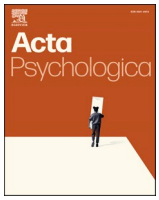
Acta Psychologica 253 (2025) 104744

Contents lists available at ScienceDirect

Acta Psychologica

journal homepage: www.elsevier.com/locate/actpsy



Dilemma: Utilizing the activation decision-construction-action theory to understand and predict children's hypothetical decisions to conceal cases of school bullying☆

Ipek Isik [a,*], Joshua Wyman [b], Hannah Cassidy [c], Victoria Talwar [a]

[a] Department of Educational and Counseling Psychology, McGill University, Canada
[b] Department of Psychology, King's University College at Western University, Canada
[c] School of Humanities and Social Science, University of Brighton, United Kingdom of Great Britain and Northern Ireland

ARTICLE INFO

Keywords:
ADCAT
Concealment
Adolescents' lies
Deception detection
School bullying

ABSTRACT

The Decision component of the Activation-Decision-Construction-Action theory (ADCAT) proposes that if people perceive the benefits of lying higher than the truth, they are more likely to lie. To expand on the existing ADCAT research, the current study investigated the cost-benefit appraisals of 115 children ages 7-to-14 when concealing information about school bullying. Further, the current study examined the impact of the type of bullying (verbal vs. physical), type of exposure to bullying (victim vs. bystander-witness), and familiarity of the person to whom they could disclose (familiar adult vs. unfamiliar adult) when evaluating ADCAT. The results indicate that the expected value of lie-telling and motivation to lie were only significantly related to decisions to lie when the child is the victim of physical bullying and being questioned by a familiar person. Whereas the expected value of truth-telling was only significantly related to decisions to lie when the child is the victim of verbal bullying and being questioned by an unfamiliar person. Discriminant function analysis models were also statistically significant for these two vignettes, meaning that ADCAT-dependent measures could be used to accurately classify the truth and lie tellers for these two vignettes. Furthermore, developmental factors such as age, gender and Theory-of-Mind skills of the ADCAT-dependent measures within each scenario were examined. This study provides further understanding of the complexities in cases of school bullying, particularly as it relates to social-cognitive factors that encourage or discourage children and adolescents from disclosing these events.

1. Introduction

Children start telling lies from an early age, and their lies become more plausible and sophisticated as they get older; therefore, their lies might remain undetected in the later stages of development (Evans & Lee, 2013; Talwar & Crossman, 2011; Talwar & Lee, 2008). Children can, at times, be reluctant to disclose and conceal information about the transgressive actions of others (Talwar et al., 2004). Concealing critical information, such as witnessing or being exposed to school bullying, can put youth at risk by limiting the opportunities to seek support from a parent or teacher. Although some studies examined children's reasons for not reporting bullying events to their parents and teachers (e.g., Cortes & Kochenderfer-Ladd, 2014; DeLara, 2012; Unnever & Cornell, 2004), to date, no research has explored how children and adolescents make hypothetical decisions when it comes to concealing information from people they know and people they do not know in the situations where they are bystanders or victims of different types of school bullying, such as physical or verbal bullying.

The Activation-Decision-Construction-Theory (ADCAT, Walczyk et al., 2014) is a novel framework that explains the processes involved in deception from a comprehensive social-cognitive perspective (Walczyk et al., 2014). The Decision component of ADCAT proposes that if people perceive the benefits of telling a lie to be higher than telling the truth, they would be more likely to lie. This cost-benefit model can be used to anticipate future deceptive behaviour by providing a calculable formula (Walczyk et al., 2014). By manipulating the context in which the

☆ Institutional Review Board Statement: This research fulfilled all the ethical requirements and obtained approval from the Research Ethics Board III (Research with minors or adults not competent to consent) at McGill University.

* Corresponding author at: McGill University, 845 Sherbrooke St W, Montreal, Quebec H3A 0G4, Canada.
E-mail address: ipek.isik@mail.mcgill.ca (I. Isik).

https://doi.org/10.1016/j.actpsy.2025.104744
Received 19 September 2024; Received in revised form 18 January 2025; Accepted 19 January 2025
Available online 25 January 2025

Decision component of ADCAT is used, research can help identify which social-cognitive factors impact this cost-benefit analysis. In particular, by better understanding the decision-making processes involved in concealing information, researchers and practitioners can develop evidence-based, context-specific strategies that encourage youth to feel comfortable and safe to disclose victimization experienced by themselves and others.

1.1. School bullying and concealment

Children start telling lies and concealing information as early as 3 years of age (Evans & Lee, 2013). Children's lies are easily discoverable during preschool, partly due to their relatively underdeveloped Theory-of-Mind (ToM) skills (Talwar & Crossman, 2011). Theory-of-mind facilitates the ability to understand other people's mental states, which allows children to differentiate their own beliefs and other people's beliefs. As discussed in Lee and Imuta's (2021) meta-analytic review of the ToM literature, the maturation of children's ToM skills allows children to produce more sophisticated, plausible and consistent lies. Therefore, children's lies become harder to detect around 7 to 8 years of age as they develop a more sophisticated mental state understanding (Lavoie & Talwar, 2020; Talwar et al., 2007; Talwar & Lee, 2008).

By early adolescence, many youths desire increased autonomy from parental figures in their lives (De Goede et al., 2009; Zimmer-Gembeck & Collins, 2008). Although concealing some information from parents is relatively typical among adolescents (Darling et al., 2006; Dykstra et al., 2020), there can be considerable negative consequences when an adolescent fails to disclose experiences when they or someone close to them, have experienced harm (Finkenauer et al., 2002; Frijns et al., 2005). Disclosure is an important aspect of parent-child communication, and it allows parents to support children when they are going through an adverse experience (Almas et al., 2011). Bullying is one of the adverse experiences children face throughout the elementary school and high school years, and studies have shown that many bullied children do not share these painful experiences with their parents or teachers (Fekkes et al., 2005).

Bullying is an aggressive behaviour that is a form of peer victimization. Bullying behaviour is intentional, as the perpetrator intends to harm the target of bullying. It is repetitive, usually occurs more than once, and involves a power imbalance between the perpetrator and the target of bullying (Olweus, 2013). Moreover, bullying can involve physical aggression, such as hitting, and verbal aggression, such as name-calling and insulting the target (Björkqvist et al., 1992). Bullying is a major public health concern with significant long-term health implications for both the victims and bullies, such as being at higher risk for psychosomatic symptoms and suffering from self-inflicted, accidental, and perpetrated injuries (e.g., Gini & Pozzoli, 2009; Srabstein & Leventhal, 2010; Srabstein & Piazza, 2008). It is, therefore, important to identify any bullying incidents early to prevent or reduce more serious outcomes.

One common strategy that bullying prevention programs have recommended is reporting these incidents early to a trusted adult (Olweus, 2010). Although disclosing bullying incidents to an adult could be helpful in terms of seeking help to stop bullying and receiving emotional support, research suggests that a significant portion of children choose not to tell trusted adults about these bullying incidents (Bjereld et al., 2021; Black et al., 2010). Prior research has focused on the factors that prevent children from disclosing bullying incidents to adults. These findings suggest that children may choose to keep the bullying incidents to themselves for many different reasons, such as a sense of helplessness, self-reliance, shame, and expectations regarding the efficiency of adult interventions (DeLara, 2012; Mishna & Alaggia, 2005). However, no studies to date have examined children's decision-making processes when deciding to disclose or conceal different situations of bullying. By teasing apart this decision-making process, better strategies can be designed that target specific variables that best predict concealment behaviour in contexts of bullying and peer victimization. The study will go beyond prior ADCAT research by understanding its ability to predict disclosure (truths) and non-disclosure (lies) in cases involving peer victimization, specifically school bullying.

1.2. ADCAT

The Activation-Decision-Construction-Action-Theory (ADCAT, Walczyk et al., 2014) aims to explain cognitive processes involved in deception. The Decision component of ADCAT suggests that individuals think about the costs and benefits of telling the truth versus lying, and these cost/benefit appraisals guide individuals to anticipate the value of truth-telling versus lying in different situations. According to Walczyk et al. (2014), an individual is more likely to tell the truth when they anticipate more benefits associated with being honest, and there is a high likelihood of being believed. However, if the anticipated value of lie-telling outweighs the value of truth-telling, people will likely decide to tell a lie (Walczyk et al., 2014). It is important to note that this decision-making process is quasi-rational since the perceived costs and benefits may not reflect reality, and the expected consequences of telling a truth or lie can be obscure.

Based on this quasi-rational decision-making process, a calculable formula was introduced for predicting decisions to tell the truth or a lie (Walczyk et al., 2014). This formula is comprised of three dependent measures: the anticipated value of truth-telling (EV_{Truth}), the anticipated value of lie-telling (EV_{Lie}) and Lie Motivation (M). The anticipated value of the truth (EV_{Truth}) is calculated by (1) multiplying the probability and valence of truth-telling and being believed, (2) multiplying the probability and valence of truth-telling and not being believed, and (3) adding these two values together. The anticipated value of telling a lie (EV_{Lie}) is calculated by (1) multiplying the probability and valence of lie-telling and being believed, (2) multiplying the probability and valence of lie-telling and not being believed, and (3) adding these two values together. For calculating both EVs, the formula is: $EV_{truth/lie} = (p_{believed} \text{ X } v_{believed}) + (p_{not\_believed} \text{ X } v_{not\_believed})$. Lie Motivation (M) is calculated by subtracting the anticipated value of the truth (EV_{Truth}) from the anticipated value of telling a lie (EV_{Lie}): $M = EV_{Lie} - EV_{Truth}$. Refer to Appendix A for a sample ADCAT calculation. Walczyk et al. (2014) proposed that EV_{Truth} would negatively correlate with the future decision to lie and Lie Motivation (M) and EVLie would positively correlate with the future decision to lie.

