Understanding self-cognition from a behavioral genetic perspective

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Outline

- Background
- Twin studies of self-cognition
  - Self-concept
  - Self-esteem
  - Self-enhancement
  - Narcissism
- Summary and discussion

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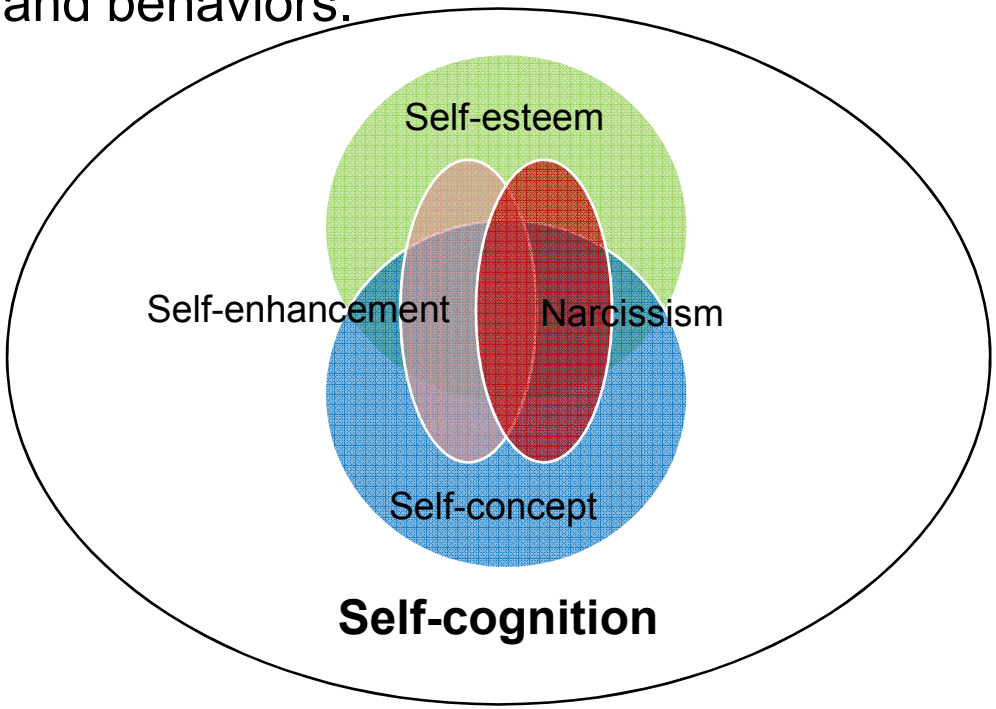
Background: Self-cognition

- The self is an individual person as the object of his or her own reflective consciousness.
- Self-cognition is the introspection and understanding of the self, including cognitive and affective representations of one's identity.
- Self-cognition has powerful impacts on human cognition, emotion, and behaviors.

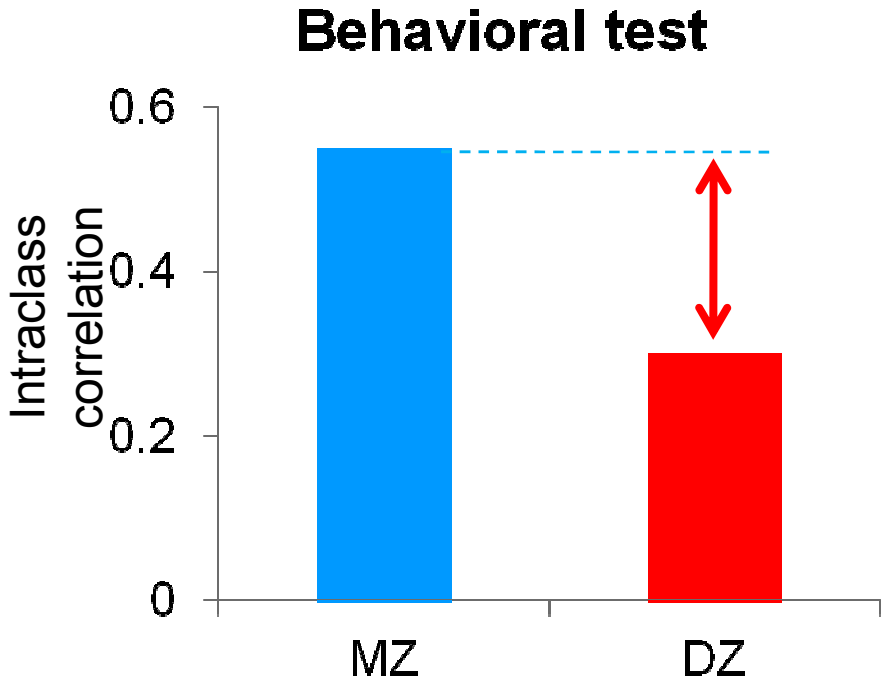


Background: Self-cognition

- Self-concept:
  - ***"Who am I?";*** A cognitive part of self-cognition.
  - A person's self-perceptions formed through one's experience and interpretations with his/her environments (Shavelson et al, 1976).
- Self-esteem:
  - ***"How do I feel about who I am?";*** An affective part of self-cognition.
  - An individual's global evaluation about his/her worth.
- Self-enhancement:
  - ***"I want to feel good about myself";*** Motivation to enhance self-image.
  - A tendency to claim greater standing on a characteristic, or more credit, than is objectively warranted (Alicke & Sedikides, 2009)
- Narcissism:
  - ***"I feel like a super hero";*** Highly inflated, unrealistically positive self-view.
  - A quality of the self that has strong self-focus, feelings of entitlement, and lack of regard of others (Campbell & Foster, 2007).

