of one another, E1 would choose to play with the globe light (which was a pre-determined match for the set of blocks) and would push the button to activate the light and motion. When the child switched toys and began playing with a new one, E1 would also switch toys, but would never choose the same toy as the child, instead choosing to play with the toy that was randomly determined to be its match.

The priming phase for each participant continued until the child played with a total of ten toys, giving E1 ten opportunities to either mimic or respond in a temporally contingent manner to the child's actions. On average, the priming phase lasted 6 minutes and 25 seconds. The range was from 2 minutes and 13 seconds to 17 minutes and 6 seconds. When the priming phase ended, E1 discretely signalled to E2 to end the play session and begin the testing phase. E2 told the child that she was ready to play the games and took the child to a different table where the testing phase of the study took place. E1 thanked the child for playing with her and then left the room for the duration of the testing phase.

Before administering the tasks, E2 presented the child with a facial affective scale and asked the child to point to which face showed how s/he felt while playing with the other person (E1). Their choice was circled on the sheet. E2 then showed the child another identical scale and asked the child to point to which face showed how s/he thought the other person (E1) was feeling while playing with her/him. Their choice was

circled on the sheet. The faces were numbered from 1-9, with 9 representing the happiest face. Each child was given the score corresponding to the face s/he chose.

The testing phase of the study consisted of two tasks, which the children performed in a counter-balanced order. For the sharing task, each child was asked to make a drawing of her/himself and the person who s/he had just played with (E1), on separate sheets of card. After both drawings were complete, E2 asked the child to verbally identify the person represented in each of the drawings. If the child was unable to identify a drawing, s/he was reminded of who the person was and was asked again until s/he could correctly identify the person in each of their drawings. The drawings were then laid out on a boundary as a reminder to the child who s/he was giving resources to during the task.

Children were told that they were going to play a choosing game. E2 told the child “In this game, sometimes you might choose frogs for yourself, and sometimes you might choose to give frogs to (E1). You can put your frogs in this paper bag (placed beside the drawing of her/himself) and you can put (E1)'s frogs in this paper bag (placed beside the drawing of E1)”.

The sharing task involved two trial types: sharing with a cost to self and sharing with no cost to self. The task involved nine trials in total: one practice trial followed by eight test trials. The test trials were counter-balanced for presentation of trial type and option order; therefore there were two conditions for this task, condition A and B. The practice trial was always performed first to ensure the child understood the task. In the practice trial, the child was asked to choose between one frog for her/himself or two frogs for her/himself. The child's response was recorded but not included in the final analysis.

During the task, the child's drawings were placed on the top row of a 2x3 boundary, and the two allocation choices were laid out in the two rows below each picture. In the “sharing with a cost to self” trials (See Figure 2), the child was asked “Would you like to choose two frogs for yourself and zero frogs for (E1), or would you like to choose one frog for yourself and one for (E1)?” The frogs the child chose for her/himself were placed in the paper bag next to the drawing of her/himself, and the frogs the child chose for E1 were placed into the paper bag next to the drawing of E1.



Figure 2. Sharing with Cost to Self. This figure illustrates the placement of the drawings and allocation choices on the boundary for the “sharing with a cost to self” trials.

In the “sharing with no cost to self” trials (See Figure 3), the child was asked “Would you like to choose one frog for yourself and zero frogs for (E1) or would you like to choose one frog for yourself and one for (E1)?”



Figure 3. Sharing with No Cost to Self. This figure illustrates the placement of the drawings and allocation choices on the boundary for the “sharing with no cost to self” trials.

Scores were calculated according to how the child decided to allocate the resources in each trial. In the sharing trials with a cost to self, s/he was given a score of “1” if s/he chose one frog for her/himself and one for E1. S/he was given a score of “0” if s/he chose two frogs for her/himself and zero for E1. In the sharing trials with no cost to self, s/he was given a score of “1” if s/he chose one frog for her/himself and one for E1. S/he was given a score of “0” if s/he chose one frog for her/himself and zero for E1. Each trial was scored following the child’s response.

For the delay of gratification task, the child was asked to choose when s/he would like to receive different amounts of rewards, either now or later. S/he was told that they were going to play a choosing game and E2 explained: “In this game, sometimes you might choose stickers for now, and sometimes you might choose stickers for later. You

can put the stickers you choose for now in your sticker book and I will put the stickers you choose for later in this envelope”.

The delay of gratification task involved one trial type, choosing between receiving one sticker now and receiving two stickers later. The task involved nine trials in total, one practice trial followed by eight test trials. The test trials were counter-balanced for the order in which the options were presented (ie: *1 now* or *2 later* vs. *2 later* or *1 now*) and the side of the boundary on which the options were displayed (ie: *1 now* on the left and *2 later* on the right vs. *1 now* on the right and *2 later* on the left); therefore there were two conditions for this task, condition A and B. The practice trial was always performed first to ensure the child understood the task. In the practice trial, the child was asked to choose between one sticker now and two stickers now. The child's response was recorded but not included in the final analysis. The child was scored according to when s/he decided to receive the stickers in each trial. S/he was given a score of “1” if s/he chose two stickers later or a score of “0” if s/he chose 1 sticker now. Scoring for this task was also done immediately following the child’s response.

After the test phase, the child was given another opportunity to play with E1. Following completion of the tasks, the child was handed two identical toys and was told to play off to the side while the second experimenter cleaned up. E1 returned to the room and was seated off to the side on one of two mats placed two feet apart. The child was timed for 60 seconds and their behaviour during this time was recorded. The child was given a score of “1” for each of the following behaviours: choosing to sit at the same mat as E1, giving one of the toys to E1, and initiating conversation with E1. The study was completed after this 60 second period.

The study lasted approximately 45 minutes and each session was recorded for verification and coding purposes, providing that parental consent to videotape was obtained. Thirty-nine out of the 40 participants received parental consent to be videotaped.

2.4 CODING OF BEHAVIORS DURING PRIMING PHASE

In order to determine whether the children in the mimicry condition realized they were being mimicked by the experimenter, the video of the priming phase for each child in the mimicry condition was coded and the participants' testing behaviors were observed. Carpenter et al. (2013) defined testing behaviours as those in which the child performs a sudden and unexpected action while looking at the experimenter to see if s/he would copy the action.

CHAPTER 3 RESULTS

3.1 PRELIMINARY ANALYSES

Preliminary data analyses revealed no significant effects of gender (all $ps' > .19$), or order of task presentation (all $ps' > .51$); therefore the data were collapsed across these factors in subsequent analyses.

3.2 MAIN ANALYSES

A series of inferential statistical tests were performed in order to determine whether there were significant differences between the mimicry and contingency conditions on the various measures assessed during the testing phase of the study. A Chi Square analysis was also performed to determine whether there was a significant difference in the number of children who performed affiliative behaviors in the mimicry and contingency conditions. Finally, a correlation analysis was performed to determine whether performance on the sharing task was related to affiliative sharing behavior during the final interaction.

3.2.1 Emotional Reaction to Priming Phase

A 2 (condition: mimicry/contingency) x 2 (facial affective scale: self/experimenter) repeated measures analysis of variance (ANOVA), with facial affective scale as the repeated measure, was conducted on the participants' ratings of the interaction in order to determine whether there were any differences in the participants' rating of the interaction between conditions or between themselves and the experimenter

(See Figure 4). No main effect of *condition* ($p > .22$) was found; there was no difference between the participants' ratings of the interaction between the mimicry ($M = 7.50$, $SD = 1.48$) and contingency conditions ($M = 7.95$, $SD = 1.15$). There was no main effect of *facial affective scale* ($p > .25$), with no difference in the participants' rating of how they felt ($M = 7.60$, $SD = 1.56$) during the interaction and how they thought the experimenter felt ($M = 7.85$, $SD = 1.10$). In addition, no *condition by facial affective scale* interaction was found ($p > .11$). As evidenced by the means, the overall ratings of the interaction by children in both conditions were high. These findings indicate that the children in the contingency condition enjoyed their interaction with the experimenter just as much as those in the mimicry condition. Likewise, children perceived the experimenter enjoying the interaction equally in both conditions.

