January 2007

Indecisiveness and response to risk in deciding when to decide

Andrea L. Patalano
Wesleyan University, apatalano@wesleyan.edu

Steven M. Wengrovitz
Wesleyan University

Recommended Citation
Patalano, A. L., & Wengrovitz, S. M. (2007). Indecisiveness and response to risk in deciding when to decide. *Journal of Behavioral Decision Making, 20,* 405-424.

Journal of Behavioral Decision Making
J. Behav. Dec. Making, **20**: 405–424 (2007)
Published online 2 February 2007 in Wiley InterScience
(www.interscience.wiley.com) **DOI**: 10.1002/bdm.560

Indecisiveness and Response to Risk in Deciding When to Decide

ANDREA L. PATALANO* and STEVEN M. WENGROVITZ
Wesleyan University, USA

ABSTRACT

When making decisions, people must determine not only what to choose but also when to choose. Do individuals modulate behavior in response to potential risks associated with delay in determining when to choose? The present work provides evidence that at least one group of people—indecisive individuals—do not. Two process-tracing studies simulated a 5-day college-course selection period in which new course alternatives appeared on each day. In a risk-free condition, no risks were associated with delay of decision making over the days. In a risk condition, each day of delay was associated with a risk of loss of existing course alternatives. Unlike decisive individuals, who modulated days of deliberation in response to presence versus absence of risk, indecisive individuals did not. The results illustrate not that indecisive individuals show uniformly increased delay relative to others, but rather that their delay behavior may be more striking in its unresponsiveness to risk. Copyright © 2007 John Wiley & Sons, Ltd.

KEY WORDS indecisiveness; choice deferral; individual differences; process-tracing

INTRODUCTION

The question of how choices are made has received much more attention than that of *when* they are made, yet the latter is a critical aspect of decision-making. Rational choice theories (Von Neumann & Morgenstern, 1947) directed attention away from this question by assuming that all relevant information is available at the time of decision-making, and thus there is no reason for delay. In actuality, it is rarely the case that a decision situation is static, and decision researchers have begun to address issues surrounding deciding when to decide (Corbin, 1980). In the present work, we focus on how this decision is made in dynamic situations, specifically those in which the choice set can change over time. This happens, for example, when one determines that a new television is needed and so looks at some televisions at one store, goes on to see additional models at two other stores, finds out that one television at the first store has sold out, hears that a better television is about to come on the market, and so on. One can ask how people use information about the quality of an existing choice set as well as expected changes in the choice set over time to decide when to decide. We consider both

*Correspondence to: Andrea L. Patalano, Department of Psychology, Wesleyan University, 207 High St., Middletown, CT 06459-0408, USA. E-mail: apatalano@wesleyan.edu

what expected utility models have to say about such situations, as well as why people defer decision-making for reasons that only sometimes appear to be related to normative expectations.

Critically related to the issue of deciding when to decide, at least from an individual difference perspective, is the construct of *indecisiveness*. Indecisiveness refers to the extent to which an individual experiences chronic choice difficulty and delay in decision-making (Crites, 1969). Exploring how and why indecisive versus decisive individuals differ from one another in delay of decision making—including decision strategies, reasons for delay, ultimate choices, and decision satisfaction—is a potentially valuable route to addressing the question of how people decide when to decide, in that it is likely to reveal both broad patterns of behavior as well as important individual differences. Past research on indecisiveness has focused on developing reliable scale measures, and on establishing a relationship between indecisiveness and decisional delay in static contexts, when all decision alternatives are available and are not subject to change over time. One central behavioral finding is that indecisive individuals delay decision-making for a longer time than do decisive ones in these contexts (e.g., Frost & Shows, 1993). Behavioral research is limited, however, and no existing studies speak to dynamic decision situations. It is not clear whether the differences found in static situations represent increased deliberation by indecisive individuals in these situations only—when delay has no impact on the quality of the choice set—or reflect a more far-reaching difference in how decisive and indecisive individual assess the relative value of choice versus delay. To get at this question, after reviewing research on indecisiveness in static situations, we focus here on the delay behavior of indecisive and decisive individuals in dynamic situations in which delay has significant consequences for choice quality.

Indecisiveness and decisional delay

That indecisiveness is characterized by decisional delay is evident in self-report scale measures of indecisiveness (Frost & Shows, 1993; Germeijs & DeBoeck, 2002; Mann, 1982), the most common being Frost & Shows' (1993) 15-item Indecisiveness Scale and Mann's (1982) 5-item Decisional Procrastination Scale. The Decisional Procrastination Scale focuses on decisional delay, with items such as ''I put off making decisions'' and ''I waste a long time on trivial matters before getting to a final decision.'' The Indecisiveness Scale, in addition to delay, incorporates decisional difficulty, as in ''I find it easy to make decisions'' or ''I always know exactly what I want,'' and proposed affective components including anxiety, worry, low confidence, and regret. These two scales reflect different views on the major components of indecisiveness, that is, delay only versus a combination of difficulty, delay, and negative affect. Despite this, both scales are highly reliable, with the internal reliabilities somewhat higher for the Indecisiveness Scale (internal $\alpha = 0.87$; 1-month test-retest $\alpha = 0.67$; Frost & Gross, 1992; Wengrovitz & Patalano, 2006) than for the Decisional Procrastination Scale (internal $\alpha = 0.70$; 1-month test-retest $\alpha = 0.69$; Effert & Ferrari, 1989; Beswick, Rothblum, & Mann, 1988).

Behavioral differences in decisional difficulty and delay as a function of indecisiveness have been shown in studies of choice in static decision situations, using measures of choice difficulty, perceived readiness to decide, response latencies, and choice deferral. Veinott (2002) found that indecisive individuals, relative to more decisive individuals, experienced more choice difficulty and reported being less ready to decide among five multiattribute alternatives in the domains of car purchase and applicant selection. Frost and Shows (1993) presented pairs of alternatives, such as two articles of clothing, and found choice response latencies to be greater for indecisive than for decisive individuals, as did Ferrari and Dovidio (2000) using a multiattribute college-course selection task. Rassin and Muris (2005) observed that indecisive individuals were more likely than decisive ones to choose an ''I don't know'' alternative in response to strongly worded social statements such as ''Suicide is never a rational option.'' These results support the conclusion that, at least when the choice set does not change over time, as was the case in all studies, indecisive individuals are more likely to delay decision-making.

DOI: 10.1002/bdm

Though not directly related to choice difficulty or delay, there is also evidence of a strategy difference between indecisive and decisive individuals that might mediate delay differences in multiattribute choice situations. Using process-tracing methodology (Payne, 1976), Ferrari and Dovidio (2000, 2001) looked at the informational search patterns of decisive versus indecisive individuals in the college-course selection task. They found that indecisive individuals engaged in more dimension-based search, moving from one alternative to another within a dimension (e.g., from one course to another on the dimension of meeting time). Decisive individuals, in contrast, engaged in more alternative-base search, moving from one dimension to another with an alternative (e.g., from meeting time to instructor quality for the same course).[1] While interesting, it is not clear how this difference might relate to differences in choice difficulty and delay, or even whether the finding generalizes beyond the specific decision context.

These scale and behavioral results suggest that indecisive individuals might delay decision-making longer than decisive ones because they find the decision task more difficult in that they are unable to identify a clearly preferred alternative to which to commit (Janis and Mann, 1977). This possibility is consistent with studies of contextual influences on choice delay. For example, Tversky and Shafir (1992) compared deferral rates in a dominance context (e.g., [65%, \$15; a gamble with a 65% chance of winning \$15 and a 35% chance of winning nothing] vs. [65%, \$14]), in which one alternative clearly dominated another, versus a trade-off conflict context (e.g., [65%, \$15] vs. [30%, \$35]), in which alternatives had different advantages and disadvantages. Participants were informed that deferral, if selected, would bring a new alternative but also the potential loss of one or both initial ones. In a comparable context, Dhar (1997) manipulated the similarity of the perceived attractiveness of choice alternatives, such that, in one condition, alternatives were highly similar to one another in perceived attractiveness while, in another condition, they were more spread out. In both studies, the more difficult the choice task, the more likely individuals were to defer choice, even though the most attractive alternative was the same in both conditions.

