

Motivation and engagement according to PISA: Unlocking ability in achievement settings

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- Motivation

- concerns the *energy* and *direction*, the reasons for behaviour

- Engagement

- describes *energy in action*, the active connection between person and achievement task
- both an end in itself and a means to an end; predictor and outcome

From PISA 2000 ...

- “Education systems aim to enable students not just to acquire knowledge but also to become capable, confident and enthusiastic learners. ... Beyond school, children and adults who have developed the ability and motivation to learn on their own initiative are well-placed to become lifelong learners.” (Learners for Life, 2003, p.8)

Three types of engagement

- *Behavioural* - participation in specific activities, attendance ...
- *Cognitive* – self-related beliefs e.g., self-efficacy, reading self-concept, maths self-concept, academic self-concept ...
- *Affective* – interest, enjoyment, anxiety ...

PISA: self-report measures ...

- instrumental motivation - "I study to get a job"
- interest in reading - "When I read I sometimes get totally absorbed"
- interest in mathematics - "Because doing maths is fun, I wouldn't want to give it up"
- shows effort and persistence - "When studying, I put forth my best effort"

PISA2006 – Interest in Science

“Students with interest in science:

- Indicate curiosity in science and science-related issues and endeavours.
- Demonstrate willingness to acquire additional scientific knowledge and skills, using a variety of resources and methods.
- Demonstrate willingness to seek information and have an ongoing interest in science, including consideration of science-related careers.”
(OECD, 2007, Vol.1, p.123)

The questions ...

- To what extent does the network of relations between the components of interest in science as measured in PISA2006 fit models such as the model proposed by Hidi and Renninger (2006)?
- To what extent is the pattern of relations the same for students from different cultural environments?

Individual interest in science involves:

- Enjoyment of science
- Valuing science
- Having a coherent body of science knowledge and understanding

Predicts to:

- Current engagement with science activities
- Intentions for future engagements with interest activities

A set of PISA2006 Indicators

Included:

- General interest in science:
 - Ratings of interest in major domains of science
 - "I am happy doing science problems"
 - "Advances in science and technology usually bring social benefits"
 - "I find that science helps me to understand things around me"
 - Watch TV programmes about science
 - "I would like to work on science projects as an adult"
- Enjoyment of science :
- General value of science:
 - Personal value of science
 - Science-related activities
 - Future-oriented motivation to learn science
- Science knowledge
 - Overall index of science knowledge – a coherent body of understanding and knowledge

Not included:

- Instrumental motivation to learn science
 - "What I learn will help my job prospects"

Combined PISA 2006 data ...

Interest in Science (INS) and

- Value:

- general (GVS) $r = .37$

- personal (PVS) $r = .52$

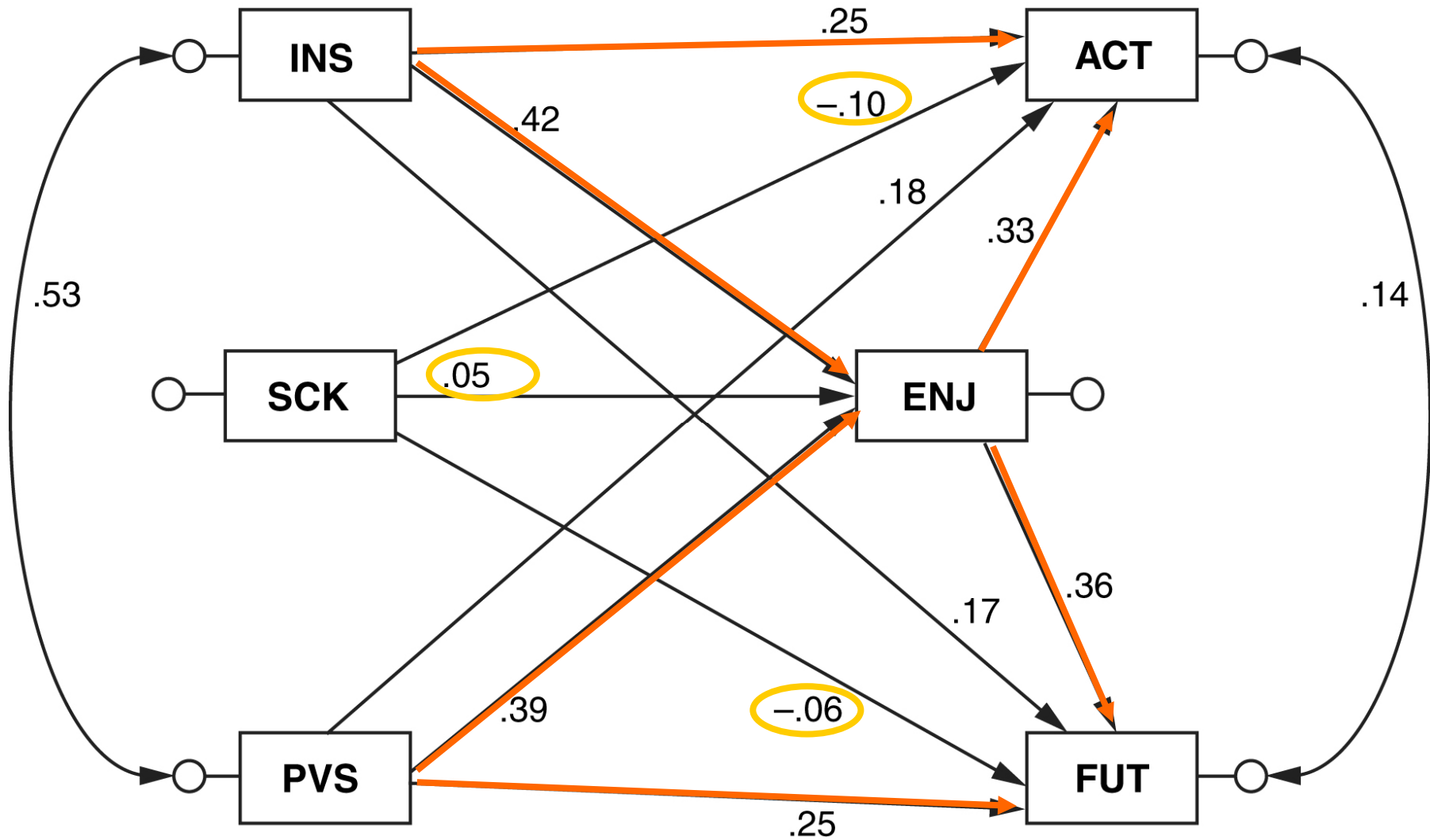
- (GVS and PVS $r = .61$)

- Enjoyment (ENJ) $r = .62$

- Knowledge (SCK) $r = .00$

- Current activities (ACT) $r = .53$

- Future activities (FUT) $r = .52$



INS = General interest in science; SCK = Science knowledge; PVS = Personal value of science; ENJ = Enjoyment of science; ACT = Current science-related activities; FUT = Future-oriented motivation to learn science

The Inglehart Values Map

- http://www.worldvaluessurvey.org/library/main_illustrations.asp

Traditional vs. Secular-Rational Values (TRADITIONAL)

God is very important in respondent's life.

It is more important for a child to learn obedience and religious faith than independence.

Abortion is never justifiable.

Respondent has strong sense of national pride.

(SECULAR-RATIONAL VALUES EMPHASIZE THE OPPOSITE)

Survival vs. Self-Expression Values (SURVIVAL)

Respondent gives priority to economic and physical security over self-expression and quality-of-life.

Respondent describes self as not very happy.

