

# NOT ANXIOUS OR CONFIDENT: A FRAMEWORK OF WHY MATHEMATICS APATHY IS A BARRIER FOR LEARNING

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## Not Anxious or Confident: A Framework of Why Mathematics Apathy is a Barrier for Learning

MATHEMATICS ANXIETY HAS BEEN WIDELY STUDIED AS A BARRIER TO LEARNING AND ACHIEVEMENT [1], YET MATHEMATICS APATHY, CHARACTERISED BY LOW PERCEIVED VALUE AND LOW PERCEIVED CONTROL, REMAINS UNDEREXPLORED DESPITE ITS SIGNIFICANT IMPACT ON STUDENT ENGAGEMENT AND ACHIEVEMENT [2]. THIS PAPER INTRODUCES A THEORETICAL FRAMEWORK SITUATING MATHEMATICS APATHY WITHIN THE CONTROL-VALUE THEORY OF ACHIEVEMENT EMOTIONS [3] UNDERPINNED BY PRINCIPLES OF SOCIAL COGNITIVE THEORY [4]. DRAWING ON LONGITUDINAL SURVEY DATA FROM OVER 1,200 UK SECONDARY STUDENTS, THIS STUDY TRACES HOW MATHEMATICS APATHY DEVELOPS OVER TIME.

THIS PAPER ARGUES THAT MATHEMATICS APATHY WARRANTS RECOGNITION AS A DISTINCT EMOTIONAL BARRIER WITH UNIQUE IMPLICATIONS FOR LEARNING. UNLIKE MATHEMATICS ANXIETY, WHICH IS ACTIVATING AND OFTEN DISTRESSING, MATHEMATICS APATHY IS DEACTIVATING: IT REDUCES EFFORT, PERSISTENCE, AND WILLINGNESS TO ENGAGE WITH CHALLENGE. THIS PAPER INVITES DIALOGUE ON HOW TEACHER PREPARATION AND MENTALITY CAN ADDRESS MATHEMATICS APATHY IN THEIR STUDENTS, AS A SYSTEMIC BARRIER TO MATHEMATICS EDUCATION.

Think back to when you were in school.....

Think back to when you were sat in a geography lesson.....

Think back to when you were sat in a biology lesson.....

Think back to when you were sat in a maths lesson.....

A motivational deficit in which learners neither value nor expect success in mathematics – often connected to mathematics anxiety, mathematics apathy is underpinned by a lack of self-confidence and self-efficacy.

## **MATHEMATICS APATHY**



# THE PROBLEM SPACE

A negative emotional reaction to mathematics that includes feelings of tension and nervousness that interfere with the manipulation of numbers and the solving of mathematical problems [19].

Mathematics anxiety is related to poor mathematics performance [1][7].

Students with high levels of this situational-specific anxiety often practice mathematics avoidance[1]. This can be at a task-level or a subject-level.

