

**Latent Structure  
in the  
Epistemic Process  
of  
Adult Judgment**

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## Introduction

The epistemological basis of judgment in loosely-structured, open-ended problems is a consequential area of study. The understanding of knowledge, the evaluation of authority, the assessment of evidence, and the justification of positions have serious implications for decision-making about important issues of life and society. Many researchers since Kohlberg (1963) and Perry (1970) have described developmental change observed in adult judgment. King and Kitchener (1994) proposed a 7-stage model of intellectual development during young-adulthood. On the other hand, Martin, Silva, Newman, and Thayer (1994) presented a model accounting for individual differences and change observed in 3 coexisting and relatively orthogonal epistemic processes (EP model).

The framework within which one conceptualizes thought has prescriptive implications for development and introduces different measurement issues for cognitive research as well as applied areas of education, risk assessment, and group behavior, among others. The investigation of growth in adult judgment has been complicated by the complexity of interview assessments and the difficulty of including both men and women in the same framework (Gilligan, 1982; Baxter-Magolda, 1992). Partly created as a solution to this difficulty, Kitchener and King's (1981) Reflective Judgment (RJ) model nonetheless often finds men to have a developmental advantage over women of the same age and educational level. Alternately, Martin et al. (1994), constructed a paper and pencil scale of adult intellectual development that measures differences in the 3 epistemological styles of absolutism, relativism, and evaluativism. The stylistic EP model has been used to examine gender differences and developmental trends (Newman, 1993), as well as to distinguish between intellectual differences among academic disciplines (Charney, Newman & Palmquist, 1995).

Briefly, the epistemological styles include: *absolutism*, a belief in direct and simple access to truth through observation or authorities who know right and wrong; *relativism*, a contextual pragmatism that holds all opinions as equal and all knowledge as subjective; and *evaluativism*, a process of value judgment based on critical thought and balanced consideration of perspectives. This poster presents an examination, using confirmatory factor analytic techniques, of hypotheses for stage-like or stylistic frameworks underlying the epistemic process. It then continues with an examination of age/education, gender, and academic discipline differences using an improved scale of adult intellectual development (SAID-60).

## Methods

### Subjects

1208 participants from schools in Maryland and Pennsylvania included 11<sup>th</sup>-grade through ABD graduate students with rural, suburban and urban backgrounds, nearly equal representation of sexes, and a minority sub-sample (13.7%).

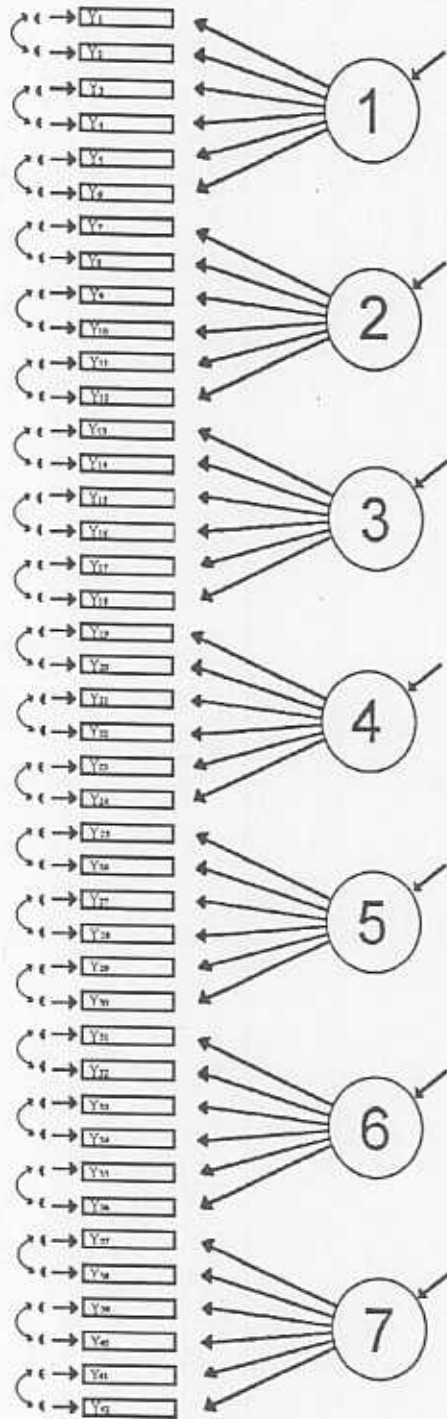
### Measures

Two alternate-form items were written to characterize each of the 81 heuristic rules and procedural concepts identified in the RJ interview scoring manuals (Kitchener, 1977; Kitchener & King, 1981, 1985). The 162 items were written for a 9<sup>th</sup>-grade reading level and piloted with 9<sup>th</sup>-grade, freshman, and graduate students for vocabulary and understanding. Three judges certified in the RJ scoring system validated the revised items ( $.72 \leq r \leq .83$ ). Four test-forms with different presentation sequences were created to counterbalance for item-order and fatigue effects. Responses were on a 7-point scale from unlike-me to like-me. Within each of the 7 RJ-stages average item correlation ranged from .19 to .32 and Cronbach's alpha ranged from .85 to .91 indicating very high internal consistency.

