Competence in Engineering: A Tale of Two Women

Center for the Advancement of Engineering Education

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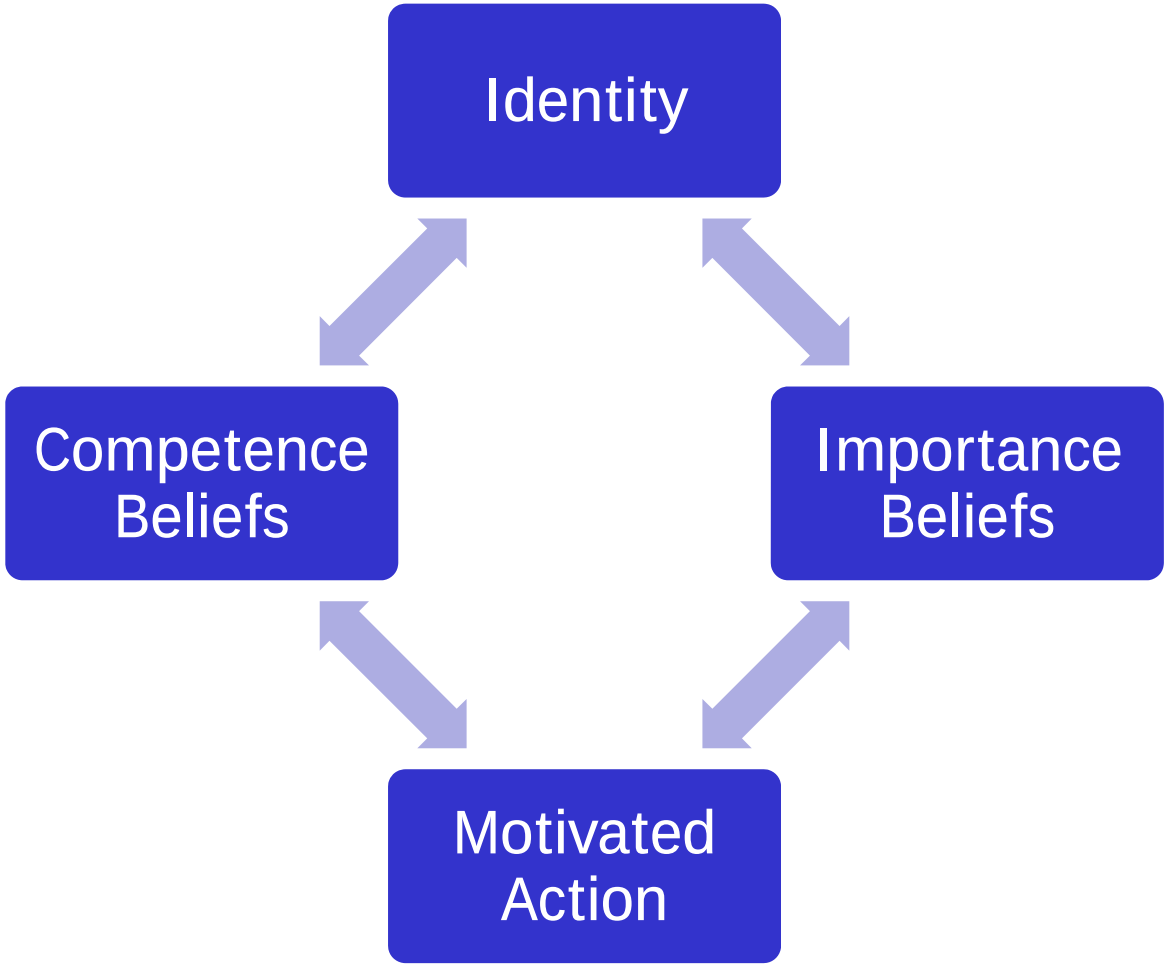
Impetus for This Study

