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Academic Self-concept: Cornerstone of a Revolution in the Positive Psychology of Education

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Overview of Presentation

1. Introduction
2. Multidimensional hierarchical (Shavelson) model & SDQ self-concept measures
3. Reciprocal Effects Model (REM): What Comes First, Self-concept or Performance?
4. Frame of reference models
   - Internal/external frame of reference model
   - Big-fish-little-pond effect (BFLPE)

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Importance of Self-concept

Nathaniel Branden (1994) stated that:

"I cannot think of a single psychological problem - from anxiety to depression, to under-achievement at school or at work, to fear of intimacy, happiness or success, to alcohol or drug abuse, to spouse battering or child molestation, to co-dependency and sexual disorders, to passivity and chronic aimlessness, to suicide and crimes of violence - that is not traceable, at least in part, to the problem of deficient self-esteem."

Importance of Self-concept

- Self-concept (SC) enhancement is a major goal in many disciplines.
- The benefits of feeling positive about oneself transcend traditional disciplinary/cultural barriers.
- Interventions that produce short-term changes in skills, aptitudes or achievement are unlikely to have long lasting effects unless there are also changes in corresponding areas of SC.
- **There has been remarkable growth in SC research & methodology in the last quarter century.**

2
Multidimensional Hierarchical (Shavelson) model & SDQ self-concept instruments

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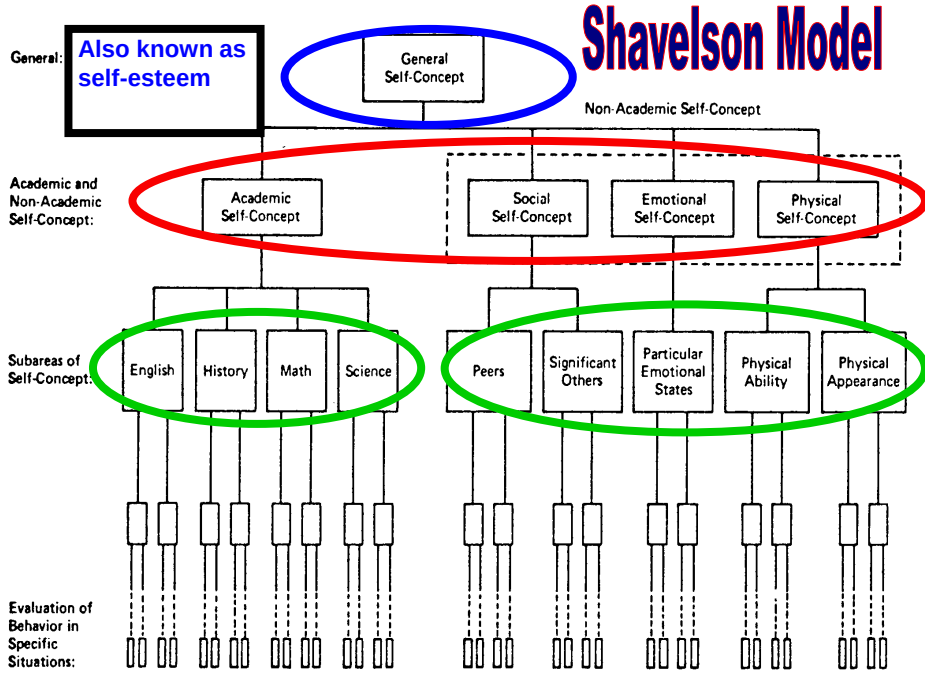

FIG. 16.1. Structure of self-concept (Shavelson, Hubner, & Stanton, 1976).

The Shavelson et al. Model

- Very heuristic, but little empirical support; **prevailing wisdom was that SC is a unidimensional construct**.
- Our SDQ instruments were based on this model. Early SDQ research provided strong support for the model -- particularly SC's multidimensionality, an important theme of our research.
- Although supportive of the Shavelson et al. model, complications eventually led to the Marsh/Shavelson model -- a revision of the original model.

Theory building and instrument construction are inexorably intertwined. Each will suffer if either is ignored. SDQ research supported the Shavelson model AND led to its revision.

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Development of SDQs

We developed separate instruments for:

- Preadolescents (**SDQI**);
- Adolescents (**SDQII**); and
- Late-adolescents/adults (**SDQIII**).

Good Psychometric properties

- **Good Reliability** (αs in the .80s & .90s).
- **Good Stability**, particularly for older Ss (median stability of .87 for 1-month to .74 for 18 months).
- **Clear Factor structure** in dozens of diverse samples differing in gender, age, country, and language.
- **Distinct domains** (median rs among factors between .1 and .2 for the 3 SDQ instruments – remarkable given earlier claims that SC is unidimensional).

Example Items From SDQI –For young children

	FALSE	MOSTLY FALSE	SOMETIMES FALSE, SOMETIMES TRUE	MOSTLY TRUE	TRUE		
1. I am good looking	1					1	Phys Appear SC
2. I am good at all **SCHOOL SUBJECTS**	2					2	Academic SC
3. I can run fast	3					3	Physical SC
4. I enjoy doing work in **READING**	4					4	Verbal SC
5. My parents understand me	5					5	Parent Relation SC
6. I have lots of friends	6					6	Peer SC
7. I get good marks in **MATHEMATICS**	7					7	Math SC
8. I do lots of important things	8					8	Global Self-Esteem

Multidimensional Perspectives: Education

Cannot rely on a single measure of global Self-esteem (SE), a **unidimensional perspective**.

- ASCs are substantially related to school grades in the matching school subjects; SE was uncorrelated.
- Academic outcomes (e.g., achievement, coursework selection, aspirations) are substantially related to ASC but relatively unrelated to SE and nonacademic components of SC.
- ASCs in specific school subjects predicted subsequent coursework selection better than corresponding school grades. SE was unrelated to grades & coursework selection (Marsh & Yeung, 1997).

Summary: SE is not useful in predicting key constructs in education

Multidimensional Perspectives: Gender

Marsh. (1989). Age and sex effects in multiple dimensions of self-concept: Preadolescence to Early-adulthood. *Journal of Educational Psychology, 81,* 417-430.

Small gender differences in SE favoring boys grow larger through high school and then decline in adulthood.

Small gender differences in SE mask larger, counterbalancing gender-stereotypic differences in specific components of SC.

- boys have high math, physical, emotional SCs;
- girls have higher verbal, social, moral SCs;
- This pattern of gender differences is reasonably consistent from early childhood to adulthood.

Summary: Gender differences cannot be understood from a unidimensional perspective.

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Multidimensional Perspectives Across all Disciplines: Human Nature

Self-beliefs are central to a positive psychology across all facets of human endeavor and all related disciplines

Particularly psychologically healthy individuals know their strengths and weaknesses. These differences are reflected in their multidimensional profile of self-concepts.

If a person has a high academic self-concept, a moderate social self-concept, and a low physical self-concept this multidimensional profile cannot be captured by a single self-esteem score.

There is growing evidence in support of our multidimensional perspective across many disciplines--education, personality, gender, early childhood, sport, mental health, and well-being more generally.

