Abstract

Purpose: To explore how reasons to lie impact upon the Decision component of Activation-Decision-Construction-Action Theory. Specifically, the study looked at how beneficiary of the lie (self vs. another) and additional cost of lying (no cost vs. cost to self/other) might influence decisions to lie.

Method: Ninety-one undergraduate students read four hypothetical scenarios representing the four reasons to lie. They stated whether they would decide to tell the truth/lie for each scenario and also estimated the probability and valence of being believed, or not, if they did decide to tell the truth/lie. These estimations were inputted into the ADCAT formulae.

Results: Higher expected values of truth-telling only reduced likelihood to decide to lie when the lie benefitted another. The beneficiary of the lie and additional cost did not moderate any of the relationships between the ADCAT variables and hypothetical decisions to lie. However, additional cost (e.g., cost to self or another) was a significant predictor of

anticipated lying behaviour. The more likely there was a cost to self or other, the less likely the participants were to decide to lie.

Conclusions: Weighing up the expected cost and benefits of truth-telling and lying was associated with hypothetical decisions to lie or not. However, other variables, such as additional cost to self or another, should be considered in the ADCAT model to extend our understanding of this decision-making process. Future research is required to investigate whether these relationships can be manipulated to promote honesty and deter deceit.

Keywords: adult deception, ADCAT model, decision-making, antisocial lies, prosocial lies

Exploring the Decision Component of Activation-Decision-Construction-Action Theory for Different Reasons to Deceive

To deceive or not to deceive, that is the question. Deception is defined as "a successful or unsuccessful deliberate attempt, without forewarning, to create in another a belief which the communicator considers to be untrue" (Vrij, 2008, p. 15). Deception can take many different forms, from outright lies that involve complete fabrications (Vrij, 2008) to embedded lies that incorporate truthful information to create the lie (Vrij, Granhag & Porter, 2010) to deception through the omission of truthful information (Lyon, Malloy, Quas & Talwar, 2008). Most theories and models of deception focus on the emotional and cognitive processes involved in telling a successful lie itself (e.g., Interpersonal Deception Theory, Buller & Burgoon, 1996; Working Memory Model, Sporer, 2016; Cognitive Lie Detection, Vrij, Granhag, Mann & Leal, 2011), leading to new interview techniques to improve lie detection. However, understanding the processes behind deciding to tell the truth

or a lie in the first place would perhaps enable us to design better strategies to reduce, or even eliminate, deception in investigative interviews.

Based on the Rational Choice Theory (i.e., a general approach to understanding social decision-making), Activation-Decision-Construction-Action-Theory (ADCAT, Walczyk, Harris, Duck & Mulay, 2014) has adapted cost-benefit formulae put forward by Stanovich (2010) to reflect quasi-rational decision-making. Providing a comprehensive framework that maps deception from start to finish, ADCAT is the only cognitive model of deception to isolate the Decision component and provide calculable formulae for predicting truth/lie decision-making. Walczyk et al. (2014) explain that this decision-making process is only quasi-rational because actual likelihoods and costs/benefits are unknown. This means that only estimates of these outcomes are used to evaluate options and to come to a final decision that best optimises goal attainment. In line with Truth-Default Theory (Levine, 2014), ADCAT assumes that people will deceive as little as possible to achieve their goals (Walczyk et al., 2014). However, this infers that, sometimes, deception will be necessary for goal attainment.

When applied to deception, the cost-benefit calculations of the ADCAT model (Walczyk et al., 2014) can be broken down into three steps. First, the expected value of truth-telling is calculated by multiplying the probability and valence of truth-telling and being believed, multiplying the probability of truth-telling and not being believed, and then adding these values together. Second, the expected value of lying is calculated using the same formula, except that ratings relate to telling a lie and being believed, or not. For calculating both expected values (EV), the formula is: $EV_{truth/lie} = (p_{believed} \times v_{believed}) + (p_{not\_believed} \times v_{not\_believed})$. Third, motivation to lie is calculated by subtracting the expected value of truth-telling from the expected value of lying: $M = EV_{lie} - EV_{truth}$ (see Supplementary Materials for an example of these calculations). Based on these formulae, Walczyk et al. (2014) predicted

that (1) expected value of truth-telling would negatively correlate with decision to lie, and (2) motivation to lie would positively correlate with the decision to lie. This theory, therefore, is designed to predict truth/lie behaviours.

Due to the novelty of ADCAT, there are very few published studies that have employed this model. In fact, only two studies (Masip, Blandón-Gitlin, de la Riva & Herrero, 2016; Walczyk, Tcholakian, Newman & Duck, 2016) to date have tested the Decision component and its formulae. First, Masip et al. (2016) used hypothetical scenarios typical for an undergraduate population (e.g., a friend cheating on a test or witnessing a theft). They found that the expected value of truth-telling was negatively correlated with deciding to lie and that motivation to lie was positively correlated with deciding to lie. Thus, both of Walczyk et al.'s (2014) predictions were supported. However, their findings showed no relationship between the expected value of lying and deciding to lie. Second, Walczyk et al. (2016) investigated impromptu decisions to lie when asked embarrassing questions during a mock job interview. They also found that the expected value of truth-telling was negatively correlated with deciding and actually telling a lie in the interview. Contrary to Masip et al. (2016), they did find a positive relationship between the expected value of lying and actual lying behaviour. Together the studies present mixed findings, with more testing required to understand whether the expected value of lying, in particular, is related to a decision to lie or not.

