Distribution Agreement

In presenting this thesis or dissertation as a partial fulfillment of the requirements for an advanced degree from Emory University, I hereby grant to Emory University and its agents the non-exclusive license to archive, make accessible, and display my thesis or dissertation in whole or in part in all forms of media, now or hereafter known, including display on the world wide web. I understand that I may select some access restrictions as part of the online submission of this thesis or dissertation. I retain all ownership rights to the copyright of the thesis or dissertation. I also retain the right to use in future works (such as articles or books) all or part of this thesis or dissertation.

Signature:

_____ _____

Cynthia Xinran Guo Date

The Motivation Behind Early Deception

By

Cynthia Xinran Guo
Doctor of Philosophy

Psychology

Philippe Rochat, Ph.D.
Advisor

Gregory Berns, M.D., Ph.D.
Committee Member

Linda Craighead, Ph.D.
Committee Member

Stella Lourenco, Ph.D.
Committee Member

Lynne Nygaard, Ph.D.
Committee Member

Accepted:

Kimberly Jacob Arriola, Ph.D, MPH
Dean of the James T. Laney School of Graduate Studies

Date

The Motivation Behind Early Deception

By

Cynthia Xinran Guo
M.A., Emory University, 2018
B.A., University of California, Los Angeles, 2016

Advisor: Philippe Rochat, Ph.D.

An abstract of
A dissertation submitted to the Faculty of the
James T. Laney School of Graduate Studies of Emory University
in partial fulfillment of the requirements for the degree of
Doctor of Philosophy
in Psychology
2022

Abstract

The Motivation Behind Early Deception
By Cynthia Xinran Guo, M.A.

Deception is a common experience and an integral part of our social life, and it emerges early in development, by 2 ½ years of age. In the past two decades, developmental researchers have identified social cognitive factors that explain *how* deception emerges. The abilities to mentalize (i.e., theory of mind) and to inhibit one's own desires (i.e., inhibitory control) are two of the critical ingredients which contribute to early deception. However, it remains an open question in terms of *why* deception emerges. In other words, what motivates young children to produce their first lies? The current dissertation examined what the motivation behind early deception is and how it changes in development. A modified third-party transgression paradigm was used to capture children's propensity to deceive to cover up a minor rule violation. Two hundred and seventeen 2 ½ -5-year-old children participated in the study. Children were assigned to one of the three motivational conditions: 1) *ambiguous condition*; 2) *self-motivated condition*; and 3) *other-motivated condition*. Deception was coded through both verbal (i.e., verbal denial) and nonverbal measures (i.e., physically covering up the transgression). Results show that 2 ½ -4-year-old children were more likely to deceive in the *ambiguous* and *self-motivated conditions* compared to the *other-motivated condition*. However, 4-5-year-old children engaged in deception equally across the three conditions. The results suggest that children's earliest deception is primarily driven by a self-serving motivation. However, the motivation to deceive diversifies from around 4 years of age, when children begin to deceive for both self-serving and other-serving motivations. On the whole, the dissertation is the first to examine the motivation behind deception in very young children. The study revealed that deception is self-serving from its emergence, but by 4 years of age, children's deception is driven equally by both self-serving and other-serving reasons. This research is a first step to understand what drives the ontogeny of human deception, and how such motivation diverges in the preschool.

The Motivation Behind Early Deception

By

Cynthia Xinran Guo
M.A., Emory University, 2018
B.A., University of California, Los Angeles, 2016

Advisor: Philippe Rochat, Ph.D.

A thesis submitted to the Faculty of the
James T. Laney School of Graduate Studies of Emory University
in partial fulfillment of the requirements for the degree of
Doctor of Philosophy
in Psychology
2022

Acknowledgements

This dissertation would not be possible without the guidance of my advisor and dissertation committee members. First, I would like to thank my dissertation chair and Ph.D. advisor, Dr. Philippe Rochat. I first came across a paper by him 7 years ago in my undergraduate developmental psychology class, and I was so fascinated by the ideas he presented that I decided to email him. Seven years later, I am at the end of my Ph.D. journey, and Philippe has been an integral part of my growth and development as a researcher. Philippe is the best mentor and advisor I could ask for – he constantly challenges me and plays "devil's advocate" with all my arguments. Yet he not only gives me the trust and support I need, but he also gives me the freedom to establish my own academic identity. The most important things he taught me are to "go for it" for all the possibilities out there, to always be curious, and to treat everyone with equal respect. I have always been proud to say that I am Philippe Rochat's student; I hope one day he would be proud to say that he is my advisor as well.

Secondly, I want to thank my dissertation committee members, Drs. Stella Lourenco, Lynne Nygaard, Linda Craighead, and Gregory Berns. I proposed my dissertation two days after Covid lockdown in the State of Georgia, on March 17th, 2020, and I was unable to resume data collection until a year and half later, in November 2021. My committee has been understanding, supportive, and flexible throughout the dissertation process. I would like to thank Dr. Stella Lourenco, who beyond serving as my committee member, has constantly inspired me to think deeper and more critically as a researcher. I also want to thank Dr. Lynne Nygaard, Dr. Linda Craighead, and Dr. Gregory Berns, for your genuine care for me, which has been a constant motivation for me to strive for excellence. I also want to thank Dr. Robyn Fivush, who helped me become a better teacher and gave me invaluable advice during my job search. I am grateful for faculty mentors like all of you. You are great exemplars of researchers and professors that I hope to become one day.

I am indebted to members of the Emory Infant and Child Lab for their support and friendship over the years. I want to specifically thank Dr. Sara Botto, who has become a sister to me inside and outside of the lab. I also would like to thank Nikita Agarwal, whose presence and care in the past year have carried me over many difficult situations. Our lab coordinators, Natalie Eldred and Amber Wallace, generously contributed their time to help running my dissertation studies. You both are invaluable to this dissertation. To Dr. Maria Jones, Dr. Shensheng Wang, and Maxime Ryser, I am thankful to have you as my lab mates and friends. And thank you to my research assistants, Arielle Kahana, Stephanie Revoredo, Dominic Lal, Hanna Lee, and Hallie Toren. It was a privilege to be your mentor, and I am excited to see all that you will accomplish. I am also very fortunate to have made friends inside and outside the Department, whom I could share my journey with, including Yaxin Liu, Ryno Kruger, Annie Cheng, Kristina Dahlgren, Dr. Miriam Kilimo, Dr. Siv Cherevu, and Dr. Mwangala Akamandisa. I am forever grateful for your friendship.

I would not have been able to complete this dissertation without the support of my family. I want to thank my husband, Timothy Lee, for his love and support over this journey. He has read drafts of my master's thesis, platform paper, dissertation proposal, as well as multiple manuscripts. This dissertation is as much a result of my work as is his. I love you more than words could describe. Thank you to our family, Tiffany, Jane, and James, for their continued prayers and encouragement.

This dissertation, as well as my entire academic career, would not be possible without the unwavering love and trust from my wonderful parents, 王雁琴 (Yanqin Wang) and 郭玮 (Wei

Guo). Ten years ago, they encouraged me to take a leap of faith to pursue college education in the United States, a country none of us had visited previously. They have been my biggest cheerleaders and continue to support me to chase all my dreams. Although I have not been able to visit them for the past 2 ½ years, their love motivates me to push a little harder every day.

Lastly, I would like to dedicate this dissertation to my late grandfather, 郭寿康 (Shoukang Guo; 1926-2015). My grandfather was a law professor and dedicated his life to education. Through him, I have witnessed many students from extreme poverty in rural China transform their lives. He taught me three things that I will always remember: 1) you are never too old to learn; 2) knowledge can overcome barriers and borders, culturally, politically, and geographically; and 3) education can change lives. In a way, his legacy was what motivated me to embark on this journey to pursue a Ph.D. degree. It is my hope to carry his legacy forward.

Table of Contents

The Motivation Behind Early Deception

Human deception is the intentional concealment of truth that encourages another individual to develop a false but plausible hypothesis (Jakubowska, & Białecka-Pikul, 2020). If one fundamental goal of social communication is to deliver truthful information to the conversation partner (Grice, 1980), then deception violates this goal and makes communication more complicated and challenging. A substantial amount of deception in interactions violates expected norms in social information exchange and hinders the development of cooperative and trusting relationships (Diekmann et al., 2011; Tyler et al., 2006).

Albeit the negative connotations associated with deception, it is prevalent in social interactions and serves critical social functions to protect and improve interpersonal relationships (Levine & Schweitzer, 2015). For example, parents sometimes tell lies to their young children to promote behavioral compliance (Heyman et al., 2009), and physicians frequently engage in deception driven by prosocial motivations, reporting their patient's prognosis in a more positive manner than it warrants (Iezzoni et al., 2012). The complex interactions between the negative moral connotations, the undeniable prevalence, and the potential other-serving intentionality associated with deception perhaps contribute to the early fascination of deception in psychology as a scientific field, as well as the resurgent interest in understanding deception from its emergence (Darwin, 1877; Hall, 1891; Piaget, 1932/1965; Wimmer & Perner, 1983; Evans & Lee, 2013).

Recent developmental researchers have specified the social cognitive abilities that make it possible for children to deceive. Theory of mind and inhibitory control have been identified as two critical ingredients for children to start producing lies (Ding et al., 2015;

Evans & Lee, 2013; Talwar & Lee, 2008). However, questions remain as to why children become liars. In particular, what may be the reasons behind children's earliest deception remains an open question and calls for further investigation (Talwar & Crossman, 2012).

In this dissertation, I aimed to study the motivation behind children's early deceptive behaviors. To begin with, I briefly introduce deception in non-human animals and review literature on how human deception has been studied from a developmental perspective. Next, I point out the lack of investigation on the motivation behind deception and argue the importance of studying the ontogeny of human deceptive motives. I then report my dissertation research that probed 2 ½ -5-year-old children's deceptive behaviors in three varying motivational contexts, where children could engage in deception for 1) *ambiguous*, 2) *self-motivated*, or 3) *other-motivated* reasons. In closing, I discuss the implications and limitations of current findings and suggest future directions.

Deception in Non-human Animals

Deception in non-human animals is an evolutionary strategy that an animal produces to exploit the perception of another animal, such that the perceiver may misinterpret the perceptual information (Mokkonen & Lindsted, 2015). Deception is prevalent in nature (Bugnyar & Kotrschal, 2004; Munn, 1986). For example, when male fiddler crabs are injured and become weaker, they bluff and act more aggressively towards male conspecifics. In this way, a competitor may misinterpret the aggressive behaviors as a demonstration of higher combat power (Bywater & Wilson, 2012; Lailvaux et al., 2009). Similarly, small male mourning cuttlefish sometimes display a male-specific pattern on their mantle towards the female conspecific but display a female-specific

pattern towards the male conspecific, when they are positioned between a larger male conspecific and a female conspecific (Brown et al., 2012). This deceptive strategy helps small male cuttlefish court females without being challenged by their larger male competitors.

In primates, tactical deception has also been widely observed (Hirata & Matsuzawa, 2001; Whiten & Byrne, 1988). Tactical deception is learned, appears more flexible, and requires higher cognitive abilities, such as perspective-taking (de Waal & Preston, 2017). Some evidence suggests that primates' deceptive behaviors may be intentional – similar to humans, primates could also manipulate others' experience cognitively (de Waal, 1992; Hare, Call, & Tomasello, 2006; Hall et al., 2017). In support of this view, Hare et al. (2006) found that chimpanzees could change their approach to food based on the gaze of a competitive human experimenter. They reached for food significantly more when the experimenter was looking away from the food and when her view was occluded.

More recently, Hall and collaborators (2017) revealed that subordinate chimpanzees could flexibly conceal their gaze information towards the goal to deceive the dominant chimpanzee. When presented with two food choices, one of modest value (i.e., a cucumber) and one of high value (i.e., a banana), the subordinate chimpanzee would refrain from gazing towards the high value food choice. Instead, she alternated her gaze between the food of modest value and the dominant chimpanzee to lure the dominant towards the modest value food. By doing this, the subordinate chimpanzee secured the high value food for herself. The evidence shows that one of our closest

primate relatives could flexibly manipulate their own and others' visual information to deceive a competitor, indicating that their deceptive behaviors may be intentional actions.

Deception in Development

Despite non-human animals' competency in deception, human deception is more varied, complex and serves diverse purposes. For example, we use deception to cover up our misconduct (Talwar & Lee, 2008), to gain material benefit (Fu et al., 2018), to protect others' feelings (Sierksma et al., 2019), to help another achieve their goals (Demedardi et al., 2021), and to protect the reputation of our group (Fu et al., 2008). How do these deceptive motives emerge in development? To study human deception from its ontogeny can help reveal the fundamental question of *when*, *how*, and *why* we deceive.

Human deception, also commonly referred to as lying, can be either verbal or nonverbal. But verbal lies have attracted significantly more research interests due to their variability and accessibility (Lee, 2013). Developmental researchers have typically used verbal lies as measures of deception in children from 2 ½ years of age, when deception is recorded to emerge. They have divided lies into two main categories based on their assumed motivations: anti- and prosocial lies (Evans & Lee, 2011; Talwar et al., 2007; Talwar & Lee, 2002a). Antisocial lies are self-serving and intended to conceal transgressions to avoid negative consequences, maximize material benefits, or harm others (Sai et al., 2021). In contrast, prosocial lies are other-serving false and deceptive statements that are communicated to protect the feelings of others or help others achieve their goals (e.g., Lee & Imuta, 2021; Talwar & Crossman, 2011).

Antisocial Lies in Development

Already by 2 ½ years of age, children are documented to produce self-motivated antisocial lies to avoid potential negative consequences (Darwin, 1877; Newton et al., 2000; Wilson et al., 2003). The first known parental report of deception comes from Darwin's (1877) observation of his 2½ year-old son, who tried (yet failed) to conceal from his father that he had stolen food from the kitchen. More recently, Newton et al. (2000) followed a 2 ½ year-old child over a six-month period and found that the child could use deception flexibly and in appropriate contexts. These observational records suggest that children could engage in intentional deception by 2 ½ years of age.

Young children's earliest deceptive attempts have also been examined in the laboratory settings, usually through the temptation resistant paradigm (Lewis et al., 1989, Polak & Harris, 1999; Talwar & Lee, 2002a). In the paradigm, the experimenter invites children to play a guessing game with an impossible trial. During the impossible trial, the experimenter makes an excuse to leave the room, but instructing children not to peek at the answer key on the table in her absence. Many children could not resist the temptation and peek at the answer key, therefore transgressing the rule in the experimenter's absence. Upon her return, the experimenter could ask children questions about the transgression and measure their propensity to lie.

Results from the temptation resistant paradigm corroborate with findings from observational studies (e.g., Newton et al., 2000; Wilson et al., 2003) and show that children as young as 2 ½ years of age may lie to cover up for a transgression they committed (Evans & Lee, 2013; Talwar & Lee, 2002a; Talwar & Lee, 2008). This

propensity to lie to conceal transgressions increases with age, and by 8 years of age, more than 80% children tend to lie to cover up their misconduct (Evans & Lee, 2011). Older preschoolers are more strategic in their lie production. They not only keep their subsequently statements consistent with their initial lies (Talwar et al., 2007), but could also lie convincingly when they are presented with physical evidence to the contrary (Evans et al., 2011).