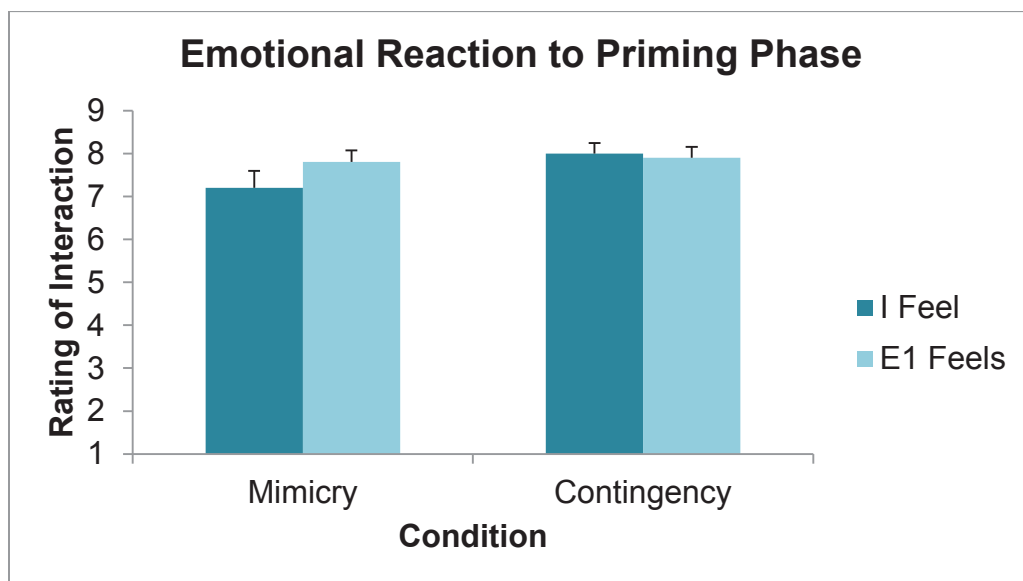


Figure 4. Emotional Reaction to Priming Phase. This figure illustrates the children's rating of their interaction with E1 on the facial affective scale. The highest value (9) corresponds to the most positive rating. Error bars represent the standard error of the mean.

3.2.2 Sharing Task

A 2 (condition: mimicry/contingency) x 2 (trial type: cost/no cost) repeated measures analysis of variance (ANOVA) was conducted for the sharing task, with trial type as the repeated measure. This was done in order to determine whether there were any differences in the level of sharing between conditions or trial types (See Figure 5). There was no main effect of *condition* ($p > .67$); those in the contingency condition ($M = 2.13$, $SD = 1.45$) engaged in pro-social sharing just as often as those in the mimicry condition ($M = 1.98$, $SD = 1.31$). However, there was a significant main effect of *trial type*, $F(1,38) = 9.30$, $p < .005$. Levels of pro-social sharing were lower for the cost trials ($M = 1.68$, $SD = 1.42$) compared to the no-cost trials ($M = 2.43$, $SD = 1.26$) for both conditions. No *condition* by *trial type* interaction was found ($p > .42$). These findings indicate that mimicry was not effective in increasing pro-social sharing. However, children were more likely to engage in pro-social sharing with the experimenter when there was no cost associated with sharing, in both the mimicry and contingency conditions.

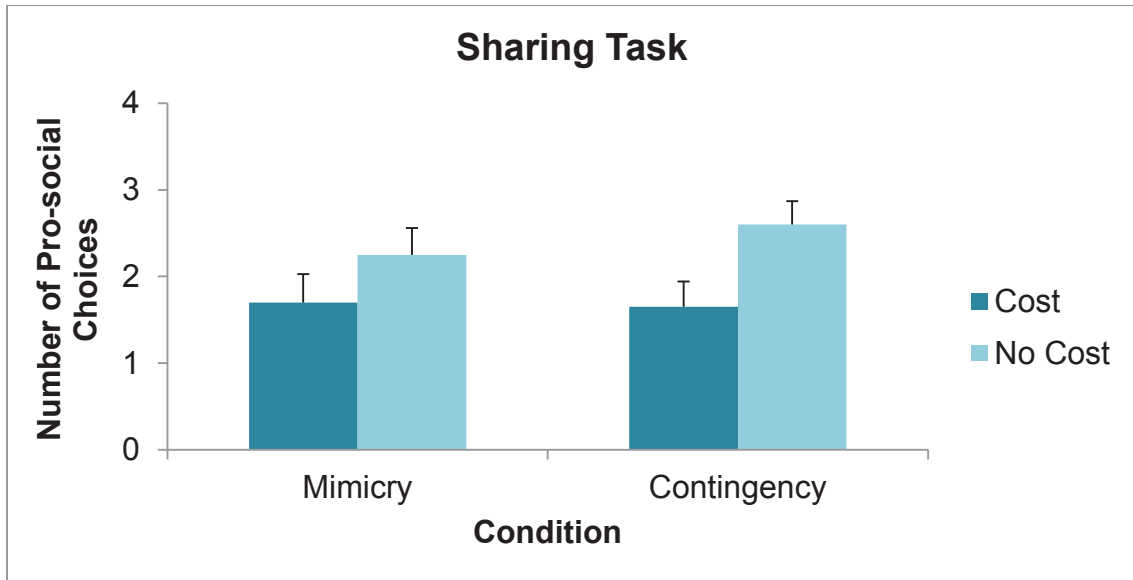


Figure 5. Sharing Task. This figure illustrates the number of pro-social choices made by the children in each condition, for each of the trial types. Error bars represent the standard error of the mean.

3.2.3 Delay of Gratification Task

For the delay of gratification task, no difference in performance was found between the two priming conditions, $t(38) = -.82, p > .42; (d = -.27)$. As expected, those in the mimicry condition ($M = 3.40, SD = 2.50$) chose to delay gratification just as often as those in the contingency condition ($M = 2.70, SD = 2.90$). This finding indicates that mimicry had no influence on the performance of the non-social task.

3.2.4 Affiliation Measurement

As a behavioral measure of affiliation, the participants' engagement in interactive behaviors during a final interaction with E1 was recorded (See Figure 6). A chi-square test was performed and no relationship was found between condition and the number of children who chose to sit next to the experimenter during the final interaction, $\chi^2(1, N =$

40) = .14, $p > .71$; In terms of physical closeness, the number of children who sat next to the experimenter during the final interaction did not differ between the mimicry and contingency conditions. A chi-square test was performed and no relationship was found between condition and the number of children who chose to share a toy with the experimenter during the final interaction, $\chi^2 (1, N = 40) = .000, p > 1.0$; In terms of sharing, no difference was found in the number of children who gave a toy to the experimenter during the final interaction between the mimicry and contingency conditions. Finally, a chi-square test was performed and no relationship was found between condition and the number of children who chose to speak to the experimenter during the final interaction, $\chi^2 (1, N = 40) = 1.76, p > .19$; In terms of verbal communication, no difference was found in the number of children who spoke to the experimenter during the final interaction between the mimicry and contingency conditions. Taken together, these findings indicate that mimicry did not result in higher levels of affiliation, as measured through the current methods, compared to the contingent interaction.

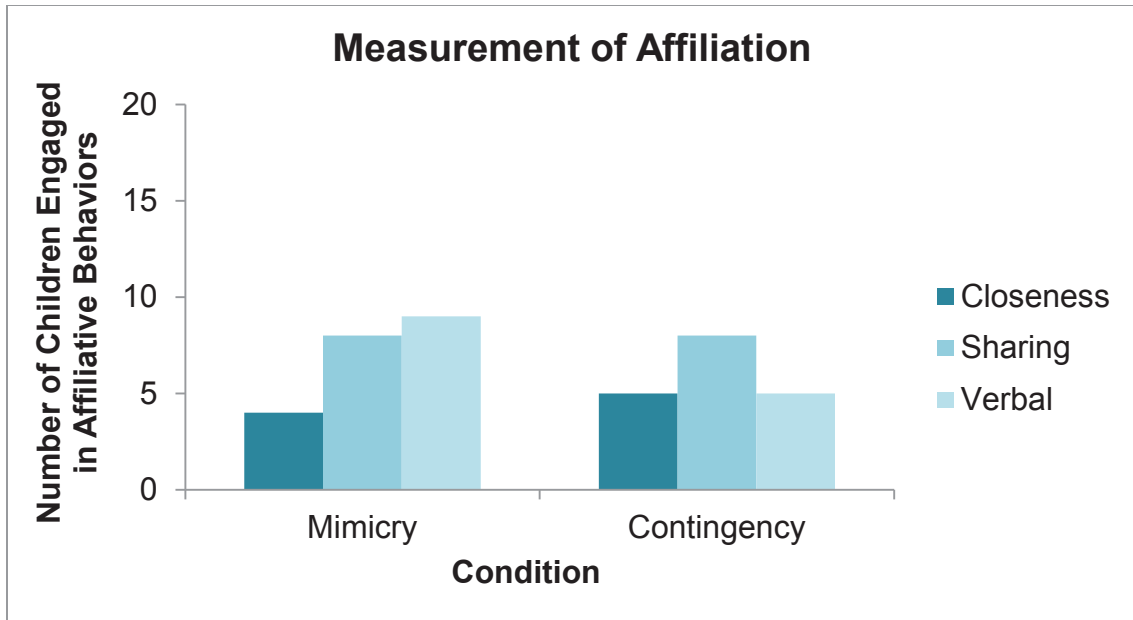


Figure 6. Measurement of Affiliation. This figure illustrates the number of children who engaged in affiliative behaviours with E1 following the testing phase.

3.2.5 Correlation Analysis

In order to determine whether sharing behavior on the sharing task was related to sharing behavior during the final interaction, a Pearson Correlation was performed on the number of pro-social choices the participants made, regardless of trial type, and whether they engaged in sharing behavior during the final interaction. The frequency of pro-social sharing during the sharing task was not correlated with the likelihood of sharing with the first experimenter during the final interaction, $r(38) = .11, p > .50$. This finding indicates that sharing frogs with the first experimenter during the sharing task was not related to sharing a toy with the first experimenter during the final interaction.