In light of such findings, Anderson (2003) introduced the construct of *selection difficulty* to his model of decision avoidance, a model that encompasses choice delay as well as other forms of decision avoidance. Selection difficulty was introduced to serve as a mediating variable between multiple contributors to choice difficulty (e.g., trade-off conflict, preference uncertainty), and resulting delay behavior. While Anderson's (2003) model does not consider individual differences, one can imagine that indecisive individuals might chronically act as if they are in a difficult choice context, delaying choice because the problem is more difficult to them and they are unable to commit to any of the available alternatives. It is not clear what might give rise to this experience of choice difficulty among indecisive individuals, though correlates of indecisiveness include neuroticism (Jackson, Furnham, & Lawty-Jones, 1999), obsessive–compulsive tendencies (Frost & Shows, 1993), and perfectionism (Gayton, Clavin, Clavin, & Broida, 1994; see Ferrari & Dovidio, 2001, for further correlates). Indecisiveness has also been linked theoretically to a need for a higher threshold of certainty (Frost & Shows, 1993), to a desire to minimize error (Salzman, 1980), and to a lower threshold for deciding what is important (Reed, 1985), all associated with perfectionism. One obvious possibility is that indecisive individuals find choice difficult because they seek perfect (or at least near-perfect) alternatives and are unable or unwilling to make tradeoffs when no such alternatives are available. Of course, at this point, the correlates are merely suggestive.

Dynamic situations and present research

Situations in which it is possible to delay choice can easily be adapted to rational choice models to determine when, based on normative principles, it is appropriate to choose an existing alternative versus to delay

[1]Ferrari and Dovidio (2000, 2001) used the terms *intradimensional* and *interdimensional* to refer to dimension-based and alternative-based shifts, respectively.

DOI: 10.1002/bdm

decision-making. As observed by multiple researchers (Dhar, 1997; Tversky & Shafir, 1992), the expected utility of choice is simply the utility of the best alternative in the existing choice set. The expected utility of delay is the utility of the best alternative in each possible future choice set weighted by the likelihood of that set emerging. From the perspective of utility maximization, there is no reason to defer in static situations because the expected utility of deferral is the same as that of choice. On the other hand, there is also arguably no reason *not* to defer, other than the costs of time and effort (Payne, Bettman, & Johnson, 1993), given that deferral might allow one to gain clarity through increased deliberation (Tykocinski & Ruffle, 2003). Looking only at static decision situations, it is not clear whether indecisive individuals, relative to decisive ones, show increased delay across all decision situations, delay to a greater extent only when expected utilities of choice and deferral are the same; or, show a different pattern of response to the benefits and risks of delay.

In the context of dynamic decision situations, in contrast, utility maximization requires careful assessment of the expected utilities of choice versus delay in deciding when to commit to an alternative. Attention must be paid to the attractiveness of existing alternatives, the risk of losing these alternatives, the attractiveness of potential future alternatives, and the likelihood of actually gaining these alternatives. In these situations, neither immediate choice nor delay is uniformly consistent with utility maximization, and engaging in either for reasons other than utility maximization can result in a less desirable choice set and a less satisfying ultimate choice. If indecisive individuals delay to a greater extent in these situations as well—which would be the most straightforward prediction based on past research—and if we assume that delay is warranted on about half of all occasions, decisive and indecisive individuals should each find themselves with a more desirable choice set about half the time. We argue here, however, that rather than it being the case that indecisive individuals delay to a greater extent than more decisive ones in dynamic situations, that decisive individuals differentially adjust their deferral behavior in response to the benefits and risks of delay while indecisive individuals do not.

This proposal is motivated by the fact that choice avoidance and utility maximization appear to be incompatible—or at least difficult to jointly maintain—goals. Choice avoidance focuses on difficulty of choice. Delay is used as a means of avoiding a difficult choice, possibly with the hope that delay might eventually lead to an easier choice (Janis & Mann, 1977). Utility maximization, in contrast, involves comparison of the quality of present versus future choice sets. Delay in this case reflects foresight regarding the prospect of obtaining a more desirable choice set. The possibility that choice avoidance sometimes takes precedence over attention to utility maximization is supported by the earlier described studies involving contextual manipulations of choice difficulty (e.g., Tversky & Shafir, 1992). To the extent that indecisive individuals cannot help but be impacted by perceived choice difficulty even in dynamic situations, their delay behavior should not be influenced by expected-utility-related factors. For decisive individuals, in contrast, there is no evidence that they routinely experience choice difficulty, so there is no reason to believe they do not emphasize utility maximization in dynamic situations. Their behavior might show sensitivity to factors relevant to this goal, such as the quality of the initial choice set, the risk of loss of alternatives over time, and the likelihood of gaining better alternatives over time.

We conduct two studies to test this claim. They both involve a decision scenario in which a college course must be selected from a dynamic choice set, but choice can be delayed for up to five ''cycles'' before a selection is made, with new alternatives added to the set in each cycle. We manipulate the risk associated with delay, which is the stated possibility that some existing alternatives also become unavailable over the cycles. When there is no risk associated with delay, each cycle brings only further alternatives. Here, a future choice set cannot be lower in utility than an existing one, so it is always reasonable to delay within the limits of time and effort (Payne et al., 1993). When risk is present, some existing alternatives become unavailable across cycles. This means that a future choice set might, in fact, be lower in utility than a present one. We predict that decisive individuals will modulate their delay behavior in response to risk, delaying over a greater number of cycles when there is no risk versus when risk is present, while indecisive individuals will not, consistent with the claim that only decisive individuals adjust their behavior in response to this information. Based on past

DOI: 10.1002/bdm

indecisiveness research, we also look for greater use of a dimension-based informational search strategy for indecisive individuals versus an alternative-based strategy for decisive individuals.

This course selection task is more complex than tasks in which the dependent measure is a binary choice (e.g., choose vs. defer). The present task is in the tradition of those used by Ferrari and Dovidio (2000) in their recent research on indecisiveness in which choice alternatives had multiple attributes and both choice and process-tracing data (Payne, 1976) were collected. The addition of delay cycles to their task offers a more sensitive dependent measure of delay than that of binary choice. It is useful for capturing interactions among independent variables in a way that we believe compensates for its complexity.

EXPERIMENT 1

We looked at the influence of indecisiveness group and risk condition on decisional delay, using a course-selection task similar to that of Ferrari and Dovidio (2000). In their task, indecisive and decisive individuals saw an informational grid with five college-course decision alternatives by six dimensions and could view as many information cells as desired, which would then remain visible, before choosing an alternative. Our task differed in that, after the first day's presentation of five course alternatives, two new courses were added on each day of a simulated five-day course enrolment period. At any time, the user could view course information, choose a course, or defer to the next day. By the end of the fifth day, however, one course had to be chosen. This process was not unfamiliar to participants who were college students used to choosing courses over a week from a frequently updated selection. As in Ferrari & Dovidio (2000, 2001), process-tracing methodology was used to record participant actions.

The experiment had two conditions: *No-Risk* and *Risk*. In the No-Risk condition, there were no risks associated with deliberating over the full 5 days; only negligible costs of time and effort associated with information search existed. In the Risk condition, in contrast, the risk associated with deliberation was a threatened loss of existing alternatives with each additional day of search. In fact, two alternatives became unavailable over time. The primary dependent measure of decision delay was *number of days* explored because this was most directly linked to gain and loss of alternatives. If decisive individuals are sensitive to risk while indecisive ones are not, we should see that decisive individuals delay over more days in the No-Risk relative to the Risk condition, while there is no difference across conditions for indecisive individuals.

In consideration of past work, we also collected process measures of *total time* to decide*, total information* collected (i.e., number of cells clicked), and percentages of *alternative-* and *dimension-based search shifts* relative to all shifts. For alternative-based and dimension-based shifts, only the first day of data was used because the addition of only two classes per day on later days biased search towards use of alternative-based shifts (see Payne, Bettman, & Johnson, 1988). In addition, we collected final *course choice* and participant ratings of the importance of each dimension to their decision. Course choice and dimension ratings were used to confirm that any differences between groups were not due to differences in values. The choice data also had the potential to demonstrate any outcome differences associated with delay. We placed the most desirable alternative, assuming equal weighting of dimensions, on Day 2 and, in the Risk condition, removed it on Day 3. We expected that it would be selected by most in the No-Risk condition but that it would be more likely to be selected by decisive individuals, because more indecisive individuals would lose the opportunity, in the Risk condition.

