

# Adolescents' Cognitive Capacity Reaches Adult Levels Prior to Their Psychosocial Maturity: Evidence for a “Maturity Gap” in a Multinational, Cross-Sectional Sample

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- All developed societies draw chronological age boundaries between minors and adults for legal purposes, among them, determining who is permitted to vote, drive, purchase alcohol, and make autonomous medical decisions and, if arrested, who is tried as an adult.
- In many countries, age 18 is used for most purposes with some exceptions (e.g., consent to research or medical treatment; World Health Organization, 2014). In others, such as the United States, different ages are used for different matters.
- For example, although the presumptive age of majority in the U.S. is 18, eligibility for driver's licensing is generally granted at a younger age, whereas the minimum legal purchase age for alcohol is 21.

# Overview and Rationale of Present Study

- The present study replicates Steinberg et al. (2009a) in a large international sample. Such a replication is warranted for several reasons.
- First, because most of the relevant research has been conducted in Western countries, it is not known to what degree conclusions drawn from these countries extend to non-Western societies.
- Further, of the few cross-national studies of cognitive capacity or psychosocial development that do exist, most suffer at least one major limitation. Studies typically examine only a single developmental period (e.g., middle adolescence, excluding the transition into adulthood).
- Furthermore, these studies often examine mean differences between cultures and not age trends (e.g., Thorell, Veleiro, Siu, & Mohammadi, 2013).
- In addition, apart from a few studies (e.g., Matsumoto et al., 2008; Vazsonyi & Ksinan, 2017), most cross-cultural work examines only a few countries or cultures at a time.

- In the present study, we compare two facets of development relevant to the treatment of young people under the law—cognitive capacity (the predominant influence on cold cognition) and psychosocial maturity (the predominant influence on hot cognition)—using some of the same tasks as Steinberg et al. (2009a), but in an 11-country sample of more than 5,200 individuals between the ages of 10 and 30.
- Accordingly, we examine the second two decades of life to determine whether and in what ways age differences in cognitive capacity and psychosocial maturity are evinced in a diverse group of countries.
- The countries in this sample—China, Colombia, Cyprus, Jordan, Kenya, India, Italy, the Philippines, Sweden, Thailand, and the U.S.—are diverse geographically, economically, and culturally, including on dimensions of individualism/collectivism and indulgence/restraint (Hofstede, 2011).
- China and India greatly value restraint, whereas Sweden and Columbia are highly indulgent (see Table 1 for details on country-level attributes and the online supplemental materials for details on legal age boundaries by country).

Table 1: *Country-Level Attributes*

| Country     | Individualism/Collectivism | Indulgence/Restraint | GDP per capita (PPP) 2014 (USD) |
|-------------|----------------------------|----------------------|---------------------------------|
| China       | 20                         | 24                   | 13,200                          |
| Columbia    | 13                         | 83                   | 13,500                          |
| Cyprus      | —                          | 70                   | 30,900                          |
| India       | 48                         | 26                   | 5,800                           |
| Italy       | 76                         | 30                   | 35,100                          |
| Jordan      | 30                         | 43                   | 12,000                          |
| Kenya       | 25                         | —                    | 3,100                           |
| Philippines | 32                         | 42                   | 7,000                           |
| Sweden      | 71                         | 78                   | 46,200                          |
| Thailand    | 20                         | 45                   | 15,600                          |
| U.S.        | 91                         | 68                   | 54,400                          |

Note. The Individualism/Collectivism Scale and the Indulgence/Restraint Scale range from 0–100 (Hofstede, 2011). GDP per capita is given in U.S. dollars (Central Intelligence Agency, 2018) .

# Hypotheses

- We hypothesized that cognitive capacity would reach adult levels prior to age 18 and plateau in midadolescence, but that psychosocial maturity would not reach adult levels until after 18, into the 20s.
- These hypotheses are consistent with the idea that deliberative, “cold” decision making matures prior to “hot” decision making.
- Given the substantial cultural variation in expectations for self-regulation (which likely influences each component of self-restraint within the psychosocial maturity composite), we anticipated that patterns of age differences in psychosocial maturity would vary notably across countries (Chen & French, 2008; Matsumoto et al., 2008).
- In contrast, we expected the pattern of age differences in cognitive capacity to generally be more consistent across countries.



# Method

- We recruited nine of the 11 countries of the present sample from an ongoing longitudinal study of parenting across cultures (PAC; Lansford & Bornstein, 2011), which has been described elsewhere (Steinberg et al., 2017).
- The PAC study originally selected these nine countries because they differ in how children are parented and disciplined, which is the focus of that study.
- In particular, these nine countries differ on several levels: (a) individualism versus collectivism; (b) religious affiliation; and (c) laws governing parenting behaviors (e.g., the one-child policy in China that was in effect at the time of data collection; Lansford & Bornstein, 2011).
- The current study has a different focus, but collaborating with the PAC group allowed us to build on their cross-national infrastructure.
- In addition to the PAC countries, the current study included Cyprus and India. Cyprus participated in the current study, but not the PAC project, because PAC data collection had already begun prior to Cyprus' involvement.

