The Complexities of Children's Antisocial Lie Telling: A Cross-Sectional and Longitudinal Investigation

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Summary

Despite being discouraged, children frequently tell lies to conceal their transgressions. Consequently, researchers have argued for the need to understand the complexities of children's lying. To advance this understanding, this thesis presents four laboratory-based studies, derived from one large-scale longitudinal study. The studies examine the cross-sectional (*N = 443*) and longitudinal (*N = 298*) influence of personal and environmental factors on lie telling across a *broad age range* of children (4- to 15-years) in *both* of the frequently used temptation resistance paradigm (TRP) tasks (guessing game, school-achievement task). Study one unconfounded age and task-type, finding support for the robust age-related decrease in lie telling after 8 years reported in previous research and demonstrating that the decrement in lie telling cannot be attributed to task-type. It also provided support for the situation-specificity viewpoint, showing that antisocial lie telling varies across tempting contexts. The results from studies two, three and four, further show that children's antisocial lying is differentially motivated depending on the tempting context. Study two showed that weaker internal moral standards led to more lie telling in the school achievement task concurrently and one year later. Study three showed that, depending on the time interval, harsh punishment was associated with more lie telling in the short-term, while lower levels of parental warmth led to more lie telling in the long-term. Finally, study 4 concurrently tested whether lie telling was the cause or effect of conduct problems using a cross-lagged panel design. Results indicated that lie telling is a problem behavior at the outset, rather than developmentally normative, as it follows engagement in conduct problems. Collectively, these studies show that personal and environmental factors play a complementary role in children's lying. They also provide the first causal longitudinal evidence of the relationships among personal and environmental factors related to children's lie telling.

Certification by Candidate

I certify that this thesis is all my own work and has not been submitted for a higher degree to any other university or institution. In addition, I certify that all information sources and literature used when preparing this thesis have been referenced appropriately. Approval for all aspects of the research presented in this thesis was obtained from the Macquarie University Human Research Ethics Committee (reference number: 5201300576; see Appendix D).

Talia Carl

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Chapter 1

General Introduction

Introduction[1]

Children's lie telling has been of particular interest to researchers and laypersons alike since the advent of developmental psychology (Darwin, 1877; Hartshorne & May, 1928). The topic of lie telling, however, has only received renewed attention in the past three decades because of the insight it offers into various aspects of development, such as children's cognitive abilities (e.g., Talwar & Lee, 2008), moral understanding (e.g., Bussey, 1992, 1999; Bussey & Grimbeek, 2000; Piaget, 1932/1965; Talwar, Lee, Bala, & Lindsay, 2002), social skills (e.g., Lavoie, Yachison, Crossman, & Talwar, 2017; Talwar & Crossman, 2011), and its importance in determining children's competence to testify in criminal courts (Bala, Lee, Lindsay, & Talwar, 2000; Bussey, 1995; Bussey & Grimbeek, 2000; Lyon, 2000).

Although frequently condemned and discouraged (Bok, 1978), lying is a frequent and more than occasional behavior[2] all children (and even adults) engage in from time to time. In fact, children's developing conceptual knowledge of lie telling and their actual lying abilities are considered indicative of the maturation of their cognitive abilities, such as their growing understanding of the mental states of others. This understanding is necessary to instil false beliefs in others' minds and thus effectively tell lies (Chandler, Fritz, & Hala, 1989; Polak & Harris, 1999; Talwar & Lee, 2002, 2008; Talwar, Gordon, & Lee, 2007; see also Talwar & Crossman, 2011). In addition, lying is arguably influenced by children's moral understanding of the definition of a lie and the wrongfulness of this lie telling behavior (Bussey, 1992, 1999; Bussey & Grimbeek, 2000; Talwar et al., 2002; see also Talwar & Crossman, 2012)[3].

However, there has also been growing recognition that lying is not only influenced by factors related to children themselves, but also by environmental forces. Arguably the most

[1] This thesis is presented in a 'thesis by publication' format, as outlined and recommended by the Macquarie University Higher Degree Research Unit. It is comprised of six chapters consisting of four individual papers prepared for publication and an overall introduction and discussion. As a result of the thesis' structure, there is some unavoidable repetition across chapters.
[2] Papers in this thesis are being submitted to US journals, as such US spelling is used throughout this thesis.
[3] As this thesis was prepared in thesis by publication format, 'et al.' is used to indicate remaining authors on repeat citations within each chapter, rather than across the thesis as a whole.

important of these environmental forces, is context. For instance, the context related to the way in which children are treated by others, such as their parents, is of importance. Although limited, research suggests that harsh punishment by parents encourages more lie telling as children seek to minimize these negative consequences for their engagement in transgressive behavior (e.g., Lewis, 1993; Stouthamer-Loeber, 1986; Talwar & Lee, 2011; see also Talwar & Crossman, 2011). The influence of another parenting factor, parental warmth, has also been investigated, with studies showing that in some contexts it reinforces honesty (e.g., Burton, 1963, 1976; Stouthamer-Loeber, 1986; see also Talwar & Crossman, 2011), while in others it promotes polite lie telling (e.g., Popliger, Talwar, & Crossman, 2011). Additionally, the context in which the lie is told is of consequence and has received attention historically. Specifically, Hartshorne and May (1928) emphasized the situation-specificity of children's deception; that is, they demonstrated that children's lie telling is context dependent (i.e., dependent on the task-type). Lavoie and colleagues (2017) recently showed context dependent variation in the way personal and environmental factors influenced lie telling in different experimental paradigms related to different lie-types (i.e., prosocial versus antisocial lies). Thus, it is also possible that children's propensity to tell one of the lie-types, an antisocial lie, may also vary depending on the transgressive context in which it is told; however, this has not yet been investigated. Importantly also, most of this research has examined the relation of various factors to children's lie telling behaviors using cross-sectional data. However this type of design has not allowed causal statements to be made about the relationship between various factors and lie telling. Longitudinal investigations are needed for this.

Although children's lying is considered normative, as described above, their lie telling typically decreases with increasing age (e.g., Evans & Lee, 2011; Lavoie et al., 2017). However, some children continue to tell lies frequently as they age and their lie telling is

considered problematic (e.g., Stouthamer-Loeber, 1986; Talwar & Crossman, 2011). In support of this assertion, a number of researchers have shown associations between children's propensity to tell lies and their engagement in other antisocial behaviors (e.g., Gervais, Tremblay, Desmarais-Gervais, & Vitaro, 2000; Stouthamer-Loeber, 1986). Moreover, while some researchers have suggested that early lying predicts later problem behaviors (e.g., Gervais et al., 2000), others have argued differently; instead, suggesting that problem behaviors are an antecedent to lie telling (e.g., Ostrov, Ries, Stauffacher, Godleski, & Mullins, 2008; Warr, 2007). However, whether lie telling is the cause or effect of children's conduct problem behaviors is yet to be systematically examined.

To address these voids in the literature, this thesis presents a series of four laboratory-based studies, derived from a large-scale longitudinal study, to further understand the complexities of children's antisocial lie telling. The relevant background to these studies is outlined briefly in the following literature review. The review begins by broadly defining lie telling and outlining the types of lies children often do tell, before narrowing the focus to children's antisocial lie telling. A number of the pertinent personal and environmental factors that influence children's antisocial lie telling are then reviewed, using the framework of the social cognitive theory model of children's lying (Bussey, 1995; Bussey & Grimbeek, 1995). This is followed by a discussion of the aims, methods and hypotheses of each of the four laboratory-based studies that make up the present research.

Background Literature Review

Definition

A clear definition of lie telling is essential before examining its development. Lie telling refers to a speaker making a false statement, one that s/he knows to be false, and is intended to deceive the recipient into believing that the false statement is true (Bok, 1978; Coleman, & Kay, 1981; Lee, 2000; Lee & Ross, 1997).

Types of Lies

When attempting to understand the development of children's lie telling, it is necessary to first distinguish between the different types of lies children tell, as they vary in their underlying motivation and can be broadly categorized as self-oriented or other-oriented lies. Arguably, the earliest lies that children tell are self-oriented lies told to avoid negative consequences for one's self and to promote self-interest (Talwar & Crossman, 2012). These early lies are often self-serving in nature and violate trust with bad intent (Talwar & Crossman, 2011). Other early self-serving lies are those told to obtain a personal reward or incentive, motivated either by the desire for material benefit (e.g., a forbidden prize) or the need for social praise (e.g., to appear more accomplished or clever; Talwar & Crossman, 2011). Indeed, though, the most prominent and frequent self-oriented lies children tell are the lies told to conceal their transgressions to avoid detection and punishment (e.g., Stouthamer-Loeber, 1986; Talwar & Crossman, 2011; Talwar & Crossman, 2012; Wilson, Smith, & Ross, 2003). These are antisocial lies and are often considered reprehensible and inappropriate. The often covert nature of these lies, and the focus they have on self-interest goals (sometimes to the detriment of others), has led to the fascination with understanding the development and trajectory of antisocial lying.

However, while these antisocial lies are often discouraged by adults, there are also some situations where adults encourage lie telling. These types of lies are conceptualized as prosocial (or white lies) and are not intended to hurt others (Bok, 1978). These lies are also considered to be of little moral consequence as they are told to benefit another individual to improve social relations, rather than with bad intent and to hide antisocial conduct (Bussey, 1999; Talwar & Crossman, 2011). For instance, children may lie to be polite (e.g., tell an adult they liked the present they were given when they did not) or to protect the feelings of others (e.g., tell someone they look nice when in fact they do not think they do; see Talwar &

Crossman, 2011 for review). Children can also tell lies to benefit the collective (rather than just one person), known as *blue lies* (e.g., Fu, Evans, Wang, & Lee, 2008; Fu, Xu, Cameron, Heyman, & Lee, 2007). These polite or "white" lies are considered necessary and in many social interactions, acceptable, as this lie underscores a fundamental 'maxim of politeness' that requires speakers to not harm those they are in conversation with, which outweighs the so-called 'maxim of quality' communication principle that requires speakers to be truthful to those they are communicating with (Grice, 1980; Lee & Ross, 1997; Sweetser, 1987; Talwar & Crossman, 2011). These type of lies have been found to appear later in development than self-oriented antisocial lies (Lavoie et al., 2017), as children become better able to empathize with another person's mental state and learn to appreciate the value of interpersonal relationships (Talwar & Crossman, 2011).

Overall, it is evident that children's lies can be grouped into other-oriented (i.e., prosocial) lies or self-oriented (i.e., antisocial) lies. These different lie-types, one encouraged and the other frequently condemned, highlight the complexities of deception. In development, children need to learn to appreciate when telling lies is appropriate in social situations, and when telling lies is problematic (Talwar & Crossman, 2011). This process is therefore complicated for children, and has revived the interest in research that investigates the correlates of children's developing deceptive abilities and the situations in which they choose to lie. Although psychological research has identified and focused attention on both these lie types, it has been shown that antisocial (self-oriented) lies told to avoid personal harm or to produce personal gain are rated more seriously and more negatively by children, than lies told to benefit others or save them from embarrassment (Bussey, 1999; Lee & Ross, 1997; Lindskold & Han, 1986), and also develop earlier than polite lies (e.g., DePaulo & Jordan, 1982; Lavoie et al., 2017; Xu, Bao, Fu, Talwar, & Lee, 2010). Moreover, unlike polite lies, antisocial lies are often considered contributors to the sometimes maladaptive and destructive

trajectory of lying (e.g., Bok, 1978; Stouthamer-Loeber, 1986). For these reasons, and the importance placed on antisocial lie telling in children's morality (Piaget 1932/1965), antisocial lies are the focus of this thesis and the remaining review.

Children's antisocial lies about their own behavior. The most common method used to assess children's actual antisocial lie telling (i.e., self-oriented lies told to conceal a transgression), due to its covert nature, is the modified temptation resistance paradigm (TRP: Evans & Lee, 2011; Lewis, Stanger, & Sullivan, 1989; Polak & Harris, 1999; Talwar et al., 2007; Talwar & Lee, 2002, 2008; modified from Sears, Rau, & Alpert, 1965). This experimental paradigm is frequently used as it allows for children's lie telling abilities to be observed in naturalistic conditions (Talwar & Crossman, 2011). In this paradigm, children are placed in a room with a forbidden object and are instructed not to peek while an experimenter is absent, thus tempting them into committing a minor transgression (such a peeking at a toy or a test answer). Later, the experimenter questions them about their peeking behavior, and by asking them whether or not they had committed the transgression, the experimenter provides them with the spontaneous opportunity to either tell the truth or a lie about their peeking behavior. Researchers have commonly switched between using one of two different TRP tasks to examine children's self-oriented lie telling abilities. For instance, in one of the TRP tasks, children are invited to play a guessing game, where they are instructed to guess the name of different toys from their accompanying song clues without peeking at the toy when the experimenter is absent from the room (e.g., Talwar & Lee, 2002, 2008). The nature of the tempting context in the other TRP-task, the trivia (or school-achievement) task, is slightly different in style, as children are instead asked to answer multiple-choice questions without turning over the card/booklet to look at the answer (e.g., Evans & Lee, 2011; Talwar et al., 2007).

Using these two modified TRP tasks, researchers have sought to understand the ways in which children's antisocial lie telling behavior develops by attempting to identify the factors that underlie and influence such a complex behavior. The findings from this research can be explained using the social cognitive theory model of children's behavior, proposed by Bussey and Grimbeek (1995), and elaborated upon by Bussey (1995).

Social Cognitive Theory Model of Children's Lie Telling Behavior

In the social cognitive theory model, children's lie telling is explained in terms of triadic reciprocal causation, in which person-specific (e.g., age, cognitive abilities, moral understanding, other conduct problems) and environmental factors (e.g., context of the lie, parenting) each reciprocally interact to produce children's behavior (e.g., actual antisocial lying) (Bussey, 1995; see Figure 1). According to this model, when explaining children's lie telling behavior, it is necessary to consider not only internal person factors related to the child themselves, but also external environmental forces (Bussey, 1995). While researchers have identified a multitude of person and environmental factors that influence children's lie telling (i.e., their behavior), space restrictions preclude an exhaustive examination of them. Instead, only those factors pertinent to antisocial lie telling are reviewed briefly below.

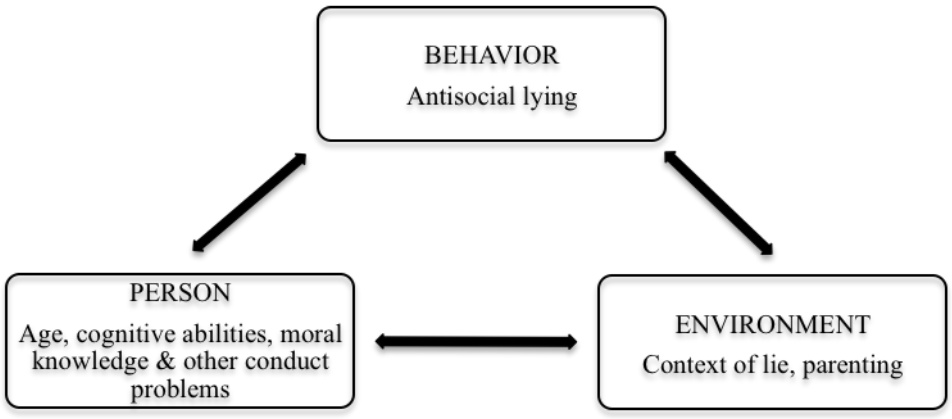


Figure 1. Model of triadic reciprocal causation between person, environment and behavior

Person factors. The person, child specific contributions to actual lie telling behavior include the child's age, their cognitive abilities, their moral knowledge, as well as their engagement in other conduct problems.

Age-related trends in lie telling. Children acquire the ability to deliberately produce false statements at around 2 years of age (Evans & Lee, 2013; Williams, Leduc, Crossman, & Talwar, 2016). At the first level, children's 'primary lies' (Talwar & Lee, 2008, p. 877) are arguably rudimentary learned behaviors designed to avoid getting into trouble when hiding a transgression. Studies examining very young children's lie telling using the TRP guessing game (e.g., Evans & Lee, 2013; Williams, et al., 2016; Wilson, et al., 2003), have provided evidence that children under the age of 3 years tell self-serving lies to cover up transgressions when they disobey instructions. However, a number of researchers have noted that only a small proportion of 2- to 3-year-olds (i.e., one third) who commit the transgression in the TRP guessing game, lie about having committed it (Lewis, 1993; Lewis, et al., 1989; Polak & Harris, 1999; Talwar & Lee, 2002). Whereas 3-year-olds tell antisocial lies relatively infrequently in the TRP, the majority of 4- to 7-year-olds readily telling lies to conceal their transgressions (e.g., Talwar & Lee, 2002, 2008). Thus, it appears that while some children as young as 2-3 years of age tell lies, the propensity to tell antisocial lies to avoid punishment increases with age, growing in middle childhood.

However, during early adolescence and with further increases in age, experimental studies show robust decreases in antisocial lie telling to conceal a transgression (e.g., Evans & Lee, 2011; Lavoie et al., 2017). Specifically, Evans and Lee (2011) used the TRP school-achievement task to investigate 8- to 16-year-old children's propensity to tell a lie after committing a transgression (i.e., peeking at the multiple-choice answer). They found that, compared to studies examining 4- to 8-year-old children's lying, where the majority of children lied in the TRP guessing game (e.g., Talwar & Lee, 2002, 2008, 2011), significantly

fewer children over 8 years of age lied in the TRP school-achievement task. Lavoie et al. (2017) investigated children's lying across a broader age range of 4- to 14-year-olds using the TRP guessing game, also finding that while lying peeked in middle childhood, it decreased during early adolescence. Together, this evidence shows that children's lying behavior decreases after the age of 8-years; in particular, children aged 4 to 8 years are more likely to tell lies to conceal their transgression than 8- to 16-year-olds. However, the age related findings from these studies are reliant on the use of one or the other of these two different TRP tasks, and in many cases with different age groups. It is thus possible that age and TRP task-type effects are confounded. For example, this age related decrease has been inferred when younger children typically participate in one of the tasks, and older children typically participate in the other task. However, this issue can only be clarified if both tempting TRP tasks are used in one study across a broad age range of children.

Cognitive abilities and lie telling. Cognitive abilities, such as theory of mind and executive functioning skills, have been associated with children's developing deceptive abilities (Carlson, Moses, & Hix, 1998; Chandler et al., 1989; Evans & Lee, 2011; Polak & Harris, 1999; Talwar & Crossman, 2011; Talwar et al., 2007; Talwar & Lee, 2008).

Theory of mind. Talwar and Lee's (2008) developmental model of lie telling suggests that children's lying develops alongside their understanding of others' minds. In other words, since children's deceptive abilities require an understanding of other people's minds (i.e., theory of mind), it is considered an indicator of their first- and second- order belief understanding (e.g., Chandler et al., 1989; Polak & Harris, 1999; Talwar & Lee, 2008). First, Talwar and colleagues (Talwar & Crossman, 2011; Talwar & Lee, 2008) posit that the developmental shift from 2- to 3-year-olds' relatively infrequent 'primary lies', or rudimentary intentionally false statements, to 4 year and older children's frequent 'secondary lies', reflects the acquisition of first order belief understanding; an understanding that lie

telling requires deliberately creating a false belief in the mind of another. This notion arose from previous studies (e.g., Polak & Harris, 1999; Talwar & Lee, 2002) showing that 3- to 5-year-olds who comprehended false belief were more likely than those who did not to deny committing a transgression in the TRP. Although this reflects an increased ability to lie to instil false beliefs in others, children at this age are not yet skilled lie-tellers, as they often fail to maintain consistency between their initial lie and subsequent statements during follow up questioning (known as semantic leakage) (Talwar et al., 2007; Talwar & Lee, 2002, 2008). It is not until 7-8 years, that 'tertiary lies' emerge, whereby children become increasingly capable of controlling semantic leakage to ensure that their subsequent verbal statements do not negate the plausibility of their initial lie (Talwar & Crossman, 2011). This indicates that children's ability to maintain their lies (and transition from the secondary to tertiary level) is closely associated with their acquisition of second-order belief understanding; the ability to determine the belief the deceived person should have based on the false belief they created in their mind (Talwar & Crossman, 2011, 2012). Taken together, this evidence suggests that children's developing abilities to tell lies between 3 and 8 years can be credited to increased cognitive sophistication in terms of theory of mind.

Executive functioning. Several researchers have also emphasized the importance of another cognitive ability, executive functioning skills, in the development of lie telling as these skills develop alongside theory of mind (e.g., Carlson et al., 1998; Evans, Xu, & Lee, 2011; Talwar et al., 2007; Talwar & Lee, 2008; Williams et al., 2016). Executive functioning skills have been broadly defined as higher order cognitive and goal-directed processes that serve to monitor and control thought and action, including self-regulation, working memory, inhibitory control, and planning (Carlson et al., 1998; Zelazo, Carter, Reznick, & Frye, 1997). Primarily, researchers have indicated that children who performed better on inhibitory control tasks, were also more adept at deception at young ages (Carlson et al., 1998), more likely to

tell lies in middle-childhood (Talwar & Lee, 2008) and better at maintaining their lies (e.g., Evans et al., 2011). Inter-related to inhibitory control are also the executive functioning skills of working memory and planning, which researchers have directly related to children's ability to maintain their lies (e.g., Carlson, Moses, & Claxton, 2004; Evans & Lee, 2011, 2013; Evans et al., 2011; Fu, Evans, Xu, & Lee, 2012; Talwar & Lee, 2008; Talwar & Crossman, 2011; Williams et al., 2016). For instance, children must suppress interfering thought and action processes (inhibitory control), as well as temporarily hold in their memory the information about the lie (working memory) to lie successfully (Carlson et al., 1998; Talwar & Crossman, 2011). Moreover, children's ability to tell sophisticated lies has also been tied with their ability to foresee and plan their responses in order to tell a lie and maintain it (planning; e.g., Evans & Lee, 2011; Williams et al., 2016). Therefore, the development of younger children's lying has been attributed to the development of these cognitive skills, as described above, which have been the focus of much of the extant research. The relationship of these cognitive factors to children's developing lie telling abilities are stronger for younger children (i.e., 3- to 8-year olds), whereas for older children who have developed the ability to lie, other individual difference factors are stronger influences on their lie telling (Talwar & Crossman, 2011).

Moral knowledge about lie telling. For instance, in addition to focusing on the relation between cognitive abilities and lying, research has also examined another individual difference factor, that is, children's conceptual and moral understanding of lies. Findings have shown that the children's conceptions of lie telling develop over time (e.g., Bussey, 1992, 1999; Piaget, 1932/1965; Talwar & Lee, 2008). Researchers have found that while 3- to 4-year-old children defined a lie based primarily on the factuality of the statement, 6- to 11-year-olds considered the speakers intentions when categorizing lies and truths (see Talwar & Crossman, 2012, for review). Yet, others have shown that even young children (aged 4

years) can categorize lies based on different intentions (e.g., Bussey, 1992, 1999). Nevertheless, children's ability to identify a lie does increase with age, with Bussey (1992) indicating that 8- to 11-year-olds were more accurate at correctly differentiating lies from truths than their younger counterparts (i.e., 5-year-olds), and Talwar and Crossman (2012) positing that by early adolescence, children's conceptual understanding of lies is similar to that of adults.

In addition to examining whether children know the difference between truths and lies, children's personal (moral) standards for the wrongfulness of immoral deception has also been investigated (Bussey, 1992, 1999; Haugaard, Reppucci, Laird, & Nauful, 1991). Using a series of vignettes, researchers demonstrated that from as young as 3 years of age, children evaluate telling a lie about a misdeed negatively, and with increasing age, moral standards associated with lies develop rapidly and become increasingly negative (Bussey, 1992, 1999; Talwar et al., 2002). To further specify, while most children from preschool onwards appear to know what it means to tell a lie and rate lying to conceal a misdeed negatively (e.g., Bussey, 1992, 1999), several researchers (e.g., Bussey, 1992; Talwar et al., 2002) found that preschool children (4-year-olds) tended to rate the lie as less bad than their older (7- and 11-year-olds) counterparts. Apart from children having developed moral standards associated with lie telling, the ways in which children self-evaluate or internalize these moral principles has also been investigated. According to Bandura (1986, 1991), children who have internalized such moral standards feel guilt and self-criticism when they have done something they judged to be bad, and this ability increases with age. Bussey (1992) corroborated this, showing that children expected that the vignette character would react with more displeasure after telling a lie versus the truth. However, rather than focusing on these self-evaluative reactions, much of the research has instead investigated the link between children's definitions and lie-telling moral standards to their actual lie telling

behavior. This is due to the importance placed on children's ability to define a lie (i.e., definitions) and appreciate its wrongfulness (i.e., lie-telling moral standards) in competency examinations; that is, correctly classifying a lie and knowing that telling lies is wrong is a requirement for children to be able to testify as witnesses in legal settings (Bala et al., 2000; Bussey, 1992; Bussey & Grimbeek, 2000; Haugaard, 1993; Lyon, 2000, 2011).

These requirements are guided by the assumption that if children know that lying is wrong, and have thus attained knowledge of the moral standards, they will in turn behave in line with this knowledge (e.g., Bala et al., 2000; Bussey & Grimbeek, 2000; Lyon, Carrick, & Quas, 2010). However, despite these assumptions, there has been little research examining the relationship between the two and studies that have examined the link have provided mixed results. For example, of the little research that has examined this link, Talwar et al. (2002) did not find a relationship between 3- to 8-year-old children's moral standards and actual lying behavior in the TRP. The majority of children rated that lying to conceal a transgression was bad. Nevertheless, most of them lied to conceal their own transgression in the TRP. Other research by London and Nunez (2002), with 4- to 6-year-olds, similarly found no relation between the two. In contrast, when examining the association between moral standards and lying to conceal a parent's transgression (rather than their own), another study by Talwar and colleagues (2004), found a modest correlation between lie-telling moral standards and lying behavior. In Talwar and Lee's (2008) study, they separately assessed the relationship between children's definitions of lies and lying behavior, and lie-telling moral standards and lying behavior, to more extensively assess the relationship between moral knowledge and lie telling among 3- to 8-year-olds. In doing so, they found that children's actual lying behavior was related to their moral standards, but not to their ability to correctly define lies.

Together, these mixed findings suggest that the relationship between moral standards and actual lying behavior requires further investigation. Future investigations could benefit from specifically examining possible age-related contributions in the relationship between moral standards and lie telling in a broader age range than that used in many of the studies described above (i.e., 3 to 8 years; London & Nunez, 2002; Talwar et al., 2002; Talwar & Lee, 2008). This might unmask the full picture of the relationship between moral standards and lying. In support of this possibility, theorists and researchers (e.g., Bandura, 1991; Bandura, Barbaranelli, Caprara, & Pastorelli, 1996; Bussey & Bandura, 1992; Evans & Lee, 2014; Henshel, 1971) have posited that with increasing age children are better capable of engaging their moral standards to behave in accord with them. Moreover, the fact that the age-related shift in children's tendency to rate lie telling as worse from 7 to 8 years onwards coincides with a decrease in their actual lie telling behavior from 8 years (described in above sections), further emphasizes that the relationship between the two may emerge after 8 years. Since this research highlights the impact of age on moral standards and actual lie telling separately, and previous research has not yet investigated this relationship using a broad developmental range that includes children below and above 8 years of age, this is an avenue for future research.

Problem behaviors and lie telling. Although, as noted above, lying appears to be related to adaptive and normative cognitive development, and to morality, still children's continued telling of antisocial lies is frequently judged by many as a problem behavior. This rests not only on the actual telling of these lies, but also on its links to engagement in other more serious conduct problem behaviors, such as aggressiveness and stealing (e.g., Achenbach & Edelbrock, 1979; Ostrov et al., 2008; Stouthamer-Loeber, 1986). While experimental studies, discussed above, show that children's propensity to tell lies to conceal their own transgressions does tend to reduce as they age (e.g., Evans & Lee, 2011; Lavoie et

al., 2017), a relatively small percentage of children (3-5%) continue to lie habitually for antisocial reasons (e.g., Stouthamer-Loeber, 1986). Frequent and persistent lie telling in childhood is one of the earliest presenting symptoms of conduct disorder (Stouthamer-Loeber, 1986), and is thus considered a first step toward maladjustment (Gervais et al., 2000; Talwar & Crossman, 2011). For instance, Stouthamer-Loeber (1986) showed that two-thirds of children from a clinical population diagnosed with a conduct disorder, also told antisocial lies. Thus, children who consistently violate other peoples' trust by frequently telling lies are also likely to engage in other antisocial behaviors. Some children become very skilled at using lie telling in manipulative and antisocial ways, without thinking of the negative outcomes, adding to the idea that lie telling is symptomatic of psychopathy (Talwar & Crossman, 2011). These links raise important questions about how or why children's lie telling becomes problematic, and further the need for research to explore these questions to develop better interventions that stop this cycle of maladaptive behavior.

At the same time, lying is believed to be one of the first concealing behaviors (i.e., behavior that aims to hide other antisocial behavior) to emerge and is thus considered a possible developmental precursor for later engagement in other problematic and concealing behaviors (e.g., stealing; Gervais et al., 2000; Patterson, 1982; Stouthhamer-Loeber, 1986). When children's lie telling is not effectively thwarted, they come to rely on it chronically, and this then becomes part and parcel of their engagement in more problematic behaviors (Talwar & Crossman, 2011). Stouthamer-Loeber (1986) reviewed empirical literature on the relationship between lying and child psychopathology, and showed that children's lie telling at early ages was somewhat predictive of later criminal convictions and offenses. In a later longitudinal study by Gervais and colleagues (2000), it was reported that children who persistently told lies, were also rated as engaging in more disruptive behaviors than those who were not persistent liars. Taken together, this research suggests that frequent lying can

be a marker of behavioral problems that develop later (Patterson, 1982; Stouthamer-Loeber, 1986). Although the research to date has produced important findings to confirm this link, this research has relied on only one person's reports on both elements of children's behavior (i.e., lying and other problem behaviors). This reporting procedure is vulnerable to biases, such as a "halo effect", whereby the single reporter is influenced by the presence of lying when reporting on behavior problems (Ekman, 1989; Gervais et al., 2000; Stouthamer-Loeber, 1986). Due to the potential biases which stem from this research methodology, and the few studies that have been conducted thus far, research addressing this issue using multiple reporters and assessing children's actual lie telling in naturalistic environments is required.

