

## **A User's Guide:**

Evolution Attitudes and Literacy Survey (EALS) and  
Evolution Attitudes and Literacy Survey-Short Form (EALS-SF)

Pat Hawley & Stephen Short

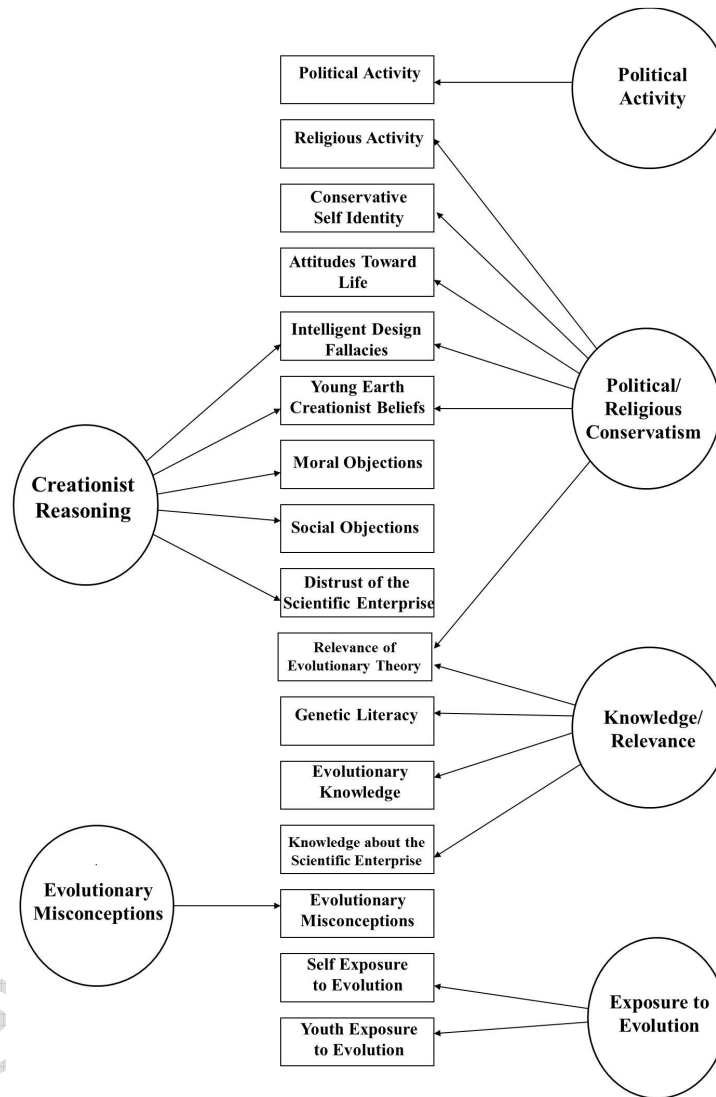
The University of Kansas

### **----- LONG FORM ITEMS -----**

This guide is a draft of a 'white paper' developed by the authors. Please direct comments and questions to Pat Hawley.

Correspondence concerning this guide should be addressed to Patricia H. Hawley, Department of Psychology, University of Kansas, 1415 Jayhawk Blvd, Lawrence, KS 66045. Telephone : 785-864-9818, Fax 785-864-5696, E-mail: phawley@ku.edu or Stephen D. Short, Department of Psychology, University of Kansas, 1415 Jayhawk Blvd, Lawrence, KS 66045. Telephone : 785-864-9118, E-mail: sdshort@ku.edu.

*Figure 1. Hierarchical Structure of the EALS and EALS-SF*



Thus, in ANOVA/regression analyses the following subscales define each higher order factor:

**Political Activity**

- Political Activity

**Political/Religious Conservatism**

- Religious Activity
- Conservative Self Identity
- Attitudes Towards Life

**Creationist Reasoning**

- Intelligent Design Fallacies
- Young-Earth Creationism
- Moral Objections
- Social Objections
- Distrust of the Scientific Enterprise

**Knowledge/Relevance**

- Relevance of Evolutionary Theory
- Genetic Literacy
- Evolutionary Knowledge
- Knowledge About the Scientific Enterprise

**Evolutionary Misconceptions**

- Evolutionary Misconceptions

**Exposure to Evolution**

- Self Exposure to Evolution
- Youth Exposure to Evolution

**Citation:** Hawley, P. H., Short, S. D., McCune, L. A., Osman, M. R., & Little, T. D. (2011).

What's the matter with Kansas?: The development and confirmation of the Evolutionary Attitudes and Literacy Survey (EALS). *Evolution: Education and Outreach*, 4, 117-132.