3 Reciprocal Effects Model (REM): What Comes First, Self-concept or Performance?

What Comes First, The chicken or The Egg

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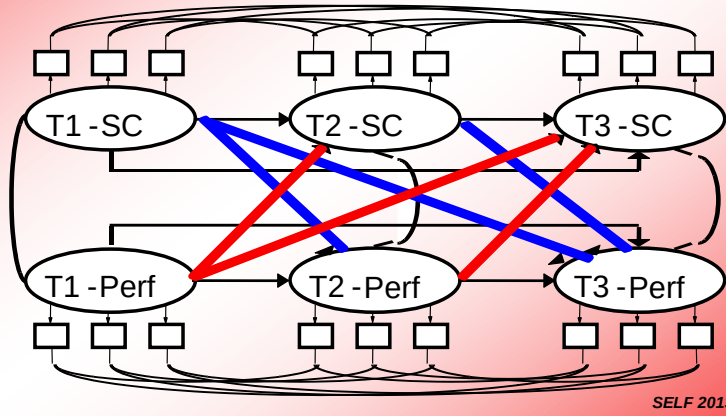
Causal Ordering Models of SC and Perf

Self-enhancement
(+ blue paths: SC➔Perf)

Skill-development
(+ red paths: Perf ➔ SC)

Reciprocal effects (+ blue & red)



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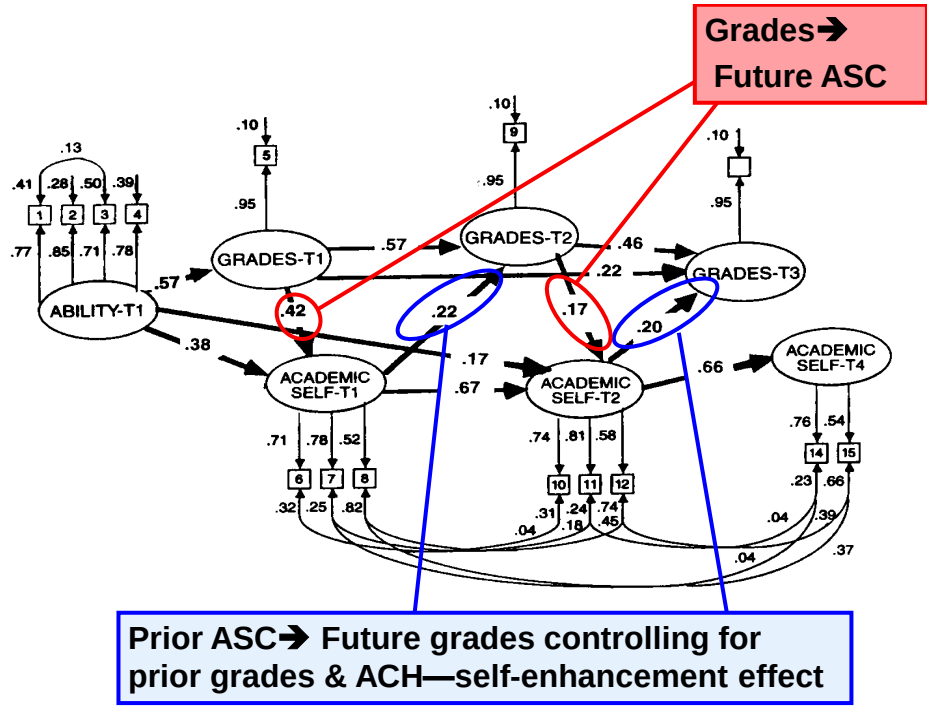

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Development of Causal Ordering

Marsh, Byrne & Yeung (1999) concluded that research was not adequate to evaluate developmental hypotheses.

Recommended use of multicohort-multioccasion designs that combined advantages of cross-sectional (multiple age cohorts) and longitudinal (multiple occasions) studies.

Guay, Marsh, & Boivin (2003) implemented this design:

- young children in grades 2, 3 & 4 (multiple age cohorts)
- each measured for three years (multiple occasions)
- support for REM across all 3 cohorts and all 3 Occasions

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Marsh, Papaioannou, and Theodorakis (2006)

Tested reciprocal effects Model of physical SC & exercise behavior:

- Greek PE classes *(2,786 students, 200 classes, 67 teachers)*
- collected early (T1) and late (T2) in the school year,
- Extended to tests to include other constructs from ***theory of planned behavior***

In Support of the Reciprocal Effects Model (Model A):

- T1PhySC ➔T2ExBeh = .17
- T1ExBeh ➔ T2PhysSC = .10

Juxtaposed the REM with the Theory of Planned Behavior

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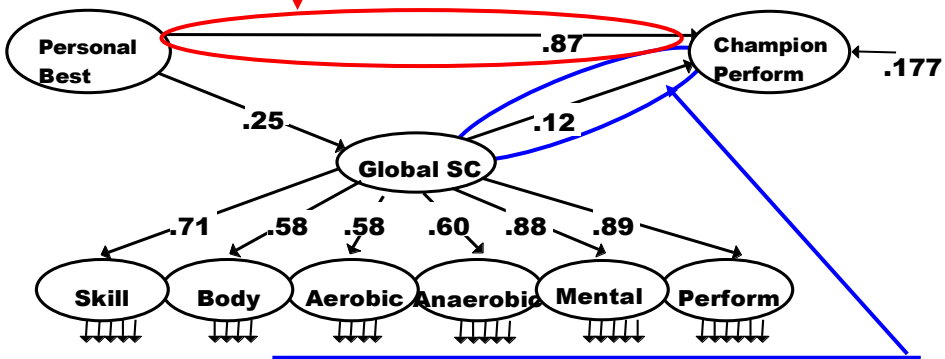
Self-concept & Winning Gold Medals: 200 of the top swimmers in the world

Very large effect of prior personal best performance (PB) on championship performance



Global Athletic SC effect on Championship performance beyond effects of previous PBs

Marsh & Perry, C. (2005) *J Sport & Exercise Psyc, 27*, 71-91.

Meta-analysis of REM Studies

Valentine, J. C., & DuBois, D. L. (2005). Effects of self-beliefs on academic achievement and vice-versa: Separating the chicken from the egg. In Marsh, H. W., Craven, R. G. and McInerney D. M. (eds.), *International Advances in Self Research*, vol. 2, (pp 53–78). Greenwich, CT: Information Age.

Valentine, J. C., DuBois, D. L., & Cooper, H. (2004). The relations between self-beliefs and academic achievement: A systematic review. Educational Psychologist, 39, 111–133.

- 55 publications, 282 separate effect sizes
- effect of prior self-beliefs on subsequent achievement after controlling for the effects of prior achievement was highly significant overall and positive in 90% of the studies
- effects of prior self-beliefs were significantly stronger
  - For **academic** self-beliefs (e.g., ASC) rather than on global measures (e.g., self-esteem),
  - when the self-belief and achievement measures were matched in terms of subject area (e.g., mathematics achievement and math self-concept).
- The results were very robust and did not vary as a function of many potential moderators (e.g., age, country, type of ach, time interval, design features).