Apart from being a possible forerunner to other problem behaviors, it becomes evident that lying is also viewed as the product of engagement in antisocial behaviors, in an attempt to conceal the behaviors to avoid negative consequences (Stouthamer-Loeber, 1986). Such a relationship is arguably caused by a reliance on maladaptive social strategies, poorly developed cognitive skills, immature moral knowledge or self-regulatory capacities, or issues in their environment, which lead children to engage in more problem behaviors to begin with, and then rely upon lying to avoid the punishment for these initial transgressions (Loeber, 1982; Ostrov et al., 2008; Talwar & Crossman, 2011; Warr, 2007). Similarly, Talwar and Crossman (2011, p.165) argue, "lying could be a secondary behavior used to cover up other primary antisocial acts…a product of other aspects of maladjustment". Ostrov and colleagues (2008), using a short-term longitudinal design with preschoolers, demonstrated that children's lying increased following their engagement in higher levels of aggressive behavior. Other longer-term longitudinal research also suggested that older adolescent delinquent children frequently lied to their parents in an attempt to conceal their problem behaviors (Warr, 2007). Lavoie and colleagues (2017) employed a broader developmental range, which included both

preschool and adolescent children from the two previous studies, in a cross-sectional design, and also showed that children's propensity to tell a lie in the TRP was related to higher parent-reported engagement in problem behaviors. Thus, together this evidence points to the conclusion that children's lie telling follows their engagement in other problem behaviors, irrespective of age.

Overall, this research suggests that lying can be both a trigger of later antisocial behavior, as well as a result of engagement in other problem behaviors. However, this requires further investigation in order to try and resolve the direction of the relationship, to help understand and stop the problematic cycle of lying and problem behavior.

In summary, there are a number of personal factors related to the child that are implicated in children's antisocial lie telling to conceal a transgression, including their problem behaviors, moral knowledge, cognitive abilities and age. According to social cognitive theory (Bandura, 1986; Bussey, 1995), however, it is maintained that personal factors are not the only markers of children's lying behavior. Specifically, problem behaviors, moral knowledge and children's lying behavior itself, are also inextricably linked to and influenced by environmental factors.

Environmental Factors. The environmental factors that influence children's lie telling include the ways in which a child is parented (i.e., specific parenting styles and practices), as well as the context of the lie.

Parenting Behaviors. Of all the environmental factors to be discussed, both theorists and researchers assert that parents are the most critical and impactful socialization agents who shape children's behavior (see Talwar & Crossman, 2011). In the literature, two broad styles of parenting, authoritarian and authoritative have received extensive theoretical and empirical attention in relation to child behavior problems, but less so in relation to lie telling.

Authoritarian parenting. Authoritarian parenting is characterized by the use of harsh discipline, forceful control and power assertion, with little positive parental warmth and involvement (Baumrind, 1966, 1967; Baumrind, Larzelere, & Owens, 2010), and has consistently been associated with high rates of antisocial conduct (e.g., Gershoff, 2002; Grogan-Kaylor, 2005; Hoeve, Dubas, Eichelsheim, Laan, Smeenk, & Gerris, 2009; Landsford, Criss, Dodge, Shaw, Pettit, & Bates, 2009). It has often been claimed that children from such environments are more likely to commit transgressions due to their inability to resist temptation, poorer self-control and their impulsive desire to gain immediate benefit at any cost (Coy, Speltz, DeKlyen, & Jones, 2001; Dodge Coie, & Lynam, 2006; Gershoff, 2002; Lepper, 1973; see also Talwar & Crossman, 2011). Further, harsh discipline arguably undermines the internalization of moral standards associated with problem behaviors, as children do not learn why their behavior is wrong, but instead only learn to avoid punishment when necessary, and so it does not put a stop to the initial problem behavior (e.g., Bandura, 1986; Bugental & Grusec, 2006; Deci & Ryan, 1985; Hoffman, 1977, 1984). Thus, researchers have posited that an authoritarian parenting style (characterized by harsh punishment) may also foster children's antisocial lie telling; because when children engage in problem behaviors, they are motivated to hide this behavior to avoid the punishment imposed on them by their parents, and may then, to this end, repeatedly use lie telling as it works in the short-term (Lewis, 1993; Stouthamer-Loeber, 1986; Talwar & Crossman, 2011).

To date, however, empirical research has paid little attention to the link between authoritarian parenting and children's lying, even though parents arguably play a critical role in helping children navigate the complexities and intricacies of lying. Yet, despite relying on parent- and teacher- reports of behavior, Stouthamer-Loeber (1986) highlighted that discipline and maternal rejection were related to increased rates of deception. The prevalence of lie telling is also thought to be associated with control-oriented and power-assertive

disciplinary environments, as children seek to assert their autonomy (Jensen, Arnett, Feldman, & Cauffman, 2004). Furthermore, in Talwar and Lee's (2011) study of West African school contexts, they examined the influence of being exposed to an authoritarian, harsh school context on children's deceptive tendencies, by comparing lie telling in the TRP across an authoritarian versus non-authoritarian (less harsh) school. They found that most students from the authoritarian school context told lies in the TRP, and were better at lying that those children who were exposed to a less harsh school context. In contrast, a more recent study by Talwar and colleagues (2017), that extended this research to examining authoritarian practices in the context of parenting, did not find a significant association to between authoritarian parenting and children's antisocial lying in the TRP.

Prior to this, Ma and colleagues (2015) had turned their attention to examining specific parenting practices that make up the authoritarian style in relation to antisocial lying. They found that controlling parenting was associated with less lie telling, but that punishment (characteristic of authoritarian parenting) was not. However, these findings are problematic, as the researchers assessed *milder* forms of punishment. Yet, harsher punishment is more characteristic of the authoritarian parenting style (Baumrind, 1966, 1967). Hence, it is possible, as Stouthamer-Loeber (1986) postulates, that children are motivated to tell lies when exposed to *harsher* environments, where harsh disciplinary practices are used, not simply because of punishment in general. Talwar and Lee's (2011) findings discussed earlier add weight to this interpretation. Thus, overall, there is convergent evidence to suggest that *harsh* punishment promotes children's lie telling to conceal a transgression.

Authoritative parenting. Different from authoritarian parenting and its negative impact on child outcomes, authoritative parenting, which consists of warmth, sensitivity, support and involvement (Baumrind, 1966, 1967; Baumrind, Larzelere, & Owens, 2010), has been associated with more positive cognitive, behavioral and social outcomes for children

(Bernier, Carlson, Deschenes, & Matte-Gagne, 2012; Burton, 1976; Lamborn, Mounts, Steinberg, & Dornbusch, 1991; Stouthamer-Loeber, 1986). Some researchers have highlighted that responsive and warm parenting practices promote autonomous self-regulatory control, facilitating children's development of self-control abilities and moral internalization (e.g., Bugental & Grusec, 2006; Grolnick & Pomerantz, 2009; Lamborn et al., 1991; Rinaldi & Howe, 2012). Other researchers have also argued that authoritative parenting practices are consistent across contexts, and foster instrumental competence and adaptive social skills (Popliger et al., 2011; Robinson et al., 1995). For instance, Popliger and colleagues (2011) found that authoritative parenting was associated with children's higher propensity to tell polite lies to protect the feelings of another (i.e., prosocial lies), a lie type that has been linked with good interpersonal relationships (Talwar & Crossman, 2011). Thus, through interactions with authoritative parents, children learn in which situations lie telling is appropriate and when it is not (Popliger et al., 2011).

However, there is less support for the influence of authoritative parenting practices on children's lie telling to conceal a transgression (i.e., antisocial lies), compared with the literature on authoritarian parenting styles. Nevertheless, it has been suggested that authoritative parenting practices, specifically parental warmth, emphasize honesty and the necessity to tell the truth, and not lie in these contexts (Burton, 1963; Stouthamer-Loeber, 1986; Talwar & Crossman, 2011; Talwar et al., 2017). In support of these assertions and findings, other researchers (Almas, Grusec & Tackett, 2011; Darling, Cumsille, Caldwell, & Dowdy, 2006) also reported an association between these practices and truthful disclosure. It has been claimed that children may be less likely to tell lies in transgression contexts when parents use authoritative rather than authoritarian parenting practices, since parental warmth emphasizes the importance of the welfare of others, and such parenting focuses on demonstrating how antisocial lies violate trust and cause harm to social relationships

(Smetana, 1999). Moreover, other researchers have shown that warm parenting keeps children from engaging in the transgression they would otherwise need to conceal in the first instance (e.g., Loeber & Stouthamer-Loeber, 1986; Stouthamer-Loeber, 1986). In support of this assertion, Burton (1976) highlighted, in his review, that parental warmth was associated with children's increased ability to resist temptation, which has also been linked to self-regulation and an increased acceptance that lie telling is wrong (i.e., internalization of personal standards) in the long term (e.g., Bugental & Grusec, 2006; Grolnick & Pomerantz, 2009; Rinaldi & Howe, 2012), as discussed above. Very recently, however, Ma and colleagues (2015) did not find that parental warmth significantly influenced 3-year-old children's propensity to tell an antisocial lie in the TRP. Conversely, Talwar and colleagues (2017) found that 3- to 6-year-old children were less likely to tell an antisocial lie in the TRP when their parents used authoritative practices, such as warmth and involvement. Thus, in the main, the theoretical perspectives and Talwar et al.'s (2017) findings highlight that parental warmth, a characteristic of the authoritative parenting style, is a deterrent of children's antisocial lying.

Taken together, research on the link between parenting factors and children's antisocial lie telling reviewed above indicate the importance of specific, independent *parenting practices* associated with each of the authoritarian and authoritative styles of parenting in children's propensity to tell antisocial lies. Specifically, these studies show that harsh punishment promotes more lie telling, while parental warmth is associated with less lie telling. Moreover, some of the reviewed studies also highlight that the context of the lie (specifically, the lie type) may differentially affect these relationships and children's lie telling behavior itself.

Context of the lie. Therefore, an important consideration with regard to children's lie telling is the possibility that children's propensity to lie may depend on the context of that

false statement. Historically, there has been a focus on the influence of context on children's transgressive behaviors; that is, an attempt to determine whether children may lie in one context, but not in another. In particular, Hartshorne and May (1928) investigated this possibility in their seminal work on *Studies in Deceit*, and argued for the situation-specificity of children's dishonesty. Their research showed that lie telling to conceal transgressions depended on the task used, highlighting that some children did not lie consistently across the different tasks. This finding led researchers to cast doubt on the opposing, doctrine of generality, which posited that children have a dishonest trait that can be generalized across different task-contexts (see Burton, 1963). Instead, according to Hartshorne and May (1928), children's decision to tell a lie is not a fixed trait, but is differentially influenced by task-related factors (i.e., context). Although Burton (1963) later raised questions about Hartshorne and May's (1928) findings due to the low reliability of some of the task measures they had used, he still concluded that despite some underlying degree of generality in children's deceptive behavior, each task-related context is important. This highlights the need for researchers to consider children's antisocial lie telling behavior in more than one experimental tempting context.

Despite this, little evidence currently exists on the role of environmental factors (such as the context in which the lie is told) in children's propensity to tell antisocial lies (Talwar & Crossman, 2011), with much of the contemporary research instead paying attention to lying in one type of context and in relation to personal factors. Recent research by Lavoie et al. (2017), however, has paid renewed attention to the influence of context on lying, examining context in terms of different types of lies (i.e., prosocial versus antisocial) to determine whether there are differences in the ways in which these lie-types are associated with personal factors (such as age and TOM). They found that antisocial liars were younger than prosocial liars and had lower TOM scores. However, we are not aware of any other recent

investigation into the influence of context on lie telling. Evidently, it is important to examine whether children's lie telling is differentially influenced by the context in which the lie is told. Moreover, given Lavoie et al.'s (2017) findings showing that the context of the lie-type differentially relate to person-specific factors, together with Hartshorne and May's (1928) situation-specific argument, it becomes clear that context is not only important with respect to different lie-types, but may also be critical within a given lie-type. This implies that children's propensity to tell an antisocial lie should be compared across different TRP tasks in the one study.

Summary. To summarize, in line with the social cognitive theory model of behavior (Bussey, 1995), both individual differences related to the child themselves (i.e., personal factors) and their environment (i.e., environmental forces) are markers of children's antisocial lie telling behavior. Although the development and maintenance of children's lies has been attributed to children's emerging cognitive abilities, children's propensity to lie is also shaped by their moral knowledge. Furthermore, while children's lie telling thus reflects normative developmental processes, it can also become a problem behavior for some when used frequently, due to its links with other problem behaviors. However, children's propensity to tell lies is moderated not only by these personal factors, but also by environmental forces. In particular, parents are active socialization agents influencing lie telling, whereby children's interactions with their parents can either reinforce truth-telling (leading to lower rates of antisocial lie telling) when their parents use more positive parental warmth, or foster higher rates of lie telling where children seek to avoid the harsh punishments their parents use. Arguably though, children's propensity to tell antisocial lies and the ways in which these factors influence such behavior, are inextricably linked to the tempting context of the lie (i.e., task-type); that is, children's antisocial lying behavior may be situation specific and their decision to tell an antisocial lies may be context-dependent. These issues are undoubtedly

important to developing a more nuanced and complete picture of children's antisocial deception.

However, there are some important limitations to the studies upon which these findings are based, that need to be addressed. First, with the exception of the limited studies examining the link between lie telling and problem behaviors, all of the research is based on cross-sectional data. It therefore cannot be concluded whether lie telling is the cause or the effect of these factors (i.e., moral standards, parenting practices etc.), without a longitudinal investigation. Second, the relationship between children's antisocial lying and these personal and environmental factors has been investigated using only one of the two experimental temptation resistance paradigm (TRP) tasks within the one study (i.e., the guessing game or the school-achievement task). Although these factors do foster lie telling when investigated in one TRP-task, lie telling is a multi-dimensional behavior, and it is therefore possible that the tempting context (i.e., TRP task-type) of the antisocial lie itself may influence its development and association with different factors. Children's antisocial lie telling in two tempting TRP-tasks (both the guessing game and the school-achievement task) and across development, however, has not yet been examined in the one study.

The Present Research

To bridge these gaps in the literature, this thesis presents a series of four laboratory-based studies, generated from a large-scale longitudinal study with data collected at two time points, 12 months apart. These studies examined the influence of various personal and environmental factors on children's antisocial lying in the context of two of the frequently used TRP tasks and across a broad developmental range. In all four studies, a broad age range of children (3 to 15 years), which incorporated specific age groups (preschool, grade 2, grade 4, grade 6, grade 8), participated in both of the most commonly used TRP tasks, the guessing game and the school-achievement task, which had previously been used in different age

studies with different age groups. Children were tested at Time 1 (T1), and again 12 months later at Time 2 (T2). For study one, the sample consisted of the 443 children (N_{male} = 252, M_{age} = 9.17 years, *SD* = 3.42; age range 3 to 14 years) who participated at T1 only. For studies two, three and four, the sample consisted of all 443 children for all of the cross-sectional analyses, and a total of 298 children (N_{male} = 185, M_{age} = 9.89 years, *SD* = 3.17; age range 4 to 15 years) that had complete data from T1 and T2 for the longitudinal analyses.

The first laboratory-based study is presented in Chapter 2. This study aimed to determine whether TRP task-related factors contributed to the age-related patterns that have emerged from different studies using one of two different TRP tasks. By removing the potential confounds of age and TRP-task-type factors, it was expected that the age-related decrement in lying established in previous studies (e.g., Evans & Lee, 2011; Lavoie et al., 2017; Talwar & Lee, 2002, 2008) would be evident for both tasks when used in the one study, but in line with Hartshorne and May's (1928) situation-specificity argument, it was also expected that children's lie telling may not be consistent across both tempting TRP tasks.

The second laboratory-based study is presented in Chapter 3. This study was designed to examine the influence of moral standards about the wrongfulness of lie telling on children's actual lying across development, using both cross-sectional and longitudinal data to enable causal statements. In addition to participating in both TRP tasks to assess lying, children also watched two animated vignettes to assess their lie-telling moral standards. It was predicted, in line with claims that children's lie-telling moral standards become more negative as they age (e.g., Bussey, 1992, 1999; Talwar et al., 2002), and their lie telling decreases (e.g., Lavoie et al., 2017), that lie-telling moral standards and antisocial lying would be negatively associated and that this relationship would emerge with increasing age. Also, extending this investigation longitudinally for the first time, it was predicted, in line with legal assumptions and theoretical notions (Bandura, 1991; Bandura et al., 1996; also see

Talwar & Crossman, 2012 for review), that moral standards would guide lying behavior over time.

The third laboratory-based study is presented in Chapter 4. The aim of this study was to add to the limited research on environmental influences on deception, by systematically examining, in combination, the relations of each independent parenting practice (i.e., the use of harsh punishment and parental warmth) to lie telling in the context of both cross-sectional and longitudinal data. The same group of children, discussed with regard to the first and second laboratory-based study, participated in the two TRP tasks to assess their lying, and parenting practices were assessed through parent-report. In accord with claims that children's antisocial lie telling is motivated primarily by a desire to avoid punishment for their transgressions (e.g., Lewis, 1993; Stouthamer-Loeber, 1986), it was expected that children would be more likely to lie if their parents employed more harsh punishment. On the other hand, in line with theoretical and research assertions (e.g., Bugental & Grusec, 2006; Burton, 1976; Grolnick & Pomerantz, 2009; see also Talwar & Crossman, 2011), that warm parenting practices foster resistance to temptation, and in turn a lesser need to lie, as well as moral internalization in the longer term, more parental warmth was expected to be associated with a lower propensity to lie.

The fourth laboratory-based study is presented in Chapter 5. This study evaluated whether lying behavior was the cause or effect of engagement in other conduct problem behaviors, by using a cross-lagged panel design, which measures both behaviors at 2 separate times, 12 months apart. This research is necessary given the theoretical and research support for two opposite directions of the relationship (Gervais, et al., 2000; Ostrov, et al., 2008; Stouthamer-Loeber, 1986; Talwar & Crossman, 2011), and to further understand how antisocial lie telling can be a problem behavior. Thus, this study concurrently tested two competing hypotheses regarding the direction of the relationship between antisocial lie telling

and conduct problems (specifically it was predicted that children's lie telling predicted their later engagement in conduct problems *and* it was predicted that children's engagement in conduct problems predicted their propensity to tell lies a year later), in order to support or rule out one of the hypotheses.

The final chapter, chapter 6, presents a discussion of the key findings of these four laboratory-based studies, as well as their implications for understanding the complexities of children's lie telling to conceal a transgression. The strengths and limitations, along with suggestions for future research are also provided.

Chapter 2

Contextual and Age-Related Determinants of Children's Lie Telling to Conceal a Transgression

Abstract[4]

Children frequently tell lies to conceal their transgressions. Evidence to date, from the temptation resistance paradigm (TRP), indicates that lie telling increases into middle childhood (4 to 8 years), but decreases during early adolescence (8 to 14 years). However, these age-related conclusions have emerged from different studies that have included different age groups, using one of two different TRP tasks. Before accepting this age-related trend, this study aimed to remove the confound of age and task-type by using both of the frequently used TRP tasks across a broad age range in one laboratory study. Four hundred and forty-three 4- to 14-year-old students participated in both frequently used TRP tasks (guessing game, school-achievement task), where they could commit a minor transgression (i.e., peek at a forbidden toy/answer) and were given the opportunity to lie or tell the truth about having peeked. For both tasks, the same age-related decrease in lie telling after 8 years was evident; indicating that the age-related patterns found in previous research cannot be attributed to the different TRP tasks used. Across all ages, there was an overall difference in the amount of lie telling with respect to the TRP task, with more children telling a lie about having peeked in the guessing game (36%) than in the school-achievement task (19%). Implications for understanding the independent and critical role that age and TRP task-type play in children's lie telling and suggestions for future research are discussed.

[4] This manuscript has been submitted for publication in the International Journal of Behavioral Development. This is the revised version that has been submitted at the editor's request. In subsequent chapters this study is referred to as "Carl, T., & Bussey, K. (2017a). *Contextual and age-related determinants of children's lie telling to conceal a transgression.* Manuscript submitted for publication".

Contextual and Age-Related Determinants of Children's Lie Telling to Conceal a Transgression

From a young age, children know that antisocial behavior is wrong. Despite this knowledge, children engage in antisocial behavior in their day-to-day lives, and often tell lies to conceal this behavior (Talwar & Crossman, 2011). Lying to conceal misbehavior (i.e., antisocial lies) is arguably the most common lie told by children and children begin to tell these types of lies as early as two years of age (Chandler, Fritz, & Hala, 1989; Evans & Lee, 2013; Williams, Leduc, Crossman, & Talwar, 2016; Wilson, Smith, & Ross, 2003). The development of antisocial lie telling has been of particular interest to researchers, with many examining this behavior in controlled laboratory studies using the *temptation resistance paradigm* (TRP; see Evans & Lee, 2011; Talwar & Lee, 2002, 2008). Employing this experimental methodology to assess children's actual lie telling, researchers have shown an age-related decrease in lying behavior with increasing age. In particular, results from these studies have shown that antisocial lie telling increases into middle childhood (i.e., between 4 to 8 years; Talwar & Lee, 2002, 2008), but decreases during early adolescence (i.e., 8 to 14 years; Evans & Lee, 2011; Lavoie, Yachison, Crossman, & Talwar, 2017). However, these age-related patterns have emerged from different studies that have included different age groups, using one of two different TRP tasks. Therefore, before this age-related trend can be accepted, it is necessary to unconfound age and task-type effects, by using both of the frequently used TRP tasks (e.g., guessing game and school-achievement task), across a broad age range of children in the one study. This is the aim of this study.

To date, research on children's antisocial lying has interchangeably used one or the other of these two TRP task to assess children's lie telling. It has been assumed that children's antisocial lie telling can be measured by a single task and is comparable across these two tempting tasks. Arguably, these TRP tasks do have similarities; both place children

in a tempting context by leaving them alone in a room with a forbidden item after being instructed not to peek (i.e., the transgression) and then give children the opportunity to either lie or tell the truth about whether or not they peeked (i.e., the lie or truth). The guessing game has mostly been used in studies with younger children (i.e., 4 to 8 years; Talwar & Lee, 2002, 2008), with the exception of one recent study that included children aged 4 to 14 years (Lavoie et al., 2017), which required children to guess the name of a toy from a song clue, without peeking at the toy. Whereas, the school-achievement task has mainly been used in studies with older children (i.e., 6 to 16 year olds; Evans & Lee, 2011; Talwar et al., 2007) and requires children to answer test-like multiple-choice questions, without peeking. Taken together, the findings from these experimental studies show that while the majority of children aged 4 to 8 years lie in this context, lie telling decreases after 8 years of age (e.g., Evans & Lee, 2011; Lavoie et al., 2017; Talwar & Lee, 2002, 2008). Although, children's developing ability to lie has often been attributed to an increase in cognitive maturity at younger ages (Carlson, Moses, & Hix, 1998; Evans & Lee, 2011; Polak & Harris, 1999; Talwar & Crossman, 2011; Talwar et al., 2007; Talwar & Lee, 2000), the decrease in lying at older ages is arguably indicative of children's internalization of moral and social norms relating to lie telling behavior (Lavoie et al., 2017; Talwar & Crossman, 2011).

Notably, however, the age-related findings from these studies are reliant on the use of different TRP tasks to measure children's lying with different age groups, and therefore it cannot yet be concluded that these age differences are attributable to underlying developmental processes rather than to the context of the TRP task itself. Instead, it is possible that children's lying across age may not be consistent for the different TRP tasks. This task-related hypothesis is plausible in view of theories of morality, where utilitarian and social cognitive theoretical perspectives highlight that the act of lying is multi-dimensional, that depends on the context in which the behaviour occurs, as well as various social cognitive

processes, such as the motives, the purpose and consequences of the behavior (Bandura, 1986; Evans & Lee, 2014; Mill, 1989; Smetana, 2006; Smetana, Jambon, & Ball, 2014). However, little research has focused on this contextual aspect of morality in the development of lying. Yet, Hartshorne and May's (1928) seminal research reported in *Studies in Deceit*, showing that children's deception is situation-specific and varies depending on the context of the task (i.e., the type of task used), adds weight to this hypothesis. In addition, a study conducted by Lavoie and colleagues (2017) provides evidence for contextual variation in children's lie telling as a function of age. Using two experimental paradigms, they examined whether children's propensity to tell a lie depended on the lie-type (i.e., whether the lie was told in an antisocial or prosocial paradigm), finding that some children told one lie-type but not the other. Thus, it is possible that context is not only important with respect to different lie-types, but children's lie telling may also not be consistent within a given lie-type. This highlights the need for researchers to assess children's actual antisocial lie telling across more than one tempting context (i.e., TRP task) in the one study.

Thus, the goal of this study was to examine the relative contribution of TRP task-type to age-related differences in antisocial lie telling, by employing both frequently used experimental TRPs with a broad age range of children. This broad age range was selected to include both age groups used in previous studies with the two different tasks. By removing the confound of task-type and age in this study, it was predicted that the type of TRP task, and the child's age, would independently predict children's antisocial lying. Consistent with the age-related decrement in lying observed in previous studies (e.g., Evans & Lee, 2011; Lavoie et al., 2017; Talwar & Lee, 2002, 2008), it was hypothesized that the same developmental pattern would be evident for both tasks when used across a broad age range of children in the one study. Further, based on Hartshorne and May's (1928) specificity argument, and on recent findings showing contextual variation in lie-types (Lavoie et al.,

2017), it was also predicted that lying would vary depending on task-type. Specifically, children may lie in one TRP task but not in the other.

Method

Participants

Participants were 443 (252 males, 191 females) children attending middle-class schools in a large metropolitan city. Approximately, 80% of the children were White, 8% Asian, 5% Middle-Eastern, and the remaining 7% were from other ethnic backgrounds. There were 100 (48 boys) preschool (M_{age} = 4 years, *SD* = 7 months), 85 (42 boys) grade 2 (M_{age} = 8 years, *SD* = 5 months), 93 (59 boys) grade 4 (M_{age} = 10 years, *SD* = 5 months), 69 (46 boys) grade 6 (M_{age} = 12 years, *SD* = 5 months) and 96 (57 boys) grade 8 (M_{age} = 14 years, *SD* = 5 months) students. Written parental consent for students to participate in this study and children's verbal assent were obtained prior to participation.

Design and Procedure

Children were tested individually in a quiet room on school premises by a female experimenter. Each child was invited to participate in two temptation resistance paradigm tasks (TRP tasks; e.g., Evans & Lee, 2011; Lewis, Stanger, & Sullivan, 1989; Talwar, et al., 2007; Talwar & Lee, 2002, 2008), a guessing game and a school-achievement task. In both TRP tasks, the child was given the opportunity to commit a minor transgression (i.e., peek at a forbidden item). Later, the child was questioned about their peeking behavior and given a naturalistic opportunity to tell a lie if they had peeked. The order in which each child participated in the games was counterbalanced. The entire procedure was videotaped using a hidden video camera. At the conclusion of the study, children were thanked for their participation and were told that no matter what they did or said in the room today, they would not get into trouble.

Guessing game. The TRP guessing game followed the structure used by Talwar and Lee (2002, 2008), where each child was told to sit with their back to the experimenter, while the experimenter played a song clue from a toy. The child was asked children to guess the toys identity from the song clue, without turning around. All toys represented popular television and movie characters. This was done with two practice trials (e.g., Elsa from Frozen, The Little Mermaid). After the two practice trials, the experimenter told the child that she needed to leave the room for a minute and that they would continue the game once she returned. Before leaving the room, she placed the third target toy (e.g., A lion - Simba) on the table behind the child and played an unrelated song (i.e., music from a greeting card), which could not be used to infer the identity of the toy. Thus, the child was tempted to peek in order to discover the toy's identity. The child was told, "Do not turn to look at the toy while I am out of the room". The experimenter then left the room for 1 minute. When the experimenter (who was blind to whether the child had peeked at the toy in their absence) returned, she immediately covered the toy with a piece of cloth and asked the child, "When I was out of the room, did you turn around and look at the toy?

School-achievement task. The TRP school-achievement task was modified from previous studies utilising the task (e.g., Evans & Lee, 2011; Talwar et al., 2007) and followed a similar premise as the guessing game, but instead of being asked to guess the name of toys from their associated sounds, each child was asked to complete a multiple-choice style test designed to assess their knowledge on popular television shows and movies (e.g., "What is the name of Winnie the Poo's donkey friend?"). They were told that there were three questions, which were selected to be suitable for both the younger and older age groups. The child was also told that if they got all the questions correct they would receive a prize. The experimenter read two practice trial questions to the child along with the four possible answers written on the front side of the trivia card, with accompanying pictures. For the third

target question, a slight modification was made to the way in which it was presented to the younger versus older age groups. This modification was done in order to make the task age-appropriate, by matching the different levels of reading across the wide age range used in this study. For each child in preschool and grade 2, the experimenter read the third target question to the child, which was written on the front of a trivia card, accompanied by pictures, and the fictitious "correct" answer was written on the back of the card. Whereas, each child in grade 4, 6 and 8, was presented with a test booklet which had the third target question written on the front, and the fictitious "correct" answer written on the inside of the booklet. For both age groups, the experimenter then told the child she had to leave the room for a minute, and preschool and grade 2 children were instructed not to peek at the answer to the question written on the back of the card, while grade 4, 6 and 8 children were told to answer the question on the booklet without peeking at the answer, while she was absent. However, the third target question remained the same for both age groups (i.e., "Who discovered Peter Pan?"), and had a fictitious "correct" answer (i.e., "Profidius Aikman").