Table 1

*Evolutionary Attitudes and Literacy Survey Long Form (EALS) Constructs and Scale Items*

Lower-Order Construct	Higher-Order Construct	Items	Scale Metric
Political Activity	Political Activity	To what degree are you political?	I
		To what degree are you politically active?	I
		To what degree are you politically aware/up-to-date?	I
		To what degree do your political views influence your daily life?	II
		To what degree do your political views influence your decisions?	II
		To what degree do your political views influence courses you enroll in?	II
Religious Activity	Religious Conservatism	To what degree are you religious?	I
		To what degree does religion impact your daily life?	I
		To what degree does your religion influence your decisions?	I
		To what degree do you participate in religious activities?	I
		How much do you believe in God?	II
		Religion is especially important to me because it answers many of my questions about the meaning of life. <sup>A</sup>	III
Conservative Self Identity	Religious Conservatism	To what degree are you conservative?	I
		In general, how do you self-identify politically? <sup>B</sup>	IV
		In general how liberal/conservative are you on Social issues (abortion, same-sex marriage, flag burning, etc)? <sup>C</sup>	V
		In general how liberal/conservative are you	V

		on Economic issues (welfare, taxation, free market policies, etc)? <sup>C</sup>	
		In general how liberal/conservative are you on foreign policy and defense issues (defense spending, combating terrorism, pre-emptive war)? <sup>C</sup>	V
Attitudes Toward Life <sup>D</sup>	Religious Conservatism		
		Life begins at conception.	VI
		After conception, a developing human is only a cluster of cells, and it makes no sense to discuss its moral condition. <b>(R)</b>	VI
		All stages of human life- embryo, fetus, child, adult- should have the same legal protections.	VI
Intelligent Design Fallacies	Religious Conservatism & Creationist Reasoning		
		There is scientific evidence that humans were created by a supreme being or intelligent designer.	VI
		There is no evidence that humans evolved from other animals.	VI
		The theory of evolution is a matter of faith and belief, just like religion.	VI
		Humans were specially designed.	VI
		There are no transitional fossils (remains of life forms that illustrate an evolutionary transition).	VI
		It is statistically impossible that life arose by chance.	VI
		The theory of evolution does not explain similarities or differences between chimps and humans.	VI
		Complex biological systems cannot come about by slight successive modifications (i.e., they are irreducibly complex).	VI
		Evolution is a theory in crisis.	VI
		Evolution violates the 2nd law of thermodynamics (that systems move toward <i>disorder</i> , not order). <sup>E</sup>	VI
		Natural selection cannot create complex structures; It is like a tornado blowing through a junkyard and creating a 747.	VI

Young Earth Creationist Beliefs	Religious Conservatism & Creationist Reasoning		
		I read the bible literally.	VI
		God created humans in their present form. (used to be: A supreme being created humans in their present image.)	VI
		Humans never could have been related to apes.	VI
		The Earth isn't old enough for evolution to have taken place.	VI
		There was a time when humans and dinosaurs lived on earth together.	VI
		Present animal diversity can be explained by the Great Flood.	VI
		A majority of present-day geological features are the result of the Great Flood.	VI
		Adam and Eve of Genesis are our universal ancestors of the entire human race.	VI
		All modern species of land vertebrates are descended from those original animals on the ark.	VI
Moral Objections	Creationist Reasoning		
		People who accept evolution do not believe in God.	VI
		People who accept evolution as fact are immoral.	VI
		If you accept evolution, you really can't believe in God.	VI
		Darwinism strips meaning from our lives.	VI
		People can be moral and believe in evolution at the same time. <b>(R)</b>	VI
Social Objections	Creationist Reasoning		
		The theory of evolution has contributed to racism.	VI
		Applying the theory of evolution to human affairs implies we are not fully in control of our behavior.	VI
		The theory of evolution has contributed to sexism.	VI
		The theory of evolution has contributed to an increase in abortion.	VI
		The theory of evolution has contributed to genocide (the deliberate killing of a group	VI

		based on nationality, race, politics, or culture).	
		The theory of evolution has contributed to an increase in euthanasia (the act of killing someone painlessly or allowing to die to stop the suffering; also called mercy killing).	VI
Distrust of the Scientific Enterprise	Creationist Reasoning		
		Contemporary methods of determining the age of fossils and rocks are untrustworthy. <sup>D</sup>	VI
		The data used to support evolution is untrustworthy.	VI
		The theory of evolution is capable of explaining the diversity of life. <b>(R)</b>	VI
		Evolutionary theorists believe that if something is natural then it is good or right.	VI
		Evolutionary theorists believe that inevitable inequality is morally acceptable. <sup>F</sup>	VI
		Evolutionary theorists believe that because the strongest survive, it's a mistake to help the weak. <sup>F</sup>	VI
		The available data are ambiguous as to whether evolution actually occurs. <sup>G</sup>	VI
Relevance of Evolutionary Theory	Religious Conservatism & Knowledge/Relevance		
		The theory of evolution helps us understand plants.	VI
		Evolutionary theory is highly relevant for biology.	VI
		The theory of evolution helps us understand animals.	VI
		The theory of evolution helps us understand human origins.	VI
		For explaining human behavior, evolutionary theory is irrelevant. <b>(R)</b>	VI
		Evolutionary theory is highly relevant for the social sciences (e.g., anthropology, psychology, sociology).	VI
		Evolutionary theory is highly relevant for the humanities (e.g., history, literature, philosophy).	VI
		Evolutionary theory is relevant to our everyday lives.	VI
		The theory of evolution helps explain the	VI