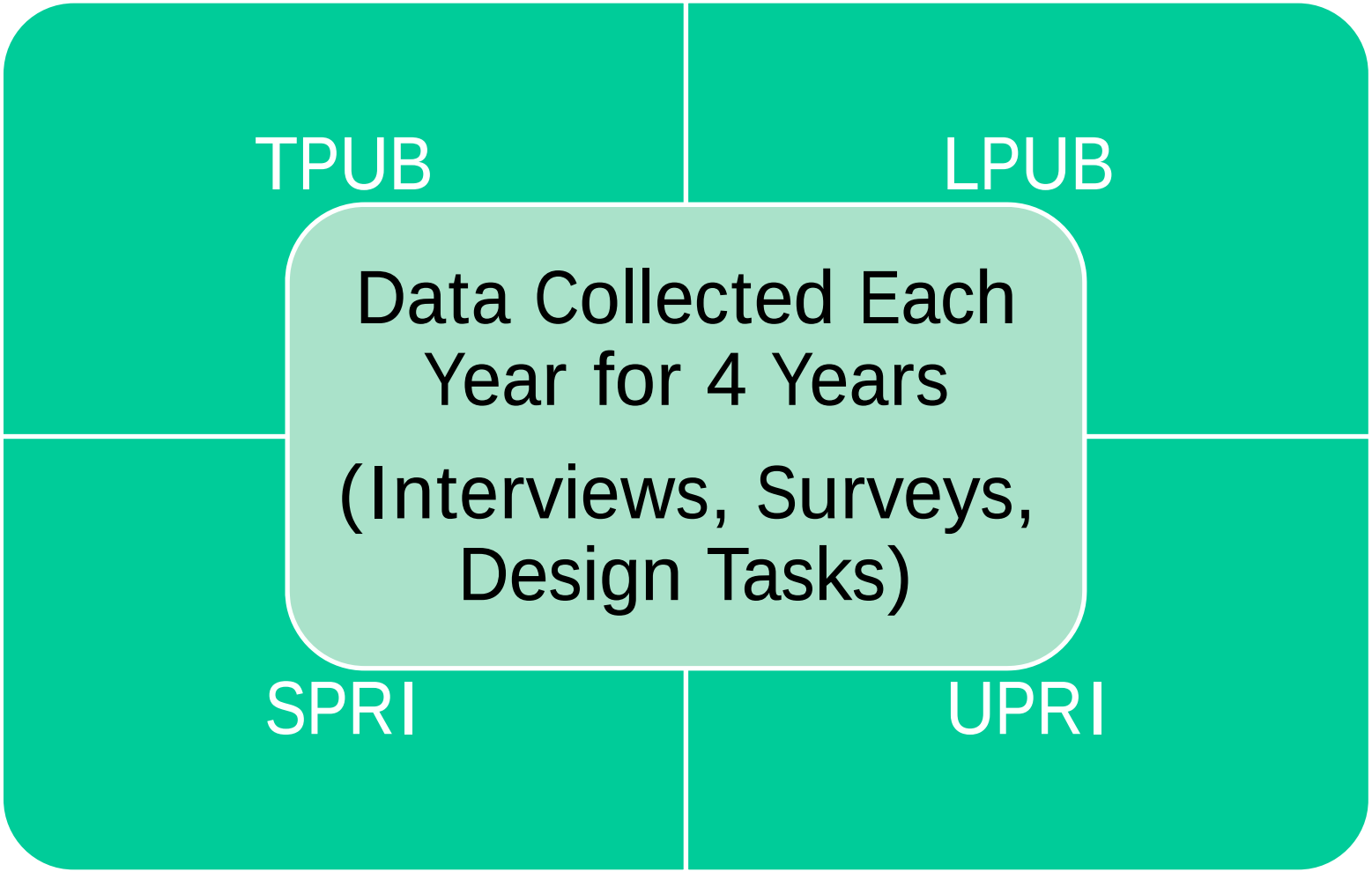
- Persistence (women) important issue
- Persistence from a motivational perspective
- Persistence from a student-centered perspective

How do students' beliefs about being engineers shape their choices to pursue engineering degrees?

