# Gritty Parenting: The Development and Validation of the Parental Grit Scale

**Article** *in* Assessment · November 2024

DOI: 10.1177/10731911241289242



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# Gritty Parenting: The Development and Validation of the Parental Grit Scale

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This manuscript has been accepted for publication in *Assessment*.

A preprint of this manuscript is available at: https://doi.org/10.31234/osf.io/gnyex

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## Authors' Contributions

Z.T. conceptualized the PGS, conceptually designed the study, collected data, carried out data analyses, interpreted the results, and drafted and revised this manuscript; J.A.D.D. contributed to this manuscript by conceptualizing the PGS, interpreted the results, drafting, and revising this manuscript; E.B. contributed to this study by interpreting the results, reviewing, and revising drafts of the manuscript; T.D. contributed to this manuscript by interpreting the results and reviewing the drafts of this manuscript; G.J. collected data for this manuscript and reviewed the drafts of the manuscript; X.L. contributed to this manuscript by reviewing and revising drafts of the manuscript; D.I. and J.G. reviewed and revised drafts of the manuscript; S.G. funded this study, reviewed and revised drafts of this manuscript. All authors read and approved the final manuscript.

## Open Science and Data Sharing Declaration

This study's design and hypotheses were preregistered before data collection; see https://doi.org/10.17605/OSF.IO/4XPDF. The preregistration protocol was updated before the completion of W2 data collection. Data and analysis codes have been made publicly available at the Open Science Framework and can be accessed at https://doi.org/10.17605/OSF.IO/GV5EQ.

## Compliance with Ethical Standards

### Conflict of Interest

The authors report no conflict of interests.

### Ethical Approval

The study protocol was approved by the Ethical Review Board of the University of Luxembourg.

### Informed Consent

Participation was voluntary, and informed consent forms were collected from participants.

**Abstract**

In this study, we aimed to expand the domain specificity of grit by exploring it in the realm of parenting. Parental grit was defined as parents' inclination to demonstrate perseverance, sustained passion, and adaptability in pursuing long-term parenting goals. With longitudinal data from 1,373 U.S. parents, we developed and validated the Parental Grit Scale (PGS) in three phases: item development and revision, establishment of factor structure, and examination of criterion-related and incremental validity. The PGS exhibited a three-factor structure and (partial) scalar measurement invariance across genders, the status of the child's special needs, and measurement occasions. The PGS demonstrated moderate temporal stability. We found evidence of its validity in predicting parental emotional exhaustion, self-efficacy, autonomy support, and parents' perceptions of children's school well-being. Parental grit explained variance in these outcomes beyond domain-general grit and conscientiousness. The PGS has sound psychometric properties and is a valuable measure in the parenting domain.

*Keywords*: parental emotional exhaustion, parental self-efficacy, autonomy support, school well-being, adolescent development

## Gritty Parenting: The Development and Validation of the Parental Grit Scale

Parenting is a complex and challenging responsibility (Nelson et al., 2014; Teuber, Grüter, et al., 2024), particularly the parenting of adolescents who are undergoing profound biological and socioemotional changes (Meschke et al., 2012). Researchers in developmental and educational psychology have long been intrigued by the factors that give parents strength and cultivate adaptive parenting, thereby promoting positive child and adolescent development. This study delves into parental grit as a potential asset in navigating and surmounting the challenges of parenting and thereby fostering positive adolescent development. To this end, we endeavored to develop and validate the Parental Grit Scale (PGS).

Drawing on the triarchic model of grit (TMG; Datu et al., 2017, 2018), we conceptualized parental grit as parents' inclination to demonstrate perseverance, sustained passion, and adaptability of goal-specific pathways in pursuing long-term parenting or child-rearing goals. Furthermore, we incorporated insights from the existing literature on parenting (Clayborne et al., 2021; Liu et al., 2020; Sanders et al., 2014) and the benefits associated with theoretically relevant factors, such as domain-general grit (e.g., Datu et al., 2018; Duckworth & Quinn, 2009) and conscientiousness (Le Vigouroux et al., 2017; Prinzie et al., 2009; Schofield et al., 2012), in hypothesizing how parental grit and its dimensions are potentially linked to relevant criterion measures, such as parental emotional exhaustion, parental self-efficacy, parenting practices, and children's school well-being.