Participants were divided into decisive and indecisive groups using a median split on Frost and Shows' (1993) Indecisiveness Scale. The scale was used because it captures a broad notion of indecisiveness, most consistent with our views, and because it has a high internal reliability. We also administered Mann's (1982) Decisional Procrastination Scale**,** and Burns' (1980) 10-item Perfectionism Scale, given a secondary interest on our part in assessing correlations among scales for our participant sample, and given the past correlation between perfectionism and indecisiveness (Gayton et al., 1994).

DOI: 10.1002/bdm

Method

Participants

Seventy-four Wesleyan University students (51 women and 23 men, 18–28 years old) volunteered to participate in exchange for monetary compensation. Participants were run in groups of 1–3 in 1-hour sessions.

Decision materials

Thirteen courses (labeled Course A–M) varied on the following dimensions: *meeting time, instructor quality, potential relevance to goals, amount of work, peer evaluations,* and *interest in topic*. Dimensions were chosen to be at least somewhat relevant, and three values were associated with each dimension (e.g., *preferred, acceptable,* and *undesirable* for meeting time), with values framed in terms of desirability (e.g., ''preferred,'' not ''meets at 1 pm'') rather than absolute values to ensure that their ordering and spacing was approximately the same across participants. The grid was constructed to create a challenging decision problem involving tradeoffs. Assuming equal weighting of dimensions, Course G was the optimal alternative (high on four dimensions and moderate on two dimensions). See the Appendix for the full set of materials.

Course-enrollment simulation

A 5-day course enrolment period was simulated using Hypercard software for the Macintosh computer. The focus of the simulation was an information grid displayed on a computer screen on which rows were labeled with course names, columns were labeled with course dimensions; and grid cells contained the value of each course on each dimension. Seat availability appeared next to each course, but grid-cell information was initially hidden. On Day 1, 5 courses appeared in the grid; on each subsequent day, 2 courses were added to the end of the list, for a total of 13 courses by Day 5.

Three types of actions were available. One was to click on a grid cell to display a desired piece of information. Once visible, the information stayed on the screen for the entire task. The second was to click on a ''Go to Next Day'' button to update the screen with the next day of enrolment and thus the new alternatives. The third was to click on a course name and the ''Finalize Choice'' button to make a course selection and end the task, which had to be done by the end of the fifth day.

Other than the list of available courses, the only information that changed daily was seat availability so as to simulate a course database being updated daily. In the No-Risk condition, availabilities were high (more than 10 seats per course), and no courses were in danger of becoming full. In the Risk condition, availabilities were low (fewer than 5 seats per course) and courses were in danger of becoming full (indicated by 0 seats). In the Risk condition, 2 courses actually became unavailable: Course G (the optimal choice), introduced on Day 2, became full on Day 3; and Course I, introduced on Day 3, became full on Day 4. Once a course became unavailable, it remained this way for the duration of the enrolment period.

Questionnaire items

A 45-item questionnaire was created containing all items from the following three scales: Frost and Shows' (1993) Indecisiveness Scale (15 items), Mann's (1982) Decisional Procrastination Scale (5 items), and Burns' (1980) Perfectionism Scale (10 items). Fifteen filler items from unrelated scales were also included. All items were arranged in a single random order. Responses were elicited on a 5-point Likert scale ranging from 1 (strongly agree) to 5 (strongly disagree). In earlier work in our laboratory, 55 undergraduate participants assigned to a Risk condition similar to the one used here were administered Frost and Shows' Indecisiveness Scale both 3 weeks prior to the study and immediately after the study. Individual differences in behavioral results were the same using pre-task versus post-task Indecisiveness Scale scores, suggesting that these scores are not highly influenced by performance on the decision-making task.

DOI: 10.1002/bdm

Procedure

Participants sat at individual computers and completed the study at their own pace. For the course selection task, participants were instructed to imagine that they had the opportunity to choose a course over a 5-day course enrolment period. They were told that, on the first day, they would be presented with available course alternatives, and would have the option of either choosing a course or waiting until the next day to consider additional courses. They were informed that by the end of the period, however, a course had to be selected. Available actions were explained, and participants were advised to reveal only grid information needed to make a choice. In the No-Risk condition, participants were informed that no courses would become unavailable while, in the Risk condition, they were informed that courses could become unavailable over time. Participants completed a practice restaurant selection task to familiarize themselves with the procedure before going on to the course selection task.

After a course was selected, a new screen appeared for rating the importance of each dimension (e.g., meeting time) to the decision on a scale from 1 (highly important) to 6 (not at all important). All dimensions were presented at once in the order in which they appeared during the course selection task. After the rating task was completed, the screen changed again and participants were asked to fill out the questionnaire. Items were displayed one at a time and each remained until a rating from 1 (strongly agree) to 5 (strongly disagree) was chosen. The computer program recorded all participant actions during both course selection and these later tasks. The entire experiment took approximately 30 minutes to complete.

Results

Questionnaire data

Inter-item reliabilities were computed for each scale: Frost and Shows' (1993) Indecisiveness scale alpha = 0.85, Mann's (1982) Decisional Procrastination scale alpha = 0.81, and Burns' (1980) Perfectionism scale alpha = 0.71; all were acceptable at the conventional alpha >0.70. After reverse-coding some responses and summing to get scale scores, positive correlations were found between Indecisiveness and Decisional Procrastination ($r(74) = 0.66$, $p < 0.001$), and Indecisiveness and Perfectionism ($r(74) = 0.28$, $p < 0.050$), but not Decision Procrastination and Perfectionism (p's > 0.100 for all null results unless otherwise noted).

Based on Indecisiveness Scale scores, a median split (mdn = 50) was used to divide the data into two approximately equal-sized groups of decisives and indecisives. Note that indecisiveness is reflected in *lower* scores here. The split resulted in 15 decisives ($M = 57$, range = 51–65) and 22 indecisives ($M = 43$, range = 35–50) in the No-Risk condition, and 19 decisives ($M = 57$, range = 52–64) and 18 indecisives ($M = 40$, range = 27–50) in the Risk condition. The lowest (most indecisive) and highest (most decisive) possible scores on this scale are 0 and 75, respectively.

Delay data

The dependent measure of delay was number of days searched prior to choice (see Figure 1, left side). A 2×2 between-subjects ANOVA of condition by group was run on this measure. Not surprisingly, there was a main effect of condition in that more days were searched in the No-Risk relative to the Risk condition, $F(1,70) = 8.95$, $MSE = 2.03$, $p = 0.004$. More importantly, there was also an interaction in that decisive individuals searched fewer days in the Risk relative to the No-Risk condition while indecisive individuals did not, $F(1,70) = 4.02$, $MSE = 2.03$, $p = 0.048$. No main effect of group was found. *Post hoc* analyses revealed that the group means did not differ in the No-Risk condition but did in the Risk condition because only for decisive individuals was there less delay in the Risk relative to the No-Risk condition (p's < 0.01).

