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Lie-telling for personal gain in children with and without externalizing behavior problems

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ABSTRACT

Few studies have examined the lie-telling behavior of children who have externalizing problems using experimental procedures. In the current study, children's lie-telling for personal gain (N = 110 boys aged 6–11 years) was examined using an experimental paradigm in relation to their theory-of-mind abilities and inhibitory control as well as their moral evaluations of truths and lies. Children with externalizing behavior problems (n = 53) were significantly more likely to lie and to be less skilled at lying than a typical comparison group (n = 57). Children who had lower theory-of-mind scores were significantly less likely to tell a lie for personal gain compared with those who had higher theory-of-mind scores. Children with externalizing problems who told personal gain lies were also more likely to rate tattle truths more positively than other children. For a subsample of children (n = 55), parent-reported diaries of the frequency of children's lies over 2 weeks revealed a higher frequency of lies by children with externalizing problems compared with the typical comparison group. Children whose parents reported a high frequency of lies for their children were also more likely to lie in the experimental personal gain lie paradigm. Results suggest that children with externalizing behavior may have a different pattern of lie-telling than has been previously reported for normative lie development.

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Introduction

Although lying is considered a vice, and honesty a virtue (Calder, 2007), current research has shown that lie-telling is a part of regular social life (e.g., DePaulo, Kashy, Kirkendol, Wyer, & Epstein, 1996; Kashy & DePaulo, 1996; Serota & Levine, 2015; Serota, Levine, & Boster, 2010). Why lie-telling occurs, and what purpose such behavior serves, has interested researchers and clinicians for decades (Hall, 1891; Hartshorne & May, 1928; Nyberg, 1993; Stern & Stern, 1909). In particular, there has been a lot of research during the past two decades charting the emergence and development of lying as a normative behavior related to children's developing cognitive abilities. Children's lying develops through the preschool and elementary school years and is related to their theory-of-mind (ToM) and executive functioning skills (Alloway, McCallum, Alloway, & Hoicka, 2015; Evans & Lee, 2011; Leduc, Williams, Gomez-Garibello, & Talwar, 2017; Talwar, Gordon, & Lee, 2007; Talwar, Lavoie, Gomez Garibello, & Crossman, 2017; Talwar & Lee, 2002, 2008). Yet, the majority of this research has almost exclusively examined it within the framework of normative development and its association with children's social-cognitive development (e.g., Lee & Imuta, 2021; Talwar & Lee, 2008).

Although for many children lying develops into an adaptive strategy used occasionally in socially acceptable ways to manage relationships, for some children (and adults) lying is a problem behavior. Although the frequency of occasional lie-tellers tends to decrease with age, the same is not shown for frequent liars (Achenbach & Edelbrock, 1981; Stouthamer-Loeber, 1986). Ostrov (2008) found in a longitudinal study, where mothers and teachers rated disruptive behaviors and lie-telling in children (aged 6–8 years), that whereas lying was common in 6- to 8-year-olds, persistent lying was shown in some children by 7 years of age and children who were high-frequency lie-tellers also demonstrated behavioral problems (see also Gervais, Tremblay, & Desmarais-Gervais, 2000).

As a sign of maladjustment, the development of lying is of particular interest because studies suggest that lying is related to aggression, delinquency, and conduct problems (Achenbach & Edelbrock, 1978, 1981; Gervais et al., 2000; Ostrov, 2008; Stouthamer-Loeber & Loeber, 1986) and is perceived as a serious behavioral problem by teachers, clinicians, and parents (Lavoie, Leduc, Crossman, & Talwar, 2016; Stouthamer-Loeber, 1986; Talwar, Lavoie, & Crossman, 2021). In particular, children who have externalizing problem behaviors may have an increased tendency to lie based on parent and teacher reports (Gervais et al., 2000; Keltikangas-Jarvinen & Lindeman, 1997; Loeber & Schmaling, 1985; Stouthamer-Loeber, 1986; Wilson & Caroll, 1991).

In addition, frequent lie-tellers are at risk of developing behavioral difficulties later on in life because lying is considered to be an early indicator of future antisocial behavior problems (Gervais et al., 2000; Stouthamer-Loeber & Loeber, 1986). Children with externalizing behavior problems are at greater risk of violent behaviors and display conduct problems during adulthood (Lahey et al., 1999). Because it is one of the earliest antisocial behaviors to emerge, lying has been referred to as being in a "pivotal position" and a "transition symptom" to the development of pathological levels of antisocial behavior during adolescence and adulthood (Stouthamer-Loeber & Loeber, 1986).

It appears as though lying may be an important strategy that these children use to cover up and maintain their antisocial behavior (Ostrov, 2006). It may be that children with externalizing problems use lying as a strategy to cover up their impulsive actions and, rather than resolving the "stage-salient developmental task" of adopting appropriate self-control strategies (Rogosch, Cicchetti, & Aber, 1995, p. 594), these children rely on the more primitive strategy of lie-telling, which becomes maladaptive. For instance, one study found that children with fetal alcohol syndrome who have deficits in executive functioning were more likely to lie to conceal a transgression than typically developing children (Rasmussen, Talwar, Loomes, & Andrew, 2008). Successful lying (i.e., being a good liar) may help to conceal other antisocial behaviors such as stealing and aggression and thereby reduce the potential negative repercussions to liars. Although there is considerable experimental research on children's normative lie-telling and its relation to typical social-cognitive development, there has been little experimental research to examine lie-telling in children who have externalizing behavior compared with those who do not as well as little experimental research to examine the association with children's social cognition and their lie-telling skills in this population.

Lie-telling in children with externalizing behavior

Although chronic lying has been associated with problem behavior for a long time in the psychological literature (Stouthamer-Loeber, 1986; Stouthamer-Loeber & Loeber, 1986), most research has been observational or has relied on questionnaires containing just one item to measure the frequency of lying (e.g., Gervais et al., 2000; Loeber, Green, Lahey, Christ, & Frick, 1992; Stouthamer-Loeber & Loeber, 1986; Warr, 2007). Such measurement may give a limited picture of children's lie-telling. However, research on the normative development of lying has led to ecologically valid experimental paradigms designed to examine children's spontaneous lie-telling behavior and skills across different motivations (see Talwar & Crossman, 2011).