Coding. In each task, children were classified as liars if they told the experimenter that they had not peeked when they had peeked at the answer (s). Alternatively, children were classified as truth-tellers, if they had peeked but told the truth about having peeked at the answer (s), or if they had not peeked but told the truth about having not peeked at the answer (s).

Statistical Analysis

Correlations amongst all the measures (i.e., grade, peeking behavior in both TRP tasks, lie telling behavior in both TRP tasks) are presented first (see Table 1). Then, results examining children's propensity to lie to conceal their transgression (i.e., peeking) in the two TRP tasks, and across a wide age range are presented. Analyses were conducted with 443 participants using Generalized Linear Mixed Models as responses were categorical. This data

analytic strategy is an extension of the generalized linear model but is useful in the analysis of grouped or repeated data, where random and fixed effects are accounted for (Jiang, 2007). It was used in this study because each participant's data was repeated (i.e., in the two TRP tasks; McCulloch, Searle, & Neuhaus, 2008).

Results

Preliminary analyses with order of the TRP tasks (guessing game first vs. guessing game last) as the predictor variable on the first step of all described analyses, did not reveal any significant order effects ($p > .32$). Therefore, all further analyses were conducted collapsing across order.

Overall, 20% (90 of 443) of children peeked at the answer in the school-achievement task, 38% (167 of 443) of children peeked at the toy in the guessing game. Of the 90 children who peeked in the school-achievement task, 93% ($N = 84$) lied about having peeked at the answer; and of the 167 children who peeked in the guessing game, 95% ($N = 159$) lied about having peeked at the toy. To ensure that all children across both lie-telling scenarios were included, both the children who peeked in the tasks and the children who did not peek in the tasks, across both TRP tasks, were included in all subsequent analyses. Thus, all further analyses compared those children who peeked and told a lie (liars) with those children who told the truth (truth-tellers[5]; either about having peeked, or about having not peeked). Including all children allows us to capture the full extent of all relationships and compare lie tellers to truth-tellers, irrespective of the type of truth told (i.e., admitting a transgression that was committed or not admitting a transgression that was not committed), while also accounting for transgressive behavior (which is the context in which the lie is told).

[5] The confessors across both TRP-tasks were too small a group ($N = 9$ pre-schoolers) to attempt to disaggregate the two groups of truth-tellers (i.e., the confessors who peeked from the truth-tellers who did not peek). Moreover, analyses were run to determine whether inclusion of this small group of confessors altered the results. This analysis revealed that the exclusion of the small group of confessors did not change the results of the subsequent analyses in any significant way.

Correlations

Table 1 displays all correlations between grade, peeking and lie telling across both TRP tasks. The negative correlations between grade and peeking behavior in the guessing game, and between grade and peeking behavior in the school-achievement task, indicated that the higher the child's grade, the less likely they were to peek in both of the two TRP tasks. Similarly, the negative correlation between grade and lying in the guessing game also indicated that the higher the child's grade, the less likely they were to tell a lie to conceal their transgression in the guessing game. However, the child's grade was not significantly correlated with lying in the school-achievement task. Children's actual peeking behavior in both TRP tasks was positively correlated, as was their actual lying behavior in both TRP tasks. Finally, children's actual peeking behavior in the guessing game was positively and strongly correlated with their actual lie telling in the guessing game, and the same positive and strong correlation was evident between peeking and lie telling in the school-achievement task. These strong correlations indicate that peeking and lie telling are highly related in this sample.

Table 1
Correlations between children's grade and peeking and lie telling in each of the two TRP tasks

Variable	1	2	3	4	5
1. Children's Grade		-.28***	-.10*	-.23***	-.08
2. Peeking - GG			.37***	.96***	.36***
3. Peeking - SA				.35***	.96***
4. Lying - GG					.36***
5. Lying - SA					

Note. GG=Guessing game; SA=School-Achievement Task
*$p < .05$ **$p < .01$ ***$p < .001$

Removing the Confound of Age and Task-type Effects in Children's Lie Telling Behavior

In order to determine whether robust age-effects in lie telling to conceal peeking behaviour from previous studies have been confounded by task-type, the main effects of grade and TRP-task-type, as well as the interaction between the two, were analysed using a 5 (grade: preschool, grade 2, grade 4, grade 6, grade 8) x 2 (game: guessing game, school-achievement task) generalised linear mixed model, with the first factor being between subjects and the last factor being within subjects. The model correctly classified 71% of children into the two categories: "truth-tellers" and "liars".

There was a significant main effect for TRP task-type, $F(1, 886) = 26.84$, $p < .001$. For all age groups, children were significantly more likely to tell a lie to conceal a transgression (rather than tell the truth) in the guessing game than those children in the school-achievement task ($\beta = .90$, $SE = .16$, $t(886) = 5.74$, odds ratio [OR] = 2.46, $p < .001$, 95% confidence interval (CI) [1.81, 3.35]). The odds ratio indicated that children were 2.46 times more likely to tell a lie (versus the truth) to conceal their peeking in the guessing game (36%; 159/443), than in the school-achievement task (19%; 84/443).

There was also a significant main effect for grade, $F(4, 886) = 6.39$, $p < .001$ (see Figure 1). Specifically, post hoc analyses revealed that there was an overall decrease in lie telling to conceal a transgression from Grade 2 (i.e., 8 years) onwards, across both tasks. Coefficients for the grade post hoc comparisons are displayed in Table 2. Specifically, while older children in grade 6 (i.e., 12 years) and grade 8 (i.e., 14 years) were not significantly different from each other ($p = .99$), children in both these grades were significantly less likely to lie (rather than tell the truth) than their younger counterparts in preschool (i.e., 4 years) ($ps < .01$), grade 2 (i.e., 8 years) ($ps < .001$) and grade 4 (i.e., 10 years) ($ps < .05$). The odds ratio indicated that children in both grade 6 and grade 8 were 51% less likely to lie (rather than tell

the truth) than children in preschool, 32% less likely to lie (rather than tell the truth) than children in grade 2, and 54% less likely to lie (rather than tell the truth) than children in grade 4. Additionally, among the younger age group, Grade 4 (i.e., 10 years) children were significantly less likely to lie than those in Grade 2 (p =.03). The odds ratio indicated that children in grade 4 were 61% less likely to lie (rather than tell the truth) than children in grade 2. No other significant grade differences were found among the younger age group.

The two-way interaction between grade and TRP-task-type did not attain significance, $F(4, 886) = 1.07$, $p = .37$.

Table 2.
Grade to Lying Behavior Post Hoc Comparisons (N = 443)

Lie Telling Behavior	β	SE	t	Odds Ratio	p	95% C.I.
Grade 8 vs. Grade 6	.004	.29	.016	1.005	.99	.57 1.77
Grade 8 vs. Grade 4	-.63	.25	-2.53	.54	.01*	.33 .87
Grade 8 vs. Grade 2	-1.13	.25	-4.59	.32	.000***	.20 .53
Grade 8 vs. Preschool	-068	.24	-2.80	.51	.005**	.31 .82
Grade 6 vs. Grade 4	-.62	.28	-2.26	.54	.02*	.31 .92
Grade 6 vs. Grade 2	-1.13	.27	-4.09	.32	.000***	.20 .56
Grade 6 vs. Preschool	-.68	.27	-2.47	.51	.01*	.30 .87
Grade 4 vs. Grade 2	-.50	.23	-2.20	.61	.03*	.39 .95
Grade 4 vs. Preschool	-.06	.23	-.25	.95	.80	.61 1.47
Grade 2 vs. Preschool	.44	.22	1.99	1.56	.05	1.01 2.42

Note. Reference category is truth-teller
*p < .05 **p < .01 ***p < .001

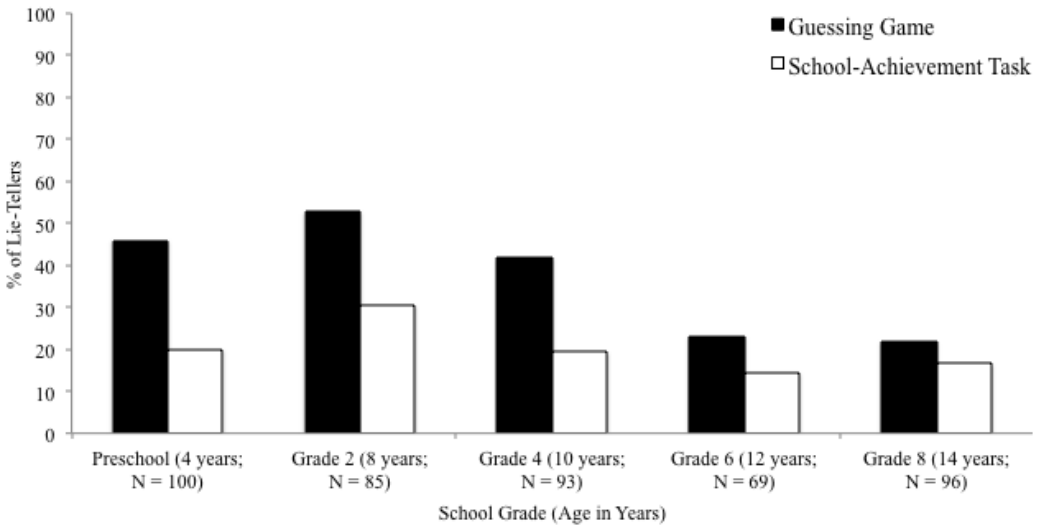


Figure 1. The percentage of children who told a lie to conceal having peeked for each TRP task as a function of grade/age

Discussion

This study examined children's antisocial lying to conceal a transgression (i.e., their peeking behavior) across two different experimental contexts (i.e., TRP tasks: guessing game and school-achievement task) and specific ages across a broad developmental range, to determine whether TRP task-type contributed to age-related differences in lying behavior. Age and TRP task-type were independently related to children's actual antisocial lie telling. For both tasks, the same age-related decrease in lie telling behavior after 8 years was uncovered. Thus, the robust decrement evident in previous literature cannot be attributed to the context of the lie (i.e., TRP task-type). Yet, across all ages, the overall level lie telling varied depending of the type of task used, with children telling more lies to conceal their peeking behavior in the guessing game than in the school-achievement task.

Strong evidence of a decrease in children's propensity to tell an antisocial lie after 8 years was evident. Extending previous studies that used only one measure of children's actual lying behavior (i.e., one TRP task; the guessing game or school-achievement task), this study showed the same age-related decrement in lying for both TRP task-types across a wide

developmental age range. While 8-year-old children lied more than 4-year-olds, with increasing age, lie telling decreased. Specifically, 10-year-old children lied less than 8-year-olds. Also, 12- and 14-year-old children lied significantly less than their 4-, 8-, and 10-year-old counterparts. It is likely then, as Talwar and Crossman (2011) contend, that children's developing capacity to lie before 8 years correspond with their cognitive development. Whereas, once children are able to lie, their decisions to lie with increasing age are influenced more by other individual difference factors. For instance, a possible explanation for the decrease in lie telling after 8 years may result from these older children having developed stronger moral standards relating to the wrongness of lie telling to conceal a transgression (Evans & Lee, 2014). However, this interpretation requires testing in future research by measuring children's moral standards in relation to antisocial lying in different contexts. Nonetheless, these findings confirm the same developmental trajectory in antisocial lying found in previous literature, regardless of the type of TRP task that was used (Evans & Lee, 2011; Lavoie et al., 2017; Talwar & Lee, 2002, 2008). Additionally, the current results suggest that these age-related differences are not attributable to context, in that, the same age-related decrement was apparent in both tasks in the one study.

It is important to note however, that the current study also showed that the overall amount of antisocial lying varied depending on the TRP task-type, irrespective of age. Specifically, children's lie telling to conceal peeking at the toy in the guessing game was significantly higher than their lie telling to conceal peeking at the test-answer in the school achievement task. In support of the hypothesis that children's lie telling may vary across different contexts, and in line with Hartshorne and May's (1928) context-specific argument and recent findings showing contextual variation in lying (Lavoie et al., 2017), children's rate of lie telling differed across the two temptation resistance tasks. Despite these task differences in lying, this same task-related finding was evident across all ages. This finding

may reflect a change in children's lie telling based on subtle differences in the nature of the tempting context in which the lie is told. It is possible that children may have perceived the school-achievement task to be more serious than a playful guessing game. As such, children may have found it more acceptable to lie in a less serious context. In support of this hypothesis, Tisak and Turiel (1998) suggest that children's behavior is motivated differently, depending on whether they anticipate more or less disapproval in different contexts.

Although the current study did uncover a difference in the overall amount of lie telling to conceal peeking in the two antisocial contexts, there was a significant but moderate correlation between lie telling in the two contexts. Thus, Hartshorne and May (1928) may not have been entirely correct in their context-specific argument for deception. Perhaps the antisocial context of the lie influences the overall amount of lie telling to conceal peeking, but children's age-related propensity to tell a lie to begin with is not context-specific. The current findings showing the same age-related pattern in lie telling in both antisocial contexts adds some weight to this interpretation. Perhaps, the different levels of lying in the guessing game versus the school-achievement task may also relate to different underlying processes or different ways in which the underlying processes influence behavior in the different contexts. For instance, Lavoie et al. (2017) showed that different factors, such as age, theory of mind, social skills, and problem behaviors, determined whether children would tell one lie-type or the other (i.e., prosocial versus antisocial lies). Together, these findings suggest that future research should further examine children's lie telling in different antisocial contexts, and investigate how different factors may influence lie telling to conceal peeking in different antisocial contexts.

Despite the notable findings of this research, there are some limitations. First, while robust developmental decrements in antisocial lie telling were uncovered across two tempting contexts, these were based on cross-sectional data. Future research should examine the

developmental progression of lying to conceal a transgression longitudinally across early, middle and late childhood in order to further understand the trajectory of lying over time. A second limitation of this research is the use of controlled laboratory situations for assessing deception. In general, motivational factors influencing children's lie or truth telling in laboratory contexts likely differ from the motivational factors influencing their lie and truth telling in their day-to-day life (Lavoie et al., 2017). Nevertheless, the temptation resistance paradigms used in this study do mimic situations encountered in daily life. Moreover, both the task-related findings and the age-related findings uncovered across both tempting tasks in this study, suggest that children's actual antisocial lying was closely captured and influenced by contextual differences in these controlled laboratory tasks. Therefore, these laboratory transgressions were useful in assessing the impact of context on children's antisocial lying. However, it is important for future research to establish if the two tasks varied by seriousness and perhaps subtly do differ from day-to-day situations.

It is also acknowledged that due to the very small number of confessors in the present study, it was not possible to disaggregate the truth-tellers who told the truth about having peeked (i.e., confessors) and the truth-tellers who told the truth about not having peeked, in order to establish the factors that differentiated the two types of truth-telling. However, it was shown that removing the confessors from all analyses conducted in the present study did not alter the interpretation of the results in any way. In fact, the findings from this study show that peeking and lie telling are inextricably connected, with only a small percentage (i.e., < 5%) confessing their transgression. Future studies with a larger group of truthful confessors would help to disentangle peeking and lie telling behaviors to allow for further exploration into how context may differentially influence these two behaviors separately. Some studies have reported more variability in the rates of confessing than was found in this sample (e.g., Evans & Lee, 2010, 2011; Talwar & Lee, 2008). One possibility for these higher rates of

confessing is that children were asked to promise to tell the truth before being questioned about their behavior. In fact, researchers have shown that promises lead to higher rates of confessing (e.g., Evans & Lee, 2010, 2011), and thus it is important for future research to include a condition that involves promises in order to increase the number of truthful confessors.

Nevertheless, the findings from this research are consistent with previous research (Evans & Lee, 2010, 2011; Stouthamer-Loeber, 1986; Talwar & Lee, 2002, 2008, 2011) showing that, when children peek (i.e., transgress), they also are likely to lie to conceal their peeking to avoid punishment. Therefore, these findings support the premise that lie telling follows engagement in transgressive conduct (Stouthamer-Loeber, 1986; Talwar & Crossman, 2011). However, the absolute rate of peeking behavior in the guessing game and school-achievement task was lower in this study than in previous research (e.g., Evans & Lee, 2010, 2011; Talwar et al., 2007; Talwar & Lee, 2002, 2008), possibly due to the broader age range used in this study. Nonetheless, the same age-related decrease shown in previous research was uncovered in this study despite the lower peeking rate. However, in order for future research to separately investigate the mechanisms underlying peeking and lie telling, studies are needed in which researchers experimentally manipulate the levels of peeking behavior before providing children with the opportunity to lie and confess.

In summary, results from the current study extend previous findings, highlighting the age-related decrement in children's antisocial lying. At the same time, the results account for the multidimensional nature of children's antisocial lies by using two temptation resistance paradigm contexts. These findings highlight that while context does not contribute to age-related trends, context does affect the overall amount of antisocial lying. Thus, findings support the importance of context, in addition to other factors, in determining lying behavior. Future studies need to focus on uncovering whether various psychological processes

influence children's lie telling in different contexts in the same way, by measuring lying behavior in multiple ways. This will provide a more comprehensive understanding of children's lie telling.

Chapter 3

Cross-Sectional and Longitudinal Relationships between Children's Moral Standards and their Antisocial Lie Telling

Abstract[6]

Although researchers posit that lying is integral to morality, findings from studies examining the link between moral standard's knowledge and antisocial lying have been mixed. The goal of this study was to examine this link, across a broad age range (4 to 15 years) to determine whether it is more evident as children aged, as well as with both cross-sectional and longitudinal data to enable causal statements. Preschool (M_{age} = 4 years), second- (M_{age} = 8 years), fourth- (M_{age} = 10 years), sixth- (M_{age} = 12 years), and eighth (M_{age} = 12 years) grade children's lie-telling moral standard and their actual antisocial lie telling behavior in two lie telling paradigms were investigated twice, 12 months apart. Results revealed that with increasing age, children rated others' lie telling more negatively, and were less inclined to tell a lie to conceal their own transgression. Most importantly, children's moral standards for lying influenced actual antisocial lie telling concurrently and over time, and this relationship emerged irrespective of age. These finding suggest that, across a broad age range, viewing the moral implications of lying less negatively leads to more actual lying. The longitudinal results further show that lower lie-telling moral standards cause more actual lying behavior a year later. Finally, these findings also highlighted the importance of context in the relationship between morals standards and lie telling, showing that moral standards are related to lie telling in one TRP context (school-achievement task), but not the other (guessing game). Implications and future research suggestions are discussed.

[6] This manuscript has been prepared for publication. In subsequent chapters this study is referred to as "Carl, T., & Bussey, K. (2017b). *Cross-sectional and longitudinal relationships between children's moral standards and their antisocial lie telling.* Manuscript prepared for publication".

Cross-Sectional and Longitudinal Relationships between Children's Moral Standards and their Antisocial Lie Telling

Despite widespread interest in children's lie telling to conceal a transgression (i.e., antisocial lie telling), and the emphasis adults place on the wrongfulness of this behavior, most recent research examining antisocial lie telling has focused on cognitive factors associated with lie telling (e.g., Chandler, Fritz, & Hala, 1989; Talwar, Gordon, & Lee, 2007; Talwar & Lee, 2002, 2008). Less research has addressed the link between morality and lie telling. Yet, lying is an integral part of morality (Piaget, 1932/1965) and children's ability to appreciate the wrongfulness of lies (i.e., moral standards) has underpinned child witness competency examinations, as it is a necessary precondition for children to testify in courts of law (Bala, Lee, Lindsay, & Talwar, 2000; Bussey, 1992; Bussey & Grimbeek, 2000; Haugaard, 1993; Lyon, 2000, 2011). The assumption guiding this precondition is that if children know that lying is morally reprehensible (i.e., have attained moral standard knowledge), they will behave in accordance with this knowledge (e.g., Bala et al., 2000; Bussey & Grimbeek, 2000; Lyon, Carrick, & Quas, 2010). However, theories of morality, such as the social cognitive perspective (Bandura, 1986, 1991; Bandura, Barbaranelli, Caprara, Pastorelli, 1996), argue differently, stating that attaining higher moral standards (i.e., evaluating lie telling as morally wrong) guides behavior but does not necessarily ensure that children will behave in line with them. Bandura and colleagues (Bandura, 1991; Bandura et al., 1996) suggest that the link between moral standards and actual behavior depends on whether children decide to use their self-regulatory skills to engage their moral standards and act in accord with them. It is posited that these skills develop with increasing age (Bussey & Bandura, 1992). However, much of the existing research has focused on the development of moral standards and lying behavior separately, with limited research linking the two across a broad developmental range. Therefore, this study examined the link between moral standards

and actual lying behaviour at specific ages across a broad age range (4 to 15 years) using both cross-sectional and longitudinal data.

To date, the findings from the few studies that have examined the link between moral standards knowledge and actual lie telling behavior have been inconsistent. For example, Talwar and colleagues (2002) did not find a significant relationship between moral standards and actual lie telling with 3- to 8-year-old children using vignettes and questions that mimicked the child witness competency examination. In this study, children's ability to correctly classify a statement as a lie or truth and to rate the wrongfulness of the lie were assessed, as well as their actual antisocial lie telling using the laboratory temptation resistance paradigm (TRP). The study showed that while most children rated other children's lying as bad, most of them lied in the TRP. It was similarly found in London and Nunez's (2002) study with 4- to 6-year-olds, that higher performance on truth/lie questions (i.e., correctly classifying a statement as a lie and rating that lie as bad) did not predict their propensity to tell the truth (versus a lie) in the TRP. However, a later study by Talwar and colleagues' (2004), which included a broader age range (3- to 11-years), showed that moral standards were significantly, but weakly correlated with actual lying when lying was assessed in the context of concealing a parent's transgression, not their own transgression. Further, for 3- to 8-year-olds, Talwar and Lee (2008) found a significant relationship between some measures of children's moral knowledge, specifically their moral standards (but not the classification of lies/truths), and their propensity to tell antisocial lies.

Talwar and Lee (2008), however, did not directly examine specific age differences in the relationship between moral standards and children's actual antisocial lie telling behavior within the age range used in their sample (i.e., 3- to 8-years). Despite this, they did conclude that the relationship between moral standards and lie telling might be more influenced by internal standards as children age. Moreover, the studies described above, which showed

mixed results, mostly included a younger age range (i.e., 3- to 8-years) when assessing the relationship between moral standards and children's actual lying behavior. For these reasons the relationship between moral standards and actual lie telling remains unresolved. Therefore, the first aim of this study was to further investigate possible age differences in the relationship between children's lie-telling moral standards and actual antisocial lie telling, by examining the relationship using specific ages within a broad age range of children, in order to elucidate the developmental trajectory of the relationship between the two.

The importance of age in children's developing moral standards and lie telling behavior is highlighted in research assessing children's moral standards using vignettes; this research shows that children's moral ratings of other children's lies become more negative (i.e., higher moral standards) as they age (e.g., Bussey, 1992; Bussey & Grimbeek, 2000). At the same time, laboratory studies using TRPs examining children's actual lying behavior have shown that children's propensity to tell lies decreases with increasing age (Evans & Lee, 2011; Lavoie, Yachison, Crossman, & Talwar, 2017; Talwar et al., 2007; Talwar & Lee, 2002, 2008). On the basis of these findings, it appears that the relationship between moral standards and lying is more likely to emerge as children age. In fact, researchers (e.g., Evans & Lee, 2014) argue that after 8 years children appear to have developed stronger moral standards related to the wrongness of lie. This prediction is consistent with Bandura's social cognitive perspective; with increasing age, children are more capable of engaging their moral standards to act in accord with them (Bandura, 1991; Bandura et al., 1996). Adding weight to this interpretation are the findings of Henshel's study (1971), showing that older children have a greater capacity than younger children to follow their moral values when performing actual behavioral tasks (i.e., cheating tasks).

Importantly, however, as most studies are cross-sectional, they are not able to draw causal conclusions about the direction of the relationship. While the cross-sectional literature

has assumed, in line with child witness competency examinations, that moral standards determine whether children will tell lies or not (see Talwar & Crossman, 2012, for review), it is possible that children's actual lie telling influences their level of moral standards (i.e., whether they will evaluate lies as morally wrong). This alternate direction of effects is supported by research that examines the relationship between moral judgement and delinquency, whereby individuals' engagement in antisocial behavior (e.g., delinquency) determines their immature moral judgement (e.g., Gregg, Gibbs, & Basinger, 1994; Raaijmakers, Engels, & van Hoof, 2005). Therefore, a second aim of the present study was to extend the literature concerning the relationship between lie-telling moral standards and actual antisocial lying by examining this relationship longitudinally. In this longitudinal investigation, children's moral standards and their lie telling were assessed at two time-points, 12 months apart, allowing the current study to make causal conclusions about the direction of the relationship between moral standards and children's actual lie telling.

To investigate these issues, this study included specific age groups (i.e., preschool, grade 2, 4, 6 and 8) within a broad age range to examine both the cross-sectional and longitudinal relationship between children's moral standards and their actual antisocial lie telling. Children's moral standards associated with lying (lie telling moral standards) were assessed using two animated hypothetical stories presented on an iPad, in which a child committed a transgression and told a lie to conceal it (i.e., broke a rule and fighting). These two stories were chosen to represent contexts relevant to those where children typically commit transgressive behavior and tell lies to conceal their behavior (Stouthamer-Loeber, 1986). Further, to minimize the demand characteristics placed on children and not to prime them, different contexts were selected which did not reflect the contexts in which children's actual lying behavior was assessed (i.e., TRP tasks) in this study. After watching each story, children were asked to answer a lie-telling moral standards question (i.e., to evaluate the

moral wrongfulness of the hypothetical lie), which was representative of those used in previous studies (Bussey, 1992, 1999; Talwar et al., 2002). Children's propensity to tell an antisocial lie was assessed using two TRP tasks (i.e., guessing game and school-achievement task). In both tasks, children were given the opportunity to commit a transgression and could choose to tell a lie to conceal their transgressive behavior or not. In most studies, only one of these TRP tasks has been employed to assess children's lying behavior. The guessing game has commonly been used with children under the age of 8 years (Talwar & Lee, 2002, 2008; Talwar et al., 2002), and in one recent study with 4- to 14-year-olds (e.g., Lavoie et al., 2017), whereas, studies involving children over the age of 8 years (i.e., 8- to 16-years) have typically used the school achievement task (e.g., Evans & Lee, 2011). To accommodate the broad age range used in the current study, which included children younger and older than 8 years, both tasks were used. As recent research findings have found contextual variation (i.e., different lie-types) influences the relationship between cognitive and social factors and children's lie telling behavior (Lavoie et al., 2017), context may also be important within antisocial lie telling. The current investigation explored whether context influenced antisocial lie telling behavior by using both experimental TRPs in the one study.

Consistent with findings of previous studies, which showed age-related changes in children's moral standards (e.g., Bussey, 1992, 1999; Talwar et al., 2002), it was predicted that with increasing age, children's ratings of the vignette characters' lie telling would become more negative. With regard to children's actual antisocial lying behavior, based on the results of Evans and Lee (2011) and Lavoie et al. (2017), a decrease in lying behavior with increasing age was expected. Most importantly, given the above, together with theoretical positions (Bandura, 1991; Bussey & Bandura, 1992; Bandura et al., 1996) and Henshel's findings (1971), it was predicted that moral standards and actual lying behavior in the TRP would be related and that the relationship would emerge with increasing age in line

with children's stronger moral standards related the wrongfulness of lie telling. Further, in order to clarify the causal direction of this relationship, the same children were followed up 12 months later in a longitudinal investigation. It was hypothesized that moral standards would predict actual lying behavior over time. This was based on the legal assumption surrounding child witness testimony (see Talwar & Crossman, 2012 for review) and the theoretical notion that moral standards serve as guides for behavior (e.g., Bandura, 1991; Bandura et al., 1996).

Method

Participants

Children were tested at Time 1 (T1) and again 12 months later at Time 2 (T2). At T1, four hundred and forty-three students in preschool (n = 100, 48 boys, M_{age} = 4 years, SD = 7 months), grade 2 (n = 85, 42 boys, M_{age} = 8 years, SD = 5 months), grade 4 (n = 93, 59 boys, M_{age} = 10 years, SD = 5 months), grade 6 (n = 69, 46 boys, M_{age} = 12 years, SD = 5 months) and grade 8 (n = 96, 57 boys, M_{age} = 14 years, SD = 5 months) from middle-class schools participated. Approximately 80% of the children were White, 8% Asian, 5% Middle-Eastern, and the remaining 7% were from other ethnic backgrounds. Due to children being absent from school and transition between school grades leading to migration of the sample at T2, 298 students in preschool/Kindergarten[7] (n = 37, 15 males, M_{age} = 5 years, SD = 7 months), grade 3 (n = 60, 34 males, M_{age} = 9 years, SD = 6 months), grade 5 (n = 78, 53 males, M_{age} = 11 years, SD = 5 months), grade 7 (n = 41, 34 males, M_{age} = 13 years, SD = 6 months) and grade 9 (n = 82, 49 males, M_{age} = 15 years, SD = 6 months) participated. Written parental consent for students to participate in this study and children's verbal assent were obtained prior to participation. A series of between group comparisons were conducted on the key

[7] Preschool encompasses children aged 3 to 5 years. As such, at T2, those preschool children who participated at T1 at the age of 3-4 years of age were still in preschool at T2. Whereas, those preschool children who participated at T1 at the age of 4-5 years had moved from preschool into Kindergarten at T2. Therefore, at T2, this group will be referred to as Preschool/Kindergarten students as it encompasses both.

variables of interest, revealing no significant differences between students who participated in both or one time point of data collection, except for their age; students who participated in both time points tended to be slightly older (M = 9.89 years, SD = 3.16) than those who participated in T1 only (M = 7.68 years, SD = 3.44) (see Table 1).

