<Recto running head>Consequences Identification
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Consequences Identification in Forecasting and Ethical Decision-making

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Abstract: Forecasting involves predicting outcomes based on observations of the situation at hand. We examined the impact of the number and types of consequences considered on the quality of ethical decision-making. Undergraduates role played several ethical problems in which they forecast potential outcomes and made decisions. Performance pressure (difficult demands placed on the situation) and interpersonal conflict (clashes among people in the problem situation) were manipulated within each problem scenario. The results indicated that the identification of potential consequences was positively associated with both higher quality forecasts and more ethical decisions. Neither performance pressure nor interpersonal conflict affected the quality of forecasts or decisions. Theoretical and practical implications of these findings and the use of this research approach are discussed.

Ethical decision-making (EDM) in human research involves responding to a problem involving multiple, often competing, goals and motives (Werhane, 2002). The decision maker must evaluate the effectiveness of alternative courses of action in relation to the ethical and professional standards of their field (Miner & Petocz, 2003). The complexity of EDM makes it a difficult phenomenon to study empirically in field settings, hence we have used role playing in a laboratory for this initial study of the role of forecasting in EDM.

We propose that forecasting, or predicting the potential consequences of future actions, is an important cognitive process involved in EDM. In prior research, we found that higher quality forecasts were significantly positively associated with better EDM (Stenmark et al., 2010). Additionally, identification of critical causes of the problem situation contributed to both better forecasting and better EDM. In the present study, we ask: How do the number and characteristics of the *consequences* considered in forecasting impact forecast quality and EDM? The ultimate objective of this line of research is to learn how individuals or groups involved in EDM should structure their decision processes for optimum results.

<Head C>Forecasting

Forecasting involves making predictions based on observations of the situation at hand (Pant & Starbuck, 1990). Because ethical problems in professional contexts are likely to be complex, and to have significant consequences for the individuals or groups involved,

engagement in forecasting activities is an important process that can be expected to aid EDM, thus:

1. We propose that the quality and quantity of possible consequences considered are related to the quality of the EDM.

<Head C>Consequences

It has been argued that the nature and success of people's forecasting efforts depend on the number and characteristics of the consequences examined (Mumford, Schultz, & Van Doorn, 2001). The present study examined several different strategies regarding the identification of consequences in forecasting: 1) identifying a larger number of consequences, 2) identifying positive consequences, 3) identifying negative consequences, 4) identifying long-term and short-term consequences, and 5) and identifying the most critical consequences involved in the problem situation.

<Head D>*Consequences Identification Strategies.* Considering a wide range of consequences contributes to better quality forecasting (Mumford, Schultz, & Van Doorn, 2002). Furthermore, Mumford, Friedrich, Caughron, and Byrne (2007) propose that effectively solving complex problems involves extensive forecasting activities, considering both positive and negative scenarios in forecasting the effects of the problem solution. It is unclear, however, how the identification of positive versus negative consequences may impact forecasting. Additionally, the timeframe of problem-solving activities may impact the effectiveness of the problem solution (Antes & Mumford, 2009). The potential role of the timeframe of the consequences considered in forecasting and EDM, however, is unclear, due to the complex, dynamic nature of ethical decisions (Werhane, 2002). Finally, it it important to note that forecasting is a time- and resource-intensive activity (Dorner & Schaub, 1994; Moskowitz &

Sarin, 1983), thus, it may be vital that people focus on the critical consequences in their forecasts, in order to ensure that the most important outcomes are accounted for in the final problem solution. Thus, the following hypotheses and research questions are warranted:

2. Considering a larger number of potential consequences will be related to a) higher quality forecasts and b) better ethical decisions. (Research Questions: How will the consideration of positive and negative consequences impact forecast quality and EDM? How will the consideration of long-term and short-term consequences impact forecast quality and EDM?)

3. Considering critical consequences will be associated with a) higher quality forecasts and b) better ethical decisions.

Situational Variables

Forecasting and EDM do not occur in a vacuum. Indeed, they are likely to be impacted by a number of situational variables. The present study examined the impact of performance pressure and interpersonal conflict on forecasting and EDM.