- The sample ( $N = 5,404$ ) comprises individuals between 10 and 30 years of age in 11 countries: China ( $n = 493$ ), Colombia ( $n = 513$ ), Cyprus ( $n = 407$ ), India ( $n = 425$ ), Italy ( $n = 561$ ), Jordan ( $n = 506$ ), Kenya ( $n = 488$ ), the Philippines ( $n = 512$ ), Sweden ( $n = 425$ ), Thailand ( $n = 504$ ), and the U.S. ( $n = 570$ ; see Table S2 for a breakdown of participants by age in each country).
- We balanced the proportion of males and females in the full sample (50.8% female,  $n = 2,746$ ), within each country (ranging between 48.9%–53.8% female) and across age group (ranging between 48.7%–52.0% female).
- Each site recruited participants from urban centers in each participating country using flyers posted in neighborhoods, advertisements in newspapers, and word of mouth.
- All sites attempted to recruit a minimum of 60 participants (50% female) for each of seven age groups: 10–11 years, 12–13 years, 14–15 years, 16–17 years, 18–21 years, 22–25 years, and 26–30 years. (Because the 10- to 11-year-old group comprised PAC participants, within PAC countries, the number of participants in this group generally exceeded those in other age groups.)

# Procedure

- At each data collection site, research staff received identical training for administering the test battery.
- Measures were administered in the predominant language at each site, following forward- and back-translation and a process of cultural adaptation (Erkut, 2010).
- Translators were fluent in both English and the target language, and identified any items that translated poorly, were culturally insensitive or inappropriate, or may have multiple meanings.
- Site coordinators and translators then modified items as appropriate. During data collection, investigators from each site attended an annual in-person meeting to resolve any questions, concerns, or obstacles, and to review study procedures.
- In addition, sites regularly used e-mail and Skype calls to resolve ongoing questions or issues. A central coordinating center received and checked all incoming data each week.

- Participants completed a session that lasted 2 hr. Staff members tested participants individually in their homes, schools, or other locations designated by the participants.
- Parental consent and adolescent assent were obtained at all sites for all youth under 18 except Sweden, where parental consent is not required for participants over 15.
- Participants completed computerized versions of all measures including self-report measures, behavioral tasks, an intelligence assessment, and a demographic questionnaire.

# Measures

- Demographics
- Intellectual ability
- Cognitive capacity
- Digit span
- Working memory
- Verbal fluency
- Psychosocial maturity
- Resistance to peer influence
- Delay discounting
- Modified Iowa gambling task
- Tower of London task



# Results

- Zero-order correlations among all variables and descriptive statistics for each measure by age group are reported in Table 2 and Table 3, respectively.
- For all regression analyses, we report only coefficients from the model with the highest-order significant age trend.
- Lower-order age trends are reported in the online supplemental materials.
- Results of age patterns of individual components can be found in the online supplemental materials.

Table 2: Zero-Order Correlations Among Variables

| Variable  | Par. Ed. | WASI   | RPI    | Stoplight | DD     | IGT     | ToL     | WM      | VF      | DSB     |
|-----------|----------|--------|--------|-----------|--------|---------|---------|---------|---------|---------|
| Age       | -.07***  | .15*** | .15*** | -.03*     | .06*** | -.16*** | .18***  | .29***  | .26***  | .20***  |
| Par. Ed.  | —        | .20*** | .05**  | .004      | .09*** | -.08*** | .04**   | .10***  | -.03*   | .09***  |
| WASI      |          | —      | .10*** | .06***    | .13*** | -.15*** | .21***  | .36***  | .30***  | .36***  |
| RPI       |          |        | —      | -.05***   | .07*** | -.07*** | .06***  | .15***  | .04*    | .06***  |
| Stoplight |          |        |        | —         | -.03   | .04**   | .02     | .09***  | .09***  | .07***  |
| DD        |          |        |        |           | —      | -.12*** | .09***  | -.01    | .09***  | .05**   |
| IGT       |          |        |        |           |        | —       | -.14*** | -.13*** | -.10*** | -.10*** |
| ToL       |          |        |        |           |        |         | —       | .16***  | .08***  | .23***  |
| WM        |          |        |        |           |        |         |         | —       | .26***  | .37***  |
| VF        |          |        |        |           |        |         |         |         | —       | .27***  |

Note. Par. Ed. = Parental education; WASI = WASI t-score; RPI = Resistance to peer influence; DD = delay discounting, average indifference point for longest delays; IGT = Iowa gambling task, corresponding to the proportion decrease in plays on disadvantageous decks; ToL = Tower of London, latency to first move; WM = working memory; VF = verbal fluency; DSB = digit span backward. \*p = .05. \*\*p = .01. \*\*\*p = .001.