3.2.6 Behavioral Coding

As an indication of the children's awareness of the mimicry, the testing behaviors of the children in the mimicry condition were recorded. Almost all of the children in the mimicry condition recognized that they were being mimicked by the experimenter, as demonstrated by their testing behaviors during the priming phase. Fifteen of the 16 children whose videos were coded performed testing behaviors. The videos of four participants could not be coded given the camera angle at the time of recording.

The goal of the current study was to determine whether mimicry influences the pro-social behavior of four-year-olds, making them more likely to share resources with those who mimic their behavior. Stemming from the main purpose, the study was designed to address whether mimicry influences behavior in a general sense at the pre-school age or if pro-social behavior is impacted exclusively. Furthermore, the study was also designed to examine whether mimicry creates feelings of affiliation for the mimicker, resulting in the increased likelihood of future interaction between the child and their interaction partner.

4.1 SHARING TASK

In the current study, there was no evidence found to support the hypothesis that preschool children who were mimicked would engage in more pro-social sharing behavior than those who were not mimicked. The amount of sharing behavior found in the mimicry condition of the current study was equal to that of the contingency condition, indicating that mimicry did not result in higher levels of pro-social sharing behavior. Differences were found in the level of sharing behavior between the different trial types of the sharing task, however. It was found that children in both conditions shared more with the experimenter during the no cost trials when there was no cost associated with their sharing behavior, compared to the cost trials in which they had to make a sacrifice in order to share pro-socially. This finding is not unique to this study, however, as it has been found in previous studies with children of this age (Williams & Moore, 2013).

The current findings are not consistent with the previous literature suggesting that mimicry influences the pro-social behavior of young children (Carpenter et al., 2013). In their study, Carpenter et al. found that the 18-month-olds who were mimicked were more likely to help the experimenter than those who did not have their actions copied. As in the study by Carpenter et al. (2013), the experimenter overtly copied the physical behaviors of the children in the mimicry condition, and responded in a friendly, contingent manner to the actions of the children in the non-mimicry/contingency condition. However, one important difference between the studies that could explain the discrepancy in the findings is the lack of verbal interaction with the children during the priming phase of the current study. Carpenter et al., (2013) had the experimenter engage in verbal communication with the children during the play phase of their study, whereas verbal communication was purposefully removed from both conditions of the current study in order to maintain that the presence or absence of mimicry was the only difference between the conditions. As such, the lack of verbal interaction may be the reason the mimicry failed to result in higher levels of pro-social sharing.

4.2 DELAY OF GRATIFICATION TASK

As expected, there was no difference between the conditions with regard to performance on the delay of gratification task. Children in both conditions chose to delay gratification roughly half of the time, which has been previously demonstrated in children of this age (Garon, Longard, Bryson & Moore, 2012).

4.3 AFFILIATION MEASUREMENT

The current study was unable to provide support for the hypothesis that mimicry would be associated with more feelings of affiliation in children towards their interaction partner, at least as measured by the methods of the current study. It was expected that mimicry would result in more feelings of affiliation towards the experimenter, above and beyond that of a positive interaction, making the children want to engage with her during subsequent interactions. However, this was not the case. During the final interaction with the experimenter, children in both conditions were equally likely to sit with the experimenter, share one of the toys with her, and initiate conversation.

Again, these results are not consistent with findings in the literature. It has previously been demonstrated that, following an interaction in which their physical behaviors are mimicked, adults report liking their interaction partner more than those who did not have their behaviors mimicked (Chartrand & Bargh, 1999). In addition, mimicry has been found to increase perceptions of affiliation (Lakin & Chartrand, 2003) and interpersonal closeness and decrease the physical proximity to others (Ashton-James et al., 2007).

Taken together, mimicry has been shown to create feelings of affiliation for one's interaction partner in adults; however the current study was unable to replicate this effect in preschoolers using the methods of the current study. Moreover, the number of children to perform these affiliative behaviors was low in both conditions; less than half of the children in both conditions engaged in any one of these behaviors suggesting that, despite the friendly manner in which the experimenter interacted with the children during the priming phase, children in both conditions did not experience feelings of affiliation for

the experimenter, resulting in the low percentage of children seeking subsequent interaction overall.

As mentioned previously, it is possible that the lack of verbal communication between the experimenter and the children during the priming phase is also responsible for the low number of affiliative behaviors engaged in by children in both conditions. If the children perceived the interaction with the experimenter to be strange, due to the missing verbal component, it is unlikely that they would want to engage in subsequent interactions with the experimenter, therefore leading to the low measure of affiliation by children in both conditions.

4.4 EMOTIONAL REACTION TO PRIMING PHASE

The current findings suggest that the priming phase involving contingent interaction was just as enjoyable for the children as mimicry. Children in both conditions reported feeling happy during their interaction with the experimenter suggesting that children in both conditions had a positive experience.

4.5 COMPARISON OF RESULTS TO BASELINE MEASURE

No differences were found in the level of pro-social sharing between the mimicry and contingency conditions, although the level of sharing found in both conditions was lower than what might have been expected. The level of sharing behavior within each condition was compared to a previous assessment of sharing within this age group, using the same sharing task. Williams and Moore (2013) presented 4.5 year-old children with a sharing task in which they were asked to make decisions about sharing stickers with a

friend. A 3 (condition: mimicry/contingency/baseline) x 2 (trial type: cost/ no cost) repeated measures ANOVA, with trial type as the repeated measure, was conducted on the sharing task to see if the results of the current study differed from those of Williams and Moore (2013; see Figure 7). Interestingly, the overall pattern of results was the same in both studies, ie: sharing was higher for the no cost trials compared to the cost trials; however the level of sharing for both trial types of the current study was significantly lower as indicated by a significant main effect of *condition*, $F(2, 60) = 4.55, p < .014$. Pairwise comparisons (Bonferroni corrected) revealed a significant difference between the *baseline* condition of the Williams and Moore study ($M = 2.89, SD = 1.25$) and both the *mimicry* ($M = 1.98, SD = 1.30$) and *contingency* ($M = 2.13, SD = 1.39$) conditions of the current study, which did not differ. A main effect of *trial type*, $F(1, 60) = 17.18, p < .001$, was evident in both studies as indicated by a significant difference between the two trial types (pairwise comparisons, Bonferroni corrected); children showed a higher level of sharing in the no cost trials ($M = 2.73, SD = 1.15$) compared to the cost trials ($M = 1.93, SD = 1.47$). No *condition x trial type* interaction was found ($p > .67$).

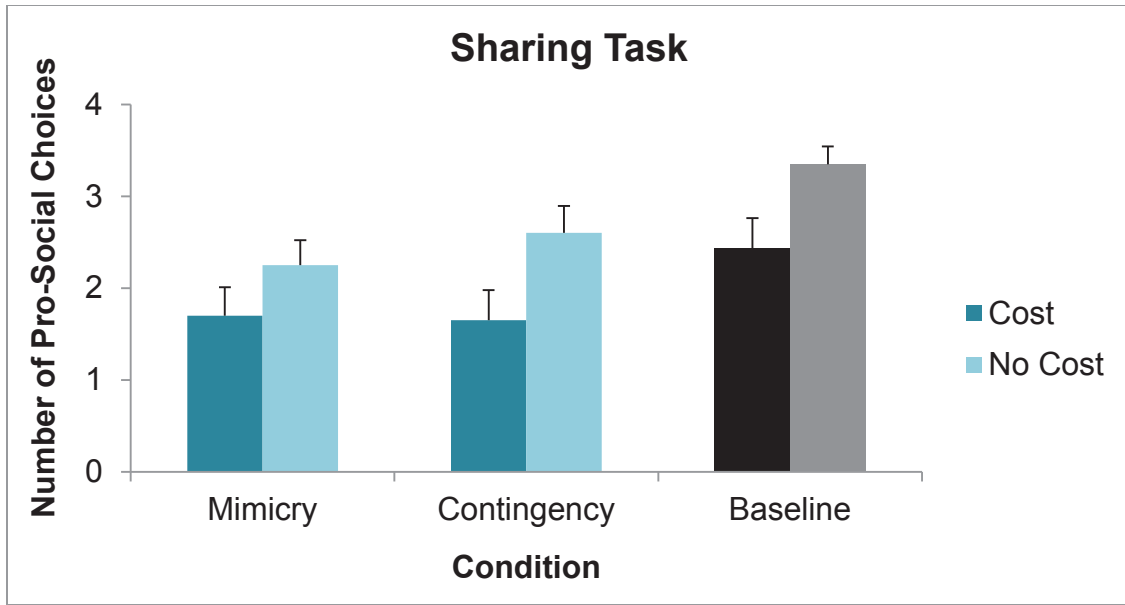


Figure 7. Baseline Levels of Sharing Behavior. This figure illustrates the number of pro-social choices made by the children in each condition, compared to the baseline level of sharing found in Williams and Moore (2013). Error bars represent the standard error of the mean.

