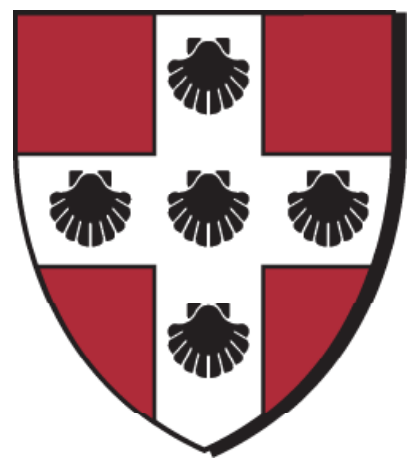


Eye Movements and Decision Making Behavior in Indecisive Individuals



Joanna Dicke

Faculty Sponsors: Barbara Juhasz & Andrea Patalano, Psychology Department

Eye Movement Lab at Wesleyan University

QAC Summer 2008

Introduction

Indecisiveness is defined as the inability to make decisions in a timely manner across situations and domains [1], and it may inhibit the ability to process information and make a suitable decision [2]. Indecisiveness has been correlated with other characteristics such as perfectionism, lower self-esteem and lower life satisfaction, behavioral manifestations such as taking more time to decide and procrastination [1], and gathering more information on the chosen course from an information grid in a course decision task [3]. In addition, indecisives and decisives seem to use different search strategies but findings have been conflicting. Some report that indecisives use alternative-based (inter-dimensional) search strategies—searching across the dimensions for each course alternative—and decisives use dimension-based (intra-dimensional) strategies—searching across the courses for each dimension [4], while other studies have found the opposite [5].

Purpose

- To apply eye movement to decision making search behavior because of the advantages it holds over manual search tasks [6].
- To understand how indecisiveness affects decision making search behaviors, with a primary focus on the amount of information gathered and search strategy.
- Of secondary interest is how other personality correlates can also provide insight into the underlying factors of decision-making search behaviors.

Method

Participants: 55 Wesleyan University students

Apparatus: An EyeLink 1000 eye tracker was used to record subjects’ eye movements. It records eye fixations every millisecond.

Procedure:

•Conditions:

•No Delay

In this condition, there was one trial. Subjects were asked to look at a grid containing information on five dimensions for five college course options while their eye movements were tracked. They were instructed to look at as little or as much information as they wanted and then to make a course decision.

•Delay

Subjects in this condition were told that they had the option of re-accessing the course database once more before making a course decision, during which courses could become available or unavailable. If they chose to defer, there were no changes and the same course grid was presented as Trial 2.

	MEETING TIME	INSTRUCTOR QUALITY	AMOUNT OF WORK	USEFULNESS FOR GOALS	INTEREST IN TOPIC
COURSE A	Acceptable	Poor	Preferred	Fair	High
COURSE B	Preferred	Good	Preferred	Poor	Low
COURSE C	Acceptable	Fair	Burdensome	Fair	Moderate
COURSE D	Fair	Good	Burdensome	Good	High
COURSE E	Acceptable	Fair	Acceptable	Good	Low

Screen shot of course information grid with **alternative-based** and **dimension-based** strategies shown.

•Subjects filled out a questionnaire using items from personality scales, such as Frost & Shows’ 15-item Indecisiveness Scale, which includes items like “I try to put off making decisions.”

•Other scales that were used measure holism, self-esteem, maximization, and perfectionism.

Results

Personality Scale Correlations:

	Holism	Concern over mistakes	Doubt about actions	Low Self-Esteem	Maximization
Indecisiveness	.197	.204	.688**	.691**	.194
Holism		-.069	.143	.256	.162
Concern over mistakes			.492**	.414**	.458**
Doubt about actions				.592**	.533**
Low Self-Esteem					.278*

