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Utilizing the Activation-Decision-Construction-Action Theory to predict children's hypothetical
decisions to deceive.

Abstract

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3 The Decision component of the Activation-Decision-Construction-Action-Theory (ADCAT)
4 utilizes a cost-benefit formula to explain the cognitive, motivational and social processes
5 involved in deception. Three prior studies suggest that ADCAT can be used to predict adults'
6 future deceptive behavior; however, no study has assessed the potential relevance of ADCAT
7 with children. The present study is the first to date to examine whether this cost-benefit formula
8 can predict children's hypothetical decisions to tell three different types of lies, and whether
9 there are specific developmental factors that need to be considered. The results indicate that the
10 cost-benefit formula was only effective for predicting children's hypothetical lies for self-gain at
11 no cost to another (Self-Neutral lies) and lies for others when there was a personal cost (Other-
12 Cost). More specifically, expected value of telling the truth was related to lower willingness to
13 tell hypothetical Self-Neutral and Other-Cost lies. On the other hand, the expected value of lying
14 was not related to children's hypothetical decisions to tell Self-Neutral, Self-Cost or Other-Cost
15 lies. Children's inhibitory control and theory of mind were significant covariates for some of the
16 ADCAT predictor variables and children's hypothetical truth and lying behaviours. **Altogether,**
17 **these results suggest that there is a lack of evidence for the Decision component of ADCAT,**
18 **particularly regarding expected value of lying, for explaining children's decision-making**
19 **processes for telling different types of lies.**

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23 *Keywords:* ADCAT; children's lies; deception detection; development of deception.

24

1 **Highlights**

- 2 • Children's appraisal of the expected value of truth-telling informed decisions for both
3 self-oriented and other-oriented lies.
- 4 • Children's appraisal of the expected value of lying did not inform their decisions to
5 deceive for any of the lies.
- 6 • The ADCAT predictors were only effective in detecting children's self-oriented lies
7 when there was no potential cost to another person present.
- 8 • The significance between inhibitory control and theory-of-mind scores and the ADCAT
9 predictors were based on the type of lie children considered telling.
- 10 • These findings call into doubt the efficacy of the Decision component of ADCAT for
11 understanding children's decision-making processes for different reasons to lie.

12

1 Utilizing the Activation-Decision-Construction-Action Theory to predict children's hypothetical
2 decisions to deceive.

3 Children and adults tell lies for many reasons. While most lies are relatively harmless,
4 there are some cases wherein an intentional false report can have serious repercussions to others.
5 In legal settings, for example, a child's false report can affect the outcome of a criminal
6 investigation (Faller, 2016). Previous deception literature has focused on understanding child
7 (e.g., Heyman, Sweet, & Lee, 2009) and adolescent (e.g., Perkins & Turiel, 2007) motivations to
8 tell truth or lies in different social contexts. In fact, a crucial component of lying is how the
9 initial decision to deceive is made. Yet, this is the least understood component of deception. The
10 Activation-Decision-Construction-Action-Theory (ADCAT, Walczyk, Harris, Duck, & Mulay,
11 2014) is a new approach that utilizes an adapted cost-benefit formula, put forward by Stanovich
12 (2010), to reflect the quasi-rational decision-making process involved when making a decision to
13 tell a truth or lie. The Decision component of this model posits that people are more likely to tell
14 a lie if the perceived benefits of doing so are higher than those for telling the truth (Walczyk et
15 al., 2014). Likewise, higher value towards being truthful is expected to increase the likelihood of
16 being honest. By understanding the important predictors of future honest and dishonest
17 behaviors, it may be possible to encourage honesty in situations where a child may feel pressure
18 to lie.

19 While recent research with adult participants provide support for the Decision component
20 of this theory (Cassidy, Wyman, Talwar, & Akehurst, 2019; Masip, Blandon-Gitlin, de la Riva,
21 & Herrero, 2016; Walczyk, Tcholakian, Newman, & Duck, 2016), it is unclear whether children
22 utilize the same decision-making processes when they choosing whether to be honest or
23 dishonest. Given the developmental changes in children's cognitive and social functioning

1 throughout the primary school years, including considerable maturation of their general
2 communication, executive functioning (e.g., memory, planning, inhibition and organization) and
3 perspective-taking skills (Bolton & Hattie, 2017), the link between internal motivation and future
4 honest and dishonest behavior may be represented differently when compared to adults.
5 Moreover, there are different types of lies that might influence one's motivation and eventual
6 behaviors. For example, people sometimes lie for self-gain (e.g., to get out of trouble), and in
7 other situations, they lie for the benefit of others (e.g., lying to protect someone). There are also a
8 range of consequences for telling different truths and lies that vary in outcome (i.e., consequence
9 to self or others). The type of lie and potential outcome can therefore serve as an important
10 motivation for future behaviors (Vrij, 2007, 2008). However, only one study to date (Cassidy et
11 al., 2019) has analyzed the relevance of ADCAT to situations involving different types of lies
12 and consequences.

13 To address these gaps in the literature, the present study is the first to answer the
14 following two research questions. First, are there relationships between the ADCAT predictors
15 and children's hypothetical decisions to tell truths or lies? Second, does a child's developmental
16 capacity, with respect to age, inhibitory control and theory-of-mind, influence their motivation
17 and hypothetical future-decisions to tell different types of lies?

18 **ADCAT**

19 The Activation-Decision-Construction-Action-Theory (ADCAT, Walczyk et al., 2014)
20 was developed to help explain the cognitive, motivational and social processes involved in
21 deception. Specifically, lying and truth-telling utilize corresponding cognitive processes,
22 including working memory, theory of mind and central executive functioning (see Walczyk &
23 Fargerson, 2019, for a review). At the same time, future decisions to tell a truth or lie are

1 influenced by similar motivational and social factors. Namely, people make these decisions
2 based on their perceived costs and benefits, whether that be psychological (e.g., gratification,
3 avoiding punishment), materialistic (e.g., being awarded a prize or monetary reward) or social
4 (e.g., helping or hurting someone else) factors. However, this decision-making process is quasi-
5 rational because these expected likelihoods are actually unknown; instead, these perceived costs
6 and benefits are only cognitive estimates of what may happen if one were to tell a truth or lie.
7 While people typically tell the truth in most situations (DePaulo et al., 1996), people do tell lies
8 for the purpose of achieving a specific goal when the perceived benefits of doing so outweigh
9 those for telling the truth (Walczyk et al., 2014).