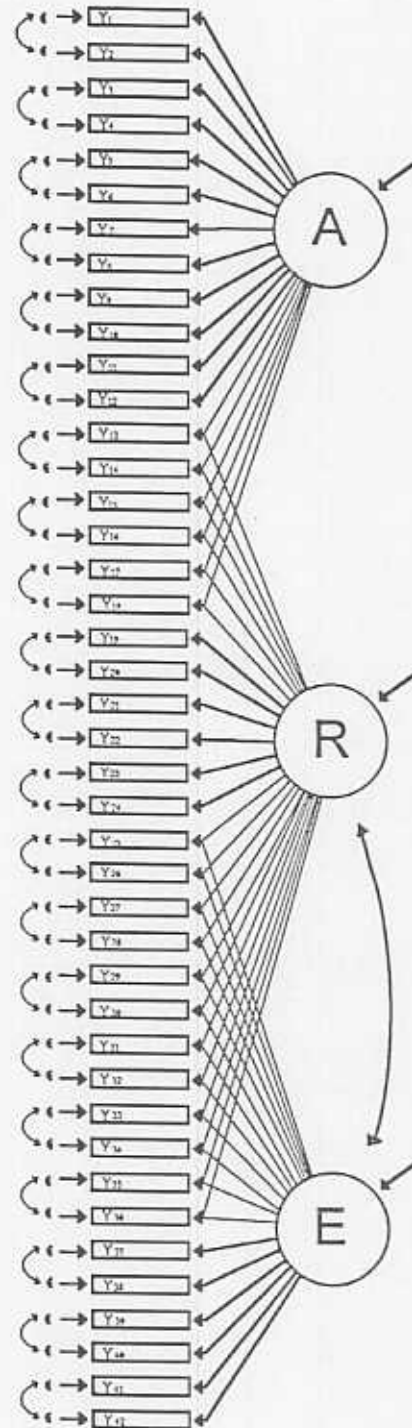
### Procedure

Responses were gathered in group-testing sessions of 30 to 60 participants. Of the 1208 participants, 198 of them missed 268 out of a total 195,696 data-points. Values for the omissions were imputed by selecting 6 items with the highest item correlation from the same RJ-stage and computing a multiple regression formula for estimating the missing value. In the first analysis, the alternate items were grouped into parallel 3 or 4 item mini-scales; 3 pairs of alternate mini-scales represented each RJ stage and the same concepts made up the mini-scales for each RJ-stage. The data set was randomly divided into two groups for replication purposes and a progressive sequence of nested structural equation models were fitted to the data using LISREL. Sex differences in the model structure were then examined with the full data set. For the second analysis, on the basis of the most adequate structural model, items were selected for 20-item subscales in an improved Scale of Adult Intellectual Development (SAID-60). The subscales were created with criteria of clarity in factor loading, internal subscale structure, and item reliability. Group differences for sex, education, and field of study were examined with MANOVA.

### RJ Model



### EP Model



### Competing Models

## Results

### Analysis 1

The goal of the first analysis was to compare the adequacy of the competing RJ and EP models. Beginning with the 7-stage RJ model, modifications consonant with good theory were made as suggested by LISREL. Moving from a strong-stage to a soft-stage framework by freeing the Psi-matrix produced a significant improvement ( $\Delta X^2 = 2342.56$ ,  $\Delta df = 21$ ,  $p < .0001$ ). The best stage-like model disclosed factors underlying RJ stages 1-2, 3, 4, 5-6, and 7. However, the 3 styles of the EP model showed a significant improvement ( $\Delta X^2 = 194.74$ ,  $\Delta df = 8$ ,  $p < .001$ ) over stages and the best goodness-of-fit of the models examined. Analysis of the second-half data-split replicated these results, with the qualification that only the 3-style EP model was statistically admissible. Reanalysis with the complete data set retained the good fit (GFI = .94, RMS = .05) and inclusion of sex-based groups did not improve the model with a GFI = .91 for men ( $n = 446$ ) and a GFI = .91 for women ( $n = 598$ ). No sensible modifications to the final model (see figure) were indicated for either sex.