Table 3: *Descriptive Statistics by Age Group: Mean (SD)*

| Variable  | 10–11             | 12–13             | 14–15             | 16–17             | 18–21             | 22–25             | 26–30             |
|-----------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Par. Ed.  | 11.83 (3.00)      | 12.07 (2.91)      | 12.12 (2.78)      | 11.86 (2.88)      | 12.01 (2.79)      | 11.78 (3.03)      | 11.24 (3.24)      |
| WASI      | 48.33 (11.00)     | 46.01 (11.07)     | 46.18 (10.87)     | 46.97 (10.54)     | 49.81 (10.41)     | 51.36 (10.19)     | 51.42 (11.62)     |
| RPI       | .57 (.25)         | .60 (.25)         | .60 (.25)         | .62 (.25)         | .62 (.24)         | .67 (.23)         | .67 (.25)         |
| Stoplight | .42 (.22)         | .42 (.21)         | .44 (.23)         | .42 (.21)         | .43 (.23)         | .42 (.23)         | .39 (.23)         |
| DD        | 400.85 (301.17)   | 375.29 (303.76)   | 384.49 (269.58)   | 400.23 (295.09)   | 415.20 (291.62)   | 443.08 (303.11)   | 437.20 (311.98)   |
| IGT       | -.02 (.24)        | -.03 (.24)        | -.06 (.25)        | -.07 (.27)        | -.10 (.28)        | -.12 (.29)        | -.13 (.32)        |
| ToL       | 4475.99 (3382.75) | 4467.41 (3661.45) | 5363.33 (5660.86) | 5848.01 (6092.83) | 6481.17 (5978.23) | 6926.48 (6618.99) | 7055.67 (6932.37) |
| WM        | 6.11 (1.37)       | 6.58 (1.26)       | 6.97 (1.08)       | 7.15 (1.00)       | 7.26 (.95)        | 7.21 (1.08)       | 7.17 (1.11)       |
| VF        | 10.5 (4.44)       | 11.03 (5.15)      | 12.72 (5.71)      | 13.65 (6.52)      | 13.94 (5.84)      | 14.46 (6.49)      | 14.90 (6.48)      |
| DSB       | 4.02 (1.19)       | 4.26 (1.20)       | 4.52 (1.47)       | 4.61 (1.43)       | 4.82 (1.49)       | 4.81 (1.52)       | 4.79 (1.39)       |
| N         | 1191              | 702               | 667               | 623               | 715               | 670               | 659               |
| % Female  | 51.8              | 48.4              | 50.7              | 50.9              | 49.9              | 51.3              | 51.4              |

Note. Par. Ed. = Parental education. WASI = WASI t-score; DD = delay discounting, average indifference point for longest delays; RPI = Resistance to peer influence (on a 0–1 scale); IGT = Iowa gambling task, corresponding to the proportion decrease in plays on disadvantageous decks; ToL = Tower of London, latency to first move (in ms); WM = working memory, average accuracy (out of 8); VF = verbal fluency, number of words produced in 1 min; DSB = digit span backward, longest string of digits correctly recalled in reverse order (with a maximum value of 8).

# Measurement Invariance

- To ensure that self-reported resistance to peer influence was suitable for use in our sample, we examined measurement invariance in all 11 countries.
- We fit CFAs for this measure within each country to test for unidimensionality and identify problematic items.
- We used the alignment technique to explore measurement invariance (Muthén & Asparouhov, 2014), which also provided information about the noninvariance of each item in each country.
- CFAs indicated that the RPI evinced acceptable model fit when three problematic items (based on visual inspection and alignment analyses) were dropped.
- Muthén and Asparouhov (2014) suggest that approximate measurement invariance is attained if less than 20%–25% of parameters register as noninvariant.
- Tests of measurement invariance indicated very few noninvariant items (less than 7%) for the RPI. More details of this process and results can be found in the online supplemental materials.

# Full Sample Age Trends

- Cognitive capacity followed a significant cubic age trend in the full sample ( $b_{\text{Age}} = 22.82$ ,  $SE = 1.07$ , 95% CI [20.68, 24.90],  $p = .001$ ;  $b_{\text{Age}^2} = -1.95$ ,  $SE = 0.14$ , 95% CI [-2.22, -1.66],  $p = .001$ ;  $b_{\text{Age}^3} = 0.05$ ,  $SE = 0.01$ , 95% CI [0.04, 0.06],  $p = .001$ ;  $R^2 = .92$ ,  $p = .001$ ).
- Improvements in cognitive capacity were most striking from childhood into adolescence, with little change after age 16.
- Psychosocial maturity, in contrast, followed a significant linear trend ( $b_{\text{Age}} = 1.86$ ,  $SE = 0.12$ , 95% CIs [1.62, 2.07],  $p = .001$ ;  $R^2 = .09$ ,  $p = .001$ ).
- Figure 1 displays age patterns of both composites.