10 The Decision component of ADCAT provides a calculable formula for predicting truth
11 and lie decision-making based on this quasi-rational decision-making process (Walczyk et al.,
12 2014). This cost-benefit formula is broken down into three steps. First, the anticipated value of
13 telling the truth is determined by: (1) multiplying the probability and valence of truth-telling and
14 being believed; (2) multiplying the probability and valence of truth-telling and not being
15 believed; and (3) adding these two values together. Second, the anticipated value of telling a lie
16 uses the same formula, but with the ratings for the likelihood that the lie would/would not be
17 believed. For calculating the expected values for truths and lies (EV), the formula is: $EV_{\text{Truth/Lie}} =$
18 $(p_{\text{believed}} \times v_{\text{believed}}) + (p_{\text{not_believed}} \times v_{\text{not_believed}})$. Third, Lie Motivation (M) is calculated by
19 subtracting the expected value of telling a lie (EV_{Lie}) with the expected value of truth-telling
20 (EV_{Truth}). The formula for M is: $EV_{\text{Lie}} - EV_{\text{Truth}}$. Refer to Appendix A for an example of these
21 calculations. Using this cost-benefit formula, Walczyk et al. (2014) hypothesized that EV_{Truth}
22 would negatively correlate with future decision to lie. Whereas, Lie Motivation would positively
23 correlate with future decisions to lie. When people have a higher value for honesty in a particular

1 situation (i.e., higher estimated benefits and likelihood of being believed), then they are more
2 likely to tell the truth. At the same time, when the expected value for telling a lie (EV_{Lie}) in a
3 situation (i.e., more benefits for doing so and high likelihood of being believed) outweigh the
4 expected value of honesty (i.e., greater motivation to lie), then they are more likely to lie
5 (Walczyk et al., 2014).

6 To date, three studies have examined the efficacy of the ADCAT cost-benefit formula for
7 predicting adults' hypothetical decisions to tell truths and lies. Using hypothetical scenarios (e.g.,
8 a friend asking to help them cheat on an exam), Masip et al. (2016) found that EV_{Truth} was
9 negatively correlated with hypothetical decisions to lie. Whereas, Lie Motivation, but not EV_{Lie} ,
10 was positively correlated with hypothetical decisions to lie. Similarly, Walczyk et al. (2016)
11 found that EV_{Truth} negatively correlated with telling a lie in an impromptu interview setting when
12 the adults were asked embarrassing questions. In contrast to Masip et al. (2016), expected value
13 of lying was positively correlated with future decisions to lie. Cassidy et al. (2019) examined the
14 efficacy of the ADCAT cost-benefit formula for predicting four different reasons to lies,
15 including: (1) a lie for self with no cost, (2) a lie for self with a cost to another, (3) a lie for
16 another with no cost, and (4) a lie for another with a cost to self. This novel paradigm was
17 utilized to broadly reflect the different types of lie situations people encounter on a daily basis.
18 EV_{Truth} was found to be negatively correlated with hypothetical decisions to lie, but only for lies
19 that benefited others. In line with Walczyk et al. (2016), both EV_{Lie} and Lie Motivation were
20 positively correlated with hypothetical decisions to lie across all scenarios. Taken together, these
21 three studies provide some support, albeit mixed, for the ADCAT cost-benefit formula for
22 predicting adults' hypothetical decisions to tell truths and lies.

23

1 **Present Study**

2 The present study will examine the efficacy of ADCAT for predicting children's honest
3 and dishonest behaviors across a variety of lie situations, including: (1) a self-oriented lie with no
4 cost to another (Self-Neutral); (2) a self-oriented lie with a cost to another (Self-Cost); (3) a lie
5 that benefits another with no cost to self (Other-Neutral); and (4) a lie that benefits another with
6 a cost to self (Other-Cost).

7 The current study expands on Cassidy et al. (2019) by evaluating ADCAT with a child
8 population. This is important because children's motivation and willingness to lie can be
9 influenced by the development of their cognitive (e.g., perspective-taking and executive function
10 skills; Talwar & Crossman, 2011). In contrast, these potential covariates may be less important
11 in the other ADCAT studies given that adults' cognitive development is mostly intact. Although
12 Walczyk and Fargerson (2019) theorized how ADCAT can help explain deception development
13 throughout the lifespan, the current study is the first to assess whether the Decision component of
14 ADCAT can predict children's (ages 6 to 11) hypothetical decisions to tell different types of
15 truths and lies. These findings can have positive implications for parents and professionals who
16 work with children, as this research can inform the development of evidence-based truth-
17 induction practices for encouraging honest child reports. By understanding children's motives to
18 deceive or be honest in a range of generalizable social contexts, it can permit adults to identify
19 strategies for better highlighting the benefits of truth-telling in these situations. Lastly, these
20 findings can inform forensic professionals regarding whether the Decision component of
21 ADCAT can potentially be used as a tool for predicting children's decisions to tell honest and
22 dishonest eyewitness reports.

1 The primary objective of this study was to evaluate the relationships between the
2 ADCAT measures and children's hypothetical decisions to tell truths and lies in the four
3 scenarios. The following three hypotheses are based on the previous ADCAT research with
4 adult respondents. Firstly, EV_{Lie} and Lie Motivation scores is expected to be positively related to
5 hypothetical decisions to tell a lie in each scenario (Cassidy et al., 2019; Walczyk et al., 2016);
6 whereas, EV_{Truth} will be positively correlated with hypothetical truth decisions in each scenario
7 (Masip et al., 2016; Walczyk et al., 2016). Secondly, follow-up analyses will be conducted to
8 determine if hypothetical truth-tellers (i.e., those who state they would tell the truth) and lie-
9 tellers (i.e., those who state they would tell a lie) in each scenario differ in their scores on the
10 three ADCAT measures. It is expected that hypothetical lie-tellers in each scenario will have
11 significantly higher EV_{Lie} and Lie Motivation scores than the hypothetical truth-tellers, and
12 hypothetical truth-tellers will have significantly higher EV_{Truth} scores than the hypothetical lie-
13 tellers. Thirdly, discriminant function analyses (DFAs) will be performed to determine if the
14 three ADCAT measures can predict children's hypothetical decisions to tell a truth or lie in each
15 scenario. Overall, EV_{Truth} , EV_{Lie} and Lie Motivation scores are expected to predict children's
16 hypothetical truth and lie decisions at a rate higher than chance level in all the scenarios.

17 A secondary objective of this study was to examine for developmental predictors of the
18 ADCAT dependent measures (EV_{Truth} , EV_{Lie} and Lie Motivation) within each of the four lie
19 scenarios. The developmental predictors examined in this study, including child age, inhibitory
20 control (related to cognitive load) and theory of mind, were highlighted by Walczyk and
21 Fargerson (2019) as being potential core constructs to ADCAT. Prior developmental research
22 suggests that as children get older, they perceive lying to benefit another more positively and
23 lying for self-benefit more negatively (see Talwar & Crossman, 2011, for a review). Thus, age is

1 expected to predict EV_{Lie} , Lie Motivation and hypothetical decisions to tell other-oriented lies,
2 such that scores on these measures will increase with child age. Given that ToM and inhibitory
3 control typically increase with child age (Talwar & Crossman, 2011), we hypothesize that higher
4 scores on these measures will follow the same trends with the dependent measures as child age.
5 Although Walczyk and Fargerson (2019) theorized that ToM and cognitive load are central to
6 ADCAT, this is an exploratory hypothesis given that the present study is the first to directly
7 examine the impact of these developmental factors on the ADCAT predictors.