<Head D>Performance pressure. Performance pressure has been shown to degrade performance on many different types of tasks, especially cognitively demanding tasks (Baumeister, 1984; Beilock & Carr, 2001; Lewis & Linder, 1997), such as EDM (Mumford et al., 2006). Furthermore, Jasanoff (1993) found that production pressure, among other environmental variables, was associated with ethical misconduct.

<Head D>Interpersonal Conflict. Interpersonal conflict may be another situational variable that impacts the ethicality of a decision (Levenson, 1986). Indeed, Mumford et al. (2007) found interpersonal conflict to be consistently negatively associated with EDM. Thus, the following hypotheses regarding these situational variables are warranted:

4. Performance pressure will negatively impact a) forecasting and b) ethical decision-making.

5. Interpersonal conflict will negatively impact a) forecasting and b) EDM.

Method

<Head C>Sample

The sample used to test these hypotheses consisted of 104 (63 females, 41 males) undergraduate psychology students attending a large southwestern university, with an average age of 19.29 (SD = 1.84).

<Head C>Experimental Task

The primary experimental task consisted of a scenario in which the participants assumed the role of a manager of a hypothetical electronics organization. After reading a description of the organization and its current circumstances, the participants read 8 mock emails from different characters in the organization, each presenting different problems and asking for solutions to each problem. In response to each e-mail problem, the participants wrote their solution in the form of an e-mail response to the person asking the question. Participants were asked to 1) describe the potential actions to be taken in response to the problem, 2) forecast the potential consequences, or outcomes, of those actions, and 3) describe their final decision in response to the problem. The responses to the questions regarding the potential outcomes were scored by trained judges (scoring details provided below).

<Head C>Manipulations

The experimental manipulations occurred within the context of the hypothetical organization, within the written study materials.

<Head D>*Performance Pressure*. The performance pressure manipulation occurred in the organizational background materials presented to the participants. Participants in the high performance pressure group were told that the company had recently lost some clients to its greatest competitor. Thus, it was extremely important that the organization develop, market, and sell new products, in order to keep the organization afloat. Participants in the low performance pressure group were told that the organization was performing very well, was the top electronics firm in the nation, and was working to develop new products in order to remain the top firm.

<Head D>*Interpersonal Conflict*. The interpersonal conflict manipulation also occurred in the organizational background materials presented to participants. Participants in the high interpersonal conflict group were told that two of the organizational units have been feuding lately, and how this feud has negatively impacted everyday organizational tasks. Participants in the low interpersonal conflict group were told that the organization was very fortunate in that the employees work well together and very rarely have disagreements.

<Head C>*Measurement*

<Head D>*Forecast quality.* The written answers provided in response to the prompt questions were presented to a panel of four judges, all of whom were doctoral students in industrial and organizational psychology. The forecasts of the likely outcomes of the problem scenarios were evaluated with respect to Detail, Complexity, and Criticality. *Detail* was defined as the extent to which the response covered elements (people, tasks, groups, etc.) in detail. *Complexity* was defined the extent to which the forecast was composed of multiple, interrelated elements. *Criticality* was defined as the extent to which the response considered the critical aspects of the problem scenario. Ratings of detail, complexity, and criticality were made on a 5-

point rating scale where benchmarks were selected to reflect high, medium, and low levels of performance on the problem at hand.

Prior to making these ratings, the judges completed a 20-hour training program. In this training program, judges were initially familiarized with the nature of the problem and the definitions of the constructs being applied. Subsequently, they were asked to apply these rating scales in evaluating a set of sample problem solutions and then meet and discuss and discrepancies observed in their evaluations. Following training, the inter-rater agreement coefficients obtained for evaluations of forecast detail, complexity, and criticality were .85, .79, and .68 respectively.

<Head D>Consequences. The consequences question required participants to identify the potential consequences of the courses of action previously identified. For each of the responses, the judges 1) counted the number of consequences identified by the participant, 2) counted the number of positive and negative consequences identified, 3) rated the extent to which the consequences considered were long-term, versus short-term, and 4) rated the extent to which the participants identified the most critical consequences of each problem scenario. Following training, the inter-rater agreement coefficients obtained for evaluations of number of consequences, number of positive consequences, number of negative consequences, timeframe of consequences, and critical consequences were .94, .91, .93, .66, and .73 respectively.