To meet the study's objectives, we conducted a two-wave study in a large-scale sample of U.S. parents. The conceptualization and validation of the PGS followed a three-phase approach: creation and revision of the item pool; assessment of the factor structure and internal consistency; and examinations of the PGS's stability, measurement invariance, and relationships with parenting-related outcomes. In the following sections, we critically reflect

on domain-general grit, review existing domain-specific approaches to grit, and introduce our conceptualization of parental grit.

**Domain-General and Domain-Specific Approaches to Grit**

Proposed by Duckworth and colleagues (2007), grit was initially thought to be a domain-general, transversal, noncognitive construct consisting of two components: consistency of interest and perseverance of effort. Whereas consistency of interest refers to the tendency to have interests and goals that do not change frequently, perseverance of effort describes the tendency to work hard even in difficult situations.

Since its conception, grit has drawn a lot of scientific attention. On the one hand, grit has been linked to higher well-being and better health (Hou et al., 2022; Rhodes & Giovannetti, 2022), greater academic success (Lam & Zhou, 2022; Schmidt et al., 2018), better performance and retention of soldiers (Duckworth et al., 2007; Maddi et al., 2012), and more success in marriage (Eskreis-Winkler et al., 2014). On the other hand, problems related to the factor structure as well as the construct and predictive validity of domain-general grit have been revealed in the literature (Credé, 2018; Credé et al., 2017; Datu et al., 2016, 2018; Morell et al., 2020; Muenks et al., 2017).

First, all of the consistency of interest items are phrased negatively, whereas the perseverance of effort items are formulated positively. The polarity of the item formulations of the subscales is striking and makes it impossible to determine whether the facets cover two distinct content areas or are due merely to a statistical artifact (Morell et al., 2020). Second, it has been pointed out that there is a discrepancy between the definition of grit and the constructed items, which incorporate neither the passion aspect nor the long-term aspect of goal pursuit (Morell et al., 2020; Tang, Wang, et al., 2021). This discrepancy has led to doubts about the extent to which grit can be differentiated from other noncognitive traits (e.g., conscientiousness) and its incremental predictive power beyond such noncognitive

constructs. Third, the conclusion that grit reflects a higher order factor structure when the grit scales are used can be criticized due to the fact that, in order to identify a model with one higher order factor and two lower order factors, either the factor loadings or the variances of both lower order factors need to be constrained. As a result, the constrained model is mathematically equivalent to the two correlated first-order factors (Credé et al., 2017; Morell et al., 2020; Muenks et al., 2017). In the literature, no conclusive recommendation regarding the factor structure of grit can be found. Whereas some authors have suggested that grit should perhaps be used as a unidimensional construct and some items should be eliminated (Gonzalez et al., 2020), other authors have suggested that the two grit facets should be treated as separate constructs (Guo et al., 2019).

Several domain-specific grit scales have been proposed to overcome some of the aforementioned shortcomings, including the issues of dimensionality and the predictive power associated with domain-general grit. In the educational domain, Clark and Malecki (2019) defined academic grit as an individual characteristic comprising determination, resilience, and focus in pursuing long-term goals in the educational domain. In a sample of adolescents, they developed a unidimensional 10-item academic grit scale and demonstrated academic grit's incremental validity in predicting students' achievement beyond domain-general grit. Schmidt et al. (2019) demonstrated that integrating the school aspect into the Short Grit Scale (Grit-S; Duckworth & Quinn, 2009) led to better predictions in German and mathematics performance. Yu et al. (2021) adapted the Grit-S for high school students to the context of learning mathematics and found that math-specific grit was a significant mediator of the relationship between math anxiety and math achievement, whereas domain-general grit was not. More recently, grit has also been adapted to the domain of physical education (Cormier et al., 2019; Guelmami et al., 2022) and has been found to be a good predictor of sport performance. It can be concluded that, when compared with domain-general grit, the

domain-specific approach demonstrates superior incremental power and contributes to better predictions for domain-specific outcomes. This observation is aligned with the specificity-matching principle (Swann et al., 2007), which suggests that the predictive power of an assumed predictor variable depends on the match in specificity levels between this predictor variable and the outcome variable. Thus, domain-specific grit provides more valuable insights in a specific domain.