8 **Method**

9 Participants included 104 children between 6 and 11 years of age ($M_{age} = 9.28$ years,
10 $SD_{age} = 1.68$, 50% female) from a large metropolitan area (> 3,000,000 population). As a
11 recruitment requirement, all children were able to speak, read and write in English. With respect
12 to child race and ethnicity, 18 different types of racial and cultural backgrounds (e.g., Inuit, East
13 Indian, Caucasian and Egyptian) were qualitatively reported by the parents. The study received
14 ethical approval from the residing university. Written parental consent was acquired for all
15 children prior to commencing the study. Children also gave verbal consent to participate after
16 being read the instructions for the study.

17 For the ADCAT analyses, children were organized into two age groups (i.e., 6 to 8 years
18 of age vs. 9 to 11 years of age). Gender differences on the ADCAT dependent measures were
19 also examined between male versus females given that no parents reported their child's gender as
20 "other". Results from a MANOVA indicated that the 9 to 11 year olds scored significantly higher
21 on the cognitive measures of inhibitory control and ToM; this was expected given the cognitive
22 maturation that takes place as children get older. In contrast, there were no significant differences
23 in age, inhibitory control or moral identity scores between the two gender groups. However,

1 females did have higher ToM scores with the difference approaching significance, $F(1, 93) =$
 2 3.88, $p = .052$. Refer to Table 1 for the demographic characteristics of the current sample.

3 **Table 1**

4 *Sample demographics: Mean (SD) age and gender group differences on measures of inhibitory*
 5 *control (IC), theory of mind (ToM) and moral identity (MI).*

	Age in Years	IC	ToM	MI
Age Groups¹				
6 to 8 year olds	7.53 (1.04)	83.42 (17.35)	3.13 (1.34)	26.23 (5.78)
9 to 11 year olds	10.33 (0.93)	107.35 (25.05)	3.69 (0.74)	24.55 (4.28)
Total	9.28 (1.68)	98.05 (25.17)	3.48 (1.04)	25.21 (4.96)
Gender²				
Male	9.74 (1.56)	104.23 (28.03)	3.36 (1.07)	24.60 (4.86)
Female	8.82 (1.68)	92.35 (20.90)	3.58 (1.02)	25.77 (5.03)

6 ¹Differences between age groups were significant at $p < .05$ for Age in Years, IC and ToM.

7 ²Differences between gender groups were significant at $p < .05$ for ToM only.

8

9 **Materials and Procedures**

10 Children were read the general instructions for this study by the experimenter (E).
 11 Specifically, E told the children that they wanted to find out how children think and act in
 12 different situations where they may feel the need to tell a truth or lie to help themselves or
 13 someone else. Children were also told that there were no right or wrong answers, and that their
 14 responses on each questionnaire would not be shared with anyone.

15 **Vignettes.** The following study procedures are based on those used in Cassidy et al.
 16 (2019). Children completed four vignettes that included stories set in a school context in which
 17 the main character (a child) could tell a: (1) self-oriented lie with no cost to another (Self-

1 Neutral); (2) a self-oriented lie with a cost to another (Self-Cost); (3) a lie that benefits another
2 with no cost to self (Other-Neutral); and (4) a lie that benefits another with a cost to self (Other-
3 Cost).

4 For the Self-Neutral lie, the main character forgot to do some very important homework
5 that was due in class. Given that the character would get in a lot of trouble at school and home
6 for the missing homework, the children were then asked if they would tell a truth or lie about the
7 missing homework to their teacher if they were the main character. **In other words, the children**
8 **had to decide whether to tell a lie that benefited oneself when there was no potential cost to**
9 **another person.** In the Self-Cost lie scenario, the main character and another student cleaned their
10 classroom while everyone was outside at recess. The main character accidentally throws a bag in
11 the dumpster that includes their teacher's wallet. Afterwards, the teacher asks the main character
12 if they or the other student threw out the wallet. **More specifically, the children had to decide**
13 **whether to tell a lie that benefited oneself (i.e., not getting in trouble) when there was a potential**
14 **cost (i.e., wrongfully getting in trouble) for another student.** In the Other-Neutral lie scenario, the
15 main character witnessed a close friend spill water on a computer in the library. The librarian
16 makes it clear that they know that the main character is not responsible for breaking the
17 computer. Nevertheless, they ask if the main character knows the identity of the person
18 responsible for the breakage. **Namely, the children were asked whether they would tell a lie that**
19 **benefited another person (i.e., their friend) with no potential cost to themselves.** For the Other-
20 Cost lie scenario, the main character witnessed their close friend accidentally break the
21 principal's prized trophy while waiting in the school office. Since the principal did not see the
22 breakage, they ask the main character if they or their friend broke the trophy. **In this scenario,**
23 **children were asked whether they would tell a lie that benefited another person (i.e., their friend)**

1 when there was a potential cost to themselves (i.e., wrongfully getting in trouble). Refer to
2 Appendix B for a complete description of each vignette.

3 The four vignettes were presented on a laptop in PowerPoint presentation format. Pre-
4 recorded audio for each vignette was used to ensure that the narratives were presented the same
5 way to each child. Children were permitted to stop the vignette at any time, as well as go back to
6 previous slides when needed. After each vignette, children had to answer two comprehension
7 questions correctly about each vignette (e.g., What broke the computer in the library?) before
8 progressing to the questionnaire to ensure that they understood the important aspects of each
9 narrative. In the rare case that a child (9 out of 104 participants) got any of the comprehension
10 questions incorrect, the child was asked to listen to the relevant section of that vignette again and
11 then answer the question a second time. Prior to the presentation of each vignette, children were
12 asked to take on the perspective of the main character in each story.

13 **Post-scenario questionnaire.** Children completed a post-scenario questionnaire after
14 each vignette that was based on the format used in Cassidy et al. (2019) and Masip et al. (2016).
15 To ensure privacy, children above the age of eight completed each vignette questionnaire by
16 themselves. Although E remained in the same room as the children, they engaged in other
17 activities (e.g., working on the laptop) with their backs turned away from the child. For the 6- to
18 7-year-olds, E read them the vignette questions to ensure that they adequately understood what
19 was asked of them; however, E did not comment or react to any of the children's responses.
20 Children were first asked if they would tell a truth or lie if they were the main character in the
21 scenario (Initial truth/lie decision). Probability of Consequence (p_i) was determined by children
22 rating the likelihood that their lie would be believed by the recipient (e.g., the teacher) on a scale
23 from 0.1 (Will not happen) to 1.0 (Will for sure happen). To calculate the expected Valence (v_i)

1 for the hypothetical lie decisions, children rated how good (+5) or bad (-5) the recipient's
2 reaction would be if they believed or did not believe the lie. To calculate the p_i and v_i for the
3 children's hypothetical decisions to tell the truth, they completed these same questions from the
4 perspective of the recipient's reaction to their hypothetical decision to tell the truth. At the end
5 of each questionnaire, children were asked again if they would tell a truth or lie in the scenario
6 (Final truth/lie decision). The three primary dependent measures used by ADCAT (EV_{Truth} ,
7 EV_{Lie} and Lie Motivation) were calculated in accordance to the children's responses on the
8 questionnaire. Appendix A provides an example of the ADCAT formula calculations.