There has been some experimental research with children who are maltreated. Although not all children who have been maltreated will have externalizing problems, there is some evidence that some children with externalizing problems may have a higher incidence of maltreatment (e.g., Ouyang, Fang, Mercy, Perou, & Grosse, 2008). Researchers have found that maltreated children aged 7 years and older were more likely to endorse disclosure about transgression than non-maltreated children (Lyon, Ahern, Malloy, & Quas, 2010). However, experimental research examining actual lie-telling behavior about a broken toy has not found consistent differences between maltreated and non-maltreated children's lying behavior (e.g., Lyon et al., 2014; Stolzenberg, McWilliams, & Lyon, 2017).

Only recently have researchers started to empirically investigate lying in children with problem behavior in light of what is now known on the normative emergence and development of children's lie-telling. For example, a recent study by Mugno, Malloy, Waschbusch, Pelham, and Talwar (2019) examined lie-telling in children with disruptive behavior disorders and typically developing children aged 5 to 10 years. They examined the likelihood of children telling lies for personal gain and to conceal a wrongdoing in two experimental paradigms. Whereas they found that overall the majority of children told a lie to conceal a wrongdoing using a temptation resistance experimental paradigm, they found differences between the groups of children in lie-telling behavior using an experimental paradigm designed to look at lies for personal gain. Notably, they found that whereas only 16% of typical children lied for personal gain, 31% of children with disruptive behavior disorders lied. However, they did not find a significant difference in children's ability to maintain their lies. In another recent study, Zanette, Walsh, Augimeri, and Lee (2020) found that parents of children with higher conduct problems, as measured by the Child Behavior Checklist, reported their children telling more antisocial lies compared with parents of children with fewer conduct problems. Lavoie, Wyman, Crossman, and Talwar (2018), across two studies, reported a relation between children's problem behaviors and children's lie-telling. In the first study, they examined experimentally 5- to 14-year-old children's lie-telling behavior to conceal cheating behavior on a trivia computer game. They found that children with higher levels of behavior problems were more likely to tell a lie to conceal their cheating behavior (i.e., using a hint button to see the answer). In a second study, they found that parent-reported lies over a 2-week period were higher for children with higher problem behaviors. Although the frequency of children's lies with varying levels of behavior problems has been examined in two previous studies (Lavoie et al., 2018; Zanette et al., 2020), there is little information on the range of different lies children tell and how it may relate to their lie-telling abilities measured experimentally.

ToM and executive functioning in relation to lying

A considerable amount of research has established the relation between children's lie-telling and their developing social cognition, which is an area where children with externalizing problems may have difficulties (for review, see Talwar & Crossman, 2011, 2012). Both ToM and executive functioning have been found to be associated with children's lie-telling abilities (e.g., Evans & Lee, 2013; Lavoie, Leduc, Arruda, Crossman, & Talwar, 2017; Lavoie et al., 2016; Talwar et al., 2017). This is not surprising given that successful lie-telling requires individuals to hold in mind multiple perspectives at one time, suppress information they know to be true, and create a false statement depicting a nonexistent reality designed to instill a false belief in another person (Evans & Lee, 2013; Talwar & Lee, 2008). Children's ability to tell lies and maintain those lies to give plausible answers in follow-up questions is

associated with their ToM abilities, in particular second-order belief understanding (Lee & Imuta, 2021; Talwar et al., 2007). Experimental research with typical children has also found that children's higher performance on Stroop tasks, a measure of children's inhibitory control, has been found to be positively related to children's ability to tell a lie to conceal their own transgression because they must remember the initial content of their lie, and inhibit their expressive behavior and interfering thoughts, while focusing on their lie (e.g., Evans & Lee, 2011, 2013; Talwar et al., 2017; Talwar & Lee, 2008; Williams, Leduc, Crossman, & Talwar, 2017).

Furthermore, although children's ability to maintain their lies improves during the school years and is related to their social cognition, it is unclear whether children with externalizing problems are better at maintaining their lies or are less sophisticated in their lie-telling (and thus more likely to be detected) and how this relates to their social-cognitive abilities. On the one hand, children with externalizing behavior may be more experienced lie-tellers (Stouthamer-Loeber, 1986), which could result in the successful maintenance of lies (Rasmussen et al., 2008). On the other hand, children with externalizing behavior may be less successful at lie maintenance, which is cognitively demanding, due to their deficits in cognitive ability, including ToM, working memory, and inhibitory control (Albrecht, Banaschewski, Brandeis, Heinrich, & Rothenberger, 2005; Austin, Bondu, & Elsner, 2020; Sharp, 2008; Utendale, Hubert, Saint-Pierre, & Hastings, 2011). Notably, Lavoie et al. (2017) found that children who told more antisocial lies, as reported by their parents, had lower ToM scores. In sum, the relation between children's social-cognitive abilities and their problem lie-telling behavior remains unclear. It is important to investigate lie-telling in relation to these abilities to understand the potential underlying mechanisms in children's typical and atypical trajectories of lying.

Children's moral evaluations of lies

Research on typically developing children has also examined their moral evaluations of truth- and lie-telling in relation to their lie-telling behavior. Research has found that children's understanding and moral evaluations of lies emerge during the preschool years and develop rapidly with age (e.g., Bussey, 1999; Lee, Cameron, Xu, Fu, & Board, 1997; Siegal & Peterson, 1996). In addition, there is some evidence that children's moral evaluations of lying may be related to their actual lying behavior, although findings are mixed (Lyon, Malloy, Quas, & Talwar, 2008; Popliger, Talwar, & Crossman, 2011; Talwar, Lee, Bala & Lindsay, 2002, 2004; Talwar & Lee, 2008). However, there has been very little empirical investigation of how the moral evaluations of lying may differ in children with externalizing behavior and how this may be associated with their lie-telling behavior. Notably, Zanette et al. (2020) reported that children with higher levels of conduct problems believed that lying is generally a common behavior more so than children with lower levels of conduct problems, who perceived lying as a less common behavior in people more generally. However, the researchers did not find a relation between children's moral evaluations of antisocial and prosocial lies and levels of conduct problems. At the same time, the researchers examined only one antisocial scenario; one where the character lied about a minor transgression and one where the character confessed. It may be that a relation between conduct problems and moral evaluations of lying may emerge with a more extensive measure. For example, Talwar, Williams, Renaud, Arruda, and Saykaly (2016) found that children's moral evaluations varied when children were given vignettes that differed in the level of harm caused to others by the lies (or truths) told by the story protagonists. Specifically, children viewed true confession statements (where protagonists told a truth about their own transgression) very positively. However, children viewed true tattle statements (where protagonists told a true statement about someone else's transgression, thereby potentially causing harm to the other's interests) less positively. Based on these nuanced differences, it may be that a more comprehensive measure of children's moral evaluations may demonstrate differences in the types of lies that children rate as acceptable or not acceptable in relation to conduct problems. Furthermore, it remains unclear how children's moral evaluations of lies is associated with their own lying behavior and whether individual differences may explain any relation. Uncovering these potential differences would be quite useful in designing appropriate and effective interventions to promote children's honesty. Given the chronic nature of lie-telling in children with externalizing behavior, it is important to examine how these children understand and evaluate such behaviors.