In the context of parenting, few studies have endeavored to examine the role of domain-general grit. In their large multicultural studies, Fernández-Martín et al. (2023) found intergenerational covariation of grit in parents and their offspring across 11 countries. Joy et al. (2020) and Won and Lee (2023) observed similar patterns in Malaysian and Korean parent-student dyads, respectively. These studies suggest that parents' domain-general grit serves as a role model and influences the socialization of grit in their children, implicitly contributing to positive parenting and child development. Nevertheless, there remains a notable absence of efforts to conceptualize parenting-specific grit. To fill this research gap, we conceptualized parental grit as described in the next section. We believe that such a conceptualization holds promise for enhancing the understanding of the nuanced characteristics that underpin successful parenting practices.

**Conceptualizing Parental Grit**

Child-rearing is a challenging and complex responsibility for parents. Decades of parenting research have underscored the importance of consistency, perseverance, and adaptability in parenting for positive child development (for details, see the meta-analyses by Clayborne et al., 2021; Liu et al., 2020; Sanders et al., 2014). According to goal theories (Atkinson & Birch, 1970; Duckworth & Gross, 2014), individuals can pursue different goals in various domains. As such, being "gritty" in general does not necessarily mean being

"gritty" in parenting. Therefore, a parenting-specific grit scale has the potential to enhance the understanding of the construct of grit and make a contribution to parenting research.

In response to criticism of the two-factor model of domain-general grit, Datu et al. (2016, 2017, 2018) introduced the triarchic model of grit tailored for individuals from collectivistic societies and incorporated adaptability to situations as a third dimension. Adaptability has been argued to function as a salient feature of grit in collectivistic societies, as interpersonal dependency and the tendency to adopt a contextually sensitive self are considered key cultural imperatives in collectivistic cultures (Suh, 2007). We embraced this integration in conceptualizing parental grit because parent-child dyads are interdependent by nature from a family systems perspective (Bell, 1968, 1979; Sameroff, 2010). Furthermore, this dimension has been proposed to be relevant not only for individuals in collectivistic societies (Datu et al., 2024; Datu & Zhang, 2021) but also for those in individualistic societies (Datu et al., 2021; Datu & Fincham, 2022). In this vein, we define parental grit as parents' inclination to demonstrate perseverance, sustained passion, and adaptability of goal-specific pathways in pursuing long-term parenting or child-rearing goals. It encompasses three dimensions, namely: (a) perseverance of effort, which refers to persisting in pursuing parenting goals despite encountering setbacks or challenges; (b) sustained passion, which pertains to a consistent desire and intrinsic drive to accomplish parenting goals; and (c) adaptability of goal-specific pathways, which encompasses the capacity to calibrate or flexibly adjust pathways or unrealistic aspects of parenting or child-rearing goals to meet children's developmental needs in different developmental stages. As with past studies supporting this multidimensionality of grit (Datu et al., 2016; Disabato et al., 2019; Yupanqui-Lorenzo et al., 2024), we conjectured that the correlated three-factor model of grit might best fit the current sample.

Parenting is a journey that encompasses both joy and sorrow (Nelson et al., 2014; Teuber, Grüter, et al., 2024). This study specifically targeted parents of sixth- to ninth-grade children who are undergoing puberty. In this stage, children experience substantial changes in their cognitive, social, and emotional development, impacting their relationships with their parents (Meschke et al., 2012). In particular, the increased need for independence and involvement in extrafamilial activities coincides with diminishing parental supervision. Parents and their adolescent children must navigate the renegotiation of parental authority and their relationship boundaries, potentially leading to conflicts between parents and children (Branje, 2018). These conflicts make it challenging for parents to support their offspring in this developmental stage (Ryan et al., 2006). In addressing these challenges, parental grit may come into play. On the one hand, parents need to persevere and be consistent in the face of setbacks and challenges in parenting to attain their parenting goals. On the other hand, they need to adapt to their children's evolving needs while pursuing their parenting goals (Green et al., 2007). Sustained passion mirrors the enthusiasm that empowers parents in various parenting situations.