### Analysis 2

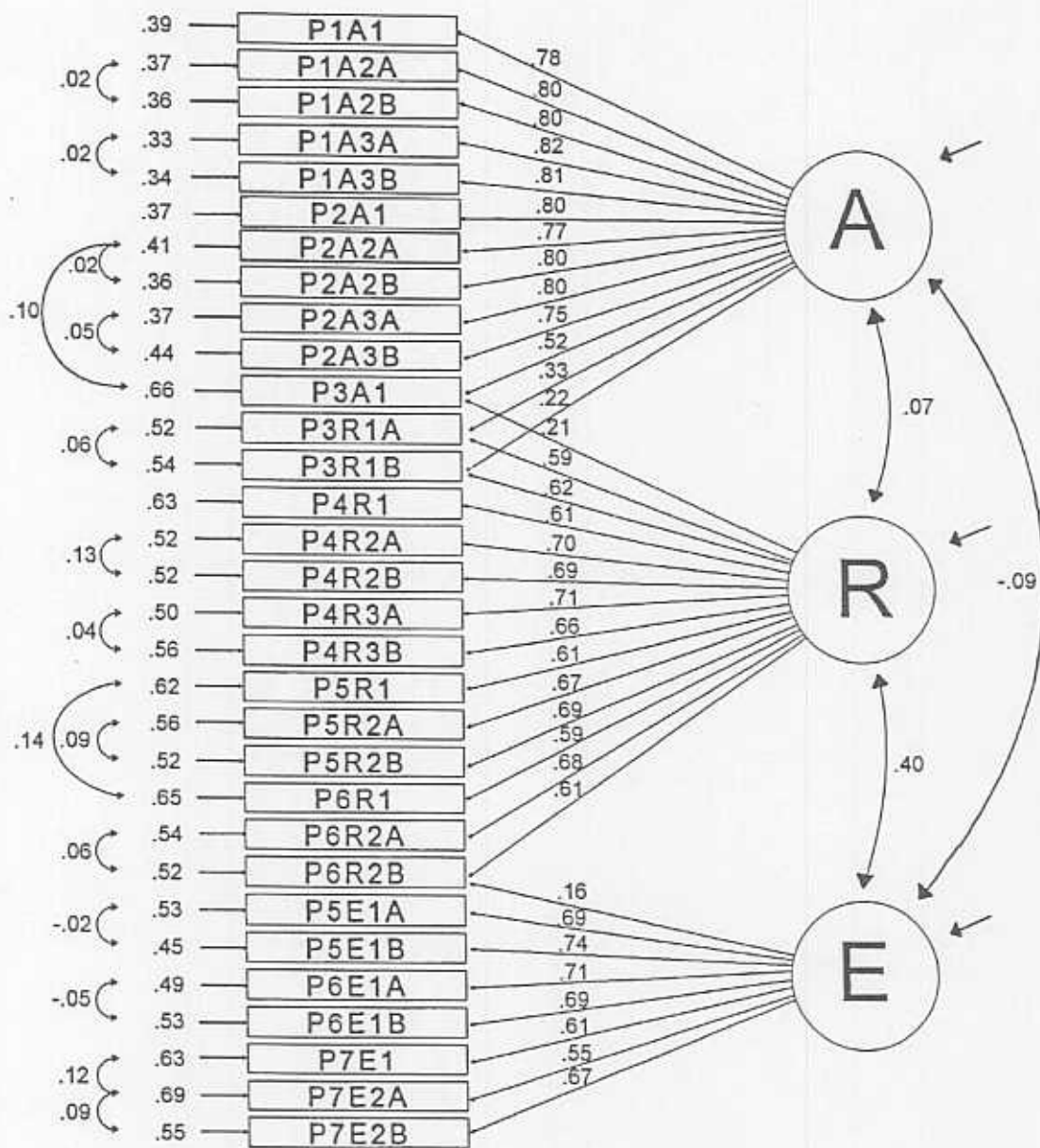
Structural modeling to include group mean differences is planned, however, a scale construction and MANOVA analysis was conducted in the interim. 20-item EP subscales measuring the epistemological styles showed high item reliability for absolutism ( $\alpha = .899$ ), relativism ( $\alpha = .842$ ), and evaluativism ( $\alpha = .809$ ), good intra-scale factor structure, and low inter-scale correlation (see table).

Six education groups represent 2-year units in education beginning with 11/12<sup>th</sup>-grade. (The high school group is not included in the analyses with field-of-study in higher education.) The five field-of-study groups are somewhat arbitrary, but consistent with recognized standards of higher education. A field by education by sex MANOVA of the EP subscales ( $5 \times 5 \times 2 \times 3$ ) indicated a multivariate effect ( $F = 1.34$ ,  $p = .06$ ) but no three-way interaction. A significant two-way interaction of field and education on absolutism ( $F[16, 966] = 2.26$ ,  $p < .01$ ) and a main effect of field on evaluativism ( $F[4, 966] = 4.14$ ,  $p < .002$ ) were disclosed. The sex by education analysis ( $2 \times 6 \times 3$ ) found an interaction on relativism ( $F[5, 1138] = 2.90$ ,  $p < .01$ ), an education main effect on evaluativism ( $F[5, 1138] = 11.85$ ,  $p < .0001$ ), and main effects on absolutism for both sex ( $F[1, 1138] = 45.55$ ,  $p < .0001$ ) and education ( $F[5, 1138] = 47.41$ ,  $p < .0001$ ).

# SAID-60 Rotated Factor Matrix

	Factor 1	Factor 2	Factor 3
VOK1A	.68506		
OVC2B	.62971		
DM1A	.62927		
DM2A	.62480		
UOE2B	.62445		
COJ1B	.61650		
CVS2A	.61620		
RVW2B	.60789		
NOJ1A	.60245		
VOK2A	.59960		
UOE1B	.59542		
ROA1A	.58832		
OVC1A	.57604		
NOJ2B	.57101		
DIV2A	.55956		
AR2A	.53294		
AR1B	.52562		
RVW1A	.52036		
COJ2B	.49181		
ROA2B	.44461		
COJ4B		.63246	
RVW4A		.57321	
DIV4B		.56715	
RVW6A		.55539	
RVW5B		.55313	
RVW3B		.53673	
VOK4A		.51107	
VOK5B		.50283	
DIV5B		.49821	
VOK6A		.49138	
DM5B		.48209	
AR5A		.48085	
UOE4A		.47229	
CVS3A		.46928	
DM3A		.46527	
AR4A		.46273	
AR6A		.45919	
RES4B		.44882	
OVC4A		.39523	
ROA4B		.25381	
UOE5B			.57209
UOE6A			.52803
OVC7B			.52697
ROA6B			.50682
ROA5A			.50247
NOJ6A			.49398
COJ7B			.48664
AR7A			.46883
UOE7A			.46739
AR6B			.45507
RVW7A			.45101
ROA7B			.45002
DM7A			.44929
VOK5A			.44664
NOJ5A			.44160
NOJ5B			.40907
NOJ7B			.40374
DIV6B	-.20357		.36573
DM5A			.35268
RES7A			.33173





Final Model

## **Absolutism Factor 1**

People have different views because of what they were taught or how they were brought up. When peoples views disagree it is because someone is wrong, even if they are both experts. But people really shouldn't have different views if they are studying the same thing, unless they are being paid by someone.