Challenge to REM

Marsh & Craven (2006). *Perspectives on Psych Sci, 1, 133-163*

Baumeister et al. challenged this optimistic perspective in highly influential reviews (Scientific American; *Psychological Science in the Public Interest)*. Their pessimistic conclusion was that:

- ***"SE per se is not the social panacea that many people hoped it was."***
- ***"Efforts to boost people's SE are of little value in fostering academic achievement or preventing undesirable behavior."***

Marsh & Craven (2006) noted that this review took a unidimensional perspective, only considered SE studies, ignoring all ASC research.

The apparent controversy is easily resolved by placing it within an appropriate multidimensional perspective.

SE has little reciprocal links with ACH (argued by Baumeister et al.) but ASC is reciprocally linked to ACH (REM research).

4
Frame of Reference Effects

Internal/external (I/E) Frame of Reference Effect

Big-Fish-Little-Pond Effect

4a
Internal/External (I/E) Frame of Reference Model
(Compensatory Effects of Math & Verbal Domains)

External and Internal Comparisons

External Comparisons – "If I am the smartest student in my class I will have a positive academic self-concept."

Internal Dimensional Comparisons – "If math is my best school subject, I will tend to have a positive math self-concept even if I am not particularly good at any school subjects."

Internal/ External Frame of Reference Model

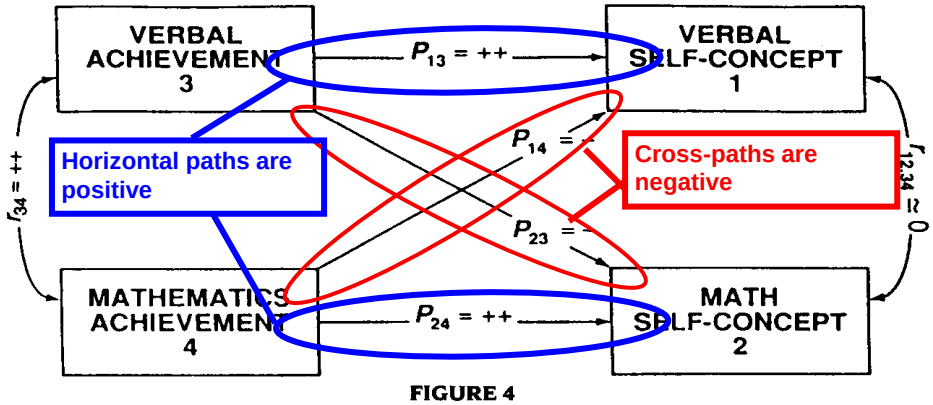


FIGURE 4

Path model of relationships among math and verbal achievements and math and verbal self-concepts: the internal/external frame-of-reference model. Coefficients indicated ++, −, and 0 are predicted to be high positive, low negative, and approximately zero, respectively. (From Marsh, 1986, pp. 129–149. Reprinted with permission.)

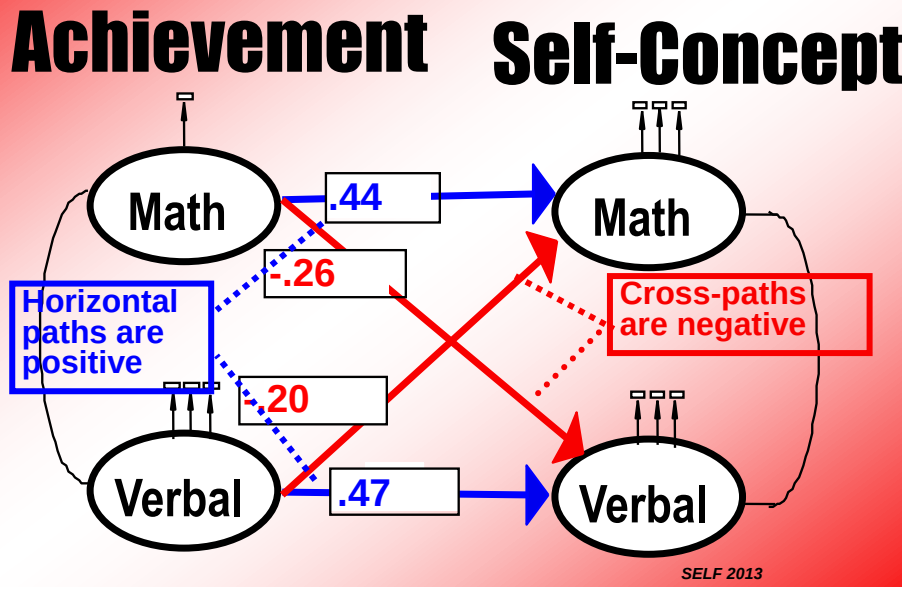
I/E Model Predictions Supported By:

- Responses to each of 3 different SC instruments by CANADIANS (Marsh, Byrne & Shavelson, 1988).
- Nationally representative sample of AMERICAN high school students ("High School and Beyond" study).
- Nationally representative sample of AMERICAN high school students (National Longitudinal Study, 1988 that included the SDQ).
- HONG KONG high school students to a Chinese SDQ following the transition from British to Chinese rule.
- Responses by EAST & WEST GERMAN High School Students shortly after the fall of the Berlin Wall.

Support for I/E model predictions generalizes across age, instruments, nationality, and ACH indicators.

PISA: I/E Model Results

Marsh & Hau (2004). *J Educ Psych*, 56-67



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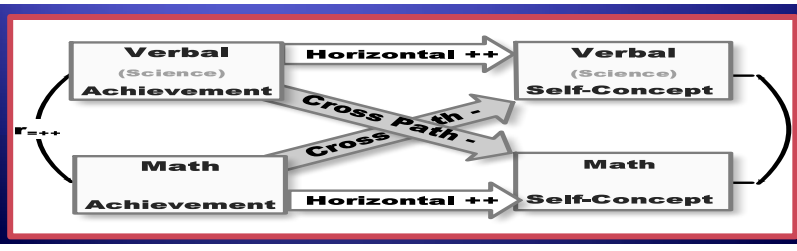
Practical Implications for Educators

The I/E model has important implications for teachers. Teachers need to understand self-concept processes to better motivate students and are sometimes asked to report on student self-concepts in reports to parents. However, teacher do not understand that:

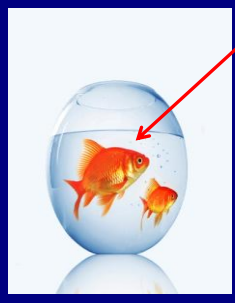
- Even the best students will have relatively poorer SCs in their worst school subjects.
- Even the poorest students will have relatively better SCs in their best school subjects. This finding is important for giving positive feedback that is credible.

Möller, J., & Marsh, H. W. (2013). Dimensional Comparison Theory. *Psychological Review*.

