

# A Categorical Analysis of the Relationship Between Protestantism and Evolutionary Understanding and Acceptance

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## INTRODUCTION

Kansas and the Midwest in general have come under fire in recent time concerning the issue of evolution education. The Kansas Evolution Hearings of 2005, and the subsequent changes to the state's science standards in favor of Intelligent Design, rolled back decades of progress on the issue of evolution. Although the changes were repealed less than 2 years later, the damage to both students and the popular image of the Midwest had been wrought, leaving the state to be the brunt of jokes on the web (the Onion), television (Jon Stewart's The Daily Show), and print magazines (The New Yorker).

In the eyes of some pro-evolutionists, religion has been the impetus for the backpedaling in terms of evolution understanding and acceptance. To them, the region has become a haven for the stereotypical Protestant: a science-denouncing biblical literalist who outright rejects the theory of evolution. Although this is an extreme portrayal, how true (or false) is this stereotype? Are Protestants, especially those belonging to more conservative denominations, truly more likely to reject and remain ignorant to evolutionary theory? With the overwhelming majority of the Midwest belonging to one Protestant denomination or another (Gallup, 2004), the answer to such questions could mean a great deal to educators and to the image of the region in general.

Given that stereotypes affect and are meant to represent groups rather than individuals, a categorical framework is ideal. Instead of relying on continuous scales of religious activity (cf. Hawley, Short, McCune, Osman, & Little, 2010), which cannot assess denominational membership, this study uses a categorical approach, allowing for a view of the general categories of denominations rather than of individuals. Within this framework, comparisons can be drawn between the four categories of religious "flavor" ("moderate" Protestant, "liberal" Protestant, Catholic, and "non-religious"; from Storm & Wilson, 2009) on three areas crucial to understanding and accepting evolution: Evolutionary knowledge, perception of evolution's relevance, and trusting in the science behind evolutionary theory. Finally, by assessing comparisons of Protestants and Catholics, this study critically evaluates whether Protestants specifically adopt anti-evolution attitudes, if Christianity as a whole can be categorized as against evolutionary theory, or if the stereotypes affecting Christians are largely unfounded.

## METHOD

### Participants

The sample consists of 642 undergraduates (Female: 61.68%; Age: M: 19.8 SD: 2.48) attending a large midwestern university whose current religious identity (as identified in the EALS, described below) corresponded to one of four theoretically meaningful categories (after Storm & Wilson, 2009):

- "Non-religious" (n = 167): Agnostics (61%) and atheists (39%)

- "Moderate" Protestant (n = 107): Baptists (50%), Lutherans (35%), and Pentecostals (15%)

- "Liberal" Protestant (n = 160): Methodists (46%), Church of Christ (25%), Presbyterians (19%), & Episcopalians (9%)

- Catholics (n = 208): Roman Catholic (100%)

### Materials

Students participated in the Evolutionary Attitudes and Literacy Survey (EALS; Hawley et al., 2009, May). The survey consists of 20 pages of web-presented items where respondents recorded demographic data (age, education of each parent, etc.) and rated the degree to which they agree or disagree with 104 statements (which corresponded to 16 constructs) on a one to seven scale (1 = *strongly disagree*, 4 = *neither agree nor disagree*, 7 = *strongly agree*). Related items were averaged to arrive at a score for each construct.

Three constructs were selected as particularly meaningful in assessing understanding and acceptance of evolution:

- Knowledge of evolutionary processes (**Knowledge**) (Alpha = 0.74; M = 4.96; SD = 0.88)
  - Seven items assessed basic evolutionary knowledge, including natural selection, tree thinking, and the role of mutation.
  - Ex: "In most populations, more offspring are born than can survive."
- Relevance of evolution (**Relevance**) (Alpha = 0.94; M = 4.84; SD = 1.22)
  - Eight items assess to what extent participants applied evolutionary concepts.
  - Ex: "Evolutionary theory helps us understand human origins."
- Trust of the scientific enterprise (**Trust**) (Alpha = 0.83; M = 5.03; SD = 1.05)
  - Seven items assessed to what degree participants trust the data and theorists involved with evolutionary theory.
  - Ex: "The vast majority of scientists accept evolution as a scientifically valid theory."

## ABSTRACT

In order to assess the validity of popular stereotypes surrounding Protestants, responses of 642 University of Kansas undergraduates to the Evolution Attitudes and Literacy survey (Hawley, Little, Sunderland, & Mendoza, 2009, May) were analyzed using a baseline-category logit model. The categorical predictor of religious identity (based on denomination: "moderate" Protestant, "liberal" Protestant, Catholic, or nonreligious) was predicted by scores on three Likert-scale constructs: relevance of evolution, trust of the scientific enterprise, and knowledge of evolutionary processes. While results of Relevance and Trust tended to support and expand stereotypes, Knowledge did not appear as a significant predictor. These results appear encouraging for evolution educators in the region.