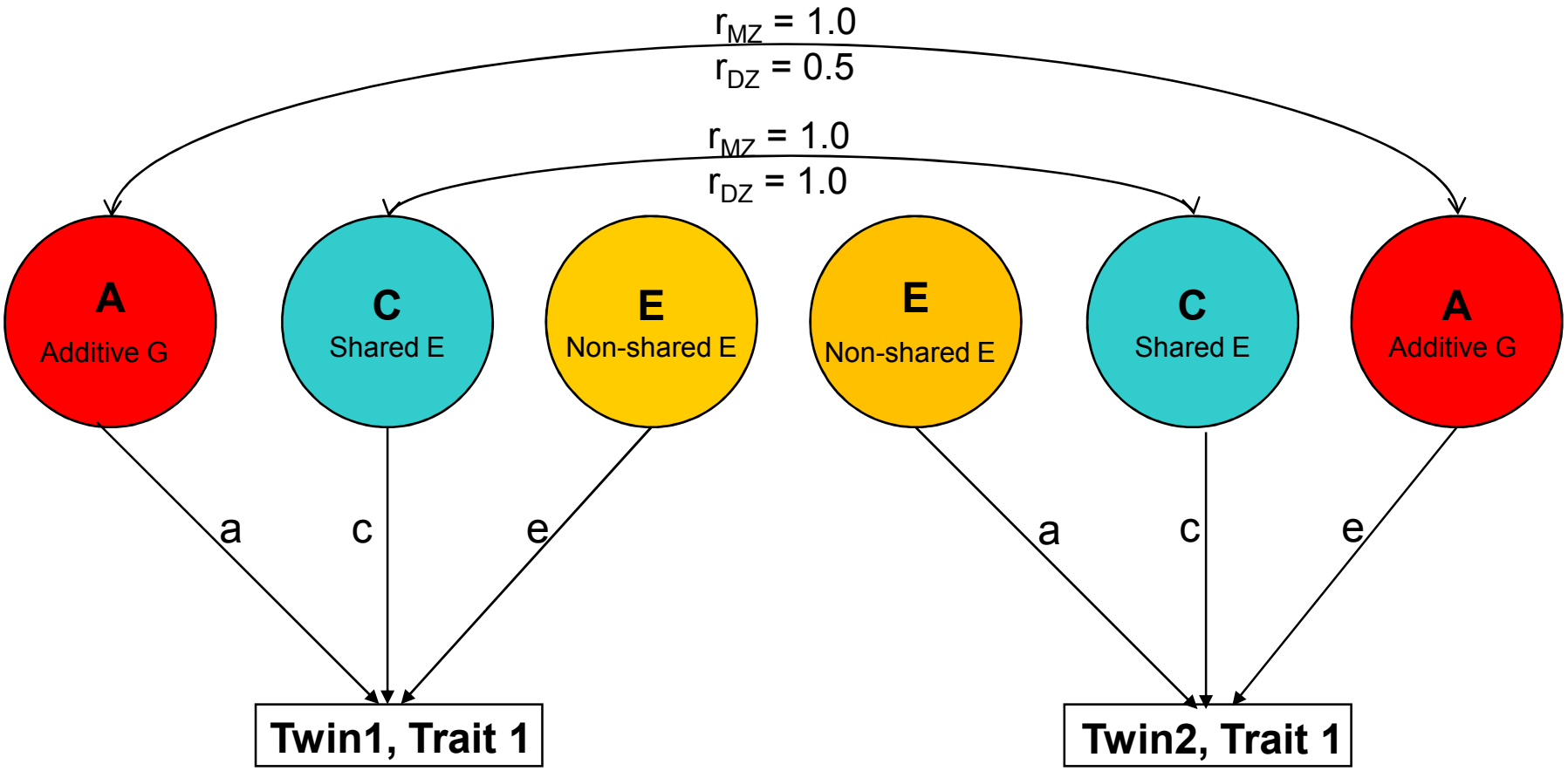
Background: Twin Study

- Similarity in genes:
  - Monozygotic twins (MZ): 100%
  - Dizygotic twins (DZ): 50% (on average)



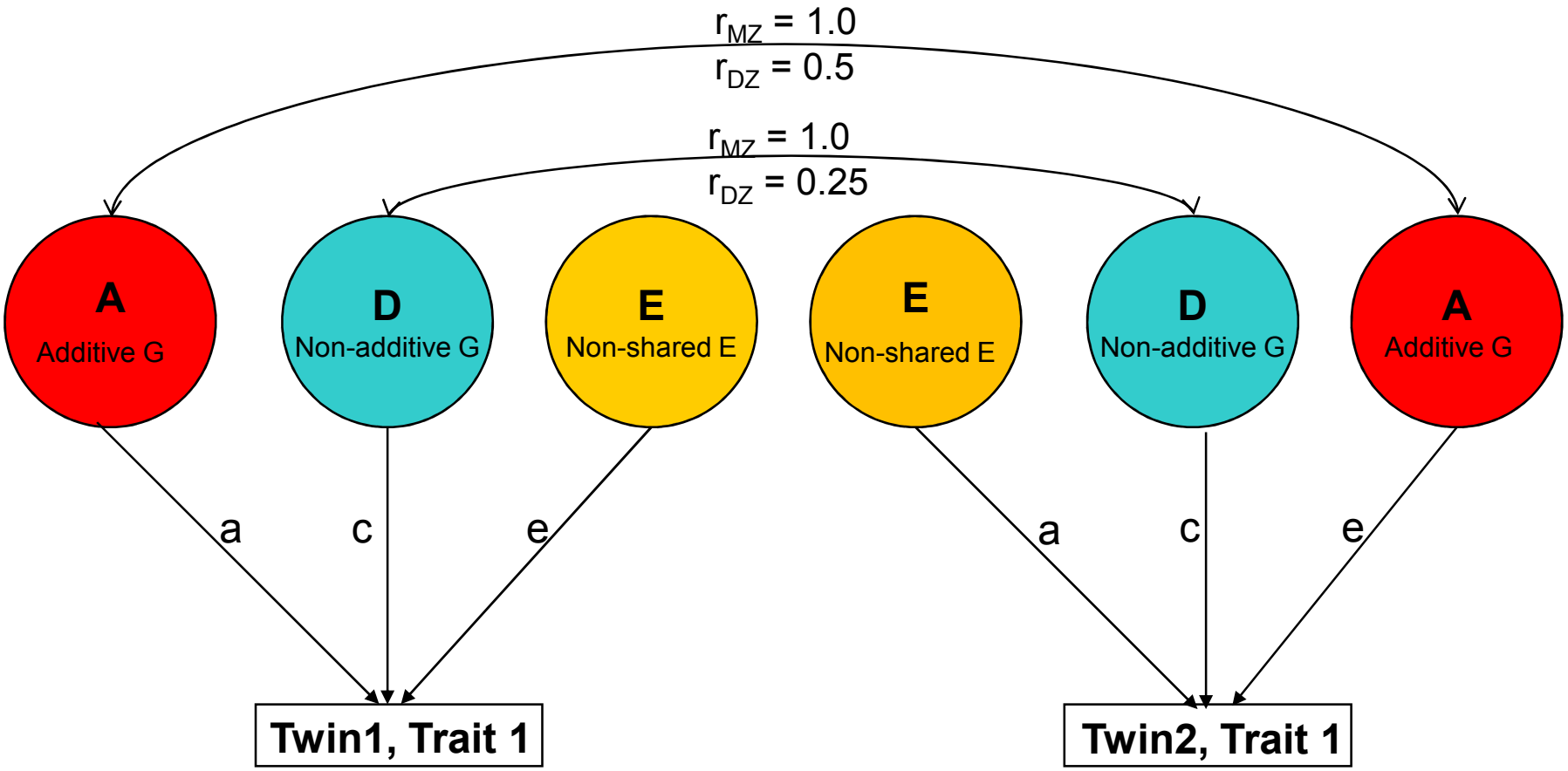
Background: ACE model

- **ACE model** decomposes the variance (i.e., individual differences) of each trait into additive genetic (A), shared environmental (C), and non-shared environmental (E) effects.