Some studies tested the Decision component of ADCAT using hypothetical scenarios for predicting adults' hypothetical decisions to deceive or tell the truth. Masip et al. (2016) found that EV_{Truth} was negatively correlated with undergraduate students' (*M*age = 20.00 years) hypothetical decisions to lie, whereas EV_{Lie} was not correlated with hypothetical decisions to lie. They also found that Lie Motivation (M) was positively correlated with hypothetical decisions to lie; however, the authors explained that M's significant correlation with lie decisions is better explained by EV_{truth} rather than EV_{Lie} (Masip et al., 2016). Walczyk et al. (2016) examined the Decision component of ADCAT in an impromptu interview setting wherein the undergraduate students (*M*age = 22.84) were asked embarrassing questions. They found that EV_{Truth} was negatively correlated with hypothetical decisions to lie, and EV_{Lie} was positively correlated with hypothetical decisions to lie (Walczyk et al., 2016). Cassidy et al. (2019) tested the Decision component of ADCAT in the context of four different reasons to lie: Beneficiary of the lie (self vs. other) and additional cost (no cost to other/self vs. cost to self/other). They found that EV_{Truth} was negatively correlated with undergraduate students' (*M*age = 18.56) hypothetical decisions to lie, but only for lies that benefitted others. Furthermore, EV_{Lie} and M were positively correlated with hypothetical decisions to tell a lie, regardless of who the beneficiary was. To summarize the findings mentioned above, Masip et al. (2016) and Walczyk et al. (2016) found that EV_{Truth} was negatively correlated with decisions to tell self-oriented lies, but Cassidy et al. (2019) found a positive correlation

only for other-oriented lies. Walczyk et al. (2016) and Cassidy et al. (2019) found that EV_{Lie} was positively correlated with the decision to lie, but Masip et al. (2016) did not. Finally, Masip et al. (2016) and Cassidy et al. (2019) found that Lie Motivation (M) was positively correlated with decisions to lie, but Walczyk et al. (2016) did not. Thus, the findings of the few studies with adults have been mixed and suggest that the context may impact the decision-making process.

To date, only one study has examined the efficacy of ADCAT in predicting children's hypothetical decisions and telling truths and lies. Wyman et al. (2021) investigated whether ADCAT components (i.e. dependent measures) correlate with 6-to-11-year olds' hypothetical lie decisions in the same four different scenarios as Cassidy et al. (2019). They found that EV_{Truth} was negatively correlated with hypothetical decisions for lies that benefitted oneself at no cost to another (initial and final decision) and lies that benefited another with a cost to oneself (final decision only). In contrast, EV_{Lie} was unrelated to children's hypothetical decisions to lie across the four scenarios. Greater Lie Motivation (M) was related to a higher willingness to tell a self-oriented lie with no cost to another (initial and final decision) and a lie that benefitted another with a cost to self (final decision only); however, these correlations with these decisions to lie are likely explained by the influence of EV_{Truth} rather than EV_{Lie}.

Taken all together, the differing factors findings with adults and children (e.g., Cassidy et al., 2019; Wyman et al., 2021) suggest that further research is needed on children and potential developmental factors that impact the decision-making process. ToM plays a significant role in ADCAT (Walczyk & Fargerson, 2019). Wyman et al. (2021) also examined the impact of ToM on children's future decisions to lie. Higher ToM scores predicted lower value towards telling the truth when children considered telling a lie for themselves at a cost to another and when telling a lie for someone else at a personal cost. Furthermore, they found that higher ToM predicted greater Lie Motivation for children's lies for another when there was a personal cost (Wyman et al., 2021). Furthermore, regarding other developmental factors such as age and gender, Wyman et al. (2021) showed no significant differences in ADCAT-dependent measure scores.

Investigating the efficacy of the ADCAT cost-benefit formula in children's decisions to deceive can have significant implications for professionals who work with children and parents, such as developing strategies for promoting honesty and predicting children's decisions to deceive in legal settings. Although Wyman et al. (2021) provided evidence for and against the effectiveness of the ADCAT cost-benefit formula for predicting children's decisions to deceive for different types of lies, more research is needed to understand the effectiveness of the ADCAT cost-benefit formula in different social contexts such as in the cases of school bullying. The current study included both children and adolescents, whereas Wyman et al. (2021) included only school-age children. Studying adolescents is important as lie-telling peaks during this stage (Debey et al., 2015). During this period, they develop a more sophisticated understanding of self and others through maturation of their theory-of-mind (Białecka-Pikul et al., 2020). Moreover, our design highlights common situations where children experience and/or witness verbal and physical bullying, which has real-world relevance given that childhood and early adolescence are periods where bullying victimization becomes increasingly frequent (Fujikawa et al., 2021; Nishina & Juvonen, 2005). These two types of bullying (i.e., verbal and physical) were included in the design because adults' responses and intervention strategies to physical and verbal bullying may differ, such as responding to physical harm more seriously than verbal bullying (Hazler et al., 2001). This difference may influence adolescents' decisions to conceal or disclose the bullying event (Cortes & Kochenderfer-Ladd, 2014). Lastly, the current study expands on Wyman et al. (2021) by investigating the potential role of truth/lie recipient familiarity and how this might impact ADCAT results. Previous research suggests that recipient familiarity influences lie decision-making, as children are more likely to tell a lie to an unfamiliar adult compared to a parent (Williams et al., 2013). Based on the aforementioned literature, this study seeks to explore the impact of the type of bullying (verbal vs. physical), the type of exposure (victim vs. bystander-witness) and the recipient of the disclosure (familiar vs. unfamiliar adult) on the ADCAT-dependent measures (EV_{Truth}, EV_{Lie}, Lie Motivation) (Table 1).

1.3. Present study

To expand on the prior child (Wyman et al., 2021) and adult (Cassidy et al., 2019; Masip et al., 2016; Walczyk et al., 2016) ADCAT research, the primary objective of the current study is to examine whether the three ADCAT dependent measures, EV_{Truth}, EV_{Lie} and Lie Motivation, are significantly correlated with child and adolescent hypothetical decisions to lie and tell the truth in different contexts of school bullying. Specifically, children and adolescents read eight different vignettes wherein the type of bullying (verbal vs. physical), type of exposure (victim vs. bystander-witness) and recipient of the disclosure (familiar vs. unfamiliar adult) were manipulated (Research Question 1). Based on previous research by Walczyk et al. (2016), we expect EV_{Lie} and Lie Motivation (M) to be positively correlated with hypothetical decisions to lie in each scenario and EV_{Truth} scores to be negatively correlated with decisions to conceal in each scenario (Hypothesis 1a). We also expect hypothetical lie-tellers to have significantly higher EV_{Lie} and Lie Motivation scores than truth-tellers, and we expect truth-tellers to have higher EV_{Truth} scores compared to lie-tellers (Hypothesis 1b). A secondary objective was to examine whether participant age, gender and performance on a measure of ToM were correlated with scores on the three ADCAT dependent measures (Research Question 2). Based on the findings of Wyman et al. (2021), we expected ToM to be positively correlated with EV_{Lie} and Lie Motivation scores (Hypothesis 2a). Nevertheless, participant age is not expected to be significantly correlated with scores on the three ADCAT-dependent measures (Hypothesis 2b), and we anticipate no significant gender differences in ADCAT-dependent measure scores (Wyman et al., 2021) (Hypothesis 2c).

2. Method

2.1. Participants

Participants were 115 children and adolescents between 7 and 14 years of age ($M_{age} = 10.28$ years, $SD = 2.14$ months, 55.7 % male, 41.7 % female and 2.6 % non-binary) recruited from Canada ($n = 25$) and the United States ($n = 90$). The present study's sample exceeds recent ADCAT research involving adults (Masip et al., 2016, $N = 75$; Cassidy et al., 2019, $N = 91$) and children (Wyman et al., 2021, $N = 104$). Children were recruited through online advertisements through social media and Children Helping Science. Participants who resided in the United States and Canada, understood English and showed typical cognitive development, were recruited for the study. Specifically, we recruited children who do not have delays in relation to their language and cognitive development as well as other neurological conditions, such as deficits related to short-term memory, which might influence their comprehension and response to the vignettes. Furthermore, we recruited participants who did not have an autism spectrum disorder (ASD) diagnosis, as there might be some differences between children who are diagnosed with ASD and children who are not diagnosed with ASD in terms of their lie-telling understanding and lie-telling behaviour (Cantarero et al., 2021; Talwar et al., 2012). Parents were asked an open-ended question about the ethnic and cultural groups to which their children belonged. In their responses, 44.3 % reported being White, 22.6 % reported being biracial, and 8.7 % reported being multiracial. Furthermore, 52.2 % of the participants reported belonging to a high-income family, and 33.0 % of the parents reported having a master's and an undergraduate degree. Refer to the Supplementary Materials Section for additional tables that display the participants' demographic backgrounds, including their household incomes, parent education

Table 1
Summary of ADCAT studies.

Citation	Lie Motivation	Sample	Findings on the anticipated value on truth telling (EV_{Truth})	Findings on anticipated value on truth telling (EV_{Lie})	Findings on Lie Motivation (M)	Lie Decisions Explained By
Masip et al. (2016)	Self-oriented	Adults	EV_{Truth} was negatively correlated with decisions to lie.	EV_{Lie} was not correlated with decisions to lie.	M was positively correlated with decisions to lie.	EV_{truth}
Walczyk et al. (2016)	Self-oriented	Adults	EV_{Truth} was negatively correlated with decisions to lie	EV_{Lie} was positively correlated with decisions to lie	M was positively correlated with decisions to lie.	Both EV_{Truth} and $EVL_{ie.}$
Cassidy et al. (2019)	Self-oriented and Other-Oriented	Adults	EV_{Truth} was negatively correlated with decisions to lie, but only for lies that benefitted others.	EV_{Lie} was positively correlated with decisions to tell a lie.	M was positively correlated with decisions to tell a lie.	Both EV_{Truth} and $EV_{Lie.}$
Wyman et al. (2021)	Self-oriented and Other-Oriented Lies	Children	EV_{Truth} was negatively correlated with decisions for lies that benefitted oneself at no cost to another and lies that benefited another with a cost to oneself.	EV_{Lie} was unrelated to children's decisions to lie.	M was positively related to a higher willingness to tell a self-oriented lie with no cost to another and a lie that benefitted another with a cost to self.	EV_{truth}

background, and cultural and ethnic groups.