In contrast to their willingness to lie to conceal their own transgressions, preschool-age children are less prone to lie for personal gain (Ding et al., 2018; Fu et al., 2018). For example, Fu et al. (2018) engaged 2-4-year-old children in a hide-and-seek game, where children could hide desirable objects (i.e., stickers) and lie about their location to mislead the opponent and win them as a prize. Most children (66%) refrained from lying in the hide-and-seek game across all 10 trials to gain the desirable gift. Among children who lied, approximately half of them only lied in 1or 2 trials. The rate of deception when children lie for personal gain is much lower than when children lie to cover up a transgression. This difference in deceptive tendency suggests that, at least by 4 years of age, young children tend to deceive for self-preservation (i.e., to cover up their own transgression) rather than for self-maximization (i.e., to obtain an attractive reward).

Only a few studies have investigated antisocial lying from childhood to adolescence, but the existing literature suggests that the rate of antisocial lying peaks in middle childhood and declines in mid-adolescence (Evans & Lee, 2011; Lavoie et al., 2017). It could be the case that, older children and teenagers can adopt alternative ways to cope with the social demands from their environment without resorting to lying, given their more advanced social cognitive skills and moral understanding of lies (Lavoie et al.,

2017; Sai et al., 2021; Talwar & Crossman, 2011). Longitudinal research that tracks children's advancing moral knowledge, social cognitive skills, and their propensity to engage in lying for self-serving purposes may be useful uncover the developmental trajectory of antisocial lying from childhood to adolescence, as well as the social cognitive factors that are potentially shaping this development (Talwar et al., 2019).

Social Cognitive Predictors of Antisocial Lies

Theory of mind and *executive functioning* are considered necessary building blocks for children to produce antisocial lies (Evans & Lee, 2013; Talwar & Lee, 2008). *Theory of mind* corresponds to the general ability children develop to represent the beliefs and mental states of others (Wellman & Liu, 2001; 2004). *Executive functioning* corresponds to the general ability children develop to plan, decide, inhibit, and monitor their own action in relation to a set goal (Diamond & Lee, 2011; Carlson, 2005). Results from meta-analyses show that both are associated with the developmental emergence of lying and deception in general (Lee & Imuta, 2021; Sai et al., 2021). For example, Sai et al. (2021) examined 47 published studies regarding lying, theory of mind, and executive functioning with participants between 2-19 years of age, and they found that both *theory of mind* and *executive functioning* play significant and positive roles in lying over development.

Specifically, regarding *theory of mind*, Talwar and Lee (2008) found that 3-8-year-old children who were more likely to lie to conceal their own transgression in the temptation resistant paradigm also performed better on the false belief *theory of mind* tasks (i.e., understand that others can possess a false belief). In another study, Ding et al.

(2018) engaged 2 ½ -3 ½ years old children in a hide-and-seek game daily over a 10-day period, where children had to lie about the content of an empty cup to win sweet treats. Although most children couldn't deceive in the beginning, many of them spontaneously discovered how to lie by the 10th day. Children who scored higher on the false belief *theory of mind* task on the first day also discovered deception earlier in the study. In addition to children's own theory of mind ability, parental engagement with mental state language also impacts children's propensity to lie. For instance, Ding et al. (2021) found that 3-5-year-old children with parents who frequently talked about the mental states of others were also more likely to engage in deception in the same hide-and-seek game adopted in Ding et al. (2018). *Theory of mind* may even play a causal role in children's emerging propensity to lie antisocially. After participating in *theory of mind* training over multiple days, 3-year-old children who were initially unable to lie showed a significant increase in their tendency to lie in a hide-and-seek game (Ding et al., 2015).

Regarding *executive functioning*, it appears also to be predictive of children's propensity to produce antisocial lies (Fu et al., 2018). Two to three-year-old children who lied to cover up their misdeed in the temptation resistant paradigm also tended to score significantly higher on the Stroop task, a measure of executive functioning in terms of inhibitory control, working memory, and cognitive flexibility (Evans & Lee, 2013). *Executive functioning* is an even stronger predictor of children's ability to maintain their lies after their initial denial (Sai et al., 2021). Three-to-four-year-old children who lied and refrained from leaking the truth in subsequent questionings also performed better on a battery of executive functioning tasks that measured inhibitory control and forward

planning (O'Connor et al., 2020). The evidence suggests that executive functioning may also play a critical role in children's early propensity to lie.

In addition to *theory of mind* and *executive functioning*, studies have also linked punitive disciplinary environments (Talwar & Lee, 2011) and controlling parenting styles (Wang et al., 2017) to preschoolers' increasing propensity to produce antisocial lies. For example, Talwar & Lee (2011) tested 3-4-year-old children's deceptive tendencies using the temptation resistant paradigm. Critically, children in the study were recruited from either a punitive school or a non-punitive school in the same neighborhood in West Africa. The punitive school allowed for corporate punishment that inflicts physical pain, whereas the non-punitive school banned physical punishment. Talwar & Lee (2011) found that almost all children from the punitive school lied in the temptation resistant paradigm. In contrast, only a little more than half of the children from the non-punitive school lied, a rate that was comparable to that of North American children (O'Connor & Evans, 2018; Talwar & Lee, 2008; 2011). The results indicate that a punitive disciplinary style could facilitate lying in preschool age children to avoid punishment.

Prosocial Lies in Development

Compared to the early emergence of antisocial lies by 2 ½ years of age, a developmental lag appears to exist between the onset of pro- and anti lies (Demedardi & Monnier, 2019), since it is not until 3-4 years of age that the earliest prosocial lies have been observed (Popliger et al., 2011; Talwar et al., 2007; Heyman et al., 2020). For example, Talwar et al. (2007) showed that, upon receiving a disappointing soap bar as the prize for winning a game, 3-year-old children would pretend to the gift giver that they

liked the gift. When Talwar & Lee (2002b) asked 3- to 7-year-old children whether an experimenter who had a noticeable red mark on his nose was presentable for photos, children as young as 3-4 years reassured the experimenter that he was ready for photos. These findings suggest that children could tell lies to appear polite from as early as 3-4 years of age.

In addition to polite lies, 4-year-old children also begin to lie to help others obtain material benefits, though at a lower rate (Talwar et al., 2017). For example, Talwar et al. (2017) recorded that 4-5-year-old children would lie to the experimenter to help their opponent (i.e., a confederate) win a prize after winning a few prizes themselves. Corroborating with results on polite lies, the study indicates that children could engage in lying and deception for the benefit of others from 4 years of age.

From preschool years onward, children become increasingly more likely and capable of lying for the benefit of others (Talwar et al., 2007). Lavoie & Talwar (2020) examined 4-11-year-old children's ability to conceal a surprise gift they made for their parent. The study showed that with age, children were more capable of concealing the surprise and falsifying information about their behaviors to mislead their parent. In another study, Jakubowska et al. (2021) tracked children's propensity to falsely flatter a confederate's artwork at three different time points: 5 ½ years of age, 6 ½ years of age, and 7 ½ years of age. They found that children were increasingly more likely to lie to false praise others as they got older.

School-age children are more prone to lie for other-motivated reasons, even at a personal cost. For example, Popliger et al. (2011) tested 3-11-year-olds' propensity to tell a polite lie when offered a disappointing gift. They found that children 7 years and older

often pretended to like the gift, even when doing so cost them the chance to exchange for a better gift. In contrast, 4-6-year-old children were less likely to pretending liking the disappointing gift when such polite lies incurred a personal cost. This development indicates that children are increasingly willing to lie for the benefit of others with age, despite the cost.

Social Cognitive Predictors of Prosocial Lies

If current evidence points to a clear developmental model to explain the emergence of antisocial lies, then the picture is less clear regarding the ontogeny of prosocial lies. Although *theory of mind* has been associated with children's general ability to produce lies (Sai et al., 2021) as well as their specific propensity to lie to cover up a transgression and maximize benefits (e.g., Ding et al., 2015; Evans & Lee, 2013), it does not appear to specifically predict the production of prosocial lies. For example, 4-5-year-old children with more advanced first-order false belief theory of mind (i.e., understand that others can possess a false belief) were not more likely to tell prosocial lies in order to boost someone's benefit (Talwar et al., 2017). Similarly, 4- to 12-year-old children who passed the first order false belief theory of mind task were as likely to tell prosocial lies as children who failed the task to cover up a parent's transgression (Gordon et al., 2014). Finally, 6-12-year-old children with autism spectrum disorder who had difficulties recognizing others' mental and affective states were as likely to pretend liking a disappointing gift as typical developing children at the same verbal mental age (Li et al., 2011).

If theory of mind only appears to predict the emergence of antisocial lies, then executive functioning seems to predict the production of both anti- and prosocial lies. Williams et al. (2016) reported that 6- to 12-year-old children's performance in both the Stroop task and a working memory task predicted the extent to which the child was likely to mask feelings when receiving a disappointing gift. Likewise, Talwar et al., (2017) reported that 4–5-year-old children who scored high on the inhibitory control and cognitive flexibility tasks were more likely to lie for someone to win a prize. Corroborating these results, Gordon et al. (2014) found that parental assessment of their children's executive functioning correlated with 4-12-year-old children's lab-measured propensity to cover up for someone else's transgression.

In addition to theory of mind and executive functioning, emotional understanding has also been associated with children's proclivity to lie pro-socially. In a recent study, Demedardi et al. (2021) found that 4-11-year-old children who were able to correctly identify a story character's emotion were also more likely to tell prosocial lies to help an adult confederate win a prize. Using the same paradigm, Nagar et al. (2020) showed that parental reports of 7-11 children's ability to read others' emotions predicted their likelihood to produce prosocial lies. Taken together, recent investigation regarding prosocial lies shows that a different set of predictors that include executive functioning and emotional understanding may contribute to the emergence of prosocial lies from 3-4 years.

The Motivation Behind Early Deception

Deception is an integral part of the human experience, and it emerges early in development. As we discussed previously, developmental researchers in the past two decades have examined *when* deception emerges and what may predict such emergence. However, to the best of our knowledge, the motivation of children's earliest deception has not been directly investigated. The question remains: *why* do children begin to engage in deception?

Adults engage in deception for a variety of reasons (Cantarero et al., 2018). We deceive to cover up a misdeed (DePaulo et al., 1996), to maximize our monetary benefits (Bucciol & Piovesan, 2011), to maintain our reputation (Ahn et al., 2020), to help someone else feel better (Palmieri & Stern, 2009), and to protect a close relationship (Kaplar & Gordan, 2004), etc. Each act of deception could also be driven by more than one motives (Erat & Gneezy, 2012; Gino et al., 2013). For instance, adults often engage in pareto lies, which are dishonest statements that benefit both liars themselves and others (Kim & Kim, 2021). How does the motivation to deceive develop to reach such diversity and complexity? A developmental perspective could help us uncover the ontogeny of deceptive motives.

The question of what motivates young children to engage in their first acts of deception bears theoretical significance. Observational accounts suggest that children's earliest deception appears to be self-serving (Darwin, 1877; Newton et al., 2000; Wilson et al., 2003). This is consistent with experimental findings that show a developmental lag between the onset of pro- and anti-social deception (Demedardi & Monnier, 2019).

Whereas by 2 ½ years of age young children are documented to lie in order to cover up a transgression to avoid punishment (e.g., Evans & Lee, 2013), the earliest evidence of prosocial deception is reported a year later, between 3-4 years of age (e.g., Fu & Lee, 2007; Talwar et al., 2007; Talwar et al., 2017). Corroborating with existing parental reports and observational studies, evidence suggests that children's early deception would be self-motivated to cover up a transgression to avoid punishment.

However, it is also possible that children's earliest deception would be driven by prosocial, other-serving motives. This is because prosocial behaviors to help another attain their goals emerge in infancy (Over & Carpenter, 2009; Warneken & Tomasello, 2007; 2009). Eighteen-month-old infants have been shown to help an adult finish a task at hand, and by 2 ½ years of age, toddlers would offer their own toys or blankets to a frustrated adult to improve her mood (Svetlova et al., 2010). The early emerging prosocial behaviors may be due to an intrinsic motive to cooperate (Tomasello & Vaish, 2013) or our early propensity to elicit positive evaluations from others (Botto & Rochat 2018). The early emergence of prosocial behaviors in young children suggests the possibility that children's earliest deception could be prosocial and out of other regard.

To the best of our knowledge, the two possible motivations behind children's early deception have not been directly examined. Therefore, the main goal of the current dissertation is to investigate whether children's earliest deceptive acts are driven by a self-serving motivation or an other-serving, prosocial motivation in the same paradigm. Identifying the motivation that drives children to lie in the first place can elucidate the root of human deception and how it develops to the diversity of deceptive behaviors we observe in adults (Mazar et al., 2008).

Deception During Third Party Transgressions Paradigm

Most existing paradigms that measure deception in children appear to capture only one main deceptive motivation[1]. For example, in the temptation resistant paradigm, children could lie to cover up their own transgression, and the motivation behind their lies is often attributed to punishment avoidance (e.g., Talwar & Lee, 2002a; 2008). In the hide-and-seek paradigm, children could lie about the location of an object to win prizes, and their lies are usually attributed to obtain reward (e.g., Ding et al., 2015). Furthermore, in the disappointing gift paradigm, children could pretend liking a disappointing gift, and their lies are often interpreted as to protect another's feelings (e.g., Popliger et al., 2011). These paradigms are useful to capture children's early deceptive tendencies for one specific type of deception. However, to examine the motivation behind children's early deception, we need to adopt a paradigm where we could systematically manipulate the motivational context where children engage in deception.

One paradigm that may be useful to investigate the motivation behind early deception is the third-party transgression paradigm (Bottoms et al., 2002; Pipe & Wilson, 1994; Tye et al., 1999). In the third-party transgression paradigm, children are implicated in another's transgression and use deception to cover up for the transgression. Compared to many existing paradigms that capture children's deception for one apparent motive (e.g., temptation resistant paradigm, hide-and-seek paradigm, etc.), the motivation behind

[1] Granted, it is possible that children's deception in these paradigms are driven by more than one motive. For example, the motivation to elicit positive evaluations from others may underlie all deceptive acts (Rochat & Guo, 2021). The current dissertation focuses on the broad and apparent deceptive motivations - either self-serving or other serving - as a first step to understand the motivations behind early deception. Future work should continue to examine the specific motivations underlying these broad categories.

deception in the third-party transgression paradigm appears ambiguous. In particular, children's deception could be interpreted as either 1) self-serving to rid themselves of potential blame, or 2) other-serving to help the third-party transgressor avoid negative consequences. Therefore, the paradigm provides an opportunity for us to test which motivation (i.e., self-serving or other-serving) could better explain children's early deceptive behaviors by manipulating the social motivational context that children engage in lie production. Differentiating between self-serving and other-serving motivations of children's early lies would be a first step to answer the question of why deception emerges.