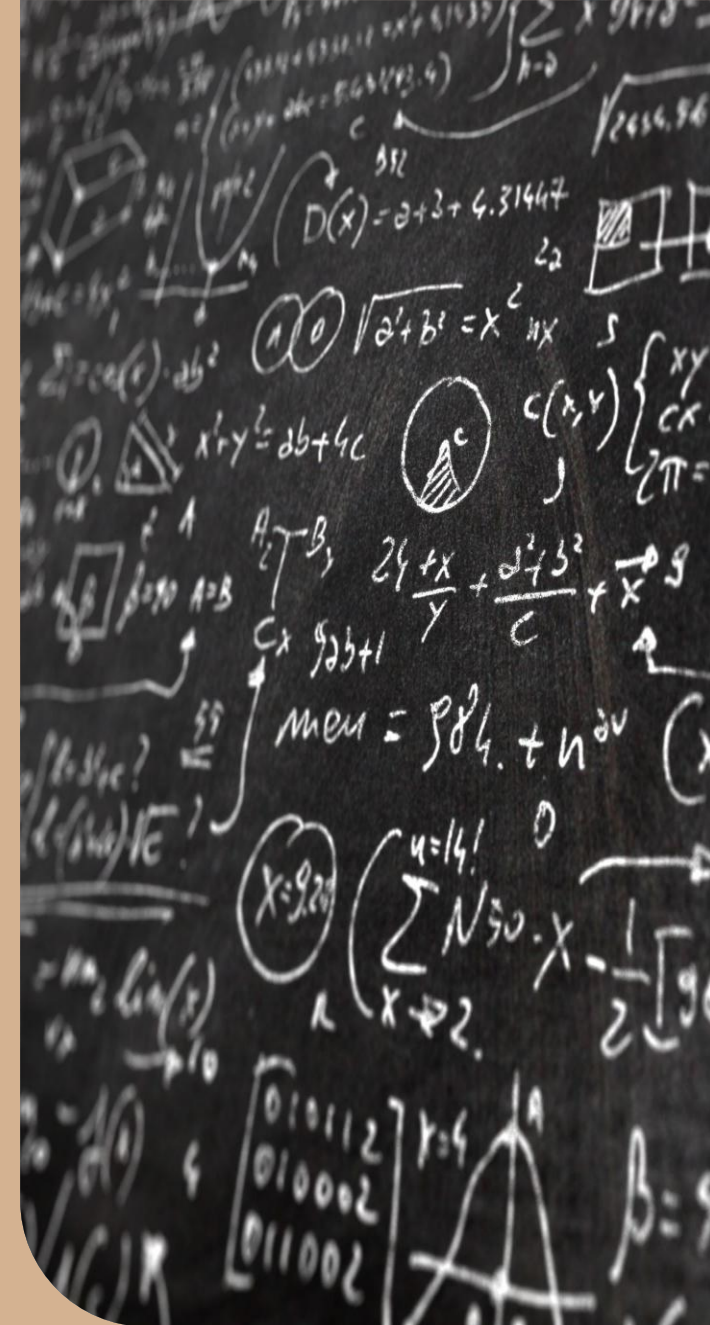
# WHY MATHEMATICS APATHY MATTERS

Mathematics Anxiety is *activating* (distress → avoidance)

Mathematics Apathy is *deactivating* (detachment → minimal cognitive effort)

Mathematics requires sustained attention → apathy is structurally damaging

A motivational deficit in which learners neither value nor expect success in mathematics – often connected to mathematics anxiety, mathematics apathy is underpinned by a lack of self-confidence and self-efficacy.





# THE GAP IN THE LITERATURE

Much of the existing research treats mathematics confidence and mathematics anxiety as opposite ends of a single continuum – high confidence implies low anxiety, and high anxiety implies low confidence [8][9][10].

Meta-analytic evidence reinforces this inverse relationship, showing strong negative correlations between the two constructs [7].

When confidence and anxiety are collapsed into a single bipolar scale, other meaningful emotional profiles disappear from view – particularly those characterised by *low confidence and low anxiety* (e.g., apathy, indifference) or *high confidence and high anxiety* (e.g., perfectionistic tension).