2.1.1. Sample power

A post hoc power analysis was completed, using G*Power version 3.1.9.7 (Faul et al., 2007), to determine if our sample size of 115 participants was sufficient to conduct the point biserial correlation analyses with an alpha error probability of 0.05. Overall, a sample of 115 yielded a power value of 0.96 for detecting a medium effect size ($\rho = 0.3$), which was considerably higher than the recommended power of 0.8 (Serdar et al., 2021). A second post hoc power analysis assessed whether our sample size was sufficient to conduct MANOVAs involving two experimental groups, three outcome variables, and with an alpha error probability of 0.05. A sample of 115 participants yielded a power of 0.94 for detecting a medium effect size ($f^2 = 0.15$). Altogether, these results indicate that our sample of 115 participants is more than sufficient to conduct the primary statistical analyses for this study. It is worth noting, however, that post hoc power analyses are limited given that the results can be analytically misleading and inconsistent for determining the true statistical power of a sample (Heinsberg & Weeks, 2022; Zhang et al., 2019). Future research should conduct a priori power analysis before data collection begins to acquire a more accurate estimate of the sample size needed to achieve an adequate level of statistical power.

2.2. Materials

2.2.1. Vignettes

Children were read eight vignettes by the experimenter that take place in a school environment and contain a school bullying event. The scenarios have been designed to manipulate the following: the type of bullying (i.e., verbal versus physical), the type of exposure to bullying (i.e., the main character being the victim of bullying versus the main character being the bystander-witness of bullying), and the familiarity of the truth/lie recipient (i.e., teacher versus unfamiliar adult). For example, in the Physical x Victim x Teacher scenario, the main character plays tag with their friends outside during recess. While the main character is running, another student pushes them on purpose and laughs, and this student has done this to them many times before. The student tells the main character they will do this again if the main character tells anyone about it. Since the main character has a cut on their knee as a result of being pushed on the ground, their teacher asks them what happened as they did not see what happened. Refer to Appendix B for a complete description of each vignette.

2.2.2. Post-scenario questionnaire

Children completed a post-scenario questionnaire after each vignette that was based on the format used by Wyman et al. (2021), Cassidy et al. (2019), and Masip et al. (2016). Children were first told, "At the moment, the story does not have an ending. I would like to know what you would do next if you found yourself in that story. So, if (brief recap of the corresponding story), can you tell me in as much detail as possible what you would do next?". Then, to determine their initial truth/lie decision, participants were asked, "Would what you have just told me be telling the truth or telling a lie?"

Probability of Consequence (p_i) was determined by children rating the likelihood that their truth/lie would be believed by the recipient (e.g., the teacher or an unfamiliar adult) on a scale from 0 (Not very likely that they would believe me) to 10 (Very likely that they would believe me). Expected valence (v_i) was determined by children's rating of how good (+5) or bad (−5) the outcome of the recipient's reaction would be if they believed or did not believe the truth/lie. Next, children were asked, "Let's imagine that you did the opposite at the end of the story and told (opposite option to the initial truth/lie response) instead." Children then completed the same questions after this prompt; this way, p_i and v_i were calculated based on their alternative truth/lie response.

To measure how participants perceived the hypothetical bully's behaviour, children were asked, "Thinking back to what happened in the story, how good or bad do you think what the other child did is?" (−5 Extremely bad to +5 Extremely good). The life relevance of each vignette was also measured, whereby participants were asked, "How likely do you think it would be for something similar in this story to happen in real life and at your school?" (0 = Not very likely that it would happen to 10 = Very likely that it would happen).

The three primary measures used by ADCAT (EV_{Truth}, EV_{Lie}, and Lie Motivation) were calculated according to children's responses to the questionnaire. Refer to Appendix A for sample ADCAT calculations. Each vignette and post-scenario questionnaire were presented in a randomized order to avoid presentation order biases that could influence children's responses to the post-scenario questionnaire.

2.2.3. Developmental measures

Age, gender, and performance on theory mind measures were used as additional predictors for the ADCAT-dependent measures. Gender was measured categorically (i.e., female versus male), and age was measured continuously (e.g., 12.29 years). As only three parents identified their child's gender as being 'Other', these participants were not included in any of the gender-specific analyses.

Previous studies suggested a relationship between children's second-order ToM understanding and lie-telling development (Talwar et al., 2007; Talwar & Crossman, 2011). For this reason, children completed two ToM false belief story tasks (i.e., Grandpa's Present and The Ice-Cream Truck), adapted from Hogrefe et al. (1986) and Sullivan et al. (1994). These two stories tested children's ability to understand a

character's false belief about another character's mental state. In one story, Simon moves a chocolate bar from the fridge to his bag, and Mary sees him moving the chocolate. Nevertheless, Simon does not know that Mary saw him moving the chocolate, so Simon thinks that Mary thinks the chocolate is in the fridge. After each story, children answered two questions that measured their comprehension of the story. After the comprehension questions, they answered two questions for each story that measured their false belief understanding. Namely, children were asked, "Does Simon know that Mary knows where the chocolate is now? and "Where does Simon think Mary will look for the chocolate?" Each correct answer was coded as 1 point per question, so children received a total score out of four on this measure, and higher scores reflected higher second-order ToM skills.

2.3. Procedure

The study received ethical approval from the University Research Ethics Board. Parental consent and verbal assent from all the children were obtained after being informed about the study. Children completed vignettes with an experimenter via a secured online video platform (i.e., Zoom). The parents were not present during the session. The experimenter shared their screen with the participants and presented both vignettes and post-scenario questionnaires throughout the session. The experimenter read the vignettes to the participants, and after each vignette, the experimenter asked the post-vignette questionnaire participants. The adolescent participants (12 years and older) were given the option to read the vignettes themselves or have the experimenter read them. All the questions were asked by the experimenter. Upon the completion of the vignettes and the questions about ToM false belief story tasks, the experimenter debriefed the children and compensated them with an electronic gift card.

3. Results

The organization and presentation of the results are similar to ADCAT research that was completed with adult (Cassidy et al., 2019; Masip et al., 2016) and child (Wyman et al., 2021) participants. In line with other lie-detection studies (e.g., Suckle-Nelson et al., 2010; Wyman et al., 2021), discriminate function analyses (DFAs) and receiver operating characteristic (ROC) curve analyses were used to assess whether the ADCAT measures could discriminate between children's hypothetical decisions to tell the truth or lie in each of the retained vignettes.

3.1. Vignette perceptions

3.1.1. Life relevance

Children were asked to rate, from 0 (situation not likely to happen) to 10 (situation very likely to happen), how likely a situation similar to those discussed in each vignette would happen in their real lives. Table 2 shows the mean (*SD*) life relevance scores for each vignette. A one sample *t*-test compared the mean life relevance scores of each vignette to the total life relevance mean score for the eight vignettes ($M = 4.05$). Overall, vignette #3 had a significantly lower mean life relevance score (Mdifference $= -1.59$) when compared to the average rating for the eight vignettes, $t(112) = -5.53$, $p < .001$.

Table 2
Life relevance of each vignette.

Vignette	Scenario	Mean (*SD*) Life Relevance out of 10
1	Physical bullying; familiar recipient; victim	4.42 (3.46)
2	Physical bullying; familiar recipient; bystander-witness	4.14 (3.39)
3	Physical bullying; unfamiliar recipient; victim	*2.46 (3.06)
4	Physical bullying; unfamiliar recipient; bystander-witness	3.66 (3.18)
5	Verbal bullying; familiar recipient; victim	4.30 (3.46)
6	Verbal bullying; familiar recipient; lie for bystander-witness	4.64 (3.32)
7	Verbal bullying; unfamiliar recipient; victim	4.47 (3.43)
8	Verbal bullying; unfamiliar recipient; lie for bystander-witness	4.34 (3.48)

* The mean life relevance score for vignette 3 was significantly different ($p < .05$) from the total mean score ($M = 4.05$) of the eight vignettes.

3.1.2. Truth and lie decision frequency

To increase the generalizability of the ADCAT results, Masip et al. (2016) developed two criteria for retaining vignettes for the subsequent ADCAT analyses. First, *n*Truth and *n*Lie should not be <10. Second, the differences between children's hypothetical decisions to be truthful or tell a lie in each scenario should not be >75 %. These two criteria were developed to limit the possibility of outliers, resulting from small *n*Truth and *n*Lie frequencies, distorting the general ADCAT findings (Masip et al., 2016). As seen in Table 3, the first criterion was met for vignettes 1, 3, 4, 5, 7 and 8, as at least ten children indicated that they would tell the truth or lie in these vignettes. Thus, vignettes 2 and 6 were not retained for the subsequent ADACT analyses. Vignettes 3 and 7 fulfilled the second criterion as the difference in the percentage of truth-tellers and lie-tellers was <75 %. These two vignettes were therefore retained for the ADCAT analyses. As the difference in the percentage of truth-tellers and lie-tellers was near 75 % for vignettes 1 (77.4 % difference), 5 (79.1 % difference) and 8 (75.7 % difference), these vignettes were also retained for the ADACT analyses. Finally, some children chose not to provide a response when asked if they would tell a hypothetical truth or lie on vignettes 3 ($n = 1$), 5 ($n = 2$), 7 ($n = 1$) and 8 ($n = 2$).

3.2. ADCAT analyses

The results from preliminary linear regression analyses indicated no issues related to multicollinearity between EV_{Truth}, EV_{Lie} and Lie Motivation for the five retained vignettes. Namely, the variance inflation factors (VIF) were all below 2.2 for these variables, which is well below the recommended VIF threshold of 5 needed to demonstrate possible issues of multicollinearity (Kim, 2019).

3.2.1. ADCAT correlates

Bivariate correlation analyses examined for correlations between

Table 3
Frequency of children's hypothetical truth and lie decisions in each vignette.

Vignette	Scenario	*n*Truth (%)	*n*Lie (%)	Truth/Lie % Difference
1	Physical bullying; familiar recipient; victim	102 (88.7 %)	13 (11.3 %)	77.4
2	Physical bullying; familiar recipient; bystander-witness	107 (93.0 %)	8 (7.0 %)	86
3	Physical bullying; unfamiliar recipient; victim	98 (85.2 %)	16 (13.9 %)	71.3
4	Physical bullying; unfamiliar recipient; bystander-witness	105 (91.3 %)	10 (8.7 %)	82.6
5	Verbal bullying; familiar recipient; victim	102 (88.7 %)	11 (9.6 %)	79.1
6	Verbal bullying; familiar recipient; bystander-witness	109 (94.8 %)	6 (5.2 %)	89.6
7	Verbal bullying; unfamiliar recipient; victim	95 (82.6 %)	19 (16.5 %)	66.1
8	Verbal bullying; unfamiliar recipient; bystander-witness	100 (87.0 %)	13 (11.3 %)	75.7

child age, ToM scores and the three ADCAT dependent measures (EV_{Truth}, EV_{Lie} and Lie Motivation) scores. With the exception of a small and positive correlation ($r = 0.26$, $p < .01$) between child age and EV_{Lie} scores on vignette 7, there were no significant correlations between child age, ToM and the ADCAT dependent measure scores for each of the five retained vignettes. Separate MANOVAs examined for gender differences on the three ADCAT dependent measures for each retained a vignette. Child gender was inputted as a dichotomous variable (male = 0, female = 1) as the majority of parents (97.4 %) identified their child's gender as either being male or female. The three participants who had a gender identified by their parents as 'other' were excluded from the five MANOVA preliminary analyses given the small sample size of this group. For vignette #5 (Verbal bullying, victim, familiar recipient), females ($M = 21.11$) reported a higher value of telling the truth (EV_{truth}) compared to males ($M = 11.13$), $F(1, 105) = 3.67$, $p = .058$. There were no significant gender differences on the ADCAT measures for the other four vignettes. Altogether, no developmental correlates were included in the following ADCAT analyses given the singular significant correlation between child age and EV_{Lie} for one vignette, along with the general lack of significant gender differences on the dependent measures.