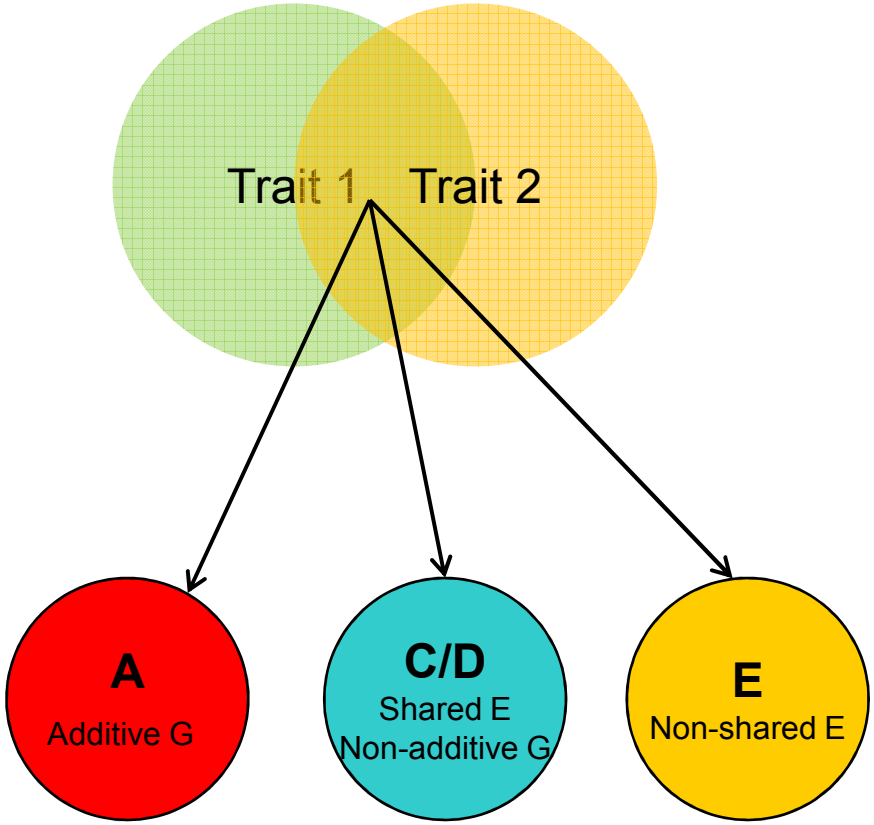
Background: ADE model

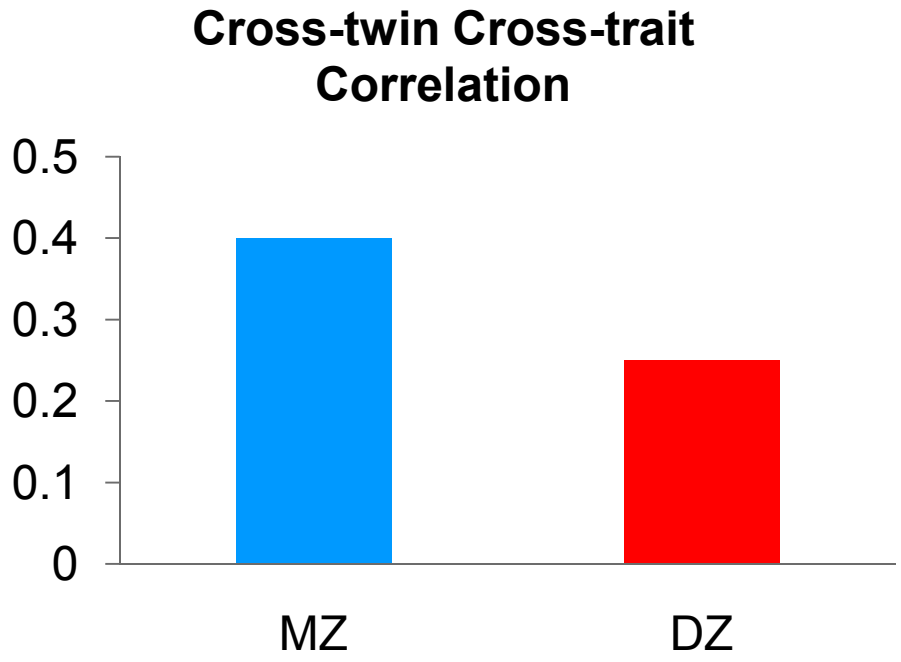
- **ADE model** decomposes the variance (i.e., individual differences) of each trait into additive genetic (A), non-additive genetic (D), and non-shared environmental (E) effects.



Background: Multivariate analysis

- **Multivariate genetic analysis** decomposes the co-variance between traits into genetic (A and/or D) and environmental (C and/or E) effects.





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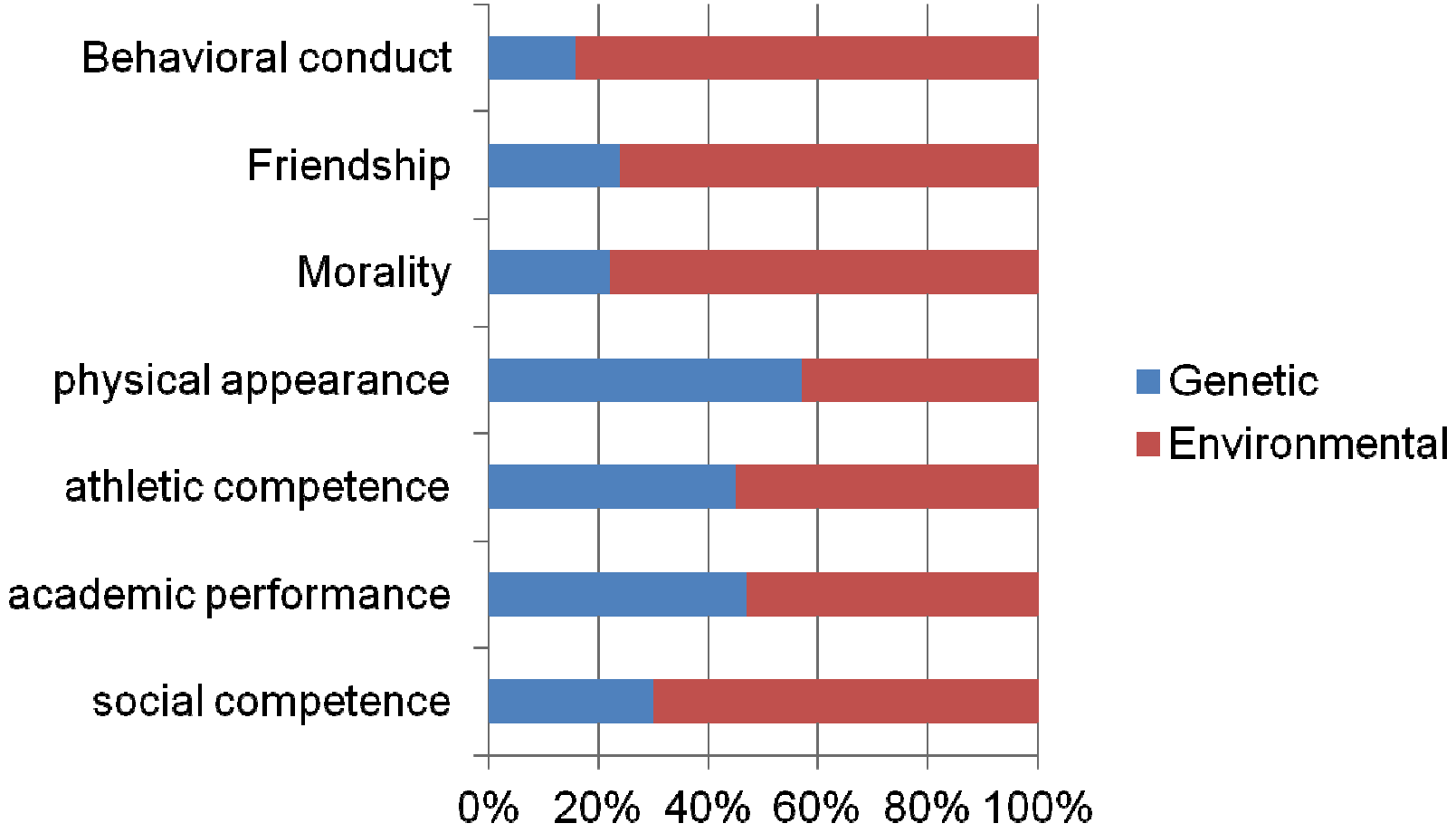
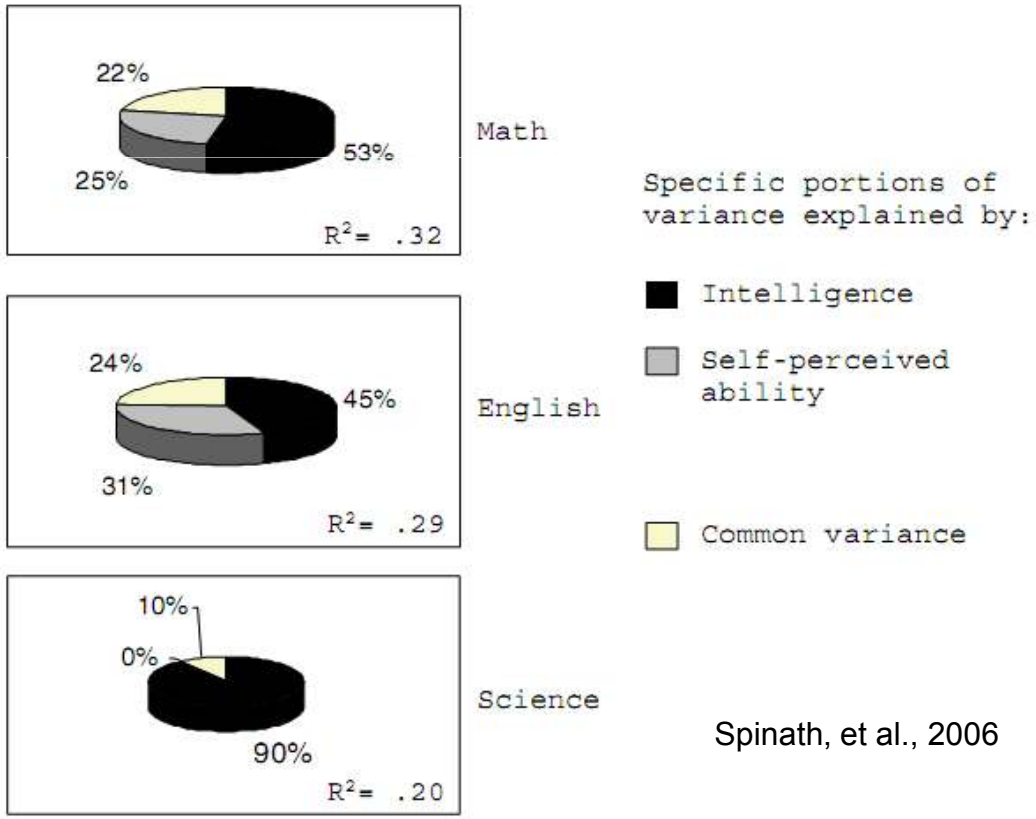
Twin Study: Self-concept



McGue et al, 1993; Hur et al, 1998, Neiderhiser & McGuire, 1994; McGuire et al, 1994, 1999; Greven et al, 2009; Spinath et al, 2008; Luo et al, 2010, 2011.