The current study

The aim of the current study was to examine spontaneous lies told for personal gain by boys with and without externalizing behavior problems. Although most of the experimental research on children's antisocial lies has focused on their lies to conceal wrongdoing, less is known about antisocial lies for personal gain, which involve intentionally manipulating others for the benefit of the self without concern to the moral unacceptability of such lies and without concern to the potential harm of others. Such lies may require the generation of a false claim compared with lies to conceal wrongdoing, which may entail just a simple denial of a transgression (DePaulo & Jordan, 1982; Newton, Reddy, & Bull, 2000; Talwar & Crossman, 2011; Wilson, Smith, & Ross, 2003), and consequently are more serious (more antisocial). Furthermore, the current investigation examined boys with externalizing behavior because it has been widely reported in the literature that such behaviors are significantly more common in young boys (Achenbach & Edelbrock, 1978; de Wied, Goudena, & Matthy, 2005; McCord, Tremblay, Vitaro, & Desmarais-Gervais, 1994).

In the current study, similar to Mugno et al. (2019), children played a computer game during which the motivation to lie was to receive a prize. We also measured children's second-order belief understanding and their Stroop scores, which were analyzed in relation to their lie-telling behavior. Similar to Talwar et al. (2016), children viewed vignettes of characters telling antisocial lies that benefited the self, with and without harm to another person, as well as true statements, with and without harm to another person (i.e., tattles vs. confessions). Children were asked to provide moral evaluations of how good or bad these lie or truth statements were. Children were also asked how often they lied overall, to their parents and their friends, in the last week. Finally, for a subset of the participants, using the same methodology as Lavoie et al. (2017), we obtained parent-reported frequency data of the lies children told over a 2-week period.

Based on the limited previous research, it was hypothesized that children with higher externalizing problems would be more likely to lie for personal gain and have higher reported self- and parent-reported lying frequency. Second, we examined children's ability to maintain their lies to provide plausible explanations when asked follow-up questions. Although we expected that there would be differences between children with and without externalizing problems, we were unsure as to what direction the effects would be given the conflicting hypotheses based on the anticipated lower executive functioning skills of children with problem behaviors (Albrecht et al., 2005; Austin et al., 2020; Sharp, 2008; Utendale et al., 2011), which can influence lie-telling ability (e.g., Rasmussen et al., 2008; Stouthamer-Loeber, 1986). Third, based on previous research, we expected that children's second-order false belief understanding and their Stroop scores would be related to their lie-telling behavior in the experimental paradigm. However, based on previous research, it remains to be explored what differences exist in the association between lying and social-cognitive abilities between children with and without externalizing problem behaviors. Fourth, regarding children's moral evaluations of truths and lies, we expected that children would rate antisocial lies, both with and without harm to another person, more negatively than true statements and that children would rate true tattle statements less positively than true confession statements, based on Talwar et al. (2016). In addition, although previous research has found mixed findings with regard to the relation between moral evaluations and actual lying behavior, we expected that children's moral evaluations may be associated with the likelihood of the children lying in the experimental paradigm. Finally, we expected that children with externalizing behavior problems would self-report lying more frequently than those without externalizing behavior to both parents and friends. Regarding the parent-reported frequency of lying data over 2 weeks, we expected that children with externalizing behavior problems would have a higher parent-reported frequency of lies and that the types of lies parents would report their children telling would tend to be more antisocial lies than the lies reported by parents of children without externalizing behavior.

Method

Participants

A total of 110 boys aged 6 to 11 years (M = 106.40 months, SD = 18.86) participated in the current study. Families were recruited from a major metropolitan city from advertisements in newspapers, parent magazines, and flyers that targeted children with behavioral problems at parenting groups. Standardized externalizing problem behavior scores of the Child Behavior Checklist (CBCL) were used to assign children to either a typical group (T score $\leq$ 60) or a borderline/clinical group. There were 57 children assigned to the typical group and 53 children assigned to the externalizing group (see Table 1 for means and standard deviations of key variables across the externalizing and typical groups). The sample ethnicity consisted of 62.7% White, 16.3% Black, 6.3% Asian, 2.7% Hispanic, 1.8% indigenous, and 7.0% multi-racial/ethnicity (2.7% did not indicate their race/ethnicity). The three most common levels of education obtained were bachelor's degree (37.3%), master's degree (20.6%), and diploma or college degree (21.6%). The three most common household income levels were: greater than $60,000 (57.1%), $40,000 to $50,000 (11.2%), and $50,000 to $60,000 (8.2%). There were no significant differences between the typical and externalizing groups.

Procedure

Parental consent was obtained prior to start of the study. Ethical approval, in accordance with American Psychological Association ethical guidelines and standards, was obtained from the university research ethics board. Parents completed the CBCL questionnaire and demographics questions. Child participants were tested individually in a quiet room. Children completed the social-cognitive tasks and questionnaire, moral evaluations, and experimental personal gain lie paradigm, which were counterbalanced with the lie paradigm being either first or last.

Child behavior checklist

Similar to previous research (e.g., Zanette et al., 2020), the school-age (6–18 years) 120-item CBCL (Achenbach & Rescorla, 2001) was administered to parents to measure emotional and behavioral problems, divided according to externalizing and internalizing problems. It is one of the most widely used measures of youth emotional and behavioral problems, having been validated for use in 30 societies (Ivanova et al., 2007), and CBCL scores are a reliable indicator of children's actual diagnoses of problem behavior (Warnick, Bracken, & Kasl, 2008). The CBCL has also been used as a measure of the severity and prevalence of externalizing problems and in relation to children's lie-telling frequency

Table 1
Means (and standard deviations) for all independent variables for children in the typical and externalizing groups.