# THEORETICAL FOUNDATION

## Control-Value Theory [3]

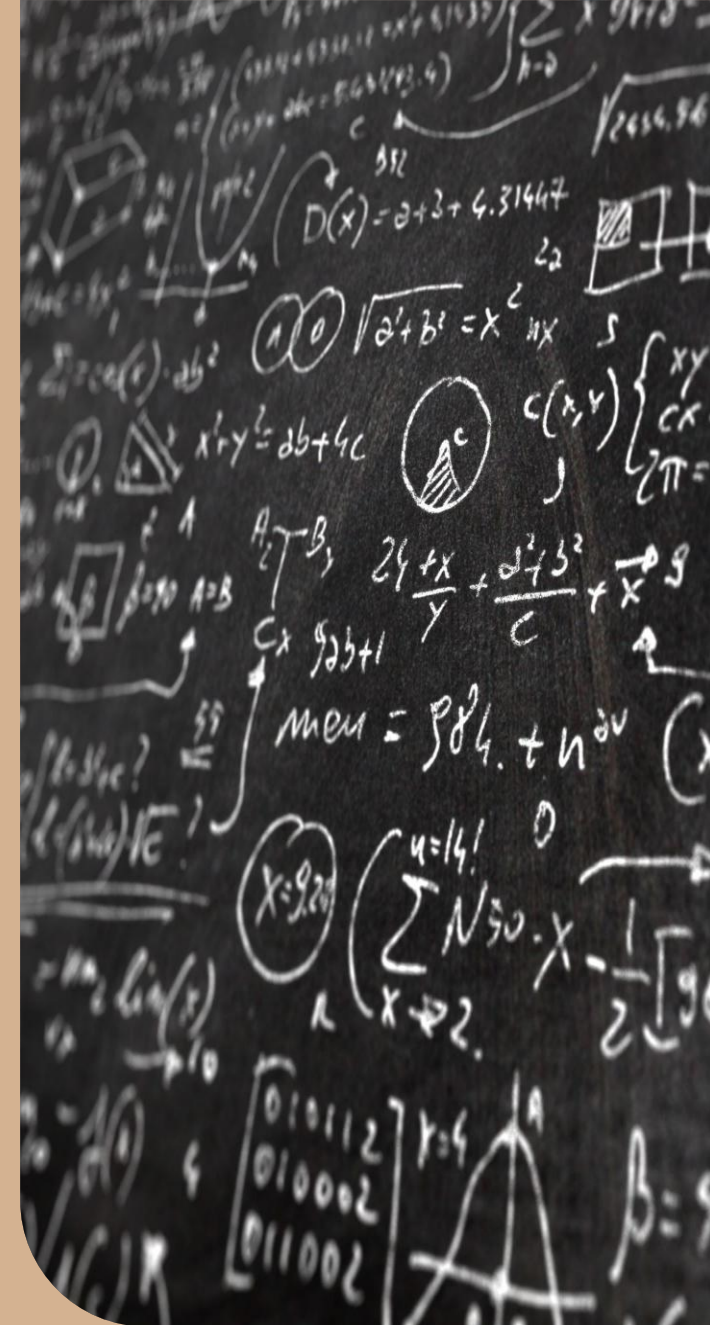
- Explains emotional profiles in mathematics
- Predicts deactivating emotions when both appraisals are low