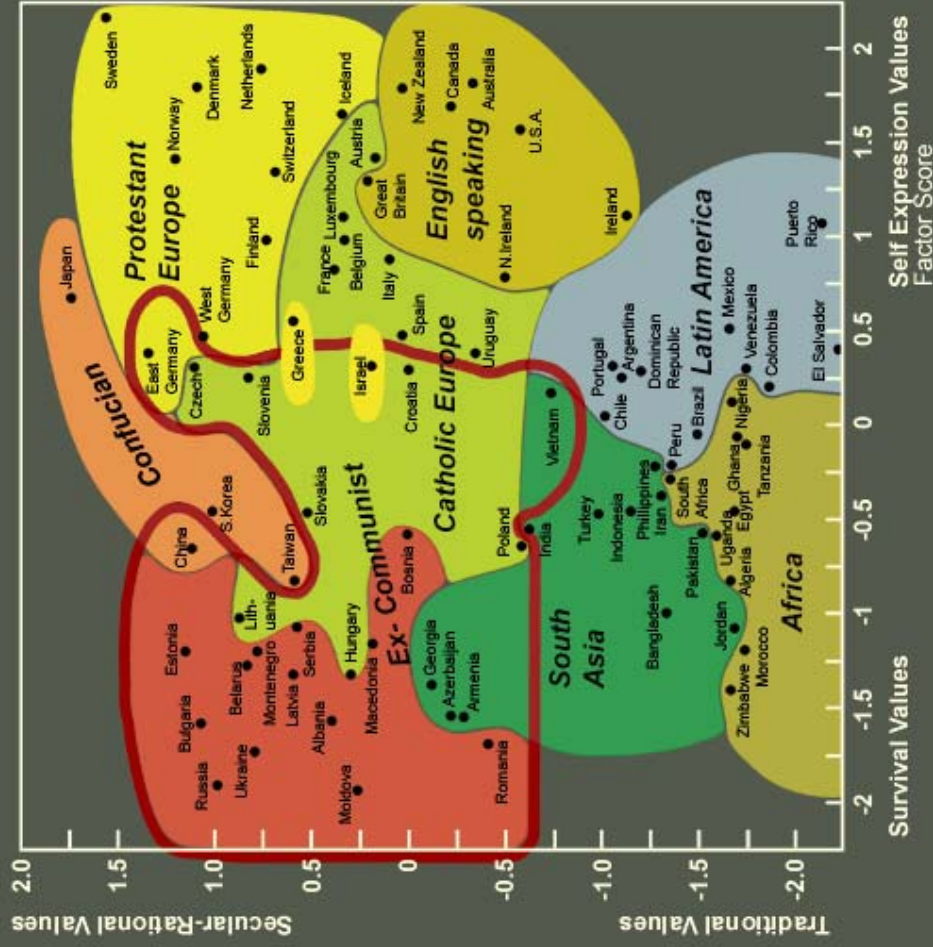
Respondent has not signed and would not sign a petition.

Homosexuality is never justifiable.

(SELF-EXPRESSION VALUES EMPHASIZE THE OPPOSITE)

The Inglehart Values Map

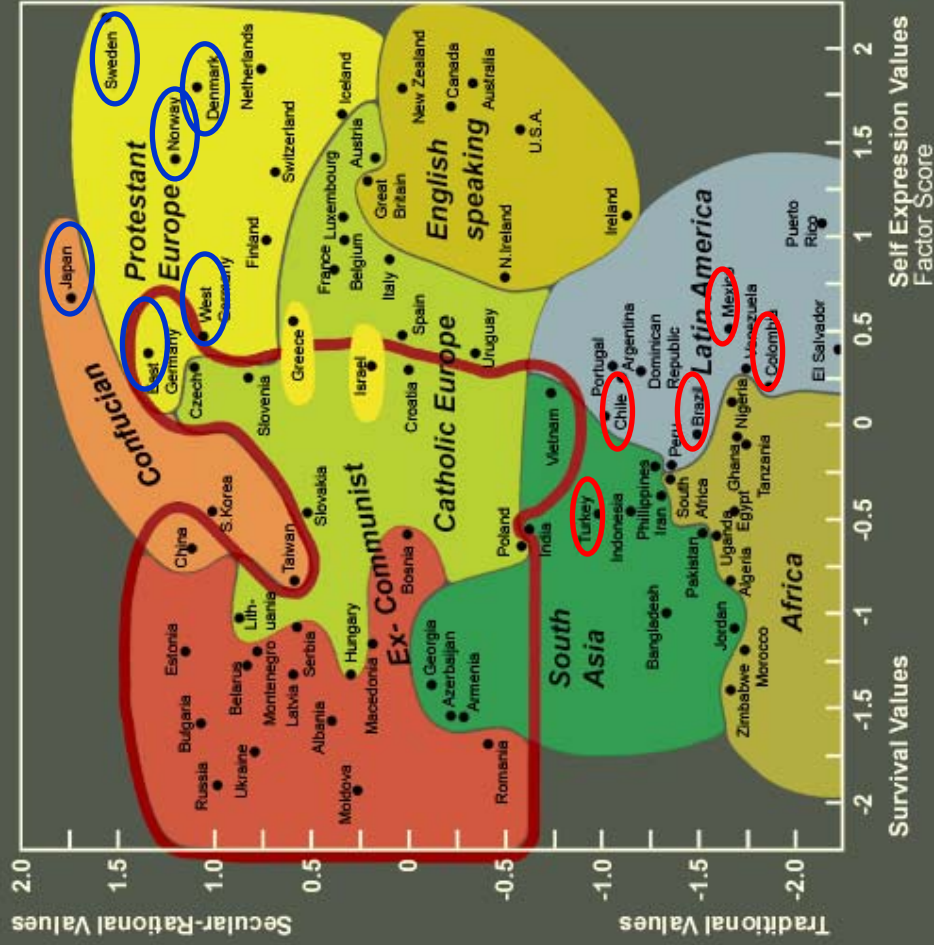
The Inglehart Values Map visualizes the strong correlation of values in different cultures. Countries are clustered in a remarkably predictable way.



