

# Undergraduate Students' Critical Thinking Dispositions and Trust in Sources of Information about Food Risks



Darnell R.H. Towns, John C. Ricketts  
Agricultural and Environmental Sciences

# What's the Problem?

- ◆ Students/consumers SAY they want to know about the benefits and risks of engineered food products.
  - ◆ Where do students/consumers acquire information?
  - ◆ Is the information credible/trustworthy?
  - ◆ Do students/consumers THINK about the credibility or reliability of information?
  - ◆ Does type of information influence THINKING habits and/or decisions made...about food?

# Trust in Sources of Info

- ◆ Public attitudes [about GM foods] driven by *TRUST* in institutions promoting and regulating technologies (Huffman, Rousu, Shogren, & Tegene, A., 2004 ).
- ◆ When different technologies are promoted, an individual's *ATTITUDE* towards technology depends on *SOURCE* of information (Teisl, Fein, & Levy, 2009).
- ◆ Trust is dependent upon source credibility, reporting bias, and access awareness (Hunt & Frewer, 2001).
- ◆ The trust placed on information sources changes the consumer self-confidence in decision making (Ha & Lee, 2011).

# Why Critical Thinking?

- ◆ When forming judgments about new technologies such as GM food products, individuals use cognitive shortcuts, such as ideological predispositions or cues from mass media (Lee, Scheufele, & Lewnstein, 2005, p. 241)
- ◆ Beyer (1995) stated, "Critical thinking... means making reasoned judgments" (p. 8).



# Why Critical Thinking?

Critical Thinking has long been a desired skill set (McMillan, 1987; Robinson, Garton, & Vaughn, 2007; Association of American Colleges and Universities, 2013)

Nearly all employers surveyed (93 %) say that “a demonstrated capacity to think critically, communicate clearly, and solve complex problems is more important than [a candidate’s] undergraduate major.”

About 95 % also say it is important that those they hire demonstrate ethical judgment and integrity; intercultural skills; and the capacity for continued new learning.

More than 75 percent of those surveyed say they want more emphasis on five key areas including: critical thinking, complex problem solving, written and oral communication, and applied knowledge in real-world settings.

# Critical Thinking Dispositions (CTD) Framework

- ◆ Engagement
  - ◆ Looking for opportunities to use reasoning
  - ◆ Anticipating situations that require reasoning
  - ◆ Confident in reasoning ability
- ◆ Cognitive Maturity
  - ◆ Aware that real problems are complex
  - ◆ Open to other points of view
  - ◆ Aware of biases and predispositions
- ◆ Innovativeness (Inquisitiveness)
  - ◆ Intellectually curious
  - ◆ Wants to know the truth (Irani, et al., 2007)