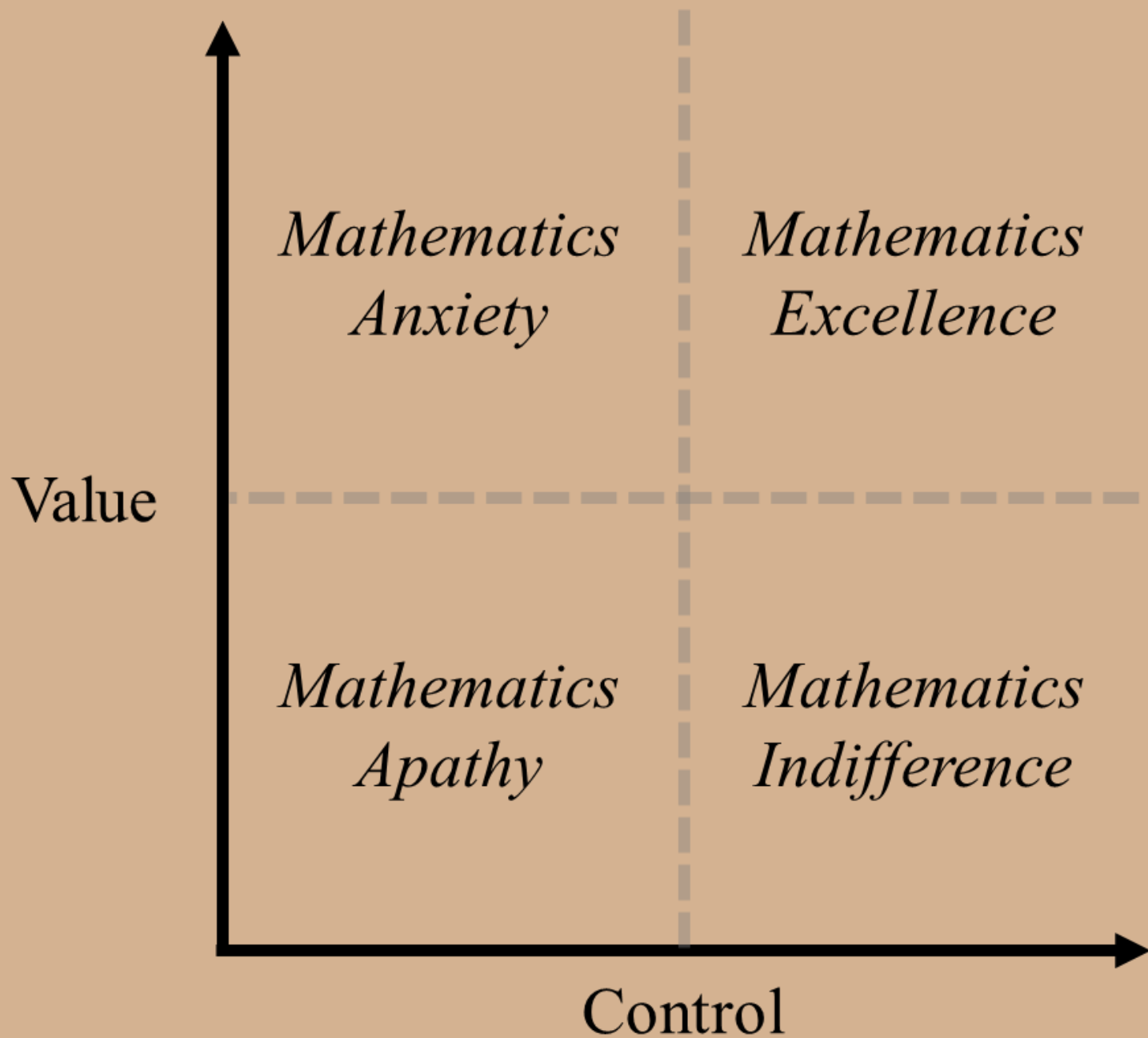
## Social Cognitive Theory [4][15]

- Low self-efficacy → reduced willingness to attempt tasks
- Low value → no incentive to persist

## ZPD [14]

- Tasks too easy or too hard → deactivation of effort





Note. An original conceptual framework illustrating four distinct emotional responses to mathematics derived on Control-Value Theory [3]: mathematics excellence (high value, high control), mathematics anxiety (high value, low control), mathematics indifference (low value, high control), and mathematics apathy (low value, low control).

# CONTROL-VALUE THEORY (CVT) [3]

Emotions arise from:

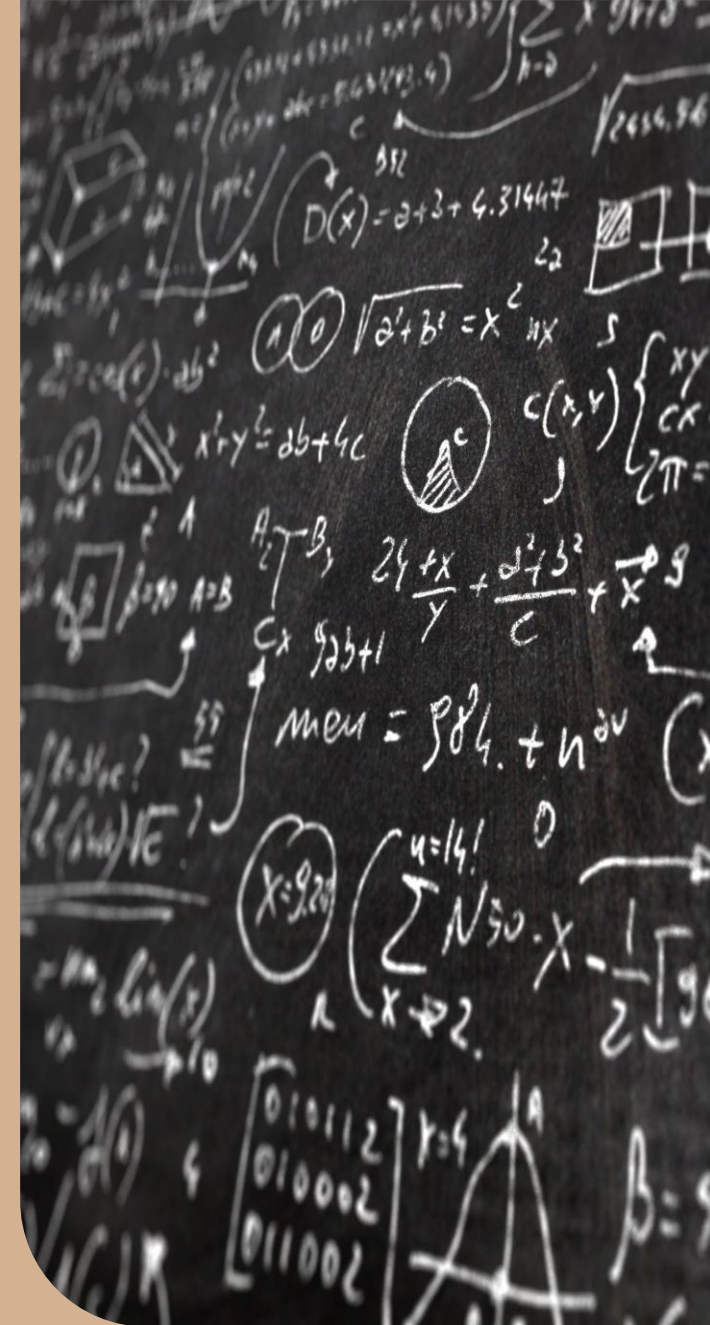
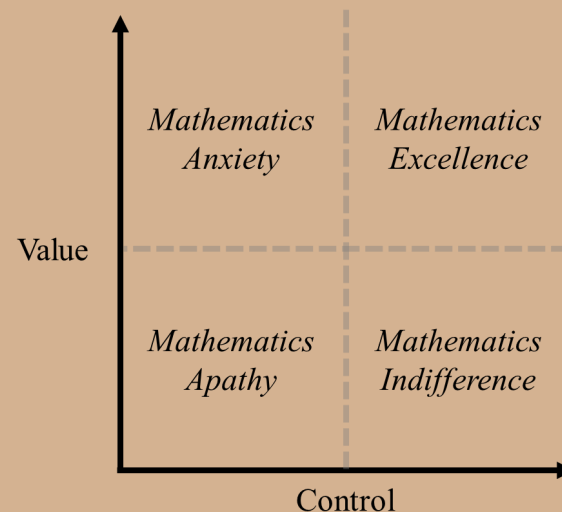
**Perceived control** (can I succeed?)