Twin Study: Self-concept

- **Self-perceived ability (SPA)**: How good people *think* they are at academic activities. It is highly correlated with academic achievement: r = 0.81. (Denissen, Zarrett, and Eccles, 200



Spinath, et al., 2006

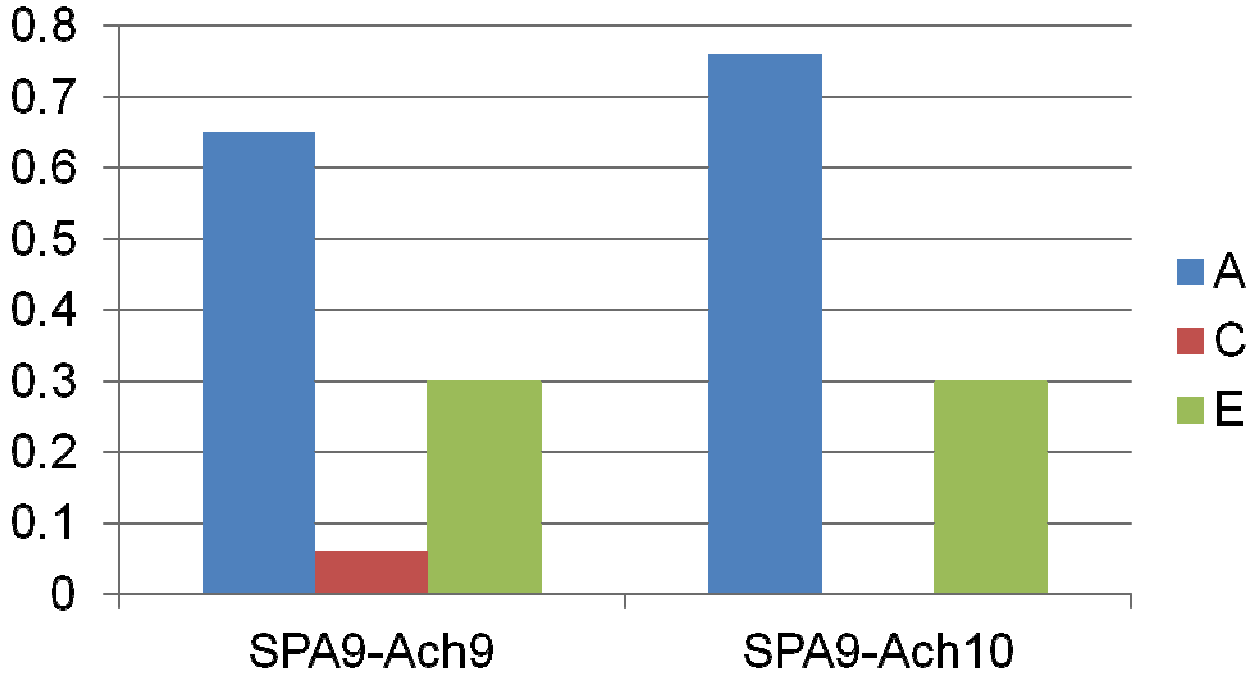
Twin Study: Self-concept

- The **T**wins **E**arly **D**evelopment **S**tudy (TEDS) is a large-scale longitudinal study of twins from early childhood through adolescence in UK.

Age		**Number of Twin Paris**		**Measure**
		MZ	**DZ**	
Middle childhood	9 (SD = 0.29)	1082	1802	Self-perceived ability Self-evaluation of math Academic achievement
Early adolescent	12 (SD = 0.66)	1380	2407	Self-perceived ability Self-evaluation of math Academic achievement

Twin Study: Self-concept

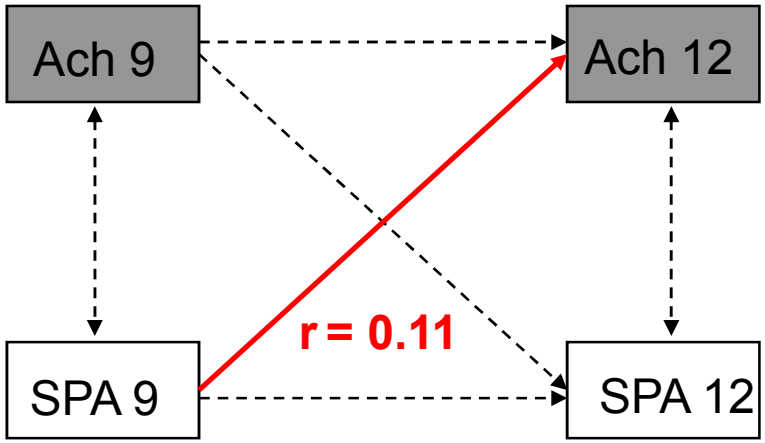
- There was substantial genetic overlap between self-perceived ability and concurrent academic achievement, and between self-perceived ability and later achievement.

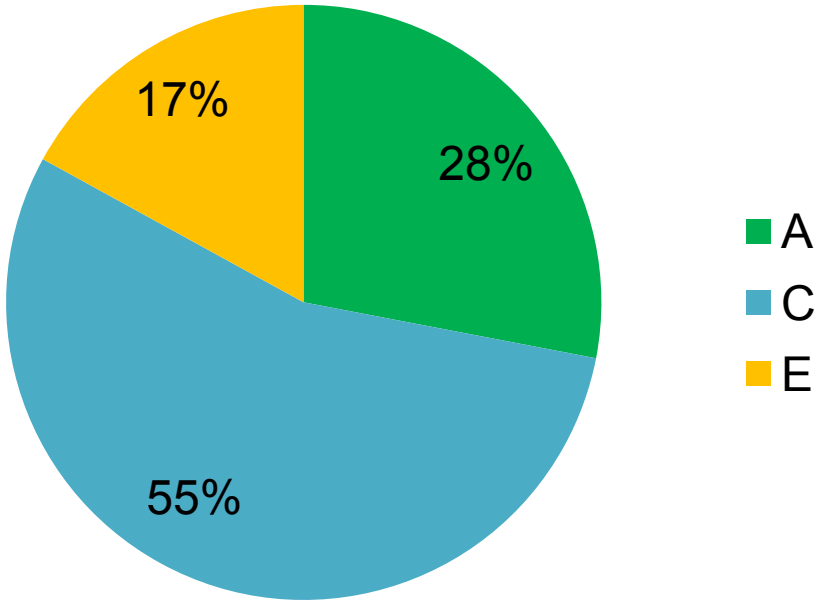


Greven et al, 2009

Twin Study: Self-concept

- Earlier self-perceived ability predicted later academic achievement modestly due to genetic effects.