9 The order of the vignettes and the order of the evaluation of truth/lie outcomes in the
10 post-scenario questionnaires were counterbalanced; this was done to negate the likelihood of
11 potential vignette presentation order biases that could influence the children's responses on the
12 post-scenario questionnaires. Preliminary MANOVAs were performed to assess for differences
13 between the four vignette presentation orders (independent variable) on the ADCAT dependent
14 measures (EV_{Truth} , EV_{Lie} and Lie Motivation) within the four vignette scenarios. For each
15 MANOVA, there were no significant differences between the four vignette presentation orders
16 on any of the ADCAT dependent measures ($ps >.05$). Chi-Square analyses also revealed that
17 there were no differences between the four vignette presentation orders in children's initial and
18 final decisions to tell Self-Neutral, Self-Cost and Other-Neutral lies.

19 **Developmental measures.** Child age and performance on measures of inhibitory
20 control and theory of mind were used as predictors for the ADCAT dependent measures. Age
21 was measured continuously (e.g., 11.50 years). After completing the vignettes and post-scenario
22 questionnaires, children were administered two ToM stories and the Stroop test. Since children's
23 second-order ToM has shown to be related to children's lie-telling development (Talwar &

1 Crossman, 2011), two ToM false belief story tasks were administered. The two stories
2 (Grandpa's Present and Ice-Cream Truck), adapted from Hogrefe, Wimmer, and Perner (1986)
3 and Sullivan, Zaitchik, and Tager-Flusburg (1994), incorporated unexpected location events that
4 tested children's ability to recognize a character's false beliefs about another character's mindset.
5 Each story included two story comprehension questions that the children had to answer correctly.
6 After, children were asked two questions that assessed their second-order false belief
7 understanding for each story, with one point awarded for a correct answer to each question (i.e.,
8 two points maximum per story). Children received a total score out of four on this measure.
9 Higher scores reflected better second-order ToM skills.

10 Three tasks from the Stroop Color and Word Test (children's version; Golden,
11 Freshwater, & Golden, 2003) tested children's inhibitory control skills; this task is a reliable
12 measure of inhibitory control for children between the ages of 5 and 14 (Homack & Riccio,
13 2004) that has been previously used in the child deception literature (e.g., Talwar & Lee, 2008;
14 Williams, Moore, Crossman, & Talwar, 2016). Children read lists of color words (Task 1) and
15 named the font colors of different shapes (Task 2) as fast and accurately as they could in 60-
16 seconds. For the third task, children were presented with a list of color words that were printed
17 in colors that were different from the word (e.g., the word "green" in red font); children were
18 then required to name the font color of as many words, instead of reading the word, as fast and
19 accurately as they could in 60-seconds. Children's total number of words read within the 60-
20 seconds and number of errors made (self-corrected and uncorrected) were calculated for each
21 task. The Total Stroop score was calculated by adding the number of correct responses across the
22 three tasks; whereas, the Total Error score was based on the total number of errors made across

1 the three tasks. Higher Total Stroop, and lower Total Error, scores represented stronger
2 inhibitory control abilities.

3 At the end of the study , E thanked each child for their participation and restated the
4 purpose of the research. Children then picked a small toy prize to take home as compensation.

5 **Results**

6 The following structure and presentation of the results corresponds to recent ADCAT
7 research with adult participants (Cassidy et al., 2019; Masip et al., 2016), with the addition of the
8 covariate analyses of the potential developmental predictors.

9 **Frequency of Lying**

10 Table 2 presents the frequencies and percentages of children’s initial and final decisions
11 to lie or tell the truth in each scenario. According to Masip et al. (2016), scenarios were
12 dismissed if they failed to meet the following two criteria: (1) n_{truth} or n_{lie} were less than 10; and
13 (2) the difference between children’s hypothetical decisions to tell the truth or lie in a given
14 scenario was greater than 75%. These two criteria were developed to ensure that the truth and lie
15 frequencies in each scenario were representative of the general population, and to increase the
16 accuracy and generalizability of the ADCAT results. More specifically, small frequencies can
17 result in outliers that can potentially distort the results. Restricted variance, resulting from
18 uneven proportions in dichotomous variables, can also underestimate the correlations between
19 variables (Kemery, Dunlap, & Griffeth, 1988).

20 The first criterion was fulfilled as at least ten children stated they would to tell a
21 hypothetical (initial and final) truth or lie in all of the scenarios. However, as seen Table 2, the
22 difference in children’s willingness to tell a hypothetical truth or lie (initial and final decision) in
23 the Other-Neutral scenario was greater than 75%; thus, this scenario was excluded from all the

1 remaining analyses as it did not meet the second criteria for analyzing the effects of ADCAT
 2 (Masip et al., 2016). The remaining three scenarios (Self-Neutral, Self-Cost and Other-Cost)
 3 were included in all the analyses since they met both inclusion criteria. Lastly, 12% ($n = 12$) of
 4 children changed their initial to final truth/lie decisions when completing the post-scenario
 5 questionnaire, with there being no significant differences in this change frequency between the
 6 four lie scenarios.

7 Table 2

8 *Frequency and percentage of children's hypothetical decision to tell a truth or lie in each*
 9 *vignette scenario.*

Lie Type	<u>Initial Decision</u>			<u>Final Decision</u>		
	Truth %	Lie %	Difference %	Truth %	Lie %	Difference %
Self-Neutral	82	18	64	86	14	72
Self-Cost	80	20	60	84	16	68
Other-Neutral	91	9	82	88	12	76
Other-Cost	76	24	52	81	19	62

10

11 **ADCAT Correlates**

12

13

14 Preliminary linear regression analyses indicated that there were no issues of
 15 multicollinearity between the three ADCAT predictors (EV_{Lie} , EV_{Truth} and Lie Motivation) within
 16 the four lie scenarios. Overall, EV_{Lie} was not highly correlated with EV_{Truth} for any of the four
 17 scenarios; thereby, indicating a low likelihood of multicollinearity. As expected, EV_{Lie} and
 18 EV_{truth} were significantly correlated with Lie Motivation given that they are used to calculate Lie
 Motivation (i.e., $EV_{Lie} - EV_{Truth}$).

1 In line with previous ADCAT studies (Cassidy et al., 2019; Masip et al., 2016; Walczyk
 2 et al., 2016), point-biserial correlations (r_{pb}) evaluated the relationships between the three
 3 ADCAT variables and the children's initial and final hypothetical decisions to lie (1) or tell the
 4 truth (0) for the three retained scenarios. Table 3 presents the descriptive and point biserial
 5 correlation statistics from these analyses.