		Typical	Externalizing
Age in months		104.04 (19.69)	108.94 (17.77)
Social-cognitive variables			
	Theory of mind	3.14 (1.22)	2.91 (1.48)
	Stroop	−20.85 (6.16)	−20.46 (6.88)
Moral evaluations			
	Antisocial lie to benefit self	8.62 (.97)	8.84 (1.10)
	Antisocial lie with harm to other	8.83 (1.19)	9.34 (.75)
	Truth confession	3.58 (1.32)	3.59 (1.17)
	Truth tattle	5.64 (1.81)	3.80 (1.95)
Self-reported lies			
	Overall frequency	1.79 (0.80)	2.56 (0.94)
	Frequency of lies to parents	1.68 (0.78)	2.19 (0.98)
	Frequency of lies to friends	1.37 (0.65)	2.00 (0.90)

Note. Children's self-reported lie frequency in a week was reported on a 4-point scale, where 1 (0 times in week), 2 (1–2 times in week), 3 (3–4 times in week), and (>4 times in week).

(e.g., Mesman et al., 2009; Robinson et al., 2019; Stouthamer-Loeber & Loeber, 1986; Talwar et al., 2021; Zanette et al., 2020). Items were rated on a scale from 0 (*not true of my child*) to 2 (*often true of my child*) and included statements such as "argues a lot" and "gets in many fights." The externalizing behavior subscale of the CBCL was used to group children into two behavioral categories of externalizing behavior problems (borderline to clinical levels) and typical behavior (or control group within the "normal" or accepted range of behavior scores) (Achenbach & Ruffle, 2000). The inter-rater reliability of the CBCL was found to range from alpha = .93 to .96, and the criterion validity was assessed and found to be acceptable.

Theory of mind

Children completed two second-order false belief stories adapted from Hogrefe, Wimmer, and Perner (1986) and Sullivan, Zaitchik, and Tager-Flusberg (1994). In one story, two children, Simon and Mary, were given a chocolate bar from their grandfather and told to share. While Mary is out playing, Simon places the chocolate bar in his bag, but Mary watches him do this through the window. Children were asked whether Mary knew where the chocolate bar was (control), where Simon had put the chocolate bar (control), whether Simon knew that Mary knew where the chocolate bar was (ToM), and where they think Simon thinks Mary will look for the chocolate bar (ToM). The second-order ToM stories measured children's ability to limit their knowledge to another individual's knowledge. For each story measuring second-order ToM, children were asked two control questions and two ToM-related questions. Children needed to correctly answer the first control question to be able to receive the point for the first ToM question and needed to correctly answer the second control question to receive the point for the second ToM question, for a maximum score of 4.

Stroop

To evaluate children's inhibitory skills, the word–color Stroop task was administered (Cohen, Dunbar, & McClelland, 1990), which was composed of three tasks. In the first task, children were asked to read a page of color words (e.g., blue, green, red) that were printed in black and white. Children were timed and scored for the number of correct words they read within the time allotted (45 s). In the second task, children were asked to name the color for a series of colored Xs (e.g., XXXX that was printed in red) on a page for the time allotted (45 s). Finally, in the third task, children were asked to name the color for a series of color words on a page that were written in the wrong color (e.g., the word *red* written in blue). To do this, children needed to inhibit their response to read the word to be able to give the correct color name. An interference score (children's scores on the second task minus their scores on the third task) was calculated for use in analyses.

Moral evaluations of truths and lies

Children watched eight counterbalanced video vignettes (two vignettes for each type of story) about story protagonists who tell either the truth or a lie after a misdeed. In the vignettes that showed an antisocial lie with benefit to the self, protagonists told a lie that prevented them from getting into trouble but did not harm anyone else. In the antisocial lie with harm to another person, protagonists told a lie that blamed another person (thereby benefiting their own self-interest but harming that of another person). In the true confession stories, protagonists truthfully admitted a wrongdoing. In the true tattle stories, protagonists truthfully reported another person's wrongdoing. Children were asked to evaluate each main character's behavior using a 5-point Likert scale from *very good* to *very bad.*

Self-reported frequency of lying

Children were asked a series of questions about their typical behavior in a week. For the current study, three questions about the frequency of their lying behavior were included: "How often do you lie in a week?"; "How often do you lie to your parents in a week?"; and "How often do you lie to your friends in a week?" Children could select answers on a scale ranging from 1 to 4, where 1 = *never* (0 times in week), 2 = *almost never* (1–2 times in week), 3 = *occasionally* (3–4 times in week), and 4 = *frequently* (>4 times in week).

Diary recording of lying behavior

Following the procedure of Lavoie et al. (2017), parents were asked to record their children's lies for a 2-week period to measure the children's lying behavior in their daily home settings. Parents were provided with instructions to record a description of each lying event and some examples of the types of lies their children may tell (e.g., a polite lie to say they like something when they do not like it, an instrumental lie to assert that they had done something they were told to do when they had not done it), and they were asked to record each event as soon as possible after it occurred. Each lie event was coded according to type (inter-rater reliability agreement of type of lie = 88%), based on previously established types of lies in the literature (e.g., lies to avoid punishment, lies for instrumental self-benefit) (DePaulo, Ansfield, Kirkendol, & Boden, 2004; Lavoie et al., 2017).

Rockband computer game

The experimenter demonstrated how to play a computer game, *Rockband,* and then told children that she needed to step out of the room to prepare for an upcoming activity and that children should continue to play the game while the experimenter was away. Prior to the experimenter exiting the room, children were shown a chart on the wall of the testing room with the fictitious names of children in order of rank that had already played the game. Children were told that only those who received a first, second, or third place score would receive a prize and that when they were finished playing, they were to add their name to the chart in the position they had achieved, which would be shown on the computer screen at the end of the game. Participants were then given a name card with Velcro to place their name on the wall chart. The experimenter then left children to play for several minutes. The computer game was programmed to indicate a fourth-place finishing position at the end of the game for all participants; thus, it was not possible for participants to place any higher. When the experimenter returned, children were asked a series of questions about their performance on the game to measure whether they would tell a lie to gain a better prize and to measure their lie maintenance ability. Specifically, children were asked, "What position did you get on the Rockband game?" and "Is that the position the computer showed?" After that, they were asked, "How did you get such a high score?" Children were considered liars if they reported any placement other than fourth position. Children who lied were categorized as *maintaining their lie* by responding "yes" if they said the computer screen had indicated that. Children's responses to the follow-up question of "How did you get such a great score?" were used to assess lie-telling maintenance ability, which was coded as a binary *plausible* (e.g., "I knew which buttons to press," "I am good at music") or *revealing/non-explanatory* (e.g., "I don't know", "I didn't").

