

Running head: A COGNITIVE TOOL

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A cognitive tool for ethical decision-making: A case for ACED IT

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### Abstract

The present study examined two forms of a cognitive tool (ACED IT map), which is designed to facilitate ethical decision-making, along with expressive writing. Results demonstrated that participants completing the original ACED IT were more likely to identify: 1) more steps to implementing a solution, 2) more barriers to solution implementation, and 3) more solutions to those barriers, than participants who completed the modified ACED IT, engaged in expressive writing, and those in the control group. These findings suggest that cognitive tools such as ACED IT may be of considerable value for individuals who are presented with ethical dilemmas.

Keywords: ethical decision-making, cognitive tool, ACED IT, sensemaking

### A cognitive tool for ethical decision-making: A case for ACED IT

Ethical dilemmas are complex and ambiguous, and they are likely to have a significant impact on individuals and organizations (Mumford et al., 2008). Because of the complexity of ethical problems and the significant impact of ethical misconduct, it is important for people to recognize how to make the best decision in such ethically-charged situations. With the aim of determining how people make ethical decisions, there are a number of prevalent ethical decision-making theories. One of the earliest, most influential models of ethical decision-making and behavior is Rest's (1986) model, which consists of a four-step process including 1) recognition of the moral issue (moral awareness), 2) making a moral judgment (moral judgment), 3) resolving to place moral concerns over other concerns (moral intent), and 4) acting on the moral concerns (moral behavior). Another influential model related to ethical decision-making is Jones (1991) Issue-Contingent model of moral intensity, which consists of 6 dimensions, including 1) magnitude of the consequences, 2) social consequences, 3) probability of effect, 4) temporal immediacy, 5) proximity, and 6) concentration.

Modern models of ethical decision-making differ from these previous, more rational models, by introducing other elements of ethical decision-making, including the roles of affect, intuition, and impulses (Trevino et al., 2014). The sensemaking model of ethical decision-making proposed by Mumford and colleagues (2008) is one such model, which takes a cognitive approach to ethical decision-making, focusing on specific cognitive processes involved in ethical decision-making and cognitive strategies that are useful for ethical decision-making, also taking

into account emotional reactions to the situation, personal biases, and concern for others' goals and motives.

There are a number of approaches to improving individuals' ethical decision-making, including the implementation of ethical codes of conduct, and ethics training. The communication of codes of conduct has been demonstrated to be effectively associated with reductions in unethical behaviors (e.g., McCabe, Trevino, Butterfield, 1996), but many ethics scholars believe that being aware of the rules and guidelines applicable to professional work in a given field serves as an important foundation to making ethical decisions, but it is only the first step (Brown, 2007; Mumford et al., 2008; Trevino & Brown, 2004; Webley & Werner, 2008); thus, many organizations choose to implement ethics training programs in order to encourage ethical decision-making.

Approaches to ethics training have been diverse, including programs with a focus on Rest's (1986) ethical sensitivity model, programs with a focus on Kohlberg's (1969) theory of moral development, and programs with a more direct emphasis on the cognitive nature of ethical decision-making. There are a number of elements of an ethics training program that appear to make it most effective. Training programs that take a cognitive approach, which includes coverage of cognitive strategies and potential reasoning errors have been demonstrated to be the most effective at improving ethical decision-making (Antes, Murphy, Waples, Mumford, Brown, Connelly, & Devenport, 2009).

Thus, an empirical examination of the cognitive processes involved in ethical decision-making is valuable in order to understand the dynamics of this unique type of decision-making. One potential decision-making aid that has shown promise in helping people make better

decisions, especially with respect to the cognitive processes underlying ethical decision-making, is the cognitive tool (Kreitler, Repasky, Travis, Dansereau, & Barth, 2012; Kreitler, Stenmark, Rodarte, & DuMond, 2014). Some research on ethics has examined ethics from a morality perspective (e.g., Kohlberg, 1981; Rest, 1986) and also proposed models aimed at delineating how individuals make ethical decisions (e.g., McMahon & Harvey, 2007; Sweeney & Costello, 2009; Yang & Wu, 2009). There is much less research, however, examining the role of cognitive tools in assisting ethical decision-making. A well-developed cognitive tool has the potential to serve as an intermediary (based on both time and financial resources) between the simplest, most cognitively basic step of the awareness of ethics codes and guidelines, and the most cognitively-intensive step of a full ethics training program. Cognitive tools are not likely to replace either of these steps, but they may serve as a good “take-home” resource to help people remember and apply their ethics training principles.

### Cognitive Tools

Cognitive tools help individuals to think more meaningfully and to assume ownership of their knowledge when solving problems (Jonassen, 1996); they allow people to generate and test hypothetical solutions to problems (Shim & Lee, 2006). Furthermore, cognitive tools help individuals engage in systematic problem-solving and decision-making, which has been demonstrated to improve logical problem-solving and increase choice certainty (Mau & Jepsen, 1992). One such cognitive tool, the ACED IT map, was constructed based on a standard decision-making model (e.g., Robbins & Judge 2007) that includes five broad stages: *Define the Situation, Generate Alternatives, Evaluate Alternatives, Selection, and Action*. The ACED IT map, which is employed in the present study, captures each of those five stages.