<Head D>Ethical decision-making. Two questions assessed the ethicality of the decision; the first required participants to indicate the decision they would make to solve the problem, and the second required participants to provide a rationale for the decision. For each of the responses, the judges rated the extent to which the response reflected ethicality on a 5-point scale. 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 of and respect for cultural norms and values, including understanding guidelines and the duties of given social roles. The overall ethicality dimension took these sub-dimensions into account to provide the primary dependent variable in this study. Following training, the inter-rater agreement coefficient obtained for evaluations of ethicality was .81.

<Head A>Results

We used a series of hierarchical regression analyses to address our hypotheses and research questions. The series of regression analyses was designed to test individually how the consequences variables influence forecast quality and ethicality, and how forecast quality influences ethicality, in addition to testing whether or not the quality of the forecast mediates the relationship of the consequences variables and decision ethicality (see Baron & Kenny, 1986). A Sobel test was performed to examine the mediating role of forecast quality in the relationship between the consequences variables and ethicality. For each regression analysis, the first block entered consisted of the control measures. Scores on a post-task measure of task motivation were retained as a control variable because they were significantly positively related to forecast quality and decision ethicality. Gender was also retained as a control variable because it was significantly related to ethicality, such that females tended to be more ethical than males. The

second block consisted of the two situational variables, performance pressure and interpersonal conflict, plus the two-way interaction between them. The third block varied, depending on the hypothesis or research question at hand.

<Head C>*Relationship of Consequences Variables and Ethicality*

For this analysis, the dependent variable was ethicality, and the third block entered consisted of the consequences variables (See Table 1). This analysis did not provide support for hypothesis 2a, that the number of consequences identified would predict ethicality. Additionally, the timeframe of the consequences identified was not associated with the ethicality of the decision. Hypothesis 3a, however, was supported, indicating that the criticality of the consequences identified was a significant predictor of decision ethicality. Neither performance pressure nor interpersonal conflict predicted ethicality, indicating that performance pressure and interpersonal conflict may not influence the processes involved in EDM.

INSERT TABLE 1 ABOUT HERE

<Head C>*Relationship of Consequences Variables and Forecast Quality*

For this analysis, the dependent variable was forecast quality, and the third block entered consisted of the consequences variables (See Table 2). This analysis provides support for hypothesis 2b, that the number of consequences identified would predict forecast quality. Hypothesis 3b was also supported, indicating that the criticality of the consequences identified significantly predicted forecast quality. The timeframe of the consequences identified, however, was not associated with forecast quality. Additionally, again, neither performance pressure, nor interpersonal conflict influenced forecast quality. Thus, performance pressure and interpersonal conflict may not influence people's ability to generate quality forecasts in response to an ethical problem.

INSERT TABLE 2 ABOUT HERE

<Head C>Relationship of Forecast Quality and Ethicality

For this analysis, the dependent variable was ethicality, and the third block entered was forecast quality (See Table 3). This analysis supported Hypothesis 1, indicating that higher quality forecasts were, indeed, related to better EDM. Additionally, again, neither performance pressure, nor interpersonal conflict influenced ethicality.

INSERT TABLE 3 ABOUT HERE

<Head C>Forecast Quality as a Mediator Between the Criticality of the Consequences and Ethicality

Next, a regression analysis was performed to determine if forecast quality is a mediator of the relationship between criticality of consequences and ethicality (See Table 4). This analysis, demonstrated that forecast quality remained a significant predictor of ethicality, even after controlling for the identification of the critical consequences. Thus, it appears that forecast quality is a mediator of this relationship. Furthermore, a Sobel test (Preacher & Hayes, 2004) was performed to determine if forecast quality was a significant mediator of the relationship between the criticality of the consequences identified and decision ethicality. The results of the Sobel test indicated that the criticality of the consequences identified does, indeed, mediate the relationship between forecast quality and decision ethicality ($p < .01$). This finding suggests that the ability to identify the most critical consequences of the problem situation is related to decision ethicality *vis a vis* the overall quality of the forecast.