Results

Lie-telling behavior in the experimental paradigm

Overall, 25 children (22.7%) placed their name card on a higher position (i.e., first, second, or third) than the predetermined computerized score of fourth place that was indicated on the screen and lied about how well they did when asked. Whereas 34% (n = 18) of children with externalizing behavior placed their name in a higher position and lied, only 12.3% (n = 7) of children without externalizing behavior lied about how well they did. A logistic regression analysis of whether children lied or not about their score in the game was conducted with age in months and CBCL groups (externalizing or control) as predictors. The logistic regression model with predictors was statistically significant, $\chi^2(2, N = 110) = 15.84$, Nagelkerke's $R^2 = .20$, $p < .001$, with an overall prediction success of 76.4%. CBCL group was also a significant predictor of children's lie-telling behavior, $b = 1.63$, $SE = 0.54$, odds ratio (OR) = 5.09, 95% confidence interval (CI) [1.76, 14.04], $p = .03$. Age was also a significant predictor of children's lie-telling, $b = -0.04$, $SE = .02$, OR = 0.96, 95% CI [0.93, 0.99], $p = .007$, indicating that as age increased participants were significantly more likely to tell the truth. Specifically, the odds ratio indicates that for each month increase in age, participants were 4% less likely to lie.

Lie maintenance ability

Overall, 10 of the 25 children who lied about their performance on the game provided plausible explanations, such as "I have a similar game at home" and "I pressed the buttons really fast," thereby maintaining their lie. Whereas most of the children without externalizing behavior problems provided plausible explanations (71.4%), fewer children with externalizing behavior problems provided plausible responses (27.8%). A logistic regression analysis of children's concealing ability was also conducted for the Rockband computer game with the 25 children who lied about their score to achieve a prize for a high ranking, with age and CBCL group as predictors. The predictor model was significant, $\chi^2(2, N = 25) = 6.14$, Nagelkerke's $R^2 = .30$, $p = .046$. CBCL group was a significant predictor of children's lie-telling behavior, $b = 2.53$, $SE = 1.11$, OR = 12.5, 95% CI [1.34, 116.80], $p = .027$. Children in the externalizing group were 12.5 times more likely to fail to maintain their lie than those in the typical behavior group.

Cognitive abilities and children's lie-telling abilities

Overall, children had a mean ToM score of 3.03 ($SD = 1.18$). There were no significant differences between children in the typical group ($M = 3.14$, $SD = 1.22$) and children in the externalizing group ($M = 2.91$, $SD = 1.48$), $t(108) = 0.87$, $p = .389$. Overall, children had a mean total Stroop interference score of −20.66 ($SD = 6.49$). Seven children did not complete the Stroop task and were not included in analyses. There were no significant differences between children in the typical group ($M = -20.85$, $SD = 6.16$) and children in the externalizing group ($M = -20.46$, $SD = 6.88$), $t(101) = -0.30$, $p = .763$ (see Table 1).

Because age and CBCL were significant predictors of lying in the Rockband game, a hierarchal logistic regression analysis was conducted on children's lie-telling behavior in the Rockband game with age and CBCL group on the first step and ToM and Stroop scores on the second step. The first block of age and CBCL groupings was significant, $\chi^2(2, 103) = 17.22$, Nagelkerke's $R^2 = .24$, $p < .001$. The final model was also significant, $\chi^2(4, 103) = 23.545$, Nagelkerke's $R^2 = .31$, $p < .001$, with 77.7% of children correctly classified. In the final model, ToM was a significant contributor, $b = -0.58$, $SE = 0.24$, OR = 0.56, 95% CI [0.35, 0.903], $p = .017$; specifically, children with high ToM scores were 44% less likely to tell a lie for personal gain than children with low ToM scores.

Next, a logistic regression on children's lie maintenance was conducted with CBCL group entered on the first step and ToM and Stroop scores entered on the second step. The final model was not significant, $\chi^2(4, 23) = 8.94$, $p = .062$.

Moral evaluations of truths and lies

Twelve children did not complete the moral evaluations vignettes, and their data were excluded from analyses. Children's moral evaluations of truths and lies during the vignette activity were assessed by a repeated-measures analysis of variance (ANOVA) with story type (antisocial lie that benefits self, antisocial lie that harms other, true confession, or true tattle) by CBCL group (externalizing or typical) as variables and age as a covariate. Mauchly's test indicated that the assumption of sphericity had been violated, $\chi^2(5) = 54.86$, $p < .001$. Therefore, degrees of freedom were corrected using the Huynh–Feldt estimate of sphericity ($\varepsilon = .79$). A significant main effect in rankings across truths and lies was found, $F(2.38, 225.70) = 17.46$, $p < .001$, $\eta_p^2 = .16$. Post hoc analyses with Bonferroni correction indicated that children's ratings of antisocial lies that benefited the self ($M = 8.74$, $SD = 0.10$) and antisocial lies that harmed another person ($M = 9.09$, $SD = 0.10$) were significantly different from each other ($p = .032$), and children did rate both of these lies more negatively than both types of truth-telling ($ps < .001$). Children also rated confession truths more positively ($M = 3.59$, $SD = 0.13$) than tattling truths about another person's transgression ($M = 4.73$, $SD = 0.19$), $p < .001$. Together, these results suggest that children rated lie-telling as worse than truth-telling.

There was also a main between-participant effect for CBCL group, $F(1, 95) = 5.46$, $p = .022$, $\eta_p^2 = .05$, which was qualified by a Story × CBCL group interaction, $F(2.38, 225.70) = 15.05$, $p < .001$, $\eta_p^2 = .14$. Follow-up t tests indicated that children from the externalizing group rated antisocial lies that harm another person significantly more negatively than children from the typical group, $t(90.36) = -2.43$,

p = .017, η_p^2 = .06. Children from the externalizing group also rated tattling truths significantly more positively than children from the typical group, $t(89.05) = 4.96$, $p < .001$, $\eta_p^2 = .21$ (see Table 1 for means and standard deviations).