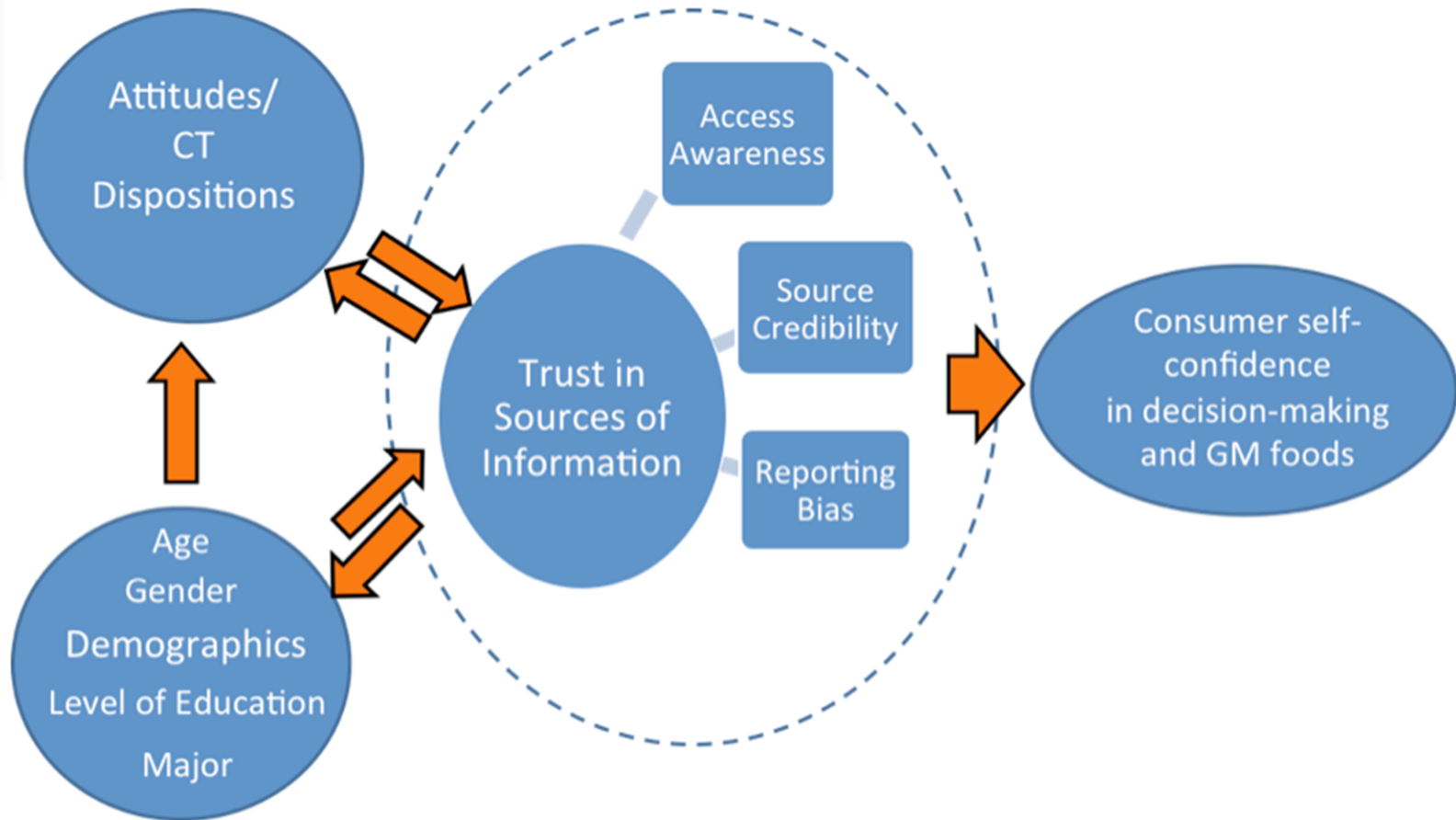
UF-EMI

*Facione (1990, etc)*

*Paul (1995, etc)*

*Irani et al. (2007, etc.)*

## Conceptual Model



*Figure 1 Conceptual model of Critical Thinking Dispositions and Consumer Trust Associations with Decision-making and GM Foods*

# Research Questions

- ◆ What are the critical thinking dispositions of TSU students?
- ◆ Are TSU undergraduate students familiar with online periodicals and research databases? What is their degree of trust in information sources?
- ◆ What relationships, if any, exist between participants' critical thinking dispositions and chosen demographic variables: gender, ethnicity, age, major, and level of education?
- ◆ What relationships, if any, exist between selected demographic variables and degree of trust, familiarity, reporting bias, source credibility of information sources?