Researchers often adopt variations of the third-party transgression paradigm to inform eyewitness interview processes with young children (Quas et al., 2018; Talwar et al., 2004; Wyman et al., 2020). These studies are typically designed to resemble alleged abuse cases when children are pressured by an adult to provide false information or conceal a transgression. For example, Gordon et al. (2014) tested 4-12-year-old children's likelihood to conceal a transgression committed by their parent, who was a confederate in the study and pretended to have broken a toy. Most children kept the transgression a secret, especially when coached by the parent. Similarly, Williams et al. (2020) led 4-9 years old children to believe that they had broken two toys during playtime with an adult stranger (i.e., a confederate). Corroborating with results from Gordon et al. (2014), Williams et al. (2020) found that most children kept the accident a secret when requested by the stranger. These findings suggest that young children often engage in deceptive acts when implicated in a third-party transgression. As such, we

could adopt the third-party transgression paradigm to probe children's deception, and then to examine the motives behind their deception.

Verbal and Nonverbal Deception

Developmental research on deception has primarily focused on children's verbal lies, which are deception with words (Lee, 2000; 2013). For example, in the temptation resistant paradigm, children 2 ½ years and older are put in a tempting situation where many would transgress the rule (e.g., Talwar & Lee, 2002a; 2008). The researchers then directly ask children questions about the transgression to probe their verbal lies. Verbal lies are also used to measure prosocial deception, such as in the disappointing gift paradigm (e.g., Talwar et al., 2007; Popliger et al., 2011). In the paradigm, researchers reward children 3 years and older a disappointing gift after finishing a task and ask whether they like the gift. Children's prosocial deception is measured through their affirmative verbal responses to the questions.

This reliance on verbal lies to measure deception is surprising due to limitations in children's verbal ability when deception emerges. For example, 2-3-year-old children often show an affirmation bias (i.e., a bias towards saying "yes") to yes/no questions (Fritzley & Lee, 2002). Additionally, observational accounts have reported nonverbal behaviors as a common method young children use to deceive. Darwin (1877) recorded that his 2 ½-year-old son rolled up his pinafore to conceal the stained pickle juice - evidence of stealing treats from the kitchen. The report suggests that children could use nonverbal behaviors to cover up their misdeed at least by the middle of their third year.

Only a few experimental studies have adopted nonverbal behaviors as measures of deception with the hide-and-seek paradigm (Chandler et al., 1989; Hala et al., 1991; Yi et al., 2014). For example, Sodian et al. (1991) measured whether 2 ½ -5-year-old children could mislead an opponent and conceal the location of a toy truck by removing its tracks and/or adding false tracks. Results from studies using the hide-and-seek paradigm often corroborate with studies using verbal deceptive measures in suggesting that deception emergences around 2 ½ years of age (Ding et al., 2015; Evans & Lee, 2013; Fu et al., 2018). This convergence indicates that nonverbal measure of deception could be a valuable addition to examine early deception in preschoolers. For this reason, in the present work, deception was measured through children's verbal as well as nonverbal responses. The goal was to better capture young children's spontaneous deceptive responses, and to further explore the relationship between verbal and nonverbal measures in the third-party transgression paradigm. A better understanding of verbal and nonverbal lies could elucidate whether the two are measures of the same construct and help

researchers determine the most effective measure to adopt in future research.

Current Research

The current project aimed to examine the motivation behind children's early deception from 2 ½ -to-5 years of age using a modified version of the third-party transgression paradigm. This age range was selected because children have been observed to start lying by 2 ½ years of age (Evans & Lee, 2013; Fu et al., 2018; Wilson et al., 2003). By 4 years of age, young children could not only produce antisocial lies to

cover up their transgression and maximize personal gains (Fu et al., 2018; Talwar & Lee, 2008), but also prosocial lies to help and protect another individual (Gordon et al., 2014; Talwar et al., 2017). The selected age range was aimed at capturing the emergence and developmental change in the motives driving early deception.

We designed three experimental conditions that offered children opportunities to deceive, including: 1) an *ambiguous condition*, 2) a *self-motivated condition*, and 3) an *other-motivated condition*. In the *ambiguous condition*, children were promised a gift but were instructed not to look or touch the gift when they were alone. But a third-party transgressor (i.e., Experimenter 2) violated the rule and showed the gift to the child, therefore implicating the child in her intentional transgression of rule. The purpose of the *ambiguous condition* was to set a baseline for the rate of deception when the motivation to deceive was ambiguous (i.e., could be either self-serving or other serving).

In the *self-motivated condition*, the majority of the procedure remained the same, but we replaced the third-party transgressor with a mechanical fan as the causal mechanism of the incident, which exposed the gift when children were left alone. As such, in the *self-motivated condition*, children found themselves caught up in an accident caused by an inanimate object (i.e., the fan), whereas in the *ambiguous condition*, children were implicated in the action of an intentional transgressor. Without a transgressor, children's deceptive behaviors in the *self-motivated condition* could only benefit themselves (i.e., self-serving motivation). The *self-motivated condition* was designed in comparison to the *ambiguous condition* and to probe children's lies that were exclusively self-serving.

Lastly, the *other-motivated* condition followed the same procedure as the *ambiguous condition*, except for some critical manipulations. Specifically, we informed children that a gift was prepared for Experimenter 2 (E2), who was not allowed to look or touch it. But E2 violated the rule and looked at the gift. In this situation, children were only witnesses to another person's transgression. In contrast to the *ambiguous condition,* they were not promised a gift and they were not subject to the rule (i.e., not look or touch the gift) in the *other-motivated condition*. Therefore, if children were to deceive in the *other-motivated condition,* their deception could only be for the benefit of the third-party transgressor (i.e., other-serving motivation). The *other-motivated condition* was set up in comparison to the *ambiguous condition* and to capture children's lies that were exclusively other-serving. With the three experimental conditions, we hoped to compare the rates of lying across ambiguous, self-serving as well as other-serving motivational contexts in 2 ½ -5-year-old children. The goal was to determine what the primary motivation was that driven children's earliest lies and examine how the motivation may change over development.

Hypotheses and Predictions

Existing research suggests that a developmental lag exists between the emergence of prosocial and antisocial lies (Rochat & Guo, 2021). Beginning from 2 ½ years, children have been documented to use deception as a way to avoid blame and escape from imminent punishment from adults (Fu et al., 2018; Talwar & Crossman, 2011; Wilson et al., 2003). However, no evidence has shown that children could deliberately engage in deception for other-oriented purposes, such as protecting another's feelings or

helping another obtain material benefits, until approximately 4 years of age (Demedardi & Monnier, 2019; Fu & Lee, 2007; Talwar et al., 2017). Therefore, it is likely that age 4 is a transitional period when the motivation to deceive begins to diversify.

Based on the current literature, we proposed three hypotheses. Our first hypothesis was that 2 ½ -4-year-old children's deceptive behaviors would be primarily driven by a self-serving motivation. In particular, we predicted that children in this age range would deceive at approximately the same rate in the *self-motivated condition* as in the *ambiguous condition*. We also predicted that 2 ½ -4-year-old children would be less inclined to deceive in the *other-motivated condition* than in the *ambiguous condition*.

Our second hypothesis was that the motivation to deceive would diversify and that children would deceive for both self-motivated and other-motivated reasons from 4 years of age. Specifically, we expected 4-5-year-old children to engage in similar rates of deception between the *ambiguous condition* and the *self-motivated condition*, as well as between the *ambiguous condition* and the *other-motivated condition*. Thirdly, we hypothesized that children would be more likely to engage in deception in general with age. In accordance with hypothesis 3, we expected older children to engage in higher rate of deception compared to younger children across the three experimental conditions (Talwar & Lee, 2008; Popliger et al., 2011).

In addition to our main hypotheses, we also probed the relationship between verbal and nonverbal deception in the dissertation. Nonverbal deception was measured by how likely children were to physically restore a misplaced item to cover up the transgression. Verbal deception was measured by children's propensity to deny the transgression when directly questioned by a researcher (see Method for detailed

procedure). Given that both measures were intended to capture children's spontaneous deceptive responses, we expected verbal and nonverbal measures of deception to be predictive of each other.

Taken together, the goal of this dissertation was to investigate the motivation behind children's earliest deceptive behaviors and examine the developmental change that may occur around 4 years of age when the motives of children's deception shift from primarily self-concern to a combination of self-concern and other regard. In doing so, we hope to take a first step towards understanding the root of human deceptive motives that emergence by the middle of the third year.

Method

Participants

Two hundred and seventeen 2 ½ -5-year-old children were recruited for the study. Eight-three children participated in the *ambiguous condition*, 76 in the *self-motivated condition*, and 58 in the *other-motivated condition*. Twelve children did not complete the study and were excluded from our final sample. Additionally, 5 children were excluded due to experimenter error, 3 children in the *ambiguous condition* were excluded because they uncovered the gift before the planned transgression occurred, and 1 child in the *self-motivated condition* was excluded because she feared fan and we could not perform the experimental manipulation.

The majority of participating children were tested prior to the COVID-19 pandemic. However, 18 children in the *other-motivated condition* were tested during the pandemic in Spring 2022, and 17 of them were included in the final sample. One child

was excluded due to experimenter error. In accordance with institutional mask policy regarding the COVID-19 pandemic, the experimenters wore masks throughout the study. Child participants were asked to remove their masks during the experiment, with consent from their parents.

A final sample included 196 children between 2 ½-5 years: 77 children in the *ambiguous condition* (*M* = 45.7 months, *SD* = 8.1, *range* = 31 to 62 months, 42 females), 63 children in the *self-motivated condition* (*M* = 44.8 months, *SD* = 8.4, *range* = 31 to 60 months, 36 females), and 56 children in the *other-motivated condition* (*M* = 44.2 months, *SD* = 8.8, *range* = 31 to 60 months, 33 females).

Parents filled out a demographic questionnaire and reported children's ethnicity as White/Caucasian (61.7%), Black/African American (17.3%), Other (20.9%). Parents also reported children's sibling status and 79.1% children had at least one sibling. Children were recruited through the Child Study Center at Emory University in Atlanta, Georgia. Informed consent was obtained from parents before children participated in the study. This study was approved by the Emory University Internal Review Board under the project name The Effects of Implicit Cues on Donation, Rule-Following, and Cheating in Development (Study Number IRB00059451).

Setup and Materials

Children were tested individually by a female experimenter (Experimenter 1) in a quiet laboratory room. During the study, the child and Experimenter 1 (E1) sat facing each other at a low table. Four video cameras recorded children's behaviors from multiple angles during the study. Bendable stick figures were used as attractive gifts in

the study after pilot testing showed that children in the 2 ½ -5-year-old age range considered them desirable.

In the *self-motivated condition*, a curtain separated the laboratory into two equal spaces, so that Experimenter 2 (E2) could hide in the other side of the room without being seen by the child. A mechanical fan (6.3 x 7.5 in) was attached to the kid's table and was turned on at the beginning of the experiment.

Design and Procedure

Ambiguous Condition

A modified version of the third-party transgression paradigm (e.g., Quas et al., 2018; Talwar et al., 2004; Wyman et al., 2020) was adopted in the study (Figure 1). E1 invited children individually to the testing room to play a game with her. Both the child and E1 sat at a low table when E1 told the child that she prepared a gift for the child. E1 then put a gift that was pre-wrapped in an opaque towel on the table in front of the child, making sure that the child did not see the gift throughout the process. After setting up the hidden gift, E1 told the child that she forgot to ask the child's parent permission to give the gift, so she had to step outside to inquire. E1 then instructed the child not to look or touch the gift (i.e., set up the rule) during her absence. She then exited the testing room, closing the door behind her and leaving the child alone.

The child was left alone in the testing room for 15 seconds before E2 entered the room. The period that children were left by themselves was short because pilot testing showed that young children exhibited signs of agitation when left alone for more than 20 seconds. After E2 came into the room, she appeared to notice the hidden gift and said in a

curious tone "*What's this? Is this a gift for me? Shall we take a look!*". Subsequently, E2 lifted the towel and revealed the gift for the child to see. She then covered up the gift halfway, leaving half of the gift exposed. E2 said to the child "*Shh! Don't tell!*" and left the room.

The child was again left alone for 15 seconds before E1 returned. E1 then told the child that the parent agreed for her to give the gift to the child. If the child left the gift uncovered, E1 added "*Oops*" and adjusted the towel to cover up the gift entirely. The gift was covered up before E1 proceed to ask the target question because previous research suggests that young children are unable to lie when physical evidence to the contrary is present (Evans & Lee, 2011).

E1 asked the target question: "*Did you look at the gift when I was outside?*" If the child denied looking at the gift, then E1 asked the follow-up question: "*Can you make a guess what the gift is?*" This question was to examine whether children could keep their subsequent statement consistent with the initial lie and control for verbal leakage. Children who resisted revealing the identity of the gift by guessing something else or feigning ignorance were considered more advanced in lying (Polak & Harris, 1999; Talwar & Lee, 2002a). If the child admitted looking at the gift, then E1 said: "*It's okay that you looked*" to rid the child of any potential guilt of the transgression.

Self-Motivated Condition

The *self-motivated condition* was similar to the *ambiguous condition*, except that an inanimate mechanism fan replaced the third-party transgressor and blew open the

towel to reveal the gift. In the beginning of the task, E1 turned on a small mechanical fan attached to the table and drew the child's attention to the effect of the fan: "look, the wind is blowing!" E1 then informed the child that she prepared a gift for the child. In this condition, the gift was hidden under a towel that had been partially taped to the table before the experiment to ensure the child could not see the gift. E1 then made an excuse to leave the room and instructed the child not to look or touch the gift during her absence (Figure 2).

Fifteen seconds after E1 left the testing room, E2, who had been hiding behind a curtain in the testing room, discreetly pulled an invisible fishing wire that had been pre-attached to the towel. As a result, half of the hidden gift was exposed to the child. From the child's perspective, the fan was the most probable cause of the gift's sudden unveiling. After 15 seconds, E1 opened the door and returned to sit in front of the child. The remaining procedure was identical to the *ambiguous condition*.

Other-Motivated Deception

The *other-motivated condition* was identical to the *ambiguous condition*, with two critical manipulations. In the *other-motivated condition*, children were told that 1) the gift was prepared for the E2, and that 2) the rule (i.e., not to look or touch the gift) only applied to E2.

First, E1 introduced children to E2, who would later join them for a game. Then E1 invited each child individually into the testing room to play a game. E1 informed the child that she had prepared a gift for E2 and put the gift on the table. The gift was pre-wrapped in an opaque towel to ensure that children did not see the gift. E1 then made an excuse to leave the room ("I need to get a gift bag to put the gift in!"). Before leaving, she informed the child of a rule she set up for E2 – that E2 was not allowed to look or touch the gift during E1's absence (Figure 3).

The remining procedure was identical to the *ambiguous condition*. For the target question, E1 asked the child: "*Did Ms. XXX (name of E2) look at the gift when I was outside*?" If the child denied that E2 had looked at the gift, then E1 asked the follow-up question: "*Can you make a guess what the gift is*?"

Measures

Nonverbal Deception

To measure children's nonverbal deception, their reactions to the half-exposed gift were coded. Children who covered up the half-exposed gift with the towel prior to E1's re-entry were coded as deceivers, and children who left the gift exposed were coded as non-deceivers.

Nonverbal Deception Latency

For the deceivers, their latency to cover up the exposed gift was coded. In the *ambiguous* and *other-motivated conditions*, latency was measured by the time difference between when E2 uncovered the gift and when the child covered up the gift. In the *self-*

motivated condition, latency was measured by the time difference between when the fan unveiled the gift and when the child covered up the gift.