Process data

Dependent measures of process were total time, total information, and percentages of alternative-based and dimension-based shifts (see Table 1, left side). A 2×2 between-subjects ANOVA of condition, by group was

DOI: 10.1002/bdm

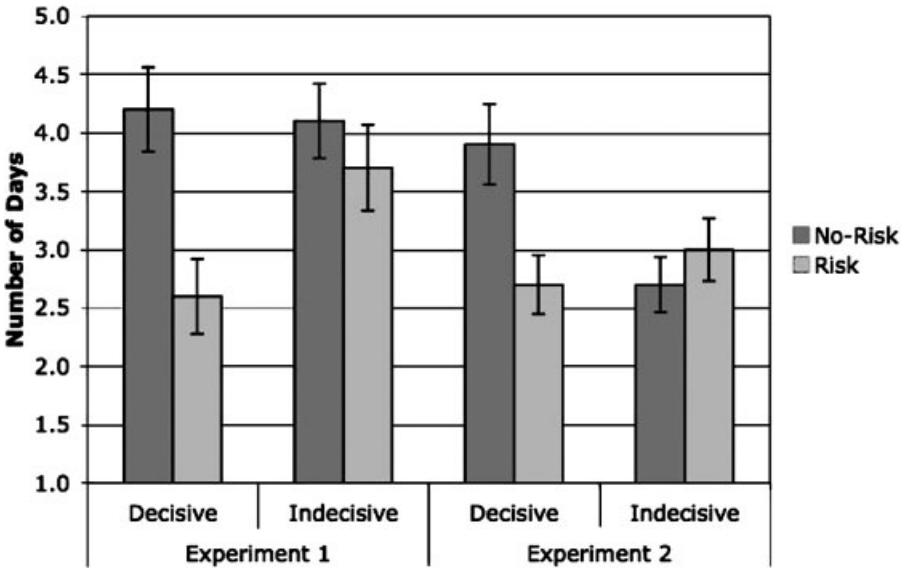

Figure 1. Number of days of delay by indecisiveness group and risk condition in Experiments 1 and 2, with SE bars

Table 1. Task behavior by indecisiveness group and risk condition for Experiments 1 and 2

	Experiment 1		Experiment 2	
	No-Risk	Risk	No-Risk	Risk
Total time (s)				
Decisive	160 (21)	143 (18)	120 (16)	93 (10)
Indecisive	136 (12)	213 (32)**†	86 (4)	131 (20)*
Total information (clicks)				
Decisive	44 (4)	35 (4)	64 (9)	63 (8)
Indecisive	44 (4)	48 (5)†	45 (9)†	82 (13)**
Dimension-based shifts (%)				
Decisive	59 (6)	54 (6)	43 (6)	29 (4)*
Indecisive	39 (7)	33 (7)	33 (4)	30 (7)
Alternative-based shifts (%)				
Decisive	17 (4)	26 (6)	38 (6)	58 (4)*
Indecisive	43 (6)†	51 (6)†	51 (3)	54 (7)

*Notes: SE*s are in parentheses; total information in Experiment 2 includes revisited cells; shifts are for Day 1 only.
$^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$ for simple effects of condition (No-Risk vs. Risk).
$^{\dagger}p < 0.05$ for simple effects of group (decisive vs. indecisive).

run on each process measure. For total time, there was an interaction in that indecisive individuals in the No-Risk condition took less time to decide than those in the Risk condition while the times of decisive individuals were the same in the two conditions, $F(1,70) = 4.86$, $MSE = 8271$, $p = 0.031$. For alternative-based shifts, there was a main effect in that indecisive individuals made a greater percentage of these shifts than did decisive individuals, $F(1,70) = 8.30$, $MSE = 0.06$, $p = 0.005$. And for dimension-based shifts, there was a main effect in that decisive individuals made a greater percentage of

DOI: 10.1002/bdm

Table 2. Course selection by indecisiveness group and risk condition for Experiments 1 and 2

	Percentage of optimal-course selections			
	Experiment 1		Experiment 2	
	No-Risk(%)	Risk(%)	No-Risk(%)	Risk(%)
Decisive	73	68	50	32
Indecisive	82	28	47	43

these shifts than did indecisive individuals, $F(1,70) = 3.83$, $MSE = 0.07$, $p = 0.054$.[2] No other main effects or interactions were reliable, including all involving the dependent measure of total information.[3] See Table 1 for *post hoc* tests of simple effects.

We also looked at amount of information obtained per alternative, and separately per dimension; no interaction of either of these with indecisiveness was found. Not surprisingly, there was a main effect of dimension importance (most important dimension to an individual, second most important, etc.) in that participants clicked more often on dimensions of greater importance to them (linear effect: $F(1,70) = 60.53$, $MSE = 3.30$, $p < 0.001$), but dimension importance also did not interact with indecisiveness.

Choice and ratings data

Choices were coded in terms of whether or not Course G was selected (see Table 2, left side). Decisive individuals were highly likely to choose this course in both conditions; indecisive individuals were highly likely to choose it in the No-Risk condition but were much less likely to do so in the Risk condition. The best fitting binary logistic regression equation includes group ($\beta = -1.56$, $SE = 0.64$, $p = 0.015$) and a group by condition interaction ($\beta = 2.18$, $SE = 0.77$, $p = 0.005$) as predictors of choice ($\chi^2(2, N = 74) = 9.82$, $p = 0.007$). In 85% of the cases in which the best course was not chosen, the participant had gone beyond Day 2 in the Risk condition, thereby losing the opportunity to choose it. A mixed three-way ANOVA conducted on indecisive and decisive participants' ratings of the importance of each dimension to their decision in each condition revealed a main effect of dimension only, with mean ratings for the most to least important dimension ranging from 1.8 to 3.9, $F(5,365) = 33.17$, $MSE = 1.58$, $p < 0.001$. With each individual's own ratings on each dimension used as weights for a linear regression, Choice G emerged as the optimal alternative 40 times, it was tied with one or two other alternatives 10 times, and it was less than optimal 24 times; this pattern did not differ by group or condition. Course B emerged as the second most optimal alternative, though it was only actually chosen by participants 4 times.[4]

[2]Probability data are sometimes transformed by taking the arcsine of the square root of each proportion so that they better approximate a normal distribution (Hogg & Craig, 1995). We did this and re-ran the analyses. The pattern of results was the same and so, for intuitiveness, we report only the untransformed results.

[3]In both Experiments 1 and 2, we also considered the shift results made on Days 2–5 taken together and found no reliable effects. Note also that, in both experiments, 90% of clicks were made on the most recently presented alternatives; rarely did participants return to earlier days.

[4]We believe Course B was rated highly because our equation did not take into account the fact that the difference between dimension values of "2" and "3" was likely perceived to be greater than that between "1" and "2" by participants. In other words, our equation did not reflect the likely possibility that participants thought that a low value of "3" on the important dimension of "Interest in topic" made this alternative look particularly unattractive.

DOI: 10.1002/bdm

Other analyses

All analyses were re-run using median splits on Decisional Procrastination (mdn = 35.0; Procrastinators $M = 29$; Non-Procrastinators $M = 42$; highest possible score is 50) and Perfectionism (mdn = 14.5; Perfectionists $M = 12$; Non-Perfectionists $M = 17$; highest possible score is 25), but no reliable effects of either on any dependent measures were found. All were also run on three previously identified factors of the Indecisiveness Scale (confidence and pleasure, planning, and anxiety; see Patalano & Wengrovitz, 2006), with no significant findings, though this is somewhat unsurprising given lower reliabilities of factor scores.

Discussion

The main findings are that decisive individuals had fewer days of search for alternatives when risk was present relative to when it was absent. Indecisive individuals, in contrast, did not differ in days of search in response to the presence versus absence of risk. Specifically, both decisive and indecisive individuals searched for an average of just over 4 days when there were no risks to delay. When risks were imposed, decisive individuals searched for fewer than 3 days while indecisive individuals still searched for four days; indecisive individuals in the Risk condition did take more time to decide and did look at more information than did those in the No-Risk condition. The two groups chose the same alternative in the No-Risk condition—the condition in which they would be most likely to choose their preferred alternative overall—and indicated the same course-dimension ratings, ruling these out as other explanations for group differences. The results suggest that decisive individuals modulate their delay behavior in response to risks associated with delay while indecisive individuals do not.

The two groups arrived at their choices using different patterns of information collection. Indecisive individuals tended to make alternative-based shifts, focusing on gathering information on one alternative at a time. Decisive individuals tended to make dimension-based shifts, comparing multiple alternatives on one dimension at a time. This is the opposite of the results of Ferrari and Dovidio (2000, 2001) who found greater use of dimension-based shifts by indecisive individuals and alternative-based shifts by decisive ones. The latter pattern was interpreted by Ferrari and Dovidio as reflecting use of a less effortful decision strategy by indecisive individuals, specifically a strategy that focuses on fewer dimensions, due to their reduced cognitive resources during decision-making. There is no obvious explanation for the search pattern discrepancy between our study and theirs, though we will discuss this further after Experiment 2. Finally, decisive individuals looked at less information and took less total time to decide in the Risk condition, while indecisive individuals took more time and looked at more total information in the Risk condition relative to the No-Risk condition, though the interaction was only statistically reliable for the time variable.