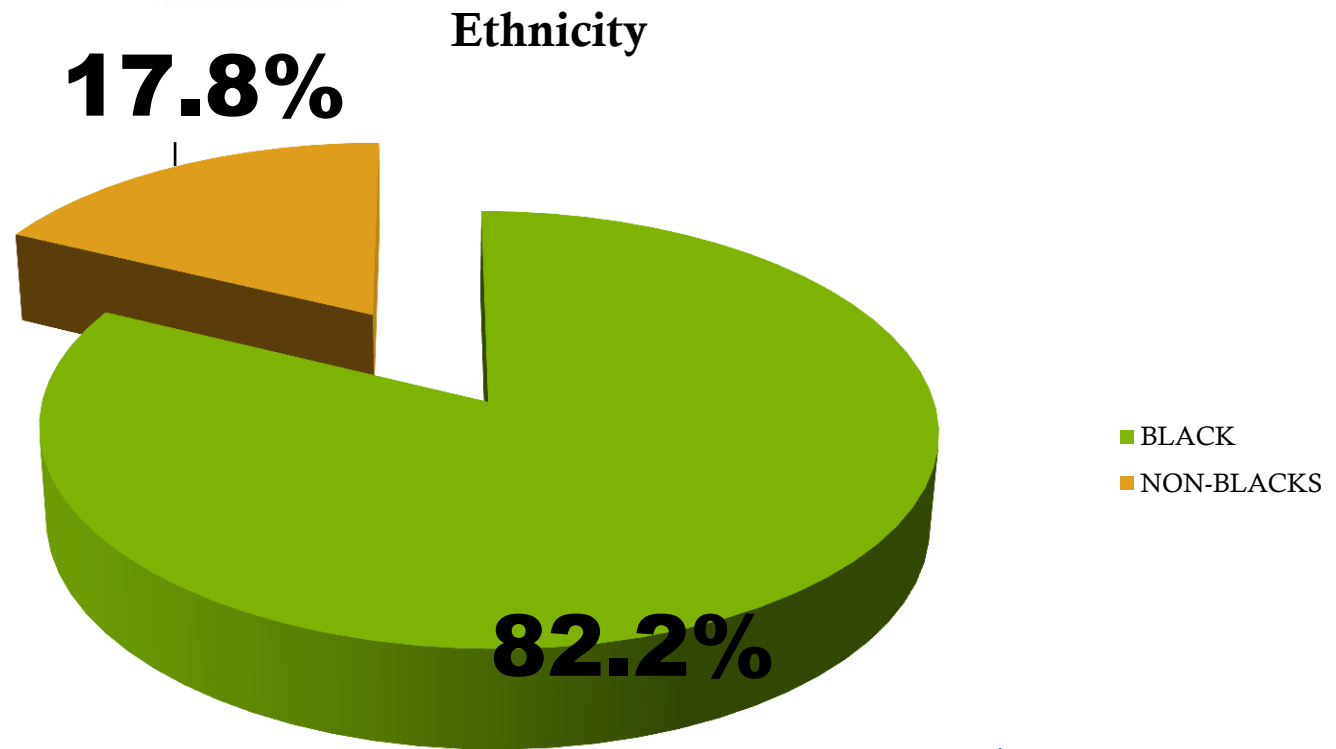
# Methods

- ◆ Purpose: Describe and Explore Relationships
- ◆ Sampling: All Maymester 2012 trad. students in target pop (452); 154 respondents (34% response rate)
- ◆ Type: Survey and Nonexperimental, Cross-sectional (Kerlinger, 1986) Research
- ◆ Analyses: Descriptive and Inferential (Oliver & Hinkle, 1982) analyses with SPSS

# Instrument

- ◆ Demographics
  - ◆ Gender (60.5% Female); Ethnicity (82% Black); Age (49% over 21); Major (45% Sciences); Minor (if applicable); Education level (38% Sr., 36% Jr., 22% Soph., 5% Fr.)
- ◆ CTD (26 1-5 summated rating scale items; 3 constructs)
  - ◆ Engagement (.79), Cognitive Maturity (.75), & Innovativeness (.89), UF-EMI (Irani, et al., 2007).
- ◆ Modified “Trust in Sources of Information about Genetically Modified Food Risk in the United Kingdom” (summated rating scales)
  - ◆ Accessibility
  - ◆ Familiarity
  - ◆ Trust (Hunt & Frewer, 2001; Ekanem, et al., 2006).