## RESULTS

**Table 1. Means (Standard Deviations) of Standardized Independent Variables within Levels of Religious Identity**

	Trust	Relevance	Knowledge
Moderate	-0.68 (0.94)	-0.63 (1.13)	-0.36 (0.93)
Catholic	-0.27 (0.82)	-0.17 (0.78)	-0.20 (0.85)
Liberal	-0.20 (0.82)	-0.18 (0.84)	-0.17 (0.90)
Nonreligious	0.86 (0.76)	0.78 (0.76)	0.55 (1.00)

A simple examination of the means by religious group appears to support stereotypes, given that "moderate" Protestants have the lowest Trust, Relevance, and Knowledge scores while nonreligious individuals have the highest scores on these three measures.

**Table 2. Model Intercept and Beta Value Estimates (Standard Error)**

	Int.	Beta Estimates						
		Trust	Relevance	Knowledge	Trust*Rel	Trust*Know	Rel*Know	Trust*Rel*Know
N / M	0.29 (0.31)	<b>1.47****</b> (0.27)	<b>0.77**</b> (0.30)	0.02 (0.26)	<b>-0.66*</b> (0.28)	0.36 (0.30)	-0.31 (0.28)	0.24 (0.25)
L / M	0.99 (0.27)	0.34 (0.22)	-0.18 (0.24)	0.24 (0.21)	<b>-0.69***</b> (0.19)	0.30 (0.24)	0.13 (0.19)	0.00 (0.13)
C / M	0.96 (0.28)	0.20 (0.22)	-0.14 (0.23)	0.12 (0.20)	<b>-0.54***</b> (0.16)	0.38 (0.23)	-0.24 (0.21)	0.23 (0.16)
L / N	0.70 (0.24)	<b>-1.13****</b> (0.23)	<b>-0.95****</b> (0.26)	0.22 (0.22)	-0.03 (0.28)	-0.07 (0.26)	0.44 (0.25)	-0.25 (0.24)
C / N	0.67 (0.26)	<b>-1.27****</b> (0.22)	<b>-0.91****</b> (0.25)	0.10 (0.21)	0.12 (0.27)	0.02 (0.25)	0.07 (0.25)	-0.02 (0.23)
L / C	0.03 (0.21)	0.14 (0.17)	-0.05 (0.18)	0.12 (0.15)	-0.15 (0.18)	-0.08 (0.18)	<b>0.37*</b> (0.16)	-0.23 (0.14)