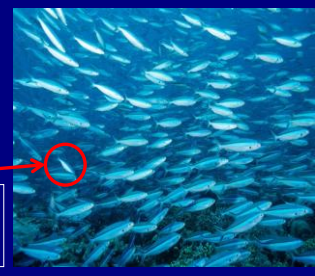
Although social comparison (Festinger, 1954) and temporal comparison (Albert, 1977) theories are well established, dimensional comparison is a largely neglected yet influential process in self-evaluation. Dimensional comparison entails a single individual comparing his or her ability in a (target) domain with his or her ability in a standard domain (e.g., "How good am I in math compared with English?"). This article reviews empirical findings from introspective, path-analytic, and experimental studies on dimensional comparisons, categorized into 3 groups according to whether they address the "why," "with what," or "with what effect" question. As the corresponding research shows, dimensional comparisons are made in everyday life situations. They impact on domain-specific self-evaluations of abilities in both domains: Dimensional comparisons reduce self-concept in the worse off domain and increase self-concept in the better off domain. The motivational basis for dimensional comparisons, their integration with recent social cognitive approaches, and the interdependence of dimensional, temporal, and social comparisons are discussed.



4b
Big-Fish-Little-Pond Effect (BFLPE)



Big fish, small pond
☞ High self-concept



Small fish, big pond
☞ Low self-concept

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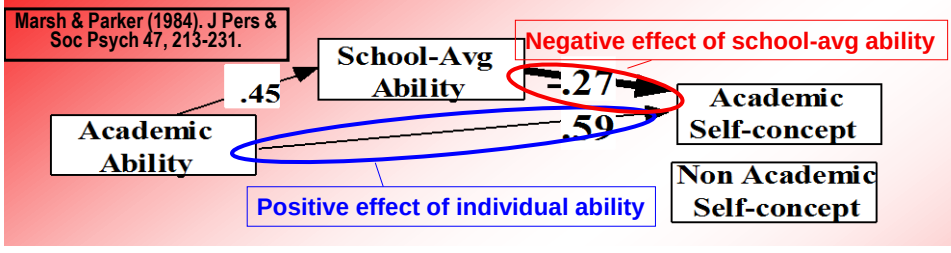
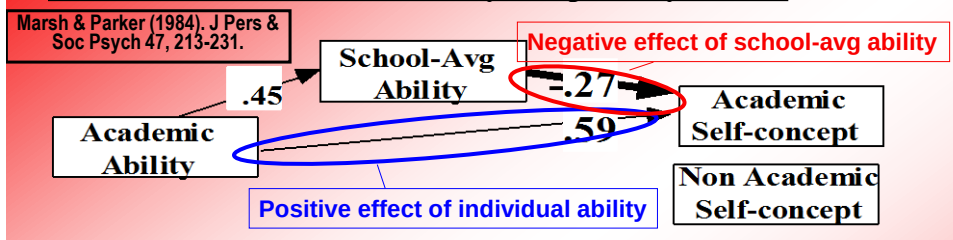
Results from an Australian study of 6 primary schools



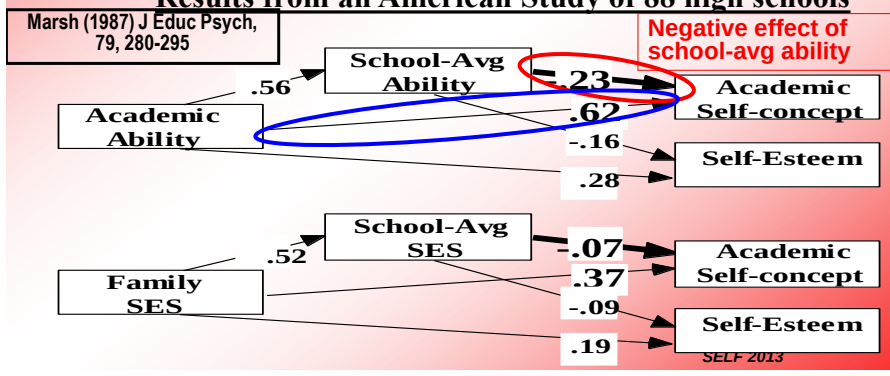
Now lets looks at an early Australian BFLPE study.

- The blue path shows that individual ability is substantially and positively related to ASC – the brighter I am the better my ASC.
- The red path from school-average ability is negative – the brighter everyone else is the lower my ASC.

Results from an Australian study of 6 primary schools



Results from an American Study of 88 high schools



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BFLPE Predictions Supported By:

- Nationally representative sample of AMERICAN high school students ("High School and Beyond" study).
- Nationally representative sample of AMERICAN high school students (National Longitudinal Study, 1988 with SDQ).
- AUSTRALIAN Primary School Students entering a gifted program matched on ability to students in comprehensive schools.
- HONG KONG high school students to a Chinese SDQ following the transition from British to Chinese rule.
- EAST & WEST GERMAN High School Students shortly after the fall of the Berlin Wall.
- Longitudinal GERMAN High School Students showing BFLPE was as strong or stronger 2 & 4 years after graduation.
- SINGAPORE students showing negative-effects of stream-avg more important than school-avg ACH.

Support for BFLPE model predictions generalizes across age, instruments, nationality, and ACH indicators.

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OECD PISA Study of BFLPE

Marsh & Hau (2003). *Am Psych 364-376.*

Now let us consider the cross-cultural generalizability of the BFLPE with the PISA data, nationally representative of 15-year olds in 26 countries.

Yes, there is support for the BFLPE for the PISA data

- Effects of individual ACH were positive.
- Effects of school-average ACH were negative.

NO, the BFLPE does NOT vary with Individual ACH

- The negative effect of school-average ability is co7nsistent across the range of student ACH levels.

Does the BFLPE vary from country to country?

- Yes, but not very much (residual variance = .007). In separate analyses of each country BFLPE was negative in all 26 countries (significant in 24 of 26).

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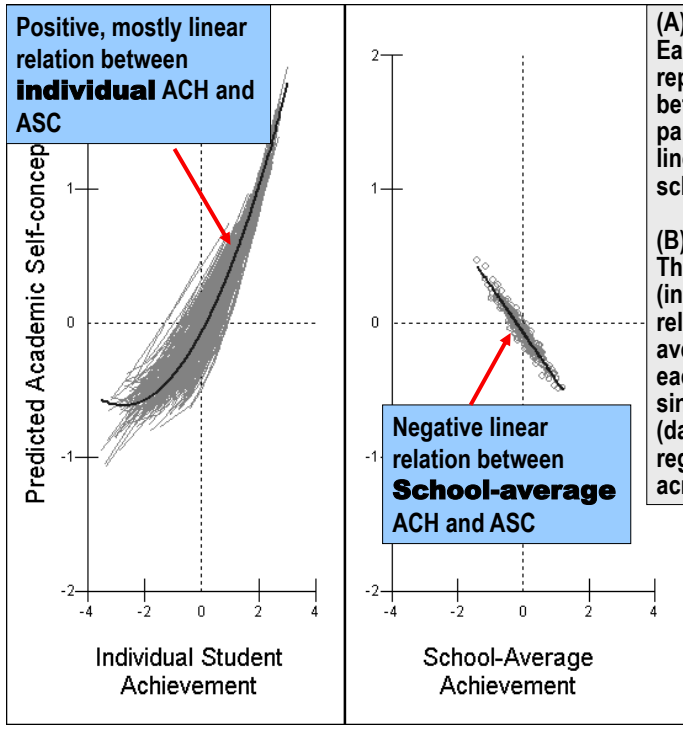

(A) Individual Student ACH. Each of the lines (in grey) represents the relation between ACH and SC in a particular school. The solid line is averaged across all schools.