ACED IT. The ACED IT map is a structured cognitive tool which has shown promise in improving individuals' decision-making in a number of domains (Kreitler, Dansereau, Barth, Repasky, & Miller, 2012; Kreitler, Dansereau, Barth, & Ito, 2012). ACED IT stands for Assess, Create, Evaluate, Decide, Implement and Test. As mentioned previously, the ACED IT was developed based on a standard decision-making model (Robbins & Judge, 2007) which includes five broad stages: define the issue, generate options, evaluate, select and act. The ACED IT form guides individuals through effective decision-making and action-planning using decision stages (Robbins & Judge, 2007; Toren & Wagner, 2010;) and multiple perspective taking (Atha-Weldon & Dansereau, 2006; Hall & Davis, 2007). This tool prompts individuals to generate potential solutions, and evaluate those solutions using a 'fill-in-the-space' format to organize the written information (Dansereau, 2005). Additionally, the ACED IT map prompts individuals to consider others' perspectives by having them create a 'Decision Team,' composed of familiar people, to which the individuals can refer for guidance (e.g., 'What would Mother Theresa do?'; Atha-Weldon & Dansereau, 2006). Participants imagine the advice they would receive from the decision team and consider this while thinking through the problem and generating potential solutions to the problem. Once individuals generate up to six solutions, they evaluate each solution based on criteria listed on the map and use those evaluations to select a final solution.

Individuals evaluate the potential solutions that they generated using five common ethical perspectives: Virtue, Rights, Justice/Fairness, Common Good and Utilitarian (Velasquez et al., 1988). When individuals consider these ethical perspectives with regard to the evaluation of the solutions they generated, they are better able to develop and analyze the potential alternative courses of action (Velasquez et al., 1988). When individuals have selected a

promising solution to the problem, based on their evaluation of their suitability with regard to the ethical perspectives, they turn to the back of the map, where they are required to: (1) describe the solution they chose; (2) detail the steps involved in implementing the solution; (3) identify potential problems that they could encounter while implementing the solution; (4) describe solutions to those problems; and (5) predict how the situation would resolve itself following the implementation of the chosen solution.

The ACED IT map was developed based on a general problem-solving framework, however, it has shown promise in aiding ethical decision-making and problem-solving in situations with ethical implications (Kreitler, Repasky, Travis, Dansereau, & Barth, 2012; Kreitler, Stenmark, Rodarte, & DuMond, 2014). Indeed, The ACED IT map is consistent with processes proposed by a number researchers studying ethical decision-making. For example, the stages of this tool, along with the Decision Team are consistent with major components of the Rest model (1986) and the research of Kohlberg (1981). For instance, Rest's model recommends role-taking when confronted with an ethical problem; this is reflected in the first phase of the ACED IT map (Assess), and its use of perspective-taking vis a vis the Decision Team.

**Expressive Writing.** Expressive writing is a technique in which people write their thoughts and feelings about a topic for twenty minutes. Research on expressive writing has demonstrated that expressive writing, as a therapeutic technique, can benefit people who write about stressful or difficult events in their lives (Pennebaker, 1997; Pennebaker & Francis, 1996). The use of expressive writing as a therapeutic tool is based on the idea that holding in emotions requires effort, which is stressful for the individual, and can have a negative impact on physical health (Sloan & Marx, 2004). Expressive writing, then, allows the writer to release his or her

emotions, which reduces stress, and results in improved physical health (Pennebaker, 1997).

Indeed, research on expressive writing as a therapeutic tool has demonstrated that it allows the writer to experience an emotional release, which can benefit coping processes, mental health, and problem-solving (Dalton & Glenwick, 2009; Frattaroli, 2006; Lyubomirsky, Sousa, & Dickerhoof, 2006; Sloan, Marx, Epstein, & Dobbs, 2008).

In addition to the emotional release experienced by individuals engaging in expressive writing, expressive writing also aids individuals in understanding dilemmas and determining solutions to those difficult problems (Pennebaker & Francis, 1996). Thus, while expressive writing is not specifically a cognitive tool, it is likely to be a useful technique for more general decision-making and problem-solving, in addition to being a valuable therapeutic technique. In fact, findings from recent research examining both expressive writing and ACED IT revealed that participants reported improved mental health, and a greater likelihood to include others in future decisions after working through a past or current difficult life event or decision that they were facing, than did participants who completed control tasks (Stenmark, 2011).

Until recently, expressive writing has not been examined in terms of its usefulness in ethical decision-making. In a study comparing expressive writing to the ACED IT map, Kreitler, Repasky, Travis, Dansereau, and Barth (2012) found that both methods improved a number of indicators of ethical decision-making, such as moral perception. Furthermore, they found that expressive writing might even have a number of advantages over the structured ACED IT map with regard to decision-making. Additionally, the less structured technique of expressive writing may exhibit different results than studies which have used more structured decision-making tasks (Stenmark et al., 2010; 2011; 2013). Perhaps this less structured task might lend itself to a



more realistic cognitive flow that might be more reflective of what people naturally think about when considering an ethical problem, as compared to how people respond to a structured task which prompts specific types of responses.

#### Sensemaking Model of Ethical Decision-Making

The ACED IT map and expressive writing are two techniques for working through ethical problems which have proven efficacious. Another approach to ethical decision-making is one that delineates the various cognitive processes involved in ethical decision-making. Identifying and describing the cognitive processes involved in ethical decision-making is a valuable foundation upon which interventions aimed at improving decision-making can be based.