These findings may also be explained by the lack of verbal communication between the experimenter and the children during their interaction. It is possible that the unusual nature of the interaction in both conditions contributed to the low levels of pro-social sharing found in the current study. To examine the possibility that the lack of verbal communication was responsible for the unpredicted findings of the current study, a second study was conducted.

CHAPTER 5

EXPERIMENT 2

Social interaction often occurs in a face-to-face context between a minimum of two individuals. Aside from the nonverbal communication that is often exchanged, including facial expressions and physical contact, this type of interaction usually involves a verbal component. It is therefore not surprising that experience with such interactions would lead us to expect verbal communication from all of our interaction partners. In both conditions of the current study however, the experimenter did not engage in verbal communication with the children during their interaction. If the child spoke to the experimenter, the experimenter acknowledged the child by looking at them and smiling, but did not provide a verbal response. Therefore, it is possible that the children did not perceive their experience during the priming phase to be a typical social interaction.

In line with this notion, Chartrand & Bargh (1999) have argued that the positive effects that have been observed following an interaction involving mimicry may not occur in a situation involving two strangers who are not interacting. For example, La France and Ickes (as cited in Chartrand & Bargh, 1999) have found mimicry and rapport to be negatively correlated in situations where the interaction partners were unacquainted and not involved in an ongoing interaction. While the experimenter in the current study was sitting with the children and was playing with the same toys, it may not qualify as a typical social interaction without the verbal component, especially for young children who are accustomed to verbal communication during social interaction. Therefore, it may be that the missing verbal component during the interaction was the reason for low levels of pro-social sharing found in both conditions. The previous studies examining the effects of mimicry on pro-social behavior have all included a verbal component, ensuring as

typical an interaction as possible between the participants and the experimenter. In fact, in the case of van Baaren et al. (2003), it was the mimicry of the verbal behavior of the participants that appeared to result in the increase in generosity that was found.

The purpose of the second experiment, therefore, was to examine whether verbal communication plays a role in pro-social sharing. In order to address this research question, two new conditions were designed: a *verbal communication* condition and a *no interaction* (control) condition. The verbal communication condition was designed to allow the experimenter to engage in communication with the children during the priming phase of the study. In contrast, the no interaction condition was designed as a control condition; there was no verbal communication involved.

These two conditions were different from the mimicry and contingency conditions of the first experiment, as the experimenter did not have a set of toys to play with. During the priming phase, instead of either copying the actions of the children or playing contingently, the experimenter either commented on the toys as the children played, or did not. Following the priming phase, the participants were assessed on their pro-social behavior as well as their feelings of affiliation toward the experimenter in order to examine the effects of verbal communication on the measures of both pro-social sharing and affiliation among partners in an interaction. Participants were also assessed on their non-social behavior in order to determine whether the effects of verbal communication influence pro-social behavior solely or behavior in general. It was expected that the participants in the verbal communication condition would engage in more pro-social sharing behavior, and be more likely to sit close to, share one of their toys with, and

initiate conversation with the experimenter during their final interaction. No condition differences were expected for the non-social task.

6.1 PARTICIPANTS

Forty 4-year-old children ($M = 4$ years; 4 months, range = 4;0-5;0; 20 girls) were included in the final sample ($n = 20$ in each condition). An additional 2 children (2 boys) were excluded from analyses due to failure to complete all tasks ($n = 1$) and interruption of the procedure ($n = 1$). Participants were of mixed socioeconomic status and the majority (93%) were Caucasian. Participants were recruited through the Early Social Development Lab at Dalhousie University. Parents were contacted by phone and were asked to sign a consent form prior to their child's participation. Each child was given a certificate for participation and a small toy as a gift. The study was approved by the local research ethics board.

6.2 MATERIALS

The materials used in Experiment 2 were identical to those used in Experiment 1, with the following exception: the second set of 10 toys used by the experimenter during the priming phase of Experiment 1 was replaced by a hard cover book in the non-interactive condition of Experiment 2. The experimenter had neither the toys nor the book in the communication condition.

6.3 PROCEDURE

Participants were recruited using a participant database of local families and these children were tested in the Early Social Development Lab at Dalhousie University. Once

parental consent was obtained, the child was permitted to participate in the study. The second experimenter (E2) described the study to the child's caregiver and introduced E1 to the child before the experiment began.

The procedure of Experiment 2 was identical to that of Experiment 1, with the following exceptions. During the priming phase of the study, the child's actions with the toys were monitored by the first experimenter, who interacted with the child depending on the condition to which the child was assigned. In the communication condition, E1 responded verbally to the child, commenting on the toy each time the child made a switch and engaging in verbal communication if initiated by the child. E1 followed a pre-determined list of responses when commenting on the child's toy to ensure that each child received as similar an experience as possible. The following 5 phrases were spoken by the experimenter in order. The order was repeated until all 10 toys were commented on: (1) "That's awesome!", (2) "Look at that!", (3) "Oh wow!", (4) "That is so cool!", (5) "That's a fun toy!". When the child initiated conversation, E1 responded affirmatively, conversing without providing additional information to the child, in order to ensure that each child had a similar communicative experience with E1.

In the non-interactive condition, E1 read a book while the child played with the set of toys; E1 did not engage with the child in any way, neither verbally nor behaviorally. The priming phase for each participant continued until the child played with a total of ten toys, giving E1 an equal opportunity to be seen as a communication partner or not.

CHAPTER 7 RESULTS

7.1 PRELIMINARY ANALYSES

Preliminary data analysis revealed no significant effect of task presentation ($p > .80$) therefore the data were collapsed across this factor in subsequent analyses. A significant main effect of gender was found ($\chi^2 (1, N = 40) = 4.29, p < .04$), but only for the affiliation measure; more males spoke to E1 during the final interaction than females.

7.2 MAIN ANALYSES

A series of inferential statistical tests were performed in order to determine whether there were significant differences between the communication and no interaction conditions on the various measures assessed during the testing phase of the study. A Chi Square analysis was also performed to determine whether there was a significant difference in the number children who performed affiliative behaviors in the communication and no interaction conditions. Finally, a correlation analysis was performed to determine whether performance on the sharing task was related to affiliative sharing behavior during the final interaction.

7.2.1 Emotional Reaction to Priming Phase

A 2 (condition: communication/no interaction) x 2 (facial affective scale: self/experimenter) repeated measures analysis of variance (ANOVA), with facial affective scale as the repeated measure, was conducted on the participants' ratings of the interaction in order to determine whether there were any differences in the participants'

rating of the interaction between conditions or between themselves and the experimenter (See Figure 8). No main effect of *condition* ($p > .15$) was found as there was no difference between the participants' ratings of the interaction between the communication ($M = 8.05$, $SD = 1.45$) and no interaction conditions ($M = 7.53$, $SD = 1.38$). In addition, there was no main effect of *facial affective scale* ($p > .28$); there was no difference in the participants' rating of how they felt ($M = 7.93$, $SD = 1.29$) during the interaction and how they thought the experimenter felt ($M = 7.65$, $SD = 1.56$). No *condition* by *facial affective scale* interaction was found ($p > .62$). As in Experiment 1, the overall ratings of the interaction by children in both conditions were high. These findings indicate that the children in the no interaction condition enjoyed their interaction with the experimenter just as much as those in the communication condition. Likewise, children perceived the experimenter enjoying the interaction equally in both conditions.

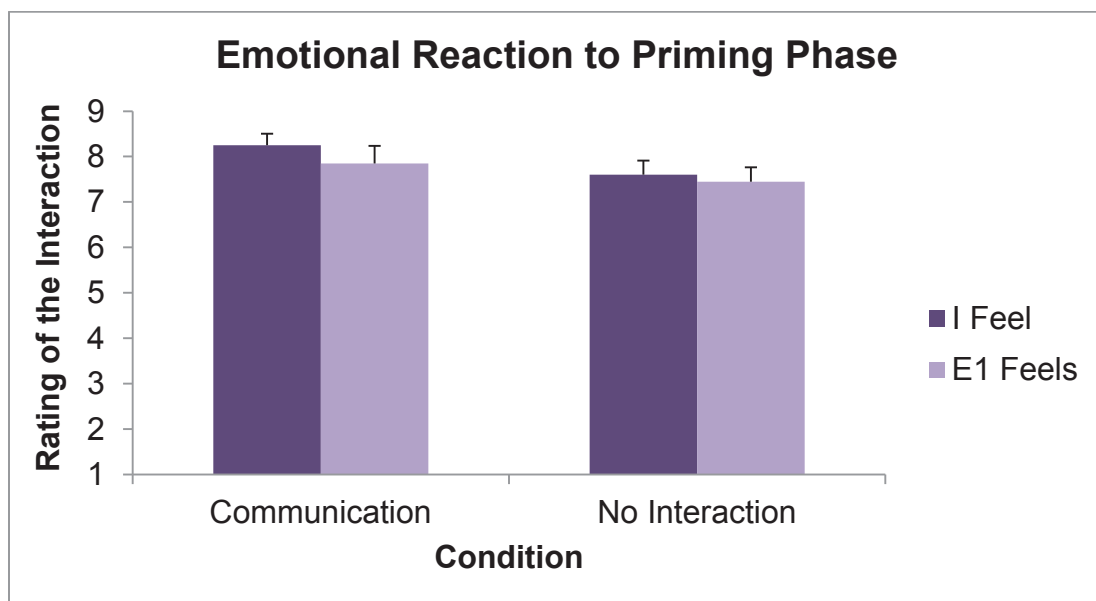


Figure 8. Emotional Reaction to Priming Phase. This figure illustrates the children's rating of their interaction with E1 on the facial affective scale. The highest value

corresponds to the most positive rating. Error bars represent the standard error of the mean.