		world as it is in the present.	
Genetic Literacy	Knowledge/Relevance		
		Humans share a majority of their genes with chimpanzees. <sup>D</sup>	VI
		Humans share more than half of their genes with mice. <sup>D</sup>	VI
		Ordinary tomatoes do not have genes, whereas genetically modified tomatoes do. <sup>D</sup> <b>(R)</b>	VI
		Today it is not possible to transfer genes from one species of animal to another. <sup>D</sup>	VI
		All plants and animals have DNA <sup>D</sup>	VI
		Humans have somewhat less than half of the DNA in common with chimpanzees. <sup>D</sup> <b>(R)</b>	VI
		You can see traces of our evolutionary past in human embryos.	VI
		Humans developed from earlier life forms.	VI
		Mutations are never beneficial. <sup>D</sup> <b>(R)</b>	VI
Evolutionary Knowledge	Knowledge/Relevance		
		In most populations, more offspring are born than can survive.	VI
		Individuals don't evolve, species do.	VI
		Mutations can be passed down to the next generation.	VI
		Increased genetic variability makes a population more resistant to extinction.	VI
		The more recently species share a common ancestor, the more closely related they are.	VI
		Natural selection is the only cause of evolution. <b>(R)</b>	VI
		Mutations occur all the time.	VI
Misconceptions about Evolution	Evolutionary Misconceptions		
		Natural selection is a random process.	VI
		Natural selection is synonymous (means the same) as evolution.	VI
		Characteristics acquired during the lifetime of an organism are passed down to that individual's offspring.	VI
		Species evolve to be perfectly adapted to their environments	VI
		Evolution means progression towards perfection.	VI



		Evolution is a linear progression from primitive to advanced species.	VI
Knowledge about the Scientific Enterprise	Knowledge/Relevance		
		Good theories can be proven by a single experiment <b>(R)</b>	VI
		For scientific evidence to be deemed adequate, it must be reproducible by others.	VI
		Scientific ideas can be tested and supported by feelings and beliefs. <b>(R)</b>	VI
		Scientific explanations can be supernatural. <b>(R)</b>	VI
		Theories requiring more untested assumptions are generally better than theories with fewer assumptions. <b>(R)</b>	VI
		Good theories give rise to testable predictions.	VI
Self Exposure to Evolution	Exposure to Evolution		
		I've visited evolution related websites (e.g., Science Daily, Pharyngula, Edge.org)	VII
		I've watched evolution related videos on the web (e.g., Ted.com, YouTube).	VII
		I read science magazines featuring evolution (e.g., Discover, National Geographic, Nature).	VII
		I've watched nature shows that discussed evolution (e.g., PBS/Nova, Discovery, National Geographic)	VII
		I've read evolution related books (e.g., by Richard Dawkins, EO Wilson, Steven Pinker)	VII
Youth Exposure to Evolution	Exposure to Evolution		
		I have visited natural history museums on field trips or with family.	VII
		As a child, I attended science and nature camps (e.g., Outdoor Ed Lab, local nature centers or zoos).	VII
		How many evolution related courses did you have in high school?	VIII
		How much training in evolution did you receive in high school?	IX

*Note.* For scale metric I = seven point Likert scale ranging from 1 (Not at all) to 7 (Very)

II = seven point Likert scale ranging from 1 (Not at all) to 7 (Very much)

III = seven point Likert scale ranging from 1 (Not at all True) to 7 (Totally True) with the midpoint 4 (Moderately True)

IV = eight point Likert scale with 1 (Strong Democrat), 2 (Democrat), 3 (Independent Leaning Democrat), 4 (Independent) 5 (Independent Leaning Republican) 6 (Republican), 7 (Strong Republican), or the option “N/A or Other”

V = eight point Likert scale with 1 (Very Liberal), 2 (Liberal), 3 (Slightly Liberal), 4 (Moderate) 5 (Slightly Conservative) 6 (Conservative), 7 (Very Conservative), or the option “Don’t Know”

VI = seven point Likert scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree) with the midpoint 4 (Neither Agree nor Disagree).

VII = five point Likert scale with 1 (Never), 3 (Occasionally), 5 (Frequently)

VIII = five point Likert scale with 1 (None) 2 (One or Two) 3 (Three or Four) 4 (Five or Six) 5 (Seven or More)

IX = five point Likert scale with 1 (None), 2 (Very Little), 3 (Some), 4 (Quite a bit), 5 (A lot)

<sup>A</sup> See also Dudley and Cruise (1990) <sup>B</sup> cf., ANES 2009 <sup>C</sup> From Carney et al. (2008) <sup>D</sup> From Miller et al. (2006)

<sup>E</sup> See also Ingram and Nelson (2006) <sup>F</sup> Item was drawn from R. Deaner (personal communication, January 20, 2009)

<sup>G</sup> See also Rutledge and Sadler (2007) **(R) Reverse coded item**