One particularly promising approach to describing the cognitive processes involved in ethical decision-making was proposed by Mumford and colleagues (2008), and it is based on a sensemaking model of ethical decision-making. This model suggests that people engage in several complex cognitive activities as they develop an understanding of a given ethical situation. This model includes several key processes held to be important for ethical decision-making: 1) Framing, 2) Emotional Regulation, 3) Forecasting, 4) Self-Reflection, and 5) Sensemaking. Mumford and colleagues' model proposes that, in order to make an effective, well-informed decision in an ethical situation, the individual first must cognitively frame the problem in terms of its ethical implications. Recognizing the ethical implications of a problem situation compels the decision-maker to focus on specific elements of the problem in generating a solution that is not only effective, but ethical. Additionally, ethical problems often involve heightened emotions. This emotional element may require the decision-maker to regulate those emotions, in order to make an effective decision.

Once the decision-maker has framed the problem in terms of its ethical implications and regulated any emotions that arise in response to the problem, the individual must then forecast the likely outcomes of possible courses of action taken to resolve the ethical problem. Forecasting the likely outcomes of the problem situation is imperative because ethical problems often have major consequences for the decision-maker and other people and organizations involved. Additionally, because these forecasts are often self-relevant, it is also beneficial for the individual to reflect on past experiences that may have been similar to the present problem-situation in order to inform potential decisions. These self-reflection activities facilitate the creation or selection of an appropriate mental model, focusing on the relevant aspects of the situation, including the causes, goals, consequences, contingencies and restrictions, which apply to the situation. This mental model then serves as the basis for the sensemaking activities, which ultimately guide how the person integrates and analyzes the relevant situational information regarding the ethical problem in order to make an informed decision.

The proposed model of the processes underlying ethical decision-making has a solid foundation in theory (e.g., Dörner & Schaub, 1994; Haidt, 2001, 2003; Mumford, Reiter-Palmon, & Redmond, 1994; Strange & Mumford, 2005; Weick, 1995), and the training program based on this model has been shown to increase ethical decision-making scores of participants in a diverse range of fields (Klignyte et al., 2008; Mumford et al., 2008). Thus, the model appears to be a valid and useful way of describing the cognitive processes involved in ethical decision-making.

Mumford and colleagues have examined each aspect of this model in a variety of studies, using multiple methods. These studies have revealed a number of cognitive strategies that have shown to be useful for ethical decision-making (Antes, Brown, Murphy, Hill, Waples, Mumford, Connelly, & Devenport, 2007; Brock, Vert, Kligyte, Waples, Sevier, & Mumford, 2008; Kligyte, Marcy, Sevier, Godfrey, & Mumford, 2008; Mumford, Connelly, Brown, Murphy, Hill, Antes, Waples, & Devenport, 2007; Mumford, Connelly, Murphy, Devenport, Antes, Brown, Hill, & Waples, 2009). The strategies that have been identified by this research are 1) recognizing circumstances, 2) anticipating consequences, 3) considering others perspectives, 4) seeking help, 5) questioning one's own judgment, 6) dealing with emotions, and 7) examining personal values.

#### Modifying the ACED IT

In addition to sharing similar processes described by Rest (1986), the ACED IT form is also consistent with the Mumford et al. (2008) sensemaking model of ethical decision-making. The Mumford sensemaking model and cognitive strategies involved in ethical decision-making share a number of similarities with the ACED IT map. For example, in the Assess stage of the ACED IT form, participants are required to define the problem, identify the practical issues involved, create a Decision Team for advice, and list people affected by the problem. These actions are consistent with the strategies: recognizing circumstances, considering others' perspectives, and seeking help, and with the framing cognitive activity. The evaluation of proposed solutions prompted by the ACED IT map is consistent with the questioning one's own judgment and examining personal values strategies proposed by the Mumford and colleagues'

sensemaking model. The back of the ACED IT map, where participants choose a solution and predict how it would turn out, involves elements of forecasting, or anticipating consequences.

The sensemaking model of ethical decision-making is a validated approach to the cognitive processes involved in ethical decision-making, and the ACED IT map has shown promise as a cognitive tool which can aid in ethical decision-making. These two approaches share a number of elements, but for the present study, the ACED IT map was modified to more directly reflect the processes and strategies proposed by the Mumford, et al. (2008) model of ethical decision-making. Because the sensemaking model has served as the basis for a successful ethics training program, it is possible that designing a cognitive tool with the specific elements proposed by the model would be beneficial to aiding ethical decision-making.

Thus, the present study compares the original ACED IT map, a cognitive tool that can help people make better ethical decisions, a modified version of ACED IT, designed to reflect the Mumford, et al. (2008) model of ethical decision-making, along with engaging in expressive writing about the problem, and a control group. Additionally, the present study used content-coding to determine which elements in the ACED IT process appeared to be related to each other, and to ethical decision-making. Thus, an exploratory correlation analysis was performed on the qualitative data obtained as participants worked through the ACED IT tool. The following research questions were examined:

RQ1: Does modifying the ACED IT map improve ethical decision-making, as compared to the original ACED IT map?

RQ2: How do the two versions of the ACED IT map compare to expressive writing and the control group, in terms of ethical decision-making?

## Methods

### Participants

One hundred fifty-two undergraduate students (109 females; average age=21.37, SD=16.58) from a mid-sized public university in the southwest participated. Most of the participants were in their first year of college (42.1 %); 23.3 % were in their second year, 16.4 % were in their third year, 10.7 % were in their fourth year, and .6% were in their fifth year. They had a mean of 3.89 years of work experience (SD = 3.13, min = 0.00, max = 25.00). Participants volunteered for this research as an optional means of fulfilling a course requirement or to receive extra credit for a class.