7.2.2 Sharing Task

A 2 (*condition*: communication/no interaction) x 2 (*trial type*: cost/no cost) repeated measures analysis of variance (ANOVA) was conducted for the sharing task, with trial type as the repeated measure. This was done in order to determine whether there were any differences in scores between conditions (communication; no interaction) or trial types (cost; no cost; See Figure 9). No main effect of *condition* was found ($p > .25$); those in the no interaction ($M = 2.38, SD = 1.37$) condition engaged in as much pro-social sharing as those in the communication condition ($M = 1.98, SD = 1.49$). Analysis revealed a significant main effect of *trial type*, $F(1,38) = 41.04, p < .001$. Levels of pro-social sharing were found to be lower for the cost trials ($M = 1.50, SD = 1.34$) compared to the no-cost trials ($M = 2.85, SD = 1.20$) for both conditions. No *condition* by *trial type* interaction was found ($p > .34$). These findings indicate that communication did not result in more pro-social sharing. However, children were more likely to engage in pro-social sharing with the experimenter when there was no cost associated with sharing, in both the communication and no interaction conditions, compared to when there was a cost to sharing.

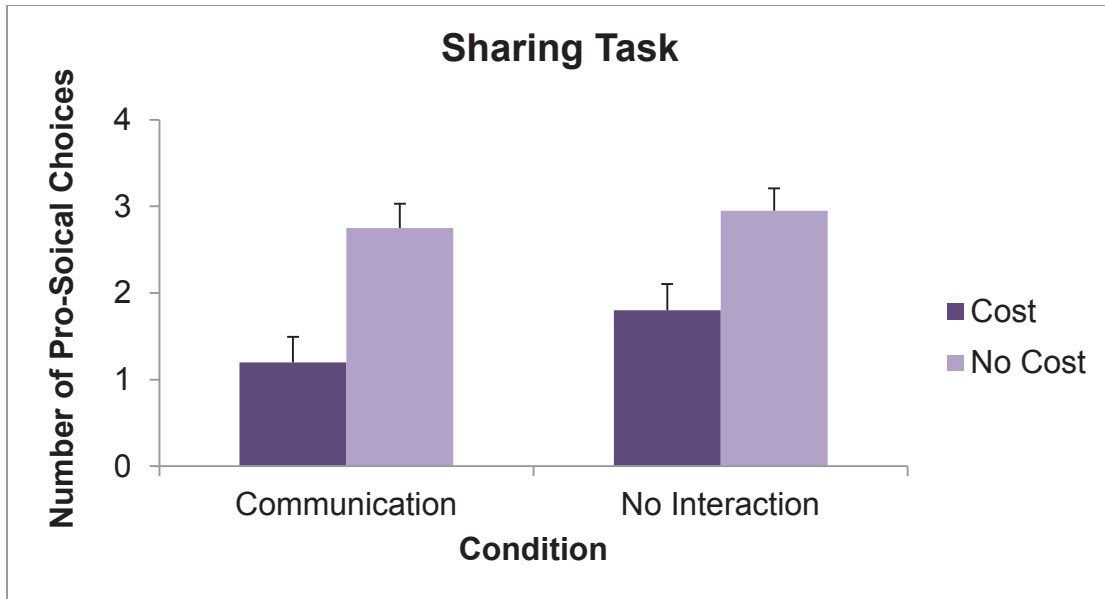


Figure 9. Sharing Task. This figure illustrates the number of pro-social choices made by the children in each condition, for each of the trial types. Error bars represent the standard error of the mean.

7.2.3 Delay of Gratification Task

For the delay of gratification task, no difference in performance was found between the two priming conditions, $t(38) = -.16, p > .87; (d = -.05)$. As expected, those in the communication condition ($M = 3.15, SD = 2.91$) chose to delay gratification just as often as those in the no interaction condition ($M = 3.00, SD = 2.87$). This finding indicates that verbal communication had no influence on the performance of the non-social task.

7.2.4 Affiliation Measurement

As a behavioral measure of affiliation, the participants' engagement in interactive behaviors during a final interaction with E1 was recorded (See Figure 10). A Chi-Square test was performed and no relation was found between condition and the number of children who chose to sit next to the experimenter during the final interaction, $\chi^2(1, N =$

40) = .13, $p > .72$. In terms of physical closeness, the number of children who sat next to the experimenter during the final interaction did not differ between the communication and no interaction conditions. Similarly, no relation was found between the communication and no interaction conditions and the number of children who chose to share a toy with the experimenter during the final interaction, $\chi^2 (1, N = 40) = 3.14, p > .08$. Finally, a relation was found between condition and the number of children who chose to speak to the experimenter during the final interaction, $\chi^2 (1, N = 40) = 4.29, p < .04$; in terms of verbal communication, those in the communication condition spoke to the experimenter more than those in the no communication condition. Taken together, these findings indicate that verbal communication resulted in higher levels of affiliation, at least with respect to verbal engagement.

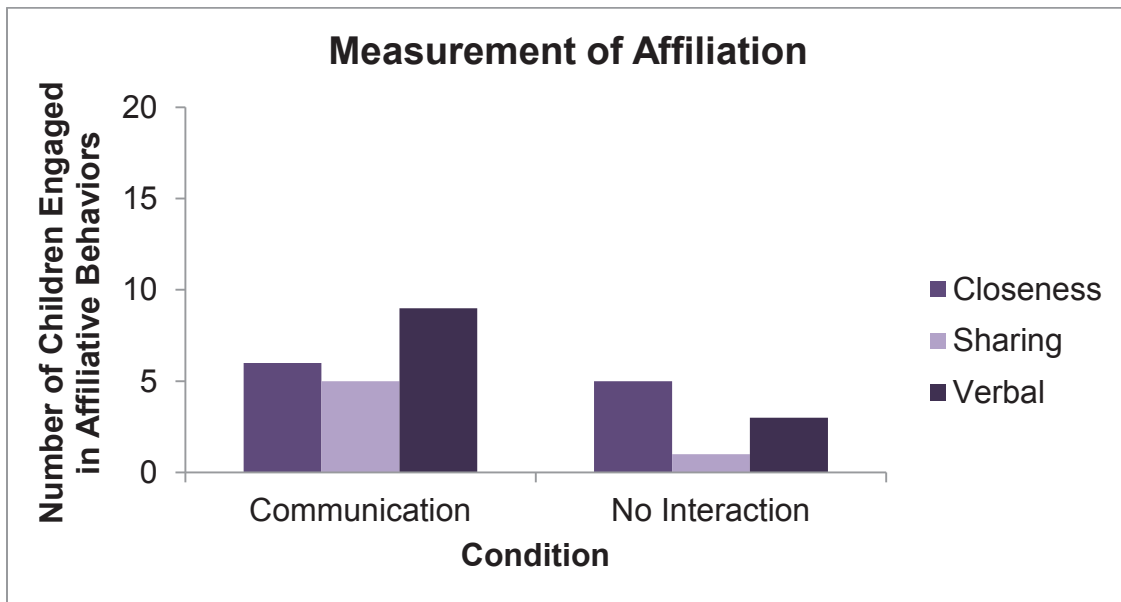


Figure 10. Measurement of Affiliation. This figure illustrates the number of children who engaged in affiliative behaviours with E1 following the testing phase.

7.2.5 Correlation Analysis

As in experiment 1, in order to determine whether sharing behavior on the sharing task was related to sharing behavior during the final interaction, a Pearson Correlation was performed on the number of pro-social choices the participants made, regardless of trial type, and whether they engaged in sharing behavior during the final interaction. Again, no significant correlation was found between the frequency of pro-social sharing choices made by the children and whether the children later engaged in sharing behavior with the first experimenter, $r(38) = -.29, p > .07$. As with Experiment 1, these findings indicate that there was no relationship between the performance on the sharing task and sharing behavior during the final interaction.

CHAPTER 8 DISCUSSION

The goal of Experiment 2 was to determine whether the lack of verbal communication during the social interaction between the experimenter and the children was responsible for the lower than expected levels of pro-social sharing found in Experiment 1. The study was designed to address whether verbal communication plays a role in sharing, making the children more likely to engage in pro-social sharing with the experimenter following their interaction.

8.1 SHARING TASK

In the current study, there was no evidence to support the hypothesis that children who experienced verbal communication would engage in more pro-social sharing behavior than those who did not. Results showed no difference between the amount of sharing demonstrated by children in the communication condition and those in the no interaction condition. Differences were found in the level of sharing between the different trial types of the sharing task, however. It was found that children in both conditions shared more with the experimenter during the no cost trials when there was no cost associated with their sharing behavior, compared to the cost trials in which they had to make a sacrifice in order to share pro-socially. This finding replicates the results of Experiment 1, as well as previous studies with children of this age (Williams & Moore, 2013).