Building on this previous research, we explored whether reasons to lie might influence decisions to lie or tell the truth. As proposed by ADCAT, reasons for lying can largely depend on the perceived benefits and costs of that lie (Walczyk et al., 2014; Walczyk et al., 2016). The beneficiary of the lie (self or other) and the protection from harm (i.e., cost) that the lie affords the beneficiary are important motives (Vrij, 2007; 2008). Self-oriented lies, also known as 'antisocial' or 'self-serving' lies, are largely discouraged because they

primarily serve to protect the liar (Hsieh, 2004). For example, an antisocial lie might include falsely telling your lecturer that your grandparent has passed away to be able to re-sit an exam. Other-oriented lies, also referred to as 'prosocial' or 'polite' lies, are perceived to be more socially tolerable than self-oriented lies because they aim to benefit others (Backbier, Hoogstraten & Terwogt-Kouwenhoven, 1997; DePaulo, Kashy, Kirkendol, Wyer & Epstein, 1996; Dunbar et al., 2016). This preference for prosocial lies has also been found cross-culturally (Seiter, Bruschke & Bai, 2002). An example of an other-oriented lie is receiving an undesirable gift (e.g., an unattractive shirt) from a dear relative and feigning delight at receiving such a gift so as not to offend the gift-giver. When deciding on the acceptability of lying and truth-telling in a given situation, adults appear to use a model of practical reasoning, whereby they adapt their reasoning to suit the needs of that situation (Lavoie, Leduc, Crossman & Talwar, 2016, O'Neill, 2007). If there is a need to protect a dear relative from becoming upset, then an other-oriented lie might be acceptable. This could explain why the most frequent form of lies are other-oriented, aimed at protecting someone else from harm (Serota & Levine, 2015). A preference for other-oriented lying could, therefore, be due to weighing up the benefits of resolving the need against the costs of not protecting another from harm.

Truth-telling and lying could also involve an additional cost to the self or another. Self-oriented lies could involve placing the blame on someone else (e.g., saying that a younger sibling broke the family heirloom, when, in fact, it was oneself). Additionally, other-oriented lies could involve placing the blame on oneself (e.g., the deceiver falsely admitting guilt for breaking the family heirloom when, in fact, it was his/her younger sibling). The perception of potential harm is a strong predictor of moral judgments, with immoral acts being linked to suffering (Gray & Schein, 2016; Gray, Young & Waytz, 2012). A primary function of these judgments is to guide practical reasoning (Cushman & Young, 2009) so that

in the case of self-oriented lies, with a cost to another, the need of the older sibling must significantly outweigh the suffering of the younger sibling to warrant deception. Other-oriented lies, with a cost to self, present a different situation. Here, the self-sacrifice of the older sibling to protect the younger sibling would constitute altruism. Evolutionary psychologists theorise that altruism is a key motivator for prosocial behaviour that has evolved through natural selection, resulting in generations with more empathic concern (Berk, 2013). This could explain why the more the deception becomes altruistically-motivated, the more the deception is rated as acceptable (Seiter et al., 2002). Metaphorically, falling on one's sword would, therefore, be preferable to stabbing someone else.

Our aims were, therefore, not only to further test the predicted relationships within the Decision component of the ADCAT model but also to add to this literature by exploring how these relationships might be influenced by different reasons to lie. We firstly hypothesised that expected value of truth-telling would negatively correlate with the decision to lie. Our second hypothesis was that the expected value of lying would positively correlate with the decision to lie. Thirdly, we predicted that motivation to lie would also negatively correlate with the decision to lie. Finally, being the first study to look at the Decision component of ADCAT for different reasons to lie, we proposed some explorative tests. We expected three-way interactions in that beneficiary of the lie and an additional cost would moderate the relationships between the expected value of truth-telling and decision to lie and the expected value of lying and decision to lie. In particular, we predicted that when the beneficiary of the lie was oneself, an additional cost to an 'innocent' other was at stake, and, thus, the expected value of truth-telling was high, then the participant would be most likely to decide not to lie. We also predicted that when the beneficiary of the lie was another, an additional cost to oneself demonstrating one's altruism was at stake, and, thus, the expected value of lying was expected to be higher, then the participant would be most likely to decide to lie.

In addition to the expected theoretical implications of analysing the Decision component of ADCAT, there are also potential practical implications as well. In investigative interviews, where the veracity of interviewees' accounts can strongly influence the outcome of the case (Berman, Narby, & Cutler, 1995), researchers have been keen to investigate strategies to promote honest disclosure and to deter deceit (see Rosenbaum, Billinger, & Stieglitz, 2014 for a review). However, depending on interviewees' motivations for lying (i.e., if the lie will protect another from harm), they might still be inclined to provide a false report. For instance, in cases of maltreatment, victims often report that a barrier to disclosure is that they do not want to get the abuser into trouble (Beaulaurier, Seff, Newman, & Dunlop, 2006; Lemaigre, Taylor & Gittoes, 2017). In these situations, it is important to know how different reasons to lie will influence cost-benefit calculations and, ultimately, final decisions to be honest or not.

