

**Equitable Shifts in Youth Resilience? Distinguishing Normative Changes and Pandemic  
Effects on Academic Self-Efficacy and Cognitive Reappraisal**

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## **Abstract**

This preregistered longitudinal study examined the long-term effects of the COVID-19 pandemic on academic self-efficacy and cognitive reappraisal in early adolescence. It followed and compared two cohorts over four years: one pre-pandemic (11-14 years, 2016-2019) and one during the pandemic (2019-2022). The study analysed annual well-being surveys merged with school enrolment data from South Australian public schools ( $N = 28,307$ , 49% female). Employing latent growth modeling and a novel cohort comparison design, the study addressed a major limitation in pandemic studies: it separated pandemic effects from normative developmental changes. Results indicate that the pandemic cohort largely followed typical, yet declining, developmental trajectories, showing resilience at a population level. Unexpectedly, the examination of multiple covariates (i.e., gender, socioeconomic status, non-English background, anxiety, peer belonging, teacher support) showed that pre-existing vulnerabilities did not predict adverse pandemic effects. This research underscores the value of longitudinal data infrastructures and the importance of understanding normative youth development and resilience research in discerning the effects of pandemics or other widespread crises.

*Keywords:* adolescent, development, resilience, COVID-19, academic self-efficacy, cognitive reappraisal

## Introduction

Regarding the pandemic's impact on adolescents, both research and public concern have heavily focused on 1) adverse mental health effects and 2) growing inequalities, with harmful impacts accumulating among those with pre-existing vulnerabilities (e.g., Kauhanen et al., 2022; Shergold et al., 2022). Meanwhile, the possible effects on adolescents' self-regulation development have been understudied, despite their centrality in psychological research, interventions, and educational policies (Domitrovich et al., 2017; Durlak et al., 2011; Restad & Mølstad, 2021; Smithers et al., 2018). The pandemic's impact on self-regulation is particularly interesting as it may have had both positive and negative effects: detrimental for some, yet opening new learning and development opportunities for others (Skinner et al., 2023).

This study focuses on two key aspects of self-regulation: academic self-efficacy and cognitive reappraisal – a subdomain of emotion regulation. These concepts are among the most studied in adolescent development and are critical for academic achievement, psychological well-being, and youth resilience (Honicke & Broadbent, 2016; McRae & Gross, 2020; Talsma et al., 2018).

During the pandemic, adolescents' self-regulation was significantly challenged due to the loss of in-person schooling and other disruptions to support systems and social interactions.

Moreover, given the rise in adolescents' internalizing symptoms during the pandemic, and the fact that these symptoms are associated with academic and emotional self-efficacy (Bandura, 1997; Skinner et al., 2023; Tak et al., 2017; Young et al., 2019), the pandemic may have adversely affected the development of these factors, disproportionately depending on individuals' psychological and social resources. As the increase in mental health symptoms may reflect a

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### **Present study**

The current preregistered study compares the development of academic self-efficacy (ASE) and cognitive reappraisal (CR) in two same-aged early adolescent cohorts before and during the pandemic. To our knowledge, it represents the largest longitudinal study to date examining developmental trends in ASE and CR across early adolescence. The primary objective is to disentangle developmental changes from possible pandemic effects. Moreover, the study seeks to ascertain if the pandemic exacerbated inter-individual differences in these domains and, if so, which pre-existing socioemotional factors predicted the diverse pandemic-related responses. To address these objectives, the study examines the following research questions:

1. What are the typical developmental patterns observed in academic self-efficacy and cognitive reappraisal among early adolescents?
2. To what extent did the pandemic affect the development of academic self-efficacy and cognitive reappraisal in adolescents?
3. Did the pandemic exacerbate between-person differences in the development of academic self-efficacy and cognitive reappraisal?
4. How much did demographic factors and initial levels of anxiety, peer belonging, and teacher support predict between-person differences in the development of the outcomes? Were there any variations in these associations between the cohorts?