Figure 1: *Age patterns in cognitive capacity (top) and psychosocial maturity (bottom) in the aggregated sample.*

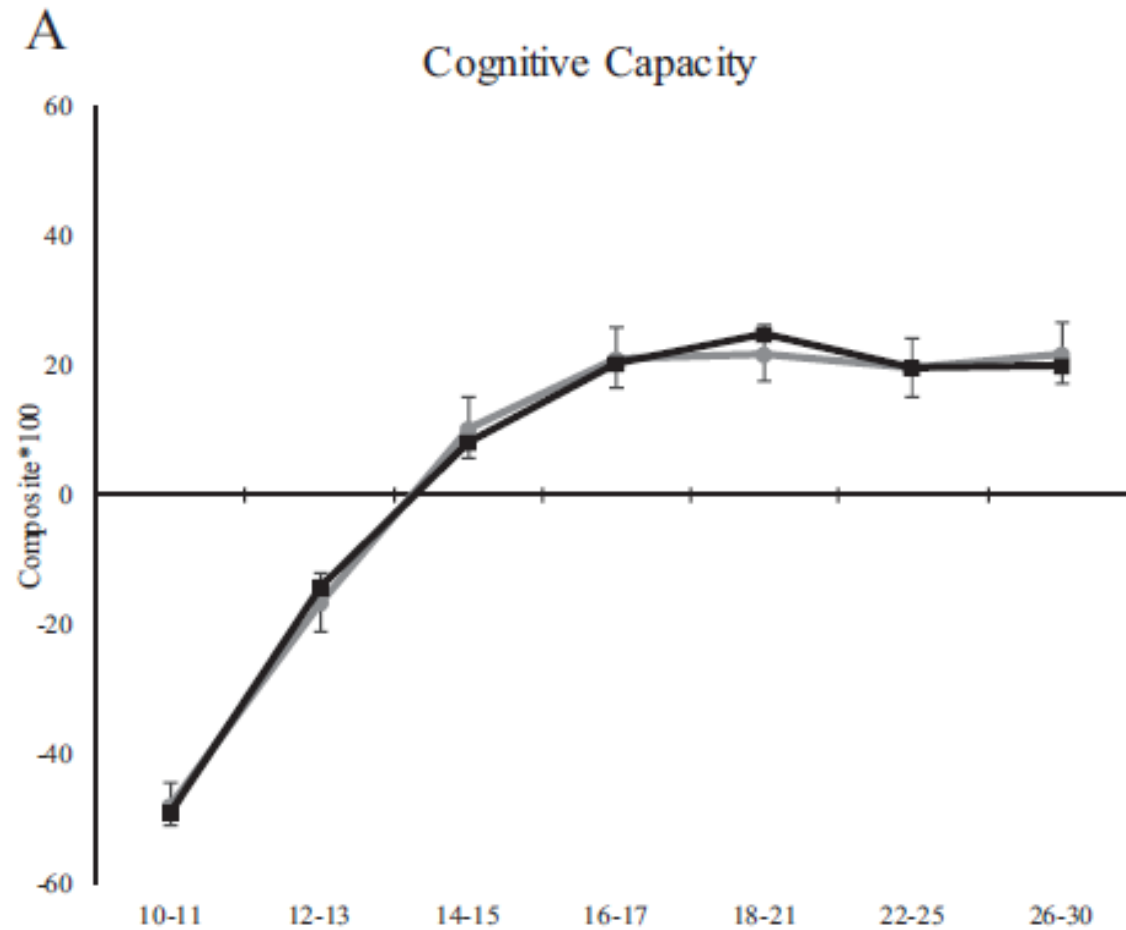
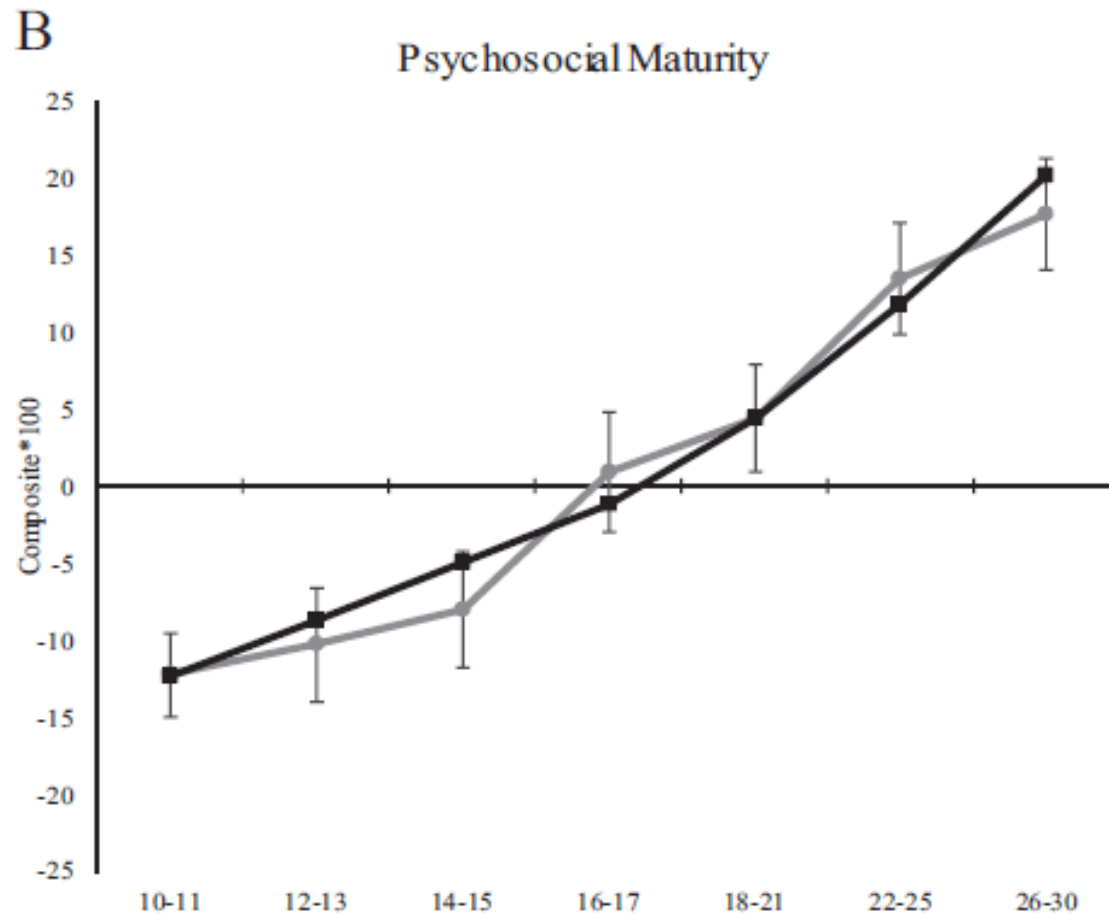