Relation between moral evaluations and lying behavior

To investigate the relation between children's moral evaluations and their lying behavior in the Rockband paradigm, we conducted a logistic regression with children's moral evaluation scores of different types of lies and truths as predictors, as well as CBCL grouping, and with children's lying during the Rockband paradigm as the outcome. The overall model was significant, $\chi^2(5, 98) = 15.64$, $p = .008$, Nagelkerke's $R^2 = .23$. Children's rating of tattling was a significant predictor, $b = -0.47$, $SE = .18$, $p = .010$, OR = 0.63, 95% CI [0.44, 0.89]. Specifically, children who lied on the Rockband paradigm were less likely to rate tattling as positive, whereas children who told the truth on the Rockband paradigm rated tattling more positively. We then conducted a follow-up comparison of the mean values of tattling according to CBCL grouping and lying behavior during the Rockband paradigm using a factorial ANOVA to see whether CBCL grouping interacted with lying behavior on children's ratings of tattling. Levene's test of equality of error variances was significant, $F(3, 95) = 5.93$, $p < .001$; consequently, the corrected model is reported. The corrected model was significant, $F(3, 95) = 16.39$, $p < .001$, $\eta_p^2 = .34$. There was a main effect of CBCL grouping, $F(1, 95) = 32.28$, $p < .001$, $\eta_p^2 = .25$, and an interaction effect between CBCL grouping and lie-telling on the Rockband paradigm, $F(1, 95) = 12.90$, $p < .001$, $\eta_p^2 = .12$. Specifically, children in the externalizing group who told a lie during the Rockband paradigm rated tattling poorly ($M = 2.20$, $SE = 0.44$) relative to children in the non-externalizing group who told a lie during the Rockband paradigm ($M = 6.28$, $SE = 0.65$).

Children's self-reported lie frequency

Next, children's self-reported lie frequency was examined. Five children did not complete the self-report lie measure. A repeated-measures analysis of covariance (ANCOVA) was conducted, with self-report of lying overall to parents and friends as the within-participant factor, CBCL group as the between-participant variable, and age in months as a covariate. Overall, there was a significant between-participant effect for CBCL group, $F(1, 102) = 20.49$, $p < .001$, $\eta_p^2 = .15$. As seen in Table 1, children from the externalizing group reported telling more lies (on average reporting 1–2 lies per week) to their parents and friends. A correlation matrix of the breakdown of the types of lies in relation to ToM and Stroop scores is presented in Table 2. There were no significant correlations.

Daily lie-telling behavior

A total of 55 diary recording logs were returned (including 25 children from the externalizing group). Overall, parents reported 267 lies across the sample of children. A breakdown of the frequency of each of the eight types of lies is depicted in Fig. 1, with a comparison between the two groups (externalizing behavior problems and typical behavior levels) provided in Fig. 2. Instrumental lies were the most commonly reported, followed by lies to avoid punishment. No polite lies were reported across the sample; consequently, this category was omitted from further analyses. A correlation

Table 2
Correlations between self-report frequency of lies, Stroop, and theory of mind scores.

	1	2	3	4
1. Self-report frequency of lying				
2. Self-report frequency of lying to parents	.707**			
3. Self-report frequency of lying to friends	.479**	.395**		
4. Stroop	−.150	−.115	−.044	
5. Theory of mind	.039	.094	−.046	−.106

** $p < .01$.

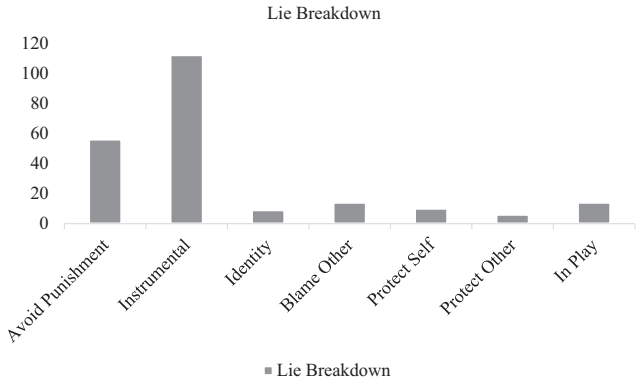

Fig. 1. Visual comparison of the types of lies reported by parents.

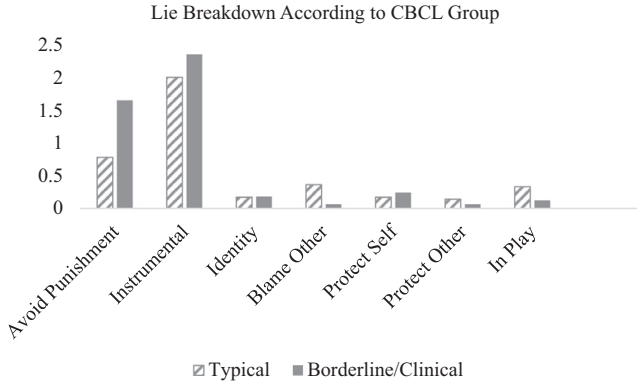

Fig. 2. Comparison of the mean frequencies of the types of lies. CBCL, Child Behavior Checklist.

Table 3
Correlations between types of lies, ToM, and empathic concern.

	ToM	1	2	3	4	5	6	7	8
1. Empathy	.07								
2. Total lies	−.04	−.27*							
3. Avoid punishment	.06	−.27*	.62**						
4. Instrumental	−.03	−.17	.75**	.39**					
5. Identity	−.13	−.15	−.03	−.02	−.17				
6. Blame other	.05	−.20	.43**	.17	.37**	−.02			
7. Protect self	−.10	−.15	.44**	.27*	.47**	.03	.02		
8. Protect other	−.07	−.07	.21	−.08	.12	−.00	.02	−.01	
9. In play	.04	.28*	−.15	−.26	−.19	−.10	−.07	−.18	−.11

Note. ToM, theory of mind.
* $p < .05$.
** $p < .01$.

matrix of the breakdown of the types of lies in relation to ToM and Stroop scores is presented in Table 3. There were no significant correlations.

To examine differences in the total number of reported lies according to CBCL grouping, a one-way ANOVA was conducted comparing children with externalizing behavior problems and children without externalizing behavior problems. There was a significant difference in the number of lies reported between children in the typical behavior group and those in the externalizing behavior group, $F(1, 53) = 4.89$, $p = .031$, $\eta_p^2 = .08$. Specifically, children with externalizing behavior problems had a higher number of reported lies over a 2-week period than children without externalizing behavior problems (see Fig. 3).

Each of the types of lies reported was also compared between the two groups of children (externalizing and typical behavior levels) using one-way ANOVAs of the mean lies per group according to each of the types of lies. Lies to avoid punishment significantly differed between the two groups, with children with externalizing behavior levels having a higher number of lies to avoid punishment reported than children with typical behavior levels, $F(1, 51) = 6.94$, $p = .011$, $\eta_p^2 = .12$. Lies to blame another person (corrected for unequal variances) differed between the groups, although they did not reach significance, $F(1, 45.48) = 4.02$, $p = .051$. The remaining types of lies had similar means across the two groups (frequencies are presented in Fig. 2).