Table 1
Between-Group Comparison Summary

Variable	Time 1 and T2 participated vs. T1 only participated
Time 1	
Grade	$\chi^2(4) = 69.97$, p = .005
Lie-telling moral standards score	$t(441) = 2.80$, $p = .34$, *ns*
Lying in the guessing game	$\chi^2(1) = 2.35$, p = .13, *ns*
Lying in the school-achievement task	$\chi^2(1) = .15$, p = .70, *ns*

Materials

Assessment of actual lying behavior. Children participated in two temptation resistance paradigms (TRP; Evans & Lee, 2011; Talwar et al., 2007; Talwar & Lee, 2002, 2008) tasks, a guessing game and a school-achievement task, assessing their actual lying behavior at both time points. At T1 children were randomly assigned to participate in either the guessing game first or the school-achievement task first. At T2, this order of the two tasks was reversed. Children received prizes for winning in the two games and a hidden video camera recorded children's behavior.

Guessing game. The TRP guessing game followed a similar structure to that used by Talwar and Lee (2002, 2008), where each child sat on a chair with their back towards the experimenter and was asked to guess the identity of a toy from a song associated with the toy (e.g., Elsa, Frozen and Let it Go), without turning around. These toys represented popular television or movie characters. Each child was asked to guess the name of two toys after hearing the associated song in two practice trials (e.g., Elsa from Frozen, The Little Mermaid). After the two practice trials, the experimenter explained that she needed to leave the room briefly and they would resume playing the game when she returned. Before leaving

the room, the experimenter placed the third target toy (a lion, Simba, from the Lion King) behind the child and played an unrelated song (i.e., music from a greeting card). As children were unable to identify the toy from the unrelated song, they were tempted to peek. The child was instructed, "Don't turn around to peek at the toy while I am out of the room". After a 1-minute delay, the experimenter (who was unaware of whether the child had peeked) returned to the room quickly covering the toy with a cloth and asked the child: "When I was out of the room, did you turn around and peek at the toy"?

School-achievement task. The school-achievement task was modified from previous trivia games used by researchers (Evans & Lee 2011; Talwar et al., 2007) and was similar in style to the guessing game but instead of guessing the identity of a toy from the song it was associated with, each child was required to answer multiple-choice test-like questions without peeking. Each child was told they would have to answer three questions about popular television shows or movies (e.g., "What is the name of Winnie the Poo's donkey friend?"), which were chosen so that they were appropriate for the age range in this study. The experimenter read two practice trial questions to the child along with the four possible answers, which were written on the front of the test cards with accompanying pictures. A slight modification was made to the presentation of the final target test question to make the task age-appropriate. This was achieved by matching the different reading levels across this wide age range of children. As they have lower levels of reading to the older age group, each child in preschool and grade 2 at T1 (and preschool/Kindergarten and grade 3 at T2) was read the target test question and the four possible answers written (and accompanied by pictures) on the front of the card by the experimenter, with the fictitious "correct" answer written on the back of the card. Whereas, each child in grades 4, 6 and 8 at T1 (and grades 5, 7 and 9 at T2) was presented with a test booklet which had the target question written on the front and the fictitious "correct" answer written on the inside. The experimenter then informed the

child that she had to suddenly leave the room for a minute and they were not to peek at the answer written on the back of the card or back of the booklet while she was gone. However, the question remained the same for children of all ages (e.g., "Who discovered Peter Pan?").

Coding. For both games, children were classified as liars if they told the experimenter that they had not peeked[8] when they had peeked at the answer(s). Alternatively, children were classified as truth-tellers[9] if they did not tell a lie to the experimenter (either because they told the truth about having peeked at the answer(s), or because they told the truth about having not peeked at the answer(s)).

Assessment of lie-telling moral standards. Two animated videos showing vignette characters telling lies about committing transgressions were produced. These videos were used to assess moral standards for lie telling to conceal a transgression (lie-telling moral standards).

***Animated videos*.** Two vignettes adapted from Bussey (1992) and Talwar and colleagues (2002) were prepared to examine children's lie telling moral standards. Each vignette represented a misdeed: broke rule and fighting. These misdeeds were selected as they are common transgressive behaviors committed by children (e.g., Stouthamer-Loeber, 1986) in situations where children are also likely to lie to conceal their transgressive behavior. Each vignette showed a character committing the transgression and ended with the vignette character telling a lie by denying that s/he committed the transgression. The order in which the two vignettes were presented was counterbalanced across participants so that there were two different orders of the vignettes to which children were randomly allocated. Girls heard stories about female protagonists and boys heard stories about male protagonists.

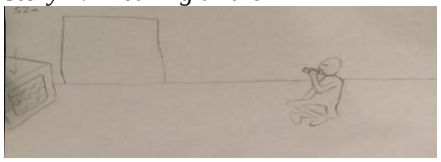
[8] Peeking behavior and lie-telling behavior across both TRP-tasks were highly correlated ($r = .96$, $p < .001$).
[9] Truth-tellers were aggregated in this sample to compare lie tellers to truth-tellers as a whole (irrespective of peeking behavior), in order to: ensure that no data were lost across the two TRP-tasks and to align with other recent research (i.e., Lavoie et al., 2017) that similarly grouped truth-tellers. Also, confessors across both TRP-tasks were too small a group ($N = 9$) to attempt to disaggregate the groups of truth-tellers. Analyses run to determine whether including this small group altered the results, revealed that, when excluded, the results of subsequent analyses did not change in any significant way.

The two vignettes were presented as stick figure animation videos and were shown on an iPad, each with subtitles in order to facilitate children's comprehension and attention. The actual stories are presented in Figure 1. After each vignette, the child was asked a question about the story to assess comprehension (i.e., "I want you to tell me what you saw happen in the video and what the character said"). Once comprehension was achieved, children were questioned about the vignettes. The experimenter read the questions to the preschool and grade 2 children at T1 (and preschool/Kindergarten and grade 3 children at T2), and grade 4, 6 and 8 children at T1 (and grade 5, 7, 9 children at T2) were given a choice to either read the questions on their own or the experimenter could read the questions to them. The *lie telling moral standards* question specifically focused on the character's statement (lie), "How bad or good was it for (character's name) to (restate lie)?" The rating scale (1 = *very bad* to 6 = *very good*) was accompanied by pictures: "Very bad" (3 black dots), "fairly bad" (2 black dots), "a little bit bad" (1 black dot), "a little bit good" (1 gold star), "fairly good" (2 gold stars), "very good" (3 gold stars). The question and rating scale were modelled after Bussey (1999) and Peterson, Peterson, and Seeto (1983), who successfully used it with 4- to 11-year-olds.

Procedure

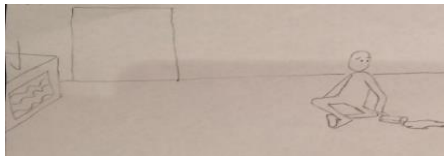
At both time points, a female experimenter tested children individually in a quiet room located on school grounds. The testing session consisted of two parts: the two TRP tasks and two animated videos. At T1, children were randomly assigned to either watch the animated videos assessing lie telling moral standards first, followed by the TRP tasks (guessing game and school-achievement task), assessing their actual lying behavior, or the reverse order. At T2, this order was reversed, so that children participated in the opposite order to the one they had participated in at T1. At the conclusion of T2, truth- and lie-telling was discussed with children in an age-appropriate way, and children were also reminded that, like T1, they would not get into trouble for anything they had said or done.

Story 1: Breaking a rule



Amber /Jake was drinking a glass of milk in the TV room.
Amber/Jake taking a sip of milk

Amber/Jake's mum said that s/he wasn't allowed to drink milk in the TV room
Amber/Jake resting the milk down



Amber/Jake spilled the milk on the carpet
Amber/Jake knocks milk over with his/her knee.

Later, Amber/Jake's mum asks: "Did you spill milk on the carpet?"
Amber/Jake said: "No, I didn't spill it" *(lie)*

Story 2: Fighting

Sarah/Harry and her/his friend were playing in the lounge room.
Playing 'scissors, paper, rock";
(elbow and hand motion)

Sarah/Harry shoved her/his friend and her/his friend fell on the floor.
(Pushes friend onto the floor)

Sarah/Harry's friend starts to cry.
Friend's tears dripping from eyes

Sarah/Harry's mum came into the room to see what had happened and asked Sarah/Harry: "Did you make your friend cry?"
Sarah/Harry said: "No s/he just fell" *(lie)*

Figure 1. Storyboards for Lie-telling Moral Standards Vignettes (i.e., Videos)

Statistical Analysis

A multi-method approach was undertaken for the analyses. Both peekers and non-peekers from both TRP tasks were entered into all the analyses to ensure that all children across the two TRP contexts were included in the analyses. The cross-sectional relationships between T1 variables only were examined with all 443 students using IBM SPSS Statistics 23. Cross-sectional analyses are presented in the first section and were conducted to replicate and extend the limited existing research on the relationship between lie telling moral standards and actual lying to conceal a transgression (e.g., Talwar et al., 2002). As actual lying behavior is a categorical variable, logistic regression was used. Correlations among the measures at T1 are presented first. Second, an analysis of variance was conducted to examine grade differences on the independent variable of interest (i.e., lie telling moral standards). Finally, to examine the hypothesized relationship between lie telling moral standards and actual lying, cross-sectional logistic regression analyses were conducted with the T1 lie telling moral standards score as the predictor and T1 actual lying behavior as the predicted variable. Regressions also included an interaction term to determine whether the hypothesized relationship between lie telling moral standards and actual lying was moderated by grade. Analyses involving children's actual lying behavior were conducted separately for each of the two TRP laboratory tasks, the school-achievement task and the guessing game.

In the second section, longitudinal relationships among the variables are presented. These longitudinal analyses were conducted on the 298 participants who participated at both T1 and T2 using Mplus 7 (Muthén & Muthén, 1998-2015). Mplus 7 was employed to examine the longitudinal relationships due to the specific advantage associated with this statistical package for handling missing data, whereby the Maximum Likelihood (ML) algorithm is used (Enders, 2010; Muthén & Muthén, 1998-2015). The longitudinal analyses were conducted in order to extend the cross-sectional findings to enable causal statements

regarding the relationship between lie telling moral standards and actual lying behavior. First, cross-time correlations between the hypothesized predictors of lying at T1 (i.e., grade and the lie telling moral standards score) and actual lying in both games at T2 are presented. Next, to assess whether lie telling moral standards predicted changes in actual lying behavior in each of the TRP tasks, logit regressions were conducted in Mplus. Separate analyses were run for each of the two TRP tasks (first the school-achievement task and then the guessing game). Actual lying behavior at T1 and the lie telling moral standards score at T2 were used as control variables in each of these analyses. To determine whether the relationships varied across grades, the Wald test of parameter constraints was used. A significant Wald test indicates that the relationships vary across groups, whereas a non-significant test suggests that the relationships across groups are similar (Hosmer & Lemeshow, 2000; Long, 1997).

Results

Preliminary analyses with order of the TRP tasks (guessing game first vs. guessing game last) and the order of the tasks (animated videos followed by TRP tasks vs. TRP tasks followed by animated videos) and gender (male vs. females) as the predictor variables in all described cross-sectional and longitudinal analyses revealed no significant effects of gender, orders or interactions involving the lie telling moral standards score at T1, actual lying in the guessing game at T1 and T2, or actual lying in the school-achievement task at T1 and T2. Thus, all further analyses were conducted collapsing across gender and order variables.

Cross-Sectional Relationships between T1 Variables

Correlations. Correlations between all T1 variables are presented in Table 2. The negative correlations between grade and lie telling moral standards, indicated that the higher the child's grade, the more negatively they evaluated the vignette character's lying (i.e., higher lie telling moral standards). The negative correlation between grade and lying in the guessing game also indicated that the higher the child's grade, the less likely they were to tell

a lie to conceal their transgression in the guessing game. However, the child's grade was not significantly correlated with lying in the school-achievement task. Children's actual lying behavior in both the guessing game and the school-achievement task were positively correlated. Finally, the positive correlation between children's lie telling moral standards score and their actual lying in the school-achievement task, indicated that the less negatively children rated the vignette characters' lying, the more likely they were to tell a lie to conceal their own transgression in the school-achievement task. However, the lie telling moral standards score was not significantly correlated with lying in the guessing game.

Table 2
Correlations between T1 variables and cross-time correlations between T1 independent variables and T2 outcome variables

Variable	1	2	3	4
1. Grade at T1		-.17***	-.08	-.23***
2. Lie-telling Moral Standards at T1	-.17***		.13**	.06
3. Lying: School-achievement task	-.17**	.14*		.36***
4. Lying: Guessing Game	-.26***	.04	.46***	

Note. Correlations between T1 variables are presented above the diagonal (N = 443) and cross-time correlations between T1 independent variables and T2 outcome variables are presented below the diagonal (N = 298).
*p < .05 **p < .01 ***p < .001

Grade differences in lie-telling moral standards. A lie-telling moral standards score was obtained by summing children's goodness/badness ratings for the two vignettes, since lie telling moral standards ratings on these vignettes were positively and moderately correlated (r = .43, p < .001). This method also enabled a more robust measure of lie telling moral standards. Children's lie telling moral standards score at T1 was then analyzed using a 5 x grade (preschool, grade 2, 4, 6, and 8) analysis of variance. The only effect to attain significance was grade, F (4, 438) = 26.75, p < .001, η^2 = .15. Follow-up tests using

Bonferroni adjusted alpha ($p < .05$) revealed that, at T1, Preschool students ($M = 3.57$, $SD = 2.08$) gave significantly less negative ratings to the lies told by the characters in the videos than did older students in grade 2 ($M = 2.22$, $SD = .49$), 4 ($M = 2.44$, $SD = .75$), 6 ($M = 2.48$, $SD = .80$), and 8 ($M = 2.48$ $SD = .93$). However, the four older groups' (grade 2, 4, 6, and 8) ratings of the lies told by the characters in the video did not significantly differ from each other.

Predicting children's actual lying behavior in the school-achievement task.

Overall 19% (84/443) of the children told a lie about having peeked at the answer in the school-achievement task, and 81% told the truth (359/443) at T1. To examine the hypothesized relationship between lie telling moral standards score and children's actual lying in the school-achievement task, and to examine whether this relationship differed depending on children's grade, a logistic regression was conducted predicting lie telling behavior in the school-achievement task at T1 (0 = truth-teller, 1 = liar). Grade, the lie telling moral standards score and the interaction between the lie telling moral standards score and grade group were included in the model. The final best fitting model included main effects for grade and lie telling moral standards, χ^2 (5, $N = 443$) = 15.67, $p = .008$, Nagelkerke $R^2 = .06$. There was a significant grade effect, Wald (4) = 9.71, p = .046. Post hoc tests revealed that for younger children, preschoolers were 2.57 times more likely to tell a lie in the school-achievement task, rather than tell the truth, than grade 2, [*Wald* (1, $N = 443$) = 6.12, $p = .01$]. However, neither preschoolers nor grade 2 students significantly differed from grade 4 students. For the older children, grade 8 and grade 6 students did not significantly differ from each other. However, overall there was a difference between older and younger children. Specifically, for both grade 8 and grade 6 students, the odds of children telling a lie in the school-achievement task, rather than telling the truth, was 2.38 times and 2.66 times greater for grade 2 students, respectively [*Wald* (1, $N = 443$) = 5.64, $p = .02$; *Wald* (1, $N = 443$) =

5.48, p = .02]. There were no other significant grade differences. There was also a significant main effect for lie telling moral standards, β = .27, Wald (1) = 8.25, p = .004, odds ratio = 1.31. The odds of children telling a lie rather than telling the truth in the school-achievement task were 1.31 times greater for children who rated the vignette characters' lie told to conceal a transgression in the video less negatively.

Predicting children's actual lying behavior in the guessing game. Overall, 36% (159/443) of the children told a lie about having peeked at the toy in the guessing game, and 64% (284/443) told the truth at T1. To examine the hypothesized relationship between lie telling moral standards and actual lying behavior in the guessing game, the above logistic regression was repeated with lying behavior in the guessing game at T1 (0 = truth-teller, 1 = liar) as the predicted variable. The final best fitting model included main effects for grade and the lie telling moral standards, χ^2 (5, N = 443) = 30.27, p < 001, Nagelkerke R^2 = .09. However, further inspection of the model showed that only the grade effect was significant above and beyond the combined contributions of the grade and the lie telling moral standards factor, Wald (4) = 26.76, p < .001. Post hoc tests revealed that older children in grades 6 and 8 were not significantly different from each other, but were significantly less likely to lie than their younger counterparts in preschool, grade 2 and 4 (who were also not significantly different from each other). Specifically, for both grades 6 and grade 8, the odds of children telling a lie in the guessing game, rather than telling the truth, were 2.60 and 2.84 times greater for preschool, respectively [*Wald* (1, N = 443) = 7.01, p = .008; *Wald* (1, N = 443) = 10.21, p = .001], 3.74 and 4.10 times greater for grade 2, respectively [*Wald* (1, N = 443) = 13.53, p < .001; *Wald* (1, N = 443) = 18.28, p < .001] and 2.44 and 2.67 times greater for grade 4, respectively [*Wald* (1, N = 443) = 6.33, p = .01; *Wald* (1, N = 443) = 9.06, p = .003]. There was no significant lie telling moral standards effect.

Longitudinal Relationships between T1 Variables Predicting T2 Lying Behavior

Cross-time correlations. Table 2 also displays the cross-time correlations between hypothesized T1 predictors and actual lying behavior at T2. The negative correlations between children's grade and lie telling in the guessing and school-achievement task at T2, indicated that children's higher grade was associated with less lie telling in the guessing game and the school-achievement task at T2. Further, the negative correlation between children's grade and lie telling moral standards score at T1, indicated that the higher the child's grade, the more negatively they evaluated the vignette character's lying (i.e., higher lie telling moral standards). The positive correlation between lie telling moral standards at T1 and actual lying in the school-achievement task at T2, also indicated that the less negatively children rated the vignette characters lie told to conceal their transgression at T1, the more likely they were to tell a lie to conceal their actual transgression in the school-achievement task at T2. Further, the lie telling moral standards score at T1 was not significantly correlated with lying in the guessing game at T2. However, a positive correlation between T1 and T2 lying in the school-achievement task ($r = .15$, $p = .01$) and between T1 and T2 lying in the guessing game ($r = .31$, $p < .001$) was evident, indicating some degree of stability in lying over time. Also evident was a positive correlation between T1 and T2 lie telling moral standards ($r = .32$, $p < .001$), indicating some degree of stability in the lie telling moral standards score over time.

Predicting actual lying Behavior in the school-achievement task over time from T1 lie telling moral standards. At T2, 16% (48/298) told a lie about having peeked in the school-achievement task, and 84% (250/298) told the truth. To examine the longitudinal association between lie telling moral standards and actual lying behavior in the school-achievement task, a logit regression analysis in Mplus was conducted; grade and the lie telling moral standards score at T1 were used to predict actual lying behavior in the school-

achievement task over time. Children's actual lying behavior in the school-achievement task at T2 was the predicted variable. Children's actual lying behavior in the school-achievement task at T1 was included as a control variable to account for the stability of lying across time. The lie telling moral standards score at T2 was also included as a control variable. The interaction terms between each grade and lie telling moral standards score were also included to assess whether grade moderated the relationship. However, no interactions were significant (*ps* > .05) and the Wald test of parameter constraints indicated that the relationship between the lie telling moral standards score and actual lying the school-achievement task did not vary across grade (χ^2 (*df* = 4) = 1.80, p = .77). Thus, the interaction terms were excluded from the final model.

Similar to the cross-sectional results, after accounting for the stability of lying across time, grade and the lie telling moral standards score at T2, children's lie telling moral standards score was significantly associated with children's actual lying behavior in the school-achievement task over time. Specifically, for those children who rated the vignette characters' lie less negatively (i.e., lower lie telling moral standards score), the odds of them telling a lie in the school-achievement task (versus telling the truth) increased by a factor of 1.08 (β = .84, *z* = 2.99, *p* = .003).

In addition, and also similar to the cross-sectional results, the overall effect of grade on lying at T2 in the school-achievement task was significant (χ^2 (*df* = 4) = 14.28, p = .007). Follow-up pairwise comparisons amongst grade groups were conducted. For the younger children, preschool/Kindergarten students differed from grade 5 students only (β = 1.69, *z* = 3.02, p = .002), whereby, the odds of telling a lie in the school-achievement task at T2 (versus telling the truth) increased by a factor of 5.40 for preschool/Kindergarten students. Preschool/Kindergarten students, however, did not differ from Grade 3 students (β = 1.01, *z* = 1.86, p = .06), and Grade 3 students did not differ from students in grade 5 (β = .68, *z* = 1.47,

p = .14). For the older children, students in grade 7 did not differ from grade 9 students (β = .58, z = .95, p = .34). However, there was a difference between the older and younger groups of children. Specifically, both grade 7 and grade 9 differed from preschool/Kindergarten students ((β = 1.46, z = 2.32, p = .02) and (β = 2.03, z = 3.42, p = .001), respectively). Compared to grade 7 and grade 9 students, the odds of telling a lie in the school-achievement task (rather than telling the truth) increased by a factor of 4.29 and 7.64 respectively for preschool/Kindergarten students. Grade 9 students differed from grade 3 students only (β = 1.02, z = 1.98, p = .05). Compared with grade 9 students, the odds of telling a lie in the school-achievement task (versus telling the truth) increased by a factor of 2.78 for students in grade 3. No other grade differences were found.

Predicting actual lying behavior in the guessing game over time from T1 lie telling moral standards. At T2, 29% (87/298) lied about having peeked, and 71% (211/298) told the truth. To examine the longitudinal association between lie telling moral standards and actual lying behavior in the guessing game, the above logit regression in Mplus was repeated, this time to predict actual lying behavior in the guessing game over time. The interaction terms between each of the grades and lie telling moral standards score were included to assess whether grade moderated the relationship. However, no interactions were significant (ps > .05) and the Wald test of parameter constraints indicated that the relationship between the lie telling moral standards score and actual lying the guessing game did not vary by grade (χ^2 (df = 4) = .67, p = .96). Thus, the interaction terms were excluded from the final model.

Similar to the cross-sectional results, after accounting for the stability of lying, grade and the lie telling moral standards score at T2, children's lie telling moral standards were not related to children's actual lying behavior in the guessing game at T2. However, the overall effect of grade on children's lying at T2 was significant (χ^2 (df = 4) = 18.57, p = .001).

Follow-up pairwise comparisons amongst grade groups were conducted. Preschool/Kindergarten students differed from grade 3 (β = 1.28, z = 2.54, p = .01), grade 5 (β = 1.58, z = 3.15, p = .002), grade 7 (β = 1.89, z = 3.26, p = .001), and grade 9 students (β = 2.09, z = 4.08, p < .001). Specifically, compared with children in grades 3, 5, 7 and 9, the odds of telling a lie in the guessing game (versus telling the truth) increased by a factor of 3.58, 4.84, 6.64 and 8.11, respectively for students in preschool/Kindergarten. No other grade differences were found.

Discussion

This study examined both the cross-sectional and longitudinal relationships between moral standards and children's actual antisocial lying focusing on specific ages within a broad developmental range to determine whether the relationship was more evident as children aged and to enable causal statements about the direction of effects. Consistent with previous literature showing age-related results (e.g., Bussey, 1992; Bussey & Grimbeek, 2000; Evans & Lee, 2011; Lavoie et al., 2017; Talwar et al., 2007), children's moral standards about lie telling became more negative (i.e., higher moral standards) after 8 years, and their actual antisocial lie telling behavior also decreased with increasing age. Most importantly, children's lower moral standards (i.e., less negative ratings of lies) were related to a greater propensity to tell a lie in the TRP. Furthermore, by extending the investigation to a longitudinal design, a causal direction in the relationship between moral standards and actual lie telling was obtained. The results showed that children with lower moral standards at T1 were more likely to tell a lie (rather than the truth) to conceal their own transgression in the TRP task 12 months later, even after accounting for the stability of lying over time. Yet, counter to predictions, this moral standards/actual lying behavior relationship was not more evident for older than for younger children. Rather, moral standards and actual lying behavior were related, irrespective of age. Nonetheless, this relationship did depend on the specific

TRP task-type used, with moral standards relating to actual lying in the school-achievement task but not the in the guessing game.

Clear evidence of the age-related development of moral standards associated with actual lie telling was evident for all children. Preschool children were more likely to rate lie telling less negatively (i.e., lower moral standards) than their older counterparts, who all gave similarly negative ratings to lie telling. Further, while moral standards increased with age, children's actual lie telling behavior, in both the TRP tasks, decreased with increasing age. This accords with the robust age-related decrement in lie telling shown in previous research (e.g., Evans & Lee, 2011; Lavoie et al., 2017; Talwar et al., 2007; Talwar & Lee, 2002, 2008).

There were, however, nuanced differences in the age-related trends depending on the TRP task-type used. At T1, lie telling to conceal a transgression decreased at a later age in the guessing game, compared with the school-achievement task. In the guessing game, lie telling decreased from early adolescence (12 to 14 years), while in the school-achievement task, lie telling decreased from middle childhood (i.e., 8 years) onwards. One year later at T2, 5 year olds were the age group most likely to tell a lie to conceal their transgressions in both tasks, and this lying behavior then decreased into middle childhood; specifically, there was a decrease in lying from 8 years in the guessing game, and from 10 years in the school-achievement task. Notwithstanding these differences, this study uncovered an overall decrease in lie telling with increasing age in both TRP tasks.

In line with the above findings showing higher moral standards and a decrease in actual lying behavior with age, children who did not appreciate the wrongfulness of lying (i.e., had lower moral standards), were also the children who were more likely to tell a lie (rather than the truth) to conceal their own transgression in the school-achievement task in this study. This significant finding aligns with some of the limited existing research showing

a significant, but weak correlation between moral standards and lying (e.g., Talwar & Lee, 2008; Talwar et al., 2004), but is contrary to other research showing no significant relationship in young children aged 3 to 8 years (e.g., London & Nunez, 2002; Talwar et al., 2002). There was, however, no confirmation of the prediction that a significant relationship between moral standards and actual lie telling would only emerge at older ages. Age did not moderate the relationship. Instead, a relationship between moral standards and actual lie telling was evident across all age groups in this study. This finding was unexpected, given Henshel's (1971) findings that as children aged, they were more likely to act in accord with their moral standards. Perhaps, individual differences, more than age-related trends, account for the relationship between moral standards and lie telling behavior. For example, younger children may be able to activate their self-regulatory processes to engage or disengage their moral standards at an earlier age than expected. This is consistent with Bandura's social cognitive perspective (Bandura, 1986, 1991; Bussey & Bandura, 1992) that having developed moral standards is necessary, but not sufficient for engaging in them. Although children's engagement or disengagement of their moral standards was not assessed in this study, the findings did confirm that from an early age children do know the moral standards associated with behavior (Bussey, 1992, 1999; Bussey & Grimbeek, 2000). It is clear that future research needs to include a measure of children's engagement or disengagement of their moral standards when assessing individual variability in the relationship between moral standards and moral behavior, in order to examine the processes linking moral standards and lying behavior across development. Nonetheless, the current findings confirm a relationship between moral standards and actual antisocial lie telling when specific age ranges within a broad developmental range are included.

The current study was also able to draw causal conclusions about the direction of the relationship between moral standards and actual lying by also utilizing longitudinal data.

Consistent with hypotheses and in line with legal assumptions regarding child witness testimony, the results showed that lower moral standards at T1 led to a greater propensity to lie in the laboratory at T2, even after accounting for the stability in behavior over time. This also accords with theoretical perspectives that moral standards can influence moral behavior (Bandura et al., 1996). However, it is also still possible that this process can be impeded through not engaging the standards and enlisting moral disengagement mechanisms (Bandura et al., 1996), which is an area for future research. Nonetheless, this longitudinal study rules out the possibility that more lie telling leads to lower moral standards. Instead, by assessing moral standards and moral behavior at two time points, 12 months apart, the current study highlights the important role of children's moral standards in maintaining children's actual lying to conceal a transgression over time.

It is important to note, however, that the current study further showed that the relationship between moral standards and actual lying behavior measured across ages and longitudinally depends on the TRP context. Children's moral standards predicted children's lie telling to conceal their transgression in the school-achievement task, but not in the guessing game. This finding parallels Lavoie and colleagues' (2017) results showing variation in the way in which different factors (i.e., personal and social) influence lie telling in different experimental paradigms (e.g., Lavoie et al., 2017). Moreover, this finding could explain why previous literature examining the relationship between moral standards and actual antisocial lying in the guessing game task did not always find consistent results (e.g., London & Nunez, 2002; Talwar & Lee, 2008; Talwar et al., 2002). Therefore, it is evident from this study that future research needs to account for the lying context as one of the potential factors underlying the relationship between moral knowledge and actual lying behavior.

Despite the notable findings of this study, there are some limitations that require acknowledgement. First, it is important to acknowledge that the context of the hypothetical stories used to assess moral standards did not match the context of the TRP tasks used to assess actual lie telling. Although previous researchers emphasize that differences in some children's interpretations of the hypothetical versus experimental situations may contribute to a disconnection between their moral standards and moral behavior (Xu et al., 2010), the current study showed that children's moral standards associated with the hypothetical scenario was related to their actual behavior in one of the TRP tasks (i.e., school-achievement task). Nevertheless, it is still possible that this mismatch contributed to the finding that moral standards and actual lying in the other TRP task (e.g., guessing game) were not related in this study and in previous studies (e.g., Talwar et al., 2002). Another possible issue is that the game-like context may not have adequately resembled the situations in which common misdeeds are committed by children in their daily life in the same way that the hypothetical scenarios did. In order to account for any possible mismatch, future research needs to assess children's interpretations of the hypothetical and TRP situations (Xu et al., 2010) to determine whether they differ.