Method

Design

A within-subjects design was used, with reason to lie as the independent variable. Reason to lie was split by the beneficiary of the lie (self vs. another), and the presence of additional cost of lying (no cost (i.e., neutral) vs. cost to self/other). This resulted in four 'reasons to lie' conditions: (1) Self-oriented with no cost to another (Self-Neutral), (2) Self-oriented with a cost to another (Self-Cost), (3) Other-oriented with no cost to self (Other-Neutral), and (4) Other-oriented with a cost to self (Other-Cost). The dependent measures were dichotomous decisions to lie or tell the truth and Likert scale ratings of the probability and valence of outcomes for truth-telling and lying for each reason to lie.

Participants

Ninety-one first year undergraduate students (18 males), with an average age of 18.56 years (*SD* = 1.47 years), were recruited to participate in this study. They took part in a lab

induction exercise and did not receive credit for their participation. In terms of ethnicity, 61 identified as White/Caucasian (67%), 12 as Asian (13.2%), 8 as Multiple/Mixed ethnic group (8.8%), 7 as Black/African/Caribbean (7.7%), 1 as 'Other ethnic group' (1.1%), and 2 did not specify their ethnicity (2.2%).

Materials

Hypothetical scenarios. The four hypothetical scenarios were all set in an academic context and included situations in which undergraduate students might find themselves (similar to Masip et al., 2016). There were two scenarios where self-oriented lies could be told, and two where other-oriented lies could be told. These scenarios were then further split to manipulate the presence of an additional cost (i.e., harm) as introduced by Talwar, Williams, Renaud, Arruda, and Saykaly (2016). See the Supplementary Materials for the full scenarios. Prior to testing, the scenarios were piloted. The pilot exercise (with 14 participants) was undertaken to avoid issues of significantly uneven frequencies between decisions to lie and tell the truth, which resulted in Masip and colleagues (2016) having to withdraw numerous scenarios from their study. As a result of the pilot study, certain changes were made. Namely, the presentation of the probability rating scale was changed from decimal points (e.g., .5, .8), as used in Masip et al. (2016), to percentages (e.g., 50%, 80%) to aid responder comprehension. Furthermore, the self-oriented lie with no cost to self was considered to be too implausible, and so this was changed from a USB stick falling through a hole in a pocket and being kicked down a drain to a student misremembering a deadline and forgetting to put their phone on to charge, so the alarm did not go off.

Post-scenario questionnaire. The post-scenario questionnaire (see Appendix) firstly asked participants to make an initial decision to tell the truth or lie in the recently presented hypothetical scenario. The order of the truth/lie option was counterbalanced. Participants were then required to evaluate the anticipated outcomes of being believed/not believed and

the probability of being believed/not believed, using a scale from 0% (will not happen) to 100% (will certainly happen), and the desirability (i.e., valence) of the anticipated outcomes, using a scale from -5 (extremely undesirable) to +5 (extremely desirable) for both truth-telling and lying for that particular scenario. This mirrored the rating scales used by Masip et al. (2016). From these ratings, the expected value of truth-telling, the expected value of lying, and motivation to lie could be calculated using the ADCAT formulae noted above and included in the Supplementary Materials. The order of appraisal for telling the truth and telling a lie was counterbalanced – that is, half of the sample evaluated the outcomes of telling the truth first, and the other half evaluated the outcomes of telling a lie first. Finally, participants were asked to make a final decision to tell the truth or lie based on their evaluations. The order of the truth/lie option mirrored the order of the truth/lie option for their initial decision. Changes from the initial decision to the final decision were coded.

Procedure

The study lasted approximately 30 minutes. In groups of eight to fifteen students, participants watched the four hypothetical scenarios via a Microsoft PowerPoint slideshow on a screen projection. Text and images were presented on the slides, with the text also being read aloud. The order of the scenarios was counterbalanced so that each vignette was never preceded nor followed by the same scenario more than once. Immediately after watching each scenario, participants completed the post-scenario questionnaire (one questionnaire per scenario). To encourage impromptu decision-making, participants were encouraged to respond quickly and instinctively. Participants were also instructed not to confer with their fellow participants; the research assistant was always present in the room to ensure that there was no conferring. Following the fourth vignette, participants were invited to complete a questionnaire that asked for age, gender and ethnicity.

Results

Chi-squared testing was used to investigate differences in frequency between truth-telling and lying across the four scenarios, point-biserial correlations were used to investigate relationships between ADCAT variables and expected decisions to lie or tell the truth, and multiple regression analyses were used to explore the moderating effects of the beneficiary of the lie and additional cost of lying. Preliminary analyses revealed no effects for any of the demographic variables, group session or order of presentation of scenarios on the statistical testing. Post-hoc power tests were performed using G*Power (Faul, Erdfelder, Lang & Buchner, 2007) to analyse sensitivity based on a sample of 91 participants, an alpha level of .05 and satisfactory power level of 80%. Results showed that, for the point-biserial correlations, the sample size was sufficient to find effect sizes of .25 and above, and for multiple regressions, the sample size was sufficient to find effect sizes of .07 and above. This suggests that there is a minor risk of Type II error for small effect sizes (< .25) for the point-biserial correlations.

