

Establishing Validity and Reliability of the Renzulli Learning Executive Function Assessment

Sally M. Reis, Ph.D., University of Connecticut • Selcuk Acar, Ph.D., University of North Texas

During the past two years, we have developed a new executive function (EF) self-report instrument for Renzulli Learning. EF refers to the mental processing skills students use to complete work, adapt to new learning situations, and manage their time. Research suggests these skills develop over time and contribute significantly to self-regulation and to success in school and life.

The Renzulli Learning instrument asks students to identify their EF levels across various areas that are important for academic success, including focus and task completion, emotional regulation, project completion and problem-based learning, time management, working with others, and openness to new academic experiences. We developed the new instrument in three phases.

Phase 1: Design and Item Generation

During this phase, we determined the specific skills and behaviors we wanted to measure and decided on the use of a Likert scale. We completed a relevant review of existing research to identify relevant factors. Next, we wrote approximately 100 clear statements based on this review to help students identify their belief about and use of EF tasks and behaviors.

Phase 2: Establishing Validity

To establish content validity, we asked more than 10 subject-matter experts to review all items for comprehensive coverage of self-regulation, and items that raised concerns were rewritten and/or removed. Several content experts noted that existing EF scales generally focus on skill deficits rather than positive EF traits.

We subsequently piloted the scale with the remaining items with 10 students across grades to assess difficulty and confirm the items measured the intended behaviors; additional items were eliminated based on these results. Following these revisions and updates, the EF scale was finalized as a 32-item measure with 6 factors:

Factor	Items
1. Focus and Task Completion	7
2. Emotional Regulation	5
3. Project Completion/Problem-Based Learning	6
4. Time Management	5
5. Working with Others	5
6. Engagement with Novel Experiences	4

During this phase, we also sought to compare this new instrument against established external measures of the same skills, but no comparable instruments could be identified.

Phase 3: Factor Analysis and Reliability

Factor Analysis

To test the proposed six-factor structure of the new EF scale, we conducted a confirmatory factor analysis (CFA) with a sample of 1,990 participants. The results provided strong support for the proposed six-factor structure, $\chi^2(448) = 1,513.70$, CFI = .945, RMSEA = .035, and SRMR = .037. Furthermore, factor loadings of the individual items ranged from .48 to .92 with a median value of .74. Average variance extracted values ranged from .39 to .58 for the subscales. When the correlations among the subscales were investigated, the lowest correlation ($r = .50$) was observed between Emotional Regulation and Engagement with Novel Experiences whereas the largest correlation ($r = .83$) was between the Focus and Task Completion and Project Completion/Problem-Based Learning subscales.

Internal Consistency

We also examined the internal consistency reliability of the entire instrument as well as individual subscales. Using McDonald's omega and Cronbach's alpha coefficients, reliability estimates of the entire instrument were .95 and .94, respectively. Reliability estimates for the individual subscales ranged from good to strong.

Subscale	ω (McDonald's omega)	α (Cronbach's alpha)
Focus and Task Completion	.86	.86
Emotional Regulation	.85	.84
Project Completion/Problem-Based Learning	.83	.83
Time Management	.71	.79
Working with Others	.87	.87
Engagement with Novel Experiences	.85	.84