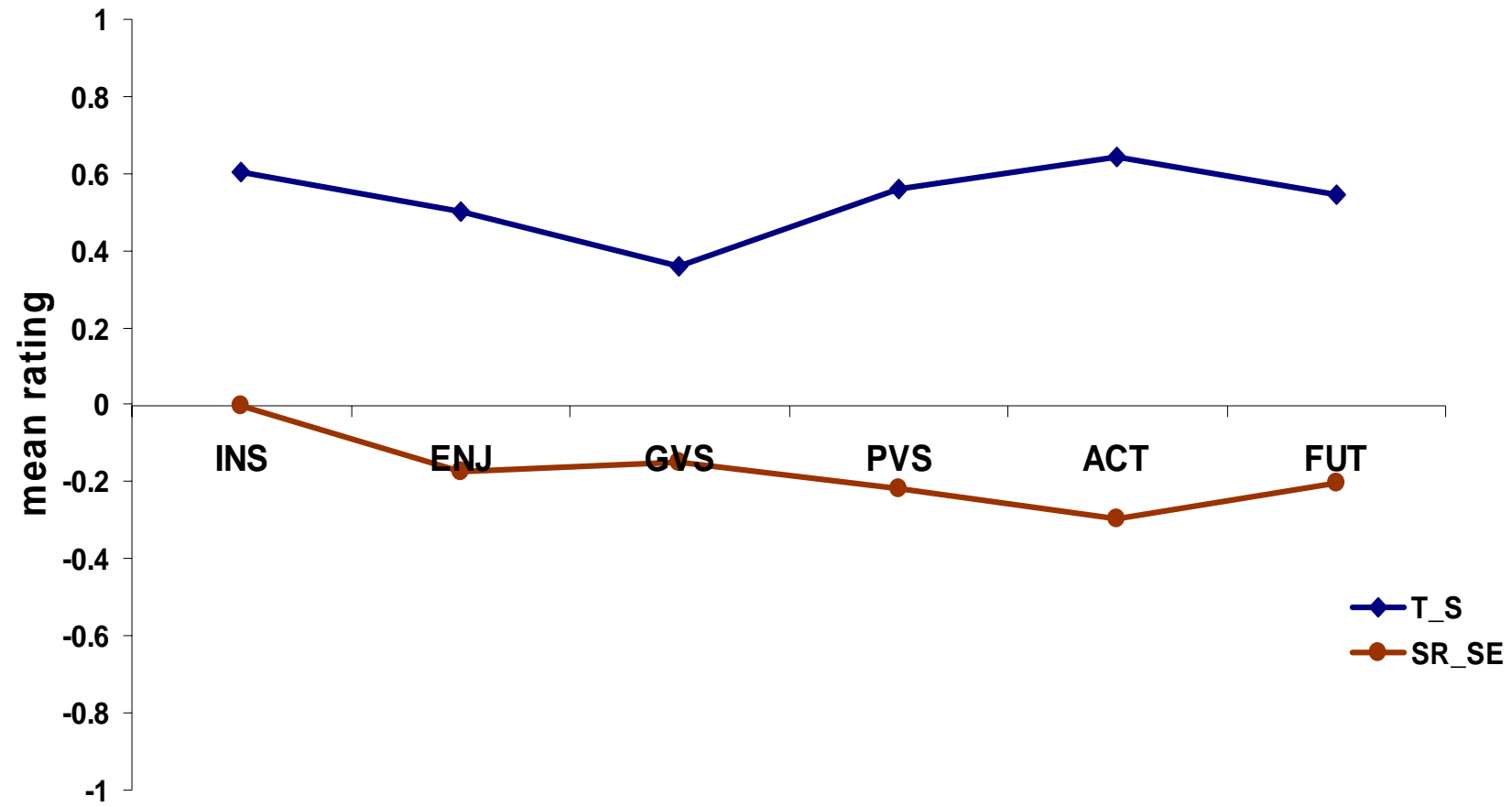
The World Values Surveys were designed to provide a comprehensive measurement of all major areas of human concern, from religion to politics to economic and social life and two dimensions dominate the picture: (1) Traditional/ Secular-rational and (2) Survival/Self-expression values. These two dimensions explain more than 70 percent of the cross-national variance in a factor analysis of ten indicators-and each of these dimensions is strongly correlated with scores of other important orientations.