There are some limitations to the first experiment. First, the placement of the optimal alternative on an early day increased its chance of being selected by a decisive individual relative to one that could have been placed on a later day. Second, use of a method in which selections remained visible made it impossible to tell when exposed cells were being revisited, possibly obscuring true group differences in strategy. Third, while the items from individual-difference scales were intermixed, put in random order, and interspersed with filler items to make the questionnaire aims less transparent, error may have been introduced into scale scores. While none of these limitations reflect our focal interests, addressing them in Experiment 2 offers an opportunity to replicate our main findings in a somewhat different context.

EXPERIMENT 2

The goal of Experiment 2 was to replicate the first experiment with three changes to the experimental procedure. The first change was to make the optimal course appear later in the simulation. In the first experiment, the optimal alternative, Course G, was presented on Day 2 and became unavailable on Day 3.

DOI: 10.1002/bdm

Because indecisive individuals in the Risk condition tended to search until Day 3 (at which point Course G was already unavailable), while decisive individuals tended to search only until Day 2, decisive individuals had an advantage for selecting the optimal alternative. In the present experiment, we modified Course I, which appears on Day 3 and becomes unavailable on Day 4, so that it surpassed Course G as the optimal alternative. While not the central goal, we hoped to demonstrate a choice-quality advantage for indecisive individuals arising from their delay behavior in this context.

The second change was to modify the process-tracing methodology to use of a hidden-information method (Payne, 1976). Each time a new piece of information was selected, the previous selection returned to its hidden state. Because this method places far more demands on working memory than the visible-information method used previously, there is reason to believe that it could influence decision strategy, possibly leading many individuals to choose a less effortful strategy. However, such an outcome would still be informative in that if delay behavior is independent of information search strategy, the study should still reveal group differences in modulation of delay in response to risks.

The third change was in questionnaire presentation. All questionnaire items were grouped by scale, the Indecisiveness Scale was presented first, and there were no filler items.

Method

Participants

Sixty-six Wesleyan University students (36 women and 30 men, 18–28 years old) volunteered to participate in exchange for monetary compensation. Participants were run in groups of 1–5 in 1-hour sessions.

Decision materials

The decision materials were the same as in Experiment 1 except that Course I was modified to be high on 5 dimensions and moderate on 1 dimension. Assuming equal weighting of dimensions, Course I became the optimal alternative (as noted in the Appendix). Course I appeared on Day 3 and became unavailable on Day 4, just as it did in Experiment 1.

Course-enrolment simulation

The simulation remained unchanged from Experiment 1.

Questionnaire items

A 30-item questionnaire contained Indecisiveness Scale, Decisional Procrastination Scale, and Perfectionism Scale items grouped by scale, presented in this order. No filler items were included.

Procedure

The procedure was the same as in Experiment 1.

Results

Questionnaire data

Inter-item reliabilities for each scale were: Frost and Shows' (1993) Indecisiveness Scale alpha = 0.83, Mann's (1982) Decisional Procrastination Scale alpha = 0.79 and Burns' (1980) Perfectionism Scale alpha = 0.86. There was a positive correlation between Indecisiveness and Decisional Procrastination,

DOI: 10.1002/bdm

$r(66) = 0.56$, $p < 0.001$; unlike Experiment 1, there was no correlation between Indecisiveness and Perfectionism scores, $r(66) = -0.02$, $p = 0.889$; and again there was no correlation between Decisional Procrastination and Perfectionism.

Based on Indecisiveness Scale scores, a median split (mdn = 42) was used to divide the data into two approximately equal-sized groups of decisive and indecisive individuals. The split resulted in 14 decisive ($M = 48$, range = 43–59) and 19 indecisive ($M = 36$, range = 28–41) individuals in the No-Risk condition, and 19 decisive ($M = 52$, range = 44–71) and 14 indecisive ($M = 32$, range = 27–41) individuals in the Risk condition. As in Experiment 1, low values correspond to greater indecisiveness.

Delay data

The dependent measure of delay was number of days searched prior to choice (see Figure 1, right side). A 2×2 between-subjects ANOVA of condition by group was run on this measure. As in Experiment 1, there was an interaction in that decisive individuals in the Risk condition searched fewer days than did those in the No-Risk condition, while indecisive individuals in both conditions delayed the same number of days, $F(1,62) = 6.03$, $MSE = 1.40$, $p = 0.017$. *Post hoc* analyses revealed that decisive individuals considered a greater number of days than did indecisive ones in the No-Risk condition. The groups did not differ in the Risk condition because only decisive individuals delayed more in the Risk relative to the No-Risk condition (p's < 0.01). No main effects of group or condition were found.

Process data

Dependent measures of process were total time, total information, and percentages of alternative-based and dimension-based shifts (see Table 1, right side). There was an interaction in that indecisive individuals in the Risk condition took more time than did those in the No-Risk condition, while decisive individuals took the same amount of time in both conditions, $F(1,62) = 7.14$, $MSE = 2872$, $p = 0.010$. Indecisive individuals in the Risk condition also looked at more information than did those in the No-Risk condition, while decisive individuals in the two conditions looked at the same amount of information, $F(1,62) = 4.77$, $MSE = 1176$, $p = 0.033$.[5] For alternative-based and dimension-based shifts, there were main effects in that a greater percentage of alternative-based shifts were made in the Risk condition as compared with the No-Risk condition, $F(1,62) = 4.51$, $MSE = 0.04$, $p = 0.038$, and there was a suggestion of a corresponding decrease in dimension-based shifts, $F(1,62) = 2.76$, $MSE = 0.05$, $p = 0.102$; this result was largely due to a difference in the behavior of decisive individuals in the two conditions, though the interaction was not statistically reliable. No other main effects or interactions were reliable. See Table 1 for *post hoc* tests of simple effects.

As in Experiment 1, we also looked at amount of information obtained per alternative, and separately per dimension; no interaction of either of these with indecisiveness was found. Not surprisingly, there was a main effect of dimension importance in that participants clicked more often on dimensions of greater importance to them (linear effect: $F(1,62) = 47.97$, $MSE = 438.92$, $p < 0.001$), but this did not interact with indecisiveness either.

Choice and ratings data

Choices were coded in terms of whether or not Course I was selected (see Table 2, right side). Indecisive individuals in both conditions were equally likely to choose this course; decisive individuals were as likely as

[5]Because the measure of total information included revisited cells (cells that were clicked on for a second or third time; about 50% of all total information was made up of revisited cells), we re-ran the analyses excluding revisited cells; the pattern of results was the same.

DOI: 10.1002/bdm

indecisive individuals to choose it in the No-Risk condition but were less likely to choose it in the Risk condition. However, neither group nor condition was a reliable predictor of choice. Given the overall low rate of choice of Course I even in the No-Risk condition (48%, though it was still the most selected alternative), the choice results were not clearly interpretable and we did not pursue them further. As in Experiment 1, a mixed three-way ANOVA conducted on indecisive and decisive participants' ratings of the importance of each dimension in each condition revealed a main effect of dimension only, with ratings for the most to least important dimension ranging from 1.9 to 3.6, $F(5,325) = 26.32$, $MSE = 1.40$, $p < 0.001$. With each individual's own ratings on each dimension used as weights for a linear regression, Choice I was identified as the optimal alternative 48 times, it was tied for optimal with one or two other alternatives 15 times, and it was less than optimal 3; this pattern did not differ by group or condition.

Other analyses

All analyses were re-run using median splits on Decisional Procrastination (mdn = 26; Procrastinators $M = 20$; Non-Procrastinators $M = 34$) and Perfectionism (mdn = 15; Perfectionists $M = 12$; Non-Perfectionists $M = 18$). For Decisional Procrastination, no reliable effects were found (though interaction effects for alternative—and dimension-based shifts were <0.100). For Perfectionism, only a marginally significant main effect on decision time was found, with perfectionists taking more time to decide than non-perfectionists (119 vs. 93 s; F (1, 62) = 3.73, $MSE = 30.05$, $p = 0.058$). All analyses were also run on three previously identified factors of the Indecisiveness Scale (see Patalano & Wengrovitz, 2006), again with no significant findings.