Second, a further limitation is that the hypothetical stories used in this study and similar studies may not adequately represent the more serious contexts in which children tell lies in their day to day lives or in the legal child witness context (Talwar et al., 2002). However, given that the current study uncovered a relationship between moral standards and moral action using these hypothetical scenarios, and that many children correctly judged the negative moral implications of lie telling in the vignettes, the hypothetical nature of the vignettes is unlikely to have distorted children's ratings. Nonetheless, future research should also examine this relationship using more naturalistic measures of moral standards, and also for other lie types (i.e., prosocial lies).

In summary, results from the current study show that moral standards influence antisocial lie telling to conceal a transgression concurrently and over time. These findings suggest that, in some contexts, and across a broad age range, viewing the moral implications of lying less negatively leads to more actual lying to conceal a transgression. Importantly, the longitudinal results further show that, after accounting for stability of lying behaviour over time, lower moral standards predict more actual lying behavior a year later. Psychologists and researchers have assumed that almost all children endorse the moral standard that lying is wrong (see Talwar & Crossman, 2012, for review). However, the fact that children with lower moral standards in this study are those that told lies (rather than truths), suggests not all children endorse the moral standards to the same extent, but instead some children have weaker moral standards than others. This highlights the need for psychologists and researchers to focus on individual differences not only age when attempting to understand the relationship between children's moral standards and actual behavior. Notably the findings also highlight the importance of context in the relationship between moral standards and actual lying behavior. Specifically, children's moral standards predicted their propensity to lie in one antisocial lying context (i.e., school-achievement task), but not in the other (i.e., guessing game). Thus, future research should also consider context when examining how factors may differentially influence the development of antisocial lie telling in different situations.

Chapter 4

The Cross-Sectional and Longitudinal Influence of Specific Parenting Practices on Children's Antisocial Lie Telling

Abstract

The current study examined the cross-sectional and longitudinal relationship of two different parenting practices, harsh punishment and parental warmth, to children's antisocial lie telling in two experimental paradigms. Researchers suggest that the fear of harsh punishment promotes children's lie telling as they attempt to avoid these negative consequences for their transgressions, while parent warmth has a more positive effect on behavior, as it fosters moral internalization, and in turn less lie telling. Four-hundred and forty-three children (N_{male} = 252, M_{age} = 9.17 years, *SD* = 3.42; age range 3 to 15 years) participated in two frequently used temptation resistance paradigms to assess their antisocial lie telling. Parenting practices were measured through parent self-report. Results indicated that a higher use of harsh punishment was associated with a higher propensity for their child to lie cross-sectionally, but not longitudinally. Conversely, parental warmth predicted children's lower propensity to tell lies one year later, but there was no cross-sectional association. Moreover, these relationships were only evident in the TRP guessing game, and not the school-achievement ask. Together these findings suggest that these different parenting practices influence children's lie telling in different ways depending on the context and on the time interval, with warmth having a long-term positive effect by reducing lie telling, and punishment associated with a negative, but only short-term effect on lie telling. Theoretical and practical implications are discussed.

The Cross-Sectional and Longitudinal Influence of Specific Parenting Practices on Children's Antisocial Lie Telling

Lying is a socially disapproved of behavior, frequently discouraged by parents and other adults. Still, from an early age children frequently tell lies to conceal their transgressions (e.g., Evans & Lee, 2013; Lewis, Stanger, & Sullivan, 1989; Talwar & Lee, 2002, 2008; Williams, Leduc, Crossman, & Talwar, 2016). Much of the current research on the development of children's lie telling has explored the role of cognitive factors (e.g., Chandler, Fritz, & Hala, 1989; Polak & Harris, 1999; Talwar, Gordon, & Lee, 2007; Talwar & Lee, 2002), with fewer studies examining the social-environmental factors that may also contribute to children's antisocial lie telling. However, lying is a social behavior, likely influenced by socialization. Consequently, researchers have focused primarily on parenting, as parents are the most critical socialization agents influencing children's development (Talwar & Crossman, 2011). Some researchers have suggested that different parenting practices differentially shape the development of children's problem behaviors, and in turn their lie telling (e.g., Gershoff, 2002; Ma, Xu, Evans, Liu, & Luo, 2015; Stouthamer-Loeber, 1986; Talwar, Lavoie, Gomez-Garibello, & Crossman, 2017; Talwar & Lee, 2011). For instance, some have shown that the use of harsh punishment increases children's propensity to tell lies, whereas others have shown that parental warmth, is associated with a decrease in children's lie telling in antisocial contexts. However, while these parenting practices have been shown to have a different and independent influence on children's behavior, little research has systematically examined their influence on lie telling across development in the one study, or both cross-sectionally and longitudinally. Addressing these issues was the goal of the current study.

To date, the influence of parenting has received extensive empirical and theoretical attention in relation to problem behaviors. Authoritarian parenting characterized by the use of

harsh discipline, forceful control, rejection and little parental warmth (Baumrind, 1966, 1967; Baumrind, Larzelere, & Owens, 2010) has consistently been associated with higher rates of problem behaviors (e.g., Gershoff, 2002; Grogan-Kaylor, 2005; Landsford, Criss, Dodge, Shaw, Pettit, & Bates, 2009). Arguably, this is because of the negative role harsher authoritarian parenting plays in lowering children's ability to resist temptation (Coy, Speltz, DeKlyen, & Jones, 2001; Dodge, Coie, & Lynam, 2006; Gershoff, 2002; Lepper, 1973; see also Talwar & Crossman, 2011). Less evidence, however, currently exists regarding the influence of this parenting style and associated practices on lie telling. The few researchers that have examined the influence of authoritarian parenting, have posited that a fear of punishment, characteristic of the authoritarian style, facilitates children's antisocial lie telling; as children seek to avoid harsh punishment for their engagement in problem behaviors (Lewis, 1993; Stouthamer-Loeber, 1986; Talwar & Crossman, 2011). In fact, increased rates of lie telling have been associated with harsh discipline (e.g., Stouthamer-Loeber, 1986). Talwar and Lee (2011) examined the influence of an authoritarian (where harsh punishment was frequently advocated) school context versus a less harsh school context in West Africa on preschool children's deceptive tendencies and found that most students from the authoritarian, harsher school context lied in the TRP, and were better at lying that those children who experienced a less harsh school context. However, a more recent study by Talwar et al. (2017) found no relationship between authoritarian parenting and children's antisocial lying in the TRP. Ma and colleagues (2015) also recently turned their attention to examining the association between specific practices that are part of the authoritarian style in relation to lie telling. They too did not find an association between punishments and lie telling, however in their study *milder* forms of punishment rather than the harsher punishment typically characteristic of the authoritarian parenting style were examined. Hence, it is possible, as Stouthamer-Loeber (1986) postulates, that it is the

exposure to *harsher* disciplinary practices that facilitate children's antisocial lie telling, which was confirmed in Talwar and Lee's (2011) study. Consequently, the present study examined the relationship between *harsh punishment specifically,* and children's lie telling to address these mixed findings.

In contrast to authoritarian parenting, authoritative parenting, which involves warmth, sensitivity, support and involvement (Baumrind, 1966, 1967; Baumrind, et al., 2010), has been associated with more positive cognitive, behavioral and social outcomes for children (Bernier, Carlson, Deschenes, & Matte-Gagne, 2012; Burton, 1976; Lamborn, Mounts, Steinberg, & Dornbusch, 1991; Stouthamer-Loeber, 1986). Researchers have claimed that this is because of the role authoritative parenting plays in increasing children's ability to resist temptation and to self-regulate their behavior (e.g., Burton, 1976; Lamborn, et al., 1991; Stouthamer-Loeber, 1986; Popliger, Talwar, & Crossman, 2011; Talwar & Crossman, 2011), as well as fostering stronger internalization of the morals associated with the behavior (Burton, 1976; Bugental & Grusec, 2006). This parenting factor has also received attention in relation to children's lie telling, primarily with regard to the characteristic of parental warmth. Specifically, researchers have posited that children may tell fewer antisocial lies to conceal their transgression, since parental warmth protects children from engaging in the transgression they would otherwise need to conceal in the first instance (e.g., Loeber & Stouthamer-Loeber, 1986; Stouthamer-Loeber, 1986). Instead, authoritative parenting, specifically the characteristic of parental warmth, reinforces truth telling in these contexts (Burton, 1963; Stouthamer-Loeber, 1986; Talwar & Crossman, 2011). In support of these assertions, other researchers (Almas, Grusec and Tackett, 2011; Darling, Cumsille, Caldwell, & Dowdy, 2006) have also reported an association between warm parenting practices and truthful disclosure. Very recently, Talwar and colleagues (2017) found that 3 to 6 year old children were less likely to tell an antisocial lie in the TRP when their parents used

authoritative practices, such as warmth. In contrast, Ma and colleagues (2015) did not find an association between parental warmth and 3-year-old children's antisocial lying in the TRP. Nonetheless, most of the findings highlight that parental warmth, a characteristic of the authoritative parenting style, is a powerful deterrent of children's antisocial lying. In order to settle the existing mixed results of parenting influences on children's lie telling, this study examines the relationship of both harsh punishment and parental warmth on children's antisocial lie telling.

Taken together, research on the development of antisocial lying in relation to parenting factors, indicates that these different parenting practices (i.e., punishment versus warmth) independently influence children's antisocial lie telling in different ways. However, due to the cross-sectional design of these studies, even those that did show significant relationships among parenting practices and lie telling, have been unable to draw causal conclusions about these relationships. While much of the research has reported that parenting practices influence children's antisocial lie telling, it is equally possible that children's lie telling behavior influences parenting practices. Stouthamer-Loeber (1986) proposes that children who lie are usually less likeable, making it harder for parents to demonstrate warmth towards them. Also, Talwar and colleagues (2017) raise a possible alternate direction of the relationship between lying and punishment, stating that a child's lying behavior may influence the degree of parental punishment. Additionally, whether these parenting practices have short- and/or long-term influences on children's antisocial lie telling has also not yet been explored. In order to address these concerns, a third aim of the current study was to extend the literature by examining the relationship between parents' use of harsh punishment and parental warmth to antisocial lying, longitudinally.

To investigate these issues in this study, both cross-sectional and longitudinal data were collected to examine the relationship between each of these two independent parenting

practices (i.e., harsh punishment and parental warmth) to children's antisocial lying, across a broad age range. Children participated twice, 12 months apart. First, children between 3 and 15 years participated in two TRP tasks (i.e., guessing game and school-achievement task), where they were given the opportunity to commit a transgression while an experimenter was absent, and later questioned the transgression to assess their propensity to tell an antisocial lie. Typically, previous studies have used one or the other of the TRP tasks with different age groups, but to accommodate the broader age range in this study, both TRP tasks were used. Moreover, given recent research by Lavoie et al. (2017) showing that social factors influenced lie telling differently depending on the context of the lie (i.e., prosocial vs. antisocial), and earlier studies showing that children whose parents showed warmth were more likely to tell a polite lie in a prosocial context (e.g., Popliger et al., 2011), but less likely to tell a lie in antisocial contexts (e.g., Talwar et al., 2017), the current study explored whether parenting practices differentially influenced antisocial lie telling depending on the tempting context used by employing both TRPs in the one investigation.

Consistent with Talwar and Lee's (2011) findings and the proposition that children would be more motivated to lie if their parents employed harsh punishment as they seek to avoid the punishment (e.g., Stouthamer-Loeber, 1986), an increase in lying for those children whose parents used more harsh punishment was expected both concurrently and longitudinally. Furthermore, based on the theoretical notion that parental warmth protects children from engagement in the primary antisocial transgression they would otherwise lie about, and instead fosters acceptable moral development (such as truth-telling) (Burton 1976; Loeber & Stouthamer-Loeber, 1986; Stouthamer-Loeber, 1986; Talwar et al. 2017), it was predicted that children whose parents showed less warmth would be more likely to tell a lie in the TRP, and this direction of effect was also expected to be maintained in the long-term.

Thus, overall, the two parenting practices were expected to differentially influence lie telling, and in positive and negative ways.

Method

Participants

Children were tested at Time 1 (T1), and again 12 months later at Time 2 (T2). At T1, a total of 443 children (N_{male} = 252, M_{age} = 9.17 years, *SD* = 3.42; age range 3 to 15 years) and their parents (N = 234) participated. The ethnic breakdown of the sample was 80% White, 8% Asian, 5% Middle-Eastern, and 7% other ethnic background. Attrition (32%) was the result of children being absent from school, transition between school grades and families that moved out of the area/country. Thus, a total of 298 children (N_{male} = 185, M_{age} = 9.89 years, *SD* = 3.17; age range 4 to 16 years) that had complete data from T1 and T2 were retained for the longitudinal analyses. A series of between group comparisons were conducted comparing the responses of children with complete data for both time points and those who were only present for a single time point on all variables. Table 1 summarizes the results: no significant differences emerged in terms of parent-reported use of punishment, parent-reported warmth, lying in the guessing game and lying in the trivia game; however, participants who had complete data (i.e., T1 and T2) tended to be slightly older (M = 9.89 years, SD = 3.16) than those who only completed the first time point of data (M = 7.68 years, SD = 3.44). Another series of between group comparisons was conducted comparing the responses of children whose parents did not complete data and those whose parents did complete data at one or both time points on the variables was conducted (see Table 1), revealing no significant differences between groups for most of the variables. Interestingly, participants whose parents did not complete data were slightly younger (M = 8.75 years, SD = 3.57) than participants whose parents did complete data (M = 9.46 years, SD = 3.29).

Table 1
Between-Group Comparison Summary

Variable	Time 1 and T2 participated vs. T1 only participated	Parent responded vs. parent did not respond
Time 1		
Age	$t(230) = .22$, $p < .001$	$t(441) = -2.15$, $p = .03$
Parents' use of harsh punishment	$t(230) = .22$, $p = .83$, *ns*	$t(230) = 1.05$, $p = .30$, *ns*
Parental warmth	$t(232) = .15$, $p = .88$, *ns*	$t(232) = -1.33$, $p = .19$, *ns*
Lying in the guessing game	$\chi^2(1) = 2.35$, p = .13, *ns*	$\chi^2(1) = .33$, p = .57, *ns*
Lying in the school-achievement task	$\chi^2(1) = .15$, p = .70, *ns*	$\chi^2(1) = .74$, p = .39, *ns*
Time 2		
Lying in the guessing game		$\chi^2(1) = 9.12$, p = .32, *ns*
Lying in the school-achievement task		$\chi^2(1) = 1.08$, p = .30, *ns*

Parent Measures

Harsh Punishment. The 4-item harsh punishment subscale of the Ghent Parental Behavior Scale (PBS; Van Leeuwen & Vermulst, 2004) was used to assess parent-reported use of harsh punishment with their child (e.g., "I spank my child when he/she doesn't obey rules"). For each item, parents rated their use of harsh punishment on a 5-point scale ranging from 1 *(never)* to 5 *(always)*. The 11 scores were then summed to generate a total harsh punishment score, with higher scores indicating a higher frequency of harsh punishment use. Van Leeuwen and Vermulst (2004) reported moderate internal consistency ($\alpha = .64$) for the harsh punishment subscale of the PBS. The reliability alpha for parent-reported use of harsh punishment in this study was .75 at T1.

Parental Warmth. Parents also completed the 11-item warmth and involvement subscale of the Parenting Styles and Dimensions Questionnaire-Short Form (PSDQ-SF; Robinson, Mandleco, Olsen, & Hart, 1995), a frequently used self-report inventory. Parents rated each item on a 5-point scale ranging from 1 *(never)* to 5 *(always)*. Summing the scores for the 11 items generated a total warmth and involvement score, with higher scores indicating more parental warmth towards their child. Robinson et al. (1995) provided evidence of high internal consistency ($\alpha = .91$). In this study, the reliability alpha at T1 was .84.

Child Measures

Lie telling in the guessing game. Children participated in the TRP guessing game (Talwar & Lee, 2002, 2008) in which they were asked to guess the names of toys. Children sat on a chair with their back towards the experimenter so they could not see the toy, while the experimenter played an auditory song clue (e.g., Elsa, Frozen and "Let it Go"). After which, children were asked to guess the name of the toy, without turning around in their chair to peek. All toys were familiar television/movie characters and were age-appropriate. After

the child had correctly guessed the names of two toys (e.g., Elsa from Frozen, The Little Mermaid), the experimenter explained she had to leave the room briefly and they would continue the game once she returned. The experimenter first placed the third target toy (A lion – Simba from the Lion King) on the table. This toy had an unrelated song clue (i.e., music from a greeting card) that could not be used to infer its identity. The child was told, "Don't turn around to peek at the toy while I am out of the room". After a 1-minute delay, the experimenter (who was unaware of whether the child had peeked) returned to the room, covered the toy with a cloth and asked the child, "While I was gone, did you turn around to peek at the toy".

Lie telling in the school-achievement task. Children also participated in the TRP school-achievement task, modified from previous trivia games used by researchers (Evans & Lee 2011; Talwar, et al., 2007), which unlike the guessing game, required children to answer multiple-choice test-like questions without peeking. Each child was told that if they correctly answered 3 age-appropriate questions on popular television shows or movies (e.g., "What is the name of Winnie the Poo's donkey friend?"), they would get a prize. After children selected the correct answer from 4 multiple-choice options to two practice trial questions, which the experimenter read to them from the front of test cards, they were presented with the third target question. The way in which the third target question was presented was modified slightly to account for the different reading levels across the wide age range used in this study. For the children in preschool and grade 2 at T1 (and preschool/Kindergarten and grade 3 at T2), who arguably had lower levels of reading than the older age group, the experimenter read the target test question and the four possible answers written on the front of the card (accompanied by pictures) and the "correct" answer was written on the back of the card. Whereas, the older children in grades 4, 6 and 8 at T1 (and grades 5, 7 and 9 at T2) were given a test booklet that had the target question written on the front, and the answer

written on the inside. After presenting the third target question to the children, the experimenter said that she had to suddenly leave the room for a minute, and that they were not to peek at the answer written on the back of the card (for preschool and grade 2 children) or the back of the booklet (for children in grade 4, 6 and 8) while she was gone. However, the third target question (e.g., "Who discovered Peter Pan"?) and fictitious "correct" answer was the same for children of all ages.

Coding for lie telling. For each of the TRP tasks, children were categorized as "liars' if they had peeked[10] and subsequently denied having peeked (i.e., lied to the experimenter). Or, children were categorized as "truth-tellers"[11], if they did not tell the experimenter a lie (either because they told the truth about having peeked at the answer, or because they told the truth about having not peeked at the answer).

Procedure

Prior to the testing day, parents provided informed written consent. At both time points, after providing verbal assent, children participated individually in a quiet room at school in child (i.e., lie telling) measures with an experimenter. After which, their parents completed the parent measures of warmth (i.e., subscale of PSDQ-SF; Robinson et al., 1995) and use of harsh punishment (i.e., subscale of PBS; Van Leeuwen & Vermulst, 2004) as part of a larger online questionnaire battery at home. The lie-telling measures included both of the two most frequently used temptation resistance paradigm (TRP; Evans & Lee, 2011; Talwar et al., 2007; Talwar & Lee, 2002, 2008) tasks, a guessing game and a school-achievement task. At T1 children were randomly assigned to participate in one of the tasks first. The order

[10] Peeking behavior and lie-telling behavior across both TRP-tasks were highly correlated ($r = .96$, $p < .001$).
[11] Truth-tellers were aggregated in this sample to compare lie tellers to truth-tellers as a whole (irrespective of peeking behavior), in order to, firstly ensure that no data were lost across both of the TRP-tasks, and second, to align with other recent research (i.e., Lavoie et al., 2017) which similarly grouped truth-tellers. Finally, confessors across both TRP-tasks were too small a group ($N = 9$) to attempt to disaggregate the truth-tellers who peeked from the truth-tellers who did not peek. To ensure that including this small group of confessors did not alter the results, the same analyses presented in this study were run excluding this small group. Results showed that this did not change the findings in any significant way.

of tasks for each individual child was then reversed at T2. A hidden video camera recorded each child's behavior in these TRP tasks. Children underwent an extensive debrief following participation at Time 2, which included an age-appropriate discussion about truth- and lie-telling, as well as reminding them that, like the last time they participated, they would not get into trouble for anything they did or said in the room.

Analytic Strategy

A multi-method approach was undertaken for the analyses. In all the analyses, both peekers and non-peekers across both the TRP tasks were entered, to ensure that all children across both tasks were included. The cross-sectional relationships between T1 variables are presented first and include all 443 students who participated in this study. Cross-sectional analyses were conducted using IBM SPSS Statistics 23 to replicate and extend the limited existing research (e.g., Almas et al., 2011; Darling et al., 2006; Ma et al., 2015; Stouthamer-Loeber, 1986; Talwar & Lee, 2008; Talwar et al., 2017) and to determine the short-term association between each parenting practice and antisocial lying. Logistic regression analyses were used because lying behavior was measured as a categorical variable. First, correlations among the variables at T1 are presented. Second, to examine the hypothesized relationship between parenting practices (i.e., parent-reported use of harsh punishment and parental warmth) and actual lying, cross-sectional logistic regression analyses were conducted with both T1 parent-reported parenting practices as the predictor variables and T1 actual lying behavior as the predicted variable, controlling for the age of the child (in years). Analyses involving children's actual lying behavior were conducted separately for each of the TRP tasks, the guessing game followed by the school-achievement task.

Second, the longitudinal relationships among the variables are presented with the 298 students who participated at both time-points. Analyses were conducted using Mplus 7 (Muthén & Muthén, 1998-2015) due to its advantage in handling missing data (i.e., on the

parent-reported measures), using the Maximum Likelihood (ML) algorithm (Enders, 2010; Muthén & Muthén, 1998-2015). These longitudinal analyses were conducted to extend the cross-sectional findings, to determine causality and the long-term impacts of each of these parenting behaviors on lie telling. Cross-time correlations between the hypothesized T1 predictors of lying (i.e., parent-reported use of harsh punishment and parental warmth) and actual lying in both TRP tasks at T2 are presented first. Next, to assess whether each of the two parenting practices predicted changes in actual lying behavior in the TRP tasks, logit regressions were conducted in Mplus. Separate analyses were run for each of the TRP tasks (first the guessing game and then the school-achievement task). Age and actual lying behavior at T1 were used as control variables in each of these analyses, to strengthen conclusions and control for stability of lying behavior across the time interval.

Results

Preliminary analyses examined gender (male vs. female), age (in years), and the order of the TRP tasks (guessing game first vs. guessing game last) differences in all described cross-sectional and longitudinal analyses involving the parent-reported use of harsh punishment score at T1, the parent-reported warmth score at T1, actual lying in the guessing game at T1 and T2, or actual lying in the school-achievement task at T1 and T2. The results revealed significant age differences in children's tendency to lie in the TRP tasks, but there were no significant gender or order differences. Thus, gender and order variables were not analyzed further.

Cross-Sectional Relationships between T1 variables

Correlations. Table 2 displays all correlations between T1 variables of interest. The negative correlation between age and lying in the guessing game indicated that the older the child, the less likely they were to tell a lie to conceal their transgression in the guessing game. However, the age of the child was not significantly correlated with actual lying in the school-

achievement task. Further, the age of the child was not significantly correlated with either of the two parent-reported parenting practices. However, children's lying behavior in both the guessing game and the school-achievement task were positively correlated. Also, parent-reported warmth was weakly and negatively correlated with parent-reported use of harsh punishment. Most importantly, the positive correlation between parent-reported use of harsh punishment and children's actual lying in the guessing game, indicated that the more parents reported they used harsh punishment to discipline their child, the more likely their child was to tell a lie to conceal their own transgression in the guessing game. However, parent-reported use of harsh punishment was not significantly correlated with children's lying in the school-achievement task. Lastly, parent-reported warmth was not significantly correlated with children's lying in either TRP task.

Table 2
Correlations between T1 variables and cross-time correlations between T1 independent variables and T2 outcome variables

Variable	1	2	3	4	5
1. Age at T1		-.03	-.04	-.21***	-.06
2. Parental warmth at T1	.05		-.24***	-.08	.03
3. Parents' use of harsh punishment at T1	-.15	-.28***		.15*	.06
4. Lying: GG	-.27***	-.25**	.19*		.36***
5. Lying: SA	-.14*	-.03	.06	.46***	

Note. Correlations between T1 variables are presented above the diagonal (N = 443) and cross-time correlations between T1 and T2 variables are presented below the diagonal (N = 298). GG = Guessing game; SA: School-achievement task
*p < .05 **p < .01 ***p < .001

Predicting children's actual lying behavior in the guessing game. At T1, 36% (159/443) of the children told a lie about having peeked at the toy in the guessing game, and 64% (284/443) were categorized as having told the truth (about having peeked or not-peeked

at the toy). To examine the hypothesized relationship between the two parenting practices (i.e., parent-reported use of harsh punishment and warmth) and children's actual lying in the guessing game, a logistic regression was conducted predicting lie telling behavior in the guessing game at T1 (0 = truth-teller, 1 = liar). Age (in years), parent-reported use of harsh punishment, parent-reported warmth and the interaction between each of these parenting practices and age were included in the model. The overall model was significant, χ^2 (5, N = 230) = 26.14, $p < .001$, Nagelkerke $R^2 = .15$. However, further inspection of the model showed that only the parent-reported use of harsh punishment effect was significant above and beyond the combined contributions of the age and parent-reported warmth factor, β = 2.45, Wald (1) = 5.56, p = .02, odds ratio = 11.54. The odds of children telling a lie rather than telling the truth in the guessing game was 11.54 times greater for children whose parents reported using more harsh punishment when disciplining their child. There was no significant age or parent-reported warmth effect.

Predicting children's actual lying behavior in the school-achievement task. At T1, 19% (84/443) of the children told a lie about having peeked at the answer in the school-achievement task, and 81% (359/443) were categorized as having told the truth (about having peeked or not-peeked at the answer). To examine the hypothesized relationship between the two parenting practices (i.e., parent-reported use of harsh punishment and warmth) and children's actual lying in the school-achievement task, the above logistic regression was repeated with lying behavior in the school-achievement task at T1 (0 = truth-teller, 1 = liar) as the predicted variable. The overall model was not significant, χ^2 (5, N = 230) = 3.53, p = .62, Nagelkerke $R^2 = .02$. None of the effects attained significance.

Longitudinal relationships between T1 variables predicting T2 lying behavior

Cross-time correlations. Cross-time correlations between hypothesized T1 predictors and actual lying behavior at T2 are also presented in Table 2 above. The negative

correlations between children's age and lying in the guessing game and school-achievement task at T2, indicated that the older the child, the less likely they were to tell a lie in the guessing game and the school-achievement task at T2. Further, the positive correlation between parent-reported use of harsh punishment at T1 and actual lying in the guessing game at T2, indicated that the more parents reported using harsh punishment to discipline their child, the more likely their child was to tell a lie to conceal their own transgression in the guessing game at T2. Also, a negative correlation between parent-reported warmth and children's actual lying in the guessing game at T2 was evident, indicating that the more parents reported being warm and involved towards their child, the less likely their child was to tell a lie to conceal their own transgression in the guessing game at T2. Neither parent-reported harsh punishment at T1 nor parent-reported warmth at T1 was significantly correlated with lying in the school-achievement task at T2. However, a positive correlation between T1 and T2 lying in the guessing game ($r = .31$, $p < .001$) and between T1 and T2 lying in the school-achievement task ($r = .15$, $p = .01$) was evident, indicating some degree of stability in lying over time within each context. Also evident was a positive correlation between T1 and T2 parent-reported use of harsh punishment ($r = .43$, $p < .001$), and between T1 and T2 parent-reported warmth ($r = .72$, $p < .001$), indicating some degree of stability in the parenting practices over time.

Predicting actual lying behavior in the guessing game over time from T1 parenting practices. At T2, 23% (36/155) lied about having peeked at the toy, and 77% (119/155) were categorized as having told the truth (about having peeked or not-peeked at the toy). To examine the longitudinal association between the two parenting practices (i.e., parent-reported use of harsh punishment and parent-reported warmth) and actual lying behavior in the guessing game, a logit regression analysis in Mplus was conducted; the two parent-reported parenting practices at T1 were used to predict actual lying behavior in the

guessing game over time. Children's actual lying behavior in the guessing game at T2 was the predicted variable. Children's actual lying behavior in the guessing game at T1 was included as a control variable to account for the stability of lying across time. The interaction terms between age (in years) and each of the two parent-reported parenting practices were also included to assess whether age moderated any of the relationships. However, no interactions were significant (*ps* > .05) and the Wald tests of parameter constraints indicated that neither the relationship between parent-reported use of harsh punishment at T1 and actual lying in the guessing game at T2, nor the relationship between parent-reported warmth at T1 and actual lying in the guessing game at T2, varied across age (χ^2 (*df* = 2) = 2.14, p = .34). Thus, the interaction terms were excluded from the final model.

In contrast to the cross-sectional results, after accounting for the stability of lying across time, age and the two parent-reported parenting practices scores at T2, parent-reported use of harsh punishment at T1 was not significantly associated with children's actual lying behavior in the guessing game over time. However, parent-reported warmth was significantly associated with children's actual lying behavior in the guessing game over time. Specifically, for those children whose parents reported lower levels of warmth, the odds of telling a lie in the guessing game (versus telling the truth) increased by a factor of .36 (β = -1.03, *z* = -2.15, *p* = .03). Finally, and as for the cross-sectional results, the overall effect of age on lying at T2 in the guessing game was not significant (β = -.13, *z* = -1.79, p = .07).