I have been surprised many times to find out how differently people can feel about straight-forward issues. I think, when it gets right down to it, there is really only one right view. That's why most people naturally feel the same way.

I believe things are the way things are, and it's not much use saying they're not. All the people who count say one thing, and I'll side with them. I know that other people can have other opinions, but it's pretty obvious that most of them are just wrong.

## **Absolutism Factor 2**

What is real in the world, and what we know about the world are identical because our senses tell us the truth. If they didn't, I couldn't understand what was going on around me, and I think I understand the world pretty well. I know the world exists, and I know what it's like.

Reality is not something a person just imagines; it is real. That's how I know things. And, if I don't know something, there's probably someone else who does. That's because there is nothing so difficult about the real world that people can't understand it.

## **Absolutism Factor 3**

If you want to know anything for sure, you have to ask an authority on it. But, sometimes, some of them don't know enough and can get things wrong. That makes it hard on me; because, how can you tell if an authority is bad?

There are some ideas that I simply believe, and I'm "just" sure about those ideas. But there are other things I believe, and I can tell you exactly why I'm sure about them. With those ideas, it's because somebody who really knows told me the answer, and I can tell other people who to check with.



## Relativism Factor 1

Everyone has a right to their opinion no matter what it is. One thing might be right for me and something else right for someone else. I know what is right for me, but I wouldn't say it was a better idea because people shouldn't say they are better than other people.

The idea of right and wrong is different for every situation, so I prefer not to say a position is right or wrong. A view might seem better to me, maybe because it has more or better evidence, but I still would not try to convince someone else it was "right." Ideas are just too personal for the terms right and wrong.

Unless you've got a special kind of problem, like in math or science, any answer is as good as another. Right and wrong are just what anyone believes. Even my point of view is only one of many. But, no one has the right to change my mind because I've been open minded and tried to find out what is best.

## Relativism Factor 2

It's not possible for me or anyone to have real, objective knowledge because everyone interprets things. The best that I'm able to say is that some of what I think has better evidence or more rational thinking behind it. So, we can't say we understand reality or even if reality is unchanging.

I have to believe there is a real, physical world outside of me and all around; but, it's impossible to know things about the world with absolute certainty. I don't care how smart the experts are, or how much time and money gets used, nobody can know anything completely for sure.

No one can say whether or not the world we see and feel is really there. Objective knowledge simply doesn't exist, everything is subjective. What I know doesn't have to be what someone else knows, because we might not have anything in common. I guess people just can't understand reality in a concrete way.

## Evaluativism Factor 1

In order to decide on my own point of view, I use the evidence from one set of views and compare it with the evidence for another set of views. Of course, I need to consider the quality of evidence within a view too. It's the quality of evidence overall that allows me to balance views or decide between them.

It's important to judge the authorities before accepting ideas from them. I'm happier with ideas that I've thought through myself, but sometimes only an expert can have everything that's needed to decide something. Then I'm careful to check that the authority's work is well done and thought out. It has to be up to my standards.

## Evaluativism Factor 2

I'm willing to stand behind the decisions I've made because I look at problems from all sides before I make a judgment. Sometimes, standing up for my ideas results in conflicts with other people. I'm able to take that responsibility for sharing my views, but I don't feel like I must change their opinions even if my ideas are better.

What I know about reality is determined by both my senses and my ideas, but in the end I have to test what I know with the real world. There is a reality out there, and by being critical and weighing our ideas, and assumptions, we can move closer to correct judgments of that reality.

When I look at an issue, I use the rules of good logic and evidence; that's where my balanced view comes from. But, sometimes the situation of a problem is too unclear, or there isn't enough information for the big picture. Then you can only compare views, but not decide between them.

## Evaluativism Factor 3

The reasons people have different ideas and opinions are very complex. Experts, often quite rightly, disagree because they interpret things according to different kinds of evidence and areas of interest. Ordinary people can disagree because of almost anything: the kind of person they are, how much they know, where they come from, or different combinations.

When people are making choices, they have to accept what the evidence and logic lead to. I can't say that I don't know something just because I feel uncomfortable with what I found out. Besides, no decision is completely final; I'm always learning new things which can change my mind.