Point-biserial correlations (r_{pb}) evaluated the relationships between the three ADCAT variables and the children's hypothetical decisions to lie (1) or tell the truth (0) for the five retained vignettes. For vignette #1, EV_{Lie} ($r = 0.28$, $p = .003$) and Lie Motivation ($r = 0.31$, $p = .001$) were positively correlated with decisions to tell a lie. Similarly, EV_{Lie} was positively correlated ($r = 0.23$, $p = .016$) with decisions to tell a lie for vignette #5. For vignette #7, EV_{Truth} ($r = -0.24$, $p = .010$) was negatively correlated with decisions to tell a lie, and Lie Motivation was positively correlated ($r = 0.31$, $p = .001$) with decisions to lie. The point biserial correlations were not significant for the ADCAT variables and decisions to lie on vignettes 3 and 8. Refer to Table 4 for the mean (*SD*) EV_{Truth}, EV_{Lie} and Lie Motivation scores for each vignette, along with the point-biserial correlation results.

3.2.2. ADCAT differences between truth-tellers and lie-tellers

Separate MANOVAs examined for differences between hypothetical truth-tellers and lie-tellers on the three ADCAT-dependent measures for the five retained vignettes. For each MANOVA, children's hypothetical decision to tell a truth (0) or lie (1) was the independent variable, and scores on EV_{Truth}, EV_{Lie} and Lie Motivation were the dependent variables. The results from the MANOVAs for the five retained vignettes are presented in Table 5. The overall MANOVA model was statistically significant for vignette #1, $F(2, 106) = 6.49$, $p = .002$; Wilk's $\Lambda = 0.90$, partial $\eta 2 = 0.11$. When analyzing the Pairwise Comparisons results, lie-tellers had significantly higher mean EV_{Lie} (*M* difference = 27.69, $p = .003$) and Lie Motivation (*M* difference = 40.83, $p = .001$) scores when compared to the truth-tellers (see Table 5). The overall MANOVA model was also statistically significant for vignette #7, $F(2, 106) = 5.93$, $p = .004$; Wilk's $\Lambda = 0.90$, partial $\eta 2 = 0.10$. Overall, truth-tellers had significantly higher mean EV_{Truth} (*M* difference = 14.34, $p = .018$) and lower Lie Motivation (*M* difference = −19.89, $p = .001$) scores than the lie-tellers (see Table 5). The MANOVA models were not statistically significant for vignettes 3, 5 and 8.

Table 4
Descriptive statistics and correlations (r_{pb}) for the ADCAT variables and decisions to lie.

Vignette	ADCAT variables	*M* (*SD*)	Decision to lie (r_{pb})
#1 Physical Bullying	EV_{Lie}	−4.22 (29.30)	0.28**
	EV_{Truth}	13.05 (30.67)	−0.10
• Victim	Lie Motivation	−17.35 (39.76)	0.31**
• Familiar Recipient			
#3 Physical Bullying	EV_{Lie}	−6.37 (27.89)	0.16
	EV_{Truth}	12.87 (29.54)	0.01
• Victim	Lie Motivation	−19.04 (36.87)	0.14
• Unfamiliar Recipient			
#5 Verbal Bullying	EV_{Lie}	−8.45 (24.89)	0.23*
	EV_{Truth}	15.65 (26.44)	−0.04
• Victim	Lie Motivation	−24.63 (31.87)	0.16
• Familiar Recipient			
#7 Verbal Bullying	EV_{Lie}	−5.06 (22.64)	0.09
	EV_{Truth}	10.81 (24.47)	−0.24*
• Victim	Lie Motivation	−14.94 (24.42)	0.31**
• Unfamiliar Recipient			
#8 Verbal Bullying	EV_{Lie}	−6.79 (26.21)	0.15
	EV_{Truth}	13.89 (24.57)	−0.004
• Bystander-witness	Lie Motivation	−21.39 (35.20)	0.13
• Unfamiliar Recipient			

* $p < .05$.
** $p < .01$.

3.2.3. ADCAT classification accuracy

Discriminant function analyses (DFAs) were used to predict children's hypothetical decisions to tell a truth or lie in each of the five retained vignettes. For each DFA, EV_{Lie}, EV_{Truth} and Lie Motivation were used to classify the children's hypothetical decisions as honest or deceptive. The grouping variable was whether the child indicated that they would tell a truth (0) or lie (1) in each of the five retained vignettes. Furthermore, the 'Leave One Out' cross-validation procedure was used for each analysis. The results from the five DFAs are presented in Table 6. The DFA model was statistically significant for Vignette #1, Wilks' $\Lambda = 0.89$, $\chi 2(2) = 12.25$, $p = .002$. More specifically, 74.5 % of truth cases and 72.7 % of lie cases were correctly classified for this vignette. The DFA Model was also statistically significant for vignette #7, Wilks' $\Lambda = 0.90$, $\chi 2(2) = 11.24$, $p = .004$. For this vignette, 60 % of truth cases and 73.7 % of lie cases were correctly classified. The DFA models were not statistically significant for vignettes 3, 5 and 8. As seen in Table 6, the lie cases were correctly classified at a higher rate than the truth cases for these three vignettes.

Receiver operating characteristic (ROC) curve analyses evaluated the accuracy of the ADCAT model predictions for each of the five retained vignettes. According to Mandrekar (2010), an Area Under the ROC Curve (AUC) score of 0.5 suggests no discrimination (i.e., the ADCAT model did not accurately distinguish between truth-tellers or lie-tellers); whereas an AUC score of 0.7 is considered 'acceptable' discrimination and above 0.8 is considered 'excellent' discrimination. For each ROC analysis, EV_{Lie}, EV_{Truth} and Lie Motivation were the test variables and the children's truth/lie decisions were the state variables. On vignette #1, EV_{Lie} (AUC = 0.76) and Lie Motivation (AUC = 0.77), but not EV_{Truth} (AUC = 0.38), had AUC scores in the 'acceptable' discrimination range. For vignette #7, only the Lie Motivation AUC score (0.73) fell in the 'acceptable' discrimination range. The AUC scores for the EV_{Lie}, EV_{Truth} and Lie Motivation variables were all below 0.7 on vignettes 3, 5 and 8.

4. Discussion

The main objective of this study was to examine the relationship between the ADCAT-dependent measures and children's hypothetical decisions about telling truths or lies in the context of school bullying. The Activation Decision-Construction Theory (ADCAT) utilizes a cost-benefit formula to explain cognitive processes involved in deception. Prior research, while mixed, suggests that this cost-benefit model can be used to anticipate future deceptive behaviours of adults (Cassidy et al., 2019; Masip et al., 2016; Walczyk et al., 2016). As with Cassidy et al. (2019) and Wyman et al. (2021), the current findings provide mixed support for Walczyk et al.'s (2014) original ADCAT hypotheses. Namely, the three ADCAT dependent measures, EV_{Truth}, EV_{Lie} and Lie Motivation, served as significant correlates of children's hypothetical decisions to tell lies in some, but not all, contexts of school bullying. Higher EV_{Lie} and Lie Motivation scores were associated with an increased likelihood of telling

Table 5
MANOVA results: Differences between hypothetical truth-tellers and lie-tellers on the ADCAT *measures*.

Vignette	*M* Truth-teller (*SD*)	*M* Lie-teller (*SD*)	*B*	*t*	*p*	*95 % CI*
#1 Physical Bullying						
• Victim						
• Familiar Recipient						
EV_{Lie}**	−7.23 (28.57)	20.45 (24.46)	−27.69	−3.08	0.003	−45.50 to −9.88
EV_{Truth}	14.24 (30.21)	1.09 (34.04)	13.14	1.35	0.179	−6.14 to 32.43
Lie Motivation**	−21.47 (37.72)	19.36 (40.37)	−40.83	−3.38	0.001	−64.77 to −16.19
#3 Physical Bullying						
• Victim						
• Unfamiliar Recipient						
EV_{Lie}	−8.19 (27.74)	4.73 (28.11)	−12.92	−1.67	0.097	−28.22 to 2.38
EV_{Truth}	12.86 (29.75)	11.00 (26.87)	1.86	0.23	0.820	−14.32 to 18.05
Lie Motivation	−21.05 (38.36)	−6.27 (22.44)	−14.79	−1.45	0.150	−34.99 to 5.42
#5 Verbal Bullying						
• Victim						
• Familiar Recipient						
EV_{Lie}	−10.29 (24.84)	4.50 (13.42)	−14.79	−1.85	0.067	−30.63 to 1.04
EV_{Truth}	15.96 (27.14)	12.50 (18.61)	3.46	0.39	0.695	−13.97 to 20.89
Lie Motivation	−26.26 (32.66)	−8.00 (14.63)	−18.26	−1.75	0.084	−38.99 to 2.48
#7 Verbal Bullying						
• Victim						
• Unfamiliar Recipient						
EV_{Lie}	−6.07 (23.00)	−0.53 (22.06)	−5.54	−0.96	0.34	−16.98 to 5.90
EV_{Truth}*	12.34 (24.24)	−2.00 (19.81)	14.34	2.41	0.018	2.56 to 26.13
Lie Motivation**	−18.41 (24.03)	1.47 (19.49)	−19.89	−3.38	0.001	−31.16 to −8.21
#8 Verbal Bullying						
• Bystander-witness						
• Unfamiliar Recipient						
EV_{Lie}	−8.26 (26.18)	4.23 (24.63)	−12.49	−1.63	0.107	−27.71 to 2.74
EV_{Truth}	14.73 (24.66)	13.62 (19.11)	1.11	0.16	0.876	−13.00 to 15.21
Lie Motivation	−22.98 (35.25)	−9.39 (33.70)	−13.60	−1.31	0.192	−34.12 to 6.93

* $p < .05$.
** $p < .01$.