Discussion

The key findings of Experiment 2 were that decisive individuals in the Risk condition searched fewer days than did those in the No-Risk condition. In contrast, indecisive individuals in both conditions searched the same number of days. In particular, decisive individuals searched for over four days when there were no risks but below three days when there were risks, while indecisive individuals searched for just below three days regardless of risk. This interaction replicates the main results of Experiment 1. In addition, decisive individuals in the Risk condition took less time to decide than did those in the No-Risk condition. In contrast, indecisive individuals in the Risk condition took more time to decide and looked at more information than did those in the No-Risk condition. This pattern matches the one found in Experiment 1. It provides evidence that any lack of delay response of indecisive individuals to risk is not likely because they do not *notice* the risk, as they do respond to it in these other ways. Rather, though it leads them to deliberate further, possibly because they know that the consequences of going on are greater, they still decide to go on in the end.

In both conditions here, indecisive individuals made the same predominantly alternative-based search shifts as they did in Experiment 1. Decisive individuals made more dimension-based shifts in the No-Risk condition, as in Experiment 1, but showed a slight dominance of alternative-based shifts in the Risk condition. It is not clear why there were differences in strategies in these two conditions, though we imagine that it resulted from the high cognitive resource demands of the task used in this experiment relative to those of Experiment 1, combined with the extra demands of the Risk condition here.

One additional difference between these results and those of Experiment 1 is the total days of delay of indecisive relative to decisive individuals. In Experiment 1, indecisive individuals in both conditions delayed as extensively as did decisive individuals in the No-Risk condition. In Experiment 2, however, indecisive individuals in both conditions delayed only as extensively as did decisive individuals in the Risk condition. From this, it appears to be incorrect, then, to say that indecisive individuals always delay choice more than do decisive ones.

DOI: 10.1002/bdm

GENERAL DISCUSSION

Two experiments were conducted here to test the hypothesis that decisive individuals modulate decisional delay in the context of searching for further alternatives while indecisive individuals do not. Consistent with this hypothesis, decisive individuals showed less delay when risk was present relative to when they when it was absent. Indecisive individuals, in contrast, showed strikingly *no* difference in delay when risk was present versus absent. This lack of response to risk information put indecisive individuals, at least in the present decision context, in the position of more often choosing a less desirable alternative. Over all conditions, counter to the assumption that indecisive individuals always delay more than do decisive one, indecisive individuals delayed choice no more nor less than did decisive individuals. In the process of obtaining information to aid choice, indecisive individuals used a predominantly alternative-based search pattern, while decisive individuals used a dimension-based pattern (in three of the four conditions across studies); this is largely the opposite of the findings of Ferrari and Dovidio (2000, 2001). Decisive individuals in the Risk condition took less time and looked at fewer cells of information than did those in the No-Risk condition, while indecisive individuals in the Risk condition took more time and looked at more information than did those in the No-Risk condition. Importantly, all of these findings emerged in a context in which decisive and indecisive individuals did not differ in their preferred alternatives, as indicated by their choices in the No-Risk condition and their decision-related values.

Proposed decision strategies

In this section, we discuss the strategies that might be used by decisive and indecisive individuals respectively in deciding when to decide. We differentiate this decision from that of identifying the most preferred alternative in a choice set, which we will discuss later. Based on the present findings, we propose that decisive individuals might attempt to maximize expected utility in deciding between choice and deferral. By this account, they look at alternatives in an existing choice set, identify the most desirable alternative (the utility of which becomes the expected utility of choice), and assess whether the prospect of a better future choice set is worth the risk of losing the currently preferred alternative. They delay choice only when they believe that the expected utility of delay is greater than that of choice. Delay occurs more often when risk is absent relative to when it is present because the expected utility of delay is always lower when risk is absent, all else being equal. This process description is consistent with the behavior of decisive individuals here, and it explains why they might have chosen desirable alternatives without delay when risk was present, but searched more extensively before making a choice when risk was absent. Given that decisive individuals, by definition, do not have undue difficulty with choice among alternatives, it would not be problematic that this strategy requires that a preferred alternative be identified before a decision between choice and deferral can be made.

Indecisive individuals, in contrast, appear to be unwilling to make this kind of trade-off between choice quality and the gains and losses associated with delay. In the first experiment, they went to nearly the last day in both conditions before going back to choose an alternative even when risk of losing promising alternatives was high. In the second experiment, they chose an alternative on an early day in both conditions, even when there was no risk of loss of alternatives with further search. We believe that the most parsimonious account for these findings is that, rather than maximizing the expected utility of choice versus delay, indecisive individuals might instead use a satisficing strategy (Simon, 1955) with a high threshold for a minimally acceptable alternative (e.g., that the alternative has high values on at least 5 of 6 dimensions). By this account, they look at all available choice alternatives for one that meets their minimum and, if none meet it, they go on to the next day regardless of risk (though they might look harder before going on in the face of risk, as suggested by the time and information results). If they do not find an above-threshold alternative by the time they have exhausted all alternatives, they lower their threshold and choose an earlier alternative. This can explain their lengthy delay in Experiment 1, in which the best alternative (as well as the second best alternative)—with moderate values on two dimensions and high values on the rest—might have initially

DOI: 10.1002/bdm

been below threshold and thus passed over. It can also explain their immediate acceptance of an alternative in Experiment 2 that had a high value on all dimensions except for one, and thus was more likely to have been above threshold.

To the extent that decisive individuals do seek to maximize expected utility in deciding when to decide while indecisive individuals engage in a satisficing strategy with a high threshold for an acceptable choice, we can infer the choices that these individuals are likely to make in risk-free versus risk situations. In risk-free situations, the two kinds of individuals will usually obtain the same most desirable alternative. That is, they will search all alternatives and then go back and choose the same most attractive alternative. The only exception is that indecisive individuals will choose a less attractive alternative on the few occasions in which it is both above threshold and arises before the most attractive alternative. Overall, in the absence of risk, decisive individuals will choose the most attractive alternative slightly more often, and will engage in the most delay. In risk situations, in contrast, decisive individuals will obtain moderately good alternatives most of the time because a moderately good choice set, in the context of risk, will often have a higher expected utility than deferral. Indecisive individuals, by continuing to search for an above-threshold choice even when the risk associated with deferral is high, will be more likely to uncover improbable exceptional alternatives not found by decisive individuals, but will also more often find themselves left only with undesirable alternatives. Overall, in the presence of risk, decisive individuals will obtain less extreme alternatives than will indecisive individuals, and will engage in less delay.

It is possible that rather than using a satisficing strategy, indecisive individuals also maximize expected utility but simply use different values in their calculations. They might believe that the likelihood of a preferred future alternative arising is higher than do decisive individuals, or that the risk of losing an existing alternative is lower, or that the utility of an ideal alternative is higher. There is no *a priori* reason to believe that indecisive individuals assess probabilities differently in this situation, but there is reason to believe that they might value an ideal alternative so highly that no degree of risk can offset the value. While further research is needed to differentiate this possibility from the first one we proposed, we do note that this account cannot explain why indecisive individuals stopped on Day 3 in the second study in the risk-free condition. If there is no risk and one is attending to expected utility, no matter how good the alternative, there is no reason to stop without exploring the rest of the options. One would have to propose a second mechanism to explain this finding, such as that process tracing is more difficult for indecisive individuals (e.g., because they have reduced cognitive resources as a result of decision-related anxiety; Ferrari & Dovidio, 2001), and so they stop earlier in the more resource-intensive context. While the satisficing account is more parsimonious, the two are abstractly quite similar in that they indicate an increased importance of ideal alternatives to indecisive individuals, and we do not rule out this second possibility.

Past work has made an individual difference distinction between satisficers and maximizers (Schwartz et al., 2002), where maximizers are those who strive to find the best alternative possible (e.g., the best television on the market) while satisficers stop when they get to one that is good enough for their purposes. It has been found that maximizers tend to be less happy, have lower self-esteem, lower optimism, lower life satisfaction, and higher perfectionism and regret. The idea is that always looking for the perfect alternative is troublesome, given that we rarely have all our options before us, and it is difficult to ever know if we have found that best alternative. While, on the surface, the terminology sounds like satisficing here might be equated with satisficers and utility maximization with maximizers, we see exactly the opposite. That is, by using a satisficing strategy with a high threshold, indecisive individuals are largely trying to get a perfect or almost perfect option, and they will keep looking for it regardless of the risk. Decisive individuals, in contrast, by using a utility maximization strategy, are trying to get the best alternative that they can, given what is available. They are satisficing in the specific sense they are accepting something good enough rather than taking a chance on getting something better or worse with continued search. Reports of maximizers are consistent with those of indecisive individuals; the latter are also less satisfied with their choices and believe that making decisions negatively impacts their lives (Frost & Shows, 1993).

