

# Religious Information Processing Biases: Detecting Change Blindness Using a Flicker Paradigm

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## Background

### Information Processing Biases

Information processing biases (IPBs) are cognitive biases towards certain tasks which result in either faster or slower processing of objects than normal. IPBs have been detected in a variety of people such as opiate users (Lubman, Peters, Mogg, Bradley & Deakin, 2000), social drinkers (Jones, Jones, Smith & Copley, 2003) and anorexics (Channon, Hemsley & de Silva, 1988). There is also some evidence to suggest IPBs occur in religious people (Gibson, 2006). One way of detecting facilitating IPBs is the flicker paradigm. A flicker paradigm is used to detect differences in change blindness between salient and neutral objects in order to identify biases (Jones, Jones, Smith & Copley, 2003). Biases detected are most commonly associated with specific behaviors.

### Religiosity

Religiosity has been measured in numerous different ways. Early practices measured solely religious attendance (Tittle & Welch, 1986). Of late the literature has moved to a more multidimensional approach like measuring a combination of religious attendance, prayer and personal views of religion ((Barkan, 2007). One of most multidimensional approaches is the BMMRS (John E. Fetzer Institute, 1999) which can be used as a whole or in parts (Mann & McKeown, 2007). This survey contains questions about both religious practices and religious attitudes. Another more recent measure of a person's participation in religious activities is the Spiritual Discipline Inventory (Habenicht, 2008). This survey explores ten different spiritual practices commonly found in religious writings. It asks specific questions about the frequency of the behavior and the attitude towards the behavior. This delineation between behaviors and attitudes is important because some literature suggests that there may be a significant difference between the two (Gorsuch, 1990).

### Hypotheses

Based on the literature we hypothesize that people with higher religious beliefs will show an increased bias towards detecting religiously salient objects. We also expect that people with higher religious attitudes will also show increased bias.

## Study 1

### Data Collection

Subjects were recruited from psychology classes Andrews University, were above the age of 18 and the majority had previous experience with flicker paradigms. A total of 47 subjects were tested in a quiet lab on identical computers. Following the flicker paradigm subjects completed two questionnaires measuring their religious attitudes and behaviors. Two students failed to complete the questionnaires reducing our N to 45. Questionnaires were scored by adding up responses to behavior questions and attitude questions separately, resulting in two composite scores.

## Design

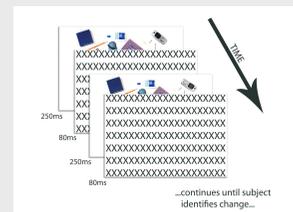
Three different types of scenes were created for this study:



Subjects viewed a total of 68 trials (32 Circle, 32 Grid and 4 Clutter). Each trial consisted of an original image followed by a disruption screen followed by the original scene with one of the objects in the scene changed. The changed object was either religiously salient or neutral:



The screen flickered between the two images in the following fashion until subject indicated that they had located the change by clicking on it.



There were a total of 8 religious changes for both the Circle trial and the Grid trial with 24 neutral changes to act a filler. For the Clutter trial subjects viewed 2 religious changes and 2 neutral changes. Trial order was randomized and counter-balanced.

## Findings

Once the data was collected averages were calculated for the number of screen changes required for the subject to locate the changing object. The scores were normalized in order to allow for comparison between trials and then the difference between the neutral average and the religious average were calculated. This was used to measure the amount of bias in a subject. This measurement was compared to the subjects self-report on religious behaviors and religious attitudes. The correlations are as follows:

		Grid Bias	Circle Bias	Clutter Bias
Behaviors	Pearson Correlation	.118	.118	.241
	Sig. (2-tailed)	.856	.847	.021
Attitudes	Pearson Correlation	.030	.069	.266
	Sig. (2-tailed)	.844	.657	.077

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

## Discussion

Our first hypothesis was supported by the data, but only in the Clutter condition. This makes sense considering that the Jones, et al. (2003) study used real world images of this type. Perhaps people fall back on some form of heuristic when the scene is obviously ordered. Our second hypothesis was partially supported, as attitudes were only marginally significant ( $p=.077$ ), and thus not as strong a predictor of bias as behavior. One potential reason that this effect was not stronger is that subjects may have been experiencing a priming effect due to the large number of trials. The Jones, et al. (2003) study only involved one flicker trial per subject.

## Study 2

### Data Collection

Data was collected using a convenience sample on the campus of Andrews University. Subjects were above the age of 18 and were currently enrolled at the University. 32 subjects participated (16 males, 16 females) but due to data corruption only 31 subjects were included in the analysis. Subjects completed the flicker paradigm on a laptop at various places on campus.

### Design

In this study students only viewed 4 stimuli (the Clutter set from Study 1). Otherwise the experiment was run in the same manner. Subjects' scores on each scene were normalized across participants in order to make it possible to combine data between trials. The neutral values were then combined together and the related values were combined together. The difference of these two values was then used to indicate the subjects' bias towards detecting religiously-salient objects.

## Findings

		Attitude	Behavior
Religious Bias	Pearson Correlation	.433*	.426*
	Sig. (2-tailed)	.015	.017

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

## Implications

In a study with a smaller number of trials, both of our hypotheses were supported. This is in line with the Jones, et al. (2003) study which used only 1 trial per subject. This study has a number of major implications. First, the organization of objects in a scene affects how people process it. Secondly, when people are exposed to a large number of trials they may potentially be primed by previous trials. Finally, as people's religious behaviors and attitudes increase, they are more likely to notice changes in religiously salient stimuli. Although a great deal more research needs to be done in this field, hopefully this study will provide a starting point for looking at religious IPBs.