Table 6
Discriminant function analysis results: ADCAT cross-validated classification accuracy (%) for children's hypothetical decisions to tell a truth or lie.

Vignette	Scenario	Truth accuracy	Lie accuracy	Total accuracy
1[1]	Physical bullying; familiar recipient; victim	74.5 %	72.7 %	74.3 %
3	Physical bullying; unfamiliar recipient; victim	60.0 %	66.7 %	60.9 %
5	Verbal bullying; familiar recipient; victim	54.9 %	90.0 %	58.0 %
7[2]	Verbal bullying; unfamiliar recipient; victim	60.0 %	73.7 %	62.4 %
8	Verbal bullying; unfamiliar recipient; bystander-witness	56.1 %	76.9 %	58.6 %

[1] The DFA Model was statistically significant for vignette #1.
[2] The DFA Model was statistically significant for vignette #7.

a hypothetical lie in a physical bullying incident involving themselves when reporting to a familiar person (Vignette 1). Higher EV_{Lie} scores were also positively correlated with hypothetical decisions to lie in a verbal bullying incident involving themselves when reporting to a familiar person (Vignette 5). For vignette #7, EV_{Truth} was negatively correlated with lie decisions in a verbal bullying incident involving themselves when reporting to an unfamiliar person, and Lie Motivation was positively correlated with lie decisions. Conversely, the three ADCAT measures were not significant correlates of lie decisions for vignette #3, which discussed physical bullying incidents involving themselves and when reporting to an unfamiliar recipient, nor for vignette #8, which discussed verbal bullying towards a friend and when disclosing to an unfamiliar recipient. The current study was the first to explore whether the ADCAT model can be used to understand children's and adolescents' hypothetical truth and lies about different forms of school bullying. In the only other study to date that examined the effectiveness of ADCAT with children, Wyman et al. (2021) found EV_{Truth} and Lie Motivation were significant correlates for children's (ages 6 to 11) hypothetical truth/lie decisions for self-oriented lies with no cost to self and lies for another with a cost to self; however, EV_{Lie} was not a significant correlate of children's hypothetical truth and lie decisions. The current study expands on Wyman et al. (2021) by including young adolescents in the sample (ages 7–14). The summary of the findings can be found in Table 7.

The current findings suggest that children's truth and lie-telling decision-making processes, namely EV_{Truth}, EV_{Lie} and Lie Motivation, were somewhat impacted by the type of bullying event (physical versus verbal) and the type of disclosure recipient (familiar adult versus unfamiliar adult). MANOVA models were significant for hypothetical scenarios which contained physical bullying incidents involving themselves when reporting to a familiar person (i.e., Vignette 1) and a verbal bullying incident involving themselves when reporting to an unfamiliar person (i.e., Vignette 7). For vignette #1, lie-tellers had significantly higher EV_{Lie} and Lie Motivation scores than the truth-tellers. This means lie-tellers perceive the estimated value of lie-telling to be higher in the context of physical bullying involving themselves when reporting to a familiar person than the truth-tellers. One possible explanation for this finding could be that parental overreaction to physical bullying events is one of the key reasons that children and adolescents do not share the bullying event with their parents (DeLara, 2012). Children and adolescents may want to avoid being perceived as vulnerable or dependent during late childhood and adolescence. As a result, they are more likely to conceal

Table 7
Summary of Findings.

Hypotheses	Findings	Support
Hypothesis 1a: EV_{Lie} and Lie Motivation (M) to be positively correlated with hypothetical decisions to lie in each scenario and EV_{Truth} scores to be negatively correlated with decisions to conceal in each scenario.	1. Higher EV_{Lie} and Lie Motivation scores were associated with an increased likelihood of telling a hypothetical lie (Vignette 1). 2. Higher EV_{Lie} scores were also positively correlated with hypothetical decisions to lie (Vignette 5) 3. EV_{Truth} was negatively correlated with lie decisions and Lie Motivation was positively correlated with lie decisions (Vignette 7).	Hypothesis 1a was partially supported for Vignettes 1, 5 and 7 among retained five vignettes.
Hypothesis 1b: We expect hypothetical lie-tellers to have significantly higher EV_{Lie} and Lie Motivation scores than truth-tellers, and we expect truth-tellers to have higher EV_{Truth} scores compared to lie-tellers.	1. Lie-tellers had significantly higher EV_{Lie} and Lie Motivation scores than the truth-tellers (Vignette 1). 2. Truth-tellers had significantly higher EV_{Truth} scores but significantly lower Lie Motivation scores compared to the lie-tellers. (Vignette 7).	Hypothesis 1b was partially supported for Vignettes 1 and 7 among retained five vignettes.
Hypothesis 2a: We expected ToM to be positively correlated with EV_{Lie} and Lie Motivation scores. Hypothesis 2b: Participant age is not expected to be significantly correlated with scores on the three ADCAT-dependent measures.	1. There were no significant correlations found between ToM scores and scores on the ADCAT-dependent measures. 2. With the exception of a small and positive correlation between child age and EV_{Lie} scores on Vignette 7, there were no significant correlations between child age, ToM and the ADCAT dependent measure scores.	Hypothesis 2a was not supported. Hypothesis 2b was supported with an exception of a limited correlation between age and EV_{Lie} scores on Vignette 7.
Hypothesis 2c: We anticipate no significant gender differences in ADCAT-dependent measure scores.	Females reported a higher value of truth-telling than males in vignette 5, which involved verbal bullying towards oneself and disclosing to a familiar recipient.	Hypothesis 2c was partially supported with the exception of gender differences found in Vignette 5.
Additional Findings	For Vignettes 1 and 7 EV_{Lie} and Lie Motivation, obtained a higher accuracy rate when classifying children's hypothetical truth and lie statements.	N/A

instances of physical bullying (DeLara, 2012). In vignette #7, truth-tellers had significantly higher EV_{Truth} scores but significantly lower Lie Motivation scores compared to the lie-tellers. This means that truth-tellers showed a greater anticipated value in telling the truth and lower overall motivation to lie when disclosing a verbal bullying incident to someone they are unfamiliar with. One possible explanation is that verbal bullying is often perceived as less costly and inconsequential compared to physical bullying due to the harm it involves (Bell & Willis, 2016). In addition, children may believe that an unfamiliar adult is less likely to intervene than a familiar adult, such as a teacher, especially if the situation doesn't involve physical harm, as familiarity with the victim is one of the factors that determine the likelihood of intervention (Bennett et al., 2014). Research among teachers and counsellors has shown that physical harassment is perceived as more serious compared to verbal harassment (Hazler et al., 2001). Therefore, they may be perceived as less inclined to intervene in instances of verbal bullying since they may not perceive it as serious as physical bullying. Furthermore, a qualitative study by Mishna et al. (2006) has shown that children, parents and educators define indirect bullying, such as acts as verbal aggression, as less serious and less likely to lead intervention by educators and parents.

There were no significant truth versus lie-teller score differences on the EV_{Lie}, EV_{Truth} and Lie Motivation measures for vignettes 3 (physical bullying towards oneself and disclosing to an unfamiliar recipient), 5 (verbal bullying towards oneself and disclosing to a familiar recipient) and 8 (verbal bullying towards a friend and disclosing to an unfamiliar recipient). This could be due to the complexity of the factors that are related to bullying disclosure in children and adolescents, such as the confidentiality level of the respondent, the victim's feeling of need to be independent (Wójcik & Rzeńca, 2021), and other factors such as perceived teacher attitude and chronicity of victimization (Blomqvist et al., 2020). Namely, for vignette 3 (physical bullying towards oneself and disclosing to an unfamiliar recipient), some participants may have thought the unfamiliar adult would not consider it important enough to take action; therefore, it might not be worth disclosing. Meanwhile, others might have thought that telling the unfamiliar adult about the physical bullying incident might make things worse in case the adult confronts the perpetrator or calls the victim's parents. Jones et al. (2015) found that youth disclosed 60 % of the harassment incidents to an adult. Their reasons for not telling an adult included things such as being embarrassed and fear that adults would make the situation worse or that the perpetrator would make things worse (Jones et al., 2015). Furthermore, youth were more likely to disclose in-person harassment incidents (54 %) to teachers compared to solely online or mixed incidents. This highlights that although, in most cases, youth prefer disclosing harassment incidents to an adult, they prefer teachers to be involved as confidants (Jones et al., 2015). Future research should consider involving unfamiliar adults, such as adult bystanders, parents of other children, and school staff, as potential confidants in the design as it might be related to children's decisions to conceal bullying events.

For vignette 5 (verbal bullying incident involving themselves when reporting to a familiar person), the variance in perceived consequences of verbal bullying to a familiar person might have caused non-significant differences between hypothetical truth-tellers and lie-tellers on the three ADCAT-dependent measures. Although verbal bullying might be perceived as less costly, which makes it somewhat more disclosable compared to physical bullying incidents, the fact that the recipient is a familiar adult might invoke emotional reactions such as being afraid of being perceived as a "snitch" and/or fear of being victimized (Thornberg et al., 2012). The current findings highlight the dilemma of disclosing bullying incidents due to two interacting factors: the familiarity of the recipient and the nature of the event.

Regarding vignette 8 (verbal bullying towards a friend and disclosing to an unfamiliar recipient), the non-significant results could be due to the complexity of bystander behaviour. Bystanders' willingness to seek help for victims depends on how they interpret the harm associated with the incident. While some might perceive verbal incidents as harmful, others may view them as less damaging (Thornberg et al., 2012). Future studies should examine how perceptions of harm affect children's decisions to conceal bullying events.