(B) School-Average ACH. The scatter plot of points (in grey) represents the relation between school-average ACH and SC (i.e., each point represents a single school. The solid (dark) line is the regression equation for across all schools.

Nagengast, B., & MARSH, H. W. (2012). Big Fish in Little Ponds Aspire More: Mediation and Cross-Cultural Generalizability of School-Average Ability Effects on Self-Concept and Career Aspirations in Science. Journal of Educational Psychology.

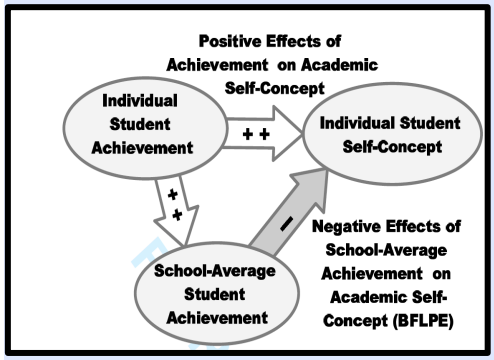

Table 4
Comparison of Country-Specific BFLPE Estimates for Academic Self-Concept From Comparative Studies Using Data From PISA

Country	PISA 2006 Science	PISA 2003 Math	PISA 2000 General
Azerbaijan	−0.154		
Argentina	−0.177		
Australia	−0.168	−0.281	−0.23
Austria	−0.231	−0.483	−0.23
Belgium	−0.183	−0.447	−0.12
Brazil	−0.118	−0.372	−0.26
Bulgaria	−0.073		
Canada	−0.234	−0.427	
Chile	−0.118		
Chinese Taipei	−0.080		
Colombia	−0.129		
Croatia	−0.123		
Czech Republic	−0.221	−0.446	−0.24
Denmark	−0.190	−0.296	−0.17
Estonia	−0.182		
Finland	−0.254	−0.301	−0.14
France	−0.226	−0.383	
Germany	−0.301	−0.713	−0.30
Greece	−0.148	−0.174	
Hong Kong	−0.209	−0.200	
Hungary	−0.209	−0.323	−0.05
Iceland	−0.173	−0.209	−0.18
Indonesia	−0.195	−0.235	
Ireland	−0.191	−0.103	−0.24
Israel	−0.222		
Italy	−0.212	−0.409	−0.36
Japan	−0.097	−0.307	
Jordan	−0.105		
Korea	0.050	−0.014	−0.02
Kyrgyzstan	−0.187		
Latvia	−0.118	−0.221	−0.06
Liechtenstein		−0.554	−0.20
Lithuania	−0.135		
Luxembourg	−0.076	−0.428	−0.17
Macao-China	−0.160	−0.330	
Mexico	−0.061	−0.357	−0.08
Montenegro	−0.136		
Netherlands	−0.287	−0.696	−0.26
New Zealand	−0.235	−0.314	−0.26
Norway	−0.198	−0.168	−0.18
Poland	−0.126	−0.279	
Portugal	−0.274	−0.205	−0.18
Qatar	−0.269		
Romania	−0.087		
Russian Federation	−0.222	−0.187	−0.21
Serbia	−0.141	−0.181	
Slovak Republic	−0.189	−0.411	
Slovenia	−0.188		
Spain	−0.080	−0.244	
Sweden	−0.177	−0.202	−0.33
Switzerland	−0.198	−0.446	−0.17
Thailand	−0.176	−0.194	
Tunisia	−0.117	−0.161	
Turkey	−0.109	−0.252	
United Kingdom	−0.225	−0.344	−0.23
United States	−0.352	−0.230	−0.26
Uruguay	−0.158	−0.240	

How Long-Lasting is the BFLPE? Does it persist after HS graduation?

Marsh, Trautwein, Ludtke, Baumert & Köller (2008). *Am Ed Res J*

Good evidence that the BFLPE grows larger over time for students in same high school (HS).

- In two large German studies :
  - BFLPEs replicated at end of high school (positive effects of individual achievement, negative effects of school-average achievement);
  - Negative BFLPE as large or larger 2 years (in Study 1) or 4 years (in Study 2) after HS graduation.

Summary: BFLPE is long lasting.

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Gifted & Talented (G&T) Students

Marsh, Chessor, Craven & Roche (1995) Am Ed Res J, 285-319

There is worldwide growth in numbers of G&T classes and selective high schools. Does this enhance or undermine SCs of gifted students?

We evaluated BFLPE predictions for attending full-time G&T primary school classes in two studies. Students from G&T programs were matched to students of equal ability from mixed-ability classes. Special G&T class placement:

- Led to significant declines in ASC over time & compared to controls;
- Had no effect on nonASCs;
- Results were consistent over gender, age & initial ability levels.

BFLPE research calls into question the assumed benefits of attending full-time G&T classes and academically selective high schools.

Mainstreaming Academically Disadvantaged Students

Tracey, Marsh & Craven (2003). *International Advances in Self Research* (Volume 1, pp. 203-230)
Marsh, Tracey, & Craven (2006). Ed & Psych Measure, 795-818.

Moving to the opposite end of the ability continuum. There is a worldwide inclusion movement of academically disadvantaged students into regular classrooms. There are two very different perspectives:

Labelling theory: Predicts that placement of academically disadvantaged students in special classes with other low-achieving students leads to lower SCs. Supports regular class placement – mainstreaming.

BFLPE: Predicts that special class placement leads to higher ASCs. Supports special class placement.

Mainstreaming Academically Disadvantaged Students

Evaluated placement (special vs. regular classes) for AD (academically disadvantaged) students with mild academic disabilities (IQs: 56-75).

Consistent with BFLPE, AD students in special AD classes:

- had higher ASCs;
- also had significantly higher Peer SCs (AD students felt excluded—not included—in regular classes).

BFLPE research questions assumed benefits of placing AD students into regular classes.

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So What If Going To Academically Selective High Schools Hurts Self-concept?