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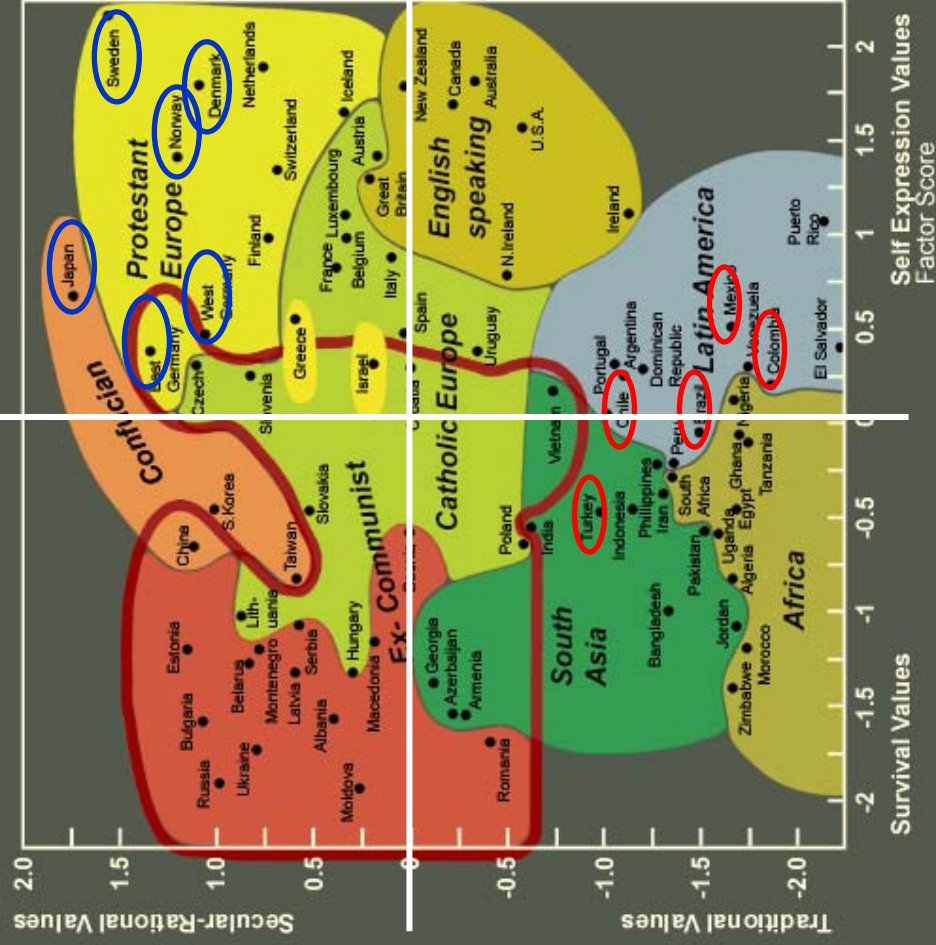