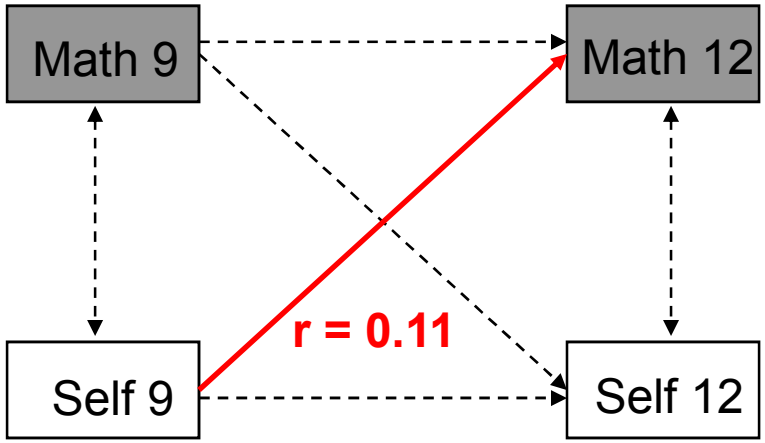


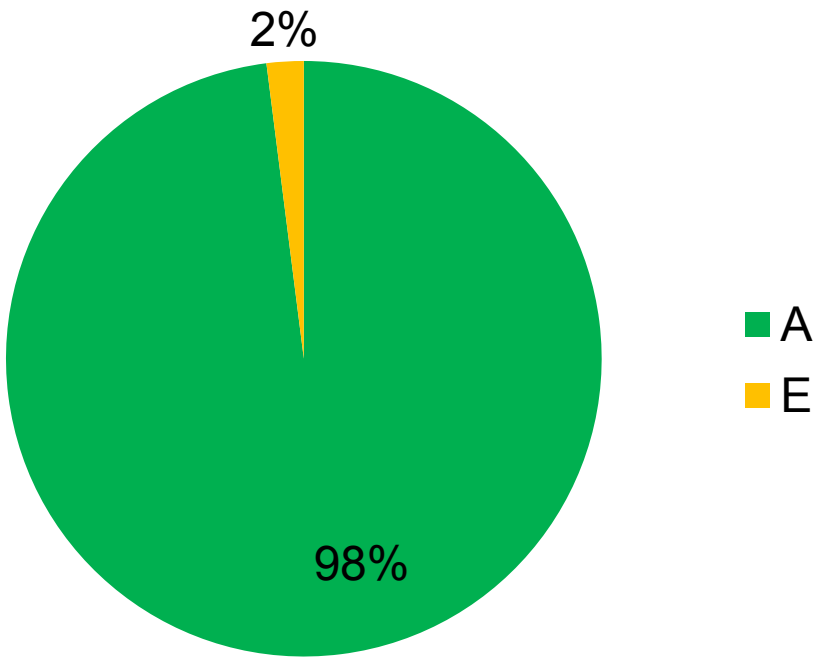


Luo et al, 2010

Twin Study: Self-concept

- Earlier math self-evaluation predicted later math achievement mainly due to genetic effects.
  - Math self-evaluation consisted of self-perceive ability and interest in math.





Luo et al, 2011

Twin Study: Self-concept

- Self-concept was heritable from modest to moderate extent for different domains.
- Same genetic factors influenced academic self-concept and academic achievement substantially.
- Academic self-concept predicted achievement partly for genetic reasons, especially for math.

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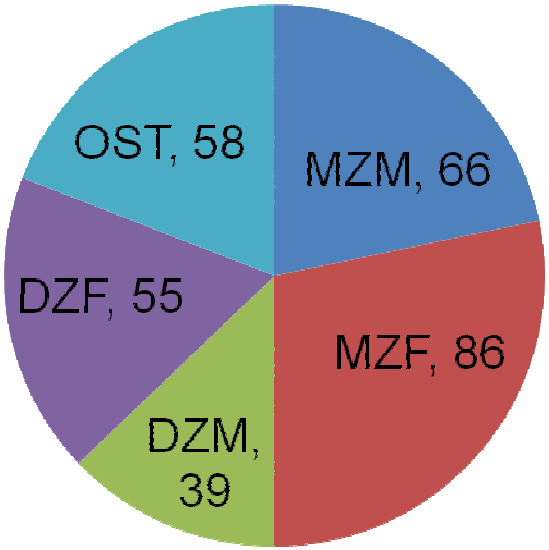
Twin study: Self-esteem

- To date, no more than 20 studies assessed the heritability of self-esteem.
  - The average was 36%, with a range from 0% to 51%.
  - The environmental contributions were largely from non-shared environments.
  - No sex differences.
- Self-esteem was stable over time, primarily due to genetic influences.
  - Genetic effects ranged from 53% to 75%.
  - Environmental effects were different across genders.

For a review see Luo & Cai, in preparation

Twin study: Self-esteem

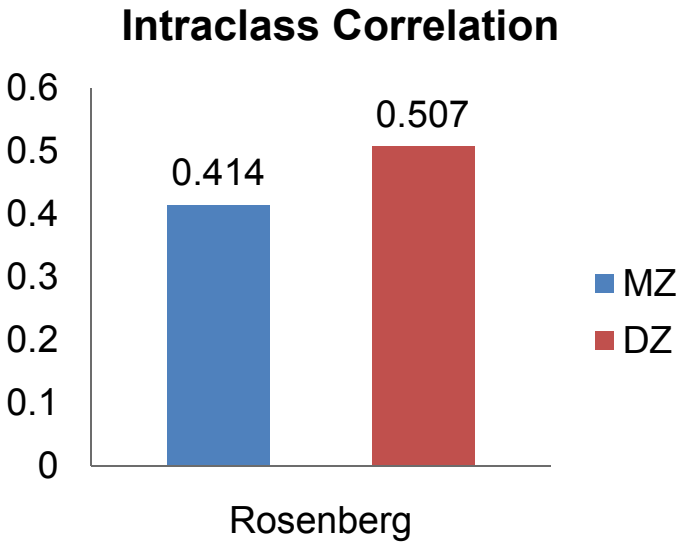
- **Participants:** 304 pairs of twins from Beijing
  - Age: 15 – 27, mean = 18.3 (SD = 2.0)
  - Sex: 268 males, 340 females
  - Zygosity: 152 MZ pairs, 152 DZ pairs

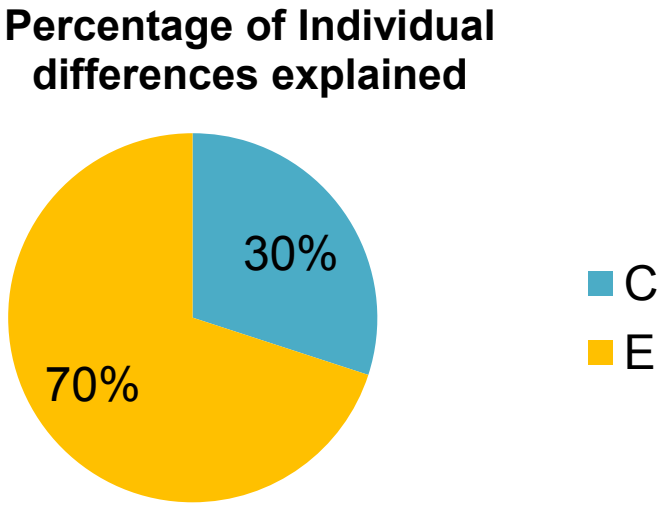


MZM: Male MZ twins
MZF: Female MZ twins
DZM: Male DZ twins
DZF: Female DZ twins
OST: Opposite-sex twins

Twin study: Self-esteem

- **Explicit self-esteem**
  - Rosenberg Self-esteem Scale, 4-point Likert scale, 10 items
  - Reliability: α = 0.76
  - Mean = 3.16 (SD = 0.43; T-test: >neutral, p<.001)
- Genetic factors did not contribute to the variance of explicit self-esteem.





Luo & Cai, in preparation

Twin study: Self-esteem

- **Implicit self-esteem**: An automatic, over-learned, and non-conscious evaluation of the self that guides spontaneous reactions to self-relevant stimuli (Greenwald & Banaji, 1995).
- Implicit self-esteem is independent from the explicit self-esteem, although modest correlation was observed (Greenwald & Farnham, 2000).

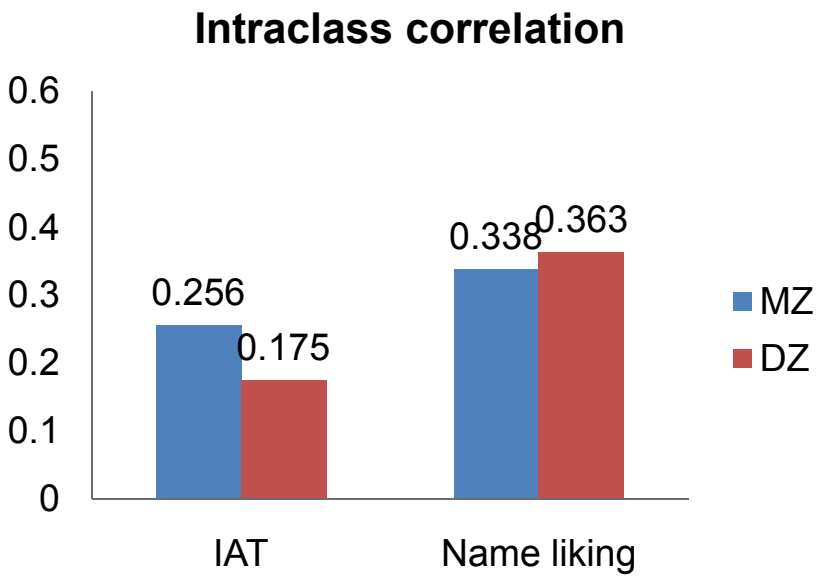
Twin study: Self-esteem

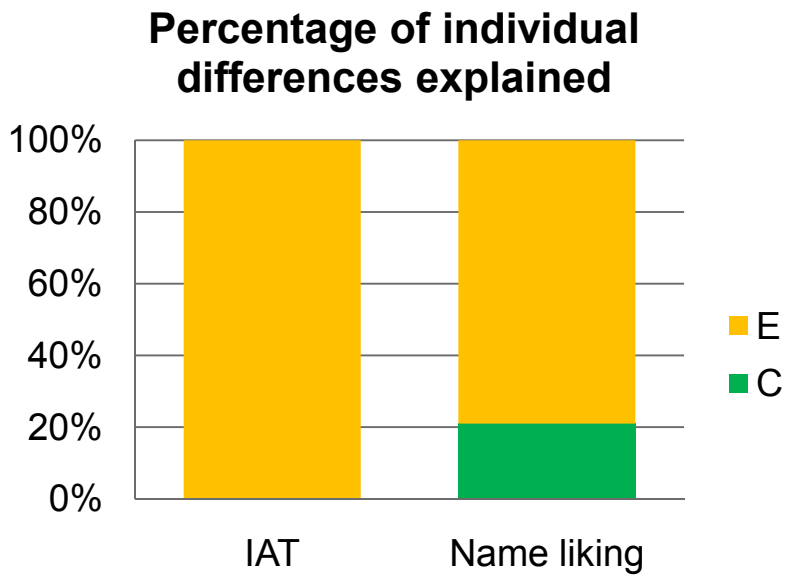
- Implicit self-esteem measures:
  - Brief Implicit Association Test (IAT) (Sriram & Greenwald, 2009)
    - 2 blocks, 24 trials per block
    - Self ~ pleasant, self ~ unpleasant
    - Split-half reliability: α = 0.63
    - Mean =0.67 (SD = 0.40)
    - T-test: > neutral ($p < .001$)

  - Name liking (Gebauer et al, 2008)
    - "How much do you like your first name/family name?"
    - 9-point Likert scales (1 = "Don't like it at all", 9 = "Like it very much")
    - Mean: first-name liking = 6.86 (2.11)

Twin study: Self-esteem

- No significant genetic influences on implicit self-esteem.

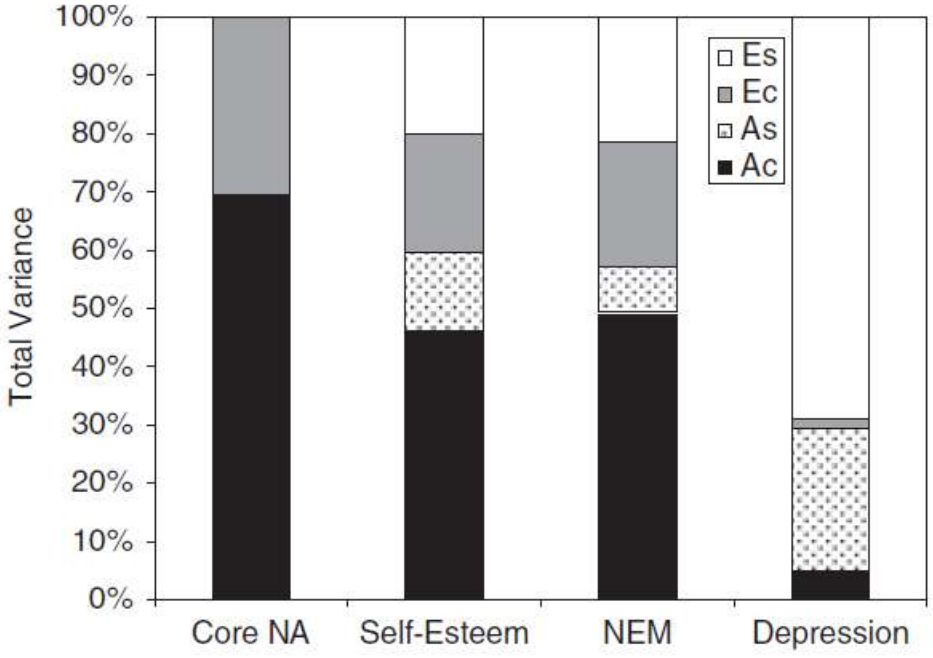




Luo & Cai, in preparation

Twin study: Self-esteem

- The relationship between self-esteem and negative affect was largely due to common genetic factors (Neiss et al, 2005).
- Genetic influences explained the majority of overlap among self-esteem, negative emotionality, and depression, as well as most of the variance in self-esteem and negative emotionality (Neiss et al, 2009).



Twin study: Self-esteem

- Explicit self-esteem was moderately heritable in Westerners, but it was mostly driven by environments in our Chinese sample.
- Individual differences of implicit self-esteem were predominantly attributed to environmental influences, especially to non-shared environments.
- Genetic effects were important for the connection between emotion and self-esteem.

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Twin study: Self-enhancement

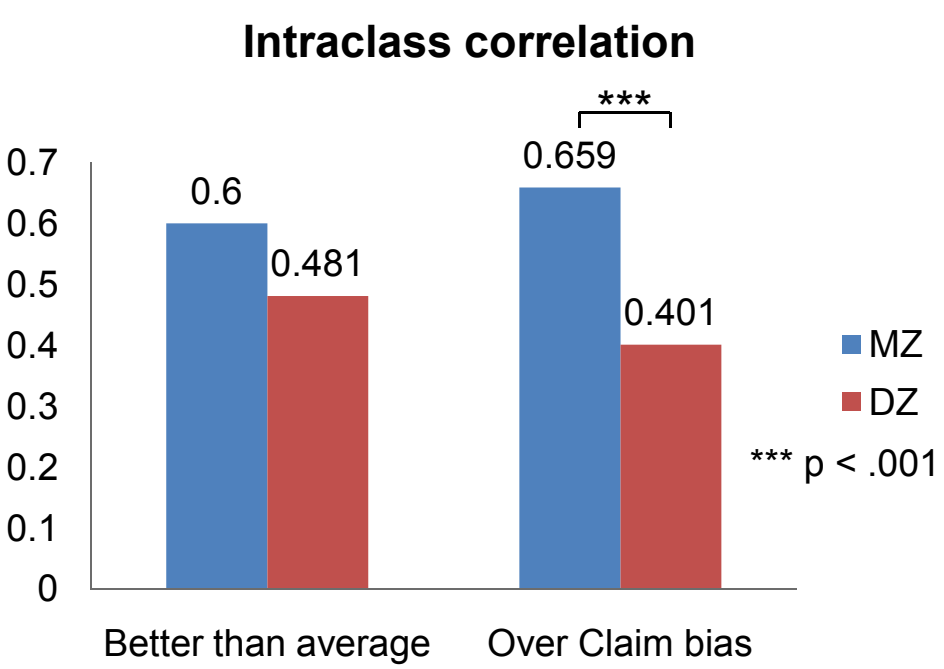
- Universal need
- Early development
- Adaptive importance
- Individual difference

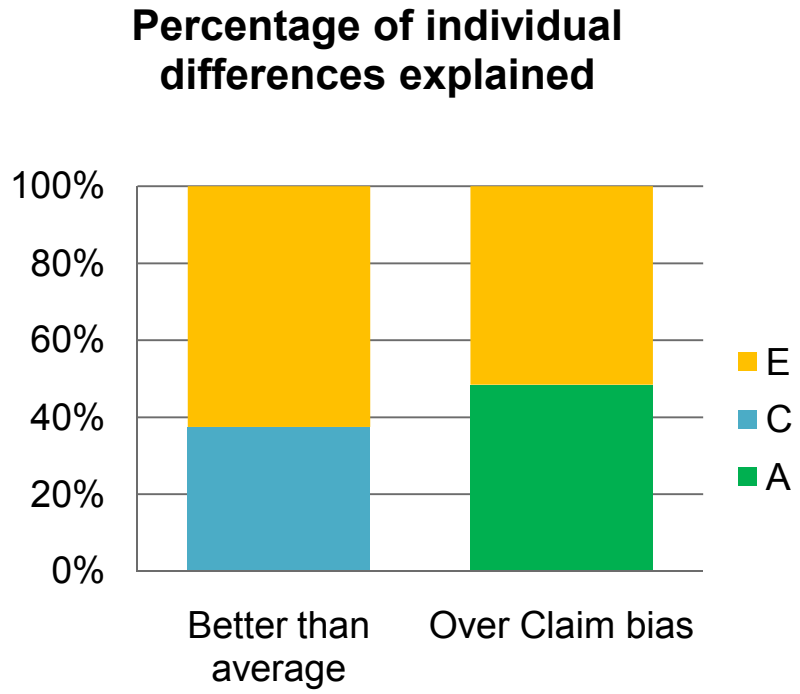
Twin study: Self-enhancement

- Direct measure: Better-than-average effect
  - "Are you better than the average on …?" (e.g., independence)
  - 6-point Likert scale, 16 items
  - Reliability: $\alpha = 0.853$
  - Mean = 4.35 (SD = 0.50; T-test: >neutral, $p<.001$)
- Indirect measure: Over-claim bias
  - Over claim of one's familiarity with Chinese social and cultural icons
  - 7 categories, 3 exemplars in each category including 1 fake item, 7-point Likert scale
  - Reliability: $\alpha = 0.804$
  - Mean = 0.69 (SD = 0.12; T-test: >neutral, $p<.001$)

Twin study: Self-enhancement

- Moderate genetic influences on indirect self-enhancement, but none on direct self-enhancement.





Luo & Cai, in preparation

Twin study: Self-enhancement

- Whether a person is a self-enhancer was largely due to environmental influences, especially on the conscious level.
- Besides non-shared environments, the unconscious intention to over rate oneself was mediated by genetic factors to a considerable extent.

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Twin study: Narcissism

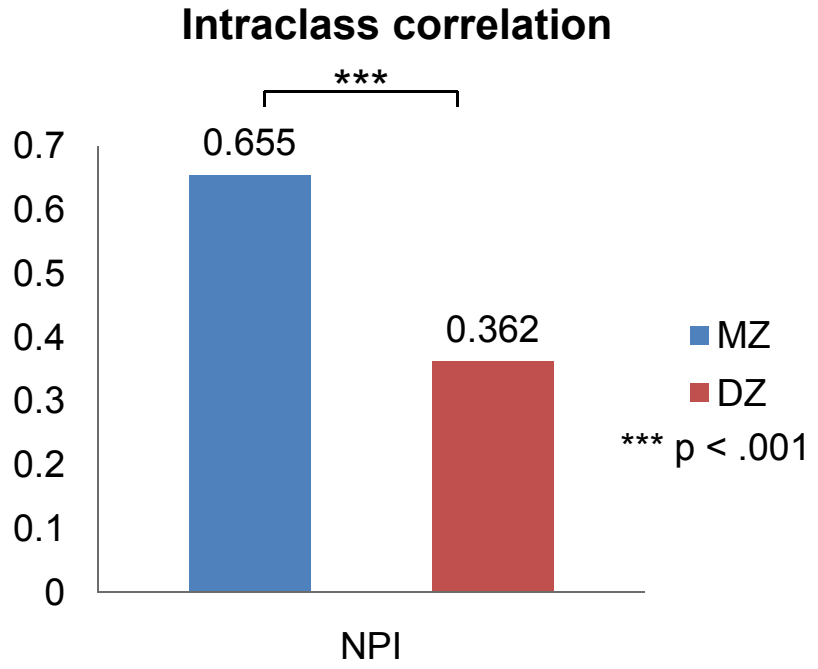
- Environmental sources: Parenting, Culture.
- As a dimension of personality disorder, narcissism was found to be heritable, with 44% ~ 64% of individual differences due to genetic factors and the rest due to non-shared environmental factors (Livesly et al, 1993, 1998; Jang et al, 1996; Vernon et al, 2008).

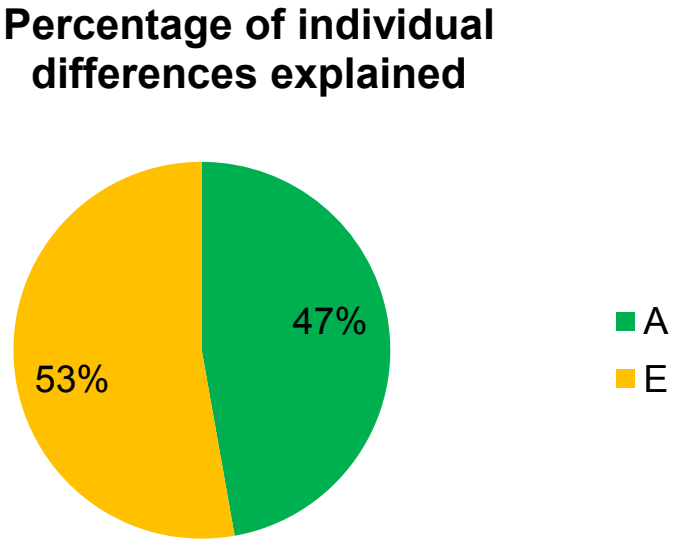
Twin study: Narcissism

Measure	Item	Item #	Reliability	Mean (SD)
Narcissism Personality Inventory	Forced choice	40	0.806	13.64 (6.05)
Grandiosity	7-point Likert Scale	16	0.953	4.16 (1.07)
Entitlement	7-point Likert Scale	9	0.839	2.87 (0.98)
Communality	7-point Likert Scale	16	0.872	4.59 (0.80)

Twin study: Narcissism

- The individual differences of narcissistic trait was half attributed to genetic factors and half to non-shared environmental factors.

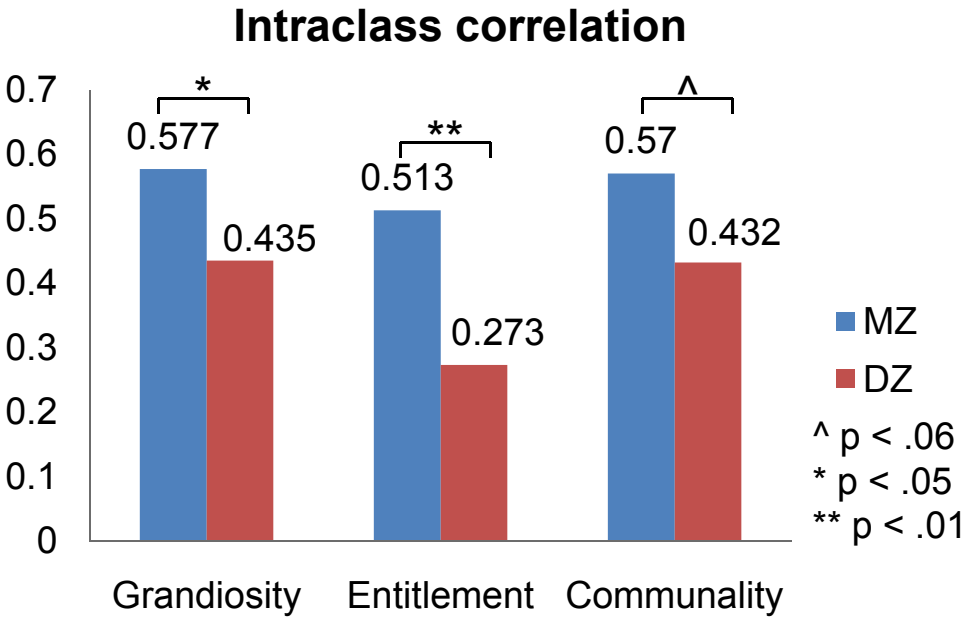


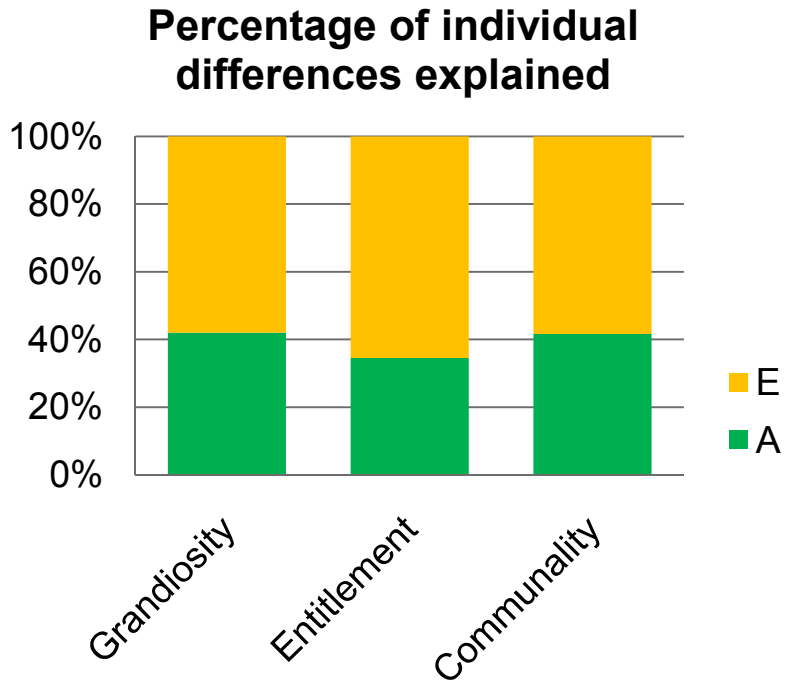


Luo & Cai, in preparation

Twin study: Narcissism

- Moderate genetic influences on the three dimensions of narcissism, with substantial non-shared environmental influences.





Luo & Cai, in preparation

Twin study: Narcissism

- Narcissism was heritable as a personality trait. Its dimensions – grandiosity, entitlement, and communality were also heritable to a moderate extent.
- The environmental influences on the variance of narcissistic trait as well as the specific dimensions were mainly unique to each individual.

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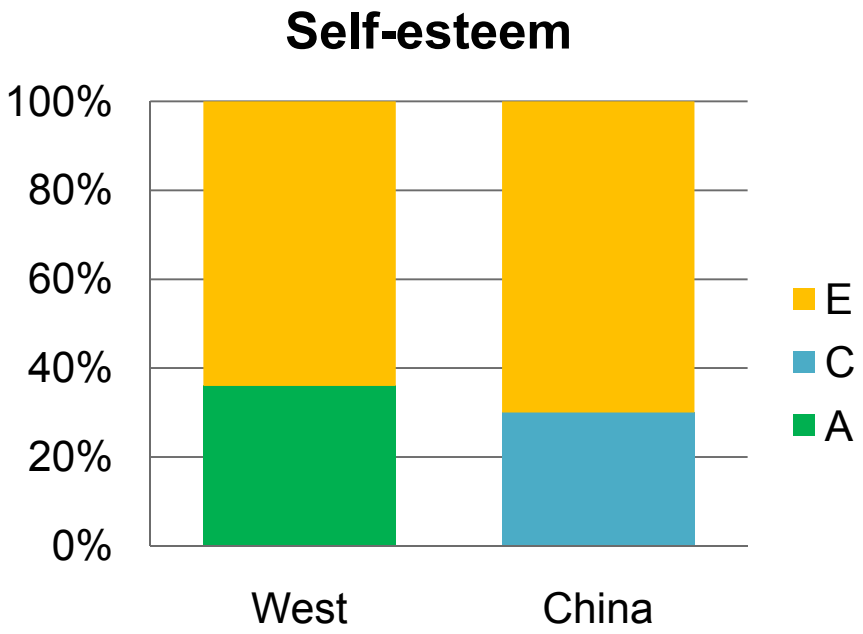
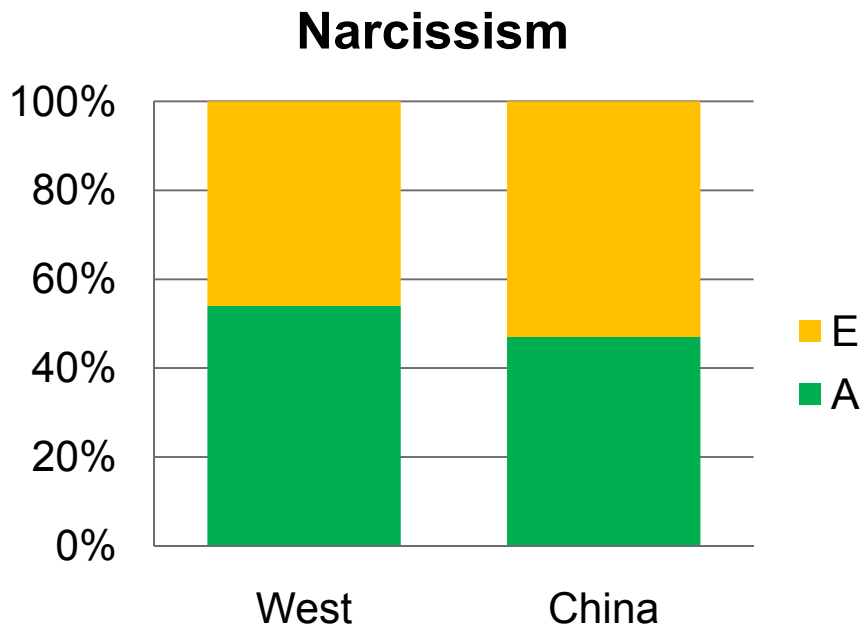
Summary and Discussion

- Generally speaking, self-cognition is heritable. But the magnitude of heritability varies across different aspects, ranging from 30% for self-esteem to 60% for narcissism.
- Most environmental contributions to self-cognition are not shared between siblings. The shared environmental contributions are limited or even missing in most cases.
- Self-cognition, particularly self-concept and self-esteem, associates with cognitive and emotional constructs because of common genetic factors, as well as non-shared environmental overlaps.

Summary and Discussion

- West vs. East





Summary and Discussion

- Explicit (Direct) vs. Implicit (Indirect)

	Explicit	Implicit
Self-esteem	G & E	E
Self-enhancement	E	G & E

Summary and Discussion

- More explorations are under way:
  - Is there a general factor of self-cognition? And is it heritable?
  - How genetic and environmental effects differ or resemble among various aspects of self-cognition?
  - Etiology underlying the links between self-cognition and personality, subjective well-being, and interpersonal orientation.

Acknowledge

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  - Prof. Robert Plomain
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Thank You!

The end

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