INSERT TABLE 4 ABOUT HERE

<Head C>Relationship of Positive and Negative Consequences Identification on Forecast Quality

For this analysis, the dependent variable was forecast quality, and the third block entered consisted of the consequences variables, including the number of positive and negative consequences identified (See Table 5). This analysis demonstrated that the number of positive consequences identified significantly predicted forecast quality, while the number of negative consequences identified did not significantly predict forecast quality. This finding suggests that the consideration of potential positive consequences is important to generating high quality forecasts.

INSERT TABLE 5 ABOUT HERE

<Head A>Discussion

Before turning to the broader implications of the present effort, certain limitations should be noted. To begin, it should be recognized that the present study was based on a low-fidelity simulation of a complex, real-world problem involving forecasting and EDM. Such simulations have been demonstrated to effectively address the study of complex cognition (e.g., Connelly, Gilbert, Zaccaro, Threlfall, Marks, Mumford, 2000). The question remains, however, concerning the generalizability of these findings to people thinking through ethical problems in the real-world. On a related note, the participants were undergraduate students. Older adults may perform differently on similar tasks or in real-world decision-making situations than undergraduate students in a research laboratory. Additional research is necessary to determine the generalizability of these findings to real-world situations and older populations.

Furthermore, it is possible that the manipulations for performance pressure and interpersonal conflict used for this study were not salient enough to impact the cognitive

processes of the study participants. Specifically, these variables were manipulated *vis a vis* the written background materials presented to the participants, as opposed to manipulations external to the participants, in which the participants would actually experience the pressure and conflict. Thus, future studies should examine these variables using other manipulations (for example, perhaps linking performance on the task to grades, in order to induce actual performance pressure), in order to determine if these variables do not, indeed, impact the forecasting and EDM processes.

Even bearing these limitations in mind, we believe that the present study can make an important contribution to the study of EDM. Although this study used undergraduate research participants, in a laboratory setting, this study may serve as a starting point for using this research approach to study EDM. Other studies examining complex cognition using low-fidelity simulations have demonstrated this to be an effective research paradigm for studying such concepts (e.g., Connelly, Gilbert, Zaccaro, Threlfall, Marks, Mumford, 2000). Thus, the findings with regard to how consequences identification, forecasting, and EDM are interrelated may still have noteworthy implications. These relationships are likely to be similar across settings (for example, the identification of a larger number of potential consequences is likely to be related to better forecasting and EDM in real-world settings, as well as the laboratory setting of this study). The question of generalizability for the results regarding the situational variables, however, is an important one that needs to be addressed. Thus, in considering these findings, it is important to ask: Is there something about the artificial research environment, and/or the sample used, that is responsible for the results, or is it possible that these variables actually do not impact the cognitive processes examined, as suggested by the study results?

In the present study, as in the Stenmark, et al., (2010) study, the manipulated situational variables did not impact the forecasting or EDM processes. As mentioned previously, in the present study, the manipulations may not have been as salient or personally relevant to participants, because the participants did not directly experience the pressure and conflict. These and other studies (Byrne, Shipman, & Mumford, in press), however, have observed similar findings, which may indicate that forecasting is a particularly "internal" cognitive process, that is relatively unaffected by situational variables.

On the other hand, there are a number of explanations for why situational variables may have failed to impact forecasting in empirical studies, and how these studies may differ from real-world problem-solving. First, in the forecasting studies discussed, participants did not actually have to implement their forecasted actions or take action to solve the problem. Thus, there may not be a sense of accountability in their forecasting activities, which may diminish the impact of situational variables, whereas these variables may be more likely to impact real-world forecasting and decision-making. Additionally, these situational variables may be more likely to impact forecasting in real-world decision-making when people are following the natural course of these problem-solving activities, as opposed to responding to specific, written prompts in the laboratory. Thus, simply by the nature of studying these processes, the impact of certain situational variables may be lost in the laboratory.

<Head A>Best Practices

There are a number of practical applications flowing from this work. First and foremost, it is imperative for people experiencing ethical problems to consider and analyze the potential consequences of the actions they may take to solve the problem. This may seem like common sense, but research has demonstrated that people not only are poor at forecasting, but they also

prefer not to engage in extensive forecasting activities, due to the resource-intensive nature of these activities (Dorner & Schaub, 1994; Moskowitz & Sarin, 1983). Thus, people must be explicitly taught not only the importance of forecasting activities, but specific, easy-to-implement, strategies facilitating the forecasting process.

Along related lines, this study identified a number of cognitive strategies that facilitate forecasting and EDM, specifically. The Mumford et al., 2008 model of EDM emphasizes that, in making ethical decisions, individuals are able to navigate the various components of ethical dilemmas most effectively by using cognitive strategies. These strategies ensure that individuals consider and analyze as much of the relevant information as possible, in order to make the most effective, well-informed, decision. Research identifying effective strategies and examining the execution of these strategies not only provides greater theoretical understanding of EDM, but also allows practical recommendations for how to improve EDM, especially for use in ethics instructional programs.

<Head A>Educational Implications

These findings have important implications for ethics training programs. The results of this study suggest that ethics programs should emphasize the cognitive processes, including forecasting, that are involved in EDM. Moreover, because forecasting is difficult for people, especially in ambiguous, complex systems (Dorner & Schaub, 1994; Moskowitz & Sarin, 1983) it is especially important for ethics training to include instruction on this critical process. In providing training with respect to forecasting, an emphasis should be placed on thinking about the critical consequences of the ethical problem situation, in order to improve forecasting, leading to a better, more informed decision. Moreover, training should emphasize that, in order to improve forecasting, people should consider a large number of consequences.

Additionally, this study found that the identification and consideration of positive consequences, as opposed to negative consequences, was associated with higher quality forecasts. Considering potential positive consequences may be important for preparing for and recognizing emergent opportunities in the problem situation. These results indicate that, while it may, indeed, be important to consider negative consequences, in order to have a well-rounded, high-quality forecast, people must also consider the potential positive consequences of the actions taken to solve the problem at hand.

<Head A>Research Agenda

The results with regard to the impact of situational variables on the cognitive processes involved in EDM implicate a rich area of future research. It is important to know if these variables indeed, do not impact these important processes in EDM, as suggested by this and other studies of forecasting (e.g., Stenmark et al., 2010), or if there is something about the nature of the way they are being studied that does not allow for the true nature of the effect to be measured. It is possible that under other circumstances, outside the laboratory, situational variables may impact forecasting and/or EDM. Thus, future studies would do well to determine better the dynamics of these processes as they relate to situational variables. Studies involving different manipulations of the situational variables would be useful, to determine if different levels of those variables and/or different levels of personal involvement with the manipulated variables (i.e., reading about characters experiencing performance pressure, vs. actually inducing performance pressure in the participants) may impact forecasting and EDM. Additionally, field studies of older adult samples, with real-world accountability for the decisions being made will help to inform how these variables impact EDM.

In conclusion, EDM is complex process, likely involving a number of cognitive processes, in response to a dynamic, complex, ambiguous problem. The findings of the present study suggest that high quality forecasting is an important process in making an effective, ethical decision. Because people are prone to a number of assumptions and errors in forecasting, training people in cognitive strategies is likely to improve forecasting quality and EDM. Findings in this study further suggest that when individuals identify the critical consequences of potential problem solutions, they generate higher quality forecasts and make more effective, ethical decisions. Interestingly, neither performance pressure, nor interpersonal conflict impacted forecasting or EDM in this study. Not only does this study demonstrate the importance of examining the cognitive processes involved in EDM, but it also may serve as a starting point for using one potentially useful research methodology in studying the complex cognitive processes involved in EDM.

<Head A>Authors' Biographical Sketches

Cheryl Stenmark is an Assistant Professor at Angelo State University. She has examined cognitive strategies for ethical decision-making, and been involved in the development and dissemination of a university-wide ethics training program currently being implemented at the University of Oklahoma.

Alison Antes is an Assistant Professor at Northern Kentucky University. She assisted in the validation of ethical decision-making measures and the development and evaluation of a responsible conduct of research training program developed to assist researchers in ethical decision-making.

Chase Thiel is a graduate research assistant at the University of Oklahoma's Center for Applied Social Research. He has examined how emotions and emotional regulation are involved in

ethical decision-making, and he is currently the director of a university-wide ethics training program currently being implemented at the University of Oklahoma.