To examine the relation between children's lie-telling behavior in the Rockband paradigm and their frequency of lying over 2 weeks as reported by parents, a one-way ANOVA of the mean lies of children who lied and of those who told the truth was conducted. Children who lied in the Rockband paradigm told significantly more lies as reported by parents ($M = 7.93$, $SD = 3.88$) than children who told the truth ($M = 4.83$, $SD = 4.48$), $F(1, 56) = 6.51$, $p = .014$, $\eta^2 = .11$. We also used a one-way ANOVA to examine the relation between children's ability to maintain a lie and their lie-telling frequency, as reported by parents, between children who concealed their lies ($M = 5.88$, $SD = 4.09$) and those who gave implausible/revealing answers ($M = 10.00$, $SD = 3.17$), but there were no significant differences, $F(1, 14) = 4.62$, $p = .051$.

Discussion

We examined the lie-telling behavior of children with and without externalizing behavior to study their tendency to tell a lie for personal gain, as well as their lie-telling ability and self- and parent-reported frequency of lying in their daily lives, in relation to ToM, inhibitory control, and their moral evaluations. We found that children with externalizing behavior were more likely to tell a lie for personal gain in the experimental paradigm but were less likely to provide a plausible response in their lie. We also found that children with higher ToM were less likely to lie for personal gain. Furthermore, we found that children with externalizing behavior rated lies differently than children without externalizing behavior; notably, they rated antisocial lies that harm another person more negatively and rated tattle truths more positively. Finally, we found that children with externalizing behavior had a higher frequency of self-reported lies to parents and friends as well as a higher parent-reported

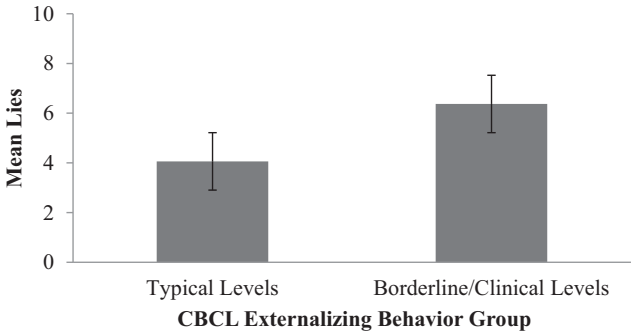

Fig. 3. Mean lies told during a 2-week period. Error bars represent standard errors. CBCL, Child Behavior Checklist.

frequency of lying (in particular, a higher frequency of lies to avoid punishment) than children without externalizing behavior.

Notably, the current findings suggest a different pattern of lying than has been documented in the normative literature on lying. We found that children with externalizing behavior problems, compared with children without externalizing behavior, were more likely to lie for personal gain in the experimental paradigm and had a higher frequency of lie-telling as reported by themselves and their parents. These findings are consistent with Mugno et al. (2019), who found that children with disruptive behavior disorder told more lies for personal gain. It should be noted that lying in the personal gain lie paradigm yields a lower rate of lying compared with children in the most commonly used lie paradigm, namely the temptation resistance paradigm, as found in previous studies (e.g., Talwar & Lee, 2002, 2008). Mugno et al (2019) found that there were no differences between children with disruptive behavior disorders (DBD) and those without DBD in the temptation resistance paradigm, during which the majority of children lied, as is typically found in other studies (e.g., Talwar et al., 2007). However, in both our study and Mugno et al. (2019), approximately less than a third of children lied in the personal gain lie paradigm. When examined more closely, most of the children who lied in this lie paradigm, which measures lies for personal gain, were children who had externalizing behavior problems. In our study 34% of children with externalizing problems lied, and in Mugno et al.'s study 31% of children with DBD lied, whereas 12% and 16% of typically developing children in these two studies, respectively, told a lie in the self-gain Rockband paradigm. Thus, it appears that these lies may be particularly indicative of more problematic lying and are a less common type of lie.

One reason for the difference in rate of lying between the temptation resistance paradigm and the personal gain Rockband paradigm is that children may be less willing to tell a lie in the personal gain situation because it requires manufacturing a false story, rather than a simple denial in the temptation resistance paradigm, and children may consider the personal gain Rockband situation more "high-stakes" for being caught lying. There is also a higher commitment required for engaging in overt deliberate deception (i.e., putting your name on a board and claiming something that is not rightfully yours). It may also be that children with externalizing problems are more motivated by rewards than other children. Taken with Mugno et al. (2019), these findings are intriguing and suggest that further research is needed both in terms of examining more non-normative types of lies experimentally and in terms of understanding motivational aspects of children's decision making when lying. It may be that in such cases children who have higher moral disengagement may be more inclined to tell such lies (Foster, Wyman, & Talwar, 2020).

The current study is the first one to show evidence that there may be differences in the abilities of children with and without externalizing behavior to maintain their lies. Notably, of the children who lied in the personal lie paradigm, children with externalizing problems gave less plausible explanations compared with the typical group. Thus, it may be that children with externalizing problems may be more inclined to lie, as further supported by the frequency of lying reported by both themselves and their parents, but they are less skilled at concealing their lies. Although it did not reach threshold, children who failed to conceal in the experimental paradigm also told more lies as reported by their parents. Overall, this provides some preliminary evidence to suggest that these children may be less skilled at concealing their deception, which may lead to their lies being detected more often. This provides some tentative evidence that these children may be motivated to act in antisocial ways and use lying as a maladaptive strategy to conceal these behaviors after the fact in an attempt to mitigate the consequences. However, this is speculative and needs further corroboration and examination.

Further evidence that children with externalizing behavior may have a different lie-telling pattern compared with other children comes from the subsample of children whose parents reported the frequency of their lies over 2 weeks. Not only did these children have a higher number of reported lies over the 2-week period, but specifically they also told significantly more lies to avoid punishment as well as having a trend to tell more lies to blame others. These findings are consistent with previous findings suggesting that children tell more lies (e.g., Gervais et al., 2000; Stouthamer-Loeber, 1986; Zanette et al., 2020) but further reveal that this pattern of lying may be particularly due to telling different types of antisocial lies. Children did not differ significantly in terms of other types of lies such as prosocial lies and lies to be playful or to protect others. Thus, the current findings do suggest that

children with externalizing behavior may differ in their lie-telling behavior both in the types of lies they will tell and in their skills at lying.