Frequency of lying

Table 1 displays the percentage of participants that made an initial and final decision to tell the truth or lie across the four scenarios. Participants indicated that they would lie significantly more than tell the truth for the self-oriented lie with no cost to another; conversely, they expected to tell the truth significantly more than lie for the self-oriented lie that incurred a cost to someone else. For other-oriented lies, the only difference in expectations for truth-telling and lying was when the lie had no cost to self. In this scenario, participants initially expected to lie significantly more than tell the truth; however, this difference became non-significant for final decisions for this scenario. This is most likely due to more participants changing their response from lie to truth than from truth to lie once they had evaluated truth/lying for that scenario, $X^2(1) = 4.46$, $p = .04$. For the other three scenarios, changes in expected truth-telling/lying were equally distributed (*p-value*s >.05).

Based on the recommendations of Masip et al. (2016), we analysed the frequency of truth/lie response and the absolute difference in percentage between truth/lie decisions because the split of binomial variables can affect point-biserial correlations. Masip et al. (2016) explained that small frequencies can often lack representativeness of the population due to outliers potentially distorting the results. Furthermore, they cite that Kemery, Dunlap, and Griffeth (1988) reported that variance could be restricted by uneven proportions in dichotomous variables, which can, in turn, underestimate correlations. Using the inclusion criteria suggested by Masip et al. (2016), we kept all scenarios where the frequency of truth-telling/lying was above 10, and the absolute difference in percentage between truth/lie decisions was smaller than 75%. All four scenarios complied with both of these inclusion criteria.

ADCAT variables

Point-biserial correlations (r_{pb}) were used to examine the relationships between the ADCAT variables (expected value of truth-telling, the expected value of lying, and motivation to lie) and participants' expected decision to lie (1) or tell the truth (0) across the four reasons to lie. This is in line with previous studies that have tested the *Decision* component of the ADCAT model (Masip et al., 2016; Walczyk et al., 2016). The descriptive statistics (means and standard deviations) for each of the ADCAT variables, as well as the point-biserial correlations between the ADCAT variables and the initial and final decision to tell a lie, are displayed in Table 2. All significant relationships between the ADCAT variables and expected decision to lie were in the predicted direction. Contrary to our predictions, the expected value of truth-telling was not related to a decision to lie for either of the self-oriented lies (*p*-values >.05).

Explorative testing

We performed hierarchical multiple regression analyses to determine the effect of expected values of truth-telling and lying, the beneficiary of the lie, additional cost and the interaction between these variables on the initial and final hypothetical decisions to lie (i.e., the outcome variables). Accordingly, the expected value of truth-telling and the expected value of lying were entered as predictors at step 1, beneficiary of the lie (self-oriented = 0, vs. other-oriented = 1) and the additional cost of lying (no cost (i.e., neutral) = 0, vs. cost to self/other = 1) were dummy-coded and entered as moderators at step 2, and the interactions between each expected value and each moderator separately, and then each expected value and both moderators, were entered at step 3.

As can be seen in Table 3, at step 1, both expected value of truth-telling and expected value of lying contributed to the prediction of participants' hypothetical decisions to lie, both initially, $F(2, 361) = 27.94$, $p<.001$, $R^2 = .13$, and finally, $F(2, 361) = 19.26$, $p<.001$, $R^2 = .10$. Entering beneficiary of the lie and presence of additional cost did result in significant models for predicting both initial, $F(4, 359) = 19.30$, $p<.001$, $R^2 = .18$, and final, $F(4, 359) = 13.90$, $p<.001$, $R^2 = .13$, hypothetical decisions to lie. The inclusion of these variables significantly increased the amount of variance explained by both models (initial = $\Delta F(2, 359) = 9.37$, $p<.001$, $\Delta R^2 = .04$. final = $\Delta F(2, 359) = 7.81$, $p<.001$, $\Delta R^2 = .04$). However, as Table 3 shows, only additional cost was a significant predictor of both initial ($\beta = -.20$, $p<.001$) and final ($\beta = -.20$, $p<.001$) hypothetical decisions to lie. The negative correlations suggesting that the presence of an additional cost to self/other decreased the likelihood of a hypothetical decision to lie in the given scenario. The interaction variables entered at step 3 did result in significant models for predicting both initial, $F(10, 353) = 8.28$, $p<.001$, $R^2 = .19$, and final, $F(10, 353) = 7.48$, $p<.001$, $R^2 = .18$, hypothetical decisions to lie. The inclusion of these variables significantly increased the amount of variance explained for final decision to lie, $\Delta F(6, 353) = 2.91$, $p = .009$, $\Delta R^2 = .04$, but not for initial decision to lie, $\Delta F(6, 353) = .95$, $p = .46$, $\Delta R^2 =$

.01. At step 3, however, the only significant predictors for final decision to lie were the expected value of lying (β = .09, p<.001) and presence of additional cost (β = -.21, p = .002). When the expected value of lying was higher, then there was a greater likelihood that the participant would decide to lie in the given scenario. Again, when there was an additional cost to self/other present, then there was a smaller likelihood that the participant would decide to lie in that hypothetical scenario.