DOI: 10.1002/bdm

Indecisiveness and search patterns

The search patterns on the first day speak not to the decision of whether to choose versus to delay—at least not explicitly—but rather to the process by which a preference is identified in the initial choice set. Recall that indecisive individuals opened cells of information on this day using a predominantly alternative-based search pattern, looking at desired information about one alternative before going on to the next alternative. According to Payne and colleagues (Payne et al., 1988), this pattern is consistent with use of a resource-intensive compensatory strategy, such as a weighted additive rule, but it is also precisely the pattern one would expect if a decision maker were using a satisficing strategy (Simon, 1955). The decision maker sets a threshold for a minimally acceptable alternative, and then looks across each alternative to see if it meets the threshold; as soon as a violation is found, the decision maker goes on to the next alternative. The major limitation of the strategy is that it does not always produce a preferred alternative in the choice set. Use of a satisficing strategy at this level of identifying a preferred alternative is consistent with use of the strategy at the level of deciding whether to choose versus to defer. If an alternative is deemed acceptable, search stops; if not, the next alternative in the set is considered. If an existing choice set is exhausted without a desirable alternative having been found, search continues for further alternatives. The fact that a preference is not always identified in an initial choice set does not matter because failure to find a preferred choice is precisely the reason for going on to look for further ones.

In contrast, decisive individuals opened cells of information using a predominantly dimension-based search pattern, comparing alternatives on one dimension before going on to another dimension. This search direction suggests that these individuals use a non-compensatory strategy, such as elimination by aspects (Tversky, 1972), to identify a preferred alternative in the initial set. This is a slightly more taxing strategy than a satisficing strategy (depending on which of many possible non-compensatory rules are being used; Payne et al., 1988), but always produces a preferred alternative, rather than sometimes recommending none. Ensuring that a preferred alternative is always identified is important because, at least in the current formulation of expected utility applied to decisional delay (Tversky & Shafir, 1992), the utility of the alternative also serves as the expected utility of choice, which is compared with the expected utility of delay to determine whether or not to defer decision-making.

One difference between this research and the process-tracing studies of Ferrari and Dovidio (2000, 2001) is that the earlier work reported a dimension-based search pattern among indecisive individuals and an alternative-based pattern among decisive ones, while we found the opposite. In some ways, differences in search patterns across studies should come as little surprise, as people are well known to adapt their search strategies to situational demands (Payne et al., 1988). However, we have some more concrete comments about this difference. First, a major finding of Ferrari and Dovidio (2001) was that decisive individuals were less taxed by the decision process and so were able to use more resource-intensive strategies. When we propose that indecisive individuals used a satisficing strategy while decisive individuals used a non-compensatory strategy here, we are again arguing that the strategy of decisive individuals was more resource intensive than that of indecisive ones. It is just that both strategies might have been less resource intensive here (than in Ferrari & Dovidio, 2001) because the present decision tasks—with the addition of multiple days, risk information, and, in the second study, hidden cells—were more difficult. Furthermore, by our account, the task used by Ferrari and Dovidio would have been perceived differently by indecisive individuals as compared with our task. Their task was clearly about choosing the most preferred alternative in the set, while ours clearly allowed that, at least on the early days, no preferred alternative need be found. This could have prompted a satisficing strategy here but not in Ferrari and Dovidio's task.

The nature of indecisiveness

This expected utility versus satisficing account—as well as the alternative possibility that indecisive individuals use expected utility but place greater value on ideal alternatives—is consistent with past

DOI: 10.1002/bdm

correlations with perfectionism (Frost, Martin, Lahart, & Rosenblate, 1990) as well as with theoretical perspectives on the nature of indecisiveness. Frost and colleagues found reliable correlations between the Indecisiveness Scale and two subscales of their Multidimensional Perfectionism Scale (MPS; Frost et al., 1990; Frost & Shows, 1993): Concern over Mistakes (internal $\alpha = 0.20$) and Personal Standards ($\alpha = 0.55$). The Concern Over Mistakes subscale reflects a negative reaction to mistakes, a tendency to interpret mistakes as failure, and a tendency to believe one will lose the respect of others as a result of mistakes (e.g., ''People will probably think less of me if I make a mistake''). The Personal Standards subscale reflects the setting of very high standards for oneself and the excessive importance placed on these high standards for self-evaluation (''I set higher standards for myself than most people''). Holding such beliefs is consistent with setting a high threshold for acceptable choice alternatives, and for striving to obtain these without obvious regard to the risks of delay. The Burns' (1980) Perfectionism Scale used here is a shorter scale containing elements of both the MPS subscales, but largely focusing on mistakes. The correlation between this and the Indecisiveness Scale was reliably different from zero in the first study only ($r = 0.28$ in Experiment 1), but the scale items have been less carefully tested than the MPS items, and the strong language of the items might have been objectionable to many students (e.g., ''If I scold myself for failing to live up to my expectations, it will help me do better in the future''), resulting in some error. Future study of the relationship between scores on the MPS and decisional delay behavior might be more informative.

Others have argued that indecisiveness is associated with a need for certainty (Frost & Shows, 1993), a desire to minimize error (Salzman, 1980), and a lower threshold for deciding what is important (Reed, 1985). It had previously been difficult to interpret what these might imply about behavior in the context of a decision task such as the present one. For example, one could have a high need for certainty in the sense of preferring a certain probability of a good alternative to the uncertain prospect of a better one. The results suggest that a high need for certainty and a desire to minimize errors might refer to a desire to make sure that no better alternatives exist before committing to an inferior choice alternative rather than to a preference for certainty over uncertainty in the probability sense. The prospect of missing such an alternative appears to be less bad to indecisive individuals than that of missing out on an earlier attractive but sub-threshold alternative. Past work with sequential tasks has shown that individuals in general wait longer to make a choice when they know that they will be shown the future alternatives they did not consider relative to when they know that they will not be shown these alternatives (Cooke, Meyvis, & Schwartz, 2001). People appear to regret missing a future opportunity more than they regret passing up a past one.

In the introduction, our studies were motivated by the belief that the choice difficulty experienced by indecisive individuals might promote delay as a means of choice avoidance. The strategy results, combined with the discussion of perfectionism, suggest that choice difficulty might arise because it is not clear what to do when no alternatives exceed one's threshold. That is, a satisficing procedure does not clearly produce choice alternatives that are the best available if they are also not above threshold. The only real recourse is to delay choice. In one way, delay can be thought of as a decision to continue to search for the ideal alternative. In another way though, continued search might be a means of avoiding the often-inevitable task of lowering one's threshold (e.g., figuring out which dimensions to relax), of identifying a different choice strategy, or of making a commitment to an imperfect alternative.

Conclusions

The application of expected utility to dynamic situations has allowed us to look at the delay behavior of decisive and indecisive individuals in situations in which delay is not a uniformly negative decision behavior. While delay can have negative consequences in the form of increased time and effort in static situations, the value of making a decision immediately versus after delay in dynamic situations depends on the expected utilities of these two options. In other words, it is equally problematic to commit to a choice before attractive alternatives have been found, as it is to delay choice to the point that all attractive alternatives are no longer

DOI: 10.1002/bdm

available. Dynamic choice situations provide a framework in which to consider the question of whether indecisive individuals *always* delay choice to a greater extent than do more decisive individuals versus that indecisive individuals respond differently than do decisive ones to the benefits and risks of choice versus delay. The results provide evidence that they do, in fact, respond differently to these situations, such that only decisive individuals clearly alter their delay behavior in response to the risks and benefits associated with deferral.

The results suggest that the question of how people decide when to commit to a choice alternative, in the face of a dynamic set of alternatives, has a different answer depending on who is making the decision. Decisive and indecisive individuals appear to use entirely different strategies—based on different goals—both at the micro level of identifying promising alternatives and at the macro level of determining whether to prolong delay. Further work is needed—including careful manipulation of the quality of choice alternatives, the degree of benefits and risks over time, the variability of the alternatives in the environment, and the importance of the decision—towards developing a richer understanding of the variety of ways in which individuals decide when to decide.