Discriminant Function Analysis (DFAs) models were significant for the scenario that contained physical bullying incidents involving themselves when reporting to a familiar person (Vignette 1; 74.5 % truth accuracy; 72.7 % lie accuracy), as well as for the scenario that contained a verbal bullying incident involving themselves when reporting to an unfamiliar person (Vignette 7; 60.0 % truth accuracy; 73.7 % lie accuracy). Follow-up ROC analyses indicated that EV_{Lie} and Lie Motivation met the acceptable discrimination threshold (i.e., ROC $\geq$0.7) for

discriminating between children's hypothetical truth and lie decisions for vignette 1, and Lie Motivation met the acceptable threshold for vignette 7. The DFA models were not significant for vignettes 3, 5 and 8, and the ADCAT dependent measures did not meet the acceptable ROC discrimination threshold for these vignettes.

In a meta-analysis conducted by Gongola et al. (2017), it was found that when adults were asked to distinguish between truthful and deceptive statements made by children, the average accuracy rate was 54 %. This suggests that adults were not particularly proficient at distinguishing between children's truthful statements and lies. Adults exhibited greater proficiency in identifying children's truthful statements (63.8 %) compared to deceptive ones (47.52 %). Compared to adults' accuracy in classifying children's statements as truth and lies, ADCAT dependent measures, particularly EV_{Lie} and Lie Motivation, obtained a higher accuracy rate when classifying children's hypothetical truth and lie statements for vignettes 1 and 7. This suggests that ADCAT-dependent measures, EVLie and Lie Motivation, in particular, can be used to accurately classify the truth and lie-tellers in these two contexts. Therefore, from a practical standpoint, ADCAT-dependent measures may be used as a deception detection strategy in certain contexts.

The current findings build on the four ADCAT studies, one with children (Wyman et al., 2021) and three with adults (Cassidy et al., 2019; Masip et al., 2016; Walczyk et al., 2016). Although previous studies have produced mixed findings, they generally suggest that the Decision component of the ADCAT model can potentially be used to predict children's and adults' decisions to tell the truth or lies. Our findings reflect some differences from the ADCAT studies involving adult respondents (Cassidy et al., 2019; Masip et al., 2016; Walczyk et al., 2016); this could be due to the content of the vignettes and scenarios that were used in those studies. The content of the scenarios to evaluate the hypothetical decisions of adults involved daily dilemmas such as forgetting to write an assignment and whether to lie about it (e.g., Cassidy et al., 2019), whether to lie about during a job interview (e.g., Walczyk et al., 2016) and transgressions such as damaging a valuable object (Masip et al., 2016). On the contrary, the content of the vignettes that were used in this study was about a negative experience that involved victimization. Therefore, decisions to conceal in situations involving experienced or witnessed peer victimization could be potentially different from events that involve telling a lie for personal gain. Disclosing peer victimization could be stressful, and factors such as powerlessness, victim-blaming, and fear of losing the relationship with the bully can influence the decision to disclose the event (Mishna & Alaggia, 2005).

A secondary objective of this study was to examine potential developmental factors, namely child age, gender and ToM performance, that could impact children's ADCAT scores. Overall, there were no significant correlations found between ToM scores and scores on the ADCAT-dependent measures. This finding is contrary to Wyman et al. (2021), who reported higher ToM was related to EV_{Truth} when children considered telling a lie for someone else at a personal cost. Moreover, they also found higher ToM was associated with increased Lie Motivation when telling other-oriented lies when there was a personal cost for doing so (Wyman et al., 2021). Wyman et al. (2021) had a younger age sample (6 to 11 years old) when compared to the current study (7 to 14 years old). Theory of mind ability has been found to facilitate lie-telling maintenance for younger children under the age of 7 (Leduc et al., 2017; Talwar et al., 2007). As our sample included typically developing school-aged children and young adolescents, it is likely that they had already developed sufficient ToM skills needed to develop hypothetical truth and lie decisions in the different contexts of bullying. This is further reflected in the limited significant correlations between child age and ADCAT dependent measure scores for the five retained vignettes. Future studies should explore how children and adolescents use ToM to guide their decisions about disclosing or concealing information. In terms of gender differences, females reported a higher value of truth-telling than males in vignette 5, which involved verbal bullying towards oneself and disclosing to a familiar recipient. This could be due to girls being more likely to report being bullied than boys, as well as verbal bullying being more prevalent among girls than physical bullying (Blomqvist et al., 2020; Unnever & Cornell, 2004; Wang et al., 2012). Nevertheless, there were no significant gender differences in ADCAT dependent measure scores for the other retained vignettes.

4.1. Implications

The current study was the first to explore whether the ADCAT model can be used to understand children's and adolescents' hypothetical truth and lies about different forms of school bullying. Bullying is a major health concern and concern with significant long-term health implications for those involved (Srabstein & Leventhal, 2010). It is, therefore, important to identify any bullying incidents early to prevent or reduce more serious outcomes. Previous research has focused heavily on understanding factors that put a child at risk of being bullied and the consequences of having been bullied (e.g., Arseneault et al., 2010; Barzilay et al., 2017; Kowalski et al., 2019), but there is still much to be known about how children decide whether and when to disclose that bullying is occurring. The current study added to this growing body of literature by investigating children's cost-benefit appraisal of concealment cases of school bullying. It also extended the current understanding by examining the impact of the type of bullying (verbal vs. physical), the type of exposure to bullying (victim vs. bystander-witness), and the familiarity of the person to whom they could disclose or not (familiar adult vs. unfamiliar adult). This study explored some of the complexities in cases of school bullying that might influence decisions of whether to tell or not to inform future interventions better to promote disclosure.

The current findings provide support for some truth-induction strategies, such as hearing social approval and the positive consequences of honesty (Talwar et al., 2015, 2016). Namely, Talwar et al. (2015) showed that using external verbal appeals such as 'I would be happy if you tell me the truth' was effective in terms of reducing children's concealment behaviour. Another example is that when children heard a moral story that highlighted the positive consequences of honesty, they were less likely to conceal their own transgression in an experimental paradigm (Talwar et al., 2016). The studies by Talwar et al. (2015, 2016) indicate that children tend to be influenced by the positive outcomes of sharing information, particularly if it leads to social approval. This aligns with our research, which suggests that children value telling the truth when they believe that doing so will not result in negative consequences.

The current findings have implications for teachers, parents and legal professionals who work with children and adolescents. Our findings suggest that the type of bullying (physical versus verbal) and disclosure recipient (familiar versus unfamiliar person) may influence children's perceptions of the value of truth-telling and lie-telling, particularly for vignettes 1(i.e., physical bullying incidents involving themselves when reporting to a familiar person) and 7 (i.e., verbal bullying incidents involving themselves when reporting to an unfamiliar person). Further, how children perceive the consequences of disclosure is one of the major factors that influence their decisions to conceal bullying events. In cases of physical bullying that results in harm to the victim, lying may appear more beneficial than telling the truth. This is because the social consequences of telling the truth can worsen the situation, particularly when teacher or practitioner intervention is necessary. Practitioners should, therefore, assess potential harm resulting from disclosure and minimize it for children (Mishna & Alaggia, 2005).

4.2. Limitations and directions for future research

There are some limitations to the current study. First, this study included vignettes that discussed examples of in-person bullying involving physical and verbal aggression. Future research is needed to investigate children's hypothetical decisions to disclose or non-disclose

cyberbullying events, especially given that cyberbullying is increasingly prevalent during early adolescence (Kowalski et al., 2019). Second, in our study, children were asked whether they would report the bullying event they were exposed to or witnessed to a teacher or an unfamiliar adult. In other words, only one conception of familiarity was used in the current study. However, children's likelihood of disclosing negative events, such as sexual abuse, may vary depending on the recipients. As children grow older, they are more likely to confide in their peers and teachers (Malloy et al., 2013). Moreover, Lavoie and Talwar (2022) found that adolescents endorse disclosure to both parents and friends. In the context of secret-keeping, adolescents kept fewer secrets from best friends than mothers and disclosed more information to best friends (Solís et al., 2015). Future studies should investigate how different recipients, such as friends, parents and teachers, influence children's perceived cost-benefit of telling the truth or a lie. Third, this study investigated children's hypothetical decisions to tell the truth or a lie. Given that children's attitudes towards lie-telling do not always reflect their actual lie-telling behaviour (Talwar et al., 2002), future research should examine whether ADCAT can predict children's actual truth and lie-telling behaviours using an experimental paradigm. Lastly, a priori power analyses to determine the adequate sample size were not performed for this study; future studies should perform a priori power analyses before collecting data to obtain an accurate estimate of the sample size needed for a sufficient level of statistical power.

Furthermore, as the respondents had answered the interviewer directly about what they would have done in a hypothetical situation, it could have introduced a truth-default bias (Levine, 2022). Children's responses may have been influenced by social conformity since they were interacting with another person. For example, the truth/lie frequency difference was only under 75 % for vignettes 3 and 7; nevertheless, we did include vignettes 1, 5 and 8 in the ADCAT analyses, given that their truth/lie frequency difference was near 75 %. Adult research using questionnaires may have been more successful in eliciting lies because the responses are answered privately without any interaction with an experimenter. However, this study reflects real-life situations where children would respond directly to another person. Future studies should compare the effectiveness of different methods, such as responding to a person's questions versus responding anonymously.

Finally, while our sample included children with diverse racial and family backgrounds (see Supplementary Materials section for detailed demographic information), there is a great need in the developmental and forensic literature to have samples that are representatives of children with diverse racial, cultural and socio-economic backgrounds. For example, recent research by Tong et al. (2023) and Shohoudi-Mojdehi et al. (2022) discussed cross-cultural differences in moral evaluations and standards of different lies. Future cross-cultural research is therefore recommended for a better understanding of children's decision-making when they decide to disclose or conceal the wrongdoings of others.

5. Conclusions

This was the first study to use the ADCAT model to understand the predictors of children's disclosure and non-disclosure in cases involving bullying. Our findings provide mixed support for the ADCAT-dependent measures, EVLie, EVTruth and Lie Motivation, for understanding and predicting children's decisions to tell the truth or lie in different situations involving verbal and physical bullying. Namely, EV_{Lie} and Lie Motivation scores were effective for understanding and predicting children's hypothetical decisions to disclose or not disclose to a familiar adult in a situation involving physical bullying towards themselves. Whereas EV_{Truth} and Lie Motivation were useful for understanding and predicting children's hypothetical decisions to disclose to an unfamiliar adult about a verbal bullying incident involving themselves. Conversely, the ADCAT-dependent measures were not effective in understanding children's truth and lie decisions for the other situations of physical and verbal bullying, such as when the target of the bullying was a friend. Altogether, this study provides further understanding towards the complexities in cases of school bullying, particularly as it relates to social-cognitive factors that encourage or discourage child and adolescent disclosures of these events. Our findings indicate that specific contextual factors, such as the recipient and the situation, affect how children perceive the cost and benefit of concealment in school bullying incidents. Therefore, further research is needed to explore the impact of other factors.