### Materials

ACED-IT. The ACED IT is a structured map (Kreitler et al., 2009; 2012; 2012; 2014) that uses a “fill-in-the-space” method to organize written information (Please contact author to see the ACED IT form). On the front of the map, participants describe the ethical dilemma, note practical issues, identify individuals affected by the dilemma, and organize a decision team. Next, participants employ the imagined advice of the decision team members and generate up to six potential solutions to the ethical dilemma. Participants then rate each solution on a Likert-type scale (0 = not at all, 3 = very much so), using ethical criteria (e.g., “It protects the rights of those involved”). Participants are encouraged to eliminate options that score poorly, and select from the ones that are rated most highly. Following the final selection of the preferred solution, the participant continues to the second side of the ACED IT map and details the steps necessary to implement their decision.

Modified ACED IT. The ACED IT was modified in a number of ways, to determine if making it explicitly reflect the Mumford, et al. (2008) model of ethical decision-making could result in improved ethical decision-making. First, for the Modified ACED IT map, questions were written out in complete sentences to prompt participants to write about the problem. For example, the original ACED IT prompts participants to note the practice issues in solving the problem with a question blank which reads “Practical Issues”; the modified ACED IT reads “What are the practical issues that must be considered in resolving this problem?” (Please contact the author to see the Modified ACED IT form).

More importantly, however, the Modified ACED IT form uses additional prompts that are reflective of the Mumford, et al. (2008) model of ethical decision-making. For example, the ACED IT form has a question blank that reads “Problem or dilemma”, in which participants write a brief description of the problem. The Modified ACED IT form asks two questions about the problem: 1) State the problem. and 2) Why is it a problem?. These questions are designed to compel the participants to fully “Recognize the Circumstances” surrounding the ethical dilemma. Other examples of elements added to the Modified ACED IT form to reflect the Mumford, et al., (2008) model include the additional questions: “What emotions might you, or other people involved, experience while working through this problem?” (Emotional Regulation), and “Have you or anyone you know ever experienced a similar situation? What was the chosen solution? How did it work out?” (Self-Reflection).

Expressive writing. Participants in the expressive writing group were instructed to express their thoughts and feelings regarding the ethical dilemma. Participants received a sheet

of paper, and they were allotted 20 minutes to write about the problem in response to the following instructions, adapted from Pennebaker (1997) and Kreitler and colleagues (2012):

Please use the space below to write your thoughts about the problem. You should write for at least 15 minutes.

Non-relevant comparison task. In order to provide the control group with a task of roughly equivalent complexity, participants in the control group completed a measure of planning skills developed by Mumford and colleagues (unpublished). The measure is described in Osburn and Mumford (2006) and Marta, Leritz, and Mumford (2005). The measure involves a series of low-fidelity simulation problem scenarios which require the use of effective planning skills. This task was chosen because it is similar in cognitive complexity to solving an ethical problem, without actually containing elements of thinking about an ethical problem.

#### Procedure

Each participant was randomly assigned to one of four different groups: ACED IT (n=41), Modified ACED IT (n= 39), Expressive Writing (n=39), and a Control group (n= 29). All participants read about a problem in a vignette. The vignette, which has been used in previous research on ethical decision-making (e.g., Stenmark et al., 2011; Stenmark 2013), details a business dilemma intended to be representative of dilemmas experienced in the workplace. Specifically, the participant is asked to play the role of a manager in a technology firm that is developing a new mobile device. Background was provided about the hypothetical organization, including the other characters involved, which are superiors, peers, and subordinates to the role the participants adopt. For the problem-solving task, participants

received a hypothetical email from one of the characters, which details a problem with the data from testing the new mobile device. It read:

“As you might have heard, the safety test results on the Platinum look a little weird. It looks like the Platinum is associated with increased headaches, but we’re not entirely sure what this means. It could be related to the phone, but it might be something else.

Anyway, we need we need to get a report out to Mr. Robertson about the test results, and I’m not sure how to handle the safety data in the report. I am worried that if we put these results in the report, the release of the Platinum might get delayed for more testing, or worse, it might not get released at all. Plus, we’re not even sure if the results are caused by the Platinum. We really need to get this product developed, so we can get it out on the market as soon as possible.

Should I put the results from the safety test in the report?”

This particular problem vignette was chosen from a larger set of problems that have been used in previous studies on ethical decision-making (Stenmark et al., 2011; Stenmark, 2013). The ethical nature of this particular vignette involves data management, which is one of four domains of research misconduct, as identified by Mumford et al., 2006). It was found in previous studies that this vignette exhibited the most engagement and the most variability in responses, and thus it appears to be complex and ambiguous enough not to have an “obvious” correct answer, such that participants would have to engage in more cognitive processes in order to solve the problem. This ambiguity also helps to minimize concerns about socially



desirable responding. Additionally, the nature of the problem is one that the undergraduate students in the sample are able to relate to. They are consumers of technological products, especially mobile devices, thus they can relate to the content of the vignette. While the problem of data management and how to present unfavorable data, is not something students would probably relate to in a research context, may be more relatable in a business context. Aside from the improved variability observed with this particular vignette, the data did not differ much in comparison to the other vignettes in other studies, so this single vignette was chosen, so as to minimize participant fatigue in the experiment session.

Participants in the ACED IT and Modified ACED IT conditions were given instructions to complete the ACED IT maps, while considering the problem in the vignette. Participants were instructed to complete the map as if they were in the main character's position. Participants in the expressive writing condition were instructed to write their thoughts about the problem, and to write for at least 15 minutes. Participants in the control condition completed an unrelated planning questionnaire after reading the problem in the vignette. In each condition, participants were given 20 minutes to complete their respective tasks.