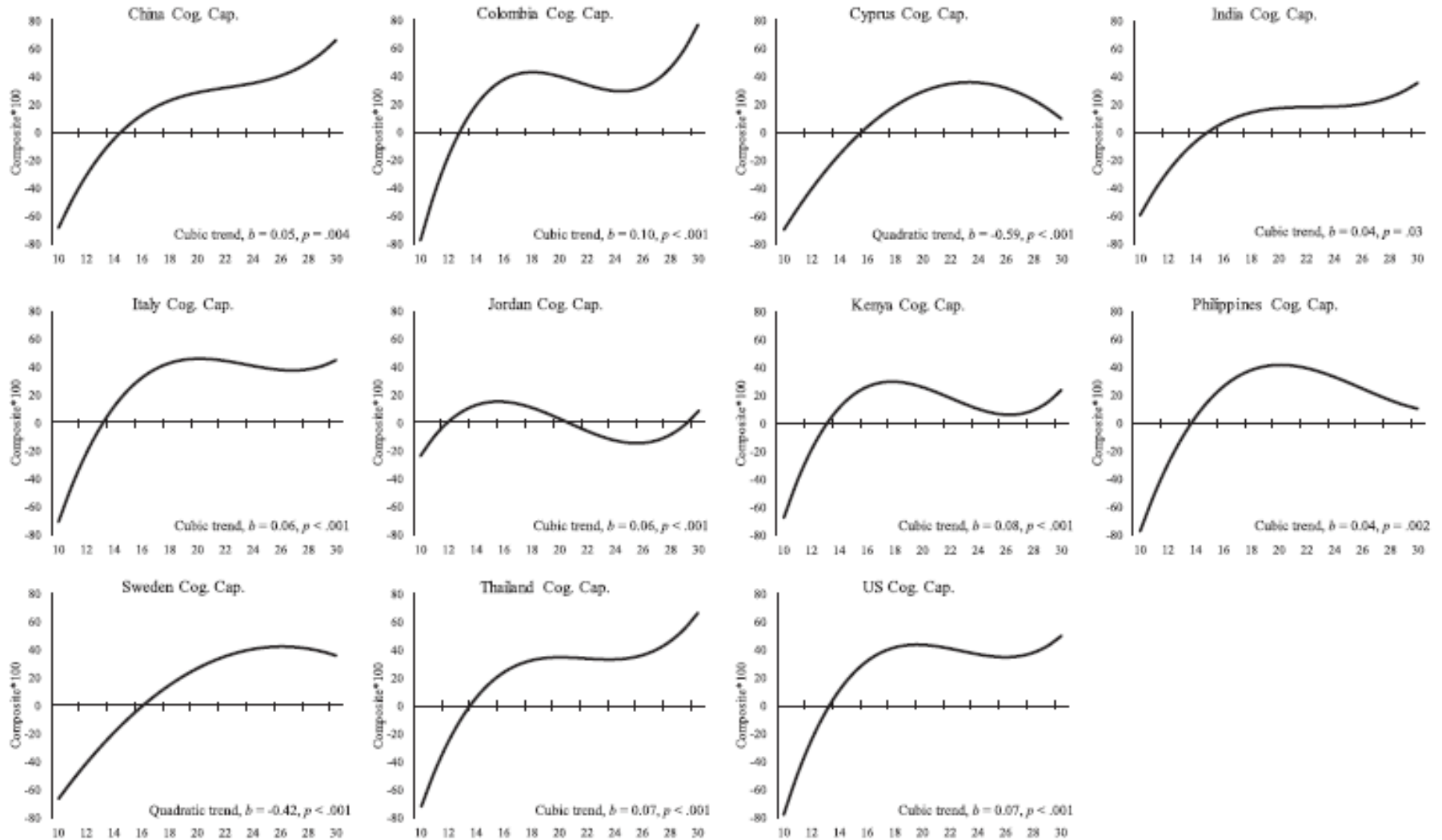
Figure 1: Age patterns in cognitive capacity (top) and psychosocial maturity (bottom) in the aggregated sample, Con'd.