The study is set in Australia, where initial success in controlling COVID-19 was followed by a surge in infections, exceeding double the OECD average (Shergold et al., 2022). Throughout

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the pandemic, Australian COVID-19 policies were among the most stringent, ranking seventh on average in the OECD (Hale et al., 2020). In South Australia, where this study's data was collected, statewide lockdowns began in March 2020 and ended in February 2022 (Storen & Corrigan, 2020). During these periodic lockdowns, schools were closed. Outside of the lockdowns, schools stayed open but implemented strict social distancing and hygiene measures (Edwards et al., 2022).

### **Methods**

#### **Data**

This study used data from two sources: an annual student well-being survey and school enrollment data, both part of the South Australian Wellbeing and Engagement Collection (WEC) administered by the South Australian Department for Education since 2013 (Gregory et al., 2022). Students completed the survey using an online data collection system during school class. Our sample includes students from governmental schools, where about 65% of South Australian students are enrolled (Australian Bureau of Statistics, 2022).

The sample consists of two age cohorts. The first cohort completed grades 6 to 9 before the pandemic, in 2016-2019, and the second during the pandemic, in 2019-2022. The annual data collection took place at different times: in 2016 (October/November), 2017 (July/August), 2018 (July/August), 2019 (March/April), 2020 (February and July/August), 2021 (February), and 2022 (February). The school year in Australia runs from late January to mid-December.

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The sample included 13,372 respondents in the pre-pandemic cohort (49.2% female; 50.8% male; mean age at T1 = 11.2, SD = 0.5) and 14,935 respondents in the during-pandemic cohort (49.0% female; 51.0% male; mean age at T1 = 11.2, SD = 0.5). The proportion of missing responses varied between 28.0 - 46.2% by wave and cohort, whereas the number of respondents ranged from 7,786 (T4, pre-pandemic) to 10,584 (T1, during-pandemic). The greatest difference between cohorts was in T2 (during-pandemic missing data 46.2% and pre-pandemic 31.9%). Overall, the missing data patterns were similar across cohorts (for detailed analysis, see Supplementary Tables 1-4).

### Measures

Demographic factors included age, gender (female/male), parental education as the highest education level of guardians, non-English background (yes/no), and Aboriginal / Torres Strait Islander (yes/no). These factors were extracted from the school enrollment records and were parent-reported. School-level factors included school SES-index (IOED) and geographical remoteness index (ARIA).

Academic self-efficacy and cognitive reappraisal were measured at four waves using a 5-point scale varying from 0 (“strongly disagree”) to 4 (“strongly agree”). Academic self-efficacy, measured with three items (e.g., “I am certain I can learn the skills taught in school this year.”, “Even if the work in school is hard, I can learn it.”, and “If I have enough time, I can do a good job on all my school work.”) had a Cronbach’s alpha ranging from .82 to .87 across time and cohort. The measure has been validated as part of the Middle Years Development Instrument (Schonert-Reichl et al., 2013). Cognitive reappraisal, also measured with three items (“When I’m

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worried about something, I make myself think about it in a different way that helps me feel better.”, “When I want to feel happier about something, I change the way I'm thinking about it.”, and “When I want to feel less bad (e.g. sad, angry or worried), I change the way that I'm thinking about it.”) had a Cronbach’s alpha ranging from .84 to .91 across waves and cohorts. The measure was originally adopted from the Emotion Regulation Questionnaire for Children and Adolescents (ERQ-CA), and thereafter shortened based on psychometric testing (Gregory & Brinkman, 2020; Gullone & Taff, 2012).

### **Analytic Plan**

The study analytic plan was preregistered, and all analytic R-code, together with synthetic data and pre-registration, are available at: [doi.org/10.17605/OSF.IO/HKQ39](https://doi.org/10.17605/OSF.IO/HKQ39). We report how we determined our sample size, all data exclusions, all manipulations, and all measures in the study. Survey responses were combined with school enrolment data to include demographic factors, utilizing the most recent available records. Further, survey responses from both cohorts were merged to create a continuous developmental trajectory spanning grades 6 through 9 for both outcomes, using grade-as-time. Cohort (pre-pandemic/during-pandemic) was used as a binary grouping variable. Full Information Maximum Likelihood estimation (FIML) was employed for managing missing data during growth modelling. Respondents with missing values on all outcomes in all waves were excluded (301 respondents for ASE and 144 for CR).