US High School & Beyond Study (1000 high schools, 30,000 students)

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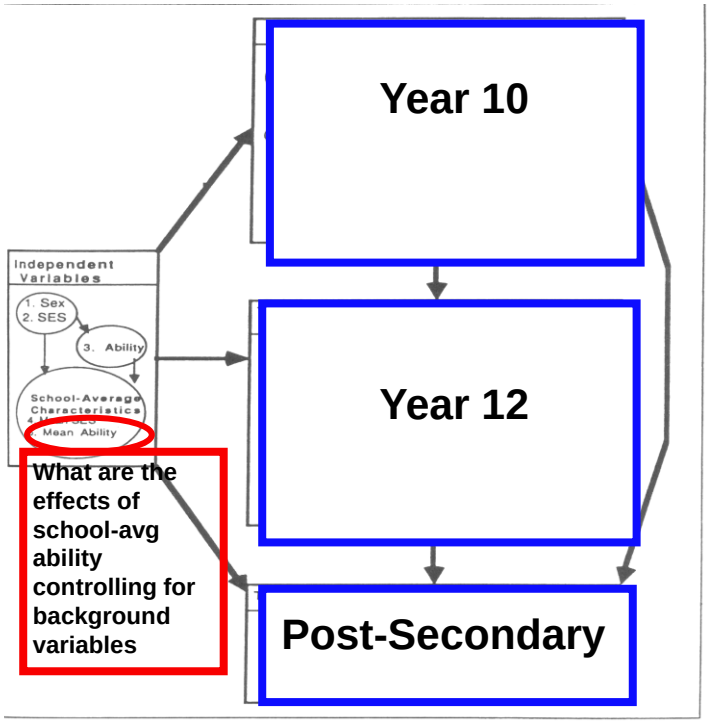

High School and Beyond Study:

Path model of 23 outcomes and their temporal ordering.

Marsh (1991) Am Ed Res J, **445-480.**

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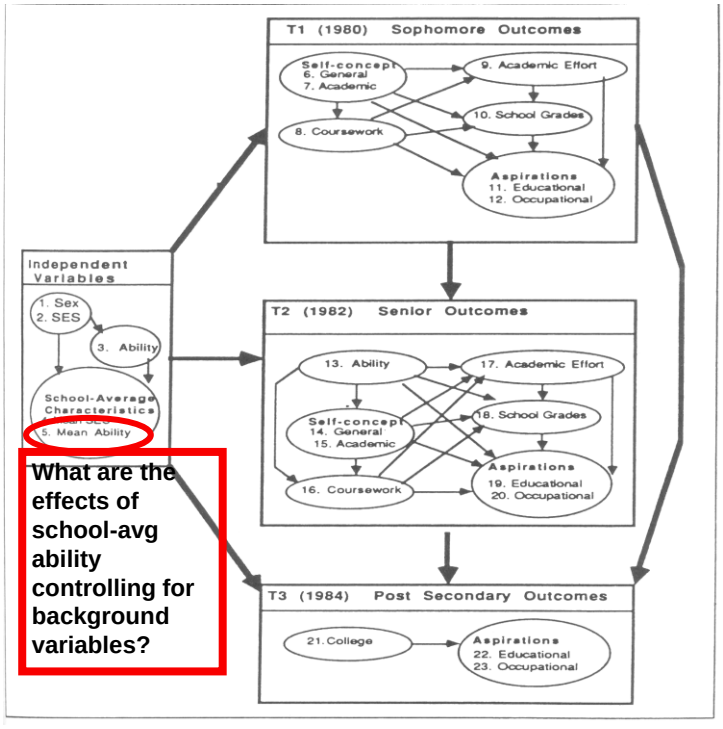

High School and Beyond Study:

Path model of 23 outcomes and their temporal ordering.

Marsh (1991). ***Am Ed Res J*** **445-480.**

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RESULTS: School-Avg Ability Effects

- 15 of 17 relations were significantly negative (2 NS);
- Largest negative effects for ASC (the BFLPE) and educational aspirations;
- School-average ability also negatively affected: SE, course selection, school grades, standardized test scores, occupational aspirations and college attendance;
- There were additional negative effects for Year 12 and post-secondary outcomes beyond the negative Year 10 effects.

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Generalisability/ Moderators of the BFLPE: Different Sides of the Same Coin

Marsh, Seaton, Trautwein, Lüdtke, Hau, O'Mara, & Craven (2008). The Big-Fish-Little-Pond-Effect Stands Up to Critical Scrutiny: Implications for Theory, Methodology, and Future Research. Educ Psych Rev, 20, 319-350.

Seaton, M., Marsh, H. W., & Craven, R. G. (2009). Earning its place as a pan-human theory: Universality of the big-fish-little-pond effect across 41 culturally and economically diverse countries. J Educ Psych, 101, 403-419.

Seaton, M., Marsh, H. W., & Craven, R. G. (2010). Big-Fish-Little-Pond-Effect: Generalizability and moderation - two sides of the same coin. *American Educational Research Journal, 47*, 390-434.

Jonkmann, K., Becker', M. Marsh, H.W., Trautwein, U, Lüdtke, O.(2012). Personality Traits Moderate the Big-Fish-Little-Pond Effect of Academic Self-Concept Learning and Individual Differences. Learning and Individual Differences, 22, 736-746.

Moderation/Generalisability

Marsh, Seaton & Craven (2009). Big-Fish-Little-Pond-Effect: Universality. JEdPsych.
Marsh, Seaton & Craven (2010). Big-Fish-Little-Pond-Effect: Generalizability and Moderation. AERJ.

- To better study BFLPE moderation, we evaluated each of a diverse set of potential moderators using PISA 2003:
  Ability, SES, Learning Styles, Elaboration, Memorization, Control Strategies, Extrinsic Motivation, Intrinsic Motivation, Self-Efficacy, Anxiety, Competitive Preferences, Cooperative Learning Preferences, Identification with School, Attitudes to School, Sense of Belonging, Student Teacher Relations
- Whilst some interactions were statistically significant (with N=265,180), the effect sizes were consistently small
- At least the direction and mostly the size of the BFLPE were extremely robust

Jonkmann, K., Becker, M. MARSH, H.W., Trautwein, U, Lüdtke, O.(2012). Personality Traits Moderate the Big-Fish-Little-Pond Effect of Academic Self-Concept. Learning and Individual Differences, 22, 736-746.

This study contributes to research aiming to identify moderators of the BFLPE by investigating the effects of students' personality (i.e. Big Five traits and narcissism). Multilevel structural equation modeling was used to test the moderator hypotheses, drawing on data from a large sample of N=4973 upper secondary track students (M age=19.57). Consistent with a priori predictions, the negative effect of school-average achievement (the BFLPE) interacted significantly with narcissism.

Students high in narcissism experienced smaller BFLPEs than did students with low or average levels of narcissism.

The study illustrates how personality moderates frame of reference effects that are central to self-concept formation.

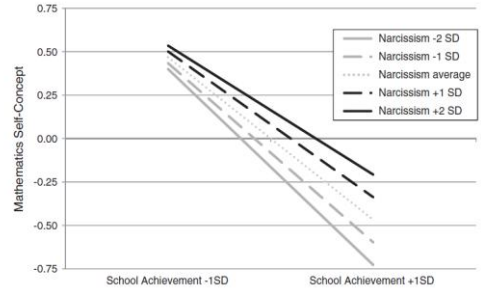

Fig. 2. Interaction between narcissism and math school achievement in the prediction of math self-concept.