Table 3

*Descriptive Statistics and Correlations (r_{pb}) for the ADCAT Variables and Decisions to Lie
 (Initial and Final) for the Self-Neutral, Self-Cost and Other-Cost Lie Scenarios.*

Type of lie	ADCAT variables	Decision to lie			
		<i>M</i>	<i>SD</i>	<u>Initial r_{pb}</u>	<u>Final r_{pb}</u>
Self-Neutral	EV _{Truth}	-.52	2.62	-.35**	-.24*
	EV _{Lie}	-1.27	2.39	.02	.09
	Lie Motivation	-.75	3.28	.30**	.25*
Self-Cost	EV _{Truth}	-1.44	2.63	-.18	-.15
	EV _{Lie}	-1.86	2.12	-.17	-.12
	Lie Motivation	-.41	2.87	.05	.05
Other-Cost	EV _{Truth}	-.37	2.99	-.19	-.23*
	EV _{Lie}	-1.21	2.49	-.04	.10
	Lie Motivation	-.84	3.40	.14	.28**

6 * $p < .05$

7 ** $p < .01$

8

9 As expected, EV_{Truth} was negatively correlated with the initial and final decisions to tell a
 10 Self-Neutral lie, as well as final decisions to tell an Other-Cost lie (see Table 3). Lie Motivation
 11 was positively correlated with initial and final decisions to tell a Self-Neutral lie, and final

1 decisions to tell an Other-Cost lie. Contrary to our hypotheses, EV_{Lie} was not related to
2 hypothetical decisions to lie or tell the truth for any of the lie scenarios. Moreover, none of the
3 ADCAT variables were significantly correlated with hypothetical decisions to tell Self-Cost
4 truths or lies (see Table 3). To summarise, higher expected value of truth-telling was related to
5 lower willingness to tell a hypothetical lie that benefitted oneself with no cost to another, and to
6 tell a hypothetical lie that benefitted another with a cost to self. Whereas, higher motivation to lie
7 increased the likelihood of telling a hypothetical lie to benefit oneself with no cost to another and
8 when telling a hypothetical lie to benefit another with a cost to self.

9 **True vs. Lie ADCAT Characteristics**

10 MANCOVAs were performed to better understand the differences between the
11 hypothetical truth-tellers and lie-tellers across the ADCAT variables. For each type of lie, the
12 three ADCAT predictors (EV_{Lie} , EV_{Truth} and Lie Motivation) were the dependent variables.
13 Initial (truth-tellers vs. liars) and final decisions (truth-tellers vs. liars) to lie were the
14 independent variables, and child age, Stroop scores and ToM scores were the covariates. The
15 lie-tellers were the reference category (i.e., the category of comparison) for the initial and final
16 decisions to lie. The MANCOVA results for children's initial lie decisions are presented in
17 Table 4, and the results for children's final lie decisions are shown in Table 5.

18 With respect to initial hypothetical lie decisions, the MANCOVA model was significant
19 for the Self-Neutral lies only, $F(2, 90) = 4.44, p = .014$. Notably, truth-tellers reported higher
20 EV_{Truth} ($B = 2.12, p = .005$) than lie-tellers, whereas lie-tellers reported higher Lie Motivation (B
21 $= -2.09, p = .018$) than truth-tellers (see Table 4). For final decisions, the MANCOVA model
22 was not significant for any of the scenarios (see Table 5). Moreover, truth-tellers and lie-tellers
23 did not differ significantly in EV_{Lie} on any of the dependent measures in the three scenarios.

1 Table 4

2 *MANCOVA results: Predictors of initial decisions to deceive for the Self-Neutral, Self-Cost and*3 *Other-Cost lies.*

	<i>M Truth (SD)</i>	<i>M Lie (SD)</i>	<i>B</i>	<i>t</i>	<i>p</i>	<i>95% CI</i>
Self-Neutral Lie						
EV _{Lie}	-1.25 (2.43)	-0.92 (2.39)	.03	.04	.966	-1.41 to 1.47
EV _{Truth} **	-0.13 (2.50)	-2.59 (1.99)	2.12	2.90	.005	.67 to 3.58
Lie Motivation*	-1.11 (2.02)	1.67 (3.25)	-2.09	-2.38	.019	-3.84 to -.35
Self-Cost Lie						
EV _{Lie}	-1.66 (2.05)	-2.26 (2.35)	.71	1.20	.232	-.47 to 1.89
EV _{Truth}	-1.24 (2.68)	-2.12 (2.49)	.39	.54	.590	-1.04 to 1.81
Lie Motivation	-.42 (2.97)	-.14 (2.83)	.33	.41	.684	-1.26 to 1.90
Other-Cost Lie						
EV _{Lie}	-1.17 (2.51)	-.93 (2.36)	-.18	-.28	.781	-1.48 to 1.11
EV _{Truth}	-.001 (3.12)	-1.34 (1.94)	1.15	1.59	.116	-.29 to 2.60
Lie Motivation	-1.16 (3.45)	.41 (2.40)	-1.33	-1.59	.115	-3.00 to .33

4 * $p < .05$; ** $p < .01$

5

6 Table 5

7 *MANCOVA results: Predictors of final decisions to deceive for the Self-Neutral, Self-Cost and*8 *Other-Cost lies.*

	<i>M Truth (SD)</i>	<i>M Lie (SD)</i>	<i>B</i>	<i>t</i>	<i>p</i>	<i>95% CI</i>
Self-Neutral Lie						

EV _{Lie}	-1.30 (2.41)	-.36 (2.40)	-.66	-.84	.404	-2.23 to .91
EV _{Truth}	-.28 (2.50)	-2.08 (2.72)	1.39	1.68	.096	-.25 to 3.03
Lie Motivation*	-1.02 (3.04)	1.72 (3.44)	-2.05	-2.12	.037	-3.97 to -.13
Self-Cost Lie						
EV _{Lie}	-1.73 (2.11)	-1.99 (2.65)	.40	.59	.555	-.93 to 1.72
EV _{Truth}	-1.31 (2.65)	-1.95 (2.72)	.18	.22	.824	-1.41 to 1.77
Lie Motivation	-.42 (3.00)	-.04 (2.56)	.22	.24	.808	-1.55 to 1.98
Other-Cost Lie						
EV _{Lie}	-1.30 (2.38)	-.22 (2.74)	-1.08	-1.57	.120	-2.44 to .29
EV _{Truth}	-.060 (3.03)	-1.42 (2.20)	1.07	1.38	.170	-.47 to 2.61
Lie Motivation*	-1.24 (3.45)	1.19 (3.07)	-2.15	-2.45	.016	-3.89 to -.41

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

Next, the effects of the developmental covariates on the dependent ADCAT variables were analyzed for each of the three retained lies in the total sample. First, Stroop test scores were significant predictors of Lie Motivation for children's initial [$F(1, 91) = 7.20, p = .009$] and final [$F(1, 91) = 7.10, p = .009$] Self-Neutral lie decisions, such that higher inhibitory control predicted more Lie Motivation (initial and final decision: $B = .042, p = .009$). Second, ToM was a significant predictor of EV_{Truth} for children's initial [$F(1, 91) = 4.89, p = .030$] and final [$F(1, 91) = 5.19, p = .025$] Self-Cost lies. Notably, higher ToM predicted lower EV_{Truth} (initial: $B = -.63, p = .030$; final: $B = -.65, p = .025$). Third, ToM was a significant predictor of EV_{Truth} for children's initial [$F(1, 91) = 8.69, p = .004$] and final [$F(1, 91) = 7.20, p = .009$] Other-Cost lies; ToM also predicted Lie Motivation for their initial [$F(1, 91) = 9.00, p = .003$] and final [$F(1, 91) = 4.85, p = .030$] Other-Cost lies. More specifically, lower ToM predicted higher EV_{Truth} (initial:

1 $B = -.91, p = .004$; final: $B = -.93, p = .003$), while higher ToM predicted greater Lie Motivation
2 (initial: $B = .80, p = .028$; final: $B = .77, p = .030$) for children's Other-Cost lies. Finally, child
3 age was not a significant covariate in any of the analyses ($p > .05$).