To ensure the comparability of the cohorts, an examination of all measures was conducted at baseline (grade 6). This step was essential as the interpretation of the results relied on the

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assumption of baseline similarity between the cohorts. Moreover, intercorrelations among key variables at baseline were explored.

To ensure the reliability and validity of the outcomes, we formed latent measurement models and assessed their adequacy and measurement invariance across time and cohorts using a series of confirmatory factor analyses. Since we aimed to explore mean-level changes, we anticipated achieving at least scalar measurement invariance level (for details, see Supplementary Material).

To estimate a potential pandemic effect on a 4-year change in the outcomes, we compared the average slope estimates between the cohorts. Furthermore, we explored whether the pandemic widened the inter-individual differences in development by comparing slope variances and intercept-slope covariances across cohorts. For illustrative purposes, we categorized the samples into three groups based on initial outcome levels: -0.5 Standard Error (SE) below the mean, at the mean, and +0.5 SE above the mean.

Further analyzing the specified LGCMs, we examined the associations between demographic covariates and outcome slope means. We tested cohort differences in these associations by applying equality constraints. Finally, we added anxiety, peer belonging, and teacher support into the models. We examined how these socioemotional factors were associated with outcome development, and whether these associations differed between the cohorts.

Models were estimated using robust maximum likelihood estimator and adjusting standard errors for the non-independence of observations due to a hierarchical data structure (students nested in schools). In all models, continuous predictors were centered at the sample mean.



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### Results

#### Descriptive results

The means and standard deviations for the demographic variables and baseline values, along with cohort comparisons, are shown in Table 1. According to t-tests, the cohort differences in demographic factors were non-existing except in Parental education level, where the pre-pandemic cohort had somewhat lower average compared to the during-pandemic cohort ( $M(SD)$  = 1.30 (0.88) and 1.34 (0.85),  $t = -3.22$ ,  $d = -.04$ ). The pre-pandemic cohort scored higher in teacher support ( $M(SD)$  = 0.89 (0.60) and 0.81 (0.55),  $t = 10.20$ ,  $d = .15$ ), yet lower in peer belonging ( $M(SD)$  = 1.08 (1.02) and 1.15 (0.93),  $t = -4.80$ ,  $d = -0.07$ ), compared to the during-pandemic cohort. Regarding the outcomes, no baseline cohort differences were identified. Supplementary Table 6 provides correlations among key variables. The highest correlations were found between ASE and Teacher support ( $r = .61$ ) and between ASE and CR ( $r = .47$ ).

#### What are the typical developmental patterns observed in academic self-efficacy and cognitive reappraisal?

There was strong measurement invariance across time and cohorts for ASE and CR (see Supplementary Table 7). Examination of the mean-level changes in the pre-pandemic cohort suggested declining trends in both outcomes (see Table 2). From grade 6 to grade 9, mean scores in ASE decreased from 3.06 ( $SD = 0.90$ ) to 2.73 ( $SD = 0.84$ ), and in CR from 2.49 ( $SD = 0.92$ ) to 2.24 ( $SD = 0.93$ ).

### **Discussion**

The present longitudinal multi-cohort study aimed to investigate the long-term effects of the COVID-19 pandemic on academic self-efficacy (ASE) and cognitive reappraisal (CR) beliefs among early adolescents in South Australia. It tracked two cohorts over four years: one that experienced their early adolescence (11-14 years) before the pandemic (2016-2019) and another during the pandemic (2019-2022). The study examined the normative development of ASE and CR, their alteration during the pandemic, the impact of demographic and socioemotional factors, as well as the pandemic's possible role in magnifying individual differences.