After completing their respective tasks, participants in all conditions answered questions about the problem in the vignette, indicating what their decision would be regarding the problem, detailing the steps, problems, and solutions to implementing the decision, and forecasting the likely outcomes to their decision implementation. The open-ended responses to these questions served as the dependent variables for comparing the different conditions. Finally, participants were given a debriefing form.

Measurement

Content-Coding. The qualitative data obtained from the ACED IT maps were content-coded in order to examine the strategies and cognitive processes involved in contemplating an ethical decision. Six coders, all of whom were Masters students in industrial and organizational psychology, evaluated the written material on the ACED IT maps. The raters completed a 10-hour frame-of-reference training program in which they were initially familiarized with the nature of the stimulus problem and the definitions of the dimensions to be rated, vis a vis benchmarks selected to reflect high, medium, and low levels of performance on the problem at hand. After the introduction to the problem and definitions, the coders applied the rating scales in appraising a set of sample participant materials from all conditions, and ratings discrepancies were discussed. Once raters exhibited a satisfactory frame-of-reference regarding their practice ratings (i.e., acceptable interrater reliabilities on the small sample of practice rating materials), the coders rated the remainder of the participant materials on their own. The reliabilities cited below were based on the data that the coders provided on their independent ratings.

Dimensions of Interest. The coded dimensions were chosen and operationalized based on previous research that has determined them to be important for the cognitive processes involved in ethical decision-making (e.g., Mumford et al., 2006; Stenmark et al., 2010; 2011; 2013). For participants in the ACED IT conditions, the coders performed numerical counts on several dimensions, including Number of People in Decision Team (in the Decision Team response field), Number of People Impacted (in the People Affected response field), and Number of Choices (in the Choices response field). For all participants, the coders performed numerical counts on: Number of Steps (in the Steps response field), and Number of

Consequences identified (in the How did it work out? response field). Intra-class correlation coefficients for these dimensions ranged from .97 to .99.

Coders next evaluated the quality of the plan, the quality of the forecast, and the ethicality of the final decision for all participants by evaluating material in the Decision response field (which includes the Steps, Possible Problems, and Solutions fields) and the How did it work out? response field. The plan was evaluated by appraising the detail, complexity, and criticality of the response material in the Steps, Problems, and Solutions response fields, each on a 5-point scale. Detail was defined as the extent to which the response covered the specifics of problem elements (people, tasks, groups, etc.) in detail. Complexity was defined the extent to which the forecast was composed of multiple, interrelated elements (people, groups, tasks, etc.). Criticality of the plan elements was defined as the extent to which the response considered the critical aspects of the problem scenario. The ratings of detail, complexity, and criticality of the plan were aggregated to form an overall evaluation of plan quality. The interrater reliabilities calculated for plan detail, complexity, and criticality were .93, .93, and .89, respectively.

The forecast was evaluated by appraising the detail, complexity, and criticality of the response material in the How did it work out? response field, on a 5-point scale. These ratings were aggregated to form an overall evaluation of forecast quality. The interrater reliabilities found for forecast detail, complexity, and criticality were .88, .93, and .92, respectively.

The coders evaluated the ethicality of the final decision on a 5-point scale, based on the material in the Decision response field. Markers of ethicality included 1) regard for the welfare of others, 2) attendance to personal responsibilities, and 3) adherence to/knowledge of social

obligations. Regard for the welfare of others was defined as the extent to which a participant's response reflected attention and care for the welfare of others, including decisions that intentionally work to benefit others, and behaving for the benefit of others, even at personal expense. Attendance to personal responsibilities was defined as the extent to which a participant's response reflected actively avoiding bias and being accountable for one's actions and behaviors. Adherence to/knowledge of social obligations was defined as the extent to which a participant's response reflected an understanding and respect of cultural norms and values, including understanding guidelines and the duties of given social roles. The overall ethicality dimension took these subdimensions into account to provide the ethicality dimension in this study. The interrater reliability coefficient obtained for evaluations of ethicality was .89.

### Results

A one-way (ACED IT vs. Modified ACED IT vs. Expressive Writing vs. Placebo Control) MANOVA (see Table 1) was conducted on the content-coded dimensions: Number of Steps, Number of Problems, Number of Solutions, Number of Consequences, Forecast Quality, Plan Quality, and Ethicality. The main effect for the experimental condition was significant,  $F(21, 132) = 2.74, p < .01$ . Significant univariate main effects were obtained for Number of Steps identified,  $F(3, 138) = 4.33, p < .01$ , Number of Problems identified,  $F(3, 138) = 5.19, p < .01$ , and Number of Solutions identified,  $F(3, 138) = 6.19, p < .01$ . Plan Qual  $F(3, 138) = 2.68, p = .05$

LSD post hoc tests revealed that participants in the ACED IT group identified significantly more steps ( $M = 2.87, SD = .16$ ) than participants in the Modified ACED IT, Expressive Writing, and Control groups ( $M = 2.42, SD = .16, M = 2.07, SD = .15$ , and  $M = 2.32, SD = .19$ , respectively).

Furthermore, participants in the ACED IT group identified significantly more problems ( $M = 2.34$ ,  $SD = .13$ ) than participants in the Modified ACED IT, Expressive Writing, and Control groups ( $M = 1.74$ ,  $SD = .12$ ,  $M = 1.73$ ,  $SD = .12$ , and  $M = 1.89$ ,  $SD = .15$ , respectively). Finally, participants in the ACED IT group identified significantly more solutions ( $M = 2.17$ ,  $SD = .12$ ) than participants in the Modified ACED IT, Expressive Writing, and Control groups ( $M = 1.53$ ,  $SD = .12$ ,  $M = 1.47$ ,  $SD = .12$ , and  $M = 1.63$ ,  $SD = .14$ , respectively).