# Findings



# Critical Thinking Disposition of TSU Students

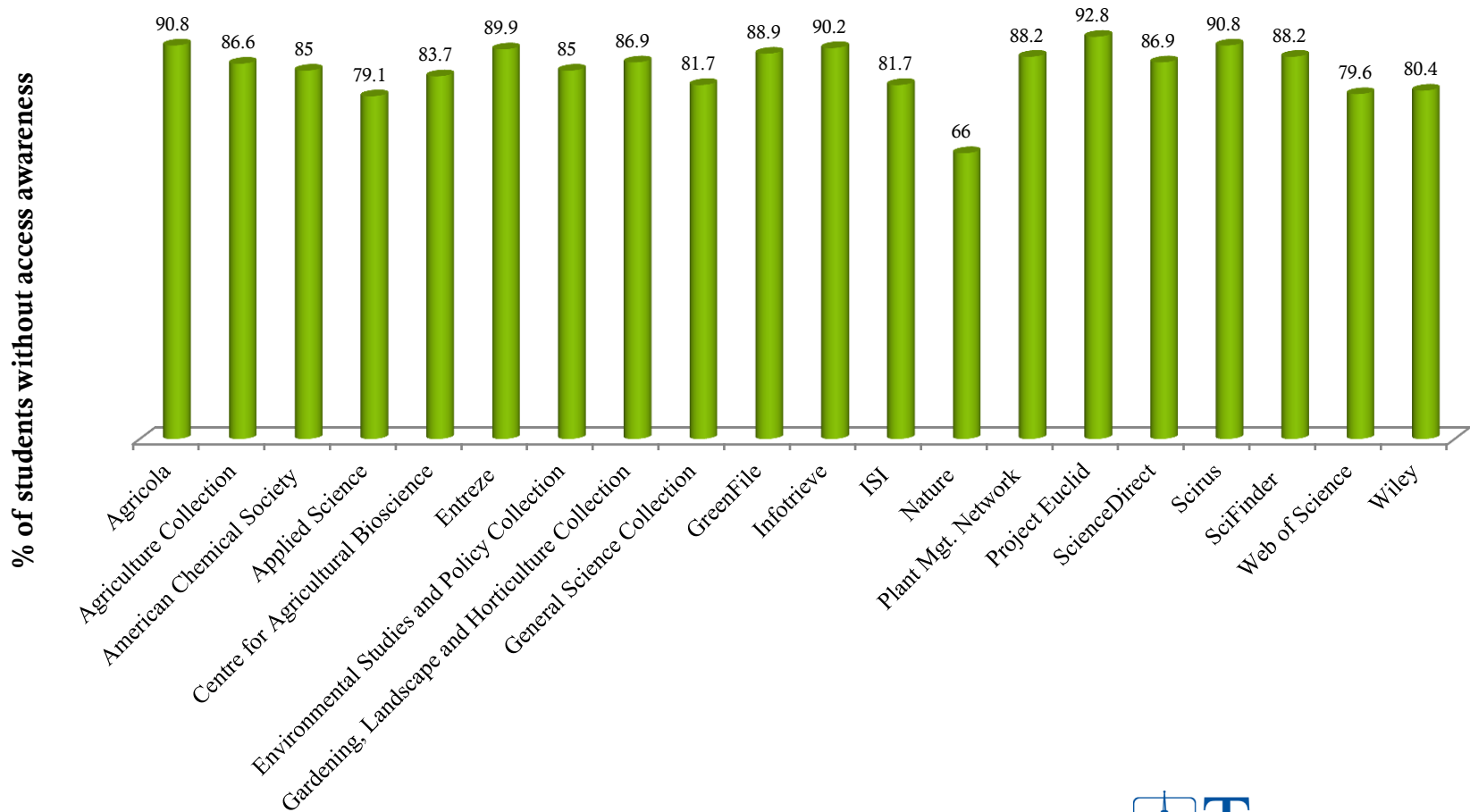
## *Critical thinking disposition profile of TSU students*