Verbal Deception

In the *ambiguous* and *self-motivated conditions*, children's answers to the target question: "*Did you look at the gift when I was outside?*" were coded. If a child admitted looking at the gift, the child was classified as a truth-teller. If a child spontaneously disclosed information about the transgression prior to the target question, then the child was also classified as a truth-teller. If a child denied looking at the gift and did not disclose any information regarding the transgression, the child was classified as a lie-teller.

In the *other-motivated condition*, children's answers to the question: "*Did Ms. XXX (name of E2) look at the gift when I was outside?*" were coded. If a child admitted that E2 had looked at the gift, the child was classified as a truth-teller. If a child spontaneously disclosed information about the transgression, then the child was also classified as a truth-teller. If a child denied that E2 had looked at the gift and did not disclose any information regarding the transgression prior to the target question, the child was classified as a lie-teller.

Verbal Deception Latency

For the lie-tellers, their latency to respond to the target question "Did you/E2 look at the gift" was coded. Verbal deception latency was measured by the time difference between when E1 finished asking the target question and when children provided their answers. Note that the latency measure could be either positive or negative. For children

who blurted out their responses before E1 finished her question, their latency measure would be negative.

Lie Maintenance

For the lie-tellers, their ability to maintain the lie was coded through their responses to the follow-up question: "*Can you make a guess what the gift is*?" (Evans & Lee, 2013; Talwar & Lee, 2008). Children were considered concealers if they kept their subsequent statement consistent with their initial lie and managed to conceal the truth by feigning ignorance (e.g., "I don't know!") or guessing another gift (e.g., "maybe it's a car" when the gift was a bendable cow). Children were considered revealers if they could not help but blurting out what the hidden gift was and leaked the truth.

Transgression Prevention

Children's propensity to protest and prevent the third-party transgression was coded in the *ambiguous* and the *other-motivated conditions*. Children who exhibited verbal or nonverbal behaviors that suggested an intention to prevent the transgression were classified as transgression preventers. Examples of nonverbal behaviors include grabbing onto the towel or pushing E2's hand away. Examples of verbal behaviors include statements such as "No! No! Don't touch it!" or "The person working here said not to look!" Children who exhibited no intention of preventing the transgression were classified as transgression approvers.

This measure was not coded in the *self-motivated condition* because the fan served as the mechanism that unveiled the gift. The accident was caused by an inanimate object and occurred quickly. Therefore, children were not provided with the opportunity to prevent it from happening.

Spontaneous Disclosure

Children's tendency to spontaneous disclosure the transgression was coded. Children were considered disclosers if they commented on the transgression without prompting and before E1 asked the target question. Examples of spontaneous disclosures are: "well, someone made me look at it" (*ambiguous condition*); "the fan blows off the towel!" (*self-motivated condition*); and "she saw it while you were outside" (*other-motivated condition*). Children were coded as non-disclosers if they did not spontaneously disclose the transgression.

Spontaneous Disclosure Latency

For disclosers, their latency to disclose the transgression was coded. Latency was measured by the time difference between when E1 re-entered the testing room and when children disclosed the transgression. It serves as a proxy measure of children's eagerness to disclose the rule violation.

Behavioral Coding and Reliability

Two trained researcher assistants coded children's behaviors in the deception task. For categorical variables, including nonverbal deception, verbal deception, lie maintenance, transgression prevention, and spontaneous disclosure, we calculated Cohen's Kappa to measure inter-rater reliability. Inter-rater reliability was good across all categorical measures, with Cohen's Kappa ranging from 0.82-1: nonverbal deception (Cohen's Kappa = 1), verbal deception (Cohen's Kappa = .94), lie maintenance (Cohen's Kappa = 0.96), transgression prevention (Cohen's Kappa = 0.82), and spontaneous disclosure (Cohen's Kappa = 0.96).

For latency measures that include nonverbal deception latency, verbal deception latency, and spontaneous disclosure latency, the measures were first coded by a well-trained research assistant. Then a second research assistant coded 20% of the participants to ensure accuracy. Interrater reliability was excellent - all differences in latency measures fell within 1.2 seconds.

Analysis Plan

First, preliminary analyses using one-way ANOVA and chi-square analyses were conducted to examine whether age and gender distributions were significantly different across the three experimental conditions. Because some data collection in the *other-motivated condition* happened during the pandemic, we also performed separate chi-square analyses to test whether the pre-pandemic sample significantly differed from the pandemic sample on the two deception measures (i.e., nonverbal and verbal). Then, we obtained and reported descriptive statistics for each measure.

To test our main hypotheses, we first performed a binary logistic regression with nonverbal deception as outcome variable, and age group (younger: 2 ½ -4 years old; older: 4-5 years old), condition, and age group x condition interaction as predictors. The same analysis was repeated for verbal deception. These analyses were conducted to examine whether age group, condition, and the interaction between age group and condition were predictive of children's deceptive behaviors, as we hypothesized.

To test our first hypothesis that children between 2 ½ - 4 years would deceive primarily for self-serving reasons, we performed chi-square analyses to compare the rate

of verbal deception and nonverbal deception between the *ambiguous condition* and the *self-motivated condition*, and between the *ambiguous condition* and the *other-motivated condition*. We also conducted one-way ANOVA to test whether children's latency to nonverbal and verbal deception would differ across the three motivational conditions. Then, we compared the rate and speed of spontaneous disclosure across the three conditions. The rationale was that, if children deceived out of self-motivation, then they may have engaged in spontaneous disclosures more and faster in the *self-motivated condition* than in other two conditions. The same set of analyses were repeated with 4-5-year-old children to probe our second hypothesis that the motivation to deceive diversifies from 4-5 years of age. To test our last hypothesis that deception increases with age, we performed multiple logistic regressions with age in months as predictor and verbal deception, nonverbal deception, and lie maintenance as outcome variables.

Finally, we ran exploratory analyses to probe relationships between verbal and nonverbal measures of deception, as well as between transgression prevention and the deception measures. We conducted binary logistic regression with verbal deception as outcome variable and nonverbal deception as predictor to test whether nonverbal deception was predictive of verbal deception. In addition, we performed binary logistic regressions with nonverbal and verbal deception as outcome variables and transgression prevention as predictor to examine whether children's sensitivity to transgressions was predictive of their deception. All analyses were conducted using RStudio Version 1.2.5001.

Results

Preliminary Analyses

Age and Gender Distributions Across Experimental Conditions

To ensure that children across the three experimental conditions were comparable in age distributions, we first conducted a one-way ANOVA with age in months as dependent variable and condition as independent variable. The ANOVA showed that age distributions were not significantly different across conditions, F (1, 194) = 1.07, p = .304. Secondly, we performed a chi-square analysis to ensure that gender distributions were comparable across conditions. Chi-square analysis revealed no significant gender differences across the experimental conditions, χ^2 (4, 196) = 2.90, p = .574. Therefore, we were confident that results from the study were not driven by age and gender differences across conditions.

Comparing Participants Recruited Pre-Pandemic and During the Pandemic

Children who participated in the study during the pandemic may have been impacted by 1) mask-wearing by the experimenters or 2) general stress due to the pandemic. Therefore, we tested whether the pandemic sample was significantly different from the pre-pandemic sample for the two deception measures in the study: nonverbal deception and verbal deception. Please note that the pandemic sample was only recruited for the *other-motivated condition*.

We performed separate Chi-square tests to compare the pandemic sample (n = 17) with the pre-pandemic sample (n = 38) in the *other-motivated condition* for nonverbal deception and verbal deception. The analyses revealed no significant difference between the pre-pandemic sample and the pandemic sample for nonverbal deception, p = .318, and

for verbal deception, $p = .991$. Therefore, we combined the pre-pandemic sample and the pandemic sample in the following analyses.

Descriptive Statistics

Nonverbal Deception

One child from the *other-motivated condition* was excluded for this measure due to experimenter error. Overall, 72 children (36.9%) covered up the exposed gift, and 123 children (63.1%) did not. In the *ambiguous condition*, 33 children (42.9%) covered up the gift and were classified as deceivers. Forty-four children (57.1%) left the gift exposed and were classified as non-deceivers. In the *self-motivated condition*, 20 children (31.7%) were deceivers, and 43 children (68.3%) were non-deceivers. In the *other-motivated condition*, 19 children were deceivers (34.5%), and 36 children (65.5%) were non-deceivers. Overall, around 1/3 of children engaged in nonverbal deception across conditions (Table 1).

Nonverbal Deception Latency

Among children who covered up the exposed gift, the average time it took them was 9.8 seconds, with a median of 8.5 and a range from 0.2 - 48.2. In the *ambiguous condition*, the average nonverbal deception latency was 13.1 seconds; in the *self-motivated condition*, the average was 4.5 seconds; and in the *other-motivated condition*, the average was 9.7 seconds. The results suggest that most deceivers covered up the gift after a short delay and not immediately after the unveiling of gift.

Verbal Deception

Three children refused to answer the target question and were therefore excluded from the analyses. Across the three conditions, 78 children (40.4%) were lie-tellers, and 115 children (59.6%) were truth-tellers. In the *ambiguous condition,* 39 children (52%) denied looking at the gift and were classified as lie-tellers. Thirty-six children (48%) admitted looking at the gift and were classified as truth-tellers. In the *self-motivated condition*, 22 children (34.9%) were categorized as lie-tellers and 41 children (65.1%) were categorized as truth-tellers. In the other-motivated condition, 17 children (30.9%) were lie-tellers and 38 (69.1%) were truth-tellers. On the whole and consistent with previous findings (e.g., Carl & Bussey, 2019; Evans & Lee, 2013), approximately less than half of the children lied about the transgression.

Verbal Deception Latency

Among the lie-tellers, the average time it took them to deny the incident was 1.61 seconds, with a median of 1.0 and a range from -1.5-16.0. In the *ambiguous condition*, the mean nonverbal deception latency was 1.9 seconds; in the *self-motivated condition*, the mean was 0.7 seconds; and in the *other-motivated condition*, the mean was 2.0 seconds. This suggests that the majority of lie-tellers responded quickly to the target question and lied within 1-2 seconds.

Lie Maintenance

Two children refused to answer the question "*Can you make a guess what the gift is?*" and were therefore excluded from subsequent analyses with this measure. Among the remaining 76 lie-tellers across the three experimental conditions, only 18 (23.7%) maintained their initial lie in their subsequent responses; the other 58 children (76.3%) leaked the truth. In the *ambiguous condition*, 5 out of 36 children (13.9%) maintained the lie; in the *self-motivated condition*, 8 out of 23 children (34.8%) maintained the lie; and

in the *other-motivated condition*, 5 out of 17 children (29.4%) maintained the lie. Consistent with existing research (e.g., Talwar & Lee, 2008), most lie-tellers in the 2 ½ - 5-years age range could not resist leaking the truth when asked subsequent questions about the incident.

Transgression Prevention

Across the *ambiguous* and the *other-motivated conditions*, 63 out of 132 children (47.7%) attempted to prevent the transgressor from uncovering the gift. In the *ambiguous condition*, 33 out of 77 children (42.9%) prevented the transgressor. In the *other-motivated condition*, 30 out of 55 children (54.5%) prevented the transgressor. This shows that approximately half of the children were sensitive to the transgression and tried to prevent the rule violation.

Spontaneous Disclosure

Overall, 59 children (30.1%) spontaneously disclosed the transgression without any prompting, whereas 137 children (69.9%) were non-disclosers. In the *ambiguous condition*, 13 children (16.9%) were classified as disclosers, and 64 children (83.1%) were non-disclosers. In the *self-motivated condition*, 32 children (50.8%) were disclosers, and 31 children (49.2%) were non-disclosers. In the *other-motivated condition*, 14 children (25%) were categorized as disclosers and 42 (75%) were non-disclosers. At a glance, children's tendency to disclose the incident appears to vary across the motivational conditions.

Spontaneous Disclosure Latency

Among disclosers, the average time it took them to disclose the incident was 18.82 seconds across the conditions, with a median of 20.00 and a range from 1.0 -39.0.

In the *ambiguous condition*, the mean of spontaneous disclosure latency was 24.91 seconds; in the *self-motivated condition*, the mean was 16.29 seconds; and in the *other-motivated condition*, the mean was 18.36 seconds. Overall, children appear not to disclose the incident immediately after E1 returned; instead, they tended to mention it after a delay.

Main Analyses

Because we hypothesized a change in deceptive motivations at around 4 years of age, we first subset our data into two age groups: younger children between 2 ½ -4 years of age and older children between 4-5 years of age. For the younger age group, the subset included 120 children (M = 39.3 months, SD = 4.7, range = 31 to 47 months, 72 females), with 45 children in the *ambiguous condition*, 39 children in the *self-motivated condition*, and 36 children in the *other-motivated condition*. For the older age group, the subset included 76 children (M = 54.0 months, SD = 3.8, range = 48 to 62 months, 39 females), with 32 children in the *ambiguous condition*, 24 children in the *self-motivated condition*, and 20 children in the *other-motivated condition*.

As a first step, we conducted two binary logistic regressions to probe whether age and condition would be predictive of children's deceptive behaviors. A binary logistic regression was performed with nonverbal deception as the outcome variable, and age group, condition, and age group x condition as predictors. The model was significant, p = .000, AIC = 237. Condition was predictive of children's propensity to engage in nonverbal deception, p = .014, SE = 0.29, OR = 0.50, 95%CI [-1.27, -0.16]. The results also revealed that condition x age group interaction was predictive of nonverbal

deception, p = .005, SE = 0.41, OR = 3.14, 95%CI [0.35, 1.97]. Age group by itself was not a predictor of nonverbal deception, p = 0.35. This initial analysis suggests that condition predicted children's propensity to engage in nonverbal deception, but the effect depended on children's age group.

This analysis was repeated with verbal deception as the outcome variable, and age group, condition, and age group x condition as predictors. The model was significant, p = .034, AIC = 260. Condition was predictive of children's verbal deception, p = .006, SE = 0.25, OR = 0.51, 95%CI [-1.19, -0.20]. However, the regression revealed no main effect of age group, p = 0.29, or age group x condition interaction, p = 0.16. The analysis with verbal deception suggests that condition, rather than age, predicted children's tendency to verbally lie.

Hypothesis 1: 2 ½ -4-year-old children deceive primarily for self-serving reasons

To test our first hypothesis that 2 ½ -4-year-old children deceived primarily due to self-motivation, we conducted a chi-square analysis with the subset of younger age group on nonverbal deception (deceivers vs. non-deceivers) and conditions (*ambiguous condition* vs. *self-motivated condition*). The analysis did not reveal significant differences on nonverbal deception across the two conditions, χ^2 (1, 84) = 2.21, p = .137. The same analysis was repeated with verbal deception (lie-tellers vs. truth-tellers) and conditions (*ambiguous condition* vs. *self-motivated condition*). Again, the result was not significant, χ^2 (1, 82) = 1.89, p = .169. These results show that children's deceptive behaviors did not differ significantly between the *ambiguous condition* (with transgressor) and the *self-motivated condition* (without transgressor). The result provides support for our

hypothesis that 2 ½ -4-year-old children deceived primarily out of self-motivation. Even when the transgressor was removed and there was no other-motivated reason to lie, children still deceived at approximately the same rate between the two conditions (Figure 4).