### Correlation Analysis

Table 2 shows the correlations among the rated variables. With regard to the rated variables, Plan Quality was significantly positively related to the Number of Steps identified ( $r = .61$ ,  $p < .001$ ), Number of Problems identified ( $r = .61$ ,  $p < .001$ ), Number of Solutions identified ( $r = .64$ ,  $p < .001$ ), Number of Consequences identified ( $r = .46$ ,  $p < .001$ ), Forecast Quality ( $r = .71$ ,  $p < .001$ ), and Ethicality ( $r = .54$ ,  $p < .001$ ). Forecast Quality was significantly positively related to the Number of Steps identified ( $r = .42$ ,  $p < .001$ ), Number of Problems identified ( $r = .35$ ,  $p < .001$ ), Number of Solutions identified ( $r = .38$ ,  $p < .001$ ), Number of Consequences identified ( $r = .79$ ,  $p < .001$ ), and Ethicality ( $r = .54$ ,  $p < .001$ ). Ethicality was significantly positively related to the Number of Steps identified ( $r = .22$ ,  $p < .01$ ), Number of Problems identified ( $r = .24$ ,  $p < .01$ ), Number of Solutions identified ( $r = .17$ ,  $p < .05$ ), and Number of Consequences identified ( $r = .31$ ,  $p < .01$ ).

### Discussion

Before turning to the broader contributions of the present study, a few limitations should be noted. First, the task employed in this study represents a low-fidelity simulation of a complex, real-world problem involving forecasting and ethical decision-making. While past

studies (e.g., Dailey & Mumford, 2005; Marcy & Mumford, 2007) have shown these types of tasks to be interesting and engaging to students, the question remains, concerning the generalizability of these findings to people thinking through ethical problems in the real-world. On a related note, this study was conducted using college students as participants. While there is no reason to believe that the cognitive processes underlying ethical decision-making operate differently for young adults, as opposed to older adults, future studies would do well to examine these processes in older, working populations, using real problems faced by those individuals.

Nonetheless, college students are an important group to utilize for examining a cognitive tool, as such assistance may be more important for them than other populations since the average college student is 20 years of age. Research has shown that the frontal lobe (responsible for executive functioning and decision making) is not fully developed until approximately 21 years of age for females and 25 years of age for males (Tanaka, Matsui, Uematsu, Noguchi, & Miyawaki, 2012). Moreover, research also indicates that college students are at great risk for unethical decision making, thus making college students an appropriate population to assess (Lindgren, Schacht, Pantalone, Blayney, & George, 2009). Indeed, previous studies examining the ACED IT map utilized a college student sample, and these studies provided evidence that the ACED IT map resulted in changes in the way the student participants viewed the ethical problem (Kreitler et al., 2012, Kreitler, Stenmark, Rodarte, & DuMond, 2014). Thus, college students do seem to respond to the ACED IT map. Furthermore, unpublished data obtained from several ethical workshops for mid-level managers in the local DFW government demonstrated that employed adults respond similarly to the ACED IT map,

suggesting that despite being a convenience sample, using college students can provide useful information that can provide implications for older adults. Additionally, despite our student sample, participants had an average of almost 4 years of work experience, so they are not completely naïve to the work environment.

Furthermore, the experimental nature of the present study might not be representative of decision-making in the real world. The tasks employed in this study are structured techniques designed to aid in decision-making, and thus may not necessarily represent the way that people think through ethical problems in the real world. The results of the study, however, indicate that these techniques might be effective interventions in aiding ethical decision-making. Additionally, future studies may do well to examine the sequence and content of the cognitive processes individuals engage in naturally when thinking through ethical problems. On a related note, previous forecasting and ethical decision-making studies have used structured stimuli with a specified framework (e.g., the Mumford model of ethical decision-making, Mumford, et al. (2008)). The qualitative data acquired vis a vis the expressive writing technique could potentially be content-coded to see if people naturally engage in those specified processes, and if those who do, tend to make better decisions.

Additionally, the control task employed in this study was cognitively engaging. This was intentional, as the experimental tasks were also cognitively engaging, and the cognitively engaging control task was employed so as to make the control condition as similar as possible to the experimental conditions, but without the key treatment: the problem-solving techniques of the ACED-IT map and expressive writing. It is possible, however, that by employing a

cognitively engaging control task, ethical decision-making might be improved in those participants, thus future studies should consider employing a true no-treatment control group.

Furthermore, the dependent variables in this study were measured via expert judges' content-coding of the participants' qualitative responses. Thus, it may be possible that some of the observed relationships among these variables may be due, at least in part, to common method variance. We conducted a constrained single factor test (e.g., Aulakh & Gencturk, 2000) on the rated variables to determine if common methods bias was an issue of concern. This analysis found that a general factor accounted for just over 50% (51.94%) of the variance, thus, common method bias could not be entirely eliminated as a factor in the correlational results. Those variables, however, would be expected to be highly related, so it is possible that the relatedness of the constructs contributes to this result. Thus, with regard to the correlation analysis, the possibility of common method bias, could not be eliminated; therefore those results should be viewed in light of that possibility. We endeavored to alleviate these concerns, however, by specifically defining the different constructs to be rated and by rating each construct on different areas of the ACED IT map. In training the raters, we worked diligently to make sure that they understood the differences among the rated constructs and how to operationalize the constructs in the qualitative material. For the MANOVA analysis, the IV (cognitive analysis technique) and DVs (cognitive process variables), did not use a common method, so common method bias should not of concern for those findings.

