How do Boys’ and Girls’ Self-Beliefs and Values Develop in Math and English through Australian Grades 7 to 11?

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THEORETICAL FRAMEWORK

- Cultural milieu
- Socialisers' beliefs and behaviours
- Differential aptitudes of child
- Previous achievement-related experiences

- Child's perceptions of socialisers' attitudes and expectations, gender roles and activity stereotypes
- Child's interpretation of experience: causal attributions, locus of control

- Child's goals and general self-schemata, S-C ability, perceived task demands
- Child's affective memories

- Expectation of success
- Achievement-related choices
- Subjective task value
Given important achievement-related outcomes from key E-V constructs:

- What are the developmental trajectories for key E-V constructs?
- Can we explain gender and age effects?
- Are trajectories domain specific?
- Are critical intervention points identifiable?
Measures

Based on those of Eccles, Wigfield and colleagues for

Self beliefs:
- Perceived talent
- Success expectancies

Values:
- Intrinsic value
- Utility value
Current Evidence

- Transition studies
- Pubertal timing explanations
- Person-environment fit (Eccles & Midgley, 1989, 1990)
- Temporary decrements with recovery (Wigfield et al., 1991)
- Recent research shows continued declines (Jacobs et al., 2002; Watt, in review)
Jacobs et al. (2002) math and Language Arts (LA) competence beliefs and values (grades 1 to 12):

- **Math competence beliefs** linearly declined and initial gender differences converged
- **LA competence beliefs** declined steeply through grades 1 to 6, most steeply for boys, then plateaued for girls and increased for boys
- **Math value** declined most through secondary school (no gender effects)
- **LA value** declined most up to grade 7, then plateaued for boys and increased for girls
Fredricks & Eccles (2002, same dataset):

• (same findings on math competence beliefs)
• declines in intrinsic value grades 3 through 9 with slight subsequent recovery
• declines in utility value, particularly through secondary school
Explanations?

- **Pubertal timing**
  are decrements during this developmental period?

- **Person-environment fit** (Eccles & Midgley, 1989, 1990)
  do +/- changes occur at times of structural curricular change?

- **Gender intensification** (Hill & Lynch, 1983)
  do girls ‘turn off’ math, and boys ‘turn off’ English?

- **‘Realism’** (Nicholls, 1978)
  gender convergence from increasingly realistic perceptions
  (performance feedback, social comparisons)

- **Boys ‘at risk’** (Jacobs et al., 2002)
  gendered trajectories showing greater declines for boys
Overlapping Cohort-Sequential Accelerated Longitudinal Design

c2: n=436  
c1: n=428  
c3: n=459

7a 7b 8 9 10 11 (grade)
Sample

- Longitudinal overlapping cohort-sequential design spanning grades 7-11 (N=1,323)
- 3 upper-middle class coeducational secondary schools in metropolitan Sydney NSW
- From a larger study investigating a broader range of math- and English-related variables
Latent Growth Modeling

- flexible framework for non-linear trajectories
- gendered trajectories
- amount of change and stability
- more parsimonious and elegant than MANOVA
Analyses

- Number of models
- Levels
- Baseline variance components models
- Level 2 predictors
- Order of entry
- Term retention
- General form:

\[ y_{ij} = \beta_{0ij} \text{constant} + \beta_{1j} \text{grade}_{ij} + \beta_{2j} \text{grade}^2_{ij} + \beta_{3j} \text{grade}^3_{ij} \]

\[ + \beta_{4j} \text{gender}_{ij} + \beta_{5j} \text{gender} \times \text{grade}_{ij} + \beta_{6j} \text{gender} \times \text{grade}^2_{ij} \]

\[ + \beta_{7j} \text{gender} \times \text{grade}^3_{ij} \]
MATH Self-Perceptions
(a) perceived talent

predicted values vs grade

[Graph showing the relationship between predicted values and grade]
(b) Math success expectancies

Predicted values versus grade.
ENGLISH Self-Perceptions
(a) perceived talent
(b) English success expectancies
MATH values
(a) intrinsic value

![Graph showing predicted values vs grade]

- Predicted values range from 4 to 7.
- Grade range from -6 to 6.
- The graph illustrates a trend where predicted values decrease as grade increases.
(b) Math utility value
ENGLISH values
(a) intrinsic value

predicted values

grade
(b) English utility value
Gender Effects I: non-gendered patterns of development

No gender effects:

- math utility value
- English talent perceptions
- English success expectancies

Boys > girls:

- Math talent perceptions
- Math intrinsic value

Girls > boys:

- English utility value
Gender Effects II:
Gendered Developmental Trajectories

- math success expectancies
- English intrinsic value
Girls ‘at risk’?

• Math expectancies showed *girls* had more negative change through middle grades, recovering somewhat by grade 11.

• English intrinsic value declined more for girls through grade 7, the reverse grades 10-11.

• Important to retain focus on girls’ well-being alongside current emphases on boys’
Developmental Changes and Grade

‘grade independence’

- Math and English talent perceptions
- Math success expectancies for boys

grade influences on trajectories

- math intrinsic value
- math utility values
- Math success expectancies for girls
- English success expectancies
- English intrinsic value
- English utility value
Explanations?

- Gender intensification
- ‘Realism’
- Person-environment fit
  English success expectancies, intrinsic value, utility value;
  Math intrinsic value, utility value
- Boys ‘at risk’
  contrast with Jacobs et al.
Contributions

• extended our understanding of how a range of beliefs develop through secondary school

• documented gendered trajectories

• established critical points at which declines occur, which appear to relate to structural curriculum changes

• identified points at which intervention efforts may be most fruitful
Future Directions?

- how and why curricular structuring may bring about changes
- within-individual explanatory processes (e.g., Jacobs et al.)