Discussion

Using the Decision formulae of the ADCAT model, the current study replicated previous research on whether deciding to tell the truth or a lie in a hypothetical scenario is related to the expected costs and benefits of truth-telling and lying. It was also the first study to look at how reason to lie can affect this decision-making process. In support of Walczyk et al. (2016) and Masip et al. (2016), positive associations were found between calculated motivation to lie and expecting to decide to lie. Additionally, we found a positive relationship between the expected value of lying and deciding to lie, in line with Walczyk et al. (2016), but contrary to Masip et al. (2016). We also found that a negative relationship between the expected value of truth-telling and expecting to decide to lie only occurred when the lie was other-oriented. This is contrary to both of the previous studies that found this relationship in scenarios where the lies were predominantly self-oriented.

A significant correlation for both prosocial lies suggests that Walczyk et al.'s (2014) overarching hypothesis of a negative relationship between the expected value of truth-telling and deciding to lie depends on who the lie benefits. In the context of prosocial lies where there is the intention to act for the benefit of another (Dunbar et al., 2016; Lavoie et al., 2016), it can be concluded that if a person decides to tell the truth, then another will primarily suffer the consequences. The cost to another, therefore, forms the basis for calculating the expected value of truth-telling for prosocial lies and would explain why it is particularly

important to consider in the decision-making process. On the other hand, no significant relationship for self-oriented lies could be due to a Type II error, or that the primary victim of deciding to tell the truth when presented with an opportunity to tell an antisocial lie is oneself. The findings of the current study suggest that the primary cost to another is considered more important than the primary cost to self when evaluating the cost and benefits of truth-telling.

Our exploration of the effects of reason to lie on the truth-telling/lying decision-making process revealed neither beneficiary of the lie nor the additional cost of lying moderated the relationships between the expected values of truth-telling and lying and hypothetical decisions to tell a lie both initially and finally. That said, the additional cost was found to be a significant predictor in the second and third models for both initial and final decisions to lie. When the additional cost of lying was present (i.e., lying by blaming their fellow student, or lying and taking the blame for their fellow student), participants were less likely to decide to lie. In terms of frequency, this resulted in a significant preference for telling the truth for self-oriented lies, with a cost to another, but no preference for truth-telling or lying for other-oriented lies, with a cost to self. Our initial prediction of a differential response to additional cost, based on whether it was to another at the benefit of the self or if it was to oneself at the benefit of another, was not supported. Indeed, our participants did not show a preference for expecting to act altruistically. Even though altruistic lies are considered to be more acceptable (Seiter et al., 2002), it could be that the need to protect someone else did not outweigh the suffering that the self would incur through the deception. That said, one could argue that a certain level of altruism is shown in the clear preference for telling the truth when the lie would protect the self to the detriment of another person. In this scenario, the participant is incurring a cost to themselves in order to protect another from potential harm.

352 **Theoretical implications**

353 Our findings provide further support for the formulae in the Decision component of
354 Activation-Decision-Construction-Action theory (ADCAT, Walczyk et al., 2014). The results
355 also showed that additional cost to self or another should be considered as an external
356 variable that can predict the expected value of lying and motivation to lie. However, more
357 qualitative research is required to provide a more in-depth understanding of how outcomes of
358 truth-telling and lying are perceived as benefits and costs, and whether these benefits and
359 costs are psychological or materialistic (Vrij, 2008). This might further highlight the quasi-
360 rational decision-making process that underpins ADCAT (Walczyk et al., 2014). There are
361 many other rational, or perhaps irrational, factors that might influence expected values of
362 truth-telling/lying and, ultimately, decisions to lie. Indeed, individual factors, such as
363 confidence in lying ability (Vrij, 2008), propensity to lie (Serota & Levine, 2015), and
364 fantasy proneness (Merckelbach, 2004) could affect these calculations, as well as contextual
365 factors, such as who the lie is told to (Buller & Burgoon, 1996). Furthermore, participants'
366 strategies for telling a convincing lie may have differed affecting their confidence in telling a
367 lie and being believed.

368 **Practical applications**

369 The current findings demonstrated the complex thought process involved in truth/lie
370 decision-making. In particular, the perceived benefits and costs of a decision to oneself and
371 others were associated with participants' truth/lie decision-making. For other-oriented lies,
372 the suggestion would be that increasing the expected value of truth-telling and decreasing the
373 expected value of lying could result in less motivation to tell a lie. For self-oriented lies, the
374 suggestion would be to only focus on decreasing the value of lying to deter motivation to
375 deceive. Whether these suggestions actually promote honesty and deter deception requires
376 further testing. Developmental research on child deception has found that methods for

increasing the value of telling the truth significantly increase children's willingness to truthfully disclose transgressions. These methods include: (1) having the eyewitness promise to tell the truth (e.g., Evans & Lee, 2010; Talwar, Lee, Bala & Lindsay, 2002); (2) reducing any of the perceived negative consequences of truth-telling (Talwar, Arruda, & Yachison, 2015); and (3) information or stories that highlight the benefits of honesty (e.g., Lee et al., 2014; Talwar, Yachison & Leduc, 2016). To date, research into the Decision component of ADCAT has shown cost-benefits calculations are related to adults' decision-making for (1) minor transgressions (Masip et al., 2016), (2) mock job interviews (Walczyk et al., 2016), and (3) academic transgressions (the current study) using predominantly undergraduate samples. Before these techniques can be used by police investigators to promote true and deter false eyewitness accounts, more research is required to understand whether these relationships can be manipulated to change truth-telling/lying behaviour in adults, whether this applies to a more general population, and whether the ADCAT variables relate to decisions regarding more serious and high-stakes lies.