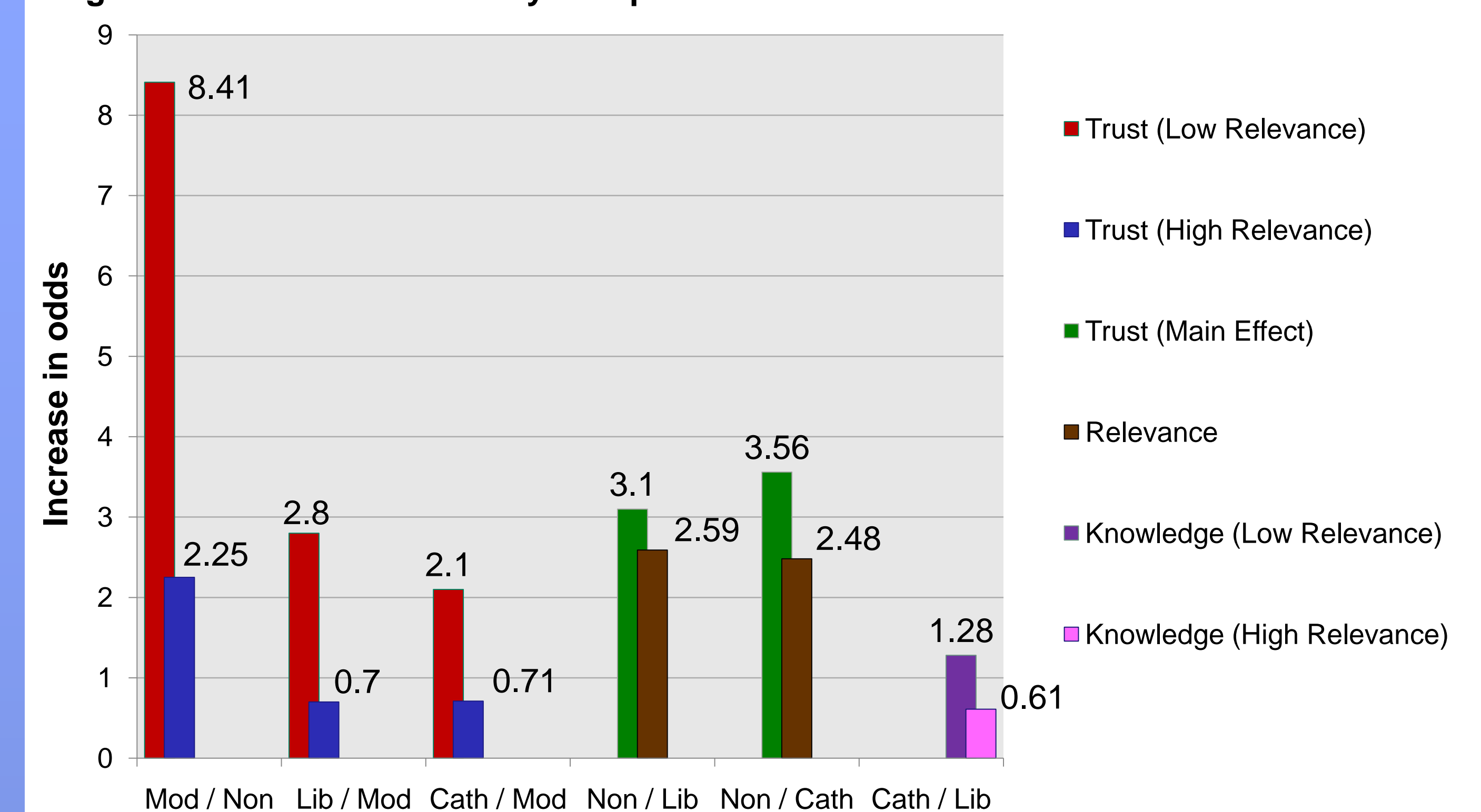
= p > 0.05; \* = p < 0.05; \*\* = p < 0.01; \*\*\* = p < 0.001; \*\*\*\* = p < 0.0001

"N" = "Nonreligious"; "M" = "moderate" Protestant; "L" = "liberal" Protestant; "C" = Catholic  
Ex: "N/M" = Comparing "nonreligious" individuals to "moderate" Protestants

Figure #1 graphically illustrates the increase in odds for each significant (p < 0.05) comparison.

- Nonreligious individuals were more associated with higher scores on Trust and Relevance than those from any Christian category.
- While "moderate" Protestants were associated with the lowest scores on Trust when Relevance was "low" (one standard deviation below the mean), they were associated with the highest scores (out of the Christian groups) on Trust when Relevance was "high" (one standard deviation above the mean).
- The effect of Knowledge only appears to slightly differentiate between Catholics and "liberal" Protestants, and only then when taking into consideration levels of Relevance. Therefore, all religious categories in this analysis (including nonreligious individuals) are equally associated with knowledge of evolutionary processes.

**Figure #1: Increase in Odds by Comparison and Construct**



## CONCLUSIONS

In terms of perceived relevance of evolution and trust of the science, the results of these analyses tend to actually expand the stereotype of the Protestant to include Catholics as well, given that one's odds of being nonreligious are, in all circumstances, increased with higher scores on Relevance and Trust. Therefore, Christians in general are more associated with low acceptance and low trust of evolutionary theory.

The interesting element that arose through these analyses, however, was the effect that differing levels of Relevance had on Trust. Although Protestants from "moderate" denominations are the least likely out of all the categories to trust in science when Relevance is held at a low level, they are the most likely out of the categories of Christians to trust in science when Relevance is held at a high level. It is hypothesized that "moderate" Protestants may have needed to trust in science more than other denominations in order to eventually reach a higher level of perceived relevance of evolution, given that there is more resistance and stigma associated with evolution in these moderate denominations versus more liberal denominations (Scott, 2004). In other words, "moderate" Protestants had to have more convincing (exhibited in a higher trust of science) in order to achieve the same level of Relevance as other denominations had achieved in the "high" Relevance condition. At this point, this is still only a hypothesis, however, and must be investigated in further depth in future research.

The finding that Knowledge did not emerge as a significant predictor for the differences between the groups should be encouraging to educators in the region, allowing them to consider each student, regardless of religious background, as capable of learning about key biological concepts like evolution.

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