APPENDIX

Course selection grid

In the actual materials, the numbers were replaced with the following:

Meeting Time: 1 = Preferred, 2 = Acceptable, 3 = Undesirable
Instructor Quality: 1 = Good, 2 = Fair, 3 = Poor
Relevance to Goals: 1 = High, 2 = Moderate, 3 = No relevance
Amount of Work: 1 = Preferred, 2 = Ok, but high, 3 = Burdensome
Peer Evaluations: 1 = Good, 2 = Fair, 3 = Poor
Topic Interest: 1 = High, 2 = Moderate, 3 = Low

	Seats available[a]	Meeting time	Instructor quality	Relevance to goals	Amount of work	Peer evaluation	Topic interest
Day 1							
Course A	2	2	3	1	1	2	1
Course B	4	1	1	2	1	1	3
Course C	3	2	2	2	2	2	2
Course D	4	1	1	1	3	2	2
Course E	3	2	2	1	1	1	2
Day 2							
Course F	3	2	3	3	1	2	2
Course G	2[b]	2	1	1	1	2	1
Day 3							
Course H	4	2	2	1	1	2	2
Course I	3[c]	3(1)[d]	1	3 (1)	2	1	1
Day 4							
Course J	3	3	3	3	2	3	3
Course K	4	1	2	2	1	3	1
Day 5							
Course L	2	1	3	1	1	3	1
Course M	1	3	2	1	1	1	2

[a]These values are for the Risk condition; the No-Risk condition values were all >10.
[b]Changes to 0 seats available on Day 3 in Risk condition.
[c]Changes to 0 seats available on Day 4 in Risk condition.
[d]The values in parentheses were the only changes made to the grid for Experiment 2.

DOI: 10.1002/bdm

ACKNOWLEDGEMENTS

This work was partially supported by a Hughes Foundation Fellowship to Steven M. Wengrovitz. The authors thank Ying Xiong, Jessica Jacobson, Sam Duncan, Rebecca Gould, and Kirsten Haller for many helpful discussions of this research. The authors thank three anonymous reviewers for their invaluable comments and suggestions.

REFERENCES

Anderson, C. J. (2003). The psychology of doing nothing: Forms of decision avoidance from reason and emotion. *Psychological Bulletin, 129*, 139–167.

Beswick, G., Rothblum, E. D., & Mann, L. (1988). Psychological antecedents to student procrastination. *Australian Psychologist, 23*, 207–217.

Burns, D. D. (1980). The perfectionist's script for self-defeat. *Psychology Today*, 34–52.

Cooke, A. D. J., Meyvis, T., & Schwartz, J. (2001). Avoiding future regret in purchase timing decisions. *Journal of Consumer Research, 27*, 447–459.

Corbin, R. M. (1980). Decisions that might not get made. In T. S. Wallsten (Ed.), *Cognitive processes in choice and decision behavior* (pp. 47–68). Hillsdale, NJ: Erlbaum.

Crites, J. O. (1969). *Vocational psychology: The study of vocational behavior and development*. New York: McGraw-Hill.

Dhar, R. (1997). Consumer preference for a no-option choice. *Journal of Consumer Research, 24*, 215–231.

Effert, B., & Ferrari, J. R. (1989). Decisional procrastination: Examining personality correlates. *Journal of Social Behavior and Personality, 4*, 151–156.

Ferrari, J. R., & Dovidio, J. F. (2000). Information search processes by indecisives: Individual differences in decisional procrastination. *Journal of Research in Personality, 34*, 127–137.

Ferrari, J. R., & Dovidio, J. F. (2001). Behavioral information search processes by indecisives. *Personality and Individual Differences, 30*, 1113–1123.

Frost, R. O., & Gross, R. C. (1992). The hoarding of possessions. *Behaviour Research and Therapy, 31*, 367–381.

Frost, R. O., Martin, P., Lahart, C., & Rosenblate, R. (1990). The dimensions of perfectionism. *Cognitive Therapy and Research, 14*, 449–468.

Frost, R. O., & Shows, D. L. (1993). The nature and measurement of compulsive indecisiveness. *Behaviour Research and Therapy, 31*, 683–692.

Gayton, W. F., Clavin, R. H., Clavin, S. L., & Broida, J. (1994). Further validation of the indecisiveness scale. *Psychological Reports, 75*, 1631–1634.

Germeijs, V., & DeBoeck, P. D. (2002). A measurement scale for indecisiveness and its relationship to career indecision and other types of indecision. *European Journal of Psychological Assessment, 18*, 113–122.

Hogg, R. V., & Craig, A. (1995). *Introduction to mathematical statistics* (5th ed.). Englewood Cliffs, NJ: Prentice Hall.

Jackson, C. J., Furnham, A., & Lawty-Jones, M. (1999). Relationship between indecisiveness and neuroticism: The moderating effect of a tough-minded culture. *Personality and Individual Differences, 27*, 789–800.

Janis, I. L., & Mann, L. (1977). *Decision making*. New York: Free Press.

Mann, L. (1982). *Decision-making questionnaire*. Unpublished scale. Flinders University of South Australia.

Patalano, A. L., & Wengrovitz, S. M. (2006). Cross-cultural exploration of the Indecisiveness Scale: A comparison of Chinese and American men and women. *Personality and Individual Differences, 41*, 813–824.

Payne, J. W. (1976). Task complexity and contingent processing in decision-making: An information search and protocol analysis. *Organizational Behavior and Human Performance, 16*, 366–387.

Payne, J. W., Bettman, J. R., & Johnson, E. J. (1993). *The adaptive decision maker.* New York: Cambridge University Press.

Payne, J. W., Bettman, J. R., & Johnson, E. J. (1988). Adaptive strategy selection in decision–making. *Journal of Experimental Psychology: Learning, Memory and Cognition, 14*, 534–552.

Rassin, E., & Muris, P. (2005). To be or not to be . . . indecisive: Gender differences, correlations with obsessive-compulsive complaints, and behavioural manifestation. *Personality and Individual Differences, 38*, 1175–1181.

Reed, G. F. (1985). *Obsessional experience and compulsive behaviour: A cognitive-structural approach*. Orlando, FL: Academic Press, Inc.

Salzman, L. (1980). *Treatment of the obsessive personality.* New York: Jason Aronson.

DOI: 10.1002/bdm

Schwartz, B., Ward, A., Monterosso, J., Lybominsky, S., White, K., & Lehman, D. R. (2002). Maximizing versus satisficing: Happiness is a matter of choice. *Journal of Personality and Social Psychology, 83*, 1178–1197.
Simon, H. A. (1955). A behavioral model of rational choice. *Quarterly Journal of Economics, 69*, 99–118.
Tversky, A. (1972). Elimination by aspects: A theory of choice. *Psychological Review, 79*, 281–299.
Tversky, A., & Shafir, E. (1992). Choice under conflict: The dynamics of deferred decision. *Psychological Science, 3*, 358–361.
Tykocinski, O. E., & Ruffle, B. J. (2003). Reasonable reasons for waiting. *Journal of Behavioral Decision Making, 16*, 147–157.
Veinott, E. S. (2002). The effect of understanding and anticipated regret on decision readiness. Unpublished doctoral dissertation, University of Michigan, Ann Arbor.
Von Neumann, J., & Morgenstern, O. (1947). *Theory of games and economic behavior* (2nd ed.). Princeton, NJ: Princeton University Press.
Wengrovitz, S. M., & Patalano, A. L. (2006). [Test-rest reliability of Frost & Shows' Indecisiveness Scale] Unpublished raw data.

Authors' biographies:

Andrea L. Patalano is an assistant professor in the Department of Psychology and the Program in Neuroscience and Behavior at Wesleyan University. Her research interests include decision-making, categorization, and planning.

Steven M. Wengrovitz is a Master's degree candidate in the Department of Psychology at Wesleyan University. His research interests include decision-making, political psychology, and individual and cross-cultural differences.

Authors' addresses:

Andrea L. Patalano and **Steven M. Wengrovitz**, Department of Psychology, Wesleyan University, 207 High St., Middletown, CT 06459-0408, USA.

DOI: 10.1002/bdm