Methodological considerations

Akin to previous studies that have investigated the frequency of deceptive behaviour (Argo, White & Dahl, 2006), the current study used hypothetical scenarios. The limitation of this method is that there is no certainty that participants will respond truthfully about their willingness to deceive. It could also be that a decision to deceive might not translate into actual lying if they found themselves in the situation. Walczyk et al. (2016) resolved this issue by asking participants in their study to actually lie on the spot during mock job interviews. This study showed that the relationship between ADCAT variables and actual truth-telling/lying behaviour did exist. Other studies have demonstrated how hypothetical scenarios of dishonesty can be translated into real tasks (e.g., cheating in Shu, Gino & Bazerman's, 2011 study). However, these scenarios are still a far cry from police

investigations where telling a lie can have serious and long-term legal implications. Future research should try to create more forensically relevant scenarios in which the Decision component of ADCAT can be tested, without encountering ethical issues.

In the post-scenario questionnaire, the questions were focussed on collecting the relevant data that could be inputted into the ADCAT formulae. This meant that other questions regarding participants' understanding of the study and the scenarios was overlooked. This information would further expand the current findings and provide insights into the relationship between the decision to lie and construction of lies.

Conclusion

Cost-benefit calculations of lying were associated with decisions to lie; however, the cost-benefits calculation of truth-telling were only associated with other-oriented lies. Additional cost significantly predicted the expected value of lying and motivation to lie. The presence of a cost to another significantly reversed participants' preference for telling a self-oriented lie. For other-oriented lies, an additional cost to oneself resulted in no preference for deciding to lie or tell the truth. The current study builds upon previous research on the Decision component of ADCAT and presents the first explorative testing of predictions regarding the influence of reason to lie on the formulae within this component. Further confirmative research is required to replicate our findings (Wigboldus & Dotsch, 2016). Future studies should also look to use larger and more diverse samples and investigate ADCAT in more forensically relevant scenarios where participants actually lie or tell the truth.

Appendix

Vignette questionnaire to assess ADCAT variables of the Decision component

SCENARIO 1

All of the questions below refer to the scenario that you have just watched and that scenario only.

1. **If you were in this situation, what would you decide to do?** Circle one response below.

   TELL A LIE TELL THE TRUTH

Regardless of how you answered Question 1, please answer the following questions:

2. **If you were to tell a lie in this situation and were believed, what do you think would happen?**

   ……

3. **What is the probability that your lie would be believed and your answer to Question 2 would happen?**

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%

Will not happen **Will certainly happen**

4. **Overall, how desirable is the outcome for your response to Question 2?**

-5	-4	-3	-2	-1	0	1	2	3	4	5

Extremely undesirable **Neutral** **Extremely desirable**

5. If you were to tell a lie in this situation and were <u>not</u> believed, what do you think would happen?

……

6. Overall, how desirable is the outcome for your response to Question 5?

-5	-4	-3	-2	-1	0	1	2	3	4	5

Extremely undesirable **Neutral** **Extremely desirable**

7. If you were to tell the truth in this situation and were believed, what do you think would happen?

……

8. What is the probability that your truth would be believed and your answer to Question 7 would happen?

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%

Will <u>not</u> happen **Will <u>certainly</u> happen**

9. Overall, how desirable is the outcome for your response to Question 7?

-5	-4	-3	-2	-1	0	1	2	3	4	5

Extremely undesirable **Neutral** **Extremely desirable**

10. If you were to tell the truth in this situation and were <u>not</u> believed, what do you think would happen?

……

11. Overall, how desirable is the outcome for your response to Question 11?

-5	-4	-3	-2	-1	0	1	2	3	4	5

Extremely undesirable **Neutral** **Extremely desirable**

12. Regardless of how you answered Question 1, after considering your responses for Question 2 to 11, what would you decide to do if you were in this situation?
Circle <u>one</u> response below.

TELL A LIE TELL THE TRUTH

13. If you have <u>changed</u> your decision from Question 1, why?
If you would act the same as you responded to Question 1, please write N/A below.

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539 References

540 Argo, J. J., White, K., & Dahl, D. W. (2006). Social comparison theory and deception in the
541 interpersonal exchange of consumption information. *Journal of Consumer Research,*
542 *33*(1), 99-108. doi: 10.1086/504140

543 Backbier, E., Hoogstraten, J., & Terwogt-Kouwenhoven, K. M. (1997). Situational
544 determinants of the acceptability of telling lies. *Journal of Applied Social Psychology,*
545 *27*(12), 1048-1062. doi: 10.1111/j.1559-1816.1997.tb00286.x

546 Beaulaurier, R. L., Seff, L. R., Newman, F. L., & Dunlop, B. (2005). Internal barriers to help
547 seeking for middle-aged and older woman who experience intimate partner violence.
548 *Journal of Elder Abuse & Neglect, 17*, 53-74. doi: 10.1300/J084v17n03_04