In order to determine whether the lack of verbal communication was responsible for the low levels of pro-social sharing found in conditions of Experiment 1, the results of

the sharing task for Experiment 2 were compared to the levels of pro-social sharing found in Experiment 1. A 4 (*condition*: mimicry/contingency/communication/no interaction) x 2 (*trial type*: cost/ no cost) repeated measures ANOVA was conducted for the sharing task, with trial type as the repeated measure. This was done in order to determine whether there were any differences in the level of sharing between the conditions or trial types of Experiment 1 and Experiment 2 (See Figure 11). There was no main effect of *condition* ($p > .62$), however there was a main effect of *trial type*, $F(1, 76) = 42.05, p < .001$. Pairwise comparisons (Bonferroni corrected) revealed a significant difference between the two trial types, with a higher level of sharing in the no cost ($M = 2.64, SD = 1.23$) compared to the cost trials ($M = 1.59, SD = 1.38$). No *condition* x *trial type* interaction was found ($p > .18$).

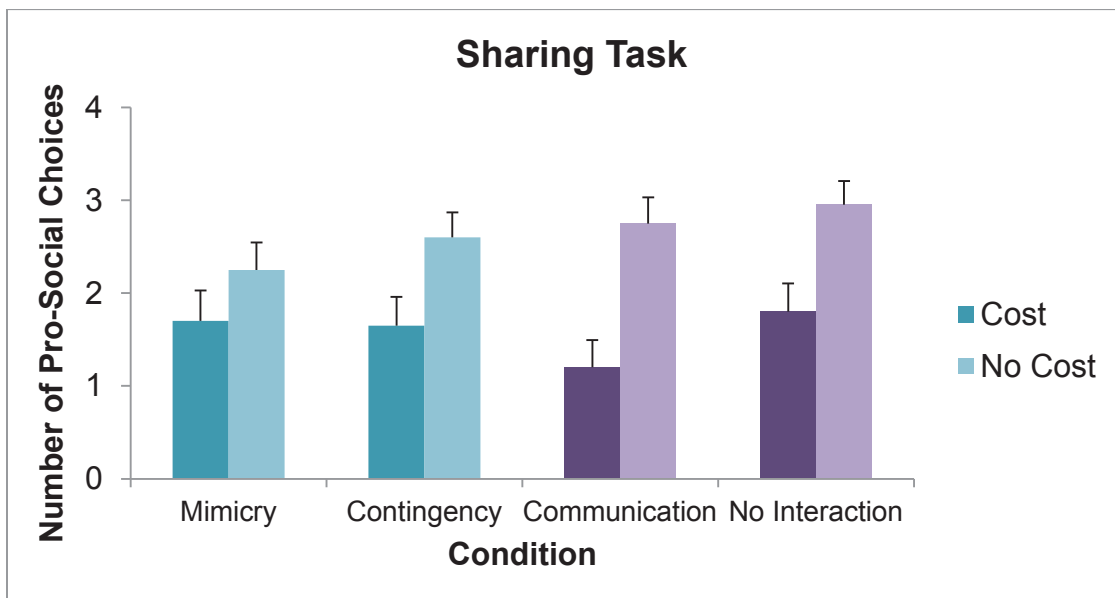


Figure 11. Sharing Task. This figure illustrates the number of pro-social choices made by the children in each condition, for each of the trial types. Results of Experiment 1 are shown in blue and the results of Experiment 2 are shown in purple. Error bars represent the standard error of the mean.

The overall pattern of results for the conditions in Experiment 2 was similar to that of Experiment 1, with no differences in the level of sharing between the communication condition and the conditions of Experiment 1, for either trial type. These findings indicate that verbal communication did not influence the level of pro-social sharing behavior as predicted, suggesting that another factor may be responsible for the findings of Experiment 1.

8.2 DELAY OF GRATIFICATION TASK

As in Experiment 1, there was no difference between the conditions with regard to performance on the delay of gratification task. Children in both conditions chose to delay gratification roughly half of the time, which has been previously demonstrated in children of this age (Garon, Longard, Bryson & Moore, 2012). This finding suggests that delay of gratification is not influenced by verbal communication within social interaction, which was expected given the non-social nature of the task.

8.3 AFFILIATION MEASUREMENT

The current study found evidence that children in the communication condition had greater feelings of affiliation for their interaction partner compared to those in the no interaction condition. It was expected that communication would result in more feelings of affiliation towards the experimenter, above and beyond that of a positive interaction, making the children want to engage with her during subsequent interactions. During the final interaction with the experimenter, children in the communication condition were equally likely to sit next to the experimenter, and share one of the toys with her.

However, the children in the communication condition initiated conversation with the experimenter more than those in the no interaction condition, indicating that the children in the communication condition were more likely to engage in subsequent interaction with the experimenter. As in Experiment 1 however, the number of children who engaged in any one of the affiliative behaviors with the experimenter was low in both conditions (See Table 1), suggesting that, the initiation of conversation during the final interaction may not represent a strong affiliation with the experimenter.

Table 1.

Number of Children Engaged in Affiliative Behaviors: Experiments 1 & 2

<u>Condition</u>	<u>Zero Behaviors</u>	<u>One Behavior</u>	<u>Two Behaviors</u>	<u>Three Behaviors</u>
Mimicry	7	7	5	1
Contingency	7	9	3	1
Communication	11	2	3	4
<u>No Interaction</u>	<u>14</u>	<u>4</u>	<u>1</u>	<u>1</u>

8.4 EMOTIONAL REACTION TO PRIMING PHASE

The current findings suggest that the priming phase involving no interaction was just as enjoyable for the children as the interaction involving verbal communication. Children in both conditions reported feeling happy during their interaction with the experimenter suggesting that children in both conditions had a positive experience. This is interesting given the lack of interaction between the experimenter and the children during the priming phase of the no interaction condition. Given this finding, it is

questionable whether the children's ratings on the facial affective scale provided an accurate measurement of their feelings regarding the interaction. This will be discussed further in the limitations section.

8.5 COMPARISON OF RESULTS TO BASELINE MEASURE

The results of the sharing task for Experiment 2 were also compared to the levels of pro-social sharing found in the Williams and Moore study (2013) to determine whether there were any differences in the level of sharing between the conditions of Experiment 2 and the previous findings. A 3 (*condition*: communication/no interaction/baseline) x 2 (*trial type*: cost/ no cost) repeated measures ANOVA was conducted, with trial type as the repeated measure (See Figure 11). As in Experiment 1, the overall pattern of results was the same as that found in the Williams and Moore (2013) study, ie: sharing was higher for the no cost trials compared to the cost trials; however the level of sharing for both trial types of the Experiment 2 was significantly lower as indicated by significant main effect of *condition*, $F(2, 60) = 3.97, p < .024$. Pairwise comparisons (Bonferroni corrected) revealed a significant difference between the *baseline* condition ($M = 2.89, SD = 1.25$) and the *communication condition* ($M = 1.98, SD = 1.29$). No difference was found between the *baseline* ($M = 2.89, SD = 1.25$) and *no interaction* conditions ($M = 2.38, SD = 1.26$). There was also a main effect of *trial type*, $F(1, 60) = 46.53, p < .001$. Pairwise comparisons (Bonferroni corrected) revealed a significant difference between the two trial types, with a higher level of sharing in the no cost trials ($M = 2.73, SD = 1.15$) compared to the cost trials ($M = 1.93, SD = 1.47$). No *condition* x *trial type* interaction was found ($p > .33$).

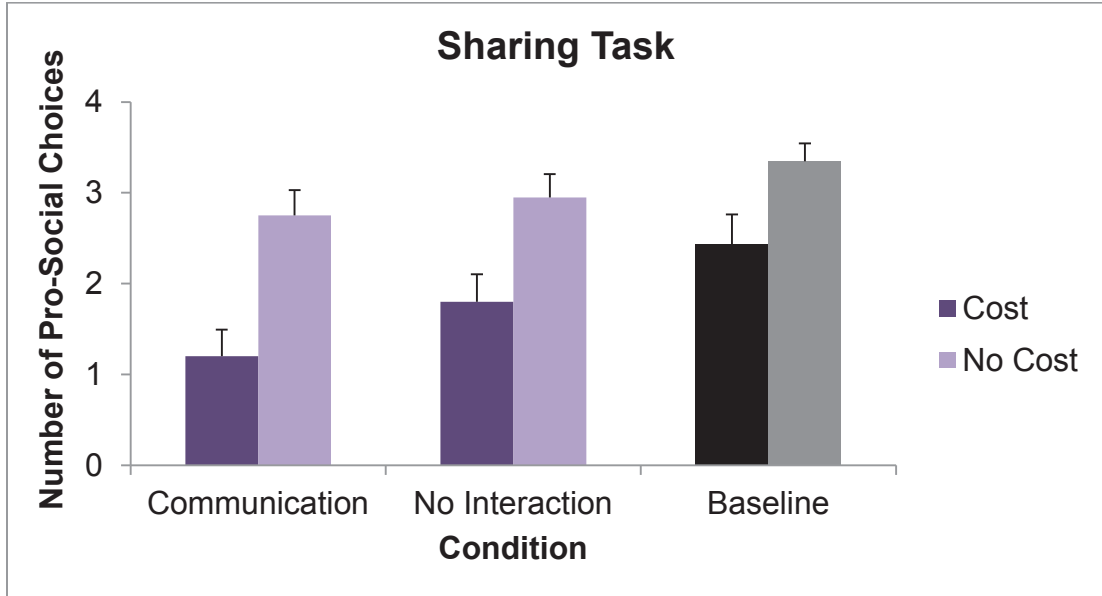


Figure 12. Sharing Task. This figure illustrates the number of pro-social choices made by the children in each condition, compared to the baseline level of sharing found in Williams and Moore (2013). Error bars represent the standard error of the mean.