**Perceived value** (does this matter?)

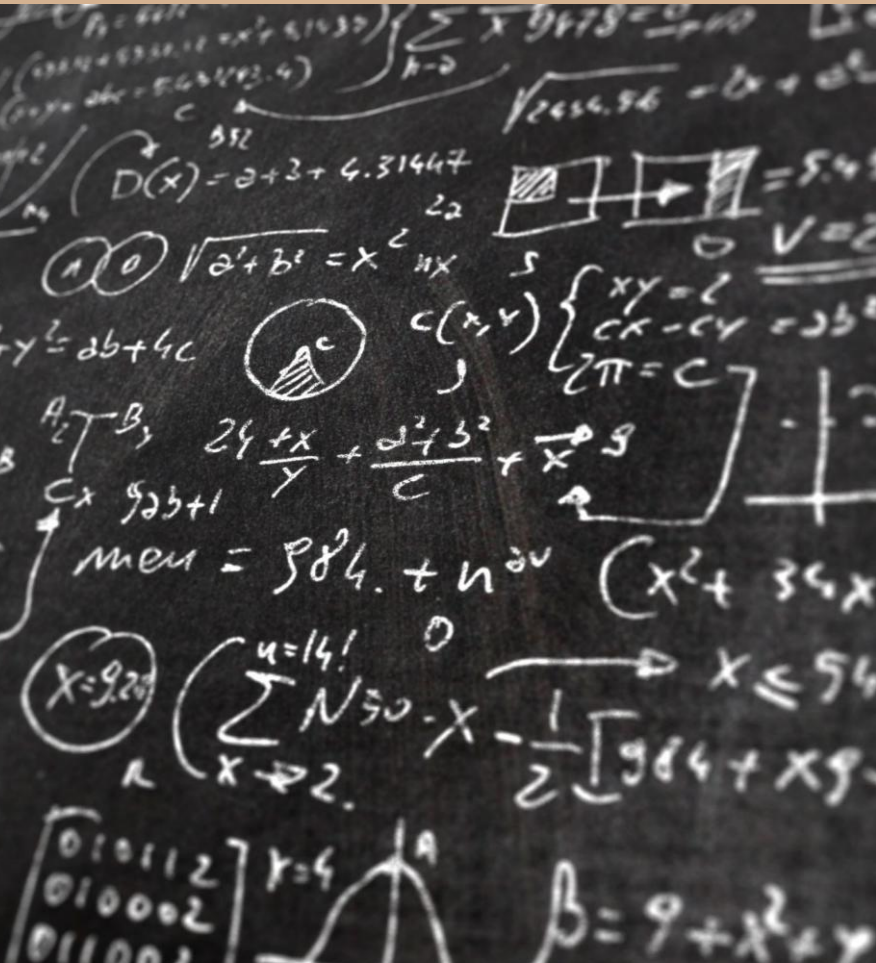
High control + high value → enjoyment, pride

Low control + high value → anxiety

Low control + low value → boredom, hopelessness, apathy [3]



# THE DATA: EMPIRICAL ILLUSTRATION



1,246 matched UK secondary students (ages 11–14)

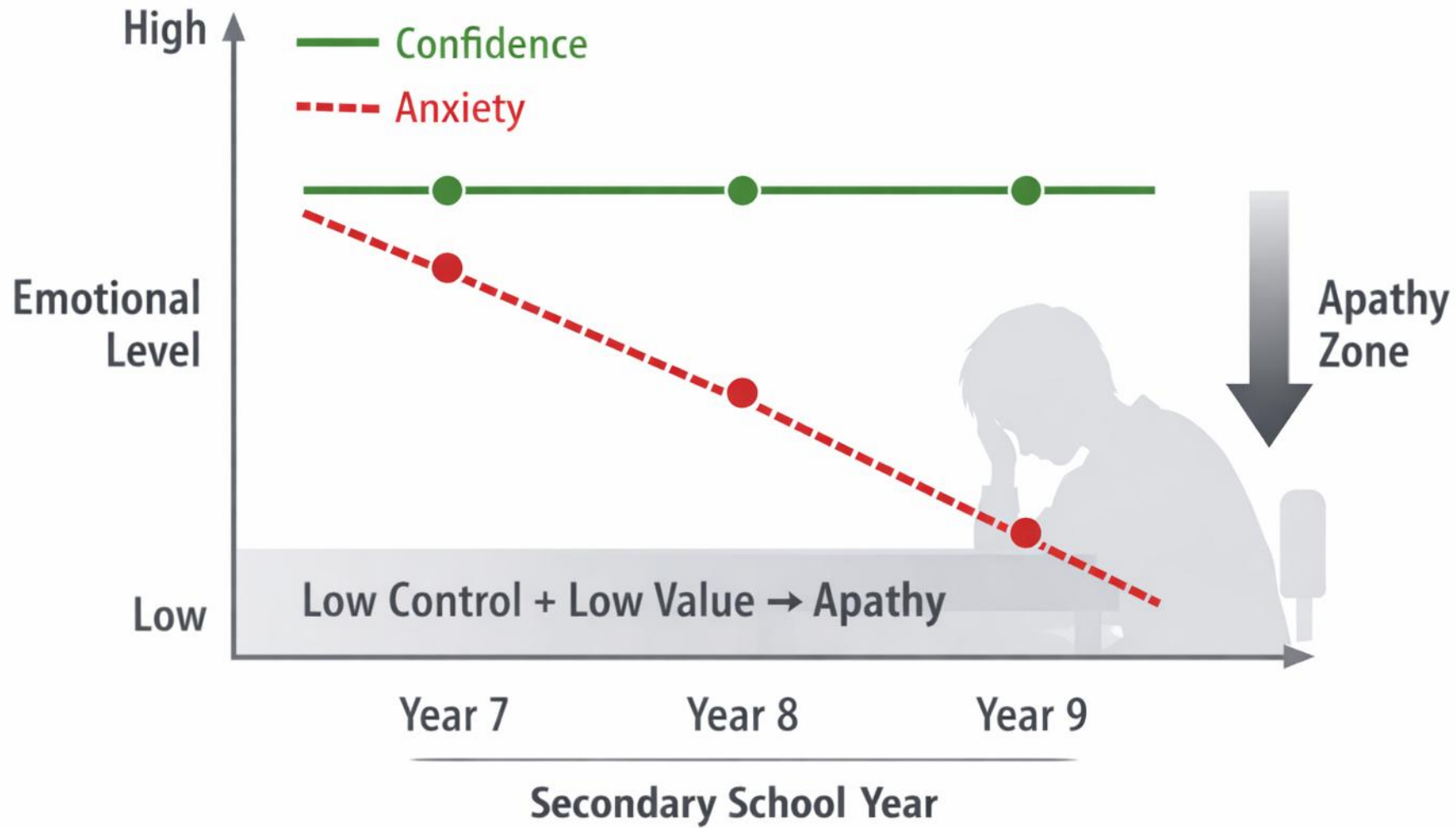
- Measures:
  - Modified Abbreviated Math Anxiety Scale [16]
  - Mathematics Confidence Scale [17]

*Students' mathematics anxiety decreases throughout secondary education, however there is no corresponding increase in mathematics confidence." [18]*

Confidence  $\leftrightarrow$  & Anxiety  $\downarrow$

- Emotional energy does not convert into positive engagement
- Pattern aligns with shift toward low control + low value

## The Apparent *Apathy* Trajectory in Mathematics



But Why?

- Building Blocks
- Societal Value
- “Why are we solving problems?”
- “Why can I just use AI?”

Note: The author declares this is a generated image for illustration in this presentation.

# IMPLICATIONS

## Theory

1. Expands CVT by formalising the low-control/low-value quadrant
2. Challenges the confidence–anxiety continuum
3. Provides explanatory power for “silent disengagement”
4. Opens new avenues for measurement and modelling

## Teachers

1. Apathy must be addressed explicitly
2. Teachers need:
  - a. strategies to rebuild perceived control (scaffolding, mastery)
  - b. strategies to rebuild perceived value (relevance, authenticity)
  - c. resilience to respond to quiet disengagement
3. Professional learning should include apathy awareness

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# LET'S CONNECT