To further test the first hypothesis, we directly examined whether younger children would deceive for motivations that were exclusively other-serving. We performed a chi-square analysis with the subset of younger age group on nonverbal deception (deceivers vs. non-deceivers) and condition (*ambiguous condition* vs. *other-motivated condition*). The analysis showed that 2 ½ -4-year-old children tended to engage in nonverbal deception less in the *other-motivated condition* compared to the *ambiguous condition*, χ^2 (1, 81) = 4.62, p = .032. The same analysis was repeated for verbal deception. Consistent with nonverbal deception, younger children also tended to verbally lie less in the *other-motivated condition* compared to the *ambiguous condition*, χ^2 (1, 78) = 6.33, p = .012. These results suggest that when children were no longer implicated in the transgression (as was the case in the *other-motivated condition*), the rate of deception significantly decreased (Figure 4). They were less likely to lie when lying exclusively benefited a third party. Together, these findings further support our first hypothesis that 2 ½ -4-year-old children deceive primary out of self-motivation.

For younger children who engaged in nonverbal deception, we also explored whether condition may have influenced their latency to cover up the gift. The rationale was that, if children's deception was self-serving, then children may have covered up the exposed gift faster when there was no one else to blame for the incident, as in the *self-motivated condition*, than when there was a third party to blame, as in the *ambiguous* and

other-motivated conditions. A one-way ANOVA was conducted with nonverbal deception latency as the dependent measure and condition (*ambiguous, self-motivated, other-motivated*) as the independent variable. The model was marginally significant, $F(1, 30) = 3.87$, $p = .055$. Post hoc analyses revealed that younger children were significantly faster to cover up the gift in the *self-motivated condition* compared to the *ambiguous condition*, $p = .000$, and the *other-motivated condition*, $p = .000$.

The same analysis was repeated for verbal deception latency, and younger children's latency to verbal deception did not differ across conditions, $F(1, 42) = 0.18$, $p = .673$. For the lie-tellers, children's speed to deny the incident did not vary based on the experimental conditions. Overall, 2 ½ -4-year-old children tended to cover up the exposed gift faster when the transgressor was absent and there was no one else to blame for the incident (*self-motivated condition*), than when the transgressor was present and children could blame a third party for the rule violation (*ambiguous* and *other-motivated conditions*). This finding further supports our hypothesis that children's earliest deception was self-motivated.

We then tested whether condition influenced younger children's tendency to spontaneous disclose the incident. Again, the rationale was that, if children were self-motivated to lie, then they should have been more inclined to spontaneously disclose the incident in situations where they were the only one responsible for the transgression, as in the *self-motivated condition*, than in situations where they could place responsibility on a third party, as in the *ambiguous* and *other-motivated conditions*. Chi-square test revealed that the rate of spontaneous disclosure significantly differed across the experimental conditions, $\chi^2 (2, 114) = 7.37$, $p = .025$. Post hoc tests showed that 2 ½ -4-year-old

children were significantly more likely to spontaneously disclose in the *self-motivated condition* compared to the *ambiguous condition*, χ^2 (1, 79) = 5.97, p = .015. Overall, 2 ½ -4-year-old children were more inclined to spontaneously disclose an accident caused by an inanimate object (i.e., the fan; *self-motivated condition*) than a transgression committed by an intentional transgressor (*ambiguous condition*). In other words, they were more likely to disclose the incident when they were the only ones to blame for the rule transgression (Figure 5).

Lastly, for younger children who spontaneously disclosed, we tested whether the speed at which they disclosed the incident may differ across conditions. Due to violation of the homogeneity of variance assumption in ANOVA, we performed a Kruskal-Wallis test (a nonparametric equivalent of ANOVA) with spontaneous disclosure latency as dependent measure and condition as independent variable. The model was significant, χ^2 (2) = 7.63, p = .022. Post hoc pairwise t tests revealed that 2 ½ -4-year-old children were significantly faster in disclosing the incident in the *self-motivated condition* than in the *ambiguous condition*, p = .007. In addition to engaging in higher rates of spontaneous disclosure, children in the *self-motivated condition* also tended to disclose the incident faster than in the *ambiguous condition*. This shows that children were more eager to disclose an incident when they were the only ones that could be blamed for the incident. Overall, results from the spontaneous disclosure measures suggest that children's actions and responses in the third-party transgression paradigm were self-serving to avoid potential repercussions.

Hypothesis 2: The motivation to deceive diversifies from 4-5 years of age

To examine our second hypothesis that 4-5-years-old children would deceive for both self-serving and other-serving reasons, we repeated the previous analyses with the older age group between 4-5 years of age. First, we performed a chi-square analysis with the subset of 4-5year-old children on nonverbal deception (deceivers vs. non-deceivers) and conditions (*ambiguous condition* vs. *self-motivated condition*). Results showed that 4-5-year-old children engaged in nonverbal deception at approximately the same rate across the two conditions, χ^2 (1, 56) = 0, p = 1.00. We repeated the chi-square analysis with verbal deception and found that verbal deception also did not differ across the two conditions, χ^2 (1, 56) = 0.95, p = .330. Similar to the younger age group, 4-5-tear-old children did not differentiate between the *ambiguous* and *self-motivated conditions* in their deception.

To further test our second hypothesis, we directly examined whether 4-5-year-old children would have deceived for other-motivated reasons. We performed a chi-square analysis with the subset of 4-5-year-old children on nonverbal deception (deceivers vs. non-deceivers) and condition (*ambiguous condition* vs. *other-motivated condition*). In contrast to results from the younger children, we did not find a difference between the *ambiguous condition* versus the *other-motivated condition* for nonverbal deception, χ^2 (1, 51) = 1.87, p = .172. The same analysis was repeated for verbal deception, which also revealed no significant difference between the two conditions, χ^2 (1, 52) = 0.00, p = .948. Overall, 4–5-year-old children did not demonstrate the selectivity to social motivational context that we found in younger children. Instead, they tended to engage in deception both for serving-serving reasons and for other-serving reasons. These results supported

our second hypothesis that the motivation to deceive diversifies at around 4 years of age (Figure 4).

For 4-5 years old children who engaged in nonverbal deception, we examined whether condition may have influenced their latency to cover up the exposed gift. The rationale was to test whether 4-5-year-old children, like younger children, would have been faster to deceive in the condition that was exclusively self-serving (*self-motivated condition*) than in the other conditions. A one-way ANOVA was conducted with nonverbal deception latency as the dependent measure and condition (*ambiguous*, *self-motivated*, *other-motivated*) as independent variable. The model was not significant, $F(1, 40) = 0.03$, $p = .860$. Among children who covered up the exposed gift, the speed at which they engaged in the nonverbal deceptive act did not differ significantly across conditions. The same analysis was repeated for verbal deception latency, and older children's latency to verbal deception also did not differ across conditions, $F(1, 30) = 0.50$, $p = .484$. For the lie-tellers, children's speed to deny the incident did not vary based on the experimental conditions. In contrast to results from 2 ½ -4-year-old children, who covered up the exposed gift faster in the *self-motivated condition* compared to the other two conditions, 4-5-year-old children's latency to nonverbal deception did not differ across conditions. This suggests that 4-5-year-old children were as eager to cover up the exposed gift when there was a third-party to take responsibility for the transgression (*ambiguous* and *other-motivated conditions*) as when there was no one else to blame (*self-motivated condition*). The results provide support for the hypothesis that 4-5-year-

old children's deception was not exclusively self-motivated; instead, their behaviors could have been driven by more than one motives.

We then tested whether condition influenced older children's tendency to spontaneous disclose the incident (Figure 5). This was intended to examine whether older children, like the younger age group, would disclose more and faster in the *self-motivated condition* compared to the other conditions. Chi-square test revealed that children's propensity to spontaneous disclose differed across conditions, χ^2 (2, 71) = 8.64, p = .013. Older children were more likely to engage in spontaneous disclosure in the *self-motivated condition* compared to the *ambiguous condition*, χ^2 (1, 51) = 5.44, p = .020, and they were also more likely to disclose in the *self-motivated condition* compared to the *other-motivated condition*, χ^2 (1, 40) = 3.84, p = .050.

Among the disclosers, we tested whether the speed at which children disclosed the incident may have differed across conditions. Due to violation of the homogeneity of variance assumption in ANOVA, we performed a Kruskal-Wallis test with spontaneous disclosure latency as dependent measure and condition as independent variable. The model was significant, χ^2 (2) = 6.71, p = .035. Post hoc pairwise t tests revealed that 4-5-year-old children were significantly faster in disclosing the incident in the *self-motivated condition* than in the *ambiguous condition*, p = .036, and in the *other-motivated condition*, p = .029. No difference was found between the *ambiguous* vs. *other-motivated conditions*, p = .802. Corroborating with findings from the younger age group, children between 4 -5-years of age disclosed an incident both at a higher rate and faster without an intentional third-party transgressor. Overall, 2 ½ -5-year-old children were more likely and faster to disclose the incident in situations where they were the only ones to take

responsibility for the rule violation (*self-motivated condition*) compared to situations where a third party could be blamed for the transgression (*ambiguous* and *other-motivated conditions*). The spontaneous disclosure measures suggest that children were eager to disclose a transgression out of self-preservation across the two age groups.

Hypothesis 3: Both self-motivated and other-motivated deception increase with age

To test our third hypothesis on age, we performed two separate binary logistic regressions with nonverbal deception and verbal deception as outcome variables and age in months as predictor with the full sample. Age was a significant predictor of nonverbal deception when collapsed across the three conditions, χ^2 (1, 194) = 4.32, *SE* = 0.02, *OR* = 1.09, *p* = .000, 95%*CI* [0.05, 0.12], AIC = 240.1, and older children were more prone to cover up the exposed gift than younger children. However, we did not find an age effect for verbal deception, *p* = .571, suggesting that age did not play a role in children's propensity to lie verbally. We also conducted an additional binary logistic regression with lie maintenance as outcome variable and age in month as predictor. The model was not significant, *p* = .731. Therefore, age was not predictive of children's ability to maintain their lie.

Lastly, we repeated the previous steps and conducted separate binary regression analyses with nonverbal deception, verbal deception, and lie maintenance as outcome variables, and age in months as predictor for each of the three experimental conditions.

Age was a significant predictor of nonverbal deception in the *self-motivated condition*, χ^2 (1, 62) = 2.33, *SE* = 0.04, *OR* = 1.09, *p* = .020, 95%*CI* [0.02, 0.16], AIC = 76.8, and the *other-motivated condition*, χ^2 (1, 54) = 3.48, *SE* = 0.05, *OR* = 1.17, *p* = .000, 95%*CI* [0.08, 0.26], AIC = 57.6. No other age effect was found. Overall, we only found age effect in children's tendency to cover up the exposed gift, but not their propensity to lie verbally or to maintain their lie. Therefore, our third hypothesis that deception increases with age was only partially supported.

Exploratory Analyses

Verbal and Nonverbal Deception

We also conducted exploratory analyses to test whether nonverbal and verbal deceptive measures were related in our study. We performed a binary logistic regression with verbal deception as outcome variable and nonverbal deception as predictor. The model was not significant, *p* = .820. Nonverbal deception did not predict verbal deception in the study. We then repeated the binary logistic regression for each condition. In the *self-motivated condition*, nonverbal deception was predictive of verbal deception, *p* = .031. The two deceptive measures were not related in the *ambiguous condition* or in the *other-motivated condition*, respectively *p* = .696 and *p* = .069. Overall and contrary to our prediction, children's verbal and nonverbal deception were not related in our deception task.

Transgression Prevention

Finally, we explored whether children's sensitivity to the transgression would be predictive of their deceptive responses. We conducted a binary logistic regression with

nonverbal deception as outcome variable and transgression prevention as predictor. The model was significant, $p = .005$. Across the *ambiguous* and the *other-motivated conditions*, children were more likely to cover up the exposed gift when they tried to prevent the transgression. The *self-motivated condition* was excluded from this analysis because the transgression was potentially caused by an inanimate fan and children did not have the opportunity to prevent it. Next, we repeated the binary logistic regression separately for the *ambiguous* and the *self-motivated conditions*. Transgression prevention was predictive of nonverbal deception in the *ambiguous condition*, $p = .002$, but not in the *other-motivated condition*, $p = .995$. We then conducted a binary logistic regression with verbal deception as outcome variable and transgression prevention as predictor. The model was not significant, $p = .536$. Children's sensitivity to the transgression was not predictive of their verbal lies. Overall, children's propensity to prevent a transgression was related to their propensity to nonverbally cover up the transgression only when they were implicated in the transgression (*ambiguous condition*).

Discussion

Deception is a prevalent social behavior, and it emerges in early childhood. In the past two decades, researchers have systematically studied 1) *when* deception emerges (Polak & Harris, 1999; Evans & Lee, 2013; Fu et al., 2018) and 2) *how* it emerges (Lee & Imuta, 2021; Sai et al., 2021; Talwar & Lee, 2008). But what still remains for the most part unanswered is *why* deception emerges. What motivates young children to produce their first lies, and how does the motivation to deceive change in development? The current dissertation aimed to examine these two questions.

We tested 217 2 ½ -5 -year-old children using a modified third-party transgression paradigm. Children were assigned to one of the three experimental conditions, where they had the opportunity to deceive for reasons that were 1) *ambiguous,* 2) *self-motivated*, or 3) *other-motivated*. Based on developmental evidence that suggests a developmental lag between antisocial and prosocial deception (Demedardi & Monnier, 2019; Rochat & Guo, 2021), we proposed that children's earliest deception is primarily driven by self-serving motivations (Hypothesis 1). We also hypothesized that around 4 years of age is a critical transitional period, when children begin to deceive for both self-serving and other-serving reasons (Hypothesis 2). Lastly, we predicted that older children would engage in higher rate of deception compared to younger children, regardless of whether it is self-motivated or other-motivated.

Our results support the first hypothesis that 2 ½ -4-year-old children deceive primarily for self-serving reasons when implicated in a third-party transgression. We found that young children were as likely to deceive in the *ambiguous condition* as in the *self-motivated condition*. In other words, younger children were equally likely to engage in deception when a transgressor was present (*ambiguous condition*) as when the transgressor was absent (*self-motivated condition*; fan replaced transgressor). As such, children's deceptive behaviors were unlikely produced to help the transgressor. Rather, deception was used to benefit children themselves, presumably to avoid potential punishment. Results comparing the *ambiguous condition* and the *other-motivated condition* further support this hypothesis. Children were less likely to deceive in the *other-motivated condition* compared to the *ambiguous condition*. The result suggests that 2 ½ -4-year-old children were less inclined to deceive to help someone else when they

were only observers to another's transgression (*other-motivated condition* condition) than when they were implicated in the transgression (*ambiguous condition*). The results were consistent for both nonverbal and verbal deception measures, which further indicates that 2 ½ -4-year-old children were primarily self-motivated to deceive in a third-party transgression.

Results from children's spontaneous disclosures further supported the hypothesis that young children's earliest deception is self-motivated. We found that 2 ½ -5-year-old children tended to disclose the incident more and faster in the *self-motivated condition* than in the other two conditions. In other words, children disclosed more and faster when no third-party transgressor was involved. One interpretation is that children disclosed more when the fan was the perceived mechanism that caused the incident (*self-motivated condition*) because there was no one else to blame in that situation. As such, children needed to use spontaneous disclosure as a way to avoid potential blame of transgressing the rule. In contrast, children had someone to place potential blame on in both the *ambiguous condition* and the *other-motivated condition*. Hence, they were less likely to disclose. If this was the case, then children's disclosure was self-serving to provide explanations only in situations when they had to take full responsibility for the rule violation.