Recent studies have highlighted that parents often feel overwhelmed, juggling the demands of supporting their children's success while balancing their role as a parent with personal needs (Henry-Huthmacher, 2008; Roskam et al., 2021; Teuber, Grüter, et al., 2024). Strong meta-analytic evidence stresses the importance of consistency, perseverance, and adaptability in parenting for parental self-beliefs and well-being, parent-child relationships, and child development (Clayborne et al., 2021; Liu et al., 2020; Sanders et al., 2014). We view parental grit as a trait-like factor that revolves around parents' goal-directedness, with an emphasis on long-term parenting goals, thus distinguishing it from other psychological constructs. Parental grit should enhance parents' resilience and psychological flexibility in coping with parenting demands and daily hassles. Demonstrating high levels of passion,

perseverance, and adaptability in pursuing parenting goals has the potential to enable parents to interact with their children in an adaptive manner. Such parents may have a greater sense of self-belief in supporting their children, may be more responsive to their children's developmental needs, and may be less likely to experience parenting-related exhaustion. In the long run, parental grit may contribute to children's overall positive development. Hence, a sound conceptualization of parental grit is anticipated to provide evidence of its role as a predictor of parenting-related outcomes. In our study, parenting-related outcomes were operationalized as parental self-efficacy for supporting their children's success (i.e., feeling capable of supporting children's success in school despite academic setbacks; Hoover-Dempsey & Sandler, 2005), parental emotional exhaustion (i.e., feeling emotionally drained as a parent; Roskam et al., 2018), autonomy support (i.e., acknowledging the child's perspective and encouraging child-initiated activities; Grolnick, 2016), and children's school well-being (i.e., experiencing positive emotions in school; Venetz et al., 2015).

Moreover, domain-general grit and conscientiousness are deemed further components in the nomological network of parental grit. Whereas domain-general grit pertains to an individual's general inclination to maintain interests and exhibit perseverance in goal pursuit, parental grit specifically addresses an individual's passion, perseverance, and adaptivity as a parent. Conscientiousness is defined as the tendency to be self-controlled, hardworking, orderly, responsible, and goal-directed (Roberts et al., 2009). In comparison, we view parental grit as an enthusiastic pursuit of long-term parenting goals with a strong focus on child orientation. Therefore, parental grit should be related to, but distinguished from, domain-general grit and conscientiousness.

As previously mentioned, domain-general grit has been found to contribute to greater well-being and success across age groups and social contexts. Researchers in the field of personality psychology have explored the relationships between conscientiousness and

various parenting-related factors: Conscientious parents are more likely to be involved in parenting their children in a need-supportive manner (Prinzie et al., 2009), are less likely to experience emotional exhaustion in parenting (Le Vigouroux et al., 2017), and report greater well-being in their children (Schofield et al., 2012). In the sense of the specificity-matching principle (Swann et al., 2007), a sound measure of parental grit should predict such parenting-related outcomes beyond both domain-general grit and conscientiousness, reflecting its unique contribution to the parenting context.

**Relevant Sociodemographic Covariates in the Parenting Context**

While investigating the relationship between parental grit and various parenting-related variables, we considered the following sociodemographic covariates: parental gender, whether the child had any special (education) needs (i.e., the status of the child's special needs), and family socioeconomic status (SES). Special needs refer to limitations in an individual's capacity to participate in and benefit from education due to a physical, intellectual, or emotional disability, or any condition that causes them to learn differently from their peers (Cosgrove et al., 2018). Previous research on parenting has indicated that mothers tend to be more involved in supporting their children's success than fathers. However, mothers also face greater vulnerability to challenging parenting situations and daily stressors, leading to a higher likelihood of experiencing emotional exhaustion (Hoover-Dempsey & Sandler, 2005; Roskam et al., 2021; Teuber, Grüter, et al., 2024). The presence of a child with special needs adds another significant stressor for parents, as they often report elevated levels of exhaustion, fewer need-supportive parenting behaviors, and reduced self-efficacy (Hoover-Dempsey & Sandler, 2005; Roskam et al., 2021, 2022). Finally, family SES has been widely recognized as a factor that influences the well-being of both parents and children and shapes parenting practices (Bornstein & Bradley, 2014).