# Age Trends in Cognitive Capacity by Country

- Cognitive capacity followed a significant age pattern in all 11 countries (see Table 4 for regression results).
- Nine of these countries evinced a cubic pattern, and two (Sweden and Cyprus) followed a curvilinear pattern.
- Figure 2 depicts the estimated regression lines for all countries.
- Except in Jordan, cognitive capacity increased steeply from age 10 to around age 16, when it plateaued.
- In a subset of countries with cubic age patterns (China, Colombia India, and Thailand), cognitive capacity increased during childhood and again, albeit modestly, at the end of the age range.
- Jordan followed a cubic trend, but the pattern departed notably from other countries and from theory-based predictions.

Figure 2: Age patterns in cognitive capacity for each country



# Age Trends in Psychosocial Maturity by Country

- Psychosocial maturity evinced a significant age pattern in all countries except Jordan and Kenya (see Table 5).
- Notably, there was far more diversity in patterns of psychosocial maturity than in patterns of cognitive capacity (see Figure 3).
- Significant linear age patterns for psychosocial maturity were found in China, Cyprus, India, Italy, the Philippines, Sweden, and Thailand.
- The U.S. evinced a curvilinear age pattern, increasing throughout the teen years before leveling-off in the 20s.
- Lastly, Colombia followed a cubic pattern where psychosocial maturity improved until the mid-20s, after which it declined.