549 Berk, L. (2013). *Child Development.* 9th edition. Boston: Allyn & Bacon.

Berman, G. L., Narby, D. J., & Cutler, B. L. (1995). Effects of inconsistent eyewitness statements on mock-jurors' evaluations of the eyewitness, perceptions of defendant culpability and verdicts. *Law and Human Behavior*, *19*(1), 79-88. doi: 10.1007/BF01499074

Buller, D. B., & Burgoon, J. K. (1996). Interpersonal deception theory. *Communication Theory, 6*(3), 203-242. doi: 10.1111/j.1468-2885.1996.tb00127.x

Cushman, F., & Young, L. (2009). The psychology of dilemmas and the philosophy of morality. *Ethical Theory and Moral Practice, 12*(1), 9-24. doi: 10.1007/s10677-008-9145-3

DePaulo, B. M., Kashy, D. A., Kirkendol, S. E., Wyer, M. M., & Epstein, J. A. (1996). Lying in everyday life. *Journal of Personality and Social Psychology, 70*(5), 979-995. doi: 10.1037/0022-3514.70.5.979

Dunbar, N. E., Gangi, K., Coveleski, S., Adam, A., Bernhold, Q., & Giles, H. (2016). When is it acceptable to lie? Interpersonal and intergroup perspectives on deception. *Communication Studies, 67*, 129-146. doi: 10.1080/10510974.2016.1146911

Evans, A. D., & Lee, K. (2010). Promising to tell the truth makes 8-to 16-year-olds more honest. *Behavioral Sciences & the Law*, *28*(6), 801-811. doi:10.1002/bsl.960

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*, 175-191.

Gray, K., & Schein, C. (2016). No absolutism here: Harm predicts moral judgment 30x better than disgust – Commentary on Scott, Inbar, & Rozin (2016). *Perspectives on Psychological Science, 11*(3), 325-329. doi: 10.1177/1745691616635598

Gray, K., Young, L., & Waytz, A. (2012). Mind perception is the essence of morality. *Psychology Inquiry, 23*(2), 101-124. doi: 10.1080/1047840X.2012.651387

Hsieh, D. M. (2004). False excuses: Honesty, wrongdoing, and moral growth. *The Journal of Value Inquiry, 38*(2), 171-185. doi: 10.1007/s10790-004-0085-4

Kemery, E. R., Dunlap, W. P., & Griffeth, R. W. (1988). Correction for variance restriction in point-biserial correlations. *Journal of Applied Psychology, 73*(4), 688-692. doi: 10.1037/0021-9010.73.4.688

Lavoie, J., Leduc, K., Crossman, A. M., & Talwar, V. (2016). Do as I say and not as I think: Parent socialisation of lie-telling behaviour. *Children & Society, 30*(4), 253-264. doi: 10.1111/chso.12139

Lee, K., Talwar, V., McCarthy, A., Ross, I., Evans, A., & Arruda, C. (2014). Can classic moral stories promote honesty in children? *Psychological Science*, 1-7. doi:10.1177/0956797614536401

Lemaigre, C., Taylor, E. P., & Gittoes, C. (2017). Barriers and facilitators to disclosing sexual abuse in childhood and adolescence: A systematic review. *Child Abuse & Neglect, 70*, 39-52. doi: 10.1016/j.chiabu.2017.05.009

Levine, T. R. (2014). Truth-Default Theory (TDT): A theory of human deception and deception detection. *Journal of Language and Social Psychology, 33*(4), 378-392. doi: 10.1177/0261927X14535916

Lyon, T. D., Malloy, L. C., Quas, J. A., & Talwar, V. (2008). Coaching, truth induction, and young maltreated children's false allegations and false denials. *Child Development, 79*(4), 914-929. doi: 10.1111/j.1467-8624.2008.01167.x

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. doi: 10.1016/j.actpsy.2016.05.004

598 Merckelbach, H. (2004). Telling a good story: Fantasy proneness and the quality of
599 fabricated memories. *Personaly and Individual Differences, 37*(7), 1371-1382. doi:
600 10.1016/j.paid.2004.01.007
601 O'Neill, O. (2007). Normativity and practical judgement. *Journal of Moral Philosophy, 4*(3),
602 393-405. doi: 10.1111/1467-9973.00225
603 Rosenbaum, S. M., Billinger, S., & Stieglitz, N. (2014). Let's be honest: A review of
604 experimental evidence of honesty and truth-telling. *Journal of Economic*
605 *Psychology*, *45*, 181-196. doi: 10.1016/j.joep.2014.10.002
606 Seiter, J. S., Bruschke, J., & Bai, C. (2002). The acceptability of deception as a function of
607 culture, deceiver's intention, and deceiver-deceived relationship. *Western Journal of*
608 *Communication, 66*(2), 158-180. doi: 10.1080/10570310209374731
609 Serota, K. B., & Levine, T. R. (2015). A few prolific liars: Variation in the prevalence of
610 lying. *Journal of Language and Social Psychology*, *34*(2), 138-157. doi:
611 10.1177/0261927X14528804
612 Shu, L. L., Gino, F., & Bazerman, M. H. (2011). Dishonest deed, clear conscience: When
613 cheating leads to moral disengagement and motivated forgetting. *Personal and Social*
614 *Psychology Bulletin, 37*(3), 330-349. doi: 10.1177/0146167211398138
615 Sporer, S. L. (2016). Deception and cognitive load: Expanding our horizon with a working
616 memory model. *Frontiers in Psychology, 7*, 1-12. doi: 10.3389/fpsyg.2016.00420
617 Stanovich, K. E. (2010). *Decision making and rationality in the modern world.* New York:
618 Oxford University Press.
619 Talwar, V., Arruda, C., & Yachison, S. (2015). The effects of punishment and appeals for
620 honesty on children's truth-telling behavior. *Journal of Experimental Child*
621 *Psychology*, *130*, 209-217. doi:10.1016/ j.jecp.2014.09.011
622 Talwar, V., Lee, K., Bala, N., & Lindsay, R. C. L. (2002). Children's conceptual knowledge

of lying and its relation to their actual behaviours: Implications for court competence examinations. *Law and Human Behavior, 26*, 395-415. doi: 10.1023/A:1016379104959