<b>Disposition</b>	<b>N</b>	<b>Min</b>	<b>Max</b>	<b>Ranges</b>	<b>M</b>	<b>SD</b>
Innovativeness	153	13	35	7-35	27.7778	4.50179
Engagement	153	28	88	11-55	48.2876	7.93864
Cognitive Maturity	153	17	40	8-40	31.3725	4.58241
<b>Total CT Disposition</b>	<b>153</b>	<b>60</b>	<b>142</b>	<b>26-130</b>	<b>103.6993</b>	<b>15.04646</b>

Note. 106.7 = Strong CTD; 85.9 to 106.6 = Moderate; 85.8 = Weak  
(Bisdorf-Rhoades, Ricketts, Irani, Lundy, & Telg, 2005).

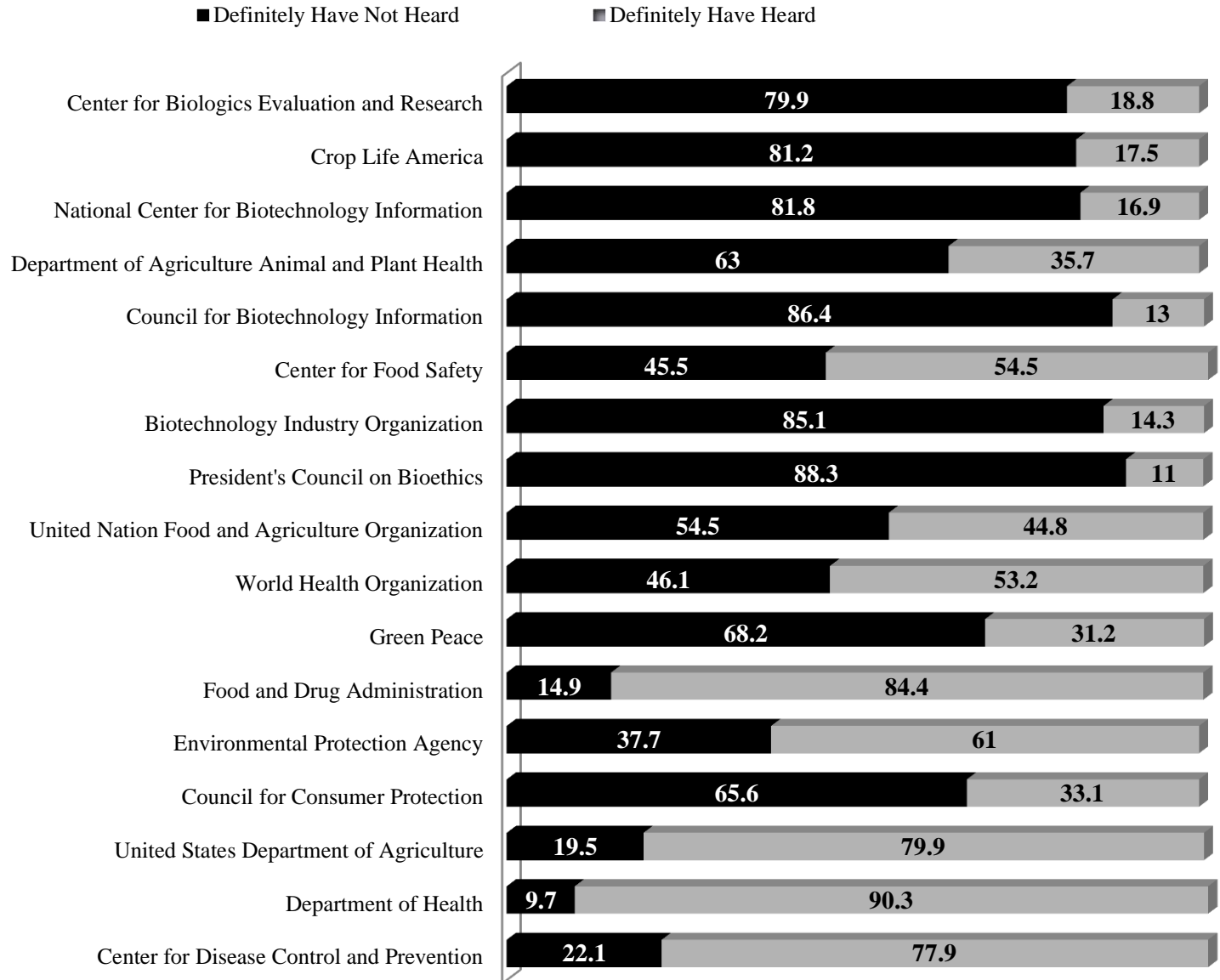
# Gross unawareness!