Figure 2: Age patterns in psychosocial maturity for each country

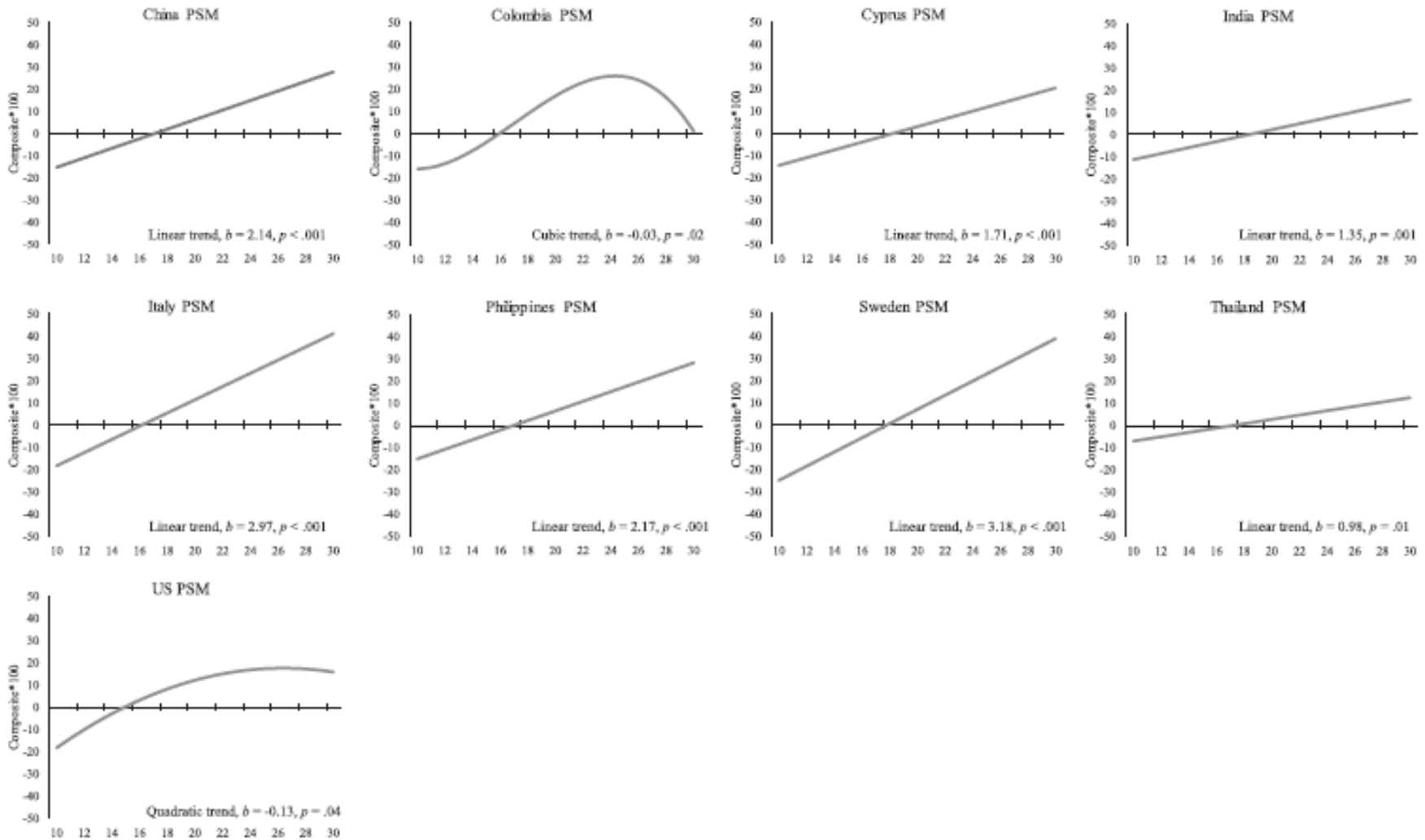




Table 4: *Regression Results for Cognitive Capacity*

| Country                       |                  | <i>b</i> (SE) | 95% Confidence Interval |       | <i>p</i> -value | <i>R</i> <sup>2</sup> Adjusted | <i>p</i> -value |
|-------------------------------|------------------|---------------|-------------------------|-------|-----------------|--------------------------------|-----------------|
|                               |                  |               | LB                      | UB    |                 |                                |                 |
| China<br><i>n</i> = 489       | Age              | 22.02 (3.48)  | 15.20                   | 28.84 | <.001           | .88                            | <.001           |
|                               | Age <sup>2</sup> | -1.70 (.45)   | -2.59                   | -.81  | <.001           |                                |                 |
|                               | Age <sup>3</sup> | .05 (.02)     | .02                     | .08   | .003            |                                |                 |
| Colombia<br><i>n</i> = 498    | Age              | 37.00 (2.76)  | 31.59                   | 42.41 | <.001           | .97                            | <.001           |
|                               | Age <sup>2</sup> | -3.58 (.40)   | -4.36                   | -2.81 | <.001           |                                |                 |
|                               | Age <sup>3</sup> | .11 (.02)     | .08                     | .13   | <.001           |                                |                 |
| Cyprus<br><i>n</i> = 364      | Age              | 15.11 (1.97)  | 11.25                   | 18.98 | <.001           | .80                            | <.001           |
|                               | Age <sup>2</sup> | -.56 (.10)    | -.76                    | -.36  | <.001           |                                |                 |
|                               | Age <sup>3</sup> | —             | —                       | —     | —               |                                |                 |
| India<br><i>n</i> = 417       | Age              | 19.19 (4.18)  | 11.00                   | 27.39 | <.001           | .86                            | <.001           |
|                               | Age <sup>2</sup> | -1.54 (.52)   | -2.57                   | -.53  | .003            |                                |                 |
|                               | Age <sup>3</sup> | .04 (.02)     | .01                     | .08   | .02             |                                |                 |
| Italy<br><i>n</i> = 547       | Age              | 28.76 (3.08)  | 22.73                   | 34.80 | <.001           | .95                            | <.001           |
|                               | Age <sup>2</sup> | -2.27 (.42)   | -3.10                   | -1.44 | <.001           |                                |                 |
|                               | Age <sup>3</sup> | .06 (.02)     | .03                     | .09   | <.001           |                                |                 |
| Jordan<br><i>n</i> = 450      | Age              | 14.90 (3.65)  | 7.74                    | 22.06 | <.001           | .84                            | <.001           |
|                               | Age <sup>2</sup> | -1.82 (.47)   | -2.75                   | -.91  | <.001           |                                |                 |
|                               | Age <sup>3</sup> | .06 (.02)     | .03                     | .09   | <.001           |                                |                 |
| Kenya<br><i>n</i> = 483       | Age              | 27.13 (3.62)  | 20.03                   | 34.23 | <.001           | .94                            | <.001           |
|                               | Age <sup>2</sup> | -2.48 (.46)   | -3.40                   | -1.57 | <.001           |                                |                 |
|                               | Age <sup>3</sup> | .07 (.02)     | .04                     | .10   | <.001           |                                |                 |
| Philippines<br><i>n</i> = 505 | Age              | 27.80 (2.89)  | 22.15                   | 33.45 | <.001           | .95                            | <.001           |
|                               | Age <sup>2</sup> | -2.01 (.39)   | -2.77                   | -1.25 | <.001           |                                |                 |
|                               | Age <sup>3</sup> | .04 (.01)     | .02                     | .07   | .002            |                                |                 |
| Sweden<br><i>n</i> = 416      | Age              | 13.61 (1.72)  | 10.25                   | 16.99 | <.001           | .75                            | <.001           |
|                               | Age <sup>2</sup> | -.42 (.09)    | -.61                    | -.25  | <.001           |                                |                 |
|                               | Age <sup>3</sup> | —             | —                       | —     | —               |                                |                 |
| Thailand<br><i>n</i> = 502    | Age              | 28.29 (3.72)  | 21.00                   | 35.58 | <.001           | .93                            | <.001           |
|                               | Age <sup>2</sup> | -2.46 (.51)   | -3.45                   | -1.47 | <.001           |                                |                 |
|                               | Age <sup>3</sup> | .07 (.02)     | .03                     | .11   | <.001           |                                |                 |
| U.S.<br><i>n</i> = 556        | Age              | 30.94 (3.18)  | 24.70                   | 37.17 | <.001           | .95                            | <.001           |
|                               | Age <sup>2</sup> | -2.47 (.42)   | -3.29                   | -1.64 | <.001           |                                |                 |
|                               | Age <sup>3</sup> | .06 (.01)     | .03                     | .09   | <.001           |                                |                 |

