Development of Children’s Expectancies and Values and Interventions to Improve Them

Allan Wigfield
University of Maryland
Keynote Address, ICM Conference Thessaloniki 2016
Where is the University of Maryland?

Go Terps
Roadmap for This talk

• Expectancy- Value Theory: An Overview

• Review of Major Findings
  • Change Over time In Children’s Expectancies and Value
  • Relations of Expectancies and Values to Performance and Choice
  • The “cost” aspect of the model: what are we learning

• Interventions to Enhance Children’s Task Values: Current Findings and Next Steps
Expectancy- Value Theory: A Thumbnail History

• Long standing theory in the motivation field; versions of it in economics

• Atkinson (1957, 1964) developed a formal, mathematical model of achievement motivation in which expectancies and values played a large role

• Eccles and colleagues (1983) re-defined the values construct in Atkinson’s model and proposed a set of social, cultural, and psychological influences on students’ expectancies and values
Eccles (Parsons) et al. (1983)

- Main focus always has been to understand individuals choices, and performance in different achievement domains

- Initial focus was on how the factors in the model affected girls’ decisions to discontinue pursuing math and other STEM areas
Expectancy-Value Model of Achievement Choice
Definitions of Expectancies, Ability Beliefs, and Achievement Task values

- **Expectancies for success**: how well one expects to do on specific activities or more general things like a class in school.

- **Self-concept of ability**: Evaluations of one’s current competence, often in comparison to others.

- **Achievement Task Values**: incentives, reasons for doing particular achievement tasks or activities.
  - Interest, importance, utility
  - Cost
CHANGES IN CHILDREN’S EXPECTANCIES AND VALUES
Changes in Children’s Motivation: A Brief Overview

• Most children come to school positively motivated to learn
  
• Optimistic about ability in different areas
  
• Enthusiastic about learning and school
  
• Enjoy learning
Changes in Motivation: The *Normative* Picture

• Different aspects of motivation **decline** over the school years
  • Children’s sense of competence in different subjects decreases
  • Children’s valuing of achievement decreases
  • Children’s intrinsic motivation decreases

See Wigfield et al. (2015) for review
Childhood and Beyond Study

• Long term longitudinal cohort sequential study of the development of children’s achievement-related beliefs and values and socializers’ influences on them

• http://www.rcgd.isr.umich.edu/garp/
Figure 6. Overview of the data collection timeline for the CAB study by age, grade, year, and wave from the CAB study research website (Gender and Achievement Research Program, 2015).
Changes in Math Competence Beliefs - Jacobs et al. 2002
Changes in Language Arts Competence Beliefs: Jacobs et al. (2002)
Change in Math Values With and Without Controls for Competence Beliefs
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Why the Declines in Expectancies and Values?

(1) Psychological and Social Processes:

• Become better at processing information—e.g., Parsons and Ruble (1977) on how failure influences children’s expectancies

• Engage more accurately and frequently in social comparison—e.g., Ruble (1983)
Why the Decline in Expectancies and Values?

(II) Schooling’s Effects (in Some Cultures)

- More frequent evaluations
- Higher stakes evaluations
- Greater emphasis on social comparison
- Ability grouping and other forms of tracking that can lead children to expect certain educational outcomes, believe they have certain levels of ability
- Particularly challenges at middle school, at least in the U. S.
CHANGES IN EXPECTANCIES AND VALUES: DIFFERENT TRAJECTORIES

Discussed in Wigfield et al. (2015), Eccles (2014 invited Address at AERA)
Archambault et al. (2010): Trajectories of Change in Reading Ability Beliefs
Musu-Gillette, Wigfield et al. (2015): Trajectories in Math Ability Beliefs and Interest
Different Patterns of Change: Musu-Gillette et al. (2015)
Meece, Wigfield and Eccles (1990): Ability beliefs, Expectancies, and Values Predicting Children’s Grades and Intentions

Figure 2. Predictors of mathematics grades and intentions to keep taking mathematics in the 7th–9th grade group (Yr = year).
Relations of Interest Trajectories to College Major Choice: Musu-Gillette, Wigfield et al. (2015)

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<th>“INTENSITY’ OF MATH IN MAJOR</th>
<th>Trajectory</th>
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<td>Some</td>
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<td>Moderate</td>
<td>High: .61  Slow: .20</td>
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<td>Intense</td>
<td>High: .34  Slow: .15</td>
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THE EMPIRICALLY NEGLECTED PART OF THE THEORY: COST

Until recently!
**Child's Goals and General Self-Schemata**

1. Self-schemata - personal and social identities
2. Short-term goals
3. Long-term goals
4. Ideal self
5. Self-concept of one's abilities