Predicting actual lying behavior in the school-achievement task over time from T1 parenting practices. At T2, 16% (24/155) told a lie about having peeked at the answer in the school-achievement task, and 84% (131/155) were categorized as having told the truth (about having peeked or not-peeked at the answer). To examine the longitudinal association between the two parenting practices and actual lying behavior in the school-achievement task, the above logit regression in Mplus was repeated, this time to predict actual lying

behavior in the school-achievement task over time. The interaction terms between age and each of the parent-reported parenting practices were included to assess whether age moderated any of the relationships. However, no interactions were significant (*ps* > .05) and the Wald tests of parameter constraints indicated that neither the relationship between parent-reported use of harsh punishment at T1 and actual lying in the school-achievement task at T2, nor the relationship between parent-reported warmth at T1 and actual lying in the school-achievement task at T2, varied across age (χ^2 (*df* = 2) = 1.03, p = .60). Thus, the interaction terms were excluded from the final model.

Similar to the cross-sectional results, after accounting for the stability of lying, age and the two parent-reported parenting practices scores at T2, neither parent-reported use of harsh punishment nor parent-reported warmth was related to children's actual lying behavior in the school-achievement task at T2. Also, the overall effect of age on lying at T2 in the school-achievement task was not significant (β = -.15, *z* = -1.87, p = .06).

Discussion

This study explored the cross-sectional and longitudinal influence of two independent and specific parenting practices (i.e., harsh punishment and parental warmth) on children's antisocial lie telling. It adds to the sparse literature on the associations amongst environmental factors and lying and extended the investigations longitudinally. The cross-sectional results revealed, consistent with predictions and with the findings of Talwar and Lee (2011) that children who experience the use of harsh punishment by their parents were more likely to tell a lie to conceal their transgression concurrently. However, these results were not maintained in the long-term (i.e., over time), in that the use of punishment by parents did not predict a higher propensity to lie a year later. In contrast, and counter to some research claims (e.g., Talwar et al., 2017), parental warmth was not related to children's lower propensity to tell lies cross-sectionally. However, parental warmth was related to lie

telling in the long-term, in that it was associated with the reduced likelihood of children telling a lie a year later. Notably the findings also highlighted the importance of context in these relationships.

Although not related to lie telling in the long-term (i.e., over time), parents' reported use of harsh punishment was positively associated with their child's propensity to tell a lie to conceal their own transgression in the guessing game cross-sectionally. This was consistent with predictions and the findings reported by Talwar and Lee (2011) in relation to the harsher parental punishment characteristic of authoritarian environments, yet in contrast to other research (Ma et al., 2015; Talwar et al., 2017). In this study, children's greater propensity to tell a lie (versus the truth) to conceal their peeking at a toy in the guessing game was associated with their parents' higher reported use of harsh punishment when disciplining them. These results also extend Talwar and Lee's (2011) findings by showing that children's lie telling was influenced by a specific part of the authoritarian style, the use of harsh punishment, and not only within a school, but also within the family context. This also reaffirms both Stouthamer-Loeber's (1986) findings and Turiel's (2005) theoretical assertions, that children will use lie telling in the short-term to protect themselves from the punishment for temptation driven transgressions.

Conversely, as previously stated, the cross-sectional results were not replicated and maintained longitudinally. That is, parent-reported used of harsh punishment did not predict children's increased propensity to tell lies a year later. This aligns with the plethora of theory and research showing that punishment does not promote the internalization of the morals regarding the wrongfulness of the behavior (e.g., Bandura, 1986; Bugental & Grusec, 2006; Deci & Ryan, 1985; Gershoff, 2002; Hoffman, 1984), and therefore has no long-term impact on the behavior. Further exploration of this relationship longitudinally and in relation to

moral standards is needed to confirm whether children's internalization of moral standards moderates the relationship.

When examining the influence of a different, and independent parental practice, parental warmth, on children's lie telling in the TRP both cross-sectionally and longitudinally in this study, a different relationship between parenting and lie telling emerged. Unlike the cross-sectional and longitudinal relationship with punishment described above, parental warmth was not related to lie telling in the context of cross-sectional data. Although, this was counter to predictions, Burton (1976) and Stouthamer-Loeber's (1986) reviews of the literature and Talwar et al.'s (2017) more recent findings, it was consistent with Ma et al.'s (2015) null findings. However, longitudinally, parental warmth was related to children's propensity to tell lies in the TRP a year later. Those children, whose parents' reported lower levels of warmth, were more likely to tell a lie (rather than the truth) to conceal their transgression.

The fact that this finding was supported longitudinally but not cross-sectionally, although unusual, is supported by the plethora of research showing that warm parenting practices, unlike harsh punishment, promotes more internalization of the wrongfulness of lying (e.g., Burton, 1976; Bugental & Grusec, 2006), in turn perhaps having a longer-term impact on children's lesser propensity to tell lies. This is congruent with assertions that parents who demonstrate warmth towards their children have children who are more prone to truthful disclosure (e.g., Almas et al., 201; Darling et al., 2006; Darling & Steinberg, 1993). At the same time, if parents show less warmth towards their children, children demonstrate a greater propensity to lie, in line with research linking authoritarian parenting to lie telling (e.g., Talwar & Lee, 2011). On the other hand, these findings also confirm assertions (e.g., Grusec & Davidov, 2010; Lamborn et al., 1991) that authoritative parenting practices facilitate children's self-regulatory capacities. Perhaps, over time children who experience

warm parenting practices learn how to better self-regulate their behavior, and avoid the temptation of engaging in transgressions, which in turn means they have less of a need to rely on lie telling. This notion is supported by research showing that parental warmth is effective in helping children to avoid engagement in problem behaviors (e.g., Finkenauer, Engels, & Baumeister, 2005). However, this study did not measure the self-regulatory mechanisms (such as self-control), nor did it assess the internalization of moral standards, which both evidently may underlie the relationship between parental warmth and lie telling and is an area for future research. Nevertheless, these findings do highlight the important and long-term causal role parental warmth plays in predicting children's lie telling over time.

Notably, these results also showed that the relationship between both parenting practices and lie telling behavior cross-sectionally and longitudinally depended on the nature of the tempting context in the TRP. Parent-reported use of harsh punishment predicted children's lie telling concurrently and parental warmth predicted children's lie telling longitudinally in the guessing game, but not in the school-achievement task. This finding accords with recent research (e.g., Carl & Bussey, 2017a; Carl & Bussey, 2017b; Lavoie et al., 2017) showing a difference in the relationship between various factors and lie telling for different experimental contexts (i.e., TRP-tasks and lie-types). Moreover, the findings showed that there was a greater difference in lie telling across time for the guessing game than the school achievement task. Perhaps, the standards for school-achievement style tasks are less flexible and therefore less likely to be influenced by other social factors. Future studies need to replicate these findings within different antisocial contexts to confirm this interpretation.

Despite the important implications of these findings for understanding the short- and long-term influences of different parenting practices on children's lie telling, there are also some limitations. Firstly, the reliance on parent-report data does warrant caution when

interpreting the findings of this study. In view of research suggesting that parent reports of their child's behavior may be biased (e.g., Cook & Goldstein, 1993), parent-report has been criticized and the extent of possible discrepancies is unknown. Future studies would benefit from exploring reporting discrepancies to further appreciate its possible role in the relationship between parent-child interactions and outcomes.

It is also acknowledge the attrition of participants from T1 to T2 could be a potential reason for why different short- and long-term relationships were discovered. However, given that the group comparison analysis comparing those participants who were tested at T1 only versus those who participated at T1 and T2 showed no statistically significant differences on the parenting variables (i.e., harsh punishment and parental warmth), this is unlikely. Moreover, the rate of attrition in this study is on par with numerous studies that have also examined various aspects of child development longitudinally, indicating that longitudinal studies are valuable for studying similarities and/or differences in relationships between parenting factors and lie telling concurrently and over time, even considering attrition rates.

Furthermore, it is possible that the short-term nature of this longitudinal study may have been insufficient to elucidate developmental changes in this relationship. However, theorists (e.g., Bandura, 1986) have argued that behavior tends to be stable over time, once the standards for it have been set. On the other hand, it is also possible that it was not sufficient to counter the stability of lying over time, which may have masked the longitudinal relationship between parents' use of punishment and lying. However, this is unlikely given that parental warmth predicted lying over time, when considered with punishment. Nevertheless, a longer-term study may provide additional information on whether there are any developmental changes in the relationship.

Overall, this study demonstrated that different parenting practices influence children's lie telling in different ways depending on the time interval and the context of the lie.

Specifically, the use of physical punishment was associated with children's propensity to lie in the short-term, that is, only cross-sectionally, but not over time. On the other hand, parental warmth had a more positive and longer term influence on children's lie telling, with lower levels of warmth in parenting predicting children's higher propensity to lie a year later. Moreover, these relationships were only evident in one of the antisocial lie-telling contexts (i.e., guessing game), but not in the other lie-telling context (i.e., school-achievement task). Taken together, these findings suggest that positive and adaptive parenting (i.e., warmth and little use of physical punishment) may help lessen children's use of deception in some contexts. Future research should include other potential underlying factors related to the child themselves in order to further understand the nuanced relationships between parenting and lie telling cross-sectionally and longitudinally. Nonetheless, the current study points to the different short- and long-term impacts different parenting practices can have on children's lie telling behaviors. Further research attention into parenting practice's associated with lie telling is needed due to the potential of these practices for reducing lie telling.

Chapter 5

Longitudinal Relations Between Lie Telling and Problem Behaviors: A Cross-Lagged Panel Design

Abstract

Drawing on various theoretical perspectives, extant research has illustrated support for two different directions in the relationship between children's lie telling and conduct problems. Some have argued that early lying is predictive of later more problematic conduct problems, while others have argued the reverse; that is, conduct problems are an antecedent to children's later lie telling as they attempt to protect themselves from negative consequences of their initial transgressions. By using a cross-lagged panel design, this study concurrently examined whether lie telling behavior was the cause or effect of engagement in other conduct problems, in order to support or rule out one of the described directions of effect. Preschool (M_{age} = 4 years), second- (M_{age} = 8 years), fourth- (M_{age} = 10 years), sixth- (M_{age} = 12 years), and eighth (M_{age} = 14 years) grade children's actual lie telling behavior in temptation resistance paradigms, as well as their engagement in conduct problems (reported by parents) was concurrently assessed at 2 separate time points, 12 months apart. Results indicated that more frequent initial engagement in conduct problems predicted later actual antisocial lying in the TRP a year later, not vice versa. Furthermore, these results also indicated that the relationship was context-specific, present in one of the TRP contexts but not the other. Overall, these findings suggest that for some children, lie telling develops into a problem behavior in order to cover up other antisocial conduct, but not for others. Theoretical and practical implications for intervention strategies are discussed.

Longitudinal Relations Between Lie Telling and Problem Behaviors: A Cross-Lagged Panel Design

Lie telling to conceal a transgression (i.e., antisocial lying) is considered a normative and common behavior in young children, reflecting their increased social and cognitive maturity (e.g., Talwar & Crossman, 2011; Talwar, Gordon, & Lee, 2007; Talwar & Lee, 2002, 2008). However, by late childhood/early adolescence, experimental studies show a decrease in children's propensity to tell such lies (e.g., Evans & Lee, 2011; Lavoie, Yachison, Crossman, & Talwar, 2017). Still, a relatively small percentage (e.g., under 5%; Stouthamer-Loeber, 1986) of children continue to tell antisocial lies persistently. For this group of children, researchers have posited that their lie telling may be problematic and linked to their engagement in aggressive behaviors, conduct disorder and delinquency (Stouthamer-Loeber, 1986). In fact, researchers (Gervais, Tremblay, Desmarais-Gervais, & Vitaro, 2000; Lavoie, Yachison, Crossman, & Talwar, 2017; Ostrov, 2006; Stouthamer-Loeber, 1986) have indicated concurrent associations between lie telling and conduct problems in children labeled as chronic/persistent liars.

Different theoretical perspectives and research traditions have demonstrated support for two different directions in the relationship between children's lie telling and conduct problems. Some theorists and researchers have argued that early lying is the first covert concealing problem behavior to develop and is predictive of later, more problematic covert concealing antisocial behaviors (Gervais et al., 2000; Patterson, 1982; Stouthamer-Loeber, 1986), while others have argued the reverse. That is, that antisocial problem behaviors are an antecedent of children's lie telling; whereby, it is argued that children first engage in problem behaviors due to possible cognitive deficits, their environment or immature self-regulatory capacities, and then rely on lying as a strategy to protect themselves from negative consequences for their transgressions (Loeber, 1982; Ostrov, Ries, Stauffacher, Godleski, &

Mullins, 2008; Talwar & Crossman, 2011; Warr, 2007). Although the two streams of research provide strong evidence for a specific direction of the relationship between antisocial lie telling and conduct problem behaviors, they each acknowledge that the reverse direction of effect may also be partially accurate.

Since both directions of effect are supported by theory and evidence, it is necessary to conduct a study that allows two competing hypotheses regarding the direction of the relationship between antisocial lie telling and conduct problems to be concurrently tested in order to support or rule out one of the hypotheses (i.e., strong interference test; Lian, Ferris, Morrison, & Brown, 2013; Platt, 1964). Therefore, the main aim of this study is to determine whether lie telling is the cause or effect of engagement in conduct problems. This research is important to help guide a comprehensive conceptual model of the development of lying as a problem behavior.

Antisocial Lying Predicting Later Conduct Problem Behaviors

Theorists and researchers have often regarded children's antisocial lie telling as an early indicator of other antisocial problem behaviors that develop later (Stouthamer-Loeber, 1986; Talwar & Crossman, 2011). In fact, lying has been related to various conduct problems (e.g., stealing) and delinquency (Stouthamer-Loeber, 1986). In her analysis of studies on child psychopathology, Stouthamer-Loeber (1986) found that children who continued to lie as they aged were more likely to commit an offense or be convicted of a crime when they were older. Moreover, lying is included in the DSM-V as one of the criteria for a conduct disorder. While acknowledging that their longitudinal results were somewhat inconsistent, Gervais and colleagues (2000) also found that persistent lying was predictive of increases in disruptive problem behaviors. Taken together, these findings imply that frequent and persistent lying is a precursor for engagement in later conduct problem behaviors.

In the studies reviewed by Stouthamer-Loeber (1986), as well Gervais and colleagues' (2000), both conduct problem behaviors and lie telling were measured using ratings by parents and/or teachers or by asking the child to report on their own behavior. The focus on a single informant reporting both lie telling and conduct problems may have been problematic. That is, it is possible that the informant's reports on lying are biased by the presence of other conduct problem behaviors, which can contribute to a "halo effect" (Ekman, 1989; Gervais et al., 2000). In other words, parents and teachers may be more likely to report other conduct problems in those children who have been identified as liars, or vice versa. To account for this possibility and avoid a possible "halo effect", in this study, children's lie telling behavior was assessed using a behavioral measure, the temptation resistance paradigm, which mimics naturalistic conditions in which children tell lies (TRP; Lewis, Stranger, & Sullivan, 1989; Talwar & Lee, 2002, 2008); and parents' reported on their children's conduct problem behaviors as they are not rating their child's lie telling.

Conduct Problems as an Antecedent to later Antisocial Lying

Apart from research that has primarily viewed engagement in conduct problem behaviors as a consequence of earlier lie telling, as outlined above, Talwar and Crossman (2011) suggest that it is also reasonable to view the opposite relationship. That is, children who engage in more conduct problem behaviors to begin with, may need to lie more, as they attempt to conceal their problem behavior to avoid negative consequences (i.e., punishment) for performing it (Talwar & Crossman, 2011). This implies that children's lie telling may be a "secondary behavior used to cover up other primary antisocial acts" (Talwar & Crossman, 2011, p. 165). Supporting these explanations, Ostrov and colleagues (2008), in their short-term longitudinal study with preschoolers, showed that increases in lying followed increases in aggressive behavior, and not vice versa. Moreover, a longer-term longitudinal study with adolescents indicated that delinquent children frequently lied to their parents in order to

conceal their bad behavior (Warr, 2007). These two longitudinal studies suggest that children's propensity to tell antisocial lies may be driven by their engagement in problem behaviors. However, these studies used two different age ranges (preschool and adolescents) to derive their findings, and therefore cannot speak to possible developmental differences. Recent cross-sectional research did show however, using a wide age range (4 to 14 year olds) to examine the relationship between problem behavior and lying, that regardless of age, those children whose parents' reported a higher frequency of engagement in problem behaviors were 17% more likely to tell a lie (versus the truth) in the TRP (Lavoie et al., 2017). However, given that the two longitudinal studies employed different age-ranges and measured lie telling through parent, teacher and clinician ratings rather than in a controlled laboratory setting, and Lavoie et al.'s (2017) study was cross-sectional, this study aimed to replicate and further investigate these findings longitudinally in a controlled laboratory setting and with a broad age range.

Current Study

The current study aimed to examine the relationship between lie telling and conduct problem behaviors to explore whether lying predicts later conduct problems or conduct problems predict later lying. Children participated twice, 12 months apart, in two frequently employed temptation resistance paradigm tasks to measure their actual antisocial lie telling (i.e., guessing game and school-achievement task; Evans & Lee, 2011; Talwar et al., 2007; Talwar & Lee, 2002, 2008). Typically, only one of these TRP tasks has been employed to assess children's actual antisocial lie telling, with the school-achievement task used mainly in studies with children over the age of 8 years (e.g., Evans & Lee, 2011). However, in order to accommodate the broad age range used in the current study, which included both younger and older age groups, both tasks were used. Since recent research has found differences in the way various factors influence lying depending on the lie-type (e.g., Lavoie et al., 2017), the

tempting context in which an antisocial lie is told may be important when examining its relation to conduct problem behaviors. Children's parents also reported on their child's engagement in conduct problem behaviors in an online questionnaire.

Based on Stouthamer-Loeber's (1986) and Gervais et al.'s (2000) claims that children's persistent lie telling is a precursor to later problem behaviors, it was hypothesized that children's antisocial lie telling will have a significant lagged effect on their engagement in conduct problem behaviors (*Hypothesis 1).* In other words, children who continued to tell antisocial lies in the TRP task would be reported by their parents as engaging in more conduct problems a year later. In addition, given Talwar and Crossman's (2011) proposed explanation, and the findings of Ostrov and colleagues (2008), Warr (2007) and Lavoie et al. (2017), which indicate the opposite relationship between antisocial lying and engagement in conduct problem behaviors, it was also hypothesized that conduct problem behaviors would have a significant lagged effect on actual antisocial lie telling (*Hypothesis 2*). That is, it was predicted that those children whose parents reported that they engaged more in conduct problems would be more likely to tell an antisocial lie in the laboratory a year later.

A longitudinal cross-lagged panel design was utilized to investigate the opposing hypotheses. This approach was adopted as arguably cross-lagged panel designs are most appropriate to address the aims of this study, as they allow for the concurrent assessment of bidirectional effects (i.e., whether one variable predicts another, or vice versa), while controlling for the level of both those variables at the previous time point (Finkel, 1995). This design is considered the best way to understand the direction of effects underlying the relationship between two variables (Finkel, 1995) and has been previously used for this purpose in longitudinal research with two time points (e.g., Lian, Ferris, Morrison, & Brown, 2014). In using a longitudinal cross-lagged panel design, the results of this study will help to unravel whether lie telling cause conduct problems or conduct problems cause lie telling.

Method

Participants

The sample consisted of 298 children in preschool/Kindergarten[12] (n = 37, 15 males, M_{age} = 5 years, SD = 7 months), grade 3 (n = 60, 34 males, M_{age} = 9 years, SD = 6 months), grade 5 (n = 78, 53 males, M_{age} = 11 years, SD = 5 months), grade 7 (n = 41, 34 males, M_{age} = 13 years, SD = 6 months) and grade 9 (n = 82, 49 males, M_{age} = 15 years, SD = 6 months) and their parents (N = 157). To generate cross-lagged data, child and parent dyads were tested at Time 1 (T1), and again 12 months later at Time 2 (T2). While data were collected for a total of 443 children at T1, only the data of the 298 children who participated at T1 and T2 were included in this study. This is in line with strategies that have been employed in previous studies using longitudinal data (e.g., Gervais et al., 2000; Ostrov et al., 2008; Warr, 2007). A series of between group comparisons were conducted comparing the responses of children with complete data for both time points of data collection and those who were only present for a single time point on the key variables of interest (i.e., parent-reported conduct problems and actual lie telling behavior). Table 1 summarizes the results: there were no significant differences between students who participated in both or one time point of data collection in terms of parent-reported conduct problems or children's actual lie telling in the TRPs. A series of between group comparisons were conducted comparing the responses of children whose parents did not complete data and those whose parents did complete data at one or both time points on the key variables of interest (i.e., actual lie telling behavior and grade) (see Table 1). No significant differences between the groups emerged for lying at T1 and at T2.

[12] Preschool encompasses children aged 3 to 5 years. As such, at T2, those preschool children who participated at T1 at the age of 3-4 years of age were still in preschool at T2. Whereas, those preschool children who participated at T1 at the age of 4-5 years had moved from preschool into Kindergarten at T2. Therefore, at T2, this group will be referred to as Preschool/Kindergarten students as it encompasses both.

Table 1
Between-Group Comparison Summary

Variable	Time 1 and T2 participated vs. T1 only participated	Parent responded vs. parent did not respond
Time 1		
Parent-reported conduct problems	$t(232) = .96$, $p = .34$, *ns*	
Lying in the guessing game	$\chi^2(1) = 2.35$, p = .13, *ns*	$\chi^2(1) = .33$, p = .57, *ns*
Lying in the school-achievement task	$\chi^2(1) = .15$, p = .70, *ns*	$\chi^2(1) = .74$, p = .39, *ns*
Time 2		
Lying in the guessing game		$\chi^2(1) = 9.12$, p = .32, *ns*
Lying in the school-achievement task		$\chi^2(1) = 1.08$, p = .30, *ns*

Measures

Conduct problem behaviors. Parents completed the 5-item conduct problems subscale of the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997), a comprehensive and frequently used measure of 4 to 16 year old children's engagement in conduct problem behaviors. For each item, parents rated the frequency of their child's conduct problem behaviors (0 = not true, 1 = somewhat true, 2 = certainly true). Summing the scores for the 5 items generated a total conduct problems score, with higher scores indicating a higher frequency of conduct problem behaviors. Goodman (1997) provided evidence of moderate internal consistency ($\alpha = .63$). In this study, the reliability alpha at T1 was .75 and .65 at T2.

Procedure

Written parental consent for students to participate in this study and children's verbal assent were obtained prior to participation at T1. At both time points, children completed the lie-telling measures individually with an experimenter in a quiet room on school grounds. Following their child's participation at school, parents completed the conduct problems subscale of the SDQ as part of a larger online questionnaire battery at home. The lie-telling measures consisted of two of the most frequently used temptation resistance paradigm (TRP; Evans & Lee, 2011; Talwar et al., 2007; Talwar & Lee, 2002, 2008) tasks, a guessing game and a school-achievement task. At T1 children were randomly assigned to participate in one of the tasks first. At T2, the order of presentation of the tasks for each individual child was reversed. A hidden video camera recorded children's behavior. At the conclusion of their participation at T2, children were age-appropriately debriefed, which included having a discussion about truth- and lie-telling with the experimenter, and were reminded (as for T1), that no matter what they said or did in the room, they would not get into trouble.

One of the TRP tasks was a guessing game (Talwar & Lee, 2002, 2008) and required children to guess the identity of a toy using only an auditory song clue (e.g., Elsa, Frozen and "Let it Go"), without turning around in their chair to peek. The toys were chosen to represent age-appropriate and popular television/movie characters. Two of the toys were easy to identify from their matching song clue (e.g., Elsa from Frozen, The Little Mermaid), while the third target toy (A lion – Simba from the Lion King) had an unrelated song clue (i.e., music from a greeting card). After the child had correctly guessed the identity of the first two toys, the experimenter placed the third target toy on the table and explained that she had to leave the room briefly. The experimenter told the child that they must not turn around to peek at the toy while she was out of the room. Since the child was unable to identify the toy from the unrelated song, he/she may be tempted to peek. After a 1-minute delay, the experimenter (who was unaware of whether the child had peeked) returned to the room and covered up the toy with a cloth. The child was asked whether he/she had turned around and peeked at the toy while the experimenter was gone.

The other TRP task was a school-achievement task, modified from previous trivia games used by researchers (Evans & Lee 2011; Talwar, et al., 2007), which was similar in style to the guessing game, but instead required children to answer multiple-choice test-like questions without peeking. Each child was told they would have to answer three, age-appropriate questions about popular television shows or movies (e.g., "What is the name of Winnie the Poo's donkey friend?"). After children correctly answered two practice trial questions, choosing from 4 multiple-choice options, which the experimenter read to them from the front of test cards, they were presented with the third target question. The presentation of the third target question was slightly modified in order to accommodate the different reading levels across the wide age range used in this study. Since children in preschool and grade 2 at T1 (and preschool/Kindergarten and grade 3 at T2) had lower

reading levels than the older age group, the experimenter read the target test question and the four possible answers written on the front of the card, accompanied by pictures. Whereas, older children in grades 4, 6 and 8 at T1 (and grades 5, 7 and 9 at T2) were presented with a test booklet which had the target question written on the front. After all children had been presented with the third target question, the experimenter said that she had to suddenly leave the room for a minute, and that the child was not to peek at the answer written on the back of the card or back of the booklet while she was gone. However, the question was the same for children of all ages (e.g., "Who discovered Peter Pan"?), as was the fictitious "correct" answer written on the back of the card for younger children or inside the booklet for older children.

For both tasks, children were classified into two categories. The first category was children who told the experimenter a lie about having not peeked[13] when they had peeked at the answer(s) and was labelled "liars". The second category represented children who did not tell a lie to the experimenter (either because they told the truth about having peeked at the answer(s), or because they told the truth about having not peeked at the answer(s)) and was labelled "truth-tellers"[14].

Analytic Strategy

Analyses involving children's actual lying behavior were conducted separately for each of the two TRP laboratory tasks, the school-achievement task and the guessing game. Both peekers and non-peekers from both TRP tasks were entered into all the analyses to ensure that all children across the two TRP contexts were included in the analyses. For each

[13] Peeking behavior and lie telling behavior across both TRP-tasks were highly correlated ($r = .96$, $p < .001$).
[14] Truth-tellers were aggregated in this sample to compare lie tellers to truth-tellers as a whole (irrespective of peeking behavior). This was done in order to ensure that no data were lost across both of the TRP-tasks, in line with what had been done in recent research (i.e., Lavoie et al., 2017). Additionally, the two groups of truth-tellers (those that did peek and those that did not) were too small a group ($N = 9$) to attempt to disaggregate them. To ensure that this small group of truth-tellers did not alter the results, the same analyses presented in this study were run excluding this small group, with results showing that it did not change the findings in any significant way.

TRP task, analyses were conducted in two steps. First, to obtain a preliminary idea about the relationship between the variables of interest, cross-time correlations between the variables of interest at T1 and T2 were conducted using IBM SPSS Statistics 23. Cross-time correlations between parent-reported conduct problems and actual lying in both games across T1 and T2 are presented. Second, since all variables were observed, and thus true reflections of the measure at both time points, the path model was examined next in order to investigate the cross-lagged relations between parent-reported conduct problems and children's actual lying behavior using Mplus 7 (Muthén & Muthén, 1998-2015). Mplus 7 was employed due to the advantage of this statistical package for handling missing data on specific variables (i.e., parent-reported measures), whereby the Maximum Likelihood (ML) algorithm is used (Enders, 2010; Muthén & Muthén, 1998-2015). In the cross-lagged path model, the two variables at T1 were allowed to be correlated, as were the two variables at T2. Further, each T1 variable had a causal effect on its T2 counterpart to represent the stability of the variables across time. Finally, parent-reported conduct problems at T1 had a cross-lagged effect on children's actual lying at T2, and children's actual lying at T1 had a cross-lagged effect on parent-reported conduct problems at T2. By controlling for stability of the variables across time, the cross-lagged effects can be used to draw stronger conclusions about the causal direction of the relationship between the two variables (Liu, Mo, Song, & Wang, 2016). Further, controlling for stability effects in a cross-lagged panel design also rules out the effect of a constant third variable (e.g., grade, gender; Zapf, Dormann, & Frese, 1996).

Results

Results are presented in three parts: (1) Cross-time correlations between parent-reports on their children's conduct problems and actual lying behavior in both TRPs (i.e., the guessing game and the school-achievement task) across T1 and T2; (2) Cross-lagged path model to assess the causal direction of the relationship between parent reports on their

children's conduct problems and actual lying behavior in the guessing game; (3) Cross-lagged path model to assess the causal direction of the relationship between parent reports on their children's conduct problems and actual lying behavior in the school-achievement task.

Cross-time Correlations

The positive correlation between T1 and T2 lying in the guessing game ($r = .31$, $p < .001$) and between T1 and T2 lying in the school-achievement task ($r = .15$, $p = .01$) was evident, indicating some degree of stability in children's actual lying over time. Also evident was a positive correlation between T1 and T2 parent-reports on their children's conduct problems ($r = .49$, $p < .001$), indicating some degree of stability in the parent-reports of their children's conduct problems over time. More importantly, the positive correlation between parent-reports on their children's conduct problems at T1 and actual lying in the guessing game at T2 ($r = .26$, $p = .001$), indicated that the more parents reported that their children engaged in conduct problems at T1, the more likely they were to tell a lie to conceal their actual transgressions in the guessing game at T2. However, children's actual lying in the guessing game at T1 was not significantly correlated with parent-reports on their children's conduct problems at T2 ($r = .09$, $p = .35$). Further, parent-reports on their children's conduct problems at T1 were not significantly correlated with actual lying in the school-achievement task at T2 ($r = .03$, $p = .72$), nor was children's actual lying in the school-achievement task at T1 significantly correlated with parent-reports of their children's conduct problems at T2 ($r = .03$, $p = .77$).