Table 5: Regression Results for Psychosocial Maturity

| Country                |                  | b (SE)      | 95% Confidence Interval |       | p-value | R <sup>2</sup> Adjusted | p-value |
|------------------------|------------------|-------------|-------------------------|-------|---------|-------------------------|---------|
|                        |                  |             | LB                      | UB    |         |                         |         |
| China<br>n = 489       | Age              | 2.1 (.40)   | 1.34                    | 2.89  | <.001   | .09                     | <.001   |
|                        | Age <sup>2</sup> | —           | —                       | —     | —       |                         |         |
|                        | Age <sup>3</sup> | —           | —                       | —     | —       |                         |         |
| Colombia<br>n = 498    | Age              | -.17 (2.23) | -4.56                   | 4.22  | .94     | .17                     | .26     |
|                        | Age <sup>2</sup> | .64 (.32)   | .02                     | 1.28  | .04     |                         |         |
|                        | Age <sup>3</sup> | -.03 (.01)  | -.05                    | -.01  | .01     |                         |         |
| Cyprus<br>n = 364      | Age              | 1.64 (.46)  | .74                     | 2.54  | <.001   | .11                     | <.001   |
|                        | Age <sup>2</sup> | —           | —                       | —     | —       |                         |         |
|                        | Age <sup>3</sup> | —           | —                       | —     | —       |                         |         |
| India<br>n = 417       | Age              | 1.29 (.42)  | .47                     | 2.11  | .002    | .02                     | .06     |
|                        | Age <sup>2</sup> | —           | —                       | —     | —       |                         |         |
|                        | Age <sup>3</sup> | —           | —                       | —     | —       |                         |         |
| Italy<br>n = 547       | Age              | 2.92 (.36)  | 2.21                    | 3.63  | <.001   | .15                     | <.001   |
|                        | Age <sup>2</sup> | —           | —                       | —     | —       |                         |         |
|                        | Age <sup>3</sup> | —           | —                       | —     | —       |                         |         |
| Jordan<br>n = 450      | Age              | .03 (.44)   | -.82                    | .89   | .94     | .01                     | .13     |
|                        | Age <sup>2</sup> | —           | —                       | —     | —       |                         |         |
|                        | Age <sup>3</sup> | —           | —                       | —     | —       |                         |         |
| Kenya<br>n = 483       | Age              | .27 (.36)   | -.44                    | .97   | .46     | .004                    | .24     |
|                        | Age <sup>2</sup> | —           | —                       | —     | —       |                         |         |
|                        | Age <sup>3</sup> | —           | —                       | —     | —       |                         |         |
| Philippines<br>n = 505 | Age              | 2.17 (.38)  | 1.44                    | 2.91  | <.001   | .12                     | <.001   |
|                        | Age <sup>2</sup> | —           | —                       | —     | —       |                         |         |
|                        | Age <sup>3</sup> | —           | —                       | —     | —       |                         |         |
| Sweden<br>n = 416      | Age              | 3.18 (.41)  | 2.38                    | 3.99  | <.001   | .22                     | <.001   |
|                        | Age <sup>2</sup> | —           | —                       | —     | —       |                         |         |
|                        | Age <sup>3</sup> | —           | —                       | —     | —       |                         |         |
| Thailand<br>n = 502    | Age              | .93 (.37)   | .21                     | 1.66  | .01     | .02                     | .05     |
|                        | Age <sup>2</sup> | —           | —                       | —     | —       |                         |         |
|                        | Age <sup>3</sup> | —           | —                       | —     | —       |                         |         |
| U.S.<br>n = 556        | Age              | 4.43 (1.21) | 2.06                    | 6.80  | <.001   | .38                     | .001    |
|                        | Age <sup>2</sup> | -.13 (.07)  | -.26                    | -.003 | .04     |                         |         |
|                        | Age <sup>3</sup> | —           | —                       | —     | —       |                         |         |

# Discussion

- The age of majority, when citizens become legal adults, is set at 18 in most countries, but this boundary is an imperfect divider separating mature from immature individuals.
- Rather, research suggests that some aspects of psychological development reaches adult levels prior to 18, whereas others reach adult levels later.
- Findings from the present study are consistent with previous reports that cognitive capacity (cold cognition), the ability of an individual to reason and consider alternative courses of action—undergirded by executive functions—reaches adult levels during the midteen years, whereas other elements of maturity, specifically those indexing aspects of psychosocial functioning (hot cognition), such as self-restraint, tend to reach adult levels into adulthood.
- That these constructs reach adult levels on different timetables suggests a “maturity gap” between these elements of psychological development.

# Conclusions

- The present study reaffirms the complexity of defining “maturity” or “adulthood” based on psychological grounds alone.
- Developmental science ought to inform, but not dictate, where the law sets age boundaries.
- Having different ages of majority, depending on the legal issue in question, is truer to the science than having a single age for all legal matters.
- Therefore, we advocate two different boundaries: one that applies to situations in which time pressure, emotional arousal, and coercive influence are not likely to inhibit decision-making capacities—which might be designated at age 16—and a second that applies to situations in which psychosocial immaturity may compromise judgment—which might be designated at 18 or older.