Alternatively, the higher rate and faster speed of disclosure we found in the *self-motivated condition* could be attributed to children's increasing negative evaluation of tattling on others (Kim et al., 2014). Tattling refers to reporting another person's rule violation to a third-party (Lok et al., 2011). Although children often tattled on their peers' rule violations in preschool (Ingram & Bering, 2010), starting from 4 years of age, they

begin to view tattling more negatively (Kim et al., 2014). This is likely because tattlers often have difficulties making friends in school (Syvertsen et al., 2009). In our paradigm, children may have been reluctant to disclose information about the third-party transgressor, which resulted in the lower and slower rates of spontaneous disclosure in the *ambiguous* and *other-motivated conditions*. Children may have refrained from disclosing in the other two conditions to avoid being labelled as tattlers. If this may be the case, it would mean that older children's selective disclosure of the incident, only in the *self-motivated condition,* could still be interpreted as self-serving to avoid negative evaluation from the adult experimenter. Taken together, both explanations would support our first hypothesis that young children are self-motivated in their behavioral responses in our paradigm.

Our results also support our second hypothesis which posited that the motivation to deceive diversifies from 4 years of age. We found that 4–5-year-old children were equally likely to deceive across the three experimental conditions. Compared to the 2 ½ - 4-year-old children, 4-5-year-old children were apparently less sensitive to the motivational context and inclined to deceive at approximately the same rate across conditions. They deceived for self-serving reasons (*self-motivated condition*), for other-serving reasons (*other-motivated condition*), and for reasons that were ambiguous (*ambiguous condition*). As such, 4-5-year-old children did not appear to be driven by either only self-serving or only other-serving motive, but rather by both motives equally. Again, children's nonverbal and verbal deceptive behaviors were consistent, further supporting our hypothesis that children tend to deceive not only for selfish reasons, but also for the protection of others, from around 4 years of age.

As for our last hypothesis that both verbal and nonverbal deception would increase with age, our results show mixed findings. Overall, our data on nonverbal deception support the hypothesis that older children were more likely to deceive for both self-motivated and other-motivated reasons. However, results from the verbal measure did not show an age effect. Younger children were as likely to verbally lie about the incident as older children. This was not surprising given that many studies failed to show an age effect when using verbal lies as measure of deception with a relatively small age range (2-3 years, Evans & Lee, 2013; 2-4 years, Leduc et al. 2017). Existing studies that show an age effect on children's propensity to lie often include children over a larger age range, usually more than 5 years (e.g., 4-14 years, Carl & Bussey, 2019; 4-12 years, Gordon et al., 2014; 3-8 years, Talwar & Lee, 2008). Therefore, the lack of developmental change in verbal deception may be a result of the relatively narrow age range captured in the current study. Future studies could test a larger age range of children (e.g., 2 ½ -8 years old) using the same paradigm to examine whether our lack of age effect is due to the narrow age range included in the study.

Another possibility is that verbal deception (i.e., verbal lies) is not a reliable measure of early deception, given that young children often show a response bias in their verbal answers. Fritzley & Lee (2003), as a case in point, found that children younger than 4 years of age often demonstrated a yes bias when asked a yes-no question. But if this was the case, then younger children would have been more likely to answer yes to the target question "*Did you look at the gift when I was outside*", and therefore, less inclined to lie about the transgression. In other words, we would have underestimated the rate of verbal deception in 2 ½ -4-year-olds and have found an even more robust age

effect in our data. Since we did not observe a developmental change in verbal deception, children's yes bias does not offer a plausible explanation to our results.

A third possibility is that the verbal deception measure captured not only children's ability to lie, but also their willingness to lie. Most existing research on children's verbal lies have used simple paradigms that aimed to measure young children's ability to lie (e.g., hide-and-seek paradigm, Ding et al., 2015; temptation resistant paradigm, Talwar & Lee, 2008; disappointing gift paradigm, Talwar et al., 2007). Our paradigm was considerably more complex, given that it involved not only an adult experimenter (E1), but also a third-party transgressor (E2) who violated an explicit rule. This third-party rule violation could have been the reason why children were less willing to lie. Current literature suggests that, at least by 3 years of age, young children show sensitivity to rules and norms (Rakoczy et al., 2008; Rossano et al., 2012; Vaish et al., 2011). For example, Vaish et al. (2011) showed that 3-year-old children would protest against a puppet who destroyed someone else's artwork. Similarly, Rakoczy et al. (2008) showed that 3-year-old children could use normative language to protest when a game rule was transgressed (e.g., "No! It doesn't go like this!"). Because of their sensitivity to rule violations, it is possible that children in our study were unwilling to lie to the researcher, because lying involved covering up for someone else's rule transgression. As such, the lack of age effect in verbal deception may be explained by children's, especially older children's, lack of willingness to lie despite their increased capability of deception.

Although more than 40% children across the conditions lied about the incident, very few could keep semantic control when answering the subsequent question "*Can you make a guess what the gift is*?" Only around 24% of the lie-tellers could maintain their

lies. This was consistent with previous studies showing that preschool-age children often have difficulties preventing semantic leakage as they answer more questions about the incident (Talwar & Lee, 2002a; Talwar &Lee, 2008). We also did not detect an age effect in lie maintenance, which is surprising given that current literature suggests that, with age, children tend to be more capable of keeping their subsequent statements consistent with their initial lie (e.g., Talwar & Lee, 2002a; Talwar & Lee, 2008). Similar to our discussion above regarding the lack of age effect on verbal deception, our finding on lie maintenance may also be due to a smaller age range of children included in the current study, or a unwillingness to maintain their lie in the third-party transgression paradigm.

Moreover, our results show that children's propensity to prevent the transgressor was predictive of their nonverbal deception, but only in the *ambiguous condition* and not in the *other-motivated condition* (this measure was not coded in the *self-motivated condition* because children were not provided the opportunity to prevent the transgression). This suggests that children's sensitivity to rule violations could influence their propensity to cover up for it, but only when they were personally implicated in the incident. When children were mere observers to the rule violation, as was the case in the *other-motivated condition*, transgression prevention was not predictive of their likelihood to deceive.

Lastly and contrary to our prediction, our data did not reveal a relationship between nonverbal and verbal deception. Children who covered up the exposed gift were not more likely to deny the fact that they looked at the gift. Thus, it is possible that verbal and nonverbal measures captured two distinct aspects of deception. Results from our latency measures appear to support this view. In addition to measuring children's

deceptive behaviors dichotomously (i.e., deceiver vs. non-deceiver; lie-teller vs. truth-teller), we also measured children's latency to lie nonverbally and verbally. Results show that, among the lie-tellers, they tended to respond to the target question quickly, often within 1-2 seconds. However, children's nonverbal response to cover up the gift happened much slower, at an average of approximately 10 seconds after the gift was exposed. This difference in latency measures indicates that children's nonverbal deception to cover up the gift may capture their decision to deceive after mental deliberation or rumination. But their verbal deception to deny the rule transgression may capture their immediate response to the target question. In this way, nonverbal deception may have measured children's calculated decision to deceive, whereas verbal deception may have measured their at-the-moment reaction to being directly questioned (Walczyk & Fargerson, 2019). This interpretation could also explain the lack of age effect in verbal deception. If this was the case, then researchers should be careful in adopting the type of deception measures in their studies, depending on the kind of deception they hope to capture.

It is also likely that nonverbal deception in the paradigm captured the omission aspect of deception, whereas verbal deception captured the commission aspect of deception. Lies of omission typically refer to the installment of false belief in someone else's mind without explicit stating incorrect information (DeScioli et al., 2011). On the other hand, lies of commissions refer to direct statements of false facts (Mann et al., 2014). Research in both adults and school age children revealed that we tend to judge lying by omission as more ethical and less harmful compared to lying by commission (i.e., the omission bias; Baron & Ritov, 2004; DeScioli et al., 2011; Hayashi & Mizuta,

2022). The omission bias suggests that lying by omission and lying by commission could belong to two non-overlapping categories of deception and reveal different aspects of lies. The differentiation between lying by omission and lying by commission could also explain the lack of relationship between the two deception measures in our study.

Limitations and Future Directions

Because this dissertation was the first to examine the motivation behind early deception in young children, there are several limitations that we need to acknowledge and address in future work. First, we used the target question "*Did you look at the gift when I was outside*" to probe children's verbal deception in the *ambiguous* and *self-motivated conditions*. The target question was adapted from previous work that probed children's lies to cover up their own transgression (e.g., Talwar & Lee, 2008). But in our modified third-party transgression paradigm, children did not *take the action of looking* at the gift. They *saw* the gift because another person or a mechanical fan revealed it to them. Therefore, children may not have been lying when they denied *looking* at the gift.

Existing research suggests that children could not differentiate between verbs in the static forms (e.g., see) and in the active forms (e.g., look) until at least 4 years of age (Elli et al., 2021). In our study, we asked a selection of children (n = 17) a follow-up question "*Did you see the gift*" after the initial target question, and most of them (n = 14) did not change their answers. Nevertheless, it is still possible that children may have answered truthfully when they provided negative responses to the target question, especially in the *ambiguous condition*, where another individual caused the transgression. Follow-up studies should test children using the question "Did you *see* the gift when I

was outside" to investigate whether verbal denial in the *ambiguous condition* was a measure of deception.

Secondly, the dissertation study examined the motivation behind early deception in the context of third-party transgressions. The paradigm was adopted because children's deception in such context could be interpreted as either self-motivated or other-motivated. Therefore, the third-party transgression paradigm provides a way for us to systematically test children's deceptive motives. Nevertheless, children's early deceptive behaviors happen in a diversity of contexts, and often without a third party. For example, one of the most common contexts that young children lie is to cover up a misdeed they themselves committed (Lavoie et al., 2017; Newton et al., 2000; Wilson et al., 2003). Future studies could investigate young children's deceptive motives in simpler social motivational situations, especially ones that do not involve a third-party, to examine whether our findings were specific to the third-party transgression paradigm.

Lastly, our results show that children's earliest lies are primarily self-motivated. However, in the paradigm, children could have been self-motivated to deceive because they wanted to avoid potential punishment from transgressing a rule set up by the experimenter. Alternatively, they could have been self-motivated to deceive because they wanted to obtain the gift that they were promised. The specific type of self-motivation that drove children to produce their first lies still demand investigation. We also found that children started to engage in other-motivated lies by 4 years of age. But did children engage in other-motivated deception so that the transgressor could avoid potential punishment, or to help the transgressor obtain the gift? Follow-up studies could further

test these specific motivations by manipulating children's expectation of the consequences of the transgression.

Conclusion

Deception is an integral part of social life, and children begin to engage in deception by 2 ½ years of age. In the past two decades, developmental research has examined the *when* and *how* deception emerges, yet little attention has been paid to *why* children deceive. As a first step to address this gap, this dissertation investigated the question: what motivates children to produce their first acts of deception? By testing 2 ½ -5-year-old children using a modified third-party transgression paradigm, we found that children's earliest deception from around 2 ½ -4 years of age is primarily self-motivated. However, around 4 years of age appears to be a critical transitional period when the motivation to deceive diversifies, and children start to deceive not only for self-serving purposes, but also for other-serving reasons.

Although this research is a critical first step to elucidate the motivation behind early deception, many questions remain. In particular, what specific self-serving motivation drives children's first acts of deception? How does the motivation to deceive develop beyond preschool? And how do inter-individual differences influence children's propensity to deceive? Understanding the motivation behind our earliest deceptive acts can help reveal the root of human deception – a complex, conflicting yet ubiquitous feature of human existence.

References

Ahn, S., Amemiya, J., Compton, B. J., & Heyman, G. D. (2020). Children approve of lying to benefit another person's reputation. *Cognitive Development*, *56*, 100960. https://doi.org/10.1016/j.cogdev.2020.100960

Baron, J., & Ritov, I. (2004). Omission bias, individual differences, and normality. *Organizational Behavior and Human Decision Processes*, *94*(2), 74–85. https://doi.org/10.1016/j.obhdp.2004.03.003

Botto, S. V., & Rochat, P. (2018). Sensitivity to the evaluation of others emerges by 24 months. *Developmental Psychology*, *54*(9), 1723–1734. https://doi.org/10.1037/dev0000548

Bottoms, B. L., Goodman, G. S., Schwartz-Kenney, B. M., & Thomas, S. N. (2002). Understanding children's use of secrecy in the context of eyewitness reports. *Law and Human Behavior*, *26*(3), 285–313. https://doi.org/10.1023/A:1015324304975

Brown, C., Garwood, M. P., & Williamson, J. E. (2012). It pays to cheat: Tactical deception in a cephalopod social signaling system. *Biology Letters*, *8*(5), 729–732. https://doi.org/10.1098/rsbl.2012.0435

Bugnyar, T., & Kotraschal, K. (2004). Leading a conspecific away from food in ravens (*Corvus corax*)? *Animal Cognition, 7*, 69-76. https://doi.org/10.1007/s10071-003-0189-4

Bucciol, A., & Piovesan, M. (2011). Luck or cheating? A field experiment on honesty with children. *Journal of Economic Psychology*, *32*(1), 73–78. https://doi.org/10.1016/j.joep.2010.12.001

Bywater, C. L., & Wilson, R. S. (2012). Is honesty the best policy? Testing signal reliability in fiddler crabs when receiver-dependent costs are high. *Functional Ecology*, *26*(4), 804–811. https://doi.org/10.1111/j.1365-2435.2012.02002.x

Cantarero, K., Van Tilburg, W. A. P., & Szarota, P. (2018). Differentiating everyday lies: A typology of lies based on beneficiary and motivation. *Personality and Individual Differences*, *134*, 252–260. https://doi.org/10.1016/j.paid.2018.05.013

Carlson, S. M. (2005). Developmentally sensitive measures of executive function in preschool children. *Developmental Neuropsychology*, *28*(2), 595–616. https://doi.org/10.1207/s15326942dn2802_3

Chandler, M., Fritz, A. S., & Hala, S. (1989). Small-scale deceit: Deception as a marker of two-, three-, and four-year-olds' early theories of mind. *Child Development*, *60*(6), 1263–1277. https://doi.org/10.2307/1130919

Darwin, C. (1877). A biographical sketch of an infant. *Mind*, *2*(7), 285-294. https://doi.org/10.1093/mind/os-2.7.285

DePaulo, B. M., Kashy, D. A., Kirkendol, S. E., Wyer, M. M., & Epstein, J. A. (1996). Lying in everyday life. *Journal of personality and social psychology*, *70*(5), 979. https://doi.org/10.1037/0022-3514.70.5.979

DeScioli, P., Christner, J., & Kurzban, R. (2011). The Omission Strategy. *Psychological Science*, *22*(4), 442–446. http://www.jstor.org/stable/25835395

de Waal, F. B. M. (1992). Intentional deception in primates. *Evolutionary Anthropology*, *1*, 86-92. https://doi.org/10.1002/evan.1360010306

de Waal, F. B. M., & Preston, S. D. (2017). Mammalian empathy: Behavioural manifestations and neural basis. *Nature Reviews Neuroscience*, *18*(8), 498–509. https://doi.org/10.1038/nrn.2017.72

Diamond, A., & Lee, K. (2011). Interventions shown to aid executive function development in children 4–12 years old. *Science*, *333*(6045), 959–964. https://doi.org/10.1126/science.1204529

Demedardi, M.-J., & Monnier, C. (2019). Le mensonge prosocial chez l'enfant: « Toute la vérité, rien que la vérité ! ». *Canadian Psychology/Psychologie Canadienne*, *60*(3), 203–214. https://doi.org/10.1037/cap0000184

Demedardi, M-J., Brechet, C., Gentaz, E., & Monnier, C. (2021). Prosocial lying in children between 4 and 11 years of age: The role of emotional understanding and empathy. *Journal of Experimental Child Psychology*, 8.