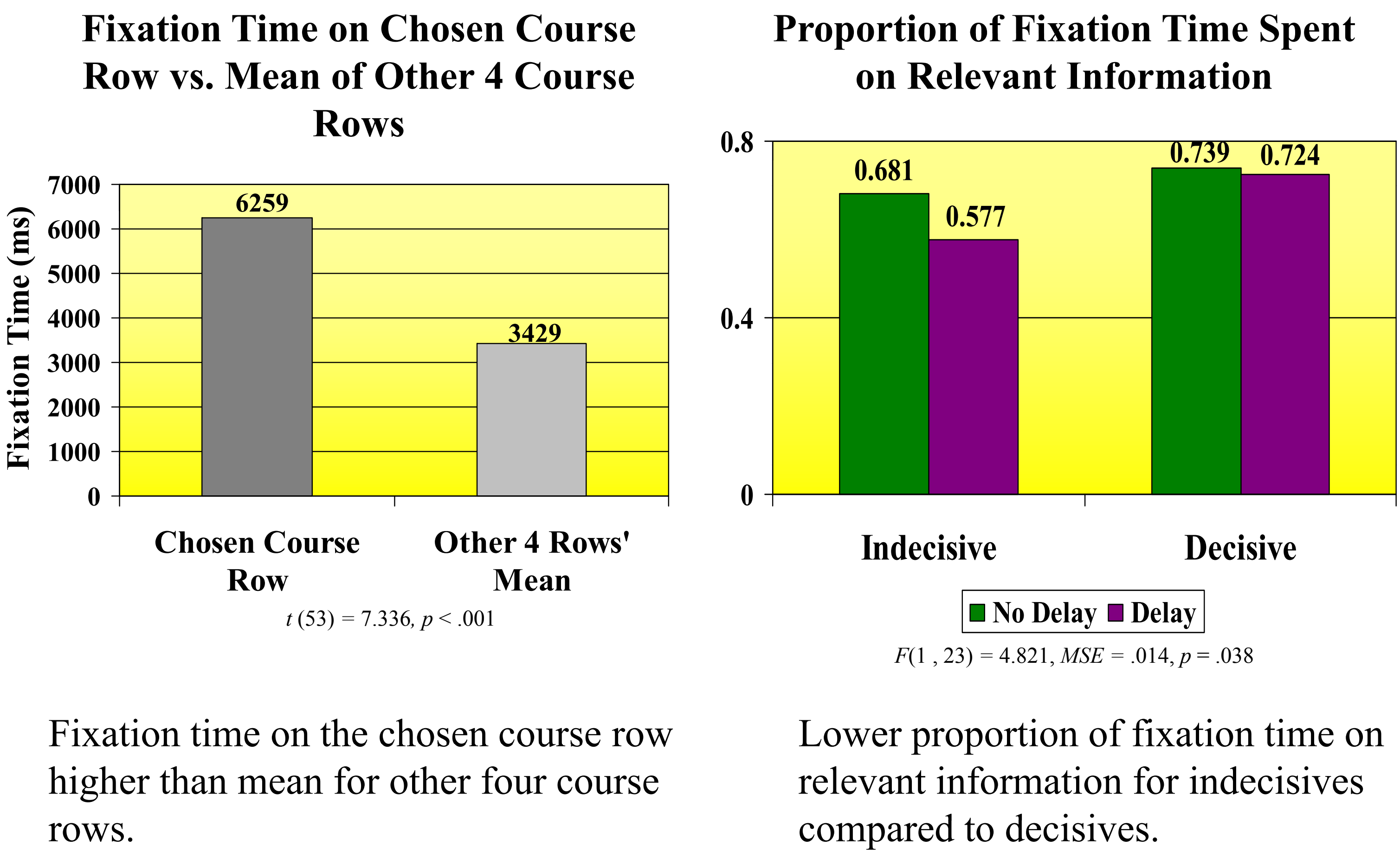
** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).111

Indecisiveness is highly correlated with doubt about actions, (part of the perfectionism scale) and low self-esteem.

Behavioral Descriptives:

	Trial 1		First 75 Fixations	
	Mean	Std. Deviation	Mean	Std. Deviation
Total fixation time (ms)	45459	18089	17360	2219
Fixation time on relevant information (ms)	31196	13728	12459	3320
Fixation time in blank cells (ms)	14250	8538	4890	2489
Proportion of intra-dimensional shifts	.706	.091	.696	.154
Fixation time in chosen course row (ms)	6259	3534	1549	1483.404

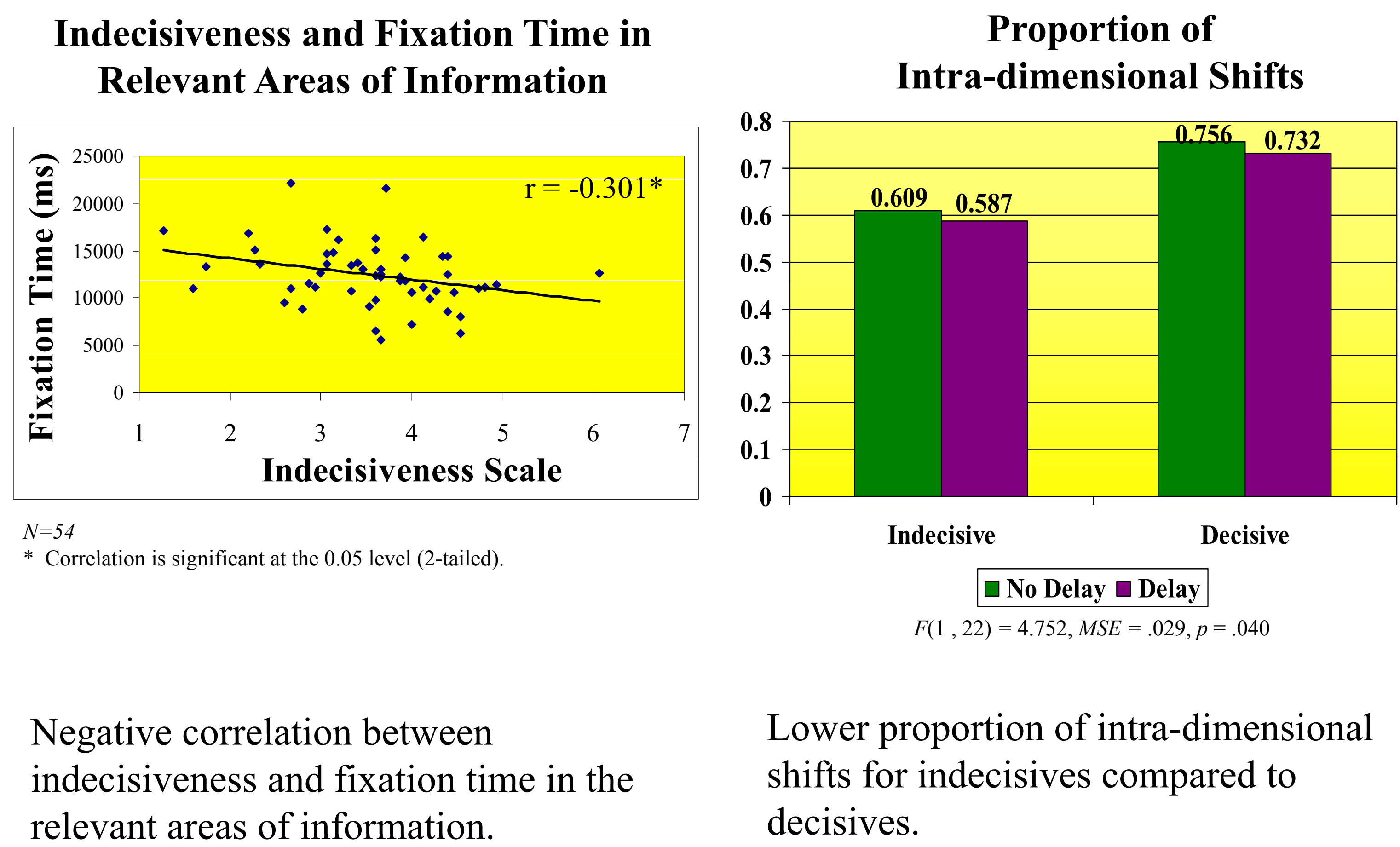
Trial 1:



Fixation time on the chosen course row higher than mean for other four course rows.

Lower proportion of fixation time on relevant information for indecisives compared to decisives.

First 75 Fixations:



Negative correlation between indecisiveness and fixation time in the relevant areas of information.

Lower proportion of intra-dimensional shifts for indecisives compared to decisives.

Note: Subjects categorized as indecisive or decisive were in the lowest or highest quartiles of indecisiveness, respectively.

Summary

- Indecisiveness is highly correlated with doubt about actions and low self-esteem.
- In Trial 1, participants looked at the chosen course row more than any of the other four rows—**eye movements capture facets of people’s decision making thought processes**.
- In Trial 1, indecisives spent a lower proportion of their fixation time on relevant information compared to decisives and a **higher percentage of time on blank spaces**.
- In the first 75 fixations, there was a **negative correlation** between indecisiveness and fixation time in the relevant areas of information.
- In the first 75 fixations, indecisives relied on more of an **alternative-based** search strategy than decisives.

Conclusions and Discussion

- Eye tracking methods can provide insight into decision making behaviors.
- **Indecisive** individuals look **less at areas containing information** and use a **different search strategy** than decisive individuals, using **more of an alternative-based search**.
 - This is similar to the search pattern found by Patalano and Wengrovitz (2007).
- Analyses of **doubt** and **self-esteem** yielded results similar to indecisiveness.
 - Post-hoc analyses revealed that once low self-esteem was covaried out in an analysis of covariance, the relationship between indecisiveness and the proportion of intra-dimensional shifts was no longer significant. This highlights the problem of the **highly collinear nature of indecisiveness** and self-esteem.

Future Research

- What are indecisive individuals thinking when they look more at the blank spaces when faced with making a decision?
- Disentangle the relationship between indecisiveness and other personality correlates such as self-esteem and perfectionism.

Acknowledgments

The author would like to thank Professors Barbara Juhasz and Andrea Patalano for their mentorship and collaboration; Manolis Kaparakis for his teaching and advice; all the Eye Movement and Reading Lab students for their input; and the 2008 Quantitative Analysis Center Summer Program.

Literature Cited

1. Frost, R. O., & Shows, D. L.(1993). The nature and measurement of compulsive indecisiveness. *Behaviour Research and Therapy*, 31(7), 683-692.
2. Di Fabio, A. (2006). Decisional procrastination correlates: Personality traits, self-esteem or perception of cognitive failure? *International Journal for Educational and Vocational Guidance*, 6(2), 109-122.
3. Rassin, E., Muris, P., Booster, E., & Kolsloot, I. (2008). Indecisiveness and informational tunnel vision. *Personality and Individual Differences*, 45(1), 96-102.
4. Patalano, A. L., & Wengrovitz, S.M. (2007). Indecisiveness and response to risk in deciding when to decide. *Journal of Behavioral Decision Making*, 20(4), 405-424.
5. Ferrari, J. R., & Dovidio, J.F. (2000). Examining behavioral processes in indecision: Decisional procrastination and decision-making style. *Journal of Research in Personality*, 34(1), 127-137.
6. Russo, J., & Doshier, B. A. (1983). Strategies for multiattribute binary choice. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 9(4), 676-696.