CRediT authorship contribution statement

Ipek Isik: Writing – review & editing, Writing – original draft, Resources, Investigation, Data curation, Conceptualization. **Joshua Wyman:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Data curation, Conceptualization. **Hannah Cassidy:** Writing – review & editing, Methodology, Conceptualization. **Victoria Talwar:** Writing – review & editing, Supervision, Methodology, Funding acquisition, Conceptualization.

Declaration of competing interest

There were no personal or institutional conflicts of interest pertaining to the subject matter or materials discussed in this manuscript.

Acknowledgements

This research is supported by the grant from Natural Sciences and Engineering Research Council RGPIN-2019-04453.

Appendix A. Post vignette questionnaire calculation example

EV_{Lie}
$= (p_{believed} \times v_{believed}) + (p_{not\_believed} \times v_{not\_believed})$
$= (10 \times 5) + (0 \times 3)$
$= 50$
EV_{Truth}
$= (p_{believed} \times v_{believed}) + (p_{not\_believed} \times v_{not\_believed})$
$= (8 \times 3) + (2 \times 4)$
$= 32$
Lie Motivation
$(EV_{Lie}) - (EV_{Truth})$
$= 50–32$
$= 18$

Appendix B. Vignette scenarios

Vignette 1 – Physical/Familiar Recipient/Victim:

At school, you are playing tag outside at recess with your friends. While you are running, another student pushes you on purpose and laughs. This student has done this to you many times before. They then say they will do this again if you tell anyone about it. Since you have a cut on your knee because you were pushed on the ground, your teacher asks you what happened. Your teacher did not see what happened. What do you do next?

Vignette 2 – Physical/Familiar Recipient/Bystander-witness:

You and your friend are taking off your coats after recess. You then see another student push your friend onto the ground. This student then laughs at your friend. Your friend gets up and says that they are okay. You've seen this student push your friend many times before. The student tells you and your friend to keep quiet, or else it will happen again to your friend. Since your friend has a cut on your knee, your teacher asks you what happened. Your teacher did not see what happened. What do you do next?

Vignette 3- Physical/Unfamiliar Recipient/Victim:

You are in the bathroom washing your hands. Suddenly, another student grabs your head and puts it in the sink while the water goes on

your head. They let go and laugh. This student has done this to you many times before. They tell you not to tell anyone, or else it will happen again. While walking back to class, an adult you do not know asks what happened since your hair is wet. What do you do next?

Vignette 4- Physical/Unfamiliar Recipient/Bystander-witness:

It is raining and you are outside at recess—the recess bell rings, which means that it is time to go inside. As you are walking towards the school, another student pushes your friend into a puddle of mud. You've seen this student push your friend many times before. They tell you and your friend to keep quiet, or else. Once inside, an adult you do not know asks you what happened to your friend since they are covered in mud.

Vignette 5- Verbal/Familiar Recipient/Victim:

You are sitting eating lunch, and you spill some of your juice on the floor. Another student calls you a "clumsy pig." Everyone in the class laughs at you. This student has said mean things to you many times before. The student tells you "not to tattle, or else". Your teacher did not see what happened, but they asked you what happened because you look sad. What do you do next?

Vignette 6- Verbal/Familiar Recipient/Bystander-witness:

Your friend comes to school wearing a new jacket. Another student says that your friend "looks terrible" in their new coat. Your friend looks sad. The student then tells your friend "not to tattle, or else". The student then walks away. When you ask if they are okay, your friend says that this student has said mean things to them many times before. Your teacher did not see what happened, but they asked you what happened because your friend looks sad. What do you do next?

Vignette 7- Verbal/Unfamiliar Recipient/Victim:

You are in the library picking out a book to read. Another student bumps into you and calls you a "big doofus" for getting in their way. The student tells you "not to tattle or else". The student walks away. An adult who you do not know walks over and asks what happened because you look sad. The adult did not see what happened. What do you do next?

Vignette 8- Verbal/Unfamiliar Recipient/Bystander-witness:

You are in the library with your friend. Another student walks up to your friend and tells them that "they look stupid." The student then tells your friend "not to tattle, or else". The student then walks away. Your friend looks sad. When you ask if they are okay, your friend says that this student has said mean things to them many times before. An adult, who you do not know, walks over and asks you what happened because your friend looks sad. The adult did not see what happened. What do you do next?

Appendix C. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.actpsy.2025.104744.

Data availability

Data will be made available on request.

References

Almas, A. N., Grusec, J. E., & Tackett, J. L. (2011). Children's disclosure and secrecy: Links to maternal parenting characteristics and children's coping skills. *Social Development, 20*(3), 624–643. https://doi.org/10.1111/j.1467-9507.2010.00602.x

Arseneault, L., Bowes, L., & Shakoor, S. (2010). Bullying victimization in youths and mental health problems: 'Much ado about nothing'? *Psychological Medicine, 40*(5), 717–729. https://doi.org/10.1017/S0033291709991383

Barzilay, S., Klomek, A. B., Apter, A., Carli, V., Wasserman, C., Hadlaczky, G., … Brunner, R. (2017). Bullying victimization and suicide ideation and behavior among adolescents in Europe: A 10-country study. *Journal of Adolescent Health, 61*(2), 179–186. https://doi.org/10.1016/j.jadohealth.2017.02.002

Bell, K. J., & Willis, W. G. (2016). Teachers' perceptions of bullying among youth. *The Journal of Educational Research, 109*(2), 159–168. https://doi.org/10.1080/00220671.2014.931833

Bennett, S., Banyard, V. L., & Garnhart, L. (2014). To act or Nnot to act, that is the question? Barriers and facilitators of bystander intervention. *Journal of Interpersonal Violence, 29*(3), 476–496. https://doi.org/10.1177/0886260513505210

Białecka-Pikul, M., Szpak, M., Zubek, J., Bosacki, S., & Kołodziejczyk, A. (2020). The psychological self and advanced theory of mind in adolescence. *Self and Identity, 19*(1), 85–104. https://doi.org/10.1080/15298868.2018.1538900

Bjereld, Y., Daneback, K., & Mishna, F. (2021). Adults' responses to bullying: The victimized youth's perspectives. *Research Papers in Education, 36*(3), 257–274. https://doi.org/10.1080/02671522.2019.1646793

Björkqvist, K., Lagerspetz, K. M., & Kaukiainen, A. (1992). Do girls manipulate and boys fight? Developmental trends in regard to direct and indirect aggression. *Aggressive Behavior, 18*(2), 117–127. https://doi.org/10.1002/1098-2337(1992)18:2<117::AID-AB2480180205>3.0.CO;2-3

Black, S., Weinles, D., & Washington, E. (2010). Victim strategies to stop bullying. *Youth Violence and Juvenile Justice, 8*(2), 138–147. https://doi.org/10.1177/1541204009349401

Blomqvist, K., Saarento-Zaprudin, S., & Salmivalli, C. (2020). Telling adults about one's plight as a victim of bullying: Student-and context-related factors predicting disclosure. *Scandinavian Journal of Psychology, 61*(1), 151–159. https://doi.org/10.1111/sjop.12521

Cantarero, K., Byrka, K., & Krol, M. (2021). It's not really lying. Autism spectrum disorder relates to lower recognition of other-oriented lies through a decrease in perceived intentionality of the liar. *Research in Autism Spectrum Disorders, 86*, Article 101806. https://doi.org/10.1016/j.rasd.2021.101806

Cassidy, H., Wyman, J., Talwar, V., & Akehurst, L. (2019). Activation-decision-construction-action theory model: An explorative study of how cost-benefit calculations influence adults' truth-telling and lying behaviours for antisocial versus prosocial lies. *Legal and Criminological Psychology, 24*, 87–102. https://doi.org/10.1111/lcrp.1214310.1007/s10964-006-9058-1

Cortes, K. I., & Kochenderfer-Ladd, B. (2014). To tell or not to tell: What influences children's decisions to report bullying to their teachers? *School Psychology Quarterly, 29*(3), 336. https://doi.org/10.1037/spq0000078

Darling, N., Cumsille, P., Caldwell, L. L., & Dowdy, B. (2006). Predictors of adolescents' disclosure to parents and perceived parental knowledge: Between-and within-person differences. *Journal of Youth and Adolescence, 35*, 659–670. https://doi.org/10.1007/s10964-006-9058-1

De Goede, I. H., Branje, S. J., & Meeus, W. H. (2009). Developmental changes in adolescents' perceptions of relationships with their parents. *Journal of Youth and Adolescence, 38*, 75–88. https://doi.org/10.1007/s10964-008-9286-7

Debey, E., De Schryver, M., Logan, G. D., Suchotzki, K., & Verschuere, B. (2015). From junior to senior Pinocchio: A cross-sectional lifespan investigation of deception. *Acta Psychologica, 160*, 58–68. https://doi.org/10.1016/j.actpsy.2015.06.007

DeLara, E. W. (2012). Why adolescents don't disclose incidents of bullying and harassment. *Journal of School Violence, 11*(4), 288–305. https://doi.org/10.1080/15388220.2012.705931

Dykstra, V. W., Willoughby, T., & Evans, A. D. (2020). A longitudinal examination of the relation between lie-telling, secrecy, parent–child relationship quality, and depressive symptoms in late-childhood and adolescence. *Journal of Youth and Adolescence, 49*, 438–448. https://doi.org/10.1007/s10964-019-01183-z

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

Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G*Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39*(2), 175–191. https://doi.org/10.3758/bf03193146

Fekkes, M., Pijpers, F. I., & Verloove-Vanhorick, S. P. (2005). Bullying: Who does what, when and where? Involvement of children, teachers and parents in bullying behavior. *Health Education Research, 20*(1), 81–91. https://doi.org/10.1093/her/cyg100

Finkenauer, C., Engels, R. C., & Meeus, W. (2002). Keeping secrets from parents: Advantages and disadvantages of secrecy in adolescence. *Journal of Youth and Adolescence, 31*, 123–136. https://doi.org/10.1023/A:1014069926507

Frijns, T., Finkenauer, C., Vermulst, A. A., & Engels, R. C. (2005). Keeping secrets from parents: Longitudinal associations of secrecy in adolescence. *Journal of Youth and Adolescence, 34*, 137–148. https://doi.org/10.1007/s10964-005-3212-z

Fujikawa, S., Mundy, L. K., Canterford, L., Moreno-Betancur, M., & Patton, G. C. (2021). Bullying across late childhood and early adolescence: A prospective cohort of students assessed annually from grades 3 to 8. *Academic Pediatrics, 21*(2), 344–351. https://doi.org/10.1016/j.acap.2020.10.011

Gini, G., & Pozzoli, T. (2009). Association between bullying and psychosomatic problems: A meta-analysis. *Pediatrics, 123*(3), 1059–1065. https://doi.org/10.1542/peds.2008-1215

Gongola, J., Scurich, N., & Quas, J. A. (2017). Detecting deception in children: A meta-analysis. *Law and Human Behavior, 41*(1), 44–54. https://doi.org/10.1037/lhb0000211

Hazler, R. J., Miller, D. L., Carney, J. V., & Green, S. (2001). Adult recognition of school bullying situations. *Educational Research, 43*(2), 133–146.