Cross-lagged Path Models and Test of the Hypotheses

Guessing game. To examine the 12 month lagged effects of parent-reports on their children's conduct problems and children's actual lying in the guessing game, a cross-lagged path model was conducted using Probit Regression in Mplus 7. This enabled the examination of whether lie telling in the guessing game was the cause or effect of conduct problems. The

cross-lagged path model was fully saturated. Therefore, model fit and fit indices were not a consideration (i.e., could not be reported) as the model perfectly reproduced/fitted the data (Muthén & Muthén, 1998-2015). A shown in Figure 1, after controlling for the stability of parent-reports on their children's engagement in conduct problems over time (β = .33, z = 5.61, $p < .001$), and children's actual lying behavior in the guessing game over time (β = .76, z = 5.94, $p < .001$), the lagged effect of actual antisocial lying behavior in the guessing game at T1 on parent-reports on their children's engagement in conduct problems at T2 was not significant ($p > .05$), failing to support Hypothesis 1. However, the lagged effect of parent-reports on their children's engagement in conduct problems at T1 on their actual lying behavior in the guessing game at T2 was significant (β = .13, z = 3.44, p = .001), supporting Hypothesis 2. In other words, as the number of parent-reported conduct problems increased at T1, the probability of children telling a lie (rather than telling the truth) in the guessing game 12 months later at T2 increased by 3.66 (β = .84, z = 2.99, p = .003). The pseudo R Squared was .24, which indicates that parent-reported conduct problems explains approximately 24% of the variance in children's actual lying behavior in the guessing game.

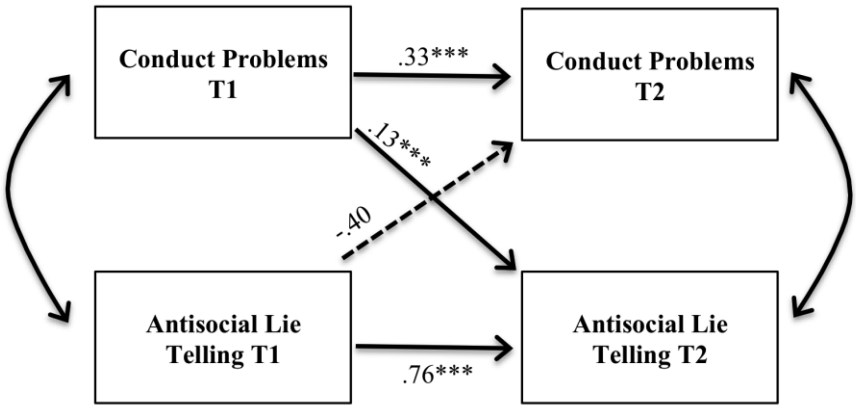


Figure 1. Estimates of path model on the relation between conduct problems and lie telling. ***$p < .001$

School-achievement task. To examine the 12 month lagged effects of parent-reports on their children's conduct problems and children's actual lying in the school-achievement task, the above cross-lagged path model analysis was repeated, this time including actual lying behavior in the school-achievement task. This enabled the examination of whether lie telling in the school-achievement task was the cause or effect of conduct problems. The cross-lagged path model was also fully saturated. Therefore, model fit and fit indices were not a consideration (i.e., could not be reported) as the model perfectly fitted the data (Muthén & Muthén, 1998-2015). However, after controlling for the stability of parent-reports on their children's engagement in conduct problems over time (β = .30, z = 5.32, p < .001), and children's actual lying behavior in the school-achievement task over time (β = .49, z = 2.56, p = .01), T1 actual antisocial lying behavior in the school-achievement task did not have a significant cross-lagged effect on T2 parent-reports of their children's conduct problems, and nor did T1 parent-reports of their children's conduct problems have a significant cross-lagged effect on T2 actual antisocial lying behavior in the school-achievement task (*ps* > .05).

Discussion

This study examined whether lie telling was the cause or effect of engagement in other conduct problem behaviors in a sample of children from a broad age range, using a longitudinal cross-lagged panel design. In addition, this study also assessed lie telling in two TRP tasks, in order to ascertain whether task-type influences the way in which lie telling and conduct problems are related. The results revealed that conduct problems predicted lie telling behavior a year later, but lie telling behavior did not predict changes in conduct problems a year later. Those children whose parents reported a higher frequency of engagement in conduct problems were more likely to tell a lie (than the truth) in the TRP task a year later. Moreover, the relationship between conduct problems and lie telling depended on the context of the antisocial lie; the lagged effect was only evident in one of the TRP contexts, the

guessing game, but not in the school-achievement task. These findings allowed for the first empirical unravelling of the direction of effects between conduct problems and lie telling.

Through a concurrent assessment of bidirectional effects (i.e., whether conduct problems predicts lying, or lying predicts conduct problems) using cross-lagged longitudinal data, the findings showed that engagement in conduct problems is an antecedent to later antisocial lie telling. This is consistent with existing research (Lavoie et al., 2017; Ostrov et al., 2008; Talwar & Crossman, 2011; Warr, 2007), and extends and supports the theoretical perspective that lie telling may be a secondary behavior used by children to conceal their engagement in conduct problem behaviors (e.g., Talwar & Crossman, 2011).

The findings, however, are in contrast with the opposing stream of evidence indicating that persistent lying is an early indicator of later problem behaviors (Gervais et al., 2000; Stouthamer-Loeber, 1986). Specifically, when lie telling was considered the cause and effect of conduct problems in the model, lying was not predictive of increases in the frequency of engagement in conduct problem behaviors a year later. As the main reason for telling an antisocial lie is arguably to escape negative consequences for transgressions (see Stouthamer-Loeber, 1986 for review), it is reasonable to assume that children who engage in these problem behaviors, have a greater need to lie to conceal their engagement in their problem behaviors over time. Therefore, there is a necessity for future research to examine the factors that may influence problem behavior in order to further understand the relationship between problem behaviors and lie telling. For example, research has shown that these primary antisocial behaviors (which children then conceal by lying) emerge as a result of a number of different factors, such as punitive parenting environments characterized by the use of harsh punishment (e.g., Loeber & Schmaling, 1985; Stouthamer-Loeber, 1986; Talwar & Crossman, 2011), cognitive impairments (see Talwar & Crossman, 2011 for review), and lack of self-regulatory capacities (e.g., Rasmussen, Talwar, Loomes, & Andrew, 2007).

Nonetheless, the current findings provide empirical support for one of the established conceptual models for understanding lying as a problem behavior.

Importantly, the current study also showed that the lagged effects (i.e., causal relationship) between conduct problems and actual lie telling behavior depended on the TRP context. Conduct problems had a lagged effect on antisocial lie telling in the guessing game, but not in the school-achievement task. Perhaps children's lie telling in the guessing game is influenced more by external factors than their lie telling in the school-achievement context, such as engagement in other problem behaviors, an inability to resist temptation, a lack of self- and emotional- regulation, attempting to attain a specific goal, or the fear of negative consequences. This also may reflect the underlying influence of children's perceptions of context on the relation between conduct problems and lie telling, in that children's lie telling in some contexts, but not others, may be problematic. This accords with the limited recent research showing that the relationship between specific social/cognitive factors and lying differs depending on the experimental context (i.e., TRP task-type or lie-type; Carl & Bussey, 2017b; Lavoie et al., 2017) and supports the need for future research to account for the antisocial lie-telling context. Such an investigation would contribute to a better understanding of the contextual mechanisms through which conduct problems and deception are related.

Although this study has significant implications for research and the development of interventions to reduce the negative trajectories associated with lying and problem behaviors, it does have some limitations. The sample was primarily from a middle-class normative community sample and not from juvenile conduct-disordered facilities. As other research has shown that children who told lies at a young age were more likely to commit or be convicted for a crime when they were older (see Stouthamer-Loeber, 1986, for review), the direction of the relationship between conduct problems and lie telling for those children with a diagnosis of a conduct-disorder may differ from that of the present sample. Perhaps, though, in a

conduct-disordered sample, their earlier lie telling behavior is used as a means for concealing their problem behaviors, thus adding further support for the direction of effect highlighted in the current findings (i.e., problem behaviors predicting lie telling). Nonetheless, future research examining whether lie telling is the cause or effect of conduct problems should include a comparison group of conduct-disordered children to extend these findings to this group of children.

Furthermore, the current study did not directly assess the influence of age on the relationship between lie telling and problem behaviors. It is possible that, as Talwar and Crossman (2011) propose, the relationship between lying and conduct problems may partly be a function of maturation, specifically immature cognitive and social development (e.g., impulsivity, lack of self-regulation etc.). Nonetheless, when examining specific ages across a broad developmental range (preschool to early adolescence) in this study, a clear direction of the association between problem behaviors and lying, over and above age, was uncovered. However, the short-term nature of this study's longitudinal design may have precluded the scrutiny of possible developmental changes in the nature of the relationship across development. Yet, the results of this study showed that lie telling and conduct problems are relatively stable behaviors across a 12-month developmental period. This does parallel prior research showing some stability in lie telling over time (e.g., Gervais et al., 2000 Stouthamer-Loeber, 1986). Nevertheless, longer-term studies, which follow children over a longer period of time would allow for the investigation of possible age-related changes in the relation between prolonged lie telling and conduct problems. Another possible limitation of this research is that it did not investigate the possible contribution of other underlying variables, which inform the ways in which conduct problems and lie telling are related. The cross-lagged panel design cannot rule out the possibility that there could be alternate explanations or factors underlying the significant lagged relations found, such as age, gender, moral

knowledge, parenting and cognitive development (Finkel, 1995). Given research highlighting the problematic trajectories of conduct problems and lie telling (e.g., Loeber, 1982; Stouthamer-Loeber, 1986), research which includes cognitive, moral and other social-contextual (i.e., parenting) factors in the model may also provide a more comprehensive understanding of the pathways to lying as a problem behavior.

Despite these limitations, the current study significantly contributes to the field by utilizing a longitudinal cross-lagged panel design that accounted for the stability of behavior over time and thus enabled consideration of two causal pathways concurrently, enhancing understanding about the nature of lie telling as a problem behavior. Findings suggest an important role for conduct problems in the development of children's lie telling. Also, data were collected from more than one source (i.e., parent and child), and lie telling was assessed through an experimental paradigm, which according to Finkel (1995) also strengthens causal inferences.

In summary, results from the current study show that, when lie telling is concurrently regarded as the cause and the effect of conduct problems, and stability of behavior is accounted for, lie telling was not a precursor for later conduct problems. Instead, more frequent engagement in conduct problem behaviors initially predicted more actual lie telling behavior a year later. Researchers have assumed that lie telling initially develops as a normative behavior, and that for some children who lie persistently and continue to lie with increases in age, lie telling may become problematic (e.g., Stouthamer-Loeber, 1986). However, the fact that lie telling did not predict conduct problems a year later, whereas frequent engagement in conduct problem behaviors did predict later lie telling in this study, suggests that for some children (i.e. those children who continue to lie with increases in age), lie telling develops into a problem behavior in order to cover up chronic antisocial conduct. Importantly, these findings also suggest that conduct problems predict lie telling behavior in

some contexts (i.e., guessing game), but not others (i.e., school-achievement task). Understanding lie telling as a problematic behavior for some children, stemming from their engagement in other problem behaviors in certain contexts, has implications for informing intervention strategies. These intervention strategies arguably should initially target the conduct problem behaviors to help reduce lie telling and stop the course of its development as a problem behavior.

Chapter 6

General Discussion

Introduction to General Discussion

Though many children know that telling lies is wrong, they still often tell lies to conceal their transgressions. Due to the complexities of this behavior, its practical consequences in daily life and in legal settings, and also the insight it offers into various aspects of children's development, there has been considerable research into lie telling to conceal a transgression during the past three decades (see Talwar & Crossman, 2011, 2012 for review). However, many gaps in the literature remain.

Thus, the goal of this thesis was to fill these gaps by testing a large number of children (N = 443), across a *broad age range* (3 to 15 years), using *two* antisocial TRP tasks (guessing game and school-achievement task), twice, 12 months apart. The research presented in this thesis provides some of the first causal longitudinal evidence of the factors influencing children's lie telling. It first focused on age-related trends. Although previous research (e.g., Evans & Lee, 2011; Lavoie, Yachison, Crossman, & Talwar, 2017; Talwar & Lee, 2002, 2008) has shown robust age-related decrements in lie telling after 8 years, these studies used only one of the two TRP-tasks and different tasks with different age groups. By unconfounding possible age and task type effects, the findings from this thesis showed that the age-related decrease in lying was evident across both tasks and thus is not attributable to task-related differences. Notably though, across all ages, the amount of lie telling varied across the two TRP tasks. The results from study two, three and four, further showed that children's propensity to lie is differentially motivated depending on the tempting context. These results extend the mixed findings uncovered in prior research with 3- to 8-year-olds (e.g., London & Nunez, 2002; Talwar & Lee, 2008; Talwar, Lee, Bala, & Lindsay, 2002) to a broader age range of children. They demonstrated that having lower moral standards regarding the wrongfulness of lie telling led to a greater likelihood of actual lie telling across age, but only in the school-achievement task. Whereas, only in the guessing game in study

three was children's lie telling motivated by factors external to the child (i.e., parenting practices); adding to the limited body of research that has investigated the influence of parenting (an environmental factor) on lie telling (e.g., Burton, 1975; Stouthamer-Loeber, 1986; Talwar & Lee, 2011). Children were more likely to lie if their parents used more harsh punishment in the short-term, and showed less parental warmth in the long-term. Together, these results highlight the complementary role of personal and environmental factors on children's lie telling cross-sectionally and longitudinally. Furthermore, by concurrently examining whether lie telling was the cause or effect of conduct problems, the results from the final study demonstrated that lie telling for some children is a problem behavior at the outset, rather than an initially normative behavior that later becomes problematic for some.

The general discussion presented below provides a more detailed overview of these studies' key findings, followed by a discussion of their theoretical and practical implications. The key strengths, limitations and potential future research directions are then described, before the main conclusions of this thesis are presented.

Overview of Findings

In the first study, presented in Chapter 2, the age-related decrease in children's lie telling after 8 years of age, which has been highlighted in previous research, was confirmed. Moreover, this study examined this age-related trend using both of the frequently and interchangeably used TRP tasks (guessing game and school-achievement task), across a broad age range that incorporated the different age groups from previous research, in the one study. By removing the potential confound of age and task-type effects, this study showed that the established age-related trends were not attributable to TRP task-related differences. However, the tempting context did influence the overall amount of children's antisocial lie telling. Specifically, across all ages, there was an overall difference in the amount of lie telling with respect to the type of TRP task, with more children lying to conceal their peeking

in the guessing game (36%) than in the school-achievement task (19%). This task-related finding is consistent with historical research (e.g., Hartshorne & May, 1928) that highlighted the importance of the task-type in deception. Also, this finding extends other more recent contextual findings which compared prosocial and antisocial lie-types in the same age range of children (e.g., Lavoie et al., 2017), demonstrating that children's deception not only varies across lie types but also across different tempting contexts within the one lie type (i.e., antisocial lies). Not only do these findings reflect a difference in children's propensity to lie in different tempting contexts, but also suggest that when it comes to understanding the different ways in which children's antisocial lie telling is motivated, it is necessary to consider the different tempting contexts in which these antisocial lies are told. The second, third and fourth studies, presented in subsequent chapters of this thesis, aimed to uncover how other factors may differentially influence lie telling in both of the frequently used tempting contexts.

Consistent with the ideas presented above, the second study, reported in Chapter 3, accounted for the role of the tempting context when examining the relationship between children's understanding of the moral implications of lie telling (i.e., their lie-telling moral standards) and their actual antisocial lie telling behavior. While previous findings have been mixed, often showing that moral standards are not integral to deceptive tendencies in 3 to 8 year olds (e.g., London & Nunez, 2002; Talwar et al., 2002), when this study considered the relationship in specific age groups across a broad developmental range, the results showed that having lower lie-telling moral standards (i.e., rating lie telling less negatively) led to more actual lie telling to conceal cheating in the TRP school-achievement task. Although the results revealed that with increasing age, children's moral standards increased, and their actual lie telling to conceal their own transgression decreased, they did not support the prediction that age would moderate the relationship between the two. Instead, the results of

this study support the idea that the engagement of moral standards guides behavior in some contexts (i.e., school-achievement task), irrespective of the age of the child.

Furthermore, this study was the first of its kind to examine the relationship between moral standards and actual antisocial lying longitudinally, which enabled causal conclusions about the relationship between the two variables. Consistent with predictions, and in line with legal assumptions regarding children's competency to give witness testimony in courtrooms (e.g., Bala, Lee, Lindsay, & Talwar, 2000; Bussey, 1992; Bussey & Grimbeek, 2000; Haugaard, 1993; Lyon, 2000, 2011), the results showed that lower lie-telling moral standards led to more actual lying behavior a year later across age. The results of this study go beyond the assumptions that with development children endorse the negative moral implications of lies, which elicits truth telling, by highlighting the possibility that some children have weak moral standards. Thus, individual differences, more than age-related changes, may play a role in the link between moral standards and actual lie telling even for younger children.

Moreover, whether children decide to tell antisocial lies to conceal their own transgressions in some tempting contexts is not only influenced by internal (personal) factors specific to each individual child, as shown above, but also by forces within their environment. Consistent with prior research (see Talwar & Crossman, 2011), the results of study three showed that the most important of these social-environmental forces, different parenting practices (i.e., harsh punishment and parental warmth), independently influenced children's propensity to lie in the other TRP task, the guessing game, and not the school-achievement task (as above). Importantly, this research was the first to examine the short-term cross-sectional associations, as well as the long-term longitudinal relationship between parenting practices and lie telling. Consistent with previous cross-sectional research (e.g., Talwar & Lee, 2011), children's greater propensity to tell a lie to conceal their own transgression in the guessing game to avoid punishment, was associated with the higher use

of harsh punishment by their parents; however, this relationship was not upheld longitudinally. Conversely, parental warmth had a more positive effect on behavior in the long-term. That is, parental warmth predicted children's lower propensity to tell lies one year later, but there was no cross-sectional association. This finding provides increasing support for the idea that children whose parents foster their self-regulation and moral internalization by showing more warmth towards them, are less likely to commit transgressions (Bugental & Grusec, 2006; Burton, 1976; Gershoff, 2002; Stouthamer-Loeber, 1986; Talwar & Crossman, 2011), and in this study, are less likely to tell lies to conceal their transgressions over time. That is, parental warmth potentially has a longer-term impact on children's behavior than other parenting practices that do not foster self-regulation and moral internalization, such as harsh punishment, which was shown to have only a short-term cross-sectional, but negative association with lie telling. These findings shed further light on the different ways in which children's parenting environments influence their lie telling concurrently and over time.

Together, the findings presented in studies one, two and three contribute to our understanding of lie telling as a complex and multi-dimensional behavior, influenced by parental socialization, internal morality, age and the tempting context in which the antisocial lie is told. While it is important to understand how lying develops through these influences, it is even more important to understand the problematic deception trajectory for some children. Some have argued that initially normative lying is predictive of later more serious maladjustment and problem behaviors (e.g., Gervais, Tremblay, Desmarais-Gervais, & Vitaro, 2000; Stouthamer-Loeber, 1986), while others have shown support for the seemingly opposite direction of effects; suggesting that children's lie telling follows their engagement in other conduct problems, as they attempt to conceal these conduct problems (e.g., Ostrov, Ries, Stauffacher, Godleski, & Mullins, 2008; Talwar & Crossman, 2011; Warr, 2007). These notions were further investigated in study four, presented in Chapter 5, but in this study both

possible directions of the relationship between lie telling and conduct problems were examined concurrently, in order to support or rule out one of the possible directions of effect. Using a longitudinal cross-lagged panel design, the results revealed that conduct problems predicted lie telling a year later, but lie telling did not predict later engagement in conduct problems. Specifically, children who engaged in more conduct problems (as reported by their parents), were those more likely to tell a lie in the guessing game (not the school-achievement task) a year later. The results of this empirical study were the first to unravel whether lie telling is the cause or effect of conduct problems. Importantly, the findings seemingly oppose the impressive body of evidence (e.g., Gervais et al., 2000; Stouthamer-Loeber, 1986; Talwar & Crossman, 2011) that suggests that lie telling is an initially normative behavior that becomes problematic for some. Rather, they show that lie telling is problematic for some children from the outset as it follows engagement in conduct problems.

Theoretical Implications

Overall, the studies in this thesis provide empirical support for the social cognitive theory model of children's moral behavior (Bussey, 1995; Bussey & Grimbeek, 1995), by demonstrating how children's lie telling (an *im*moral behavior) is influenced by both personal factors relating to the child themselves (e.g., age, moral standards for lying, other conduct problems) and external environmental forces (e.g., parenting practices and the context of the antisocial lie), as well as a complex interaction between the two.

First, it is apparent from the first study that personal, individual difference factors (e.g., age of the child) and environmental factors (e.g., context of the antisocial lie) play an independent and critical role in children's lie telling. The age-related decrease in lie telling after 8 years was not attributable to the context of the antisocial lie (i.e., the type of *temptation resistance paradigm* task), thereby confirming previous research perspectives (see Talwar & Crossman, 2011 for review) that age-related trends in the development of lie telling

correspond with individual difference factors (i.e., cognitive ability, moral knowledge). At the same time, however, the overall amount of lie telling was significantly influenced by the context of the TRP task (i.e., environmental factor).

Similarly, children's lie telling in studies two and four was influenced by their moral standards associated with lie telling and their engagement in other conduct problems, thus reflecting personal factors. Also, study three demonstrates that environmental factors that were related to the ways in which children are parented (i.e., harsh punishment versus parental warmth) also play a role in whether children will tell antisocial lies to conceal their transgressions. Taken together, these findings illustrate how personal (e.g., age, moral standards, conduct problems) and environmental forces (e.g., context of the antisocial lie, parenting practices) independently influence children's propensity to tell lies.

The findings from these studies also align with Bandura's (1986, 1991) theoretical assertion that children's lie telling is differentially reinforced by a combination of these internal and external factors. For instance, study three confirms that children's lie telling stems from external encouragement; that is, children lying is encouraged by the use of physical punishment as they seek to conceal their engagement in problem behaviors in order to avoid the punishment. Moreover, study two indicates that children's propensity to tell lies is also associated with internal factors, specifically, the engagement of their internal moral standards for lying. Thus, the findings from this thesis suggest that the shift of control from external to internal in relation to the evaluation of lie telling, comes in at an earlier age in this sample, than at an older age as theorized by others (Bandura, 1986, 1991; also see Talwar & Crossman, 2011). Rather, irrespective of age, increases in both younger and older children's (3 to 15 years) lie telling was predicted by both external (i.e., *more* harsh punishment) and internal (engagement of *lower* moral standards) factors. Thus, across development, both internal (personal) and external (environmental) control contributes to deceptive tendencies,

which aligns with research showing that in some contexts, internal control factors play a role in children's behavior earlier in development (Bussey & Bandura, 1992).

Furthermore, while children's propensity to tell lies was greater when they adopted lower moral standards and when they engaged in more conduct problems (internal and personal factors), as well as when their parents used more harsh punishment and less warmth (environmental and external factors), these relationships depended on the TRP context of the antisocial lie (other environmental forces). Specifically, the relationship between moral standards and lie telling was evident in the TRP school-achievement task, but not the TRP guessing game. In contrast, only in the TRP guessing game, not the TRP school-achievement task, were parenting and conduct problems related to lie telling. Consequently, this pattern of results further supports the social cognitive theory model of triadic reciprocity, by highlighting the complex interplay between personal and environmental factors on children's lie telling.

Practical Implications

In addition to the theoretical implications described above, the results from this thesis also have implications for understanding the multiple causes of children's lie telling behavior and the practical implications for legal personnel, parents and other adults. In particular, the findings from study one suggest that children do not necessarily have a dishonest trait, but decide whether to lie in different tempting contexts depending on their perceptions of how telling a lie will be evaluated by the self and others in that context. In other words, their lie telling behavior is not consistent across contexts. As a result, it would be interesting to interview children about their views of the different tempting contexts (i.e., TRP tasks) and how they differ in order to help understand their motivations for telling a lie in a given context, but not the other. This would also aid in shifting their motivations, context by context, towards truth telling.

Additionally, the findings from study two replicate existing research (e.g., Bussey, 1992, 1999; Talwar, et al., 2002) showing that children's moral understanding of the wrongfulness of lie telling (i.e., lie-telling moral standards) becomes more negative (i.e., more moral) as they age. However, unlike previous cross-sectional literature that showed that these moral standards do not necessarily guide children's honest behavior (e.g., London & Nunez, 2002; Talwar et al., 2002), the cross-sectional and longitudinal findings from study two instead confirmed legal assumptions, showing that morality does in fact play a role in 4- to 15-year-old children's honesty. However, it also becomes clear from these findings that not all children endorse the moral standards that lie telling is wrong with increasing age as has been assumed in forensic contexts, but instead, although most children have established moral standards from a young age, some children's moral standards are weaker. In these ways, investigators need to acknowledge these potential individual differences in moral standards when trying to determine its role in children's propensity to give truthful testimony in courts.

The findings from this research also highlight that, while internal moral standards guide behavior, they do not play a role in all tempting contexts. Therefore, caution should be taken when generalizing across tempting contexts. Children's decisions about whether to lie or not lie are differentially motivated depending on the nature of the tempting context. Study three indicates that in another lie telling context (the guessing game), children's lies are motivated more so by external factors (i.e., parenting practices), than by their internal moral compass. The findings from study three further suggest that more negative parenting practices (i.e., harsh punishment) are associated with children's propensity to lie in the short-term (i.e., cross-sectionally), while other more positive parenting practices (i.e., warmth) have a longer-term (i.e., over one year) impact in eliciting honesty. Therefore, to reduce

chronic lie telling, interventions must attempt to increase the use of more positive parenting practices.

Moreover, the findings also highlight the importance of context when understanding these different motivations for lie telling. When appraising these results, therefore, it is of practical importance to consider the subtle differences in the nature of the tempting context in which the antisocial lie occurred when attempting to understand how the combination of internal (personal) and external (environmental) factors determines deception. Previous research has shown that different motivations account for children's behavior in different lie-type contexts, particularly when the context of the behavior is associated with a cost-benefit analysis regarding anticipated amounts of approval versus disapproval (e.g., Tisak & Turiel, 1998; Talwar & Crossman, 2011). The fact that study three showed that children's decision to lie in the guessing game is associated with their desire to minimize negative disapproval (i.e., parental punishment), while study two showed that children's lying in the school-achievement task depended on the engagement of their internal moral standards, suggests that perhaps when the context is perceived as more serious (i.e., school-achievement context), children are less concerned with external punishment, and more driven by their internal judgments of themselves. Therefore, acknowledging how children's perceptions of context differentially influence their motivations for lie telling might potentially help to elicit honesty, irrespective of the amount of disapproval or approval that is anticipated for lying.

The final implication of this research is that lie telling for some children (i.e., a small subgroup of children who continue to lie with increasing age) may be a problem behavior at the outset, rather than an initially a normative aspect of development that later becomes a problem behavior. Researchers (e.g., Talwar & Crossman, 2011) argue that lie telling can be both initially normative and for some children problematic, because some children may have cognitive deficits that lead them to frequently rely on lying as a strategy to avoid negative

consequences and later engage more in other problem behaviors. However, the findings from study four of this thesis instead showed that lie telling is problematic for some children at the outset, rather than normative, as it follows engagement in other conduct problems. The implications of these findings are particularly important in terms of informing interventions. They highlight that intervention strategies that target children's lie telling behaviors directly are of little utility in breaking the chronic and problematic cycle of lie telling. Although these interventions may, in some contexts, promote honesty, interventions that target the initial conduct problems will be more effective in reducing later chronic lie telling.

Strengths of this Research

The research presented in this thesis has a number of strengths. First and foremost, antisocial lie telling was considered in two of the most common *temptation resistance paradigms* (TRPs: guessing game or trivia game), whereas prior research (e.g., Evans & Lee, 2011; Talwar & Lee, 2002, 2008) has used one or the other of these tasks with different age groups. Thus, this research demonstrates that the nature of lie telling is multi-dimensional and confirmed that it cannot be generalized from just one measure of the behavior. Moreover, this research extended the already impressive body of work on antisocial lie telling by using two TRPs across a broad developmental range in the one study. This allowed for the unconfounding of task and age-related effects on lie telling in study one, and an examination of the role moral standards (in study two) and parenting practices (in study three) play in deception when accounting for context; in particular, this research answered the question of whether age, morality and parenting motivated antisocial lie telling differentially depending on the context of the lie.

Moreover, the second and third laboratory studies were the first to examine whether specific age-related changes in the variables across this broad age range of children moderated the relationships between moral standards (personal factor) and deception in the

second study, and between parenting (environmental factor) and lie telling in the third study. The results of these studies employing this developmental range revealed that the influence these variables have on deception does not change depending on the age of the child, but instead moral standards and parenting play a complementary role in determining children's propensity for deception depending on the context of the lie.

A further strength, which also supported the objectives of this research, was the longitudinal research design, which enabled causal conclusions about the direction of these relationships by attaining data across two time points, 12 months apart. Thus, this research filled an important void in the current literature, by allowing for the first examination of the longitudinal contribution of various factors to children's antisocial lie telling, while accounting for the stability of lying over time. Moreover, the longitudinal design also allowed for a more nuanced examination of how lying can be considered a problem behavior in study four, than has been shown previously. This was achieved using a cross-lagged panel design, a sophisticated statistical technique that allowed for the concurrent consideration of lying as the cause and as the effect of conduct problems, that previously had not been applied to deception research.

Lastly, the use of an experimental, and arguably naturalistic assessment of children's antisocial lie telling through the TRPs across two time-points, and with a larger than usual sample size (N = 443 children) in all four studies, is also worth mentioning. First, the use of the TRP allowed this research to overcome the biases inherent in previous research that utilized self-report to assess deception (e.g., Stouthamer-Loeber, 1986; Gervais et al., 2000), and ensured that children's actual lie telling behavior was objectively assessed. At the same time, using multi-informant data when assessing the problematic trajectory of deception in study three, by employing the TRPs to assess lie telling and having parents report on their children's conduct problems (as they were not rating their lie telling), meant that this research

avoided the possibility that any given informants' ratings on conduct problems were biased by the presence of deceptive behaviors (i.e., "a halo effect"; Ekman, 1989; Gervais et al., 2000). Moreover, considering both parent and child reports in study three further enhanced the credibility of the findings, and arguably provided a complete picture of family dynamics (Racz & McMahon, 2011). Finally, the testing of a large sample of children in this research not only allowed for strong and powerful conclusions to be drawn from all four studies, but also meant that this research was able to better determine the effect sizes within the data and avoid the errors from testing a small number of children.