#### **Did the pandemic affect academic self-efficacy and cognitive reappraisal development?**

The pre-pandemic cohort showed a stable yet gradually declining trend in both ASE and CR. Given the prior mixed findings on normative developmental trends, this finding is notable and aligns with several studies among the same age group (Gregory & Brinkman., 2020; Gullone et al., 2010; Vestad et al., 2022; Zimmermann & Iwanski, 2014). The during-pandemic cohort also showed developmental declines in both domains. However, the cohort comparison indicated that these decreases largely echoed normative developmental changes: The -four-year ASE trajectory was similar to the pre-pandemic cohort's, with a slightly deeper decline in CR. This suggests that pandemic's long-term impact was marginally small yet negative on CR and almost negligible on ASE. This aligns with one previous study, which found that even the ones who perceived a negative effect had no observable changes in ASE (Talsma et al., 2021).

To analyse whether the pandemic exacerbated between-person differences, we categorized students based on their initial outcome levels. The results indicated that in the pre-pandemic

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cohort, CR and ASE scores converged over time; students with initially low scores displayed positive growth, in contrast to their peers who experienced a negative decline, aligning with an earlier pre-pandemic study (Herd et al., 2020). However, the during-pandemic cohort did not exhibit this compensation effect, with those having low initial scores also declining over time. Additionally, high-starting students showed a less steep decline compared to their pre-pandemic counterparts. These findings were consistent with the observation of more uniform slope variance within the during-pandemic cohort.

In essence, individuals with low initial scores seemed somewhat negatively impacted by the pandemic, whereas those with higher initial scores showed negligible or modest positive effects, in both outcomes. This pattern suggests a modest ‘buffering effect’ against adverse long-term pandemic effects, in both outcomes. Consequently, the during-pandemic cohort exhibited greater between-person differences by the final measurement, highlighting a pronounced, albeit modest, exacerbating pandemic effect on both ASE and CR.

## Conclusion

As its main conclusion, this study highlights the widespread methodological shortcomings in pandemic research. Many effects often attributed to the pandemic may actually be part of normative developmental patterns. Furthermore, self-perceived pandemic effects may be unrelated to actual long-term effects. The longitudinal cohort comparison was crucial to discern the actual extent of average pandemic effects, to pinpoint both exacerbation and buffering effects, and to discover that none of the pre-existing vulnerabilities examined predicted adverse pandemic effects. This underscores the need for caution in interpreting all pandemic studies that fail to

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account for developmental changes. Such caution is also vital when researching future crises and other widespread phenomena. Overall, our research emphasizes the critical importance of understanding normative youth development and the need for robust longitudinal data infrastructures, as exemplified by the Wellbeing and Engagement Collection in South Australia.

Furthermore, the study predominantly illustrates the inherent resilience in youth. Despite facing numerous pandemic-related disruptions and negative emotional impacts during a critical developmental phase, early adolescents largely maintained similar trajectories in academic self-efficacy and cognitive reappraisal as their pre-pandemic counterparts. The results indicate stability in self-efficacy beliefs despite significant contextual and emotional shifts.

In addition, the study emphasizes the diversity of individual experiences. It indicated that the pandemic led to a moderate exacerbation of between-person differences, particularly affecting those with initially low in academic self-efficacy and cognitive reappraisal.. However, the findings advise against a simplistic view that individuals with pre-pandemic vulnerabilities faced the worst effects. Resilience research shows that past adversities can sometimes buffer future stress impacts - yet opportunities for stress-induced resilience are not equally available for all (Rutter 2012). This highlights the need for a more nuanced approach to the socio-psychological aspects of resilience development.

Finally, while this study focused on the development of academic self-efficacy and cognitive reappraisal among South Australian adolescents, its implications reach beyond these specific domains. In a broader sense, the findings emphasize the crucial need for robust data and

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designs to account for normative developmental changes when interpreting any temporal changes observed among developing adolescents.