Heinsberg, L. W., & Weeks, D. E. (2022). Post hoc power is not informative. *Genetic Epidemiology, 46*(7), 390–394. https://doi.org/10.1002/gepi.22464

Hogrefe, G. J., Wimmer, H., & Perner, J. (1986). Ignorance versus false belief: A developmental lag in attribution of epistemic states. *Child Development, 57*(3), 567–582. https://doi.org/10.2307/1130337

Jones, L. M., Mitchell, K. J., & Turner, H. A. (2015). Victim reports of bystander reactions to in-person and online peer harassment: A national survey of adolescents. *Journal of Youth and Adolescence, 44*, 2308–2320. https://doi.org/10.1007/s10964-015-0342-9

Kim, J. H. (2019). Multicollinearity and misleading statistical results. *Korean Journal of Anesthesiology, 72*(6), 558–569. https://doi.org/10.4097/kja.19087

Kowalski, R. M., Limber, S. P., & McCord, A. (2019). A developmental approach to cyberbullying: Prevalence and protective factors. *Aggression and Violent Behavior, 45*, 20–32. https://doi.org/10.1016/j.avb.2018.02.009

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

Lavoie, J., & Talwar, V. (2022). Theory of mind and concealing vs. forthcoming communication in adolescence. *Frontiers in Psychology, 13*, Article 866964. https://doi.org/10.3389/fpsyg.2022.866964

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

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

Levine, T. R. (2022). Truth-default theory and the psychology of lying and deception detection. *Current Opinion in Psychology, 47*, Article 101380. https://doi.org/10.1016/j.copsyc.2022.101380

Malloy, L. C., Brubacher, S. P., & Lamb, M. E. (2013). "Because she's one who listens" children discuss disclosure recipients in forensic interviews. *Child Maltreatment, 18*(4), 245–251. https://doi.org/10.1177/1077559513497250

Mandrekar, J. N. (2010). Receiver operating characteristic curve in diagnostic test assessment. *Journal of Thoracic Oncology, 5*(9), 1315–1316. https://doi.org/10.1097/JTO.0b013e3181ec173d

Masip, J., Blandón-Gitlin, I., de la Riva, C., & Herrero, C. (2016). An empirical test of the decision to lie component of the activation-decision-construction-action theory (ADCAT). *Acta Psychologica, 169*, 45–55. https://doi.org/10.1016/j.actpsy.2016.05.004

Mishna, F., & Alaggia, R. (2005). Weighing the risks: A child's decision to disclose peer victimization. *Children & Schools, 27*(4), 217–226. https://doi.org/10.1093/cs/27.4.217

Mishna, F., Pepler, D., & Wiener, J. (2006). Factors associated with perceptions and responses to bullying situations by children, parents, teachers, and principals. *Victims and Offenders, 1*(3), 255–288. https://doi.org/10.1080/15564880600626163

Mojdehi, A. S., Shohoudi, A., & Talwar, V. (2022). Children's moral evaluations of different types of lies and parenting practices and across cultural contexts. *Current Psychology, 41*(8), 5420–5433. https://doi.org/10.1007/s12144-020-01059-7

Nishina, A., & Juvonen, J. (2005). Daily reports of witnessing and experiencing peer harassment in middle school. *Child Development, 76*(2), 435–450. https://doi.org/10.1111/j.1467-8624.2005.00855.x

Olweus, D. (2010). Bullying in schools: Facts and intervention. *Kriminalistik, 64*(6), 351–361.

Olweus, D. (2013). School bullying: Development and some important challenges. *Annual Review of Clinical Psychology, 9*(1), 751–780. https://doi.org/10.1146/annurev-clinpsy-050212-185516

Serdar, C. C., Cihan, M., Yücel, D., & Serdar, M. A. (2021). Sample size, power and effect size revisited: simplified and practical approaches in pre-clinical, clinical and laboratory studies. *Biochemia Medica, 31*(1), Article 010502. https://doi.org/10.11613/BM.2021.010502

Solís, M. V., Smetana, J. G., & Comer, J. (2015). Associations among solicitation, relationship quality, and adolescents' disclosure and secrecy with mothers and best friends. *Journal of Adolescence, 43*, 193–205. https://doi.org/10.1016/j.adolescence.2015.05.016

Srabstein, J., & Piazza, T. (2008). Public health, safety and educational risks associated with bullying behaviors in American adolescents. *International Journal of Adolescent Medicine and Health, 20*(2), 223–234. https://doi.org/10.1515/ijamh.2008.20.2.223

Srabstein, J. C., & Leventhal, B. L. (2010). Prevention of bullying-related morbidity and mortality: A call for public health policies. *Bulletin of the World Health Organization, 88*, 403–404. https://doi.org/10.2471/BLT.10.077123

Suckle-Nelson, J. A., Colwell, K., Hiscock-Anisman, C., Florence, S., Youschak, K. E., & Duarte, A. (2010). Assessment criteria indicative of deception (ACID): Replication and gender differences. *The Open Criminology Journal, 3*, 23–30. https://doi.org/10.2174/1874917801003010023

Sullivan, K., Zaitchik, D., & Tager-Flusberg, H. (1994). Preschoolers can attribute second-order beliefs. *Developmental Psychology, 30*(3), 395. https://doi.org/10.1037/0012-1649.30.3.395

Talwar, V., Arruda, C., & Yachison, S. (2015). The effects of punishment and appeals for honesty on Children's truth-telling behavior. *Journal of Experimental Child Psychology, 130*, 209–217. https://doi.org/10.1016/j.jecp.2014.09.011

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

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

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

Talwar, V., Lee, K., Bala, N., & Lindsay, R. C. (2002). Children's conceptual knowledge of lying and its relation to their actual behaviors: implications for court competence examinations. *Law and Human Behavior, 26*(4), 395–415. https://doi.org/10.1023/a:1016379104959

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

Talwar, V., Yachison, S., & Leduc, K. (2016). Promoting honesty: The influence of stories on children's lie-telling behaviours and moral understanding. *Infant and Child Development, 25*(6), 484–501. https://doi.org/10.1002/icd.1949

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

Thornberg, R., Tenenbaum, L., Varjas, K., Meyers, J., Jungert, T., & Vanegas, G. (2012). Bystander motivation in bullying incidents: To intervene or not to intervene? *Western Journal of Emergency Medicine, 13*(3), 247. https://doi.org/10.5811/westjem.2012.3.11792

Tong, D., Isik, I., & Talwar, V. (2023). A cross-cultural comparison of the relation between children's moral standards of honesty and their lie-telling behavior. *Journal of Experimental Child Psychology, 231*, Article 105665. https://doi.org/10.1016/j.jecp.2023.105665

Unnever, J. D., & Cornell, D. G. (2004). Middle school victims of bullying: Who reports being bullied? *Aggressive Behavior: Official Journal of the International Society for Research on Aggression, 30*(5), 373–388. https://doi.org/10.1002/ab.20030

Walczyk, J. J., & Fargerson, C. (2019). A cognitive framework for understanding development of the ability to deceive. *New Ideas in Psychology, 54*, 82–92. https://doi.org/10.1016/j.newideapsych.2019.02.003

Walczyk, J. J., Harris, L. L., Duck, T. K., & Mulay, D. (2014). A social-cognitive framework for understanding serious lies: Activation-decision-construction-action theory. *New Ideas in Psychology, 34*, 22–36. https://doi.org/10.1016/j.newideapsych.2014.03.001

Walczyk, J. J., Tcholakian, T., Newman, D. N., & Duck, T. (2016). Impromptu decisions to deceive. *Applied Cognitive Psychology, 30*(6), 934–945. https://doi.org/10.1002/acp.3282

Wang, J., Iannotti, R. J., & Luk, J. W. (2012). Patterns of adolescent bullying behaviors: Physical, verbal, exclusion, rumor, and cyber. *Journal of School Psychology, 50*(4), 521–534. https://doi.org/10.1016/j.jsp.2012.03.004

Williams, S. M., Kirmayer, M., Simon, T., & Talwar, V. (2013). Children's antisocial and prosocial lies to familiar and unfamiliar adults. *Infant and Child Development, 22*(4), 430–438. https://doi.org/10.1002/icd.1802

Wójcik, M., & Rzeńca, K. (2021). Disclosing or hiding bullying victimization: A grounded theory study from former victims' point of view. *School Mental Health, 13*(4), 808–818. https://doi.org/10.1007/s12310-021-09447-5

Wyman, J., Cassidy, H., & Talwar, V. (2021). Utilizing the activation-decision-construction-action theory to predict children's hypothetical decisions to deceive. *Acta Psychologica, 218*, Article 103339. https://doi.org/10.1016/j.actpsy.2021.103339

Zhang, Y., Hedo, R., Rivera, A., Rull, R., Richardson, S., & Tu, X. M. (2019). Post hoc power analysis: Is it an informative and meaningful analysis? *General Psychiatry, 32*(4), Article e100069. https://doi.org/10.1136/gpsych-2019-100069

Zimmer-Gembeck, M. J., & Collins, W. A. (2008). Autonomy development during adolescence. In G. R. Adams, & M. D. Berzonsky (Eds.), *Blackwell handbook of adolescence* (pp. 174–204). Blackwell Publishing. https://doi.org/10.1002/9780470756607.ch9.