Awareness of Access to Databases at TSU



Databases

# Unawareness Continued



Source	Reporting Bias		Source Credibility		Trust	
	Mean	SD	Mean	SD	Mean	SD
Magazines	1.79	.927	2.70	1.509	1.25	.783
The Tennessean	1.43	.967	3.19	1.413	1.49	.836
Family/Friends	1.81	1.075	2.95	1.387	1.88	.827
EPA	1.37	1.031	3.53	1.635	1.89	.863
Online Search Engines	1.85	1.062	3.25	1.616	1.48	.884
Food and Drug Administration	1.73	1.045	4.27	1.500	2.14	.823
World Health Organization	1.53	1.089	4.04	1.610	2.04	.908
Facebook	1.77	1.123	2.09	1.843	.79	.835
Twitter	1.75	1.145	2.06	1.866	.75	.831
The Meter	1.20	.979	2.11	1.620	1.07	.848
TV News Reporter	1.62	1.004	2.94	1.661	1.43	.831
University Scientist	1.31	1.012	3.31	1.670	1.78	.819
Extension Professionals	1.11	.893	2.95	1.718	1.65	.891
Radio News Reporter	1.37	.937	2.69	1.554	1.73	.903
Government Scientist	1.40	1.032	3.52	1.827	1.45	1.887
Green Peace	1.13	1.049	3.14	1.758	1.56	.859
Political Officials	1.40	1.057	2.66	1.750	1.22	.903
Health Care Professionals	1.64	1.113	3.86	1.656	2.01	.857
Grocers	1.51	1.048	2.85	1.679	1.30	.898
CDC	1.48	1.151	4.17	1.669	2.16	.899
Department of Health	1.76	1.155	4.42	1.613	2.32	.856
USDA	1.52	1.162	4.15	1.784	2.17	.923

# Relationships between Students CTD & Demographic Variables

- ◆ Gender – NR
- ◆ Level of Education – NR
- ◆ Age – NR
- ◆ Ethnicity – Maybe...
- ◆ Major – NR

<b>Disposition</b>	<b>Age</b>	<b>n</b>	<b>M</b>	<b>SD</b>	<b>t</b>	<b>Sig</b>	<b>Cohen's d</b>
Innovativeness	Blacks	125	28.02	4.20	-.250	.077	-0.040
	Non-	27	27.48	5.86			
Engagement	Blacks	125	48.80	7.97	.072	.943	0.011
	Non-	27	47.70	8.29			
Cognitive	Blacks	125	31.73	4.25	-.084	.243	-0.0137
	Non-	27	31.13	4.95			
Total CTD	Blacks	125	104.82	14.36	.022	.982	0.0035
	Non-	27	102.52	17.73			