In comparison to the findings of Williams and Moore (2013), the level of pro-social sharing by children in the communication condition of Experiment 2 was significantly lower. Interestingly, however, the level of sharing by children in the no interaction condition was comparable to the baseline measure, suggesting that verbal communication may have decreased the level of pro-social sharing by children in the communication condition. Given this counter-intuitive finding, the results of Experiment 2 were unable to provide support for the hypothesis that a lack of verbal communication was responsible for the low levels of pro-social sharing found in Experiment 1. It is possible that other factors may be responsible for these findings.

The purpose of Experiment 1 was to examine the effects of mimicry on the pro-social behaviour of young children. More specifically, Experiment 1 was designed to determine whether mimicry increases pro-social sharing in four-year-old children, above that of a contingent interaction. Stemming from the main research question, the study was also designed to investigate whether the effects of mimicry are exclusively social in nature and whether mimicry leads to more feelings of affiliation between the partners in an interaction.

The results of Experiment 1 did not support the hypothesis that children in the mimicry condition would engage in more pro-social sharing with the experimenter than children in the contingency condition. Likewise, no differences were found between conditions with regard to the number of affiliative behaviors the children engaged in during their final interaction with the experimenter. Finally, there were no differences between conditions in terms of the children's performance on the non-social task, as expected.

Given the unexpectedly low levels of sharing in both the mimicry and contingency conditions, it was speculated that the children in both conditions may have found their interaction with the experimenter to be unusual, as there was no verbal communication throughout the priming phase. In order to examine whether the lack of communication was responsible for the low levels of sharing found in Experiment 1, a second experiment was conducted. The purpose of Experiment 2 was to examine whether verbal communication influences pro-social sharing behavior. This time, instead of

having the experimenter either mimic the children's behavior or interact in a contingent manner, the experimenter either engaged in verbal communication with the children, or did not.

The findings of Experiment 2 did not support the hypothesis that children in the verbal communication condition would engage in more pro-social sharing behavior than those in the no interaction condition, and therefore could not explain the low levels of pro-social sharing found in Experiment 1. Interestingly, however, children in the communication condition were more likely than those in the no interaction condition to initiate conversation with the experimenter during their final interaction, but given the low number of behaviors the children engaged in overall, it is difficult to conclude whether the children felt affiliated with the experimenter or not. Finally, there were no differences between conditions in terms of the children's performance on the non-social task, as expected.

Based on the findings of Experiment 2, several additional accounts should be considered for explaining the low level of pro-social sharing behavior in Experiment 1. One explanation for the findings may relate to the fact that the type of mimicry used in the current study was more overt than the much more subtle form of mimicry used in previous studies with adult populations. A second explanation for the current findings may relate to the fact that contingency within social interaction has also been found to produce positive effects between interaction partners. A final explanation may stem from the fact that the experimenter, who was the recipient of the shared resources during the sharing task, was a stranger to the children during the priming phase of the study. Each account will be addressed separately in the following sections.

9.1 TYPE OF MIMICRY

It has been argued that in order for mimicry to have its desired positive, pro-social effects, it must go unnoticed by the interaction partner (Ashton-James et al., 2007). Furthermore, Lakin & Chartrand (2003) argued that if one partner becomes aware that they are being mimicked, liking for the mimicker may not increase as a result of the interaction. In the current study, the experimenter copied the exact behaviors of the children in the mimicry condition in an overt manner. As a result, almost every child in the mimicry condition recognized that their actions were being mimicked, as demonstrated by their testing behaviors. It is therefore possible that the conscious awareness of the mimicry by the children thwarted the positive effects predicted as a result of the interaction in the mimicry condition, eliminating the higher level of both sharing behavior and feelings of affiliation that was expected; in other words, the overt nature of the mimicry may have been responsible for the similar results between conditions in terms of both pro-social sharing and measures of affiliation.

It should be noted, however, that in a previous study of 18-month-olds, Carpenter and colleagues (2013) found that positive, pro-social effects were seen following an interaction where the infants were aware they were being mimicked. Interestingly, the authors suggested some of the children may have had an unpleasant experience with the mimicry and therefore speculate that their findings only apply to those children who enjoyed the experience. These findings by Carpenter et al. (2013) suggest that, at least for infants, conscious mimicry results in the same pro-social behaviors that have been found to occur following unconscious and automatic mimicry with adults. In contrast to the argument that mimicry needs to go unnoticed in order to produce its effects (Lakin &

Chartrand, 2003; Ashton-James et al., 2007), the findings of Carpenter and colleagues (2013) have demonstrated that conscious mimicry may also result in pro-social benefits for the mimicker, above and beyond that of a friendly interaction.

Interestingly, in the current study, the majority of the participants recognized the experimenter's behavior and were therefore aware of the mimicry. However, despite the findings of Carpenter et al. (2013) suggesting overt mimicry also results in pro-social effects, the level of sharing behavior was no higher in the mimicry condition than what was found in the contingency condition. Therefore, perhaps it was not the mere recognition of the mimicry, but the children's perception of the interaction that resulted in the equal level of sharing in both conditions; in other words, perhaps the children found it strange to have their actions copied by the experimenter, despite their high ratings of the interaction.

There may also be developmental effects when it comes to the perception of mimicry. It is possible that 18-month-olds and 4-year-olds feel differently about having their actions copied by another, as the older children are more socially aware and therefore may feel self-conscious around others at this age. If it is the case that the older children disliked having their actions copied by the experimenter, this would explain the discrepancy in findings between the current study and that of Carpenter et al. (2013). While the ratings of the children's emotional reaction to the priming phase in the mimicry condition do not suggest that the 4-year-olds disliked having their actions copied by the experimenter, it is possible that the facial affective scale was not successful in accurately capturing how the children were feeling during the priming phase. This will be discussed further in the limitations section.

9.2 CONTINGENCY IN SOCIAL INTERACTION

If we assume that high levels of affiliation are responsible for the high level of pro-social behavior following mimicry, we would have expected the measures of affiliation in the current study to be higher in the mimicry condition than in the contingency condition; however, ratings were the same for both conditions. In addition, while it was expected that children who had been mimicked would report enjoying the interaction more than those who had not been mimicked, it is not surprising that those in the contingency condition reported a positive emotional reaction to the interaction as well. In both conditions, the children were provided with a set of attractive toys to play with and the experimenter engaged with a set of toys as well; therefore there was a sense of “playing together” in both conditions. Also, while there was no verbal interaction between the experimenter and the children, the experimenter physically responded to the children’s actions in a friendly manner. Therefore, it is possible that the mimicry alone was not enough to influence the children’s feeling of affiliation towards the experimenter above and beyond the positive interaction between the children and the experimenter in the contingency condition, resulting in an equivalent level of sharing between the two groups of children.

Furthermore, it has been suggested that contingency within a social interaction may result in positive effects as well. Recently, Catmur and Heyes (under review) investigated the roles of contingency and similarity on the pro-social effects of imitation in adults. Participants’ actions were responded to in either a contingent manner, a similar manner, a manner involving both contingency and similarity, or a manner involving neither type of action. The social effects of this interaction were then assessed. Measures

included the participants' rating of how much they enjoyed the interaction, their scores on the inclusion of the other in the self (IOS) scale and their helping behavior. Catmur and Heyes (under review) found similarity to be a negative predictor of enjoyment, whereas contingency was found to be a positive predictor of how well the participants rated the interaction. Likewise, contingency positively predicted scores on the IOS closeness scale. Finally, those who had experienced a contingent interaction were more likely to return the next day to participate in a follow up, compared to those whose behavior was copied in a similar manner.

While Experiment 1 investigated the social effects of imitation in adulthood, the results are very interesting in relation to the current study, especially in light of the previous research in this area. The results from Catmur and Heyes' work suggest that mimicry, even when undetected by one's partner, may not guarantee the positive affiliative and pro-social consequences described in previous literature. In fact, the findings of Catmur and Heyes' have demonstrated that behaving in a similar manner to an interaction partner may decrease their liking for the interaction as well as the likelihood that they will engage in pro-social behavior. Contingency, on the other hand, has been shown to produce the desired effects within a social interaction; quickly responding to a partner's actions with a different action seems to result in the exact effects we would have expected from an interaction involving mimicry. In terms of the current study, perhaps the contingent interaction may have been enough to result in an enjoyable experience for the young children, such that mimicry would not have made it any more enjoyable.