**Expectation of Success**

**Achievement-Related Choices and Performance**

**Subjective Task Value**

1. Interest - enjoyment value
2. Attainment value
3. Utility value
4. Relative cost

**Child's Affective Reactions and Memories**
Defining Cost: Then and Now

- Eccles (Parsons) et al. (1983): *Influences* overall value negatively- “conceptualize the influence of cost of an activity in terms of a cost/benefit ratio” (p. 93)
  - Effort cost
  - Loss of valued alternatives
  - Psychological cost of failure

- Cost can lead to *avoidance* of an activity, or lead one to take a minimal effort strategy

- In the figure included in the values “box”
Defining Cost

- Wigfield and Eccles (1992): Task values contain four components: interest, attainment, utility, cost
  - Cost the least studied
- Eccles (2005): The value of a task is influenced by four factors: interest, attainment, utility, cost
  - But also: Value has four components
Wigfield, Rosenzweig, and Eccles (in press)- Unpacking Cost
Nagengast, Gaspard, Häfner, and Trautwein (AERA, 2016)

- Study of German 5th to 12th graders in academic track schools

- Measured values in German, English, math, and physics

- New measure of cost (Gaspard et al., 2015a)
  - opportunity cost
  - emotional cost
  - effort required
Nagengast et al. (2016)

• The cost and value components factored separately and correlated in the expected directions

• Interesting gender and age differences in the different value and cost facets

  • Gender differences in value and cost favoring boys ONLY for physics
Barron and Hulleman (2015)

- Careful historical analysis of EV theory and cost

- Excellent review of the recent work on cost

Cost = Perceptions of having to exert that much effort and possibly too much effort and what that takes away from other activities
Barron and Hulleman

• Propose renaming the theory to Expectancy Value Cost theory to highlight the role of cost

  • Not a subcomponent of value, but a separate component/variable in the model

• Need to look at the effects of expectancy, value, and cost individually and examine cost’s moderating effects

• Am I free of Barriers that Allow me to Engage?
Next Steps in Research on Perceived Cost

- From Jacque: look at decision making literature

- Look at the **antecedents** of cost, along with the antecedents of IV, AV, and UV

- Pattern centered approaches to looking at cost, IV, UV, AV, SCA, etc...
  - Conley (2012)
Next Steps in Research On Perceived Cost

- Interventions to reduce perceived cost - more on that later

- More broadly: should cost be added to the theory’s name?

- Jacque and I don’t think so!
INTERVENTIONS FOCUSED ON ENHANCING STUDENTS’ VALUING OF ACHIEVEMENT
Motivation interventions: Different Levels

- **Individual**: Work with single students (e.g., changing students’ attributions, efficacy beliefs)

- **Classroom**: Work with an entire class or classes in a school (e.g., Concept Oriented Reading Instruction, many of the recent social psychological interventions)

- **School**: Change culture in whole school (Maehr & Midgley, 1996) or school district(s)
  
  See Wentzel and Wigfield (2007)
  Karabenick and Urdan (2015)
Concept Oriented Reading Instruction- John Guthrie and Allan Wigfield

www.cori.umd.edu
CORI Instructional Framework

Motivational support:
- Content goals for instruction
- Hands on experiences
- Interesting text
- Autonomy support
- Opportunities to collaborate

Strategy instruction:
- Activating background
- Questioning
- Searching
- Summarizing
- Organizing graphically
- Structuring stories
- Self-evaluation
Brief Social Psychological Interventions Focused on Expectancies and Values and Related Beliefs

Social Psychological Interventions in Education: They’re Not Magic

David S. Yeager
Gregory Walton

2011 Review of Educational Research
SOME RESEARCH EXAMPLES
Example Study 1: Gaspard et al. (2015b)

The Tübingen group: Motivation in Mathematics (MoMA) intervention

- 2000 German 9th graders; RCT design

- 90 minute intervention focused on relevance of mathematics - quotes, or watched a video presentation

- Positively impacted students’ valuing of math at immediate and 6th month follow-up

- Hanna will report achievement results on Saturday
Example Studies (2): Harackiewicz and Colleagues Work

Hulleman & Harackiewicz, 2009 *Science*; Harackiewicz et al. (2015) *JPSP*, many others

- High school and college student participants
- Sometimes focuses on parents of girls to encourage their STEM course taking
- **UV Interventions**: focused on enhancing valuing/relevance of science by having students write essays about its relevance
- Recent work on **value affirmation (VA) interventions**: reducing stereotype threat for students, helping
Harackiewicz and Colleagues

- Intervention often most successful with students with low expectancies for success, lower performance

- Recent work in first semester college biology: the UV intervention reduced the achievement gap in biology by:
  - 40\% for underrepresented minority university (URM) students
  - 61\% for first generation URM students

- Examining the processes involved in why the intervention worked for these students through analysis of their responses
Example Study 3: Rosenzweig, Hulleman and colleagues

- Florida Virtual High School study

- All students in Florida take one high school math course online: algebra or geometry

- 930 students in one of three treatments

  - Utility Value Writing
  - Utility Value Quotes + Utility Writing
  - Utility Value Quotes + Ranking Activity
Rosenzweig et al Results

• Come back Saturday morning!
Recent Reviews of the Motivation Intervention Literature

Lazowski and Hulleman (2015) Meta-Analysis of Motivation Interventions

- Studies based in several frameworks: EVT, SDT, social cognitive, goal theory, mindsets, achievement emotions etc.

- Critical that motivation intervention studies test theory

- Motivation measured by self-report; achievement by grades and test scores; also behavioral outcomes

- Only looked at studies done in “naturalistic” settings
Lazowski and Hulleman (2015) Meta-Analysis of Motivation Interventions

• Overall effect sizes across all studies: .49 (range .27 to .58)

• Some moderators:
  - Grade: stronger in middle than elementary school
  - Stronger for behavioral than self-report or performance measures
  - Quasi experimental than RCT’s
  - Theory
Lazowski and Hulleman Conclusions

- Motivational processes can be enhanced, and then improve student outcomes

- Brief, relatively inexpensive interventions can be quite effective—much stronger effects than many large scale, expensive school reform effect sizes

- BUT: Many motivation theorists/researchers not trained in working with policy makers
Rosenzweig and Wigfield (2016)  
STEM Motivation Interventions

- Continuing concern about lack of participation in STEM careers in general and for particular groups

- Might motivation interventions have an impact here? Eccles and Wang (2013) paper on interest, not ability, driving young women’s decisions about science

- Like Lazowsk and Hulleman focused on theory driven interventions: EVT, SDT, social cognitive, interest, etc.
Rosenzweig and Wigfield (2016): STEM Motivation Interventions

- Vast majority of studies reported positive effects of their interventions on motivation and achievement

- Size of the effects varied across studies

- Many researchers reported moderators of the effects of their interventions
  - Gender:
  - Initial level of the motivation construct: high or low
Rosenzweig and Wigfield (2016)  
STEM Motivation Interventions

- Possible contextual moderators:
  - Quality of teacher-student relations
  - Teachers’ characteristics and beliefs
  - STEM area of focus
Rosenzweig and Wigfield Conclusions

• Importance of **aligning** theory, intervention practices, measures

• More careful consideration of moderating variables at individual, contextual levels

• Brief interventions may not be “magic”- but effects are complex
SOME DIRECTIONS FOR FUTURE INTERVENTION RESEARCH
I. Developmental Issues

• How effective will motivation interventions be for different aged students?

• How do interventions need to be modified for different aged students?

• How do motivation measures need to be modified for different aged students?
II. HOW COMPLEX DO INTERVENTIONS HAVE TO BE BE EFFECTIVE?

• Huge range in this in the current literature

• CORI- many variables, many weeks

• Social psychology interventions- brief, fewer variables

• Rosenzweig and Wigfield (2016): Effects of length of intervention, dosage of intervention should be studied
  • Neither have been systematically studied
  • Often are confounded
II. Intervention Length, Scope, and Cost

Many resource issues

- Teacher time: Both for training AND their teaching
- Student time
- Fiscal resources
III. What Other EV Variables on Which to Intervene?

- New focus on reducing perceived costs of college science classes
  - Tony Perez and colleagues - college biology
  - Emily Rosenzweig - college physics
IV. Scaling Up and Fidelity

- What are the challenges in taking successful motivation interventions to scale?
  - Mindsets training is going national in the U. S.

- What are the challenges in implementing motivation interventions with fidelity?
  - Especially if teachers have some autonomy in how they are done

- How do we measure fidelity to treatment?
TAKING IT TO OUR CURRENT LIMITS

The Eagles (1975)
What Do We Know About the Development of Children’s Expectancies and Values

• **Initial story** - children’s motivation declines

• **Current story** - a variety of trajectories, and more to come

• Motivation interventions of different sizes, shapes, and types are effective- and even simple ones can work well

• Need to explore ways to develop maximally effective interventions that work for the most children, utilize fewest resources
Efcharisto!

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