4 Additional MANCOVAs were performed to examine differences between the 6 to 8 and
5 9 to 11 year old age groups with respect to EV_{Lie} , EV_{Truth} and Lie Motivation for the three
6 retained lie scenarios; inhibitory control and ToM scores were the covariates. These analyses
7 were conducted given that prior research suggests age-related differences in how children under
8 the age of 8 interpret and tell different types of lies when compared to those above the age of 8
9 (see Walczyk & Fargerson, 2019). Overall, there were no significant differences between age
10 groups with respect to EV_{Lie} , EV_{Truth} and Lie Motivation scores for the three retained lie
11 scenarios. This is consistent with the earlier MANCOVA analyses, which indicated that child
12 age (continuous) was not a significant predictor for any of ADCAT dependent measures.

13 **ADCAT Classification Accuracy**

14 Two discriminant function analyses (DFAs) were used to predict children's hypothetical
15 decisions to tell a truth or lie, initially and finally, in each of the three retained scenarios (six
16 DFAs in total). For each DFA, EV_{Truth} and Lie Motivation were used to classify the initial and
17 final hypothetical decisions as honest or deceptive; EV_{Lie} was not included in the DFAs because
18 it was not a significant predictor of initial and final lie decisions in the point-biserial correlation
19 and MANCOVA analyses. The grouping variable was whether the child stated that they would
20 tell a truth (0) or lie (1) for each of the three retained scenarios. The 'Leave One Out' cross-
21 validation procedure was used for each analysis. Table 6 displays the classification accuracy
22 (cross-validated cases only) for children's initial and final decisions to lie in the Self-Neutral,
23 Self-Cost and Other-Cost retained scenarios.

1 Table 6
 2 *Discriminant Function Analysis results: Cross-validated classification accuracy (%) of*
 3 *children's initial and final truths and lies according to EV_{Truth} and Lie Motivation.*

	Initial Decisions			Final Decisions		
	Truth Accuracy	Lie Accuracy	Total Accuracy	Truth Accuracy	Lie Accuracy	Total Accuracy
Self-Neutral	67.1%	78.9%	69.2%	58.9%	71.4%	60.6%
Self-Cost	59.0%	61.9%	59.6%	55.2%	58.8%	55.8%
Other-Cost	51.9%	60.0%	53.8%	51.2%	55.0%	51.9%

4
 5 The discriminant function model was only significant for the initial ($\Lambda = .87, \chi^2(2) =$
 6 $14.11, p = .001$) and final ($\Lambda = .93, \chi^2(2) = 7.35, p = .025$) Self-Neutral hypothetical lie decisions.
 7 For initial Self-Neutral lie decisions, 69.2% of truth and lie cases were correctly classified;
 8 whereas, 60.6% of final truth and lie decisions cases were correctly classified. Conversely, the
 9 discriminant function models were not significant for the Self-Cost and Other-Cost lie decisions.

10 Discussion

11 The Activation-Decision-Construction-Action Theory (ADCAT) is designed to explain
 12 the cognitive, motivational and social processes involved in deception. Although the findings
 13 from the three prior ADCAT studies are somewhat mixed, they generally suggest that the
 14 Decision component of this theory can potentially be used to predict and explain adults'
 15 decisions to tell truths and lies (Cassidy et al., 2019; Masip et al., 2016; Walczyk et al., 2016).
 16 Given the novelty of this theory, however, no research has analyzed the relevance of ADCAT
 17 with children. It is necessary to study this theory with children given that they are still
 18 developing important cognitive (e.g., executive functioning and ToM) functions that are

1 important to understanding and predicting their future lie-telling behaviors; whereas, these
2 cognitive functions are already developed in most adults. Thus, the quasi-rationale decision-
3 making process for telling truths and lies may be presented differently in children when
4 compared to adults. For this reason, the current study examined the relevance of ADCAT's
5 Decision component for explaining the development of children's lie-telling skills, and whether
6 the calculable formula can be used to predict and detect their hypothetical truths and lies in
7 different situations.

8 **ADCAT Findings**

9 The primary objective of this study was to analyze the relationships between the ADCAT
10 measures and children's hypothetical decisions to tell truths or lies. In support of Walczyk's et
11 al., (2014) original hypotheses, EV_{Truth} and Lie Motivation served as potential useful measures
12 for explaining and predicting children's future decisions to tell truths for self at no personal cost
13 and for others at a personal cost. Namely, higher value towards truth-telling (EV_{Truth}) was
14 related to lower willingness to tell Self-Neutral lies (initial and final decisions), as well as Other-
15 Cost lies (final decisions only). Whereas, greater Lie Motivation was related to higher
16 willingness to tell Self-Neutral (initial and final decisions) and Other-Cost lies (final decisions
17 only). In contrast to our hypotheses, neither EV_{Truth} , EV_{Lie} or Lie Motivation were useful
18 predictors for children's hypothetical Self-Cost lies. Follow-up MANCOVAs that analyzed the
19 differences between hypothetical truth-tellers and lie-tellers on the ADCAT dependent measures
20 was only significant for initial decisions to tell Self-Neutral lies. In this scenario, hypothetical
21 truth-tellers reported significantly higher EV_{Truth} and hypothetical liars had significantly higher
22 Lie Motivation; nevertheless, there were no veracity group differences in EV_{Lie} scores.
23 Furthermore, two DFAs were performed to determine whether EV_{Truth} and Lie Motivation, the

1 two significant correlates of hypothetical truth and lie decisions, could detect children's
2 decisions to be honest or deceptive. The DFA model was significant for initial and final Self-
3 Neutral lies only with the classification accuracy of these lies (initial = 78.9%; final = 71.4%)
4 corresponding to other recommended verbal-based lie-detection tools (Vrij, 2018); however, the
5 truth classification accuracy (initial = 67.1%; final = 58.9%) was lower than these verbal-based
6 lie-detection measures. The DFA models were not significant for the Self-Cost and Other-Cost
7 scenarios.