9.3 UNFAMILIAR NATURE OF EXPERIMENTER

A possible explanation for the low level of pro-social sharing compared to the findings of Williams and Moore (2013) could be explained by the differences in sharing recipient between the two studies. The level of sharing found by Williams and Moore (2013) was measured using the same sharing task used in the current study; however, the partner that each child shared their resources with was a friend of their choosing. In the current study, the recipient of the shared resources was always the experimenter who interacted with the children during the priming phase of the study. Prior to the priming phase, any interaction between the experimenter and the children was limited to ensure that there was no a priori relationship that would influence the measure of affiliation or performance on the sharing task. As such, the experimenter would have been considered a stranger at the beginning of the priming phase during the interaction with the children. It is possible that the unfamiliar status of the experimenter made it less likely for the children to allocate resources to her.

In line with this argument, there is research to suggest that the unfamiliar nature of one's interaction partner may eliminate the positive effects expected from an interaction involving mimicry. According to van Baaren, Janssen, Chartrand, & Dijksterhuis, (2009), characteristics of both the mimicker and the mimicked determine the influence that mimicry has on a social encounter. In particular, group membership and a priori liking of the mimicker by the mimicked are said to influence the social outcome of mimicry, and in certain situations, mimicry has been found to actually backfire. In support of this notion, Likowski, Schubert, Fleischmann, Landgraf, and Volk (as cited in van Baaren et al., 2009) found that being mimicked by a member of an out-group resulted

in the mimicker liking the mimicker less compared to out-group individuals who did not copy their behavior. While this research has examined the impact of the unfamiliar partner on feelings of affiliation, these findings may also transfer to other pro-social behaviors such as sharing.

9.4 LIMITATIONS

There are several methodological limitations to the current study that could account for the current findings. Experiment 1 was unsuccessful in extending the finding that mimicry leads to higher levels of pro-social behavior from infants (Carpenter et al., 2013) to pre-school aged children. Aside from the difference in age which has been addressed above, an important difference between this and the current study was the outcome measure of pro-social behavior. The outcome variable used as the measure of pro-social behavior in the current study was pro-social sharing, and it was assessed using a resource allocation paradigm. Previous research has demonstrated the effects of mimicry on helping behavior in both adults (van Baaren et al., 2004; Guéguen et al., 2011) and young children (Carpenter et al., 2013), however the influence of mimicry on pro-social sharing has yet to be demonstrated. It is therefore possible that mimicry does not influence pro-social behavior in a general sense, but selectively impacts certain behaviors.

It is also possible that the sharing behavior engaged in by the children during the resource allocation based sharing task, is not a social behavior. During the sharing task, the children make choices regarding the distribution of resources between themselves and a partner. However, their partner is not present during the task therefore the social nature

of the behavior is absent as it does not take place within a social context. In contrast, during the helping paradigm used by both van Barren et al. (2004) and Carpenter et al. (2013), the individual requiring the help is present during the task, therefore the helping behavior takes place within a social interaction. If sharing behavior as measured by the resource allocation paradigm is not considered a social behavior, this could explain why the current study found no influence of mimicry on the sharing task.

In terms of the measure of affiliation used in the current study, it is possible that the behaviors coded during the final interaction between the children and the experimenter were not accurately measuring the children's feelings of affiliation for the experimenter. While physical closeness has been demonstrated to signify feelings of affiliation after an interaction involving mimicry (Ashton-James et al, 2007), the current study did not employ the same methods. In the study by Ashton-James, the outcome variable was how close the participants sat to an apparently occupied chair after being mimicked by a confederate. In the current study however, the outcome measure was whether the children chose to sit at the same mat as the experimenter, or the unoccupied mat, which was only two feet away. Very few children chose to sit on the mat with the experimenter; therefore it is possible that they sat on the unoccupied mat as it was the only other option. The inclusion of a third mat placed at a farther distance may have been helpful as it would have given the children two options and the measure of physical closeness could have been which of the two mats the children decided to sit on, the one closer or farther from the experimenter. It is possible that no difference was found between the conditions in either of the current studies as the distance between the mats was not far enough, resulting in a non-significant effect of the experimental condition.

Finally, in terms of the children's emotional reaction to the priming phase, it is possible that the facial affective scale, as well as the instructions given, were not successful in obtaining an accurate measure of the children's feelings about their interaction with the experimenter. The children were shown the 9-point happy face scale and were asked to point to the face that showed how they felt while they were playing with the experimenter. Regardless of condition, children, on average, were choosing the top three faces on the happy end of the scale. While this makes sense for the conditions in Experiment 1, it is interesting that children were providing equally high ratings for the no interaction condition in which the experimenter ignored the children. Based on these unintuitive findings, it is possible that 4-year-old children are not accurately able to express their emotional reaction on a likert-type rating scale. Perhaps the inclusion of an open-ended follow up question would have been helpful in accurately measuring their feelings. The facial affective scale has been used successfully with 5- and 6-year-old children in previous studies to determine feelings of empathy (Williams & Moore, under review); however it is possible that there is a developmental shift around 5 years of age that allows for these children to accurately represent their emotions using pictures. If the facial affective scale was ineffective at accurately measuring the children's emotional reaction to their interaction with the experimenter, it is possible that children in the mimicry and no interaction conditions did not enjoy their experience suggesting that there may have been differences between the experimental and control conditions for both studies.

9.5 FUTURE STUDIES

Future studies may be able to address several limitations of the current research in order to explain our findings. As the unfamiliar nature of the experimenter was thought to account for the low levels of sharing behavior found in Experiment 1, a future study could address this issue by having the experimenter engage with the children prior to the study so that they are familiar with the experimenter during the priming phase. This prior interaction would involve verbal communication therefore the study should also include verbal mimicry as in Carpenter et al. (2013), as the children will be expecting communication from the experimenter.

In addition, in order to determine if a relationship exists between mimicry and affiliation, a study could involve three familiar experimenters during the priming phase, one who copies the exact behaviors of the child, one who responds contingently to their actions, and one who does not interact. Following a distractor task in which these experimenters are not present, the experimenters could return to the room and be seated at separate locations playing with an identical set of toys. The outcome measure could be which of the three experimenters the child chooses to play with. This could also be used to determine which of the experimenters the child enjoying interacting with more, the one who mimicked their actions or the one who did not.

Finally, as it was argued that the outcome measure of the sharing task based on the resource allocation paradigm may not have been a social behavior, a future study could add a social aspect to this sharing task by having the sharing partner present while the child allocates the resources. This way, the sharing task would take place within a

social situation and the effects of mimicry of pro-social sharing could be more accurately measured. In addition, as no relationship was found between the children's sharing behavior on the sharing task and their tendency to share with the experimenter during the final interaction, it is possible that both measures are not tapping into the same type of pro-social behavior. Future studies looking to examine the influence of mimicry on pro-social sharing should examine whether explicit sharing is affected differently than implicit sharing behavior.

9.6 CONCLUSIONS

While mimicry has been found to influence pro-social behavior in infant and adult populations, the current study was unable to provide evidence that the relationship between mimicry and pro-social behavior also exists during the pre-school years. Moreover, despite the speculation in recent research that affiliation is also influenced by mimicry, no evidence was found to suggest that preschool-aged children affiliate with an adult who copies their actions. As recent research has found mimicry to influence the helping behavior of infants (Carpenter et al., 2013), perhaps mimicry is experienced differently at different stages in development and therefore mimicry may not influence the social behavior of four-year-olds. In addition, as mimicry is suggested to have a selective impact on social behavior, it is possible that the effects of mimicry can only be demonstrated for behaviors that take place within a social context.

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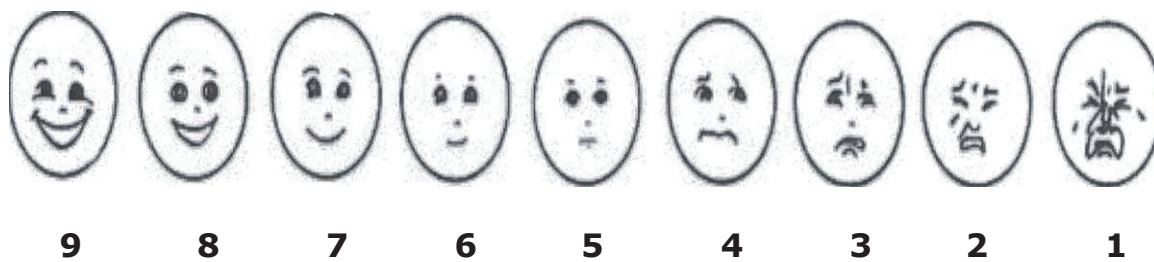
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APPENDIX A Facial Affective Scale – “I Feel”

I Feel:



Charlene Feels:

