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Investigating Delay in Health Related Decision Making Versus Non-Health Decision Making

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INVESITGATING DELAY IN HEALTH RELATED DECISION MAKING VERSUS

NON-HEALTH DECSION MAKING

by

Ann Lassiter Edwards
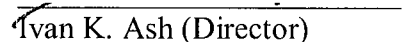B.S. May 2006, Old Dominion University

A Thesis Submitted to the Faculty of Old Dominion University in Partial Fulfillment of
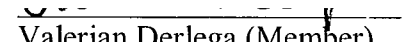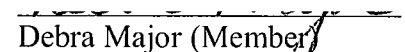the Requirement for the Degree of

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ABSTRACT

INVESTIGATING DELAY IN HEALTH RELATED DECISION MAKING VERSUS NON-HEALTH DECISION MAKING

Ann Lassiter Edwards
Old Dominion University, 2009
Director: Dr. Ivan K. Ash

Health and non-health decision domains were examined to explore the differences in decision domain and delay preferences. Using an existing cognitive theory of delay (Bastardi & Shafir, 1998; Tykocinski & Ruffle, 2003), type of scenario (health vs. non-health) was manipulated within subjects with participants receiving three scenarios of each type. Certainty (certain vs. uncertain) and delay choice condition (no delay, delay, one-week delay) were manipulated between subjects. This resulted in a 2 (health) X 2 (certainty) X 3 (delay choice) split-plot factorial design. The dependent measure was the proportion of action responses (deciding to change status quo) across the three scenarios. More people made active decisions in health related decisions than in non-health related decisions ($p < .001$). When given the opportunity to delay, significantly less people chose to make an active decision ($p < .001$) regardless of decision domain. There was no significant difference in the amount of delay (one day or one week).

This thesis is dedicated to two distinct groups of family:

Kerry, my husband, Ian, Sarah-Margaret, and Rhys my children. I love you dearly and you've given up a lot your life that I could have been a part of so that I could do this one really important thing for myself. Thank you seems very inadequate. My mother Margaret Lassiter and my brother Kim Lassiter, who helped shape the woman I became.

Rachel Phillips, Ashley Doane, Viktoria Tidikyte, Matthew (Mateo) Pearson, Greg Leffler, Jeremy Brown, and Matthew Loesch. The cohort that became family. It is utterly impossible to have gotten here without you. I love you just as deeply as if you were family given to me … you were family chosen.

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I gratefully acknowledge the work of my advisor Ivan K. Ash. Ivan loves cognition and he loves a good argument. I've given him both for three years. Ivan took me on even though I studied something different than his main interest and he let me go in my own direction. In the end, that really meant letting go. I'm very grateful for his generosity and his style.

I would also like to acknowledge Val Derlega. Val made me excited about Health Psychology when I was an undergraduate. It was that moment of knowing what I wanted to study. While I have altered course a few times since then, the basic path is still the same.

Debbie Major started out as the randomly assigned member of my committee. In the end, she gave me a better experiment. She also provided professional and personal support that guided me through a very difficult year. She continues to be a personal and professional mentor and inspiration as a scientist and a woman in the field. I am profoundly in her debt.

Finally, I would like to acknowledge the faculty and staff of the Department of Psychology, Old Dominion University. This 2009-2010 has been an especially difficult year for me personally because of my husband's health crisis. The staff and faculty have been unendingly supportive in my efforts to maintain my graduate school goals despite

very profound difficulties in my personal life. It would not have been possible without

that support, no matter what my determination. Thank you.

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INTRODUCTION

Individuals make health related decisions every day. For instance, they decide what to eat and how much. People decide to spend time on the computer rather than go for a walk. More importantly, individuals make the decision to seek medical attention and follow physician recommendations for care or they may choose to delay. Using cancer as an example, early detection impacts mortality for the individual and healthcare related spending for society as a whole. According to the American Cancer Society (2009), early detection of breast cancer increases the five-year survival rate to 97%. If the cancer is not detected until it has spread to the lymph nodes, five-year survival drops to 76%. Once breast cancer has metastasized to other organs, the five year survival rate decreases to 21%. The decision to delay seeking medical advice and delay following healthcare recommendations has an obvious link to decision making.

Delay in Health Decision Making

Health related decisions, like many others, contain an element of uncertainty (Bagassi & Macchi, 2006) which impacts an individual's decision making strategies and preferences. The pursuit of information to counter that uncertainty may have an impact on an individual's decision making strategy (Kreps, O'Hair, & Hart, 1995; Lambert & Loiselle, 2007; McCaughan & McKenna, 2007). It is also possible that the individual prefers to wait to make their decision for a variety of reasons that probably includes information pursuit but may also be tied into other individual differences such as

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The model journal used for this thesis is *Judgment and Decision Making.*

personality trait (Hashimoto & Fukuhara, 2004; Patalano & Wengrovitz, 2007; Wallston & Wallston, 1978). Researchers, however, design most health related research to explore the choices made rather than look at how or when people make their choices.

One way that health related decisions may differ from other kinds of decisions is that health communication and the decisions based on it contain implied risk (Berry, 2004). Risk and uncertainty can lead to serious consequences for the decision maker. They are also all reasons for the individual to delay. The fear of receiving a negative diagnosis may make people delay in screening behaviors or delay the decision to seek medical advice (Hale, Grogan, & Willott, 2007). Misperception of risk and many other interpersonal factors can also lead to health related delays (Facione & Facione, 2006).

Health related research examining delay is quite extensive. Researchers have examined reasons for such delay including individual differences across demographic information, in personality, and psycho-social variables. These studies often base data on archival information. There is less research examining health in the context of existing decision making paradigms.

Decision making theories have examined differences across high risk subjects such as health and financial decision (Chapman, 2004; Redelmeier & Tversky, 1992). Chapman (1998), for example, looked at health decision making utilizing discount utility theory. Two important considerations exist regarding current decision making models. First is the generalizability from the lab to real world situations. Often decision making research uses artificial constructs such as gambling scenarios (Shafir & LeBoeuf, 2002). Although these constructs have been questioned as to their utility and generalizability,

they are still used in many experimental designs (Bar & Huber, 2008). The second consideration is the domain of the problem space. When real life situations are studied, health is not the domain of choice for many cognitive researchers. In their work on personality and risk across domains, Soane and Chmiel (2005) suggest that decision making is highly specific to domain. Risk factors and other individual difference variables that are specific in each domain do not allow for generalizability.

So there is one type of problem, health decisions, being studied from different disciplines of research (social psychology, personality psychology, and to a more limited extent...cognitive psychology). This results in an incomplete picture of health decisions. My initial research addressed that partial view. I examined the specific domain of health decision making, but from a cognitive model approach. Since people often delay in making decisions (Bagassi & Macchi, 2006), I chose a paradigm that included delay as a variable. The original experiment of Bastardi and Shafir (1998) proposed that delay occurs more in the face of uncertainty. The experiment that altered the original methodology (Tykocinski and Ruffle, 2003) proposed that given a chance to delay, regardless of certainty, people will choose to delay. Since health decisions often involve uncertainty and individual choices to delay this was an appropriate model to use.

In order to explain the present research I give an overview of the chosen decision making theory. Since this experiment was developed as an outcome of two approaches to delay in uncertainty, I review both the original studies and the design that I used in this experiment. Then I explain the current study.

Cognitive Decision Making Theories

The disjunction effect. Bastardi and Shafir (1998) proposed a theory of decision making that explained why people chose to delay decisions and how it altered the decision. The theory is referred to as the disjunction effect. Bastardi and Shafir defined the disjunction effect as the use of non-instrumental information (information not necessary for the decision) to make a different decision than they would have made without the non-instrumental information. This effect occurs in the face of uncertainty in the problem. A disjunction effect example provided by Bastardi and Shafir (1998) involved a student's choice to book a Hawaiian vacation. If the student would go to Hawaii regardless of how they perform on the final exam, waiting for the exam results before booking the trip allowed non-instrumental information to have the opportunity to influence the choice. The empirical evidence presented by Bastardi and Shafir seemed to demonstrate that such information influence occurs.

A disjunction is the break between thought and action. The disjunction effect Bastardi and Shafir described was the break between a decision made without needless information and a decision made with extraneous information. Even though there was already a clear choice, information could change it. The information may have been necessary in order to make the decision. Alternatively, the piece of information may have only been relevant to the decision maker rather than instrumental or necessary for the decision. Bastardi and Shafir (1998) based their research on the ideas that a): the pursuit of information may increase the relevance that people assign to that information and b): In uncertain conditions, it is often the disparity between the choices that drives information pursuit and the assigned relevance the obtained information receives.

In an attempt to show that the introduction of new information, regardless of its necessity, impacted the decision that people make, Bastardi and Shafir (1998) presented participants with a series of scenarios involving certainty and uncertainty. One of these scenarios and its implications is included below.

Certain version: You are considering registering for a course in your major that has very interesting subject matter and will not be offered again before you graduate. While the course is reputed to be taught by an excellent professor, you have just discovered that he will be on leave and that a less popular professor will be teaching the course. Do you: a) Decide to register for the course? [82% of the participants chose "a"] or b) Decide not to register for the course? [18% of the participants choose "b"]

Uncertain version: You are considering registering for a course in your major that has very interesting subject matter and will not be offered again before you graduate. While the course is reputed to be taught by an excellent professor, you have just discovered that he may be on leave. It will not be known until tomorrow if the regular professor will teach the course or if a less popular professor will. Do you a) Decide to register for the course? [42% of the participants chose "a"]; b) Decide not to register for the course [2% of the participants chose "b"]; or c) Wait until tomorrow (after finding out if the regular professor will be teaching) to decide about registering for the course. [56% of the participants chose "c"]

The difference between the first version of the scenario and the second was the element of uncertainty. In the second version, the participants did not know whether or not the preferred professor will teach the course. If 82% of the participants would choose to

register even if the second choice professor is teaching, why did the participants hesitate to choose when the professor selection is uncertain? Shouldn't they still have chosen to take the course? What changed between the two versions?

Uncertain version (second part): If you chose (c) in the question above, please answer the following: It is the next day, and you find out that the less popular professor will be teaching the course. Do you a) Decide to register for the course? [29% of the participants in the first uncertain version now would register for the course] B) Decide not to register for the course? [27% of the participants in the first uncertain version now would not register for the course.]

The first part of the uncertain version introduced uncertainty to the scenario. The second resolved it so that the choice was now identical to the certain version. Why weren't the percentages the same? The resolution of the uncertain version means that 71% (42% + 29%) are registering for the course as opposed to the original 82%. If the decision was the same – register or not for the second choice professor – why has the percentage of those choosing to register decreased?

The main difference between the certain and uncertain conditions was a piece of missing information. Participants were given the option in the uncertain condition to wait for that information prior to making a decision. Obviously, the missing piece of information was not logically necessary for the decision to be made. If 82% of the people were willing to take the course even if the less attractive alternative was true, 82% of the people should still have been willing to take it when both alternatives were possible. In the face of uncertainty the participant could have made a personal evaluation that the missing information had relevance.

The ability to strengthen one decision over the other or the ability to create decision satisfaction in the decision maker defines relevance in this case. It should be noted that information can be perceived as being relevant and still not be instrumental (logically necessary) to the decision or its outcome. An interesting component of this assignment of relevance is that the information does not have to be actively pursued. Bastardi and Shafir (1998) state that curiosity about the information or the simple awareness of its existence can lead people to alter their decisions.

Bastardi and Shafir (1998) acknowledge that the decision maker did not realize the logical necessity of the information. People did not knowingly pursue useless information (Bastardi & Shafir, 2000). Since people did not always have the ability to easily distinguish between instrumental and non-instrumental information, they pursued more information than was strictly necessary.

Useless, non-instrumental information can alter the decisions that people make as opposed to the decisions when the information was readily available from the start (Bastardi & Shafir, 1998, 2000; Redelmeier, Shafir, & Aujla, 2001). The uncertainty itself leads to this misapplication of information. Because people functioning under uncertainty do not follow all implication paths of a decision, they are not logical in the application of information (Tversky & Shafir, 1992).

Although the disjunction effect exists, there has been a certain amount of dispute concerning the cause of disjunction (Bagassi & Macchi, 2006; Tykocinski & Ruffle, 2003). Bagassi and Macchi proposed that the effect has nothing to do with the search for information, but was based on the semantic level of the question. More importantly to

this experiment, Tykocinski and Ruffle proposed that people prefer to delay for many reasons not just information searches.

Decision delay theory. The Tykocinski and Ruffle (2003) experiment altered what they perceived to be a methodology problem in the Bastardi and Shafir (1998) experiment and proposed an alternative explanation for the delay. The questions below show that Bastardi and Shafir compared a no delay certainty condition with a second condition that not only added uncertainty but also included an additional choice, that of the ability to delay the decision.

> Bastardi and Shafir (1998) certain version: You are considering registering for a course in your major that has very interesting subject matter and will not be offered again before you graduate. While the course is reputed to be taught by an excellent professor, you have just discovered that he will be on leave and that a less popular professor will be teaching the course. Do you: a) Decide to register for the course? or b) Decide not to register for the course?

In the Bastardi ad Shafir (1998) version the participants were only given two choices. Register or don't register.

> Bastardi and Shafir (1998) uncertain version: You are considering registering for a course in you major that ha very interesting subject matter and will not be offered again before you graduate. While the course is reputed to be taught by an excellent professor, you have just discovered that he may be on leave. It will not be know until tomorrow if the regular professor will teach the course or if a less popular professor will. Do you a) Decide to register for the course? b) Decide not

to register for the course c) Wait until tomorrow (after finding out if the regular professor will be teaching) to decide about registering for the course.

Now the participants had three choices. Register, don't register, or delay. Tykocinski and Ruffle (2003) did not believe that the two versions of the scenario were comparable. The first version forced a decision. The second version allowed for delay. That delay may have occurred whether or not the information was the reason for it. Tykocinski and Ruffle also pointed out that registering for a course could also be a delaying tactic. It was much easier to register and later change your mind than it was to wait and try to register at the last minute.

Tykocinski and Ruffle (2003) reconstructed the Bastardi and Shafir (1998) course registration scenario to include a delay option certain condition to properly contrast with the three-option uncertain condition.

Delay certain: You are considering registering for a course in your major that has very interesting subject matter and will not be offered again before you graduate. While the course is reputed to be taught by an excellent professor, you have just discovered that he will be on leave and that a less popular professor will be teaching the course. Do you: a) Decide to register for the course? [70.37% of the participants chose option "a"] or b) Decide not to register for the course [12.96% chose option "b"] or c) wait until tomorrow to decide about registering for the course? [16.67% of the participants chose option "c"]

When given the option to wait, even in the certain option, some participants wanted to wait. Certainty, therefore, did not impact delays once the methodology issues were altered. Tykocinski and Ruffle (2003) replicated Bastardi and Shafir (1998) in an initial

experiment, but once the scenario choices were balanced to allow delay in both certainty and uncertainty, the responses were different than Bastardi and Shafir. This showed that only presenting a no delay choice in the Bastardi and Shafir scenario forces decision where it might not actually exist. It also legitimately raises the question as to the reason for the delay. Obviously, in the Tykocinski and Ruffle experiment information search was not the reason for the delay. Bastardi and Shafir's methodology made their conclusions logical. Change the scenario to make them more comparable and information search was no longer the only legitimate reason for delay.

Tykocinski and Ruffle (2003) further proposed that if delay was attractive to people, extended delay was an even more attractive choice. To test that, they expanded the Bastardi and Shafir scenario even further to include more delay time in the decision making process. Below is the additional certainty scenario in Tykocinski and Ruffle allowing for increased time before a decision to register for the course.

Extended delay: You are considering registering for a course in your major that has very interesting subject matter and will not be offered again before you graduate. While the course is reputed to be taught by an excellent professor, you have just discovered that he will be on leave and that a less popular professor will be teaching the course. Do you: a) Decide to register for the course? [45.45% of the participants chose option "a"] or b) Decide not to register for the course [1.82% chose option "b"] or c) wait one week to decide about registering for the course? [52.73% of the participants chose option "c"]

The opportunity for an extended delay changed the percentages of each option from both the Bastardi and Shafir (1998) no delay findings and the one day delay of the first three-

option certain condition from Tykocinski and Ruffle (2003). The percentage choosing to register decreased from 70.37% to 45.45% with an additional decrease in those choosing not to register from 12.96% to 1.82%. The only increase was in the waiting option. A similar pattern is observed in the uncertain condition when the delay is extended from one day to one week. The extension actually resulted in no participant choosing to "not register" and the majority (61.11%) choosing to wait the week. Even with no additional forthcoming information extending the waiting period increased the desire to delay the decision.

I think that the Tykocinski and Ruffle (2003) model is better than the Bastardi and Shafir (1998) for two reasons. The first reason is the balanced scenario options to include delay no matter what the level of certainty presented in the problem space. A forced choice as in the Bastardi and Shafir model did not represent empirical evidence of a theory. The second reason is that I think that the delay had many reasons and nothing in the Bastardi and Shafir (1998) proves or indicates that information search is the sole reason for delay. A large proportion of health research only establishes delay using archival data (Boydell, Gladstone, & Volpe, 2006; Gallo & Nghia, 2007; Hale, Grogan, & Willott, 2007; Horodynski et al., 2007). Experiments like Tykocinski and Ruffle and the experiment I conducted demonstrated delay in a current situation rather than through the view of past decisions.

Current Experiment

The two purposes of the current experiment were to explore the differences between health and non-health decisions and to explore the generalizability of cognitive decision theories across content domains. In their work on personality and risk across

domains, Soane and Chmiel (2005) suggested that decision making is highly specific to domain. Risk factors and other individual difference variables that are specific in each domain do not allow for generalizability. Individual assessment of risk and risk taking is also inconsistent across domains. (Highhouse & Paese, 1996; Nicholson, Soane, Fenton-O'Creevy, & Willman, 2005). Studying both health and non-health decision delay in the face of uncertainty allowed this domain specific difference to be more fully explored using cognitive decision theories rather than archival data.

In order to explore the difference between the theory of delay in the face of uncertainty, non-health scenarios using the five levels of choice in Tykocinski and Ruffle (2003) (Appendix B) balanced, to some extent, the original Bastardi and Shafir (1998) design. A no delay uncertainty condition in this experiment was added to the Tykocinski and Ruffle design. Adding the no delay uncertainty condition balanced and extended the experimental design. This was a flaw in the Bastardi and Shafir (1998) that was noted by Tykocinski and Ruffle but not altered. These scenarios included previously utilized situations and new scenarios written by the researcher.

Neither the Bastardi and Shafir (1998) theory nor he Tykocinski and Ruffle theory have been used to examine health related decisions so my research was exploratory. There were, however, interesting research questions to be examined:

Research Question 1: Verify the similarity or difference between decision domains. Does it make a difference when the decision is health related? Since the participants are university students, some of these students may never think about health related decisions in the context of health. I designed the health questions to reflect

choices that the typical university student may encounter. This was done to more fairly compare health versus non-health related decisions.

In their theory, Tykocinski and Ruffle (2003) found that delay had no significant effect on the certainty conditions. In general, delay was a decision making strategy where the implications of each decision must be fully explored when all information was not present.

Research Question 2: Can I replicate the Tykocinski and Ruffle (2003) finding that the level of certainty (certain and uncertain) had no impact on the decision to delay? Does certainty apply equally to health and non-health decisions? People use a variety of methods to explore their options when all information is not present. Therefore, the delay option may not have an impact on the uncertainty conditions compared to the equivalent certainty condition according to Tykocinski and Ruffle (2003).

Research Question 3: Can I replicate the use of delaying tactics and how does the domain of the problem space affect the need to delay?

Operationalizing the definition of health decisions. For the purposes of these experiments, a health related decision was an active or conscious decision about a behavior or choice impacting biological health or well-being. In other words, a person knew that the decision would impact their biological health and that impact was the motivator or reason for the decision. This was not a reflection of life-style choices or trends, but had real impact on a person's ongoing health.

EXPERIMENT 1

In order to ensure that the scenarios original to this study measured health related concepts and the non-health scenarios had no health content, a pilot test of the pool of decision domains was conducted. Some health situations deal with issues individuals may be reluctant to talk about. In addition, the situations portrayed in the scenario pool might represent situations that the participant had never personally encountered. Therefore, willingness of an individual to make a decision based on a scenario that either did not pertain to them personally or involved potentially sensitive information was also assessed.

METHOD

Participants

62 students from Old Dominion University participated via the Psychology Research Participation System. 49 participants were female and 13 were male. The participants ranged in age from 18-49 years ($M = 22$, $SD = 7$). Participation was solicited with the opportunity to earn research credits in partial fulfillment of some psychology course requirements. Alternatives to active research participation were available to the students. The only constraint to participation was that the students be at least 18 years of age.

Materials

An informed consent document was presented at the beginning of the on-line pilot. The participant was assured of their anonymity and the option to withdraw if needed from the pilot study (Appendix C).

Scenarios presented both health related and non-health related situations. The health scenarios were based in part on situations relevant to a university population. The University Health Services Department at Old Dominion University listed issues of concern or Frequently Asked Questions on their home page. Among these were influenza, inoculations, and sexually transmitted diseases. Issues that were current in the media and on campus at the time of the study included blood donation drives, staph infections being spread through public fitness facilities, the danger of some nutritional and/or fitness supplements, and a number of food product recalls due to salmonella and other bacterial contaminations. These issues were purposefully chosen for relevance to a university population and exposure through the popular media. A complete listing of the scenarios is in Appendix B.

Non-health scenarios were chosen based on scenarios originally used in other delay studies: course registration, vacation based on exam scores and stereo guarantee/purchase. An original scenario concerning dog-sitting for friends, was also assessed. Once again the non-health scenarios were selected for relevance to university population. The scenarios from previous studies were used in order to form a base of comparison with the health scenarios.

A definition of health decisions was created for participants so that a common idea was used to assess health content of the scenarios. For the purposes of this experiment, health decisions were defined as an "active or conscious decision about a behavior or choice impacting an individual's biological health or well-being. In other words, a person knows that the decision will impact their biological health and that

impact is the motivator or reason for the decision. This is not a reflection of life-style choices or trends, but real impact on a person's ongoing health."

Participants were asked two questions about each scenario. The health relatedness question asked "How do you rank this situation's health content?" Participants responded on a 5 point scale labeled 1 = Not health related at all, 3 = Neutral, 5 = Very health related. The willingness to answer question asked "Tell how willing you are to answer a question based on this situation, even if the situation does not now or will not apply to you." Participants responded on a 5 point scale labeled 1 = Not willing to answer the question, 3 = Neutral, 5 = Very willing to answer the question.

Procedure

Each participant signed into the Old Dominion University Psychological Research Participation system where they were provided with an online link to the study. The participant read an information page concerning the research study and their rights as participants. Participants were anonymous. Demographic information concerning age and gender was collected. Each participant read the definition of health related decisions prior to each scenario. Under the scenarios were questions regarding the participant's assessment of health content and their willingness to make a hypothetical decision based on the scenario.

RESULTS

61 participants completed all questions. One participant omitted a single question but was not dropped from the analysis. Boxplots were used to indicate outliers. Outliers were identified but it was important to keep the entire range of opinion in the analysis, even extreme opinion. 12 Outlying scores were moved one point closer to the mean.

One sample t-tests were conducted to assess that the health scenarios contained significantly more health content than a neutral response and that the non-health scenarios contained significantly less health content than a neutral response. Table 1 contains the results of the t- tests for the health related scenarios. Table 2 contains the results of the t-tests for the non-health related scenarios. On all health scenarios, mean health content ratings were significantly higher than the neutral score of 3. This indicated that participants viewed all of these scenarios as being health related. Effect sizes revealed that the 3 scenarios with the highest health ratings were STD exposure, flu, and salmonella contamination. The items that were scored positively significant represented scenarios with the highest health related content. The items that that were scored negatively significant represented scenarios with the highest non-health related content.

Likewise all the non-health scenarios' mean health content ratings were below the neutral score of 3. This indicated that participants viewed all of these scenarios as not being related to health. The three scenarios from the original research by Bastardi and Shafir (1998) and Tykocinski and Ruffle (2003) were maintained for Experiment 2.

Table 1

One-Sample t-test on Health Relatedness of Health Scenarios

Health Scenario	M	SD	df	t
Blood Donation	4.35	0.63	61	16.94***
Flu	4.63	0.63	61	20.25***
Health Insurance	3.65	1.18	61	4.32***
Inoculations	4.08	0.96	61	8.83***
STD Exposure	4.76	0.62	61	22.36***
Supplements	4.52	0.57	61	21.12***
Staph Infections	4.52	0.65	61	18.47***
Salmonella	4.53	0.82	61	14.63***

*** $p < .001$.

Table 2

One-Sample t-test on Health Relatedness of Non-Health Scenarios

Non-Health	M	SD	df	t
Course Registration	1.21	0.52	61	-27.29***
Stereo Purchase	1.10	0.39	61	-38.14***
Vacation	1.35	0.63	61	-20.57***
Dog-sitting	1.87	0.76	61	-11.58***

*** $p < .001$.

Analysis of the willingness to answer question revealed that participants indicated a wiliness to answer questions about all of the scenarios (see Tables 3 and 4). A one-sample *t*-test was performed to see if the participants' willingness to respond was significantly different than the neutral response. Scores that were positively significant represented scenarios about which participants would be willing to make decisions. Table 5 contains the results of the one sample *t*-test for this variable.

Table 3

One-Sample t-test on Willingness to Answer Health Scenarios

Health Scenario	M	SD	df	t
Blood Donation	4.24	1.082	61	9.041***
Flu	4.45	.935	61	12.222***
Health Insurance	4.13	.983	61	9.042***
Inoculations	4.44	.692	61	16.325***
STD Exposure	4.53	.844	61	14.298***
Supplements	4.42	.860	61	14.298***
Staph Infections	4.42	.879	61	12.719***
Salmonella	4.48	.864	61	13.531***

***$p < .001$.

Table 4

One-Sample t-test on Willingness to Answer Non-Health Scenarios

Non-Health Scenario	M	SD	df	t
Course Registration	4.08	1.121	61	7.593***
Stereo Purchase	4.02	1.194	61	6.700***
Vacation	4.10	1.112	61	7.767***
Dog-sitting	4.03	1.159	61	7.013***

***p < .001.

DISCUSSION

The purpose of Experiment 1 was to assess whether the scenarios written for this project were viewed by participants as either significantly health related decision domains or significantly non-health related decision domains. The non-health decisions should not have any health component so that the variables were not confounded. The *t*-tests showed that participants viewed health scenarios as being representative of health related decisions and non-health scenarios were not viewed as health related domains.

Of the four non-health scenarios, the three scenarios used in Bastardi and Shafir (1998) and Tykocinski and Ruffle (2005) were maintained for the second study (course registration, vacation based on exam scores, stereo purchase/warranty). This decision allowed for exact comparison of my results with previous work and gave an established base to which the health values could be compared. These three scenarios also had the highest ranking of non-health relatedness. An equivalent amount of health scenarios were chosen to balance the design. The three health scenarios with the highest ranking of health relatedness were chosen (STD exposure, Flu, and Nutritional Supplements).

EXPERIMENT 2

This study examined the effects of uncertainty, delay option, and health relatedness on decision preference (Bastardi & Shafir, 1998; Tykocinski & Ruffle, 2003). Experiment 2 examined a health condition (health and non-health) to see if any differences in active decision making existed between the two decision domains. Using the delay theory of Tykocinski and Ruffle, Experiment 2 also examined certainty level (certain and uncertain) to see if active decision making was affected by certainty level and how the domain of the decision changed that preference. Delay (no delay, delay, and extended delay) preference was examined to see if people preferred to delay when given the opportunity and how certainty level and health influenced that preference.

METHOD

Participants

177 students from Old Dominion University participated via the Psychology Research Participation System. 122 participants were female and 52 were male. The participants ranged in age from 18-48 years ($M = 21.34$, $SD = 5.14$). Participation was solicited with the opportunity to earn research credits in partial fulfillment of some psychology course requirements. Alternatives to active research participation were available to the students. Constraints to participation were that the students be at least 18 years of age and not have participated in Experiment 1 of this project.

Materials

An informed consent document was presented at the beginning of the on-line pilot. The participant was assured of their anonymity and the option to withdraw if needed from the pilot study. (Appendix D)

The scenarios from Experiment 1 that were identified as most health related (STD exposure, Flu, Salmonella) and most non-health related (course registration, vacation based on exam scores, and stereo purchase/warranty) were modified by adding certainty or uncertainty information. The STD exposure question is shown below in both certain and uncertain forms:

Certain: Your partner tells you that they have possibly been exposed to a sexually transmitted disease. They had been unaware of the exposure but were just notified by a previous partner. Your partner decides to go to the University Health Center to be tested. When they get their results the lab tests are negative.

Uncertain: Your partner tells you that they have possibly been exposed to a sexually transmitted disease. They had been unaware of the exposure but were just notified by a previous partner. Your partner decides to go to the University Health Center to be tested. They do not have their results yet.

Once the scenarios were modified on a certainty level, the delay questions were added. In Tykocinski and Ruffles (2003) modification of Bastardi & Shafir (1998) there are three levels of decision preference (no delay, delay, extended delay). The three levels of question are shown below, also for the STD exposure example:

No Delay: Do you (A) Decide to be tested anyway? Or (B) Decide that no test is necessary?

Delay: Do you (A) Decide to be tested anyway? (B) Decide that no test is necessary? or (C) Wait until tomorrow to make the decision?

Extended Delay: Do you (A) Decide to be tested anyway? (B) Decide that no test is necessary? or (C) Wait until the end of the week to make the decision?

The questions were presented as part of a larger survey. Health and non-health decisions alternated. Each decision scenario was separated by ten questions from the larger survey to provide a distracter. An educational debriefing was presented at the end of the study (Appendix E).

Procedure

Each participant signed into the Old Dominion University Psychological Research Participation system where they were provided with an online link to the experiment. The participant read an information page concerning the research study and their rights as participants. The student provided an identification number rather than a name. Demographic information concerning age and gender was collected. The student was next instructed to click on the link that appeared at the top of a list. The links represented the six between subject variables (certainty x delay). The links were presented in random order to each participant.

The participant was presented with a scenario and decision choices on a single page. The next page contained filler material from a larger survey to serve as a distracter. Health and non-health scenario/decision pages alternated in presentation. At the end of the experiment, an instructional debrief was presented as the last page.

Design

The design of Study Two is a repeated split plot Analysis of Variance (ANOVA). The within subjects variables were health and non-health decisions. The between subject variables were certainty (certain and uncertain) and delay (no delay, delay, extended delay). Type of scenario (health vs. non-health) was manipulated within subjects with participants receiving three scenarios of each type. Certainty (certain vs. uncertain) and

delay choice condition (no delay, delay, one-week delay) were manipulated between

subjects. This resulted in a 2 (health) X 2 (certainty) X 3 (delay choice) split-plot factorial

design. The dependent measure was the proportion of action responses (choosing to

change the status quo) across the three scenarios.

RESULTS

177 participants completed the experiment with no omitted questions. Table 5

contains the means and standard deviations for the health (health, non-health) x certainty

(certain, uncertain) x choice condition (no delay, delay, extended delay) conditions.

Table 5

Means and Standard Deviations for Health, Certainty, and Choice Condition

Health	No delay			Delay			Extended delay		
	Mean	SD	n	Mean	SD	n	Mean	SD	n
certain	0.77	0.30	38	0.73	0.29	28	0.67	0.27	22
uncertain	0.75	0.26	35	0.62	0.25	23	0.79	0.27	31
Non-Health									
certain	0.63	0.24	38	0.44	0.27	28	0.48	0.25	22
uncertain	0.65	0.30	35	0.49	0.26	23	0.54	0.25	31

Table 6 presents the results of the 2 X 2 X 3 split-plot analysis of variance on proportion

of action responses. Results revealed a significant main effect for the type of scenario

(health, non-health). Participants were more likely to take action on the health scenarios

than on the non-health scenarios. Results also revealed a significant main effect of delay

condition. There was also a significant main effect for risk. There were no significant

interactions.

Complex contrasts showed a significant difference between no delay and total delay

(delay and extended delay), with participants showing a greater likelihood of choosing

the action response in the no delay condition (Table 7). There was no significant

difference between the two delay levels (delay an extended delay). Level of certainty

(certainty and uncertainty) made no significant difference to active decision making.

Table 6

Results of the 2 (Health, Non-health) x 2 (Certain, Uncertain) x 3 (No Delay, Delay, Extended Delay) split-plot analysis of variance and effect

Source	df	MS	F	p	Partial η²
Health	1	2.8	39.60***	.000	.19
Certainty	1	0.032	0.43	.516	.00
Choice Condition	2	0.54	7.25***	.001	.08
Health x Certainty	1	0.05	0.72	.396	.00
Health x Choice Condition	2	0.10	1.40	.250	.02
Choice x Certainty	2	0.10	1.30	.282	.28
Health x Choice Condition x Certainty	2	0.09	1.19	.307	.01
Error (within)	171	0.07			
Error (between)	171	0.07			

***$p < .001$.

Table 7

Complex Contrasts of Choice Condition (no delay, delay, extended delay)

Choice Condition	df	Mean Sq.	F	Sig.	Partial η²
No Delay vs. Combined Delay	1	.908	12.214	.001	.066
Delay vs. Extended Delay	1	.132	1.773	.185	.010

DISCUSSION

One of the purposes of this study was to compare the Bastardi and Shafir (1998) and Tykocinski and Ruffle (2003) methodologies and results. The methodology was further altered by the researcher in order to truly balance the design.

Examining the original theories

In their original research on information seeking in decision making, Bastardi and Shafir (1998) proposed that certainty affected active decision making. When faced with an uncertain situation, people pursued information, sometimes non-essential information. The pursuit of that information delayed an active decision. Tykocinski and Ruffle (2003) showed that people often delay making a decision; they just did not assign information seeking behavior as the sole reason for this delay. Indeed, they did not replicate the effect of certainty (certain and uncertain) found in the Bastardi and Shafir experiments. Tykocinski and Ruffle also proposed that given an extended opportunity to delay, even more people will choose to delay the decision.

As in both Bastardi and Shafir (1998) and Tykocinski and Ruffle (2003), the results of Experiment 2 showed people do prefer to delay when given the opportunity. Experiment 2 also replicated the Tykocinski and Ruffle conclusion that delay preference is not affected by certainty levels. Unlike Tykocinski and Ruffle, Experiment 2 did not show that extended delay was any more desirable than delay (in this case, a one day delay).

The additional purpose of this research was to examine health and non-health related decisions to see if there were any differences in participant's delay preference. Health related decisions have been studied from many different perspectives including

individual differences across demographic variables (Boydell, Gladstone, & Volpe, 2006; Gallo & Nghia, 2007; Hale, Grogan, & Willott, 2007; Horodynski et al., 2007). Some researchers have looked at perceived differences in decision making based on the domain of the decision, such as health related problems versus another risk laden domain (finance) (Chapman, 2004; Redelmeier & Tversky 1990, 1992). Weber (2004), for example assessed this with discount utility theory and risk differences. The contribution of this research was to look at health delay behaviors specifically with a cognitive model not previously applied to health.

If we use delay of health screening behaviors as an example, the cost in terms of lives lost and lives impacted is very great. According to the American Cancer Society (2009), "Early detection of cancer through screening has been shown to reduce mortality from cancers of the colon and rectum, breast, and uterine cervix." In this annual report the American Cancer Society also states, "Following the recommendations for cancer screening from the American Cancer Society is an important complement to healthy behaviors that reduces the risk of developing cancer." Despite this many individuals delay in seeking medical attention or following through on screening recommendations from health care professionals. Even in areas that showed improvement of screening behaviors, people have become complacent. For example mammography screening rates have not increased since 2000. The research presented here provides another aspect to delay in health behaviors. It explores a more global perspective, rather than relying so heavily on individual differences. In other words, the preference of humans is to delay any decision if it is possible to do so.

Another aspect of the present research was exploring the generalizability of an existing cognitive model. This has been a serious concern for researches and answers a general call to study decision making across various domains (Koehler & Harvey, 2004). Shafir & LeBoeuf (2002), for instance, believed that research should embrace more real world applications and less artificial constructs. Bar & Huber (2008) believed that cross domain research was vitally important.

Health v non-health

Participants chose not to take action (change status quo) in all behaviors when given the opportunity to delay. However, in health related scenarios more people made active choices than in non-health related scenarios. It was the opportunity to delay in general, rather than the opportunity to extend delay that was significantly different when examining active decision making.

Limitations and Possible Explanations

A possible reason for the preference against active decisions (those that change status quo) between health and non-health related decisions was the risk involved in each decision. The health scenarios presented examined STD exposure, flu, and salmonella contamination. All of these were highly related as health scenarios but were also the most risky or threatening situations. Flu, because of its pandemic associations, has moved from an illness that makes you ill for a brief period of time, to something that can kill people. Historic statistics of recent US flu epidemics probably wouldn't lead to that association. The bombardment of mass media attention to the danger of flu, specifically H1N1 may have changed individual assessment of risk. STD exposure can lead to serious if not always fatal medical complications. The salmonella and other bacterial contamination

that was prevalent in the media at the time of this study resulted in a number of deaths in North America. Clearly, these situations differed in level of threat from registering for a college course, planning a vacation, or purchasing stereo equipment. Although the vacation and the stereo scenarios included financial decisions, the money to risk ratio may have differed significantly from the health to risk ratio in the STD exposure, flu, and salmonella contamination scenarios.

Extended delay was not preferred to delay in health related scenario decisions. Although extended delay had a significant effect in the Tykocinski and Ruffle (studies) it was not significant here although it approached significance. Two out of the three health scenarios required immediate decisions. Putting off flu and salmonella exposure by a week may have very grave consequences or make the whole issue moot. The extended delay was not as attractive in these cases as a shorter delay.

The certain health conditions were always presented with positive outcomes as the certainty. It may be that certain conditions with negative outcomes, for example a positive test for an STD, may generate different decision choices. The positive or negative knowledge in the certain conditions should be explored further.

Future research

In order to extend this research of delay in health related decision making, the variable of risk must be assessed in the scenarios and balanced across all domains. Future planned studies will extend both the health and non-health related scenarios so a wider level of risk is represented. The differences in decision domain (health and non-health) will be examined when the risk level is balanced between the two. This will allow us to see if there is a difference in delay preference regardless of risk assessment.

Threat communication and message framing will also be examined. When the risk/threat remains constant, how the message is framed may impact delay preference. Manipulating the message and assessing risk assessment and delay preference will assist in exploring the public's delay in health related decisions, despite mass media campaigns to alter the delaying behavior.

Delay in health decision making, as previously outlined, has grave consequences. The research presented here examines delay preference based on an existing cognitive model. Although health related decision making has been examined using different decision making models, such as discount utility theory (Weber, 2004), it has not been previously examined using this kind of delay paradigm. A more complete picture of all aspects relating to the preference of delay in decision making will save the general public money, improve quality of life for survivors, and improve disease specific mortality rates.

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APPENDIX A

Original Scenario Questions

The Bastardi and Shafir (1998) the Tykocinski and Ruffle (2003) scenario questions including percentages obtained.

Course Registration

Certain version (no delay): You are considering registering for a course in your major that has very interesting subject matter and will not be offered again before you graduate. While the course is reputed to be taught by an excellent professor, you have just discovered that he will be on leave and that a less popular professor will be teaching the course. Do you: A) Decide to register for the course? [82%] or B) Decide not to register for the course? [18%]

Uncertain version (delay): You are considering registering for a course in you major that ha very interesting subject matter and will not be offered again before you graduate. While the course is reputed to be taught by an excellent professor, you have just discovered that he may be on leave. It will not be known until tomorrow if the regular professor will teach the course or if a less popular professor will. Do you a) Decide to register for the course? [42%] B) Decide not to register for the course [2%] c) Wait until tomorrow (after finding out if the regular professor will be teaching) to decide about registering for the course. [56%]

Uncertain version (second part): If you chose (c) in the question above, please answer the following: It is the next day, and you find out that the less popular professor will be

teaching the course. Do you A) Decide to register for the course? [29%] B) Decide not to register for the course? [27%]

*Tykocinski and Ruffle(2003)

Course Registration

Certain (delay): You are considering registering for a course in your major that has very interesting subject matter and will not be offered again before you graduate. While the course is reputed to be taught by an excellent professor, you have just discovered that he will be on leave and that a less popular professor will be teaching the course. Do you: A) Decide to register for the course? [70.37%] or B) Decide not to register for the course? [12.96%] Or C) wait until tomorrow to decide about registering for the course [16.67%]?

Certain (extended delay): You are considering registering for a course in your major that has very interesting subject matter and will not be offered again before you graduate. While the course is reputed to be taught by an excellent professor, you have just discovered that he will be on leave and that a less popular professor will be teaching the course. Do you: A) Decide to register for the course? [45.45%] or B) Decide not to register for the course? [1.82%] or C) wait another week (until the end of the registration period) to decide about registering for the course [45.46% decided to register and 7.27% decided not to register after one week].

Uncertain (extended delay): You are considering registering for a course in you major that ha very interesting subject matter and will not be offered again before you graduate. While the course is reputed to be taught by an excellent professor, you have just discovered that he may be on leave. It will not be known until tomorrow if the regular

professor will teach the course or if a less popular professor will. Do you A) Decide to register for the course? [38.88%] B) Decide not to register for the course [0%] C) Wait another week (after finding out if the regular professor will be teaching) to decide about registering for the course. [27.78% decided to register 33.33% decided not to register after one week]

APPENDIX B

Experimental Questions

Scenario - Blood Donation

Certain (no delay) - Because of an ongoing military deployment, our area is suffering from a severe shortage of blood donors. The University's Greek societies are sponsoring a ten day blood drive event. The Red Cross is particularly interested in obtaining blood type O. You know that your blood type is not O. Do you (A) Donate anyway? (B) Decide not to donate?

Uncertain (no delay) – Because of an ongoing military deployment, our area is suffering from a severe shortage of blood donors. The University's Greek societies are sponsoring a ten day blood drive event. The Red Cross is particularly interested in obtaining blood type O. You don't know what your blood type is. Do you (A) Donate anyway? (B) Decide not to donate?

Uncertain (delay) – Because of an ongoing military deployment, our area is suffering from a severe shortage of blood donors. The University's Greek societies are sponsoring a ten day blood drive event. The Red Cross is particularly interested in obtaining blood type O. You don't know what your blood type is. Do you (A) Donate anyway? (B) Decide not to donate? (C) Wait until tomorrow to decide?

Certain (extended delay) - Because of an ongoing military deployment, our area is suffering from a severe shortage of blood donors. The University's Greek societies are sponsoring a ten day blood drive event. The Red Cross is particularly interested in obtaining blood type O. You know that your blood type is not O. Do you (A) Donate anyway? (B) Decide not to donate? (C) Wait until tomorrow to decide?

Certain (extended delay) - Because of an ongoing military deployment, our area is suffering from a severe shortage of blood donors. The University's Greek societies are sponsoring a ten day blood drive event. The Red Cross is particularly interested in obtaining blood type O. You know that your blood type is not O. Do you (A) Donate anyway? (B) Decide not to donate? (C) Wait until the end of the week to decide?

Uncertain (extended) - Because of an ongoing military deployment; our area is suffering from a severe shortage of blood donors. The University's Greek societies are sponsoring a ten day blood drive event. The Red Cross is particularly interested in obtaining blood type O. You don't know what your blood type is. Do you (A) Donate anyway? (B) Decide not to? (C) Wait until the end of the week?

Scenario – Flu Shot

Certain (no delay) – The University has issued a health alert. There is a flu strain circulating along with several non-treatable flu-like viruses. The only way to know which you have is to be tested at the University Health Center. You don't feel well. Your roommate has similar symptoms and goes to be tested. She does not have the real flu and is given no prescription. Do you (A) Go to be tested anyway? (B) Decide not to be tested?

Uncertain (no delay) - The University has issued a health alert. There is a flu strain circulating long with several non-treatable flu-like viruses. The only way to know which you have is to be tested at the University Health Center. You don't feel well. Your roommate has similar symptoms and goes to be tested. She doesn't have her results when

she gets back to the dorm. Do you (A) Go to be tested anyway? (B) Decide not to be tested?

Uncertain (delay) The University has issued a health alert. There is a flu strain circulating long with several non-treatable flu-like viruses. The only way to know which you have is to be tested at the University Health Center. You don't feel well. Your roommate has similar symptoms and goes to be tested. She doesn't have her results when she gets back to the dorm. Do you (A) Go to be tested anyway? (B) Decide not to be tested? (C) Wait to make your decision?

Certain (delay) – The University has issued a health alert. There is a flu strain circulating long with several non-treatable flu-like viruses. The only way to know which you have is to be tested at the University Health Center. You don't feel well. Your roommate has similar symptoms and goes to be tested. She does not have the real flu and is given no prescription. Do you (A) Go to be tested anyway? (B) Decide not to be tested? (C) Wait to make your decision?

Certain (extended delay) – The University has issued a health alert. There is a flu strain circulating long with several non-treatable flu-like viruses. The only way to know which you have is to be tested at the University Health Center. You don't feel well. Your roommate has similar symptoms and goes to be tested. She does not have the real flu and is given no prescription. Do you (A) Go to be tested anyway? (B) Decide not to be tested? (C) Wait until the end of the week to make your decision?

Uncertain (extended delay) – The University has issued a health alert. There is a flu strain circulating long with several non-treatable flu-like viruses. The only way to know which you have is to be tested at the University Health Center. You don't feel well. Your

roommate has similar symptoms and goes to be tested. She doesn't have her results when she gets back to the dorm. Do you (A) Go to be tested anyway? (B) Decide not to be tested? (C) Wait until the end of the week to make your decision?

Scenario - Health Insurance

Certain (no delay) – You have gotten your first job after graduation. The company you are working for has a new health plan that you find very attractive overall. The company has been looking at bids from two different pharmaceutical plans. One plan would allow all prescriptions to cost no more than $10. One plan would allow generic drugs to cost $10 and brand name drugs to cost $40. The company chooses the second plan. Do you (A) sign-up for the plan? Or (B) Decline the coverage.

Uncertain (no delay) - You have gotten your first job after graduation. The company you are working for has a new health plan that you find very attractive overall. The company has been looking at bids from two different pharmaceutical plans. One plan would allow all prescriptions to cost no more than $10. One plan would allow generic drugs to cost $10 and brand name drugs to cost $40. The company still has not chosen which plan to accept. Do you (A) sign-up for the plan? (B) Decline the coverage?

Uncertain (delay) – You have gotten your first job after graduation. The company you are working for has a new health plan that you find very attractive overall. The company has been looking at bids from two different pharmaceutical plans. One plan would allow all prescriptions to cost no more than $10. One plan would allow generic drugs to cost $10 and brand name drugs to cost $40. The company still has not chosen which plan to accept. Do you (A) sign-up for the plan? (B) Decline the coverage? (C) Wait to decide?

Certain (delay) – You have gotten your first job after graduation. The company you are working for has a new health plan that you find very attractive overall. The company has been looking at bids from two different pharmaceutical plans. One plan would allow all prescriptions to cost no more than $10. One plan would allow generic drugs to cost $10 and brand name drugs to cost $40. The company chooses the second plan. Do you (A) sign-up for the plan? Or (B) Decline the coverage. (C) Make your decision tomorrow?

Certain (extended delay) – You have gotten your first job after graduation. The company you are working for has a new health plan that you find very attractive overall. The company has been looking at bids from two different pharmaceutical plans. One plan would allow all prescriptions to cost no more than $10. One plan would allow generic drugs to cost $10 and brand name drugs to cost $40. The company chooses the second plan. Do you (A) sign-up for the plan? Or (B) Decline the coverage. (C) Make your decision at the end of the week when your orientation is over?

Uncertain (extended delay) – You have gotten your first job after graduation. The company you are working for has a new health plan that you find very attractive overall. The company has been looking at bids from two different pharmaceutical plans. One plan would allow all prescriptions to cost no more than $10. One plan would allow generic drugs to cost $10 and brand name drugs to cost $40. The company still has not chosen which plan to accept. Do you (A) sign-up for the plan? (B) Decline the coverage. (C) Make your decision at the end of the week when your orientation is over?

Inoculations

Certain (no delay) – The University is offering reduced price vaccinations for the flu season. They have been in negotiations with two separate vendors. The price for one vaccination is $15 dollars and it will be available in sufficient quantities at the beginning of the flu season. The other vendor could offer $7.50 but in limited quantities and it could not be guaranteed to be available in the preferred time frame. The University Health Service decides that it is preferable to have a guaranteed supply so they opt for the $15 vaccine. (A) Do you sign-up for the vaccine? Or (B) Do you decide not to have the inoculation?

Uncertain (no delay) - The University is offering reduced price vaccinations for the flu season. They have been in negotiations with two separate vendors. The price for one vaccination is $15 dollars and it will be available in sufficient quantities at the beginning of the flu season. The other vendor could offer $7.50 but in limited quantities and it could not be guaranteed to be available in the preferred time frame. The University Health Service has not made a decision but is offering early sign-ups. (A) Do you sign-up for the vaccine? (B) Do you decide not to have the inoculation?

Uncertain (delay) - The University is offering reduced price vaccinations for the flu season. They have been in negotiations with two separate vendors. The price for one vaccination is $15 dollars and it will be available in sufficient quantities at the beginning of the flu season. The other vendor could offer $7.50 but in limited quantities and it could not be guaranteed to be available in the preferred time frame. The University Health Service has not made a decision but is offering early sign-ups. (A) Do you sign-up for the vaccine? (B) Do you decide not to have the inoculation? (C) Wait to decide?

Certain (delay) – The University is offering reduced price vaccinations for the flu season. They have been in negotiations with two separate vendors. The price for one vaccination is $15 dollars and it will be available in sufficient quantities at the beginning of the flu season. The other vendor could offer $7.50 but in limited quantities and it could not be guaranteed to be available in the preferred time frame. The University Health Service decides that it is preferable to have a guaranteed supply so they opt for the $15 vaccine. (A) Do you sign-up for the vaccine? (B) Do you decide not to have the inoculation? Or (C) Wait until tomorrow to decide?

Certain (extended delay) – The University is offering reduced price vaccinations for the flu season. They have been in negotiations with two separate vendors. The price for one vaccination is $15 dollars and it will be available in sufficient quantities at the beginning of the flu season. The other vendor could offer $7.50 but in limited quantities and it could not be guaranteed to be available in the preferred time frame. The University Health Service decides that it is preferable to have a guaranteed supply so they opt for the $15 vaccine. (A) Do you sign-up for the vaccine? (B) Do you decide not to have the inoculation? Or (C) Wait until the end of the week to decide?

Uncertain (extended delay) – The University is offering reduced price vaccinations for the flu season. They have been in negotiations with two separate vendors. The price for one vaccination is $15 dollars and it will be available in sufficient quantities at the beginning of the flu season. The other vendor could offer $7.50 but in limited quantities and it could not be guaranteed to be available in the preferred time frame. The University Health Service has not made a decision but is offering early sign-ups. (A) Do you sign-up

for the vaccine? (B) Do you decide not to have the inoculation? Or (C) Wait until the end of the week to decide?

Scenario – STD exposure

Certain (no delay) – Your partner tells you that they have possibly been exposed to a sexually transmitted disease. They had been unaware of the exposure but were just notified by a previous partner. Your partner decides to go to the University Health Center to be tested. When they get their results the lab tests are negative. Do you (A) Decide to be tested anyway? Or (B) Decide that no test is necessary since your partner's results were negative?

Uncertain (no delay) - Your partner tells you that they have possibly been exposed to a sexually transmitted disease. They had been unaware of the exposure but were just notified by a previous partner. Your partner decides to go to the University Health Center to be tested. They do not have their results yet. Do you (A) Decide to be tested anyway? (B) Decide that no test is necessary?

Uncertain (delay) – Your partner tells you that they have possibly been exposed to a sexually transmitted disease. They had been unaware of the exposure but were just notified by a previous partner. Your partner decides to go to the University Health Center to be tested. They do not have their results yet. Do you (A) Decide to be tested anyway? (B) Decide that no test is necessary? (C) Wait to decide?

Certain (delay) – Your partner tells you that they have possibly been exposed to a sexually transmitted disease. They had been unaware of the exposure but were just notified by a previous partner. Your partner decides to go to the University Health Center

to be tested. When they get their results the lab tests are negative. Do you (A) Decide to be tested anyway? (B) Decide that no test is necessary? or (C) Wait until tomorrow to make the decision?

Certain (extended delay) – Your partner tells you that they have possibly been exposed to a sexually transmitted disease. They had been unaware of the exposure but were just notified by a previous partner. Your partner decides to go to the University Health Center to be tested. When they get their results the lab tests are negative. Do you (A) Decide to be tested anyway? (B) Decide that no test is necessary? or (C) Wait until the end of the week to make the decision?

Uncertain (extended delay) - Your partner tells you that they have possibly been exposed to a sexually transmitted disease. They had been unaware of the exposure but were just notified by a previous partner. Your partner decides to go to the University Health Center to be tested. They do not have their results yet. Do you (A) Decide to be tested anyway? (B) Decide that no test is necessary? (C) Wait until the end of the week to make the decision?

Scenario – Supplements

Certain (no delay) - According to the University Health Services, the FDA has issued a warning on the dietary supplements Total Body Formula and Total Body Mega Formula. You are currently taking one of these supplements. You feel fine. Do you (A) Decide to stop taking the supplement? (B) Decide to keep taking the supplement?

Uncertain (no delay) - According to the University Health Services, the FDA has issued a warning on the dietary supplements Total Body Formula and Total Body Mega Formula. You are currently taking one of these supplements. You don't remember whether you

were taking those supplements. Do you (A) Decide to stop taking the supplements? (B) Decide to keep taking the supplements?

Uncertain (delay) - According to the University Health Services, the FDA has issued a warning on the dietary supplements Total Body Formula and Total Body Mega Formula. You are currently taking one of these supplements. You don't remember whether you were taking those supplements. Do you (A) Decide to stop taking the supplements? (B) Decide to keep taking the supplements? (C) Wait until tomorrow to decide?

Certain (delay) - According to the University Health Services, the FDA has issued a warning on the dietary supplements Total Body Formula and Total Body Mega Formula. You are currently taking one of these supplements. You feel fine. Do you (A) Decide to stop taking the supplements? (B) Decide to keep taking the supplements? (C) Wait until tomorrow to decide?

Certain (extended delay) - According to the University Health Services, the FDA has issued a warning on the dietary supplements Total Body Formula and Total Body Mega Formula. You are currently taking one of these supplements. You feel fine. Do you (A) Decide to stop taking the supplements? (B) Decide to keep taking the supplements? (C) Wait until next week to decide?

Uncertain (extended delay) - According to the University Health Services, the FDA has issued a warning on the dietary supplements Total Body Formula and Total Body Mega Formula. You don't remember whether you are taking one of the supplements. Do you (A) Decide to stop taking the supplements? (B) Decide to keep taking the supplements (C) Wait until next week to decide?

Scenario – Staph Infection

Certain (no delay) - Staph infections are on the rise. One possible source of staph infection is public fitness equipment. The University has opened a new fitness center. You are considering joining. There has been a reported staph infection at the facility. Do you (A) Decide to join? (B) Decide not to join?

Uncertain (no delay) - Staph infections are on the rise. One possible source of staph infection is public fitness equipment. The University has opened a new fitness center. You are considering joining. You are concerned about the possibility of a staph infection. Do you (A) Decide to join? (B) Decide not to join?

Uncertain (delay) - Staph infections are on the rise. One possible source of staph infection is public fitness equipment. The University has opened a new fitness center. You are considering joining. You are concerned about the possibility of a staph infection. Do you (A) Decide to join? (B) Decide not to join? (C) Wait until tomorrow to decide?

Certain (delay) - Staph infections are on the rise. One possible source of staph infection is public fitness equipment. The University has opened a new fitness center. You are considering joining. You are concerned about the possibility of a staph infection. There has been a reported staph infection at the facility. Do you (A) Decide to join? (B) Decide not to join? (C) Wait until tomorrow to decide?

Certain (extended delay) - Staph infections are on the rise. One possible source of staph infection is public fitness equipment. The University has opened a new fitness center. You are considering joining. There has been a reported staph infection at the facility. Do you (A) Decide to join? (B) Decide not to join? (C) Wait until next week to decide?

Uncertain (extended delay) - Staph infections are on the rise. One possible source of staph infection is public fitness equipment. The University has opened a new fitness center. You are considering joining. You are concerned about the possibility of a staph infection. Do you (A) Decide to join? (B) Decide not to join? (C) Wait until next week to join?

Scenario – Salmonella Contamination

Certain (no delay) - Recently, there has been news coverage of an extensive salmonella outbreak concerning peanut butter products. You have several boxes of differing snacks that contain peanut butter. Do you (A) Decide to discard the remaining snacks? (B) Decide to keep the remaining snacks?

Uncertain (no delay) - Recently, there has been news coverage of an extensive salmonella outbreak concerning peanut butter products. You have several different snacks that contain peanut butter but since they aren't in their original boxes you aren't sure of the brand name. Do you (A) Decide to discard the remaining snacks? (B) Decide to keep the remaining snacks?

Uncertain (delay) - Recently, there has been news coverage of an extensive salmonella outbreak concerning peanut butter products. You have several different snacks that contain peanut butter but since they aren't in their original boxes you aren't sure of the brand name. Do you (A) Decide to discard the remaining snacks? (B) Decide to keep the remaining snacks? (C) Wait until tomorrow to decide?

Certain (delay) - Recently, there has been news coverage of an extensive salmonella outbreak concerning peanut butter products. You have several boxes of differing snacks

that contain peanut butter. Do you (A) Decide to discard the remaining snacks? (B) Decide to keep the remaining snacks? (C) Wait until tomorrow to decide?

Certain (extended delay) - Recently, there has been news coverage of an extensive salmonella outbreak concerning peanut butter products. You have several boxes of differing snacks that contain peanut butter. Do you (A) Decide to discard the remaining snacks? (B) Decide to keep the remaining snacks? (C) Wait until next week to decide?

Uncertain (extended delay) - Recently, there has been news coverage of an extensive salmonella outbreak concerning peanut butter products. You have several different snacks that contain peanut butter but since they aren't in their original boxes you aren't sure of the brand name. Do you (A) Decide to discard the remaining snacks? (B) Decide to keep the remaining snacks? (C) Wait until next week to decide?

Non-Health Scenario Questions

Course Registration Scenario from Bastardi and Shafir (1998) and Tykocinski and Ruffle (2003)

Question 1: Certain (no delay) - You are considering registering for a course in your major that has very interesting subject matter and will not be offered again before you graduate. While the course is reputed to be taught by an excellent professor, you have just discovered that he will be on leave and that a less popular professor will be teaching the course. Do you: A) Decide to register for the course or B) Decide not to register for the course?

Question 2: Uncertain (no delay) - You are considering registering for a course in you major that has very interesting subject matter and will not be offered again before you graduate. While the course is reputed to be taught by an excellent professor, you have just discovered that he may be on leave. It will not be known until tomorrow if the regular professor will teach the course or if a less popular professor will. Do you A) Decide to register for the course? B) Decide not to register for the course?

Question 3: Uncertain (delay) - You are considering registering for a course in you major that has very interesting subject matter and will not be offered again before you graduate. While the course is reputed to be taught by an excellent professor, you have just discovered that he may be on leave. It will not be known until tomorrow if the regular professor will teach the course or if a less popular professor will. Do you A) Decide to register for the course? B) Decide not to register for the course? C) Wait until tomorrow to decide about registering for the course?

Question 4: Certain (delay) - You are considering registering for a course in your major that has very interesting subject matter and will not be offered again before you graduate. While the course is reputed to be taught by an excellent professor, you have just discovered that he will be on leave and that a less popular professor will be teaching the course. Do you: A) Decide to register for the course ? B) Decide not to register for the course? or C) wait until tomorrow to decide about registering for the course?

Question 5: Certain (extended delay) - You are considering registering for a course in your major that has very interesting subject matter and will not be offered again before you graduate. While the course is reputed to be taught by an excellent professor, you

have just discovered that he will be on leave and that a less popular professor will be teaching the course. Do you: A) Decide to register for the course? B) Decide not to register for the course? or C) Wait another week to decide about registering for the course?

Question 6: Uncertain (extended delay) - You are considering registering for a course in you major that ha very interesting subject matter and will not be offered again before you graduate. While the course is reputed to be taught by an excellent professor, you have just discovered that he may be on leave. It will not be known until tomorrow if the regular professor will teach the course or if a less popular professor will. Do you A) Decide to register for the course? B) Decide not to register for the course? or C) Wait another week to decide about registering for the course?

Scenario - Stereo [Based on Bastardi and Shafir (1998)]

Question 1: Certain (no delay) - For some time, you have considered adding a compact disc (CD) player to your stereo system. You now see an ad for a week-long sale offering a very good CD player for only $120, 50% off the retail price. Recently, however, your amplifier broke. You learn that your warranty has expired and you have to pay $90 for repairs. Do you A) Decide to buy the CD player during the week sale? B) Decide not to buy the CD player during the week sale?

Question 2: Uncertain (no delay) - For some time, you have considered adding a compact disc (CD) player to your stereo system. You now see an ad for a week-long sale

offering a very good CD player for only $120, 50% off the retail price. Recently, however, your amplifier broke. The repair shop is verifying your warranty. If it has expired you will have to pay $90 for repairs. Do you A) Decide to buy the CD player during the week sale? B) Decide not to buy the CD player during the week sale?

Question 3: Uncertain (delay) - For some time, you have considered adding a compact disc (CD) player to your stereo system. You now see an ad for a week-long sale offering a very good CD player for only $120, 50% off the retail price. Recently, however, your amplifier broke. The repair shop is verifying your warranty. If it has expired you will have to pay $90 for repairs. Do you A) Decide to buy the CD player during the week sale? B) Decide not to buy the CD player during the week sale? C) Decide to wait to buy the CD player?

Question 4: Certain (delay) - For some time, you have considered adding a compact disc (CD) player to your stereo system. You now see an ad for a week-long sale offering a very good CD player for only $120, 50% off the retail price. Recently, however, your amplifier broke. You learn that your warranty has expired and you have to pay $90 for repairs. Do you A) Decide to buy the CD player during the week sale B) Decide not to buy the CD player during the week sale c) Wait before deciding about the CD player?

Question 5: Certain (extended delay) - For some time, you have considered adding a compact disc (CD) player to your stereo system. You now see an ad for a week-long sale offering a very good CD player for only $120, 50% off the retail price. Recently, however, your amplifier broke. You learn that your warranty has expired and you have to pay $90 for repairs. Do you A) Decide to buy the CD player during the week sale? B)

Decide not to buy the CD player during the week sale? C) Wait until the end of the week before deciding about the CD player?

Question 6: Uncertain (extended delay) - For some time, you have considered adding a compact disc (CD) player to your stereo system. You now see an ad for a week-long sale offering a very good CD player for only $120, 50% off the retail price. Recently, however, your amplifier broke. The repair shop is verifying your warranty. If it has expired you will have to pay $90 for repairs. Do you A) Decide to buy the CD player during the week sale? B) Decide not to buy the CD player during the week sale? C) Wait until the end of the week before deciding about the CD player?

Scenario – Bahamas [based on Bastardi and Shafir (1998)]

Question 1: Certain (delay) - You have the opportunity to go to the Bahamas after this semester is over. You thought that you'd be going with your roommate. You just found out that your roommate gave their ticket to their friend instead. Do you A) Decide to go B) Decide not to go?

Question 2: Uncertain (no delay) - You have the opportunity to go to the Bahamas after this semester is over. You thought that you'd be going with your roommate. You just found out that you may be going with your roommate's friend instead. Do you A) Decide to go? B) Decide not to go?

Question 3: Uncertain (delay) - You have the opportunity to go to the Bahamas after this semester is over. You thought that you'd be going with your roommate. You just found out that you may be going with your roommate's friend instead. Do you A) Decide to go B) Decide not to go C) Wait until tomorrow to decide?

Question 4: Certain (delay) - You have the opportunity to go to the Bahamas after this semester is over. You thought that you'd be going with your roommate. You just found out that your roommate gave their ticket to their friend instead. Do you A) Decide to go? B) Decide not to go? C) Wait until tomorrow to decide?

Question 5: Certain (extended delay) -You have the opportunity to go to the Bahamas after this semester is over. You thought that you'd be going with your roommate. You just found out that your roommate gave their ticket to their friend instead. Do you A) Decide to go? B) Decide not to go? C) Wait until the end of the week to decide?

Question 6: Uncertain (extended delay) - You have the opportunity to go to the Bahamas after this semester is over. You thought that you'd be going with your roommate. You just found out that your roommate gave their ticket to their friend instead. Do you A) Decide to go? B) Decide not to go C) Wait until the end of the week to decide?

Scenario – Dog-sitting (original)

Question 1: Certain (no delay) - Some friends have asked you to house sit for them over fall break. They had planned on taking their three dogs with them on the camping trip. The dogs need lots of exercise every day. Unfortunately the campground won't allow them to bring pets, so you will have to dog-sit as well. Do you A) Decide to house/dog-sit? B) Decide not to house/dog-sit?

Question 2: Uncertain (no delay) - Some friends have asked you to house sit for them over fall break. They had planned on taking their three dogs with them on the camping trip. The dogs need lots of exercise every day. They don't know for sure whether the campground will allow them to bring pets, so you may have to dog-sit as well. Do you A) Decide to house/dog-sit? A) Decide not to house/dog-set?

Question 3: Uncertain (delay) - Some friends have asked you to house sit for them over fall break. They had planned on taking their three dogs with them on the camping trip. The dogs need lots of exercise every day. They don't know for sure whether the campground will allow them to bring pets, so you may have to dog-sit as well. Do you A) Decide to house/dog-sit? B) Decide not to house/dog-set? C) Wait to decide?

Question 4: Certain (delay) - Some friends have asked you to house sit for them over fall break. They had planned on taking their three dogs with them on the camping trip. The dogs need lots of exercise every day. Unfortunately the campground won't allow them to bring pets, so you will have to dog-sit as well. Do you A) Decide to house/dog-sit? B) Decide not to house/dog-sit? C) Wait to decide?

Question 5: Certain (extended delay) - Some friends have asked you to house sit for them over fall break. They had planned on taking their three dogs with them on the camping trip. The dogs need lots of exercise every day. Unfortunately the campground won't allow them to bring pets, so you will have to dog-sit as well. Do you A) Decide to house/dog-sit? B) Decide not to house/dog-sit? C) Wait until the end of the week to decide?

Question 6: Uncertain (extended delay) - Some friends have asked you to house sit for them over fall break. They had planned on taking their three dogs with them on the

camping trip. The dogs need lots of exercise every day. They don't know for sure whether the campground will allow them to bring pets, so you may have to dog-sit as well. Do you A) Decide to house/dog-sit B) Decide not to house/dog-set? C) Wait until the end of the week to decide?

APPENDIX C

Participation Information

PROJECT Carnival. Experiment 1

Agreement to Participate in Research
Old Dominion University
College of Sciences
Department of Psychology

Introduction: The purposes of this form are to give you information about participation

in PROJECT Carnival

Responsible Project Investigator:

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College of Sciences
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Co-Investigator

Ann Lassiter Edwards
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Old Dominion University
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Description of Research: This experiment studies choices and decisions.
Approximately 150 people will participate in this study. Should you decide to participate
you will be asked to answer questions presented via a computer over the next ½ (.5) hour.
The questions will ask you about choices you would make in different situations.
Afterwards you will be debriefed by the researchers.
Exclusionary Criteria: You must be at least 18 years of age.

Confidentiality: All information obtained about you in this study is strictly confidential
unless disclosure is required by law. The results of this study may be used in reports,
presentations and publications. All results will be reported in the aggregate, and the

researcher will not identify you. Registration for the experiment required a SONA participation number. This number, not your name, will be used to organize all your responses. Therefore, your identity can never be associated with your questionnaire responses or performance data. Your responses will be completely anonymous, in accordance and observation with ethical guidelines established by the American Psychological Association (A.P.A.)

Withdrawal Privilege: It is OK for you to say NO. Even if you say YES now, you are free to say NO later, and walk away or withdraw from the study at any time. Your decision will not affect your relationship with Old Dominion University, or otherwise cause a loss of benefits to which you might otherwise be entitled. Also, the investigators reserve the right to withdraw your participation at any time throughout this investigation.

APPENDIX D

Participation Information

PROJECT Carnival. Experiment 2

Agreement to Participate in Research
Old Dominion University
College of Sciences
Department of Psychology

Introduction: The purposes of this form are to give you information about participation in PROJECT Carnival.
Responsible Project Investigator:

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Co-Investigator

Ann Lassiter Edwards
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Old Dominion University
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Description of Research: This experiment studies choices and decisions. Approximately 150 people will participate in this study. Should you decide to participate you will be asked to answer questions presented via a computer over the next ½ (.5) hour. The questions will ask you about choices you would make in different situations. Afterwards you will be debriefed by the researchers and before leaving you will have an opportunity to ask any questions you may have about this experiment. If you say YES, then your participation will last for approximately ½ (.5) hour.
Exclusionary Criteria: You must be at least 18 years of age. You must not have previously participated in PROJECT Carnival Study One.
Confidentiality: All information obtained about you in this study is strictly confidential unless disclosure is required by law. The results of this study may be used in reports, presentations and publications. All results will be reported in the aggregate, and the researcher will not identify you. Registration for the experiment required a SONA

participation number. This number, not your name, will be used to organize all your responses. Therefore, your identity can never be associated with your questionnaire responses or performance data. Your responses will be completely anonymous, in accordance and observation with ethical guidelines established by the American Psychological Association (APA).

Withdrawal Privilege: It is OK for you to say NO. Even if you say YES now, you are free to say NO later, and walk away or withdraw from the study at any time. Your decision will not affect your relationship with Old Dominion University, or otherwise cause a loss of benefits to which you might otherwise be entitled. Also, the investigators reserve the right to withdraw your participation at any time throughout this investigation.

Appendix E

Debrief for Project Carnival

The purpose of this experiment was to examine whether or not people choose to delay in decision making. Our premise is that when people feel like there is a missing piece of information or that they are uncertain about their choices that individuals will delay a decision. The delay can have many reasons. Sometimes people go looking for information. Finding additional information regarding a decision makes people more confident. Sometimes that information is not even really necessary. The individual can make the decision without it. In some situations, the new information changes the decision in unexpected ways. Information seeking is not the only reason, however, that people delay making a decision. Sometimes they just want time to think things over, weighing choice and outcomes. In other situations, people think that the decision will resolve itself without the individual ever having to become involved.

We wanted to see if this was true. Do people delay when the situation is uncertain? So you answered some questions that allowed us to look at how you made choices. We plan to analyze the data to see how many people delayed or made a decision to act.

The second purpose of this experiment was to take the idea of delaying and apply it to health related decisions. One research question explores whether health decisions involve the kind of uncertainty that make people delay even more. Some of the questions that you answered involved health. When the data is analyzed we will see if more participants chose to delay on health questions than non-health questions.

The study of health related decision making is very important. Decisions about lifestyle issues such as diet and exercise are really health decisions. Lifestyle choices as well as more obviously medical choices like seeking a doctor's care when you notice a symptom or change in yourself are significant in terms of your well-being and lifespan. Doing research that examines choices and decisions will allow healthcare professionals to present information in such a way that people choose to make an active decision. Also the general public should be made aware of the importance of making active decisions regarding health rather than delaying.

Do you have any questions? If you do, please contact Dr. Ivan Ash ph: 757.683.4446 Or email: iash@odu.edu or Ann Edwards email: aedwa013@odu.edu

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EDUCATION:

2006	B.S. Psychology May 2006 Old Dominion University Norfolk, Virginia 4.0 Overall GPA; 4.0 Psychology GPA
1986	B.A. English January 1986 Christopher Newport College Newport News, Virginia

EXPERIENCE:

Current Research

Masters Thesis

> I am examining differences in decision making delay based on domain of the
> decision. Specifically, I am examining decision delay in health related decisions
> versus non-related decisions. I am hoping that my research will provide an
> additional factor to evaluate delay, that of decision domain. This is exploratory
> research at the moment.

First Year Project

> Ash, Ivan K. (Principle Investigator) & Edwards, A. L. (2008). A framework for a
>   meta-analysis on novice-expert differences in medical decision making.

Teaching

> Preparing Future Faculty participant 2007-to present
> Teaching Assistant: Introduction to Psychology Fall 2009
> Teaching Assistant: Health Psychology Fall 2009