## The Present Study

In this study, we developed the PGS and investigated its psychometric properties in three phases, as depicted in the flowchart in Figure 1.

In Phase 1, we developed seven items per subscale for a total of 21 items. Five experts in grit research were invited to evaluate and provide feedback on the items. On the basis of the experts' reviews, the items were revised accordingly. More details can be found in the Measures section.

We expected the PGS to have a three-factor structure, namely, perseverance of effort, sustained passion, and adaptivity of goal-specific pathways (Hypothesis 1). Thus, in Phase 2, we evaluated the revised items in a large sample to explore and confirm the hypothesized factor structure.

In Phase 3, the measurement invariance, stability, and predictive and incremental validity of the scale were evaluated with longitudinal data. Previous research on domain-general grit and academic grit has consistently shown at least metric measurement invariance across gender groups and measurement points. Additionally, studies have reported varying degrees of stability over time, ranging from weak to strong stability, depending on the specific time interval being examined (Duckworth & Quinn, 2009; Fosnacht et al., 2019; Li et al., 2018; Postigo et al., 2020). We hypothesized that the PGS would exhibit at least metric invariance across genders, the status of the child's special needs, and measurement occasions (Hypothesis 2) and that it would show relatively high stability (Hypothesis 3). For validity, we examined the relationships between parental grit, parental emotional exhaustion, parental self-efficacy, parenting practices, and children's school well-being. More specifically, higher levels of parental grit were expected to be associated with higher levels of parental self-efficacy, autonomy support, and children's school well-being and lower levels of parental emotional exhaustion (Hypothesis 4). Finally, parental grit was expected to contribute to

predicting parental emotional exhaustion, parental self-efficacy, autonomy support, and children's school well-being beyond sociodemographics, domain-general grit, and conscientiousness (Hypothesis 5).

## Method

### Data Collection and Participants

This study is embedded in a large-scale project, and its design and hypotheses were preregistered (Teuber, Datu, Botes, & Greiff, 2024) before the data were collected. The preregistration protocol was updated before Wave 2 (W2) data collection was completed. We report how we determined the sample size, all data exclusions, all manipulations, and all measures in the study. A priori power analyses based on Monte Carlo simulations were performed with the R package pwrSEM (Wang & Rhemtulla, 2021), which is designed for power estimates for structural equation models (SEMs) to determine the optimal sample size (for details, see the preregistration protocol). The results indicated that 500 parents would be optimal. Considering possible attrition, overpowering (i.e., $N = 1{,}000$) was deemed appropriate.

In October 2023, a total of 2,009 active *Prolific* users residing in the US with at least one child enrolled in Grades 6–9 were invited to complete the first survey. In cases of multiple schoolchildren in the grade range, participants were instructed to refer to the youngest. In January 2024, participants were invited to complete a second survey. Prior to data collection, this study received approval from the Ethical Review Panel of [blinded for peer-review]. Informed consent was obtained, and participation was voluntary.

Overall, 1,525 parents accessed our survey link through *Prolific*. Among them, 13 participants failed the attention check, which comprised three items designed to gauge attentiveness. For example, participants were instructed to choose a specific response option (e.g., *strongly disagree*) for a given question. In our study, failing two or all three attention

check items indicated low data quality. One person provided ambiguous responses regarding the number of schoolchildren in Grades 6-9. Ninety-six participants withdrew their participation (e.g., participants were not required to disclose their reasons for doing so). Moreover, 37 participants exceeded the time allotted for completing the survey, resulting in a "timed-out" status in *Prolific*. This status is activated when participants exceed the maximum time limit, typically set at three times the estimated duration. Responses from these participants were excluded from data analysis. After data cleaning, the Wave 1 (W1) sample comprised 1,373 parents, with 1,059 participating in W2. The attrition rate was 22.87%. Additional sample details for each wave can be found in Table 1. Little's (1988) test statistic indicated that data were missing at random, $\chi^2(324) = 241.33$, $p = 1$.