Marsh, H. W., Lüdtke, O., Robitzsch, A., Trautwein, U., Asparouhov, T., Muthén, B., & Nagengast, B. (2009). Doubly-latent models of school contextual effects: Integrating multilevel and structural equation approaches to control measurement and sampling error. *Multivariate Behavioral Research*, *44*(6), 764-802

Doubly-Latent Multilevel Models: Integration of SEM, CFA, MLM

Lüdtke,O., Marsh, H. W, Robitzsch, A.. & Trautwein, U. (2011, in press). A 2x2 taxonomy of multilevel latent contextual models: Accuracy-bias trade-o s in full and partial error-correction models. Psychological Methods

Lüdtke, O., Marsh, H. W., Robitzsch, A., Trautwein, U., Asparouhov, T., & Muthén, B. (2008). The multilevel latent covariate model: A new, more reliable approach to group-level effects in contextual studies. Psychological Methods, 13, 203-229

Nagengast, B., & MARSH, H. W. (2012). Big Fish in Little Ponds Aspire More: Mediation and Cross-Cultural Generalizability of School-Average Ability Effects on Self-Concept and Career Aspirations in Science. Journal of Educational Psychology.

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Marsh, H. W., Lüdtke, O., Nagengast, B., Trautwein, U., Morin, A. J., Abduljabbar, A. S., & Köller, O. (2012). Classroom climate and contextual effects: conceptual and methodological issues in the evaluation of group-level effects. *Educational Psychologist*, *47*(2), 106-124

Since at least Cronbach (1976) it is well-understood that classroom climate should be based on classroom (L2) aggregates of (L1) individual student responses, not the L1 responses.

However, ~50% of published studies inappropriately based classroom climate interpretations on L1 responses, and none have incorporated doubly-latent models.

We have applied the doubly-latent model to contextual effects (the BFLPE). Here we present a **Manifesto** about how to evaluate climate & contextual effects using our doubly-latent model; argue that much educational research is invalid, treating climate and context a student level (L1) rather than group-level (L2) constructs; implications across many disciplines.

Our study is apparently the first to apply the doubly latent model to climate effects and distinguish these from contextual effects.

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MARSH, H. W., Kuyper, H., et al. (in prep). The Big-Fish-Little-Pond Effect: Juxtaposing Frame-of-Reference Contextual Effects at the Classroom and School Levels

For a large, nationally representative sample of 15,356 Dutch 9th grade students from 651 intact classes in 95 schools we test the social comparison basis of the BFLPE, juxtaposing the separate and combined effects of individual, class-average, and school-average achievement based on school grades and standardized test scores, and introducing new statistical models in pursuit of these goals.

Consistent with the 'local dominance' hypothesis, two and three-level models show that the negative effect of school-average achievement is largely eliminated by the even larger negative effect of class-average achievement in each of three school subjects (Dutch, English, Math).

In support of the social comparison basis of the BFLPE, controlling for student's subjective ranking of how they compare with other students in their class substantially reduces the BFLPE. Even though students know how their class compares with other classes in the same school and how their school compares with those in the country, ASC is largely determined by how students compare with students in their own class.

At the individual student level, ASC is more highly related to school grades than standardized test scores, but the negative BFLPE at the class and school level is largely a function of class- and school-average test scores.

Consistent with a priori theoretical predictions the BFLPE is reasonably consistent across levels of individual ACH – the brightest and weakest students within each class suffer the BFLPE to similar extents.

Marsh, H. W., Abduljabbar, A. S., Abu-Hilal, M. M., Morin, A. J., Abdelfattah, F., Leung, K. C. & Parker, P. (2013). Factorial, convergent, and discriminant validity of TIMSS math and science motivation measures: A comparison of Arab and Anglo-Saxon countries. Journal of Educational Psychology, 105, 108–128

1. Factorial, Convergent, and Discriminant Validity of TIMSS Math and Science Motivation & ASC Measures: A Comparison of Arab and Anglo-Saxon Countries

2. Age-Cohort and Cross-National Differences in Paradoxical Relations Between TIMSS ACH, SC and Intrinsic Motivation & ASC in Math and Science: The Internal/External Frame of Reference Model

3. The Big-Fish-Little-Pond Effect: Developmental and Cross-Cultural Generalizability Based on TIMSS

TIMSS 'Scale Method' for Motivation & ASC

TIMSS used a "scale method" for multi-item scales that had an underlying quantitative continuum.

- *"TIMSS classified the students into three levels: high, medium, and low. In the International Reports, these derived variables are referred to as indices. To classify the cases into three groups, two cutoff points were established. Three main criteria were used in setting the cutoff points. First, the high level of the index should correspond to conditions or activities generally associated with good educational practice or high academic ACH. Second, there should be a reasonably even distribution of students across the three index levels. Third, the scale categories should be about the same size." (Ramirez & Arora, 2004, p. 315).*

Focus On Islamic Countries

No previous psychometrically rigorous evaluation of TIMSS data in Islamic countries

Gender Differences: Islamic countries have an extreme single-sex schooling from preschool;

- male teachers teach boys in all-boy schools;
- female teachers teach girls in all-girl schools

Paradoxical Academic Self-Concept (ASC) effects:

- Academic SC HIGHER in US than Japan, China & East Asian countries, but
- ACH LOWER in US these Asian countries;
- However no comparisons of this juxtaposition in Islamic countries

Study 1 Participants: 8th grade students :

Country	Students	%Male	Intact Classes
Arab			
Saudi Arabia	4,269	47%	203
Jordan	5,251	47%	199
Oman	4,752	53%	157
Egypt	6,582	51%	237
English-Speaking Anglo-Saxon			
USA	7,593	50%	509
England	4,048,	48%	441
Australia	4,103	55%	327
Scotland	4,205	49%	257