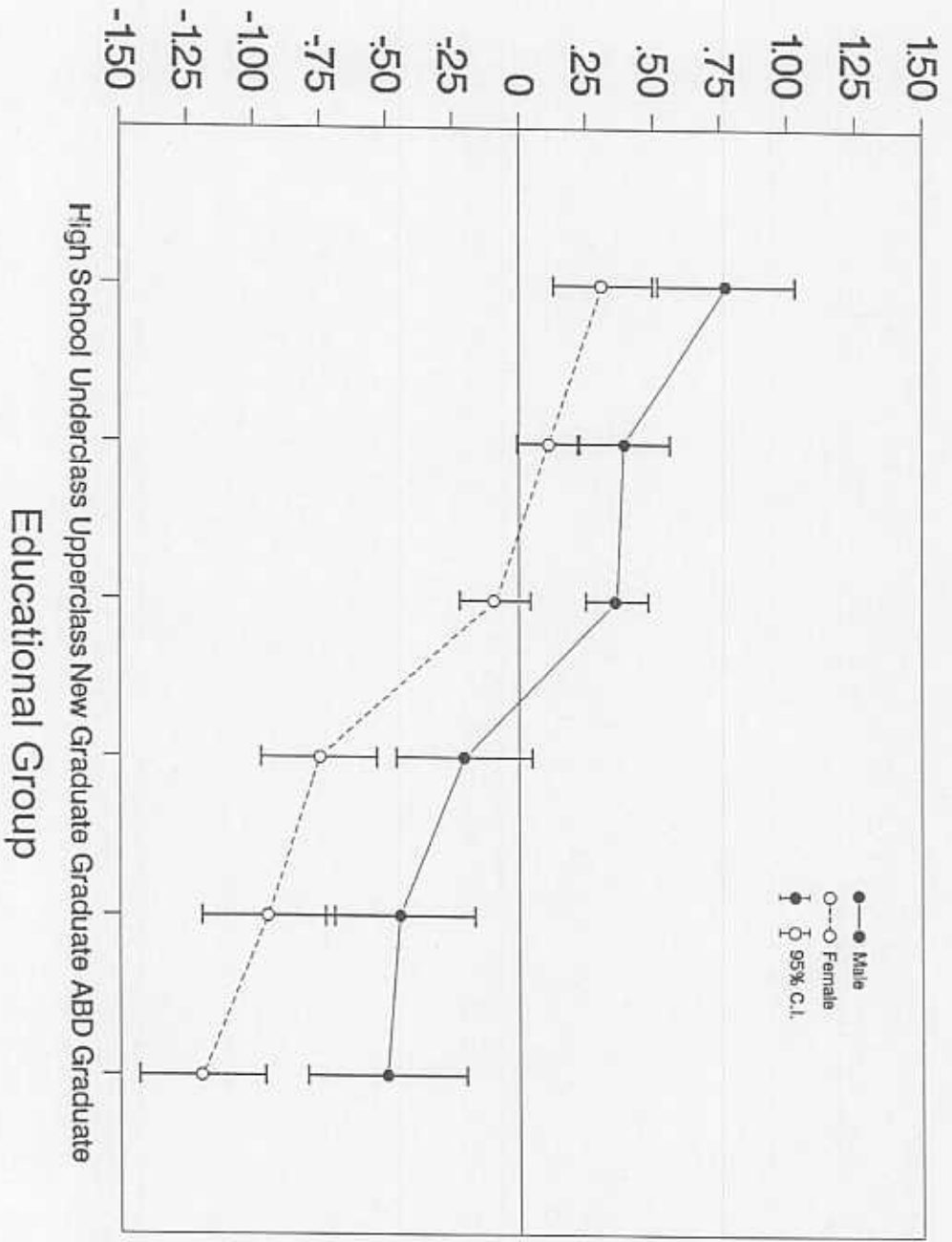
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	<u>Relativism</u>	<u>Evaluativism</u>	<u>Education</u>
Absolutism	.07*	-.02	-.37**