8 There are some possible explanations for these results. To build on the work of Walczyk
9 et al., (2016) and Masip et al., (2016), the current study assessed the efficacy of the ADCAT
10 predictors for four types of commonly told lies. The current results suggest that the predictive
11 value of EV_{Truth} and Lie Motivation are impacted by the type of lie the child is telling (i.e., for
12 self or others) and the potential cost (i.e., cost to self/other or no cost) for doing so. In the
13 current study, EV_{truth} and Lie Motivation were most predictive of children's hypothetical
14 decisions to tell Self-Neutral lies. On the other hand, EV_{Truth} and Lie Motivation were not
15 significant predictors of their hypothetical behaviours when there was an apparent cost to another
16 (i.e., the child's classmate) in the Self-Cost scenario. Therefore, the effectiveness of these
17 ADCAT measures for predicting future self-oriented honest and dishonest decisions is impacted
18 by the presence of a potential cost. For other-oriented lies, EV_{Truth} and Lie Motivation were
19 significantly correlated with their hypothetical decisions to tell Other-Cost lies; however, these
20 measures were not significant predictors in the follow-up MANCOVA analyses. That is, when
21 there is a clear cost to self for telling a lie that benefits someone else, EV_{truth} and Lie Motivation
22 can be important factors in these lie decisions. It is noteworthy that EV_{Lie} was not significantly
23 correlated with hypothetical truth or lie behaviors in Masip et al., (2016). While Lie Motivation

1 (EV_{Lie} subtracted by EV_{Truth}) was a significant correlate of truth and lie behaviors in all the
2 ADCAT studies, this is likely because of the impact of EV_{Truth} rather than EV_{Lie} .

3 These results provide some support for truth-induction strategies (e.g., moral stories) that
4 highlight the positives for being honest instead of the negatives associated with dishonesty. In
5 Talwar, Yachison and Leduc (2016) for example, children who were read a story about the
6 benefits of being honest were more likely to tell the truth about an adult's accidental
7 wrongdoing. That is, when children perceive that being honest has greater benefits than lying,
8 then they are more likely to tell the truth. On the other hand, the story that highlighted the costs
9 of lying was ineffective for discouraging dishonesty (Talwar et al. 2016). This is consistent with
10 the current findings, as EV_{Lie} was ineffective for predicting honest and dishonest behaviors
11 across all the scenarios. Specifically, children's perceptions of the value of telling a lie (EV_{Lie})
12 had far less importance than the value of telling the truth (EV_{Truth}) when making a decision to be
13 honest or dishonest. Professionals who work with children (e.g., law enforcement, forensic
14 interviewers, psychologists and social workers), particularly in criminal investigations, are
15 therefore encouraged to highlight the positives of truth-telling, instead of the negatives of lying,
16 when encouraging children to provide honest and credible eyewitness disclosures.

17 As discussed in Talwar & Crossman (2011), telling a convincing and planned-out lie
18 requires sophisticated executive functioning and perspective-taking skills. This applies to
19 ADCAT (Walczyk & Fargerson, 2019), as the children had to use higher-order ToM to take the
20 position of the main character and imagine what they would actually do in real-life. At the same
21 time, they likely had to use inhibitory control and other executive function resources (e.g.,
22 working memory, attention and planning) to develop cohesive and consistent truthful or false
23 statements. This is highlighted in the present study, as ToM and inhibitory control had varying

1 effects on the children's reported ADCAT scores and willingness to tell hypothetical truths and
2 lies, especially in the Self-Cost and Other-Cost scenarios. In contrast, adults' attitudes towards
3 honesty and dishonesty is relatively more stable given that these important developmental
4 functions are generally fully developed. Unlike the adult studies then (Cassidy et al., 2019;
5 Masip et al., 2016; Walczyk et al., 2016), the children's attitudes and motivation towards truths
6 and lies (EV_{Truth} , EV_{Lie} and Lie Motivation) was likely more affected by their level of
7 developmental functioning at the time of the study.

8 **Developmental Findings**

9 A secondary objective of this study was to examine the potential development predictors
10 (age, inhibitory control and ToM) of children's motivation and hypothetical future-decisions to
11 tell different types of lies. In line with our hypotheses and prior developmental research, ToM
12 was a significant predictor of EV_{Truth} in the Other-Cost scenario. On the MANCOVAs that
13 examined the predictors of the ADCAT dependent measures, ToM was found to be a significant
14 predictor of EV_{Truth} for children's initial and final Self-Cost lies, as well as EV_{Truth} and Lie
15 Motivation for children's initial and final Other-Cost lies. Specifically, higher ToM was related
16 to lower value towards telling the truth when children considered telling a lie for themselves at a
17 cost to another and when telling a lie for someone else at a personal cost. At the same time,
18 higher ToM predicted greater Lie Motivation for children's lies for another when there was a
19 personal cost. Finally, higher inhibitory control scores predicted greater Lie Motivation for
20 children's initial and final Self-Neutral lie decisions.

21 In contrast to our hypotheses, child age was not a significant predictor of any of the
22 ADCAT dependent measure scores. This was unexpected because prior developmental research
23 suggests that as children get older, they morally evaluate lies for self-gain more negatively

1 (Talwar & Crossman, 2011). The current study, however, differed from past lie-telling studies
2 (e.g., Gordon, Lyon, & Lee, 2014; Talwar, Crossman, & Wyman, 2017; Williams et al., 2016)
3 because it examined children's *motivation* to tell different truths and lies based on their perceived
4 benefits and costs of these hypothetical actions, rather than the development of their *lie-telling*
5 *skill* (e.g., semantic leakage control). Overall, the current findings indicate that as children
6 develop better impulse-control skills, they have higher motivation to tell a lie that benefits
7 themselves with no cost to another. This aligns with developmental research which suggests that
8 higher impulse-control is related to more effective lie-telling (e.g., Talwar & Crossman, 2011).
9 That is, children who are better able to tell convincing self-oriented lies, which is attributed to
10 their ability to withhold inconsistent and contradictory information (i.e., impulse control), may
11 therefore have increased confidence and motivation to tell these lies.

12 Furthermore, children's developmental level (i.e., age and executive functioning) was not
13 a significant predictor of motivation to tell truths or lies in the Other-Neutral scenario. As
14 highlighted in Talwar et al. (2017), the cognitive functions needed for telling other-oriented lies
15 differ somewhat from those used for telling self-oriented lies. The current study expanded on this
16 research by examining the impact of perceived cost versus no cost on the developmental
17 predictors of children's lie-telling motivation. In the case of this study, higher ToM predicted
18 increased Lie Motivation when telling other-oriented lies when there was a personal cost for
19 doing so; however, this was not the case when no cost was present. These findings indicate that
20 more research is needed to examine the effect of perceived cost of telling a truth or lie to better
21 understand the cognitive functions that are important to the development of children's self-
22 oriented and other-oriented lying behaviours.