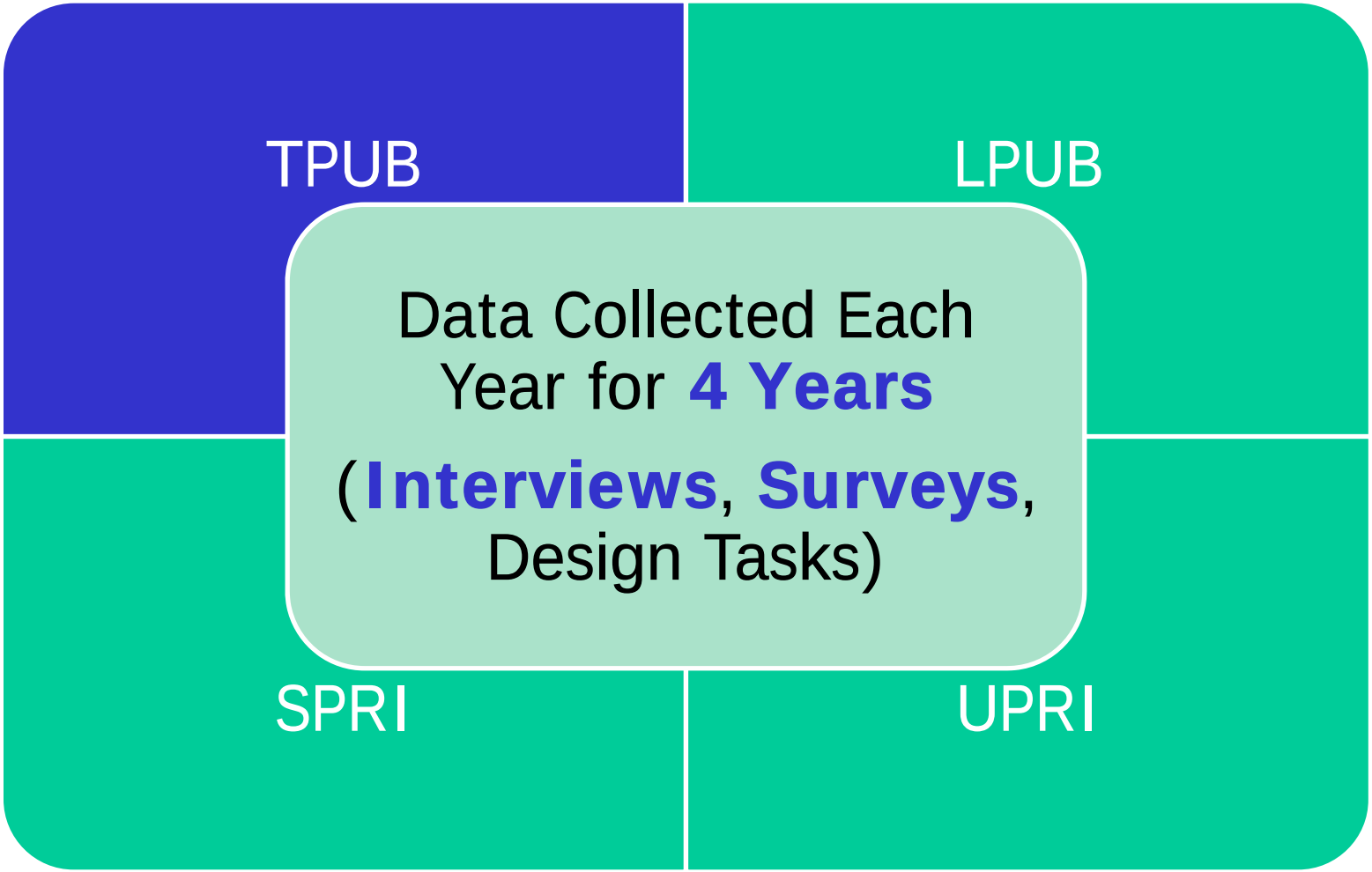
Simplified: Eccles' Expectancy-Value Theory