Relativism		.31**	-.21**
Evaluativism			.20**

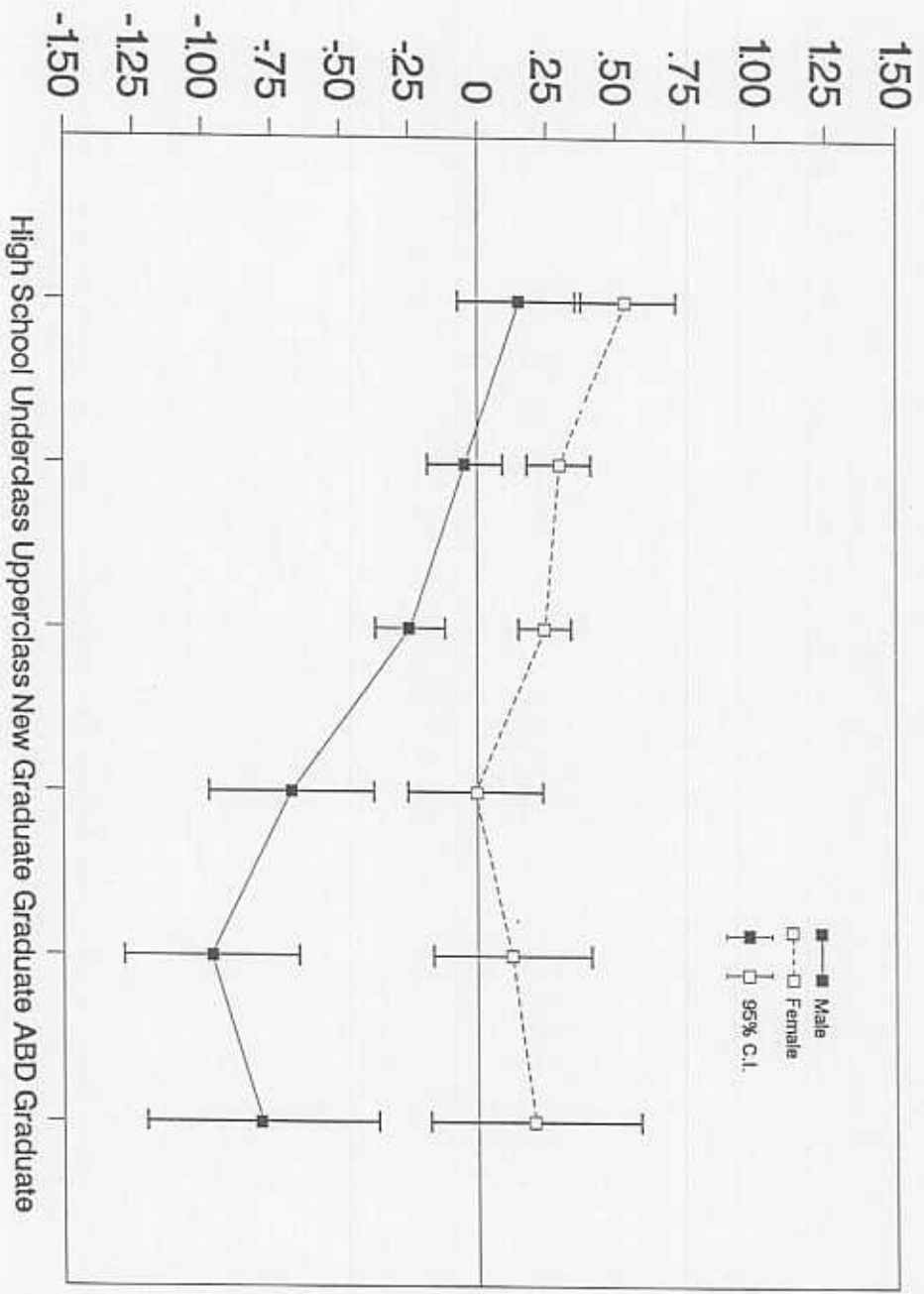
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\*  $p < .01$     \*\*  $p < .0001$