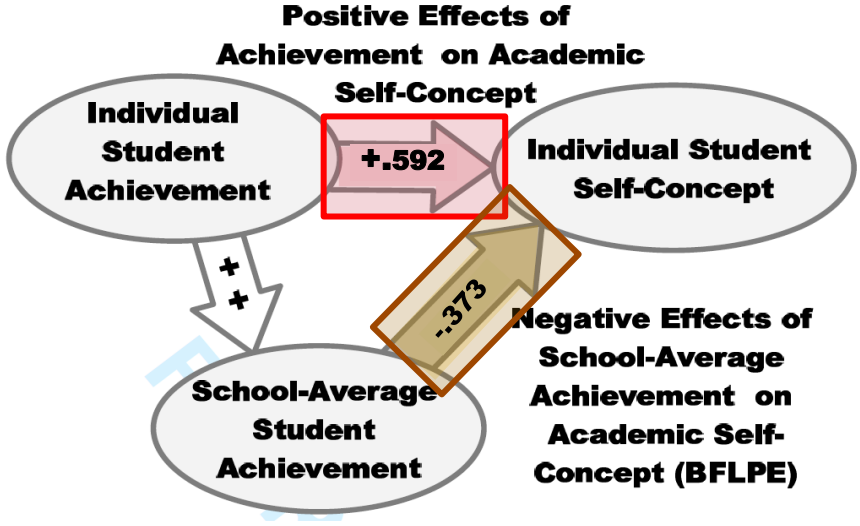
TIMSS Factor Structure

Item	Factor loading	Item wording
Mathematics		
Value		
MVAL1	0.626	I think learning mathematics will help me in my daily life.
MVAL2	0.611	I need mathematics to learn other school subjects.
MVAL3	0.743	I need to do well in mathematics to get into the university of my choice.
MVAL4	0.742	I need to do well in mathematics to get the job I want.
Self-concept		
MSCP1	0.750	I usually do well in mathematics.
MSCP2	0.857	I learn things quickly in mathematics.
MSCN1	0.550	Mathematics is harder for me than for many of my classmates.
MSCN2	0.724	I am just not good at mathematics.
Affect		
MAFFP1	0.894	I enjoy learning mathematics.
MAFFP2	0.917	I like mathematics.
MAFFN1	0.686	Mathematics is boring.
Coursework		
MMORE	1.000	I would like to do more mathematics in school (single item).
Science		
Value		
SVAL1	0.626	I think learning science will help me in my daily life.
SVAL2	0.611	I need sciences to learn other school subjects.
SVAL3	0.743	I need to do well in sciences to get into the university of my choice.
SVAL4	0.742	I need to do well in sciences to get the job I want.
Self-concept		
SSCP1	0.750	I usually do well in science.
SSCP2	0.857	I learn things quickly in science.
SSCN1	0.550	Science is harder for me than for many of my classmates.
SSCN2	0.724	I am just not good at science.
Affect		
SAFFP1	0.894	I enjoy learning science.
SAFFP2	0.917	I like science.
SAFFN1	0.686	Science is boring.
Coursework		
SMORE	1.000	I would like to do more science in school (single item).

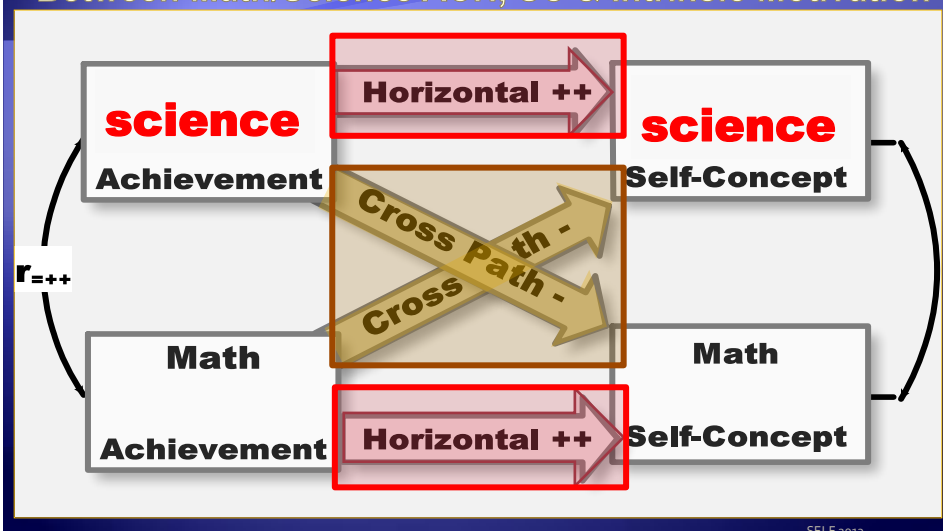
Summary of Study 1

- Big country differences in reliability of Motivation & ASC constructs
- Factor structure invariant over domain & country, but complicated by method effects (negative & parallel worded items)
- Because of reliability differences and method effects, analyses of manifest means not appropriate; need latent variable models.
- Good support for construct validity of Math/Science Motivation & ASC in relation to: ACH, plans to take more coursework in math & science, and long-term educational aspirations;
- Small, stereotypic gender differences favoring boys evident in Anglo countries, but gender differences largely favor girls in Arab countries (especially ACH)
- Paradoxical differences in means; Anglo countries scores higher in ACH but lower in Motivation & ASC than Arab countries

Study 2: The Big-Fish-Little-Pond Effect: Developmental & Cross-Cultural Generalizability Based on TIMSS



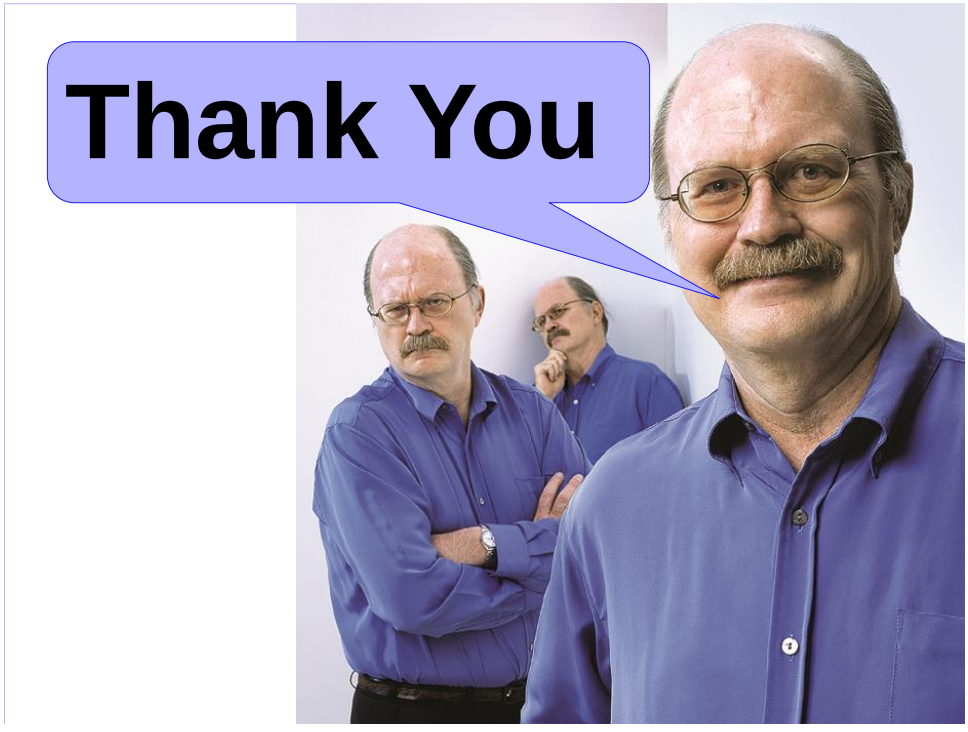
Study 3: The Internal/External Frame of Reference : Age-Cohort and Cross-National Differences in Relations Between Math/Science ACH, SC & Intrinsic Motivation



In social sciences, methodological-substantive synergy is important.

- Complex issues require strong methodology;
- methodological developments are stronger when stimulated by real substantive issues.
- Integrating the two creates a powerful synergy.
- becoming increasingly difficult as the gap between substantive and methodological research increases

Our self-concept research program is a methodological-substantive synergy, integrating good theory, strong methodology, statistical sophistication, and cross-cultural generalizability to address complex issues with important substantive/policy-practice implications.



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