# Relationships between Trust, Familiarity, Reporting Bias, Source Credibility & Demographics

Variables	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>	X <sub>7</sub>	X <sub>8</sub>	X <sub>9</sub>	X <sub>10</sub>	Y <sub>1</sub>	Y <sub>2</sub>	Y <sub>3</sub>	Y <sub>4</sub>
Trust (X <sub>1</sub> )	1	.25*	.52*	-.04	.08	.09	.00	-.13	.08	.07	.22*	.22*	.16*	.22*
Reporting Bias (X <sub>2</sub> )		1	.26*	-.03	.16	.04	-.04	-.04	.22*	.11	.03	.01	.04	.02
Source Credibility (X <sub>3</sub> )			1	-.06	.00	.09	-.03	-.09	.02	.18*	.25*	.20*	.21*	.24*
Level of Education (X <sub>4</sub> )				1	.64*	-.14	-.09	-.06	-.09	-.04	-.07	.01	-.12	-.07
Age (X <sub>5</sub> )					1	-.14	-.14	.03	.17*	.02	-.01	.04	-.07	-.02
Major (X <sub>6</sub> )						1	.22*	.06	.02	.08	.08	.01	.05	.06
Gender (X <sub>7</sub> )							1	.02	-.13	-.19*	-.03	-.10	-.10	-.07
Ethnicity (X <sub>8</sub> )								1	-.06	.05	-.01	.01	.02	-.00
Access Awareness (X <sub>9</sub> )									1	.21*	-.09	-.04	.02	-.06
Familiarity (X <sub>10</sub> )										1	.19*	.21*	.25*	.23*
Engagement (Y <sub>1</sub> )											1	.71*	.82*	.95*
Cognitive Maturity (Y <sub>2</sub> )												1	.75*	.87*
Innovativeness (Y <sub>3</sub> )													1	.91*
Total CTD (Y <sub>4</sub> )														1

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

# Discussion

- ◆ Moderate critical thinkers, but higher than some in Engagement:
  - ◆ Engagement in a Bisdorf-Rhoades, et al. (2005) study  $M=40.04$ ,  $SD=4.49$  and  $M=48.29$ ,  $SD=7.94$  in our study.
  - ◆ This disposition measured students' willingness to look for opportunities to utilize their reasoning skills and have confidence in their ability.
- ◆ Our students were weak in Innovativeness.
  - ◆ Bisdorf-Rhoades, et al., (2005) was  $M= 44.24$ ,  $SD=4.74$  and  $M=27.78$ ,  $SD=4.50$  in our study.
  - ◆ High levels of innovativeness are present in a person who is determined to learn more about a topic or situation.

# Discussion

- ◆ Bisdorf-Rhoades, et al., reported  $M=29.32$ ,  $SD=4.33$ , and our study reported slightly higher scores for Cognitive Maturity  $M=31.3725$ ,  $SD=4.58241$
- ◆ Individuals who score high on this construct are aware of the factors within their thinking that creates biases towards their thought process and ultimately affects their decision making.