Jay Caughron is an Assistant Professor at Radford University. He has examined the role of sense-making in ethical decision-making, and has been involved in the development and dissemination of a university-wide ethics training program currently being implemented at the University of Oklahoma.

Xiaoqian Wang is consultant at Mobley Group Pacific, Ltd. She has examined how cognitive framing is involved in ethical decision-making, and was involved in the development and dissemination of a university-wide ethics training program currently being implemented at the University of Oklahoma.

Michael Mumford is a professor at the University of Oklahoma where he is the Director of the Center for Applied Social Research. He developed a cognitive model of ethical decision-making, and the developed and validation a measure of ethical decision-making.

All authors contributed to the development of the research design and methodology of the study.

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Table 1. *Predicting Ethicality from Performance Pressure, Environmental Conflict, and Consequences Variables*

		β	R²	Δ R²
Block 1			.17**	
	Gender	.16		
	Motivation	.28**		
Block 2			.19	.013
	Performance Pressure	-.19		
	Environmental Conflict	-.03		
	Perf Press x Env Conf	.14		
Block 3			.34	.16**
	Number of Consequences	.08		
	Critical Consequences	.48*		
	Timeframe	-.21		

Note: *p < .05; **p < .01. No Performance Pressure = 0, Performance Pressure = 1; Low Environmental Conflict = 0, High Environmental Conflict = 1; Short-term Consequences = 1, Long-term Consequences = 5

Table 2. *Predicting Forecast Quality from Performance Pressure, Environmental Conflict, and Consequences Variables*

		β	R²	Δ R²
Block 1			.11**	
	Gender	.07		
	Motivation	.12**		
Block 2			.14	.02
	Performance Pressure	-.00		

Environmental Conflict	-.07		
Perf Press x Env Conf	.09		
Block 3		.82	.70**
Number of Consequences	.28**		
Critical Consequences	.60**		
Timeframe	.01		

Note: *p* < .05; **p* < .01. No Performance Pressure = 0, Performance Pressure = 1; Low Environmental Conflict = 0, High Environmental Conflict = 1; Short-term Consequences = 1, Long-term Consequences = 5

Table 3. *Predicting Ethicality from Performance Pressure, Environmental Conflict, and Forecast Quality*

		β	R²	Δ R²
Block 1			.17**	
	Gender	.14		
	Motivation	.22**		
Block 2			.19	.01
	Performance Pressure	-.18		
	Environmental Conflict	-.03		
	Perf Press x Env Conf	.11		
Block 3			.37	.18**
	Forecast Quality	.46**		

Note: *p < .05; **p < .01. No Performance Pressure = 0, Performance Pressure = 1; Low Environmental Conflict = 0, High Environmental Conflict = 1

Table 4. *Forecast Quality as a Mediator Between the Criticality of the Consequences and Ethicality*

		β	R²	Δ R²
Block 1			.17**	
	Gender	.12		
	Motivation	.21*		
Block 2			.19	.01
	Performance Pressure	-.18		
	Environmental Conflict	.00		
	Perf Press x Env Conf	.10		
Block 3			.34	.16**
	Number of Consequences	-.06		
	Critical Consequences	.17		
	Timeframe	-.22		
Block 4			.39	.04*
	Forecast Quality	.51*		

Table 5. *Predicting Forecast Quality from Performance Pressure, Environmental Conflict, the Number of Positive and Negative Consequences, Critical Consequences, and Timeframe of Consequences*

		β	R²	Δ R²
Block 1			.11**	
	Gender	.09*		
	Motivation	.14**		
Block 2			.14	.02
	Performance Pressure	-.00		
	Environmental Conflict	-.07		
	Perf Press x Env Conf	.05		
Block 3			.84	.71
	Number of Positive Consequences	.22**		
	Number of Negative Consequences	.12		
	Critical Consequences	.64**		
	Timeframe	.02		

Note: *p* < .05; **p* < .01. No Performance Pressure = 0, Performance Pressure = 1; Low Environmental Conflict = 0, High Environmental Conflict = 1; Short-term Consequences = 1, Long-term Consequences = 5