Table of Epistemological Style Sub-Scale Correlation.

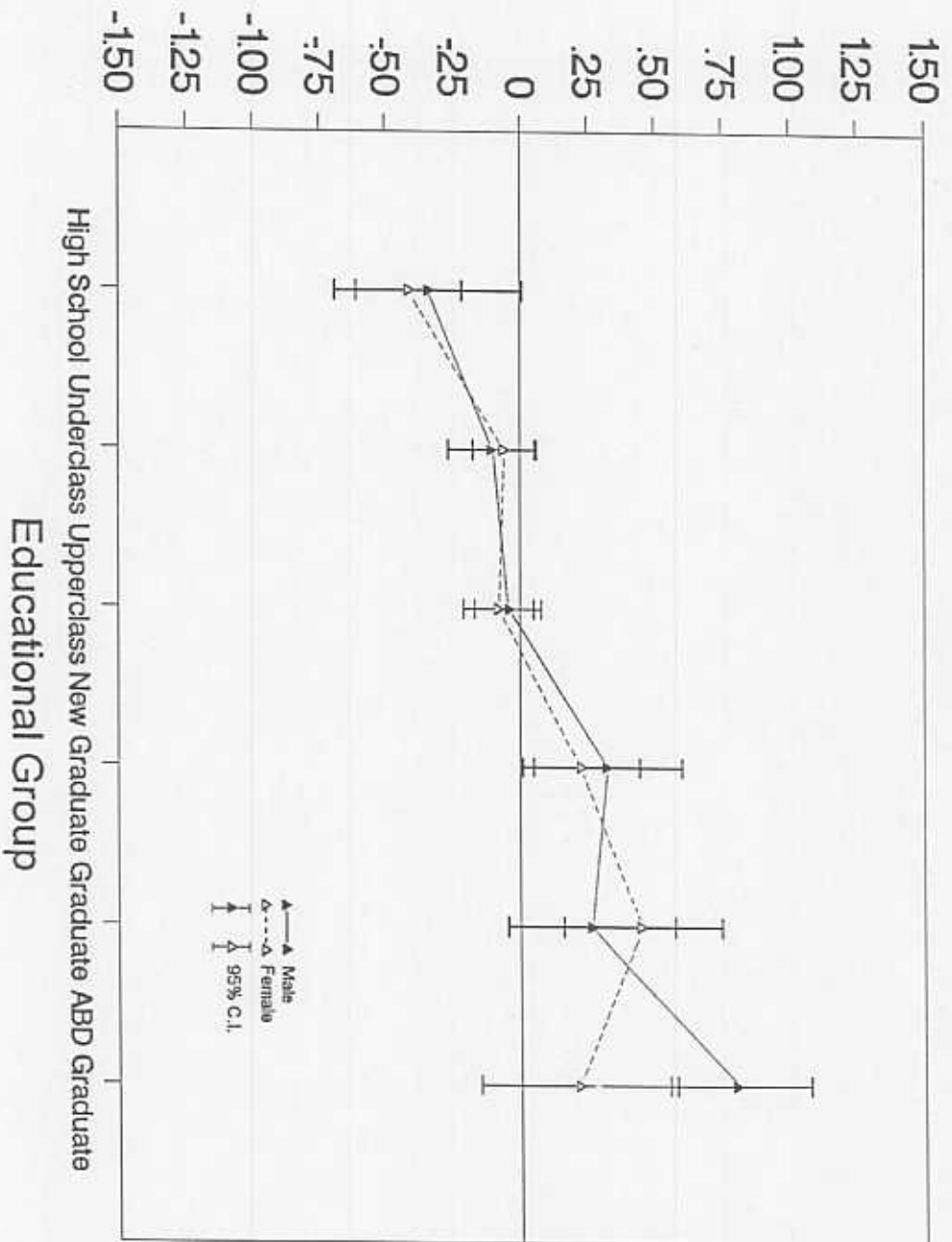


Educational and Sex Differences for Absolutism Factor Scores



### Educational Group

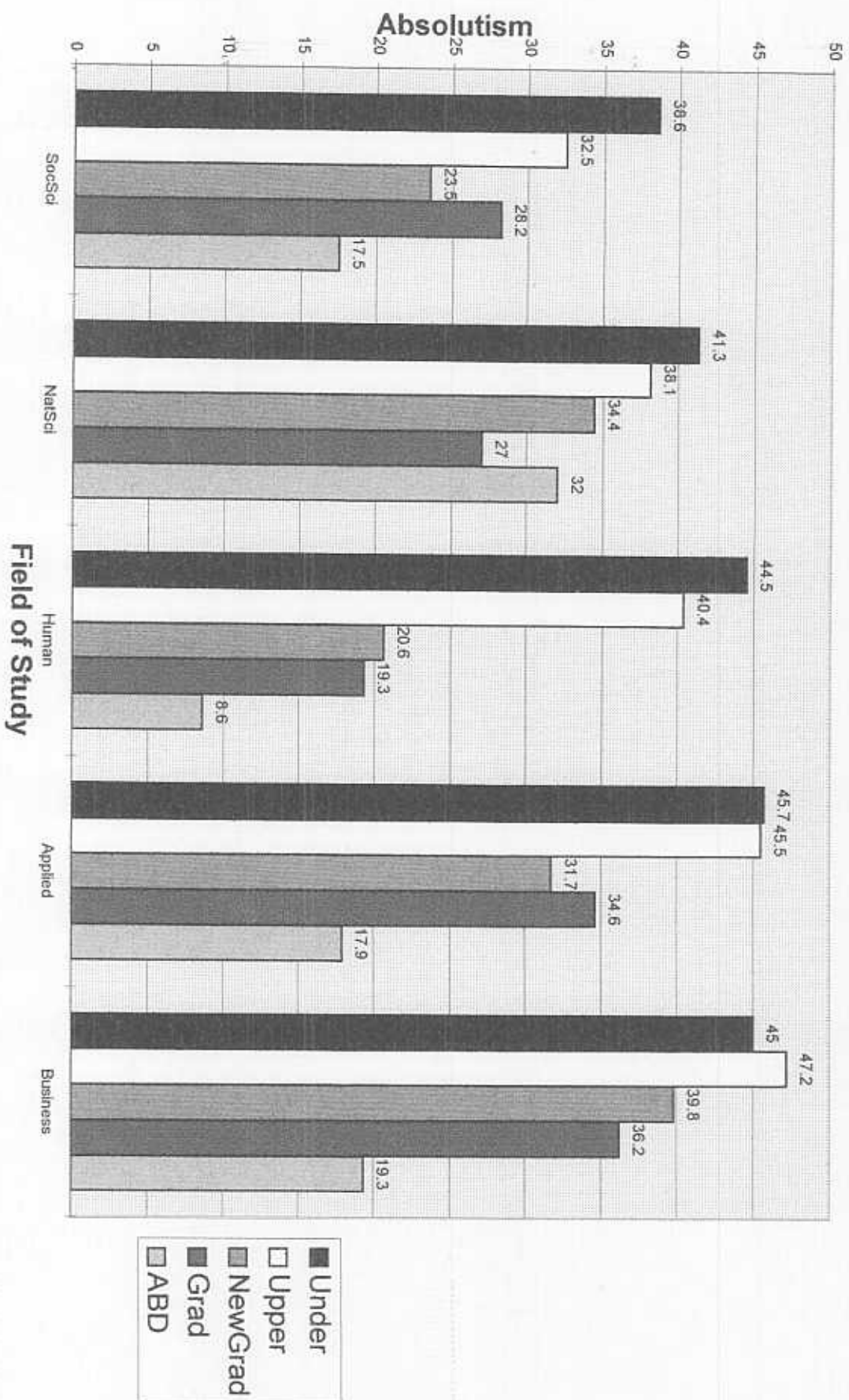
## Educational and Sex Differences for Relativism Factor Scores