Talwar, V., Williams, S. M., Renaud, S. J., Arruda, C., & Saykaly, C. (2016). Children's evaluatisons of tattles, confessions, prosocial and antisocial lies. *International Review of Pragmatics, 8*, 334-352. doi: 10.1163/18773109-00802007

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*, 484-501. doi: 10.1002/icd.1949

Vrij, A. (2007). Deception: A social lubricant and a selfish act. In K. Fiedler (Ed.), *Social Communication* (pp. 309-342). New York and Hove: Psychology Press.

Vrij, A. (2008). *Detecting lies and deceit: Pitfalls and opportunities*. Chichester: John Wiley & Sons.

Vrij, A., Granhag, P. A., Mann, S., & Leal, S. (2011). Outsmarting the liars: Towards a cognitive lie detection approach. *Current Directions in Psychological Science, 20*(1), 28-32. doi: 10.1177/0963721410391245

Vrij, A., Granhag, P. A., & Porter, S. (2010). Pitfalls and opportunities in nonverbal and verbal lie detection. *Psychology Science in the Public Interest, 11*(3), 89-121. doi: 10.1177/1529100610390861

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. doi: 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*, 934-945. doi: 10.1002/acp.3282

Wigboldus, D. H., & Dotsch, R. (2016). Encourage playing with data and discourage questionable reporting practices. *Psychometrika, 81*(1), 27-32. doi: 10.1007/s11336-015-9445-1

Table 1

Percentage of Initial and Final Truth/Lie Decisions as a function of Reason to Lie

	Initial decision			Final decision		
Reason to lie	Truth (%)	Lie (%)	X^2	Truth (%)	Lie (%)	X^2
Self-Neutral	33	67	10.56**	37	63	5.81*
Self-Cost	70	30	15.04***	69	31	13.46***
Other-Neutral	35	65	8.01**	42	58	2.46
Other-Cost	52	48	.10	59	41	3.18

** p<.05*

*** p<.01*

**** p<.001*

Table 2

Descriptive Statistics and Point-Biserial Correlations (r_{pb}) for ADCAT Variables and Decisions to Lie as a function of Reason to Lie

			Decision to lie	
Reason to lie	ADCAT Variables	*M* (*SD*)	Initial (r_{pb})	Final (r_{pb})
Self-Neutral	Expected value of truth-telling	-2.61 (2.71)	-.05	-.05
	Expected value of lying	-.19 (1.93)	.32**	.35***
	Motivation to lie	2.42 (3.35)	.22*	.24*
Self-Cost	Expected value of truth-telling	-2.38 (2.63)	-.14	-.15
	Expected value of lying	-1.75 (2.62)	.27**	.28**
	Motivation to lie	.63 (3.67)	.29**	.31**
Other-Neutral	Expected value of truth-telling	-2.34 (2.06)	-.15	-.27**
	Expected value of lying	-.48 (2.67)	.21*	.33**
	Motivation to lie	1.86 (3.34)	.26*	.43***
Other-Cost	Expected value of truth-telling	-1.75 (2.64)	-.24*	-.35**
	Expected value of lying	-1.03 (2.26)	.33**	.32**
	Motivation to lie	.73 (3.39)	.40***	.49***

* p <.05
** p <.01
*** p <.001

Table 3

Summary of Hierarchical Multiple Regression Analyses Predicting Decisions to Lie

Variables entered	Decision to lie					
	Initial			Final		
	ß	ß	ß	ß	ß	ß
	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3
Expected value of truth-telling (EVtruth)	-.03**	-.03**	-.02	-.03**	-.03**	-.02
Expected value of lying (EVlie)	.07***	.06***	.08**	.06***	.05***	.09***
Beneficiary of the lie		.08	.04		.02	-.09
Presence of additional cost		-.20***	-.22**		-.20***	-.21**
EVtruth X Beneficiary of the lie			-.002			-.04
EVlie X Beneficiary of the lie			-.004			-.03
EVtruth X Presence of additional cost			.003			-.006
EVlie X Presence of addtional cost			-.03			-.04
EVtruth X Beneficiary of the lie X Additional cost			-.04			.03
EVlie X Beneficiary of the lie X Additional cost			.06			-.05
R^2	.13	.18	.19	.10	.13	.18

Model F	27.94***	19.30***	8.28***	19.26***	13.90***	7.48***
ΔR^2		.04	.01		.04	.04
ΔF		9.37***	.95		7.81***	2.91**

* $p < .05$
** $p < .01$
*** $p < .001$

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