The current study is also the first one to address the question of how cognitive abilities may influence less normative lie-telling. Notably, in this study we found that children with low ToM scores were more likely to tell a lie than children with high ToM scores. This finding is in contrast to previous research finding that children with higher ToM are more likely to lie in the temptation resistance paradigm (e.g., Talwar et al., 2007). However, it is congruent with Lavoie et al. (2017), who found that a small subsample of children with a pattern of more commonly telling antisocial lies to avoid punishment, blame others, and protect the self (as reported by parents) also had lower ToM scores than children with different lying patterns. Taken together, these findings suggest that there may be a more nuanced relationship between children's developing cognitive abilities and their lie-telling behavior. Specifically, for many children their advanced ToM skills may support the emergence and development of their lie-telling behavior, leading to more socially acceptable levels and types of lies as they get older (e.g., Lavoie et al., 2017; Talwar & Crossman, 2011), but for some children who lag in ToM development it may affect their behavior in such a way that leads to lying for antisocial purposes, perhaps due to difficulties in considering the thoughts and beliefs of others.

It should be noted that children's Stroop scores did not predict children's lie-telling behavior. It may be that other measures of executive functioning, besides the Stroop task used in this study, may find a relation between children's lying and executive functioning. Previous research has suggested that measures of working memory and cognitive flexibility are related to children's lie-telling abilities (Alloway et al., 2015, Ding et al., 2014; Talwar et al., 2017). Taken with the findings of Lavoie et al. (2017), the current research suggests that more research is needed to understand the relation between social cognitive abilities and children who deviate from a typical developmental trajectory of lying behavior.

Our study is also the first experimental study to examine moral evaluations in relation to lie-telling behavior for children with and without externalizing behavior. We found that children with externalizing behavior differed in their evaluations of antisocial lies that caused harm to another person as well as tattles (which also can cause harm to another person). Children with externalizing behavior rated antisocial lies that harm others more negatively compared with children without externalizing behavior. Conversely, these children rated true tattle statements more positively than children without externalizing behavior problems. With confessions there is a potential cost to one's own self-interest. However, with tattles there is a potential harm to another person's interest. Talwar et al. (2016) found that children were less positive about such true statements reflecting their concern for negatively affecting another person. This same pattern was seen in this study with children who did not have externalizing behavior problems. However, children with externalizing behavior were significantly more likely to rate true tattle statements positively. Interestingly, children's moral evaluations of tattles predicted their lie-telling behavior in the personal gain lie paradigm, with children who rated tattles more positively also being more likely to lie for personal gain. These findings are consistent with Zanette et al. (2020) in that they found that children's perceptions of the frequency of other people's lying predicted the frequency of children's own lying. However, our results differ with those of Zanette et al. in that we found that children's moral evaluations of lying, tattling in particular, was associated with their likelihood of telling a lie for personal gain, whereas Zanette et al. did not find that children's moral evaluations were associated with the frequency of their lies. At the same time, the differences may be due to the measures employed in each study. The current study employed an experimental paradigm to examine lying behavior and included a more comprehensive measure of children's evaluations of antisocial lies and truths where there is a benefit or cost to self versus other. Overall, taken together, the two studies suggest that children's perceptions of others' lie-telling behavior and how children evaluate it may influence their perceptions of the acceptability of using lying as a strategy for personal gain. Further research is needed to examine the potential mechanisms that may underlie this finding such as moral disengagement and moral emotions.

Overall, the current study, taken together with recent findings in the literature, highlights the need for future research to examine different developmental trajectories of lie-telling. The findings of this study, along with those of others (e.g., Lavoie et al., 2017; Mugno et al., 2019; Zanette et al., 2020), suggest that there is more to investigate beyond the current theoretical models of the development

of lying in relation to social cognition. It might not be that for all children more advance cognitive abilities are associated with more advanced lie-telling behavior. Indeed, there is evidence that for normative samples cognitive abilities may be a double-edged sword that facilitates the likelihood to be truthful but also increases success at deception for those who do decide to lie (Ding et al., 2014). Furthermore, for some children more advanced cognitive abilities may support the emergence and development of lying when they are young but may lead to less lying and more socially acceptable lying such as prosocial lies with age (e.g., Lavoie et al., 2017; Williams et al., 2017). As suggested by Talwar and Crossman (2011), a transactional model is needed to understand the different developmental trajectories of lying and the underlying mechanisms that lead to different patterns of lying behavior. The current study, along with a handful of previous studies (e.g., Lavoie et al., 2018; Mugno et al., 2019; Zanette et al., 2020), suggests that a fruitful way to advance our understanding of these trajectories is to examine lying in atypical populations. By studying atypical pathways to development, much can be learned to understand normative development (Cicchetti, 2004). Such research not only can help to elucidate the multiple pathways underlying children's lie-telling, as well as why some children are more prone to lying than others and the underlying factors associated with lying, but also may address concerns of practitioners and educators who work with children and who need empirically based recommendations and methods to promote children's honesty.

The current study has several limitations that should be noted. First, the sample size was limited. Given that lying for personal gain has a low rate based on the current findings and those of Mugno et al. (2019), future research is needed with larger samples. This also limits the generalizability of the findings on children's lie-telling abilities to maintain their lies because only a small number of children lied overall. It may also be that particular ratings on the CBCL may predict children's lie-telling behavior. Future studies should examine children's lie-telling not only with larger samples but also with more extensive experimental measures that measure children's lying over a number of different paradigms with different motivational contexts (e.g., Talwar, Lavoie, & Crossman, 2019) to examine the pattern of lying behavior of children with externalizing behavior. The current study had only a subsample of frequency data from parent-report diaries. Future research is needed to more extensively measure the frequency of children's lies with both self- and parent-reports in relation to their lie-telling skills in experimental paradigms. Furthermore, the current research was cross-sectional in nature. In fact, there is scant research that has examined experimentally children's lie-telling longitudinally (e.g., Talwar et al., 2019), and more research is needed to examine typical and atypical developmental patterns of lie-telling to fully understand how lying develops and its relation to cognitive and social factors.

The current study found differences in lie-telling behavior for personal gain as well as in the frequency of lying between children with and without externalizing behavior. Furthermore, we also found evidence that children's lies for personal gain are predicted by lower ToM scores and more positive moral evaluations of children's true tattling statements about another person's transgression. The findings of this study, although not conclusive, are exciting in that they suggest the need for a new program of research that seeks to specifically address different developmental trajectories of lie-telling. Such research has the potential not only to address questions related to children with externalizing behavior and conduct problems but also to inform our theoretical understanding of the development of lying.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jecp.2022.105385.

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