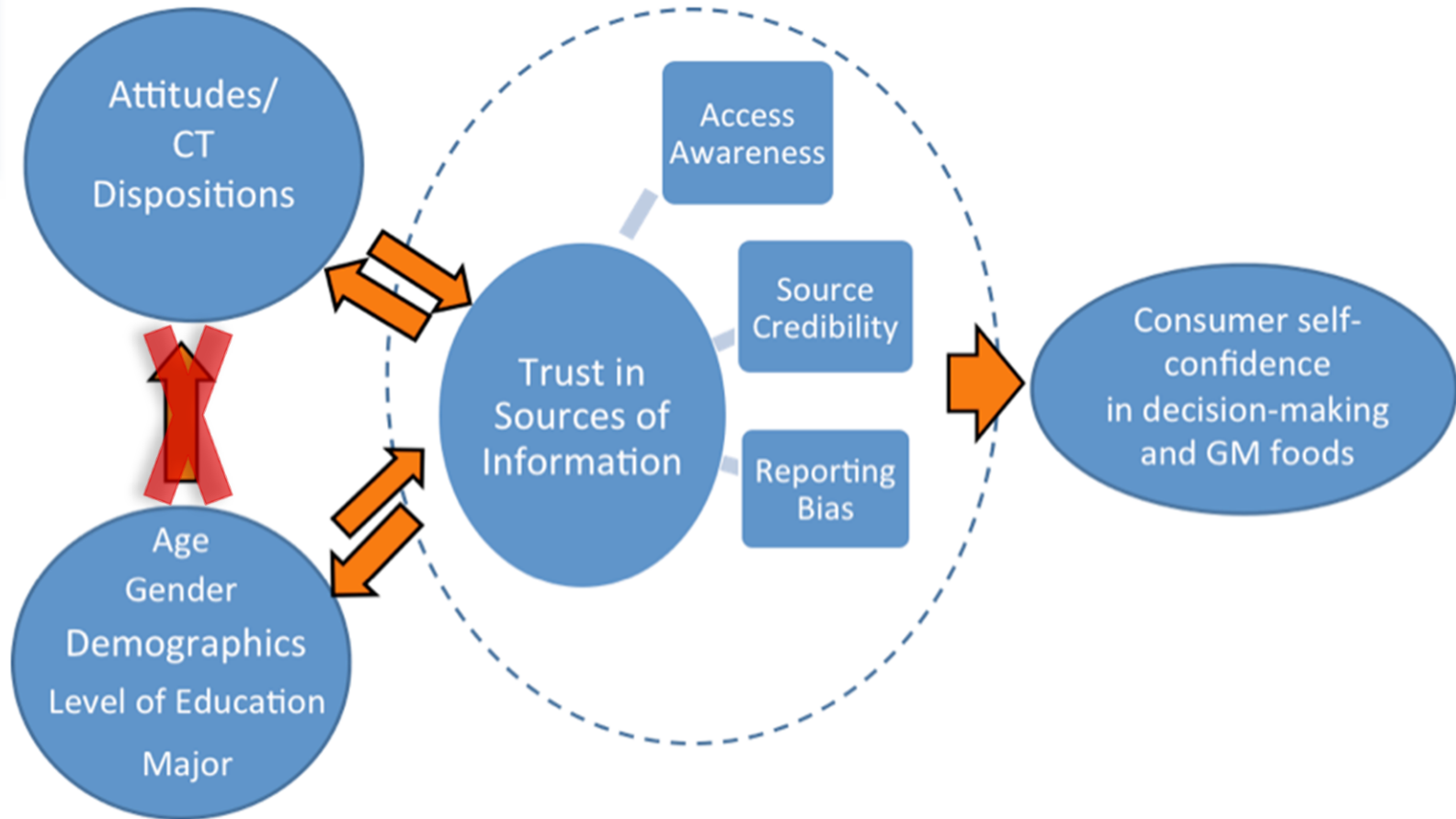
# Discussion

- ◆ Our students have almost no awareness of databases where credible information can be found. This can be fixed.
- ◆ They have no awareness of organizations providing information sources. This too can be fixed.
- ◆ Low trust in information sources presented
- ◆ Appropriately analyzed credibility of different organizations
- ◆ Consistent belief in small to moderate reporting bias from information sources

# Discussion

- ◆ No real demographic influence, but future studies should investigate critical thinking difference among African American students.
- ◆ Gender relationship with database access and awareness should be further explored.
- ◆ The significant link between overall CT and scientific database familiarity should be further analyzed as well.
- ◆ The small positive relationship between trust and critical thinking could be useful or not. Should also be looked at further.
  - ◆ Trust scales should be weighted by with a credibility factor for each information source

## Conceptual Model



*Figure 1 Conceptual model of Critical Thinking Dispositions and Consumer Trust Associations with Decision-making and GM Foods*