Diekmann, A., Przepiorka, W., & Rauhut, H. (2011). Lifting the veil of ignorance: An experiment on the contagiousness of norm violations. *Rationality and Society, 27*(3), 309-333. https://doi.org/10.1177/1043463115593109

Ding, X. P., Heyman, G. D., Fu, G., Zhu, B., & Lee, K. (2018). Young children discover how to deceive in 10 days: A microgenetic study. *Developmental Science*, *21*(3), e12566. https://doi.org/10.1111/desc.12566

Ding, X. P., Wellman, H. M., Wang, Y., Fu, G., & Lee, K. (2015). Theory-of-mind training causes honest young children to lie. *Psychological Science, 26*(11), 1812–1821. https://doi.org/10.1177/0956797615604628

Ding, X. P., Teo, S. L. Y., & Tay, C. (2021). The link between parental mental state talk and children's lying: An indirect effect via false belief understanding. *Journal of Experimental Child Psychology*, *201*, 104990. https://doi.org/10.1016/j.jecp.2020.104990

Elli, G. V., Bedny, M., & Landau, B. (2021). How does a blind person see? Developmental change in applying visual verbs to agents with disabilities. *Cognition*, *212*, 104683. https://doi.org/10.1016/j.cognition.2021.104683

Erat, S., & Gneezy, U. (2012). White Lies. *Management Science*, *58*(4), 723–733. https://doi.org/10.1287/mnsc.1110.1449

Evans, A. D., & Lee, K. (2011). Verbal deception from late childhood to middle adolescence and its relation to executive functioning skills. *Developmental psychology*, *47*(4), 1108–1116. https://doi.org/10.1037/a0023425

Evans, A. D., & Lee, K. (2013). Emergence of lying in very young children. *Developmental Psychology*, *49*(10), 1958-1963. https://doi.org/10.1037/a0031409

Fritzley, H. V., & Lee, K. (2003). Do young children always say yes to yes-no questions? A Metadevelopmental study of the affirmation bias. *Child Development*, *74*(5), 1297–1313. https://doi.org/10.1111/1467-8624.00608

Fu, G., Evans, A. D., Wang, L., & Lee, K. (2008). Lying in the name of the collective good: A developmental study. *Developmental Science*, *11*(4), 495–503. doi:10.1111/j.1467-7687.2008.00695.x

Fu, G., & Lee, K. (2007). Social grooming in the kindergarten. *Developmental Science*, *10*(2), 255–265. https://doi.org/10.1111/j.1467-7687.2007.00583.x

Fu, G., Sai, L., Yuan, F., & Lee, K. (2018). Young children's self-benefiting lies and their relation to executive functioning and theory of mind. *Infant and Child Development, 27*(1), e2051. https://doi.org/10.1002/icd.2051

Gino, F., Ayal, S., & Ariely, D. (2013). Self-serving altruism? The lure of unethical actions that benefit others. *Journal of Economic Behavior & Organization, 93*, 10.1016/j.jebo.2013.04.005. https://doi.org/10.1016/j.jebo.2013.04.005

Gordon, H. M., Lyon, T. D., & Lee, K. (2014). Social and cognitive factors associated with children's secret-keeping for a parent. *Child Development, 85*, 2374–2388. doi:10.1111/cdev.12301

Grice, H. P. (1980). *Studies in the way of words*. Harvard University Press.

Hala, S., Chandler, M., & Fritz, A. S. (1991). Fledgling theories of mind: Deception as a marker of three-year-olds' understanding of false belief. *Child Development, 62*(1), 83–97. https://doi.org/10.2307/1130706

Hall, G. S. (1891). Children's lies. *The Pedagogical Seminary, 1*(2), 211-218. doi: 10.1080/08919402.1891.10533933

Hall, K., Oram, M.W., Campbell, M.W., Eppley, T.M., Byrne, R.W., & Waal, F.B. (2017). Chimpanzee uses manipulative gaze cues to conceal and reveal information to foraging competitor. *American Journal of Primatology, 79*(3), 1-11. https://doi.org/10.1002/ajp.22622

Hare. B, Call. J, & Tomasello, M. (2006). Chimpanzees deceive a human competitor by hiding. *Cognition, 101*, 495–514. https://doi.org/10.1016/j.cognition.2005.01.011

Hayashi, H., & Mizuta, N. (2022). Omission bias in children's and adults' moral judgments of lies. *Journal of Experimental Child Psychology, 215,* 105320. https://doi.org/10.1016/j.jecp.2021.105320

Heyman, G. D., Luu, D. H., & Lee, K. (2009). Parenting by lying. *Journal of Moral Education*, *38*(3), 353-369. https://doi.org/10.1080/03057240903101630

Heyman, G. D., Ding, X. P., Fu, G., Xu, F., Compton, B. J., & Lee, K. (2020). Young children selectively hide the truth about sensitive topics. *Cognitive Science*, *44*(3), e12824. https://doi.org/10.1111/cogs.12824

Hirata, S., & Matsuzawa, T. (2001). Tactics to obtain a hidden food item in chimpanzee pairs (*Pan troglodytes*). *Animal Cognition, 4*(3-4), 285–295. https://doi.org/10.1007/s100710100096

Iezzoni, L. I., Rao, S. R., DesRoches, C. M., Vogeli, C., & Campbell, E. G. (2012). Survey shows that at least some physicians are not always open or honest with patients. *Health Affairs*, *31*(2), 383-391. https://doi.org/10.1377/hlthaff.2010.1137

Ingram, G. P. D., & Bering, J. M. (2010). Children's tattling: The reporting of everyday norm violations in preschool settings: Children's tattling. *Child Development*, *81*(3), 945–957. https://doi.org/10.1111/j.1467-8624.2010.01444.x

Jakubowska, J., & Białecka-Pikul, M. (2020). A new model of the development of deception: Disentangling the role of false-belief understanding in deceptive ability. *Social Development, 29*(1), 21-40. https://doi.org/10.1111/sode.12404

Jakubowska, J., Filip, A., & Białecka-Pikul, M. (2021). The coin that is most current is flattery? Stability and discontinuity of false praise-telling from 5 to 7 years of life. *Journal of Experimental Child Psychology*, *207*, 105128. https://doi.org/10.1016/j.jecp.2021.105128

Kaplar, M. E., & Gordon, A. K. (2004). The enigma of altruistic lying: Perspective differences in what motivates and justifies lie telling within romantic relationships. *Personal Relationships*, *11*(4), 489–507. https://doi.org/10.1111/j.1475-6811.2004.00094.x

Kim, S., Harris, P. L., & Warneken, F. (2014). Is it okay to tell? Children's judgements about information disclosure. *British Journal of Developmental Psychology*, *32*(3), 291–304. https://doi.org/10.1111/bjdp.12040

Kim, J., & Kim, H. (2021). Neural representation in mPFC reveals hidden selfish motivation in white lies. *The Journal of Neuroscience*, *41*(27), 5937–5946. https://doi.org/10.1523/JNEUROSCI.0088-21.2021

Lailvaux, S. P., Reaney, L. T., & Backwell, P. R. Y. (2009). Dishonest signalling of fighting ability and multiple performance traits in the fiddler crab *Uca mjoebergi*. *Functional Ecology*, *23*(2), 359–366. https://doi.org/10.1111/j.1365-2435.2008.01501.x

Lavoie, J., Leduc, K., Arruda, C., Crossman, A. M., & Talwar, V. (2017). Developmental profiles of children's spontaneous lie-telling behavior. *Cognitive Development*, *41*, 33–45. https://doi.org/10.1016/j.cogdev.2016.12.002

Lavoie, J., & Talwar, V. (2020). Care to share? Children's cognitive skills and concealing responses to a parent. *Topics in Cognitive Science*, *12*(2), 485–503. https://doi.org/10.1111/tops.12390

Leduc, K., Williams, S., Gomez-Garibello, C., & Talwar, V. (2017). The contributions of mental state understanding and executive functioning to preschool-aged children's lie-telling. *British Journal of Developmental Psychology, 35*(2), 288–302. https://doi.org/10.1111/bjdp.12163

Lee, K. (2000). Lying as doing deceptive things with words: A speech act theoretical perspective. In J. W. Astington (Ed.), *Minds in the making: Essays in honor of David R. Olson* (pp. 177–196). Blackwell Publishing.

Lee, K. (2013). Little liars: Development of verbal deception in children. *Child Development Perspectives, 7*, 91–96. doi: 10.1111/cdep.12023

Lee, J. Y. S., & Imuta, K. (2021). Lying and Theory of Mind: A Meta-Analysis. *Child Development*, *92*(2), 536–553. https://doi.org/10.1111/cdev.13535

Levine, E. E., & Schweitzer, M. E. (2015). Prosocial lies: When deception breeds trust. *Organizational Behavior and Human Decision Processes, 126*, 88-106. https://doi.org/10.1016/j.obhdp.2014.10.007

Lewis, M., Stanger, C., & Sullivan, M. W. (1989). Deception in 3-year-olds. *Developmental Psychology*, *25*(3), 439–443. https://doi.org/10.1037/0012-1649.25.3.439

Li, A. S., Kelley, E. A., Evans, A. D., & Lee, K. (2011). Exploring the ability to deceive in children with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, *41*(2), 185–195. https://doi.org/10.1007/s10803-010-1045-4

Loke, I. C., Heyman, G. D., Forgie, J., McCarthy, A., & Lee, K. (2011). Children's moral evaluations of reporting the transgressions of peers: Age differences in evaluations of tattling. *Developmental Psychology*, *47*(6), 1757–1762. https://doi.org/10.1037/a0025357

Mann, H., Garcia-Rada, X., Houser, D., & Ariely, D. (2014). Everybody else is doing it: Exploring social transmission of lying behavior. *PLOS ONE*, *9*(10), e109591. https://doi.org/10.1371/journal.pone.0109591

Mazar, N., Amir, O., & Ariely, D. (2008). The dishonesty of honest people: A theory of self-concept maintenance. *Journal of Marketing Research*, *45*(6), 633–644. https://doi.org/10.1509/jmkr.45.6.633

Mokkonen, M., & Lindstedt, C. (2015). The evolutionary ecology of deception. *Biological Reviews*, *91*, 1020-1035. https://doi.org/10.1111/brv.12208

Munn, C. (1986). Birds that 'cry wolf'. *Nature, 319*, 143-145. https://doi.org/10.1038/319143a0

Nagar, P. M., Caivano, O., & Talwar, V. (2020). The role of empathy in children's costly prosocial lie-telling behaviour. *Infant and Child Development*, *29*(4), e2179. https://doi.org/10.1002/icd.2179

Newton, P., Reddy, V., & Bull, R. (2000). Children's everyday deception and performance on false-belief tasks. *British Journal of Developmental Psychology*, *18*(2), 297–317. https://doi.org/10.1348/026151000165706

O'Connor, A. M., & Evans, A. D. (2018). The relation between having siblings and children's cheating and lie-telling behaviors. *Journal of Experimental Child Psychology, 168*, 49–60. https://doi.org/10.1016/j.jecp.2017.12.006

O'Connor, A. M., Dykstra, V. W., & Evans, A. D. (2020). Executive functions and young children's lie-telling and lie maintenance. *Developmental Psychology*, *56*(7), 1278–1289. https://doi.org/10.1037/dev0000955

Over, H., & Carpenter, M. (2009). Eighteen-month-old infants show increased helping following priming with affiliation. *Psychological Science*, *20*(10), 1189–1193. https://doi.org/10.1111/j.1467-9280.2009.02419.x

Palmieri, J. J., & Stern, T. A. (2009). Lies in the doctor-patient relationship. *Primary Care Companion to the Journal of Clinical Psychiatry*, *11*(4), 163–168. https://doi.org/10.4088/PCC.09r00780

Piaget, J. (1932/1965). *The moral judgment of the child*. Free Press.

Pipe, M.-E., & Wilson, J. (1994). Cues and secrets: Influences on children's event reports. *Developmental Psychology, 30*, 515–525. https://doi.org/10.1037/0012-1649.30.4.515

Polak, A., & Harris, P. L. (1999). Deception by young children following noncompliance. *Developmental Psychology*, *35*(2), 561–568. https://doi.org/10.1037/0012-1649.35.2.561

Popliger, M., Talwar, V., & Crossman, A.M. (2011). Predictors of children's prosocial lie-telling: Motivation, socialization variables, and moral understanding. *Journal of experimental child psychology, 110*(3), 373-92. doi: 10.1016/j.jecp.2011.05.003

Quas, J. A., Stolzenberg, S. N., & Lyon, T. D. (2018). The effects of promising to tell the truth, the putative confession, and recall and recognition questions on maltreated and non-maltreated children's disclosure of a minor transgression. *Journal of Experimental Child Psychology*, *166*, 266–279. https://doi.org/10.1016/j.jecp.2017.08.014

Rakoczy, H., Warneken, F., & Tomasello, M. (2008). The sources of normativity: Young children's awareness of the normative structure of games. *Developmental Psychology*, *44*(3), 875–881. https://doi.org/10.1037/0012-1649.44.3.875

Rochat, P., & Guo, C. (2021). Lying and self-consciousness in human development. In M. Fludernik & S. Packard (Eds.) *Being Untruthful* (pp. 37-58). Ergon-Verlag.