APS Research Study



This Research Study



Methods

- Multiple Case Study
- 5 male and 5 female participants
- Semi-structured interviews conducted annually
- Recorded and transcribed
- Inductive and A Priori coding
- Patterns/Categories

Summary of Results

Name	GPA CUM	Commitment to Engineering	Certainty About What Engineers Do
Hillary	3.94	Passionately Committed	Certain
Leslie	3.92	Uncommitted and Changing	Certain
Marie	3.91	Uncommitted and Steady	Uncertain
Anna	3.71	Uncommitted and Changing	Uncertain
Beth	3.38	Happily Committed	Certain
Max	3.23	Passionately Committed	Certain
Tim	3.14	Committed but Resigned	Uncertain
Joe	3.07	Passionately Committed	Certain
Will	2.96	Happily Committed	Certain
Mark	2.74	Happily Committed	Certain

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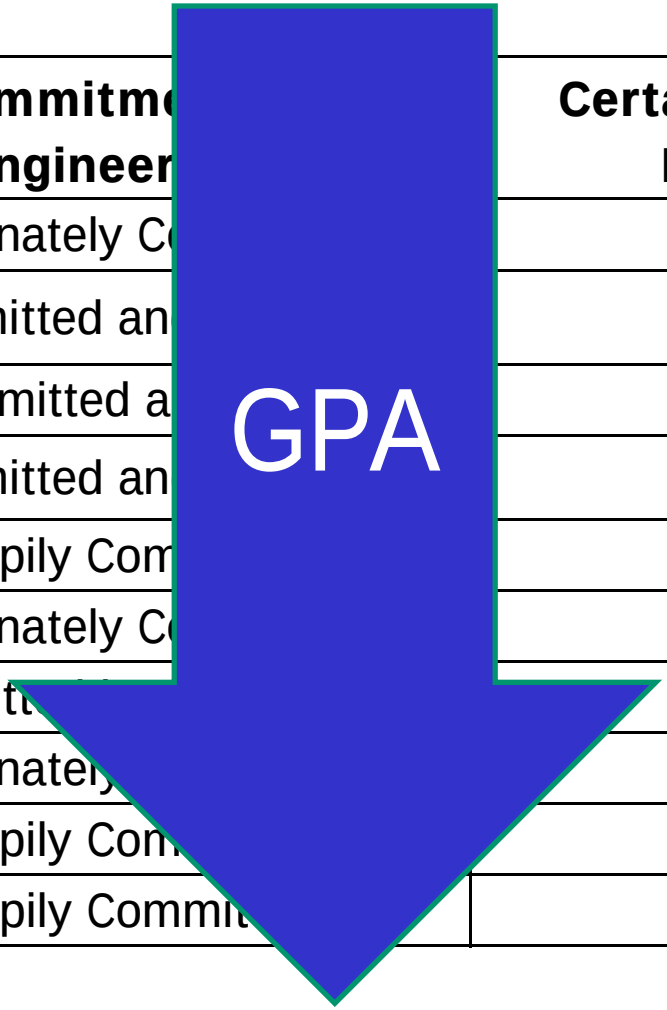

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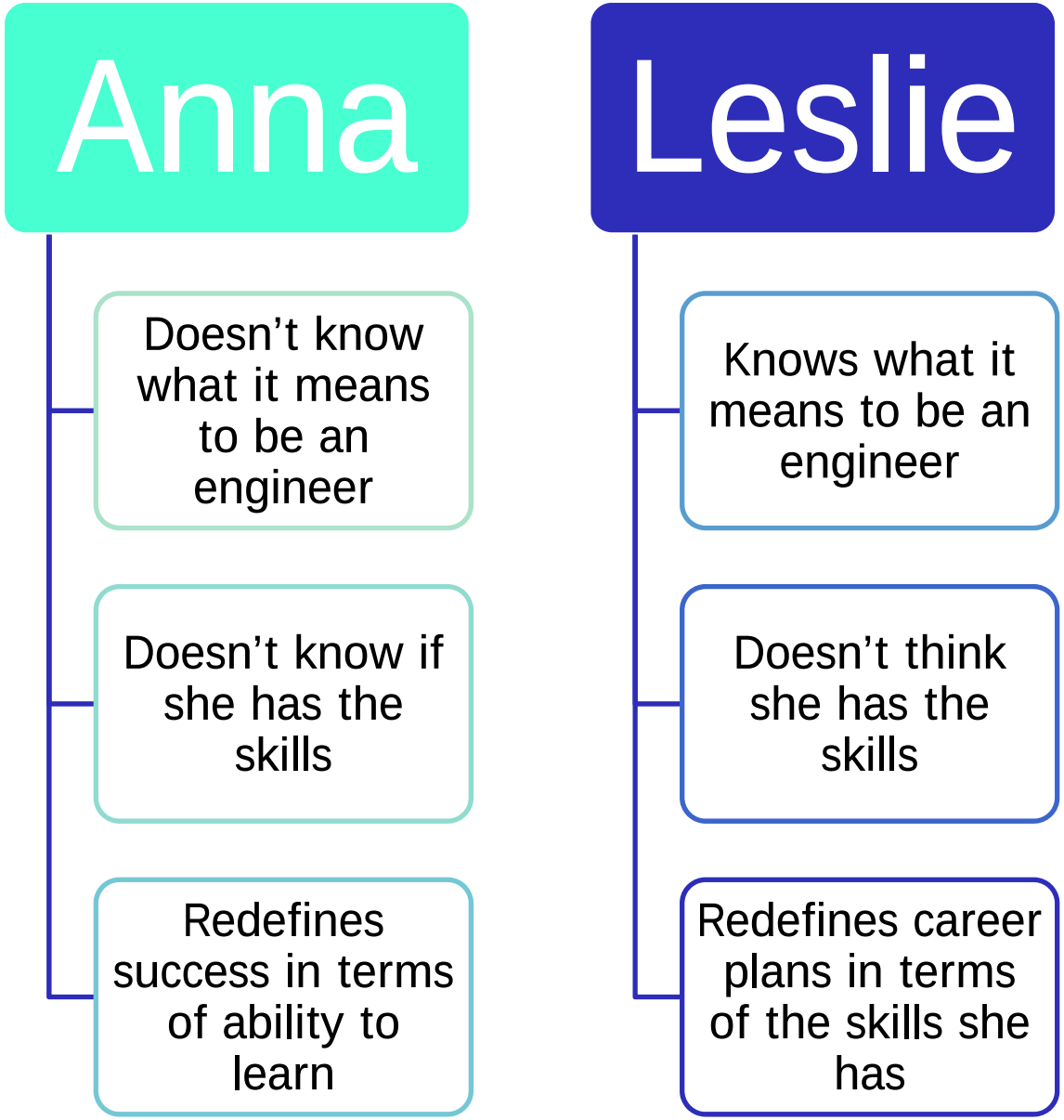
Anna
Doesn't know what it means to be an engineer
Doesn't know if she has the skills
Redefines success in terms of ability to learn
Leslie
Knows what it means to be an engineer
Doesn't think she has the skills
Redefines career plans in terms of the skills she has

Anna

I think I'll be okay. I think I, I have like I said, **I have more confidence in being able to learn** something that I need to learn. Um, **so I think I'll be okay**. Uh, like I say, I don't really know what to expect, so it's hard to say for sure, like, "Yeah, I'll be great."

Leslie

...to be honest, I think I always visualize myself **not really actually doing the engineering itself**. But, being the support to someone else who does it. And like just know what they're doing, and being able to, you know if they need somebody to **check their calculations and stuff**. But, not actually be the one who's designing the project.

Discussion

Women doubting their abilities more than men is not new.....

but

Understanding this as a process is new

Now, what can we do?

Suggestions for Practice

- Create congruence between grades and beliefs about engineering practice
  - Ground lectures and assignments in examples of engineering work
  - Model and practice engineering work
- Be aware of the messages being sent about what it means to be an engineer

Acknowledgement

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