23

1 **Directions for Future Research**

2 There are several ways to expand on the current research methodology. The present study
3 used vignettes that discussed hypothetical truth and lie scenarios that corresponded to those in
4 the adult ADCAT studies (Cassidy et al., 2019; Masip et al., 2016; Walczyk et al., 2016). These
5 vignettes provided generalizable depictions of four common lie scenarios children encounter on a
6 daily basis, and allowed the findings to be compared to those from the adult ADCAT studies.
7 Vignettes (or ‘stories’) are widely used in the child and adult deception literature (e.g., Ma, Xu,
8 Heyman, & Lee, 2011; Xu, Luo, Fu, & Lee, 2009) given that they permit for examinations of
9 people’s attitudes towards various types of truth and lie scenarios. As discussed in Hughes and
10 Huby (2002), vignettes are also used in social and health research because they encourage
11 children to comfortably discuss sensitive topics, ideas and experiences. To expand on the present
12 study, future research should also examine whether ADCAT can predict children’s actual honest
13 and dishonest behaviors, instead of their just hypothetical truth-lie decision. This can be achieved
14 by utilizing experimental paradigms used in the deception literature (e.g., Temptation Resistance
15 Paradigm; Talwar & Lee, 2002; theft of money scenario in Wyman, Foster, Crossman, Colwell,
16 & Talwar, 2019). In these paradigms, children first have to make an actual decision regarding
17 whether they should tell a truth or lie to benefit themselves or another; since the children are not
18 aware of the experimental nature of the study, these decisions are more likely reflect their real-
19 life behaviors. Afterwards, the children can complete the modified ADCAT questionnaires used
20 in the current study to examine their decision-making processes for telling the truth or lie.

21 It is worth highlighting that there are likely other factors beyond EV_{Truth} , EV_{Lie} and Lie
22 Motivation that can be used for understanding the rational and irrational decision-making
23 processes for telling truths and lies. For example, pre-existing lie-telling confidence and skill

1 level (Vrij, 2008), age and cognitive capacity (Talwar & Crossman, 2011), exposure to
2 dishonesty (Serota & Levine, 2015), the recipient of the lie (Williams, Kirmayer, Simon, &
3 Talwar, 2013) and fantasy proneness (Merckelbach, 2004) are other important factors for
4 explaining and predicting people's honest and dishonest behaviors. Future research should
5 therefore assess whether these factors affect the efficacy of the ADCAT calculations. Lastly, it is
6 recommended that future ADCAT research utilize a sample of teens. It is possible that the
7 Decision component of ADCAT may better reflect the quasi-rationale decision-making process
8 in this population given that their cognitive, social and moral developmental is more consistent
9 with those of adults.

10 **Conclusions**

11 The present study was the first of its kind to examine the benefits and limitations of
12 ADCAT's Decision component for predicting and detecting children's hypothetical decisions to
13 tell four different types of lies. With respect to ADCAT's cost-benefit formula, EV_{Truth} and Lie
14 Motivation served as significant correlates for children's hypothetical truth/lie decisions in the
15 Self-Neutral and Other-Cost lie scenarios. Specifically, higher value towards truth-telling
16 resulted in lower willingness to tell lies in these scenarios. On the other hand, EV_{Lie} was
17 generally ineffective for understanding children's hypothetical decisions to tell truth or lies in all
18 the scenarios. Moreover, EV_{Truth} and Lie Motivation were only somewhat effective for detecting
19 children's truth and lie decisions in the Self-Neutral scenario only. From a developmental
20 perspective, ToM and inhibitory control were found to be important functions that influence how
21 children perceive truth-telling and lie-telling in different situations. Namely, children with higher
22 perspective-taking skills showed lower value towards telling the truth in a situation wherein they
23 considered telling a lie for another at a personal cost. Higher inhibitory control also predicted

1 greater motivation to tell a lie for self with no potential cost. Taken together, these results
2 provide mixed support for the ADCAT cost-benefit formula with children given that its
3 effectiveness is affected by developmental factors and the type of lie being analyzed.

4

5

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7

Appendix A

Post Scenario Questionnaire Calculation Example

$$\begin{aligned} \mathbf{EVLie} &= (p_{\text{believed}} \times v_{\text{believed}}) + (p_{\text{not believed}} \times v_{\text{not believed}}) \\ &= (0.7 \times 2) + (0.3 \times -3) \\ &= 0.5 \end{aligned}$$

$$\begin{aligned} \mathbf{EVTruth} &= (p_{\text{believed}} \times v_{\text{believed}}) + (p_{\text{not believed}} \times v_{\text{not believed}}) \\ &= (0.8 \times -1) + (0.2 \times -2) \\ &= -1.20 \end{aligned}$$

$$\begin{aligned} \mathbf{Lie Motivation} &= (EVLie) - (EV_{\text{Truth}}) \\ &= (0.5) - (-1.2) \\ &= 1.70 \end{aligned}$$

Appendix B

Vignette scenarios

Vignette 1 – Lie for self, no cost to another

It is Sunday afternoon and you have some homework to do. This homework is really important because you got in trouble last week because you had forgotten to hand-in your homework. Right before you start doing the homework, your friend calls you and invites you to play a new game that you really wanted to play for a long time. So, you decide to go over to your friend's house and play the new game. You end up having so much fun that you totally forget to do the important homework. The next morning, you are in class talking to your friends about how much you liked the game. Your teacher then comes to your desk and asks for your important homework. At that moment, you realize that you completely forgot to do your homework because you were busy playing the new game with your friend! Your teacher and parents might be really mad because you did not hand-in your homework last week. When your teacher asks for your homework, what do you say?

Vignette 2 – Lie for self, cost to another

You and another student decide to clean the class while your teacher and classmates are outside at recess. You are cleaning around your teacher's desk, and you see a dirty paper bag on the floor. You pick up the dirty bag, and put it in the trash. After cleaning the classroom, you see a garbage truck parked in the school's parking lot. You really want to surprise the class with a clean classroom, so you run over to the garbage truck and throw the trash bag in the truck. Shortly after that, the garbage truck leaves the school. When recess ends, you tell your teacher that you and the other student cleaned the classroom. While the other student is in the bathroom, your teacher asks to speak to you alone. She seems upset because she can't find a little bag that was near her desk. You find out that the bag had her wallet inside it with her all money. You realize that you threw the bag in the garbage, and there is no way of getting it back since the garbage truck left the school. Your teacher asks if you or your friend threw out the bag. What do you say to your teacher?

Vignette 3 – Lie for another, no cost to self

You and your friend are in the library, and both of you are working on the computers. You see that your friend is drinking out of a water bottle, but they forgot to put the top back on. While playing a game on the computer, you hear water spill and a loud beeping noise coming from the computer. You then see your friend quickly leave the library with their bag. The librarian then comes over, and sees the water spill and the broken computer. The librarian says that they know that you didn't break the computer, but they ask if you saw who spilled the water and broke the computer. What do you say to the librarian?

Vignette 4 – Lie for another, cost to self

You and your friend are in the principal's office. You are not in trouble, but your friend might be because they were caught leaving the school grounds during recess. The principal tells your

1 friend that if they do something bad again then they will get suspended from school. The
2 principal then leaves the room to answer a phone call in the office. During that time, your friend
3 starts playing with a trophy on the principal's desks, but accidentally drops it which causes it to
4 break. Your friend then leaves the room to go to the bathroom. When the principal returns, they
5 find the broken trophy. The principal is really upset because the trophy was really important to
6 them. While your friend is in the bathroom, the principal asks if you or your friend broke the
7 trophy. What do you say to the principal?
8