Rossano, F., Rakoczy, H., & Tomasello, M. (2011). Young children's understanding of violations of property rights. *Cognition*, *121*(2), 219–227. https://doi.org/10.1016/j.cognition.2011.06.007

Sai, L., Shang, S., Tay, C., Liu, X., Sheng, T., Fu, G., Ding, X. P., & Lee, K. (2021). Theory of mind, executive function, and lying in children: A meta-analysis. *Developmental Science*, *24*(5), e13096. https://doi.org/10.1111/desc.13096

Sierksma, J., Spaltman, M., & Lansu, T. A. M. (2019). Children tell more prosocial lies in favor of in-group than out-group peers. *Developmental Psychology*. https://doi.org/10.1037/dev0000721

Sodian, B., Taylor, C., Harris, P. L., & Perner, J. (1991). Early deception and the child's theory of mind: False trails and genuine markers. *Child Development*, *62*(3), 468–483. https://doi.org/10.2307/1131124

Svetlova, M., Nichols, S., & Brownell, C. (2010). Toddlers' prosocial behavior: from instrumental to empathetic to altruistic helping. *Child Development, 81*(6), 1814–1827. http://dx.doi.org/10.1111/j.1467-8624.2010.01512.x

Syvertsen, A. K., Flanagan, C. A., & Stout, M. D. (2009). Code of silence: Students' perceptions of school climate and willingness to intervene in a peer's dangerous plan. *Journal of Educational Psychology*, *101*(1), 219. https://doi.org/10.1037/a0013246

Talwar. V., & Crossman, A. (2011). From little white lies to filthy liars: The evolution of honesty and deception in young children. *Advances in Child Development and Behavior, 40*, 139–179. https://doi.org/ 10.1016/b978-0-12-386491-8.00004-9

Talwar, V., Crossman, A.M., Wyman, J. (2017). The role of executive functioning and theory of mind in children's lies for others and for themselves. *Early Childhood Research Quaterly*, *41*, 126-135. doi: 10.1016/j.ecresq.2017.07.003

Talwar, V., Gordon, H., & Lee, K. (2007). Lying in the elementary school: Verbal deception and its relation to second-order belief understanding. *Developmental Psychology, 43*(3), 804-810. https://doi.org/10.1037/0012-1649.43.3.804

Talwar, V., Murphy, S. M., & Lee, K. (2007). White lie-telling in children for politeness purposes. *International Journal of Behavioral Development*, *31*(1), 1–11. https://doi.org/10.1177/0165025406073530

Talwar, V., Lavoie, J., & Crossman, A. M. (2019). Carving Pinocchio: Longitudinal examination of children's lying for different goals. *Journal of Experimental Child Psychology, 181*, 34–55. https://doi.org/10.1016/j.jecp.2018.12.003

Talwar, V., & Lee, K. (2002a). Development of lying to conceal a transgression: Children's control of expressive behaviour during verbal deception. *International Journal of Behavioral Development, 26*(5), 436–444. https://doi.org/10.1080/01650250143000373

Talwar, V., & Lee, K. (2002b). Emergence of white lie-telling in children between 3 and 7 years of age. *Merrill-Palmer Quarterly, 48*(2), 160-181. https://doi.org/10.1353/mpq.2002.0009

Talwar, V., & Lee, K. (2008). Social and cognitive correlates of children's lying behavior. *Child Development,* 79(4), 866-881. https://doi.org/10.1111/j.1467-8624.2008.01164.x

Talwar, V., & Lee, K. (2011). A punitive environment fosters children's dishonesty: A natural experiment. *Child Development, 82*(6), 1751–1758. https://doi.org/10.1111/j.1467-8624.2011.01663.x

Talwar, V., Lee, K., Bala, N., & Lindsay, R. C. L. (2004). Children's lie-telling to conceal a parent's transgression: Legal implications. *Law and Human Behavior, 28*(4), 411–435. https://doi.org/10.1023/B:LAHU.0000039333.51399.f6

Talwar, V., Zwaigenbaum, L., Goulden, K., Manji, S., Loomes, C., & Rasmussen, C. (2012). Lie-telling behavior in children with autism and its relation to false-belief understanding. *Focus on Autism and Other Developmental Disabilities, 27*(2), 122-129. https://doi.org/10.1177/1088357612441828

Tomasello, M., & Vaish, A. (2013). Origins of human cooperation and morality. *Annual Review of Psychology*, *64*(1), 231–255. https://doi.org/10.1146/annurev-psych-113011-143812

Tye, M. C., Amato, S. L., Honts, C. R., Devitt, M. K., & Peters, D. (1999). The willingness of children to lie and the assessment of credibility in an ecologically relevant laboratory setting. *Applied Developmental Science*, *3*(2), 92–109. https://doi.org/10.1207/s1532480xads0302_4

Tyler, J. M., Feldman, R. S., & Reichert, A. (2006). The price of deceptive behavior: Disliking and lying to people who lie to us. *Journal of Experimental Social Psychology*, *42*(1), 69-77. https://doi.org/10.1016/j.jesp.2005.02.003

Vaish, A., Missana, M., & Tomasello, M. (2011). Three-year-old children intervene in third-party moral transgressions: Children intervene in moral transgressions. *British Journal of Developmental Psychology*, *29*(1), 124–130. https://doi.org/10.1348/026151010X532888

Wang, L., Zhu, L., & Wang, Z. (2017). Parental mind-mindedness but not false belief understanding predicts Hong Kong children's lie-telling behavior in a temptation resistance task. *Journal of Experimental Child Psychology*, *162*, 89–100. https://doi.org/10.1016/j.jecp.2017.04.023

Warneken, F., & Tomasello, M. (2007). Helping and cooperation at 14 months of age. *Infancy*, *11*(3), 271–294. https://doi.org/10.1111/j.1532-7078.2007.tb00227.x

Warneken, F., & Tomasello, M. (2009). The roots of human altruism. *British Journal of Psychology*, *100*(3), 455–471. https://doi.org/10.1348/000712608X379061

Wellman, H. M., Cross, D., & Watson, J. (2001). Meta-analysis of theory-of-mind development: The truth about false belief. *Child Development*, *72*(3), 655–684.

Wellman, H. M., & Liu, D. (2004). Scaling of theory-of-mind tasks. *Child Development*, *75*(2), 523–541. https://doi.org/10.1111/j.1467-8624.2004.00691.x

Whiten, A., & Byrne, R. W. (1988). Tactical deception in primates. *Behavioral and Brain Sciences, 11*(2), 233–273. https://doi.org/10.1017/S0140525X00049682

Wilson, A. E., Smith, M. D., & Ross, H. S. (2003). The nature and effects of young children's lies. *Social Development, 12*(1), 21–45. https://doi.org/10.1111/1467-9507.00220

Williams, S., Leduc, K., Crossman, A. M., & Talwar, V. (2016). Young deceivers: The identification of lying, executive functions and antisocial lies in preschool-aged children. *Infant and Child Development*. Advance online publication. doi:10.1002/icd.1956

Williams, S., McWilliams, K., & Lyon, T. (2020). Children's concealment of a minor transgression: The role of age, maltreatment, and executive functioning. *Journal of Experimental Child Psychology*, *191*, 104664. https://doi.org/10.1016/j.jecp.2019.104664

Wimmer, H., & Perner, J. (1983). Beliefs about beliefs: Representation and constraining function of wrong beliefs in young children's understanding of deception. *Cognition, 13*(1), 103-128. https://doi.org/10.1016/0010-0277(83)90004-5

Wyman, J., Saykaly, C., & Talwar, V. (2020). The effectiveness of free-recall, cognitive instruction and closed-ended questions when students with and without disabilities provide eyewitness reports of another's transgression. *Psychology, Crime & Law*, 1–20. https://doi.org/10.1080/1068316X.2020.1852564

Yi, L., Fan, Y., Li, J., Huang, D., Wang, X., Tan, W., ... & Lee, K. (2014). Distrust and retaliatory deception in children with autism spectrum disorder. *Research in Autism Spectrum Disorders*, *8*(12), 1741-1755. http://dx.doi.org/10.1016/j.rasd.2014.09.006

Table 1.

Counts and Percentages of Children Engaged in Nonverbal Deception, Verbal Deception, Lie Maintenance, Transgression Prevention, and Spontaneous Disclosure

	Ambiguous Condition		Self-Motivated Condition		Other-Motivated Condition		Total	
Nonverbal Deception	Deceivers (%)	Non-deceivers (%)	Deceivers (%)	Non-deceivers (%)	Deceivers (%)	Non-deceivers (%)	Deceivers (%)	Non-Deceivers (%)
	33(42.9)	44(57.1)	20(31.7)	43(68.3)	19(34.5)	36(65.5)	72(36.9)	123(63.1)
Verbal Deception	Lie-tellers (%)	Truth-tellers (%)	Lie-tellers (%)	Truth-tellers (%)	Lie-tellers (%)	Truth-tellers (%)	Lie-tellers (%)	Truth-tellers (%)
	39(52)	36(48)	22(34.9)	41(65.1)	17(30.9)	38(69.1)	78(40.4)	115(59.6)
Lie Maintenance	Maintained (%)	Leaked (%)	Maintained (%)	Leaked (%)	Maintained (%)	Leaked (%)	Maintained (%)	Leaked (%)
	5(13.9)	31(86.1)	8(34.8)	15(65.2)	5(29.4)	12 (70.6)	18(23.7)	58(76.3)
Transgression Prevention	Transgression Preventers (%)	Transgression Approvers (%)	Transgression Preventers (%)	Transgression Approvers (%)	Transgression Preventers (%)	Transgression Approvers (%)	Transgression Preventers (%)	Transgression Approvers (%)
	33(42.9)	44(57.1)	-	-	30(54.5)	25(45.5)	63(47.7)	69(52.3)
Spontaneous Disclosure	Disclosers (%)	Non-disclosers (%)	Disclosers (%)	Non-disclosers (%)	Disclosers (%)	Non-disclosers (%)	Disclosers (%)	Non-disclosers (%)
	13(16.9)	64(83.1)	32(50.8)	31(49.2)	14(25)	42(75)	59(30.1)	137(69.9)

Figure 1.

Procedure for the Ambiguous Condition

Note. A) E1 instructed the child not to look or touch the gift that was covered by the towel. B) E2 revealed the gift to the child, implicating him in her rule violation. C) E1 asked the child questions about the transgression.

Figure 2.

Procedure for the Self-motivated Condition

Note. A) E1 turned on the fan. E1 informed the child that she was not allowed to look or touch the gift, which was covered by the towel. B) E2, who hid behind the curtain, discreetly pulled an invisible fishing wire pre-attached to the towel to uncover the gift. From the child's perspective, the fan was the mechanism that uncovered the gift. C) E1 asked the child questions about the incident.

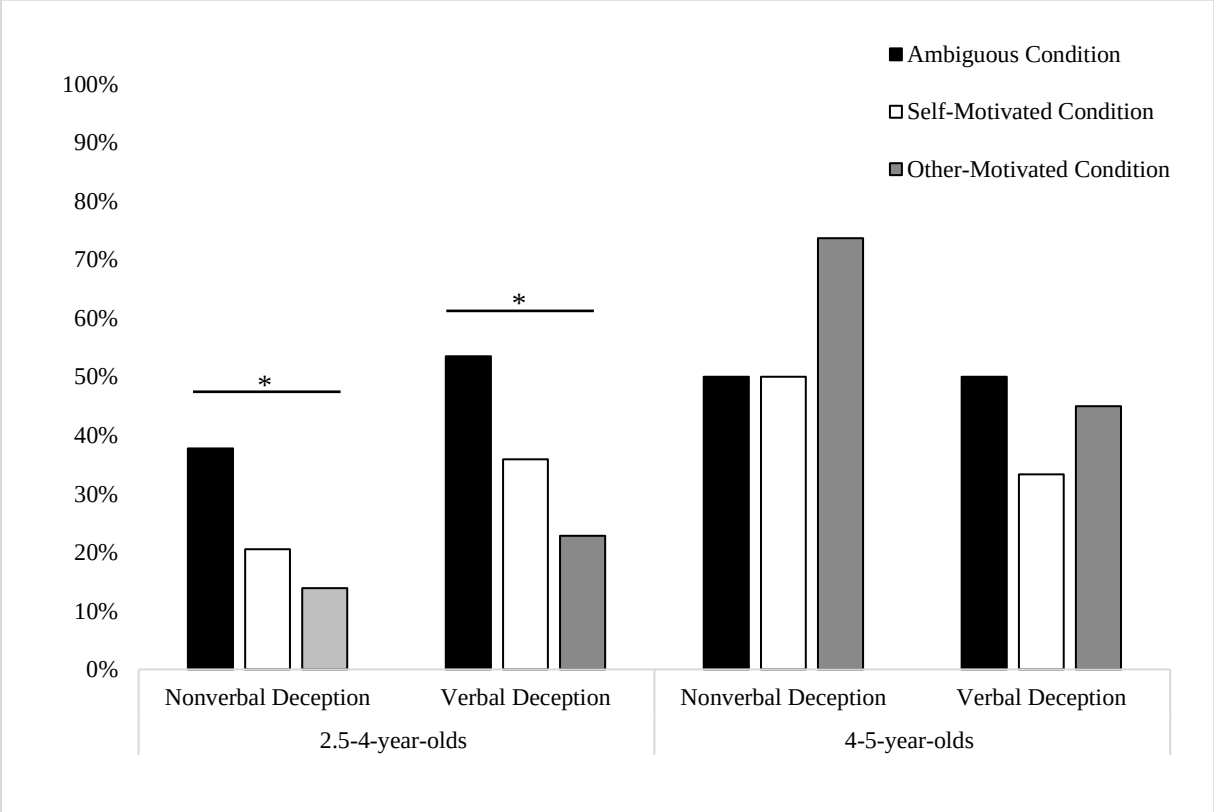
Figure 3.

Procedure for the Other-motivated Condition

Note. A) E1 informed the child that the gift was for E2 and she was not allowed to look or touch the gift, which was covered by a towel. B) E2 uncovered the gift, therefore transgressing the rule. C) E1 asked the child questions about E2's transgression.

Figure 4.

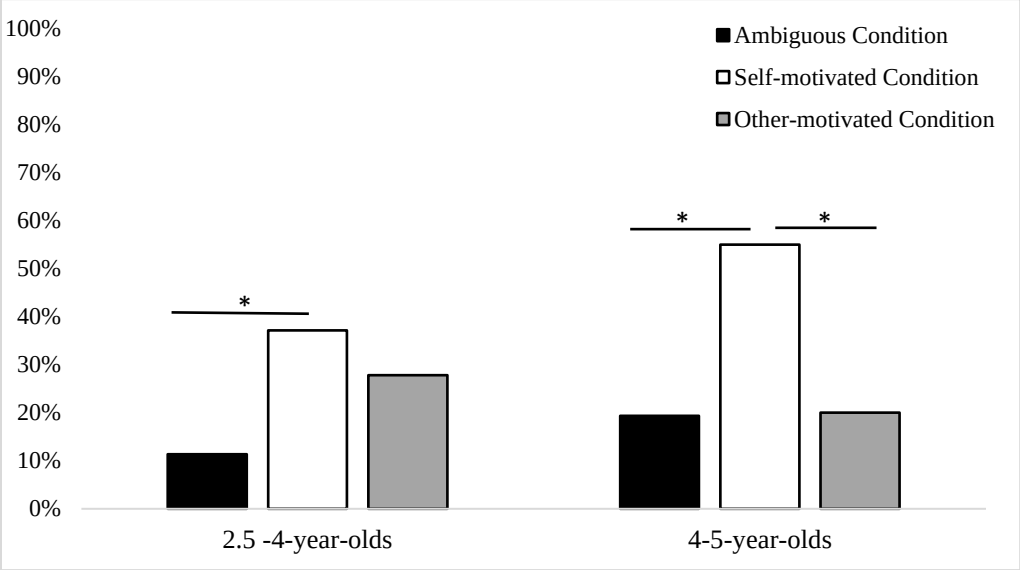
The Percentages of Nonverbal and Verbal Deception Across Age Groups and Conditions



Note. * p < .05; ** p < .01; *** p < .001.

Figure 5.

Percentage of Spontaneously Disclosure by Age Group and Condition



Note. * p < .05; ** p < .01; *** p < .001. Age was not a predictor of spontaneous disclosure across the three conditions.