Limitations and Future Directions

Although the studies comprising this thesis make significant contributions to understanding the complexities of children's lie telling and its implications, there are some limitations that warrant discussion. Firstly, the use of controlled laboratory situations for assessing deception in all four studies should be noted. As the motivational factors influencing lie and truth telling in children's day-to-day lives likely differ from those motivational factors influencing their deception in laboratory contexts (e.g., Lavoie et al., 2017), the generalizability of the findings from this research are somewhat limited. However, temptation resistance paradigms (TRPs) are commonly used to assess antisocial lie telling due to their ability to mimic the naturalistic situations in which children tend to lie in their day-to-day lives (see Talwar & Crossman, 2011). Moreover, children's willingness to commit transgressions and subsequently lie at different rates in these laboratory-contexts, and the strong and significant influence of various personal and environmental factors on deception in all four studies presented in this thesis, suggest that children's actual antisocial lie telling behavior was appropriately captured in these controlled laboratory tasks, and thus appear to provide an appropriate and ethical context in which to assess children's lie telling to conceal a transgression.

Interestingly, comparatively fewer children confessed in this research compared to previous studies (e.g., Evans & Lee, 2010, 2011; Talwar & Lee, 2002, 2008, 2011). As a result, it was therefore not possible in the present research to disaggregate the truth-tellers who peeked (i.e., confessors) and the truth-tellers who told the truth about not having peeked, in order to determine the factors that differentiated between these two types of truth telling. However, the same analyses presented in these papers without the small group of confessors were conducted, and found that removing this group of children did not change the interpretation of any of the results. In fact, the findings from this thesis show that peeking and lie telling behaviors are highly correlated, with only a small percentage (< 5%) confessing their peeking behavior. It is possible that fewer children confessed in this sample because, unlike previous research, they were not asked to promise to tell the truth before questioning them about their behavior. It has been argued that promises have a truth-promoting effect in younger and older children (Evans & Lee, 2010, 2011; Talwar & Lee, 2008). Thus, it is important for future research to experimentally manipulate the presence or absence of promises in one study when replicating the findings from this thesis.

Nonetheless, this is consistent with previous research (Evans & Lee, 2010, 2011; Stouthamer-Loeber, 1986; Talwar & Lee, 2002, 2008, 2011), which posits that when children commit a transgression, they are more likely to lie to conceal their transgression in order to avoid negative consequences. This was further confirmed by the findings from the final study in this thesis, which showed that lie telling follows engagement in other conduct problems. Thus, given the above reasons, it is unlikely that the results of this thesis are confounded by peeking behavior in this sample. However, in order for future research to separately investigate the mechanisms underlying peeking behavior and lie telling behavior, researchers may need to experimentally manipulate the levels of peeking behavior before giving children the opportunity to lie or confess.

A further limitation evident across all four studies is the normative attributes of the sample. The sample was from primarily middle class-backgrounds and not from juvenile conduct-disordered facilities. Although researchers have posited that the ways in which deceptive behaviors develop and are maintained in conduct-disordered children differs from normative children (see Stouthamer-Loeber, 1986), research comparing these groups is limited. It is noteworthy, however, that conduct-disorder status among the sample in this thesis was not assessed, and therefore it is possible that at least some of the participants may have a diagnosed conduct-disorder. Additional investigations could prove fruitful if they extended this research to a group of conduct-disordered children.

There are also some limitations regarding the methodologies employed in this thesis. In the second study, hypothetical stories were used to assess children's understanding of the moral implications of lies (i.e., moral standards). In actual legal contexts, the lies children tell are likely to have more serious impacts (Talwar et al., 2002). Although children's moral standards in these hypothetical scenarios accurately reflected children's typical negative judgments of lies, and guided their actual lie telling behavior, it is unknown whether these judgments or the relationship would differ in more serious real-life scenarios. Future studies would benefit from continuing to explore this relationship using more naturalistic assessments of moral standards (e.g., asking children to rate the moral implications of lie telling in court simulated cases). Furthermore, children in this study judged hypothetical scenarios to assess their moral standards that did not match the TRP tasks that assessed their actual lie telling in terms of the transgressive context. Interpretations of the seriousness of hypothetical versus TRP situations may differ and could contribute to a disconnection between moral standards and moral behavior (Xu, Bao, Fu, Talwar, & Lee, 2010) in the guessing game in study two. Importantly, however, this study did show that moral standards (assessed in hypothetical situations) guided actual behavior in the other TRP context (i.e.,

school-achievement context). Therefore, children's moral standards may guide their behavior in some contexts but not others, and so a study that assesses children's interpretations of the hypothetical and TRP situations would further contribute to knowledge on this relationship. Also, in study three and four, parenting practices and children's conduct problems relied on parent-report data. This approach has been criticized owing to research that suggests that parent-report is biased due to discrepancies between what parents say they or their children do, and what they or their children actually do (e.g., Cook & Goldstein, 1993). The extent of these possible discrepancies is unknown. In order to take account of the possible discrepancies, future studies need to explore how parent- and child- reported behaviors conjointly influence children's deception.

Longitudinal relationships in this research were assessed over two time-points, 12 months apart. Although this interval is sufficient to obtain causal conclusions and ascertain the magnitude of the relationships because of the time lag between measurement occasions (Selig, Preacher, & Little, 2012), it is possible that developmental changes in the nature of the relationships may surface over longer periods of time. The results of the longitudinal research in this thesis showed that deception and associated variables (i.e., moral standards, parenting, conduct problems) are relatively stable behaviors across a 12-month time lag. While this does parallel prior research showing stability in deception over time (e.g., Gervais, et al., 2000; Stouthamer-Loeber, 1986), future research investigating these relationships over a greater time frame would provide additional insight. Moreover, the measurement of behaviors across two time points only should be noted. Longitudinal designs that incorporate several time points of data collection are necessary to investigate the subtleties in the interplay between factors that contribute to deception, such as potential mediators. Nevertheless, this research was an important first step for extending deception research longitudinally and offers significant insight into how different variables play causal roles in lie telling behavior over

time. Longer-term studies, which follow children over multiple developmental periods, would extend this research and offer a great deal of additional information on deception, its correlates, and the maladaptive deception trajectory established in the final study.

A final limitation of this research is that the impact of other individual differences that may contribute to deception or inform the ways in which lie telling is motivated by the factors explored, were not investigated. A range of underlying variables has been shown to influence deception, but could not all be examined in the present research due to time constraints. Given research which highlights the association between various cognitive factors related to lie telling (see Talwar & Crossman, 2011 for review) and the moderating effect of parenting on the relationship between these cognitive abilities and lie telling (Talwar, Lavoie, Gomez-Garibello, & Crossman, 2017), these relationships require further examination in future research. Parenting behaviors could also be indirectly related to lie telling through their influence on conduct problems (e.g., Stouthamer-Loeber, 1986; Talwar & Crossman, 2011), and given the findings from study four of this thesis showing that lie telling follows engagement in other conduct problems, research including the role of these parenting behaviors and other individual difference factors (i.e., gender, age, cognitive development) may further assist in clarifying the pathways to lying as a problem behavior. Further examination of how different factors (such as age, cognitive factors, social skills) determine children's lie telling in different antisocial contexts is needed given the contextual variation shown in this research. Together these issues represent important and interesting lines of further inquiry.

Summary and Conclusions

In conclusion, the findings from the present thesis add to the mounting body of evidence that has examined the complexities of lie telling to conceal a transgression. The results highlight the importance of understanding how lie telling is differentially influenced

by both personal and environmental factors. The results further showed that these relationships depend on the context of the antisocial lie. Specifically, study one provides the first empirical support for the historically acknowledged situation-specificity argument (Hartshorne & May, 1928) that antisocial lie telling is not consistent across tempting contexts, and thus there is no general trait of antisocial dishonesty. The results also show that weaker internal moral standards influence more lie telling in school-achievement contexts, while positive and negative external parenting forces independently influence lie telling in guessing game contexts, depending on the time interval. Harsh punishment was associated with a higher propensity to lie to conceal a transgression in the short-term, and conversely, lower levels of parental warmth led to a higher propensity to lie to conceal a transgression in the long-term. Overall, the findings from the studies presented in this thesis provide the first causal, longitudinal evidence of these relationships. Importantly, they show that lie telling is not just a developmental normative behavior, but rather it is problematic from the start as it follows engagement in other conduct problems. Thus, antisocial deception needs to be considered in terms of the nature of the transgressive context, in order to understand its multi-dimensional nature and clarify its problematic trajectory.

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Appendix A

Additional Materials Relevant to Chapter 4

Parent-Report Measures

Harsh Punishment subscale from Ghent Parental Behavior Scale (PBS; Van Leeuwen & Vermulst, 2004)

On the following pages you will find some statements about handling your child. Read each statement carefully. Indicate for each statement how frequently you use this way of handling your child by circling the response that represents this.

You can only choose one answer for each statement. *Keep in mind that your answer always is related to one and the same child.* It is possible that you may think about some statements: "I should like to do it differently". Nevertheless, indicate how you actually do it in reality. There are no good or wrong answers. Please do not skip any items.

	Never	**Rarely**	**Sometimes**	**Often**	**Always**
1. I slap my child when he/she has done something wrong	1	2	3	4	5
2. I spank my child when he/she doesn't obey rules	1	2	3	4	5
3. I spank my child when he/she is disobedient or naughty	1	2	3	4	5
4. I shake my child when we have a fight	1	2	3	4	5

Warmth and Involvement subscale from Parenting Practices Questionnaire (PSDQ-SF; Robinson, Mandleco, Olsen & Hart, 1995)

Please rate how often you exhibit the following behaviors with your child by circling the response that represents this:

	Never	**Once in a while**	**About half of the time**	**Very often**	**Always**
1. I encourage my child to talk about the child's troubles	1	2	3	4	5
2. I know the names of my child's friends	1	2	3	4	5
3. I give praise when my child is good	1	2	3	4	5
4. I show sympathy when my child is hurt or frustrated	1	2	3	4	5
5. I give comfort and understanding when my child is upset	1	2	3	4	5
6. I am responsive to my child's feelings and needs	1	2	3	4	5
7. I tell my child that I appreciate what the child tries or accomplishes	1	2	3	4	5
8. I am aware of problems or concerns about my child at school	1	2	3	4	5
9. I express affection by hugging, kissing, and holding my child	1	2	3	4	5
10. I apologize to my child when making a mistake in parenting	1	2	3	4	5
11. I have warm and intimate times together with my child	1	2	3	4	5

Appendix B

Additional Materials Relevant to Chapter 5

Parent-Reported Measures

Conduct Problems Subscale of the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997)

Listed below are some activities or behaviors that some children your child's age might do. For each item, please rate how true each statement is for your child by circling the response that represents this. It would help us if you answered all items as best you can even if you are not absolutely certain or the item seems daft.

Please give your answers on the basis of the child's behavior over the last six months or this school year.

	Not True	Somewhat True	Certainly True
1. Often loses temper	0	1	2
2. Generally well behaved, usually does what adults request (R)	0	1	2
3. Often fights with other children or bullies them	0	1	2
4. Often lies or cheats	0	1	2
5. Steals from home, school or elsewhere	0	1	2

Appendix C

Parent Debrief Letter for Chapters 3, 4, and 5

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Facilitating Children's Honest Communication and Disclosure: Frequently Asked Questions

Dear Parent/Guardian,

The following are common questions that parents have about children and their truth- and lie-telling behaviour. Thanks again for the support of your child's participation in this study, it is greatly appreciated.

Q. If my child lied in the interview today, does that mean anything?
A. No, just because your child told the researcher a lie today, it does not mean that your child always tells lies. Even if the child told a lie in this situation to a researcher who is a stranger, this does not mean that your child will tell lies in other situations or to you. The situation in this study was designed to elicit lie-telling behaviour, so that our research team can study factors that influence truth and lie telling, children's disclosure and honest communication with parents. Lie telling is an important development in children's behaviour and we have to observe children's lying behaviour in order to identify strategies to reduce such behaviour and facilitate disclosure.

Q. Why do children tell lies?
A. Children tell lies for the same reason adults tell lies to gain something, protect themselves or protect others and be polite. A child may tell a lie to avoid getting in trouble for doing something wrong or they may tell a lie to protect a friend's feelings from being hurt. There are different reasons and intentions behind various lies. Children start to tell lies as they start to understand the world around them and how they can interact with the world. It reflects a cognitive development, where the child now understands that there is a difference between what they think and another thinks. This is a major milestone in a child's development and lie-telling behaviour is one sign of this new awareness. Thus, lie-telling is part of normal development. It is part of your child exploring their world and learning how they can interact and affect it.

Q. How does children's lie-telling behaviour change as they grow older?
A. As children develop they become more effective lie-tellers. After the age of 7, children are better able to conceal evidence (i.e., they will remove chocolate from their faces before saying they did not eat any chocolate), thereby becoming more effective lie-tellers. This does not mean that older children lie more. As children age, they become more aware of the benefits of truth telling and the importance of concepts such as honesty. Furthermore, Children's reasons for lying change with age. Children are often concerned with pleasing their parents or other adults and may tell lies in order to satisfy them. As children get older, they more frequently and readily tell lies to avoid punishment. Older children may also lie to cover up something they are ashamed of, for example, saying they ate their lunch because they are too ashamed to say that a bully stole it. It is therefore important to take a child's

reasons for lying and not disclosing important information into account when deciding how to react to a lie they have told.

Q. So how should I react when my child lies/does not disclose information?
A. As lying is a normal part of moral and social development, parents should not overreact when children lie. The behaviour should not be ignored either. This is a good opportunity for parents to discuss moral and social concepts such as honesty, fairness and justice with their child, stress the benefits of truth-telling and explain that if a child lies to avoid punishment they will not only face punishment for the misdeed but also for the lie-telling behaviour. By setting guidelines for children's behaviour, reasoning with them and stressing open communication, children begin to learn which behaviours are appropriate and which are not, applying these guidelines even when you are not around.

There are a few things to keep in mind when dealing with lies. When older children lie it is important not to put all the emphasis on the lie but also examine their motivation for lying. Help them to generate ideas and ways that they can avoid being dishonest in certain situations. At all ages, but particularly as children start to reach adolescence, it is important to keep the lines of communication open so that there is a mutual trust between parent and child. This way your child will feel comfortable in telling you what happened good or bad and will not fear your reaction. They know they can count on you to be supportive and fair. This way, children will understand that a parents' support is unconditional, and telling the truth, although it may disappoint at first is always the best option.

If lying or non-disclosure increases, especially during adolescence, then it could be associated with other social problems. In such cases it may be because the child is trying to get attention, or is engaging in frequent misbehaviour and wishes to hide it, or is coping with an adverse environment at home or at school. If there appears to be a problem, you may wish to speak to the school counselor or seek further professional advice

Q. How can I facilitate my child's truth-telling?
A. To facilitate truth-telling it is important to focus on the positives of being honest, and to remind your child that it is always best to tell the truth, even if they have done something wrong. If you suspect your child is lying about a particular event, be sure to ask them clear questions and ensure your child can easily understand the language you use. Allow the child to tell their own story without imposing your version of events. Where possible, ask open-ended questions such as "tell me what happened" rather than leading questions such as, "You sneaked out late on a school night, didn't you?" Be careful to use your child's words when asking more questions, rather than your own. Constantly emphasize your want and desire to hear their story, and your availability to talk about it openly.

Q. If my child tells lies, is she/he going to become a chronic liar?
A. All children tell lies at some time or another, very few ever become chronic liars. Chronic lie-telling is usually a difficulty in adolescence and is often a symptom of other problems with the child or the child's social environment. There may be difficulties at home or school that cause the child to act out. In such cases, it is important to deal with the factors causing the child to lie.

If you have any further questions, do not hesitate to contact Talia Carl (02 9850 8075; talia.carl@mq.edu.au) or Kay Bussey (02 9850 8085; kay.bussey@mq.edu.au)

This is based in part on material supplied by Dr. Victoria Talwar

Appendix D

Final Macquarie University Human Research Ethics Committee Approval Letter for Chapters 2, 3, 4, and 5

MACQUARIE University

TALIA CARL <talia.carl@students.mq.edu.au>

Ethics application ref: 5201300576 - Approved

1 message

Ethics Secretariat <ethics.secretariat@mq.edu.au> Fri, Nov 8, 2013 at 9:25 AM
To: A/Prof Kay Bussey <kay.bussey@mq.edu.au>
Cc: Miss Talia Carl <talia.carl@students.mq.edu.au>

Dear Associate Professor Bussey

Re: "Logitudinal study on bi-directional parent and child effects on children's engagement in anti-social behaviour and lying" (Ethics Ref: 5201300576)

Thank you for your recent correspondence. Your response has addressed the issues raised by the Human Research Ethics Committee (Human Sciences and Humanities) and approval has been granted, effective 8th November 2013. This email constitutes ethical approval only.

This research meets the requirements of the National Statement on Ethical Conduct in Human Research (2007). The National Statement is available at the following web site:

http://www.nhmrc.gov.au/guidelines/publications/e72

The following personnel are authorised to conduct this research:

Associate Professor Kay Bussey
Miss Talia Carl

Note to Students: Please retain a copy of this approval email to submit with your thesis.

Please note the following standard requirements of approval:

1. The approval of this project is conditional upon your continuing compliance with the National Statement on Ethical Conduct in Human Research (2007).

2. Approval will be for a period of five (5) years subject to the provision of annual reports.

Progress Report 1 Due: 08 November 2014
Progress Report 2 Due: 08 November 2015
Progress Report 3 Due: 08 November 2016
Progress Report 4 Due: 08 November 2017
Final Report Due: 08 November 2018

NB. If you complete the work earlier than you had planned you must submit a Final Report as soon as the work is completed. If the project has been discontinued or not commenced for any reason, you are also required to submit a Final Report for the project.
Progress reports and Final Reports are available at the following website:
http://www.research.mq.edu.au/for/researchers/how_to_obtain_ethics_approval/human_research_ethics/forms

3. If the project has run for more than five (5) years you cannot renew approval for the project. You will need to complete and submit a Final Report and submit a new application for the project. (The five year limit on renewal of approvals allows the Committee to fully re-review research in

an environment where legislation, guidelines and requirements are continually changing, for example, new child protection and privacy laws).

4. All amendments to the project must be reviewed and approved by the Committee before implementation. Please complete and submit a Request for Amendment Form available at the following website:

http://www.research.mq.edu.au/for/researchers/how_to_obtain_ethics_approval/human_research_ethics/forms

5. Please notify the Committee immediately in the event of any adverse effects on participants or of any unforeseen events that affect the continued ethical acceptability of the project.

6. At all times you are responsible for the ethical conduct of your research in accordance with the guidelines established by the University. This information is available at the following websites:

http://www.mq.edu.au/policy/

http://www.research.mq.edu.au/for/researchers/how_to_obtain_ethics_approval/human_research_ethics/policy

If you need to provide a hard copy letter of approval to an external organisation as evidence that you have approval, please do not hesitate to contact the Ethics Secretariat at the address below.

Please retain a copy of this email as this is your official notification of ethics approval.

Yours sincerely

Dr Karolyn White
Director, Research Ethics
Chair, Human Research Ethics Committees

Office of the Deputy Vice Chancellor (Research)

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12 February 2014

Associate Professor Kay Bussey
Department of Psychology
Faculty of Human Sciences
Macquarie University
NSW 2109

Dear Associate Professor Bussey

Re: "Longitudinal study on bi-directional parent and child effects on children's engagement in antisocial behaviour and lying" (Ref: 5201300576)

Thank you for submitting an amendment to the above study and for your response to the issues raised by the Human Research Ethics Committee (Human Sciences and Humanities). Your response was reviewed by the Ethics Secretariat on behalf of the Human Research Ethics Committee (Human Sciences and Humanities). Ethical approval has been granted to the following amendments:

1. The youngest age group of the child participants has been lowered. The study will involve children in Pre-school (aged 3-5), Year 2 (aged 7-8), Year 4 (aged 9-10), Year 6 (11-12) and Year 8 (aged 13-14).

2. An increase in the sample size from 330 participants to approximately 500 participants.

3. The study will be conducted at two time points one year apart instead of three time points eight months apart.

4. The Temptation Resistance Paradigm has been changed to include two different tasks; a 'guessing game' and a 'trivia game'.

5. Questions on popular television shows will be used instead of general knowledge questions. Two versions of each task will be randomly counterbalanced at Time 1 to avoid repetition in the longitudinal study.

6. Only children from Year 4 upwards will complete the conduct problems subscale, moral disengagement scale, the communication with parents scale and the disclosure scale. Children will no longer complete the following scales: parental control, behavioural control, Harsh Punishment and support.

7. The following aspects of the study remain unchanged:
(a) Children of all ages will listen to stories read to them by an adult researcher.
(b) Parents will complete all the scales in the questionnaire, as well as the vignettes.

The following documentation submitted with your amendment request has been reviewed and approved by the HREC (Human Sciences and Humanities):

Documents reviewed	Version no.	Date
Macquarie University HREC Request for Amendment Form		Received 10 Feb 2014

Correspondence from Talia Carl addressing the HREC's feedback regarding the amendment		Received 10 Feb 2014
Appendix A: Temptation Resistance Paradigm – Task 1 – Guessing Game	No Version	Undated
Appendix B: Temptation Resistance Paradigm – Trivia Game	No Version	Undated
Appendix C: Information and Consent for child participation (Pre-school and Grade 2)	No Version	Undated
Appendix D: Information and Consent for child participation (Grade 4, Grad 6 & Grade 8)	No Version	Undated
Appendix E: Information and Consent for parent participation	No Version	Undated
Appendix F: Information and Consent for School Participation (Pre-school and Grade 2)	No Version	Undated
Appendix G: Information and Consent for School Participation (Grade 4, 6 and 8)	No Version	Undated

Please do not hesitate to contact the Ethics Secretariat should you have any questions regarding your ethics application.

The HREC (Human Sciences and Humanities) wishes you every success in your research.
Yours sincerely

Dr Karolyn White
Director, Research Ethics & Integrity
Chair, Human Research Ethics Committee (Human Sciences and Humanities)

This HREC is constituted and operates in accordance with the National Health and Medical Research Council's (NHMRC) National Statement on Ethical Conduct in Human Research (2007) (the National Statement) and the CPMP/ICH Note for Guidance on Good Clinical Practice.

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29 July 2014

Associate Professor Kay Bussey
Department of Psychology
Faculty of Human Sciences
MACQUARIE UNIVERSITY NSW 2109

Dear Associate Professor Bussey

RE: ***Longitudinal study on bi-directional parent and child effects on children's engagement in antisocial behaviour and lying***

Thank you for your correspondence dated 18/07/2014 submitting an amendment request to the above study. The Human Research Ethics Committee (HREC) (Human Sciences and Humanities) delegated review of these changes to the Ethics Secretariat.

I am pleased to advise that ethical approval of the following amendments to the above study has been granted:

1. Changes to Children's Stories: Instead of listening to six stories, two stories will be removed and children will only listen to four stories. There will be two versions of each of the four stories (i.e. one involving an antisocial behaviour and a lie and one that simply involves the antisocial behaviour). These stories are shortened from the original and are now between 2 and 4 lines. These stories have similar themes to the previous versions but have been simplified in terms of wording, in order to improve comprehension and children's understanding.

2. Changes to Parent Stories: Instead of reading six stories, two stories have been removed, and parents will only read four stories. There will be two versions of the four stories (i.e. one involving an antisocial behaviour and a lie and one that simply involves the antisocial behaviour). The stories match the child versions but have been simplified in order to improve comprehension and reduce the length of time required from parents to read them. One question has been added asking parents to rate how wrong they think the behaviour is. The question on how parents will respond to the behaviour (i.e. in terms of disciplinary style) has remained, but instead of giving parents 6 options to rate, the new version asks parents to rate 4 options.

3. Children from Year 4 upwards will still complete the conduct problems subscale, moral disengagement subscale and the communication with parents scale. The disclosure scale will be replaced with the Overall Level of Disclosure Scale (TOLDS; Kearney & Bussey, 2014) but the questions are more specific and simpler for children to understand. Children will also complete two additional scales (the scales are only 6 items each) – The Pressured Disclosure Scale and The Pressured Scale to find out the reasons why children do or do not tell their parents about certain aspects in their life.

4. Parents will still complete the Children's lying to parents scale and conduct problems subscale. The disclosure scale will be replaced with the Overall Level of Disclosure Scale. Parents will no longer complete the Parental Control Scale and the Behavioral Control Scale. Instead parents will complete The Parental Monitoring of Behaviour Subscale.

This research meets the requirements set out in the *National Statement on Ethical Conduct in Human Research* (2007 – Updated March 2014) (the *National Statement*). This letter constitutes ethical and scientific approval only.

Details of this approval are as follows:

Reference No: 5201300576

Approval Date: 29 July 2014

The following documentation submitted with your email correspondence has been reviewed and approved by the HREC (Human Sciences and Humanities):

Documents reviewed	Version no.	Date
Macquarie University HREC Request for Amendment Form	2.0	Received 18/07/2014
Email from Talia Carl		Received 18/7/2014
Stories (Child Vignettes)		
Format of stories & questions (Child Vignettes)		
Stories (Parent Vignettes)		
Format of stories & questions (Parent Vignettes)		
The Overall Level of Disclosure Scale (TOLDS – Child Report) (Kearney & Bussey, 2014)		
The Pressured Information Management Scale (PIMS) – Pressured Disclosure Scale (PIMS-PD) (Kearney & Bussey, 2014)		
The Overall Level of Disclosure Scale (TOLDS – Mother Report) (Kearney, 2014)		
Parental Monitoring of Behaviour subscale of the Parental Regulation Scale (PRS; Barber, 2002)		

The HREC (Human Sciences and Humanities) Terms of Reference and Standard Operating Procedures are available from the Research Office website at:

http://www.research.mq.edu.au/for/researchers/how_to_obtain_ethics_approval/human_research_ethics

Please do not hesitate to contact the Ethics Secretariat should you have any questions regarding your ethics application.

The HREC (Human Sciences and Humanities) wishes you every success in your research.

Yours sincerely

Dr Karolyn White
Director, Research Ethics & Integrity
Chair, Human Research Ethics Committee (Human Sciences and Humanities)

This HREC is constituted and operates in accordance with the National Health and Medical Research Council's (NHMRC) National Statement on Ethical Conduct in Human Research (2007) (the National Statement) and the CPMP/ICH Note for Guidance on Good Clinical Practice.

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29 August 2014

Associate Professor Kay Bussey
Department of Psychology
Faculty of Human Sciences
MACQUARIE UNIVERSITY NSW 2109

Dear Associate Professor Bussey

RE: *Longitudinal study on bi-directional parent and child effects on children's engagement in antisocial behaviour and lying (Ref: 5201300576)*

Thank you for your correspondence dated 5 August 2014 submitting an amendment request to the above study. The Human Research Ethics Committee (HREC) (Human Sciences and Humanities) delegated review of these changes to the HREC (Human Sciences and Humanities) Executive.

I am pleased to advise that ethical approval of the following amendments to the above study has been granted:

1. Amendments to Children's Stories including changes to the context of Story 2 and the inclusion of an additional story, Story 5.
2. Identical changes to the Parent Stories (as above)
3. Completion of one additional scale (the Children's Social Behaviour Scale – Self Report) by children from Year 4 upwards
4. Replacement of the Parental Knowledge Scale with the Children's Social Behaviour Scale – Parent Report, in addition to the completion of the Psychological Control Scale.
5. Inclusion of two additional questions to the Temptation Resistance Paradigm – Trivia Game for children from Year 2 upwards, presented in a booklet rather than on a trivia card.

This research meets the requirements set out in the *National Statement on Ethical Conduct in Human Research* (2007 – Updated March 2014) (the *National Statement*). This letter constitutes ethical and scientific approval only.

Details of this approval are as follows:

Reference No: 5201300576

Approval Date: 27 August 2014

The following documentation submitted with your email correspondence has been reviewed and approved by the HREC (Human Sciences and Humanities):

Documents reviewed	Version no.	Date
Macquarie University HREC Request for Amendment Form	2.0	Received 5/08/2014 &
Participant Information & Consent Form (Pre-School and Year 2)	2	26/08/2014
Participant Information & Consent Form (Year 4, 6 and 8)	2	26/08/2014
Appendix I: Child Vignettes		
Appendix II: Parent Vignettes		
Appendix III: Children's Social Behaviour Scale – Self Report		
Appendix IV: Children's Social Behaviour Scale – Parent Report		
Appendix V: Psychological Control Scale – Parent Self-Report		
Appendix VI: Temptation Resistance Paradigm – Trivia Game		

The HREC (Human Sciences and Humanities) Terms of Reference and Standard Operating Procedures are available from the Research Office website at:

http://www.research.mq.edu.au/for/researchers/how_to_obtain_ethics_approval/human_research_ethics

Please do not hesitate to contact the Ethics Secretariat should you have any questions regarding your ethics application.

The HREC (Human Sciences and Humanities) wishes you every success in your research.

Yours sincerely

Dr Karolyn White
Director, Research Ethics & Integrity
Chair, Human Research Ethics Committee (Human Sciences and Humanities)

This HREC is constituted and operates in accordance with the National Health and Medical Research Council's (NHMRC) National Statement on Ethical Conduct in Human Research (2007) (the National Statement) and the CPMP/ICH Note for Guidance on Good Clinical Practice.