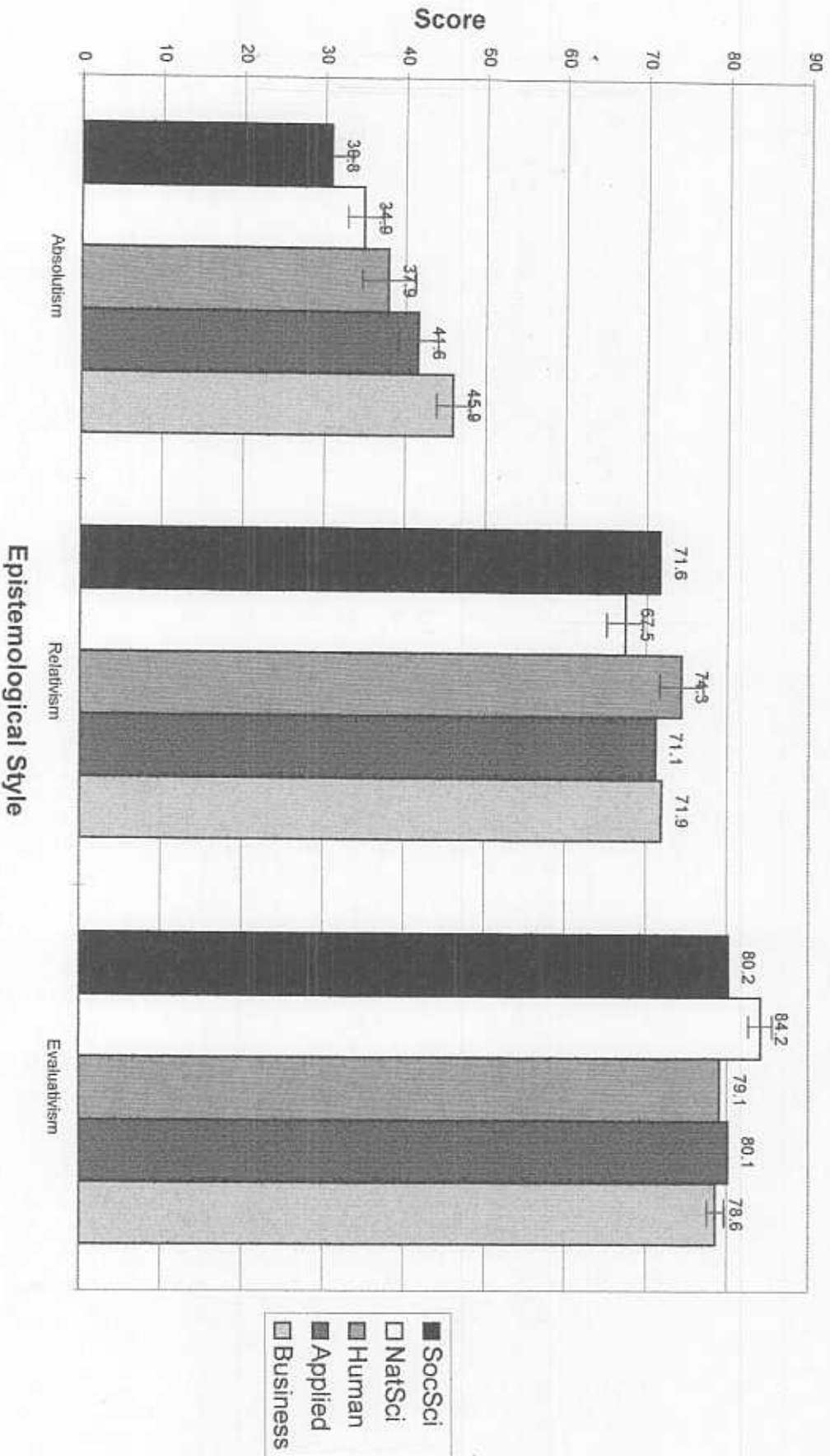
Educational and Sex Differences for Evaluativism Factor Scores.



# Level of Education and Field of Study Interaction



## Main Effect for Field of Study



## Conclusions

- Even given a methodological advantage of being the foundation for the testing materials the 7-stage Reflective Judgment model, or any stage-like model, fit the observed data less adequately than did the 3-style Epistemic Process model.
- The model of independent strong-stages that are uninfluenced by the component concepts of former stages, and/or do not exhibit covariance with other latent factors underlying the stages, is not supported.
- The relatively orthogonal epistemological styles better match with observations and intuitions that adults often do think in absolute terms at some times, and with contextual pragmatism or with principled values at other times.
- Men appear to always place more reliance on authority, easy access to evidence, and certainty that they are “right” than women, but both sexes show declines with education.
- Women appear to maintain a belief in the equality of everyone’s opinions and a social/contextual relativism while men appear to decline in the preference for this epistemological style with education.
- Men and women appear to be equivalent and show similar educational advancement in their preference for (the prescriptively most desirable epistemological style of) evaluativism, indicating gender equity and similar growth in critical thought and balanced judgment.
- The epistemic process model seems able to describe the intellectual development of both men and women within the same model, and without considering one or the other sex to be developmentally delayed while still accounting for gender differences in patterns of judgment.
- Social science, natural science, humanities, applied fields, and business are in that order increasingly absolutist in epistemological style. However, the slope of decrease in absolutism scores with advancing education becomes significantly shallower in the order of: humanities, social sciences, applied fields, business, and natural sciences. This may have implications for pedagogy in these areas.
- Students in the natural sciences are significantly more evaluative than all other fields, and students in business are also less evaluative than those in social sciences and applied fields. These differences are unaffected by educational advancement.

## References

- Baxter-Magolda, M. (1992). Knowing and Reasoning in College. San Francisco: Jossey-Bass Publishers.
- Charney, D., Newman, J. H., & Palmquist, M. (1995). "I'm just no good at writing": epistemological style and attitudes toward writing. Written Communication, 12, 298-329.
- Gilligan, C. (1982). In a Different Voice. Cambridge, MA: Harvard University Press.
- King, P. M., & Kitchener, K. S. (1994). Developing Reflective Judgment. San Francisco: Jossey-Bass Publishers.
- Kitchener, K. S. (1977). Intellectual development in late-adolescents and young-adults: reflective judgment and verbal reasoning. Dissertation Abstracts International, 39, 956B.
- Kitchener, K. S., & King, P. M. (1981). Reflective judgment: concepts of justification and their relationship to age and education. Journal of Applied Developmental Psychology, 2, 89-116.
- Kitchener, K. S., & King, P. M. (1985) Reflective judgment scoring manual with examples. Unpublished manuscript.
- Kohlberg, L. (1963). The development of orientations toward a moral order: sequence in the development of moral thought. Vita Humana, 6, 11-33.
- Martin, J. E., Silva, D. G., Newman, J. H., & Thayer, J. F. (1994). An investigation into the structure of epistemological style. Personality and Individual Differences, 16, 617-629.
- Newman, J. H. (1993). A structural investigation of intellectual development and epistemological style in young adults. Dissertation Abstracts International, 54, 2786B.
- Perry, W. G. (1970). Forms of Intellectual and Ethical Development in the College Years. New York: Holt, Rinehart & Winston, Inc.