Another limitation that is inherent in much ethics research is the notion of socially desirable responding. It can be difficult to study individual's ethical decision-making in a way that does not encourage individuals to respond in the way they think they "should". We



attempted to alleviate this problem by describing the experiment to participants as a “Problem-Solving” study and using a stimulus scenario that was ambiguous, without having an obviously “right” answer. The data exhibited enough variability to suggest that participants did not simply provide the answer they thought the experimenters were looking for.

Additionally, personality traits, such as the Big Five, cynicism, or narcissism were not measured as covariates. Thus, aptitude-treatment interactions cannot be taken into account. Intelligence, however, was measured, using the Employee Aptitude Scale (EAS, Ruch & Ruch, 1980), and EAS scores were not significant covariates in any of the analyses. Furthermore, previous research using the ACED IT map has measured the Big Five dimensions, and they were not determined to be significantly related to any of the outcome variables (e.g., Kreitler, Stenmark, Rodarte, & DuMond, 2014). Future studies, however, should examine cynicism and narcissism to determine if these are important variables to consider when examining the cognitive processes involved in ethical decision-making.

Finally, the research design had a few limitations which could limit the conclusions. First, the study is cross-sectional in nature. Future studies should examine the results of the ACED IT map from a more longitudinal perspective, perhaps using a follow-up examination to determine if completing the ACED IT map had any long-term effects on the cognitive processes involved in ethical decision-making. Second, the study determined that the ACED IT map was more effective than expressive writing and a placebo control task in improving indicators of ethical decision-making. Future studies should compare the ACED IT map to conventional ethics codes and ethics training, to determine how the ACED IT map fits in with the traditional interventions used by organizations to encourage better ethical decision-making. Also, the effect sizes

obtained for the significant effects in this study were relatively low. These effects sizes could mean that the results have little practical significance. It is also possible, however, that the effects sizes were low due to a manipulation that was not very strong (Cohen, 2007). The artificial nature of the laboratory environment and the inconsequential nature of the ethical problem might have resulted in the perception of a weak manipulation. Thus, future studies should attempt to examine these variables in more “real-world” settings, including tasks that are more consequential for the participants.

Despite these limitations, we believe that the results of the present study have significant implications for the use and development of cognitive tools designed to improve ethical decision-making. Based on the results of this study, we can draw the following conclusions: (a) completion of the original ACED IT map resulted in improvements in a number of indicators of ethical decision-making, over the Modified ACED IT map and expressive writing (b) there are a number of cognitive strategies that are related to improved plans and forecasts in ethical decision-making, and (c) plan quality and forecast quality are significantly related to decision ethicality.

Participants who completed the original ACED IT form identified significantly more: (1) steps required to solve the problem, (2) problems (barriers to solving the problem), and (3) solutions to the barriers of solving the problem, than those participants who completed the modified ACED IT, the expressive writing task, and the control group. There were no group differences in the quality of the plans, forecasts, or overall ethicality of the decisions. Thus, in the present study, it appears that completion of the ACED IT form does not result in improvements in the more macro-level cognitive processes at play in ethical decision-making

(planning and forecasting). Completing the ACED IT form does, however, appear to result in engaging in specific strategies that are known to be related to better ethical decision-making (e.g., Mumford et al., 2009, Stenmark et al., 2010, 2011, 2013): identifying steps to solving the problem, problems, and solutions. It is possible that the experimental, and relatively inconsequential nature of the laboratory setting attributed to the lack of significant results at the more macro level of cognitive processing. The differences that were observed, however, are promising indicators that perhaps in a real-world setting, completing the ACED IT form would result in better overall decisions. Individuals who identify more steps to the implementing a solution, more potential barriers to solution implementation, and more solutions to those barriers, are likely to have a more fully developed plan, which is likely to include contingencies, which should ultimately result in a more effective problem solution (Marta, Lertiz, & Mumford, 2005; Stenmark et al., 2010, 2011, 2013). Future studies should examine this question in more realistic settings with real decisions.

Importantly, modifying the ACED IT form, to make it more consistent with the Mumford sensemaking model of ethical decision-making, did not result in improvements in indicators of ethical decision-making. In modifying the ACED IT to align more with the sensemaking model, the resulting modified ACED IT form contained more words and presented less graphic illustration than the original ACED IT. Cognitive research has revealed that visual displays and graphic representations provide an advantage over typical language when it comes to communication and perception in the human brain (Dansereau & Simpson, 2009; Sternberg, 2006). It is likely that the original ACED IT's visual display and simplicity is what allowed participants who completed the original ACED IT map to perform better. This finding is

consistent with previous research and further highlights an important strength of the ACED IT map: it is a simple, structured, graphic tool that has proven efficacious in many capacities (planning, decision-making, and problem-solving).

The correlation analysis demonstrated that the quality of the plans and the quality of the forecasts written by participants was positively related to the number of steps, problems, solutions, and consequences identified, as well as ethicality. These findings are consistent with the notion that it is necessary to think deeply about the problem and consider multiple, interrelated elements of the problem situation in order to develop high quality plans and forecasts (Marta, Lertz, & Mumford, 2005; Stenmark et al., 2010, 2011, 2013). Thus, it is apparent that the consideration of these aspects of the problem situation is a strategy that people should engage in, in order to produce better plans and forecasts, and, ultimately, better decisions. Additionally, ethicality was also related to the number of steps, problems, and solutions identified by participants. The findings that these strategies are related to decision ethicality is consistent with studies demonstrating that planning and forecasting are important cognitive activities involved in ethical decision-making (Kreitler, Stenmark, Rodarte, DuMond, 2014; Stenmark et al., 2010, 2011, 2013).