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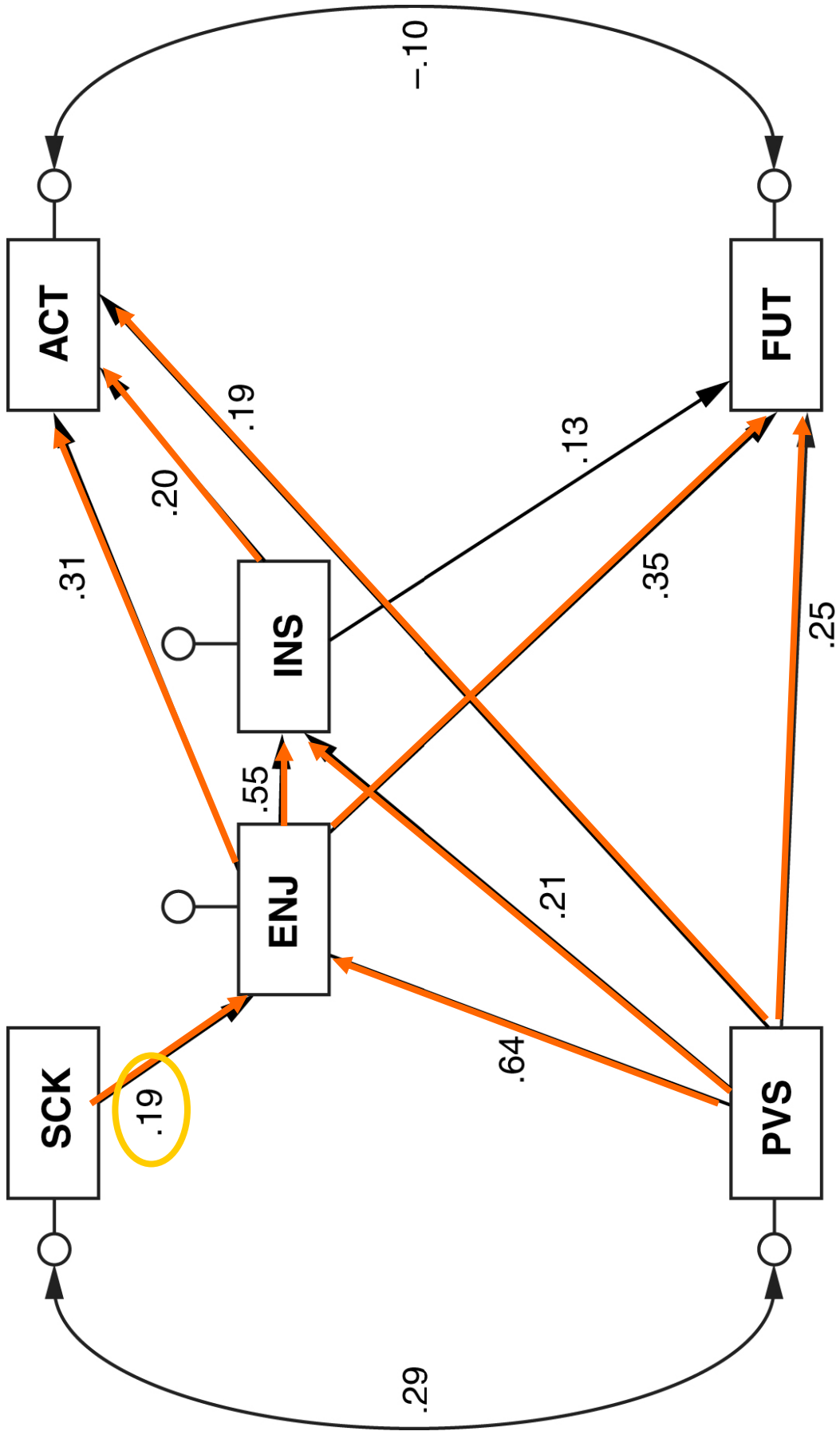
Model Fit: RMSEA

- All PISA .028
- Columbia .060
- USA .168
- Estonia .151
- Sweden .249

Selected Countries PISA 2006 ...

Interest in Science (INS) and Knowledge (SCK)

■ Columbia	$r = -.08$	(.060)
■ USA	$r = .14$	(.151)
■ Estonia	$r = .16$	(.168)
■ Sweden	$r = .32$	(.249)



Model Fit:

	RMSEA	CFI
■ Estonia	.076	.991
■ USA	.054	.996
■ Sweden	.052	.997

Some Implications ...

- If students enjoy science they are more likely to report that they participate in science-related activities NOW and that they intend to participate in the future.
- The structure of *individual interest* is not independent of the broader culture with its own history and cultural traditions (macrosystem).

Further Implications and Questions ...

- Developmental questions – what experiences of science have contributed to the 15 year old's current perspectives on science?
- Investigation of subgroups within the overall pattern of relations – person approaches.
- Different domains different motivation dynamics?

Conclusion ...

- PISA data sets present a gold-mine of secondary analyses for motivation researchers .
- But, they relate to 15year olds and so only provide a cross-section on which to base practice.

Thank you ...