The findings of this study have both theoretical and practical implications. Theoretically, this study revealed that the ACED IT form, which has been used for other types of decision-making in previous studies (Kreitler, Dansereau, Barth, Repasky, & Miller, 2012; Kreitler, Dansereau, Barth, & Ito, 2012), is also an effective instrument for ethical decision-making. Until recently, cognitive tools have not been examined in the context of ethical decision-making (Kreitler et al., 2012). Indeed, the ACED IT map is based on a standard decision-making model

which is aimed at decision-making in general (Robbins & Judge, 2007). The present study demonstrates that the decision model utilized by the ACED IT does seem to apply to the unique nature of ethical decision-making. The results strengthen the notion that ethical decision-making is improved by the ACED IT cognitive tool which requires them to slow down and systematically work through certain problems or dilemmas (Gal'per & Danilova, 1980; Sio & Ormerod, 2015). This finding adds to both the business/organizational ethics literature, and to the research on cognitive tools, as well. Both fields can benefit from evidence suggesting that cognitive tools (specifically the ACED IT map) are useful means of improving ethical decision-making.

Additionally, this study determined that there are a number of discrete cognitive processes and strategies that are important for ethical decision-making. Consistent with previous research on ethical decision-making (Stenmark et al., 2010, 2011, 2013), this study demonstrated that planning and forecasting are two cognitive processes that are involved in ethical decision-making. Delineating the cognitive processes involved in ethical decision-making helps to fill out the nomological network of this important issue; this aids in theory development, which, ultimately can contribute to measurement of ethical decision-making, future research in this area, and interventions. Additionally, the specific strategies of considering problems, steps, solutions, and conclusions were identified as important sub-elements of planning and forecasting, which are vital in ethical decision-making. Knowledge of these strategies further enriches the nomological network of our understanding of ethical decision-making.

There are also important practical implications for the present study. First, this study provides additional evidence that the ACED IT map can, and should, be used to help individuals make better ethical decisions. The ACED IT map has proven to be an effective tool in dealing with difficult, ambiguous decision situations, and individuals who are confronted with these types of decisions frequently should have access to the ACED IT form in order to help them make better decisions. The ACED IT map might be an intervention that organizations in particularly ethically challenging fields, such as medicine, may do well to implement to assist employees with these difficult situations.

Additionally, this study determined that planning, forecasting, and considering specific elements of the problem situation, are all important for ethical decision-making. Developing training interventions aimed at helping ethical decision-making can benefit from the identification of the cognitive processes and strategies important for ethical decision-making. Organizations would benefit from such interventions that focus on these important processes and strategies in order to train individuals to focus their energy on the most important activities for making the best decisions.

Additionally, this research is an early step in determining the role that cognitive tools may have in organizations. Research has shown that cognitive tools are useful in helping people to make better decisions in general problem-solving (e.g., Mau & Jepsen, 1992), and the present research demonstrates that cognitive tools can be an effective way to help people solve ethical problems. Future studies should compare the ACED IT's effects on ethical decision-making to the currently organizational interventions ethical codes of conduct and ethics training to determine how cognitive tools can enrich current organizational approaches to

encouraging ethical decision-making. As mentioned previously, the ACED IT may serve as an intermediary resource between codes of conduct and full ethics training programs that organizations and managers can use to help employees to apply effective cognitive processes in solving ethical problems, on a more day-to-day, long-term basis. A related future avenue for the ACED IT cognitive map would be to determine whether it can be similarly effective as an online tool. Presently, research on the ACED IT tool has used a paper-and-pencil version of the map, but if the ACED IT were similarly as effective in the form of an online decision tool, the ACED IT could have the potential to be even easier to use, and thus more effectual in organizations' efforts at improving ethical decision-making in their employees.

In sum, the results of this study demonstrated that the ACED IT cognitive map influences the cognitive processes that people engage in as they solve ethical problems. Completing the ACED IT map resulted in significantly better performance on a number of dimensions held to be important for ethical decision-making (Mumford et al., 2008). Furthermore, this study provided additional evidence that elements of both planning and forecasting are important for ethical decision-making, which can inform the content of training and interventions designed to improve ethical decision-making.

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Table 1

*One-way Multiple Analysis of Variance for Rated Variables*

<i>Source</i>	<i>df</i>	<i>F</i>	<i>p</i>
Number of Steps Identified	3	4.33**	.006
Number of Problems Identified	3	5.19**	.002
Number of Solutions Identified	3	6.12**	.001
Number of Consequences Identified	3	1.71	.168
Ethicality	3	.81	.492
Forecast Quality	3	2.42	.069
Plan Quality	3	2.45	.051
Wilks' Lambda	13	2.74**	.000

*Note: \*\*  $p < .01$*



Table 2

*Correlations among Study Variables*

	1.	2.	3.	4.	5.	6.	7.
1. Number of Steps	1	.44**	.45**	.31**	.22**	.42**	.61**
2. Number of Problems		1	.56**	.29**	.24**	.35**	.61**
3. Number of Solutions			1	.38**	.17*	.38**	.64**
4. Number of Consequences				1	.31**	.79**	.46**
5. Ethicality					1	.54**	.54**
6. Forecast Quality						1	.71**
7. Plan Quality							1

\* Correlation is significant at the .05 level

\*\*Correlation is significant at the .01 level

## Figures

Figure 1. Original ACED IT map

Figure 2. Modified ACED IT map