## Measures

### *Parental Grit*

As previously mentioned, the PGS was conceptualized to reflect a more accurate definition of grit in the domain of parenting. The PGS encompasses the three components of grit in pursuing long-term parenting goals: perseverance, passion, and adaptability. Thus, each item referred to long-term parenting goals with respect to one of the three components. Initially, we (the first and second authors with the support of other coauthors in both the grit and parenting fields) formulated seven items per subscale, drawing inspiration from the domain-general grit scales (Duckworth & Quinn, 2009) and the triarchic model of grit scale (Datu et al., 2017). With the item pool, we sought to capture the unique characteristics of parenting while still aligning the items with the broader concept of grit. The perseverance subscale emphasizes persistence in pursuing long-term parenting goals despite setbacks and challenges. The passion subscale focuses on the consistent desire and intrinsic motivation to achieve these goals. Lastly, the adaptability subscale assesses parents' ability to adjust their parenting goals in response to their child's needs and evolving family circumstances. The

initial item pool was then independently evaluated by five experts in relatively diverse career stages (i.e., two postdoctoral fellows, one research assistant professor, one assistant professor, and one associate professor) and disciplines (i.e., personality and assessment psychology, school psychology, and sociology) from the grit research community. The expert panel provided feedback on the extent to which our preliminary item pool was aligned with our hypothesized conceptual definition of parental grit. The evaluation criteria covered the quality of the wording, the reflection of the definition (face validity), and alignment with the broader grit construct. Table 2 presents the revised items, which were adjusted on the basis of the feedback from the five experts. All items were intended to be phrased positively to address the issue of item formulation polarization of domain-general grit and to mitigate the occurrence of the irrelevant method effect associated with reverse-scored items (Schmidt et al., 2019; Teuber et al., 2020; Zhong et al., 2009). The revised set of 21 items was measured in W1, and the final items were measured in W2.

***Domain-General Grit***

Domain-general grit was measured in W1 with the Grit-S scale (Duckworth & Quinn, 2009). It included four items that captured consistency of interest (e.g., "New ideas and projects sometimes keep me from previous ones") and four items that captured perseverance of effort (e.g., "I am diligent"), each rated on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). A correlated two-factor model achieved close fit: $\chi^2(19) = 64.11$, $p < .001$; CFI = .98; SRMR = .03; RMSEA = .05, 90% CI [.04, .06]. The internal consistency estimates were high for both subscales (α/ω = .88 and .76).

***Conscientiousness***

In W1, we used the Mini-IPIP subscale (Donnellan et al., 2006) to assess conscientiousness. It consisted of four items (e.g., "I get chores done right away"). Responses were given on a 5-point Likert-type scale (*1 = strongly disagree, 5 = strongly agree*). A one-

factor CFA model showed overall acceptable fit: $\chi^2(1) = 0.81$, $p = .37$; CFI = 1.00; SRMR = .00; RMSEA = .00, 90% CI [.00, .08]. The internal consistency of this scale was deemed good (α/ω = .82/.83).

***Parental Emotional Exhaustion***

To assess parental emotional exhaustion in W2, we used the corresponding subscale from the Parental Burnout Assessment (PBA; Roskam et al., 2018). Emotional exhaustion captured the emotional strain from the parental role and consisted of nine items. An example is "I feel completely run down by my role as a parent" (0 = *never*, 6 = *every day*). Parental emotional exhaustion exhibited close fit: $\chi^2(27) = 47.70$, $p < .001$; CFI = .99; SRMR = .01; RMSEA = .03, 90% CI [.02, .04]. This scale showed high internal consistency (α/ω = .95).

***Parental Self-Efficacy***

We adapted the Parental Self-Efficacy for Helping the Child Succeed in School Scale (Hoover-Dempsey & Sandler, 2005) to measure parental self-efficacy in W2. Five items captured parental self-efficacy (e.g., "I know how to help my child do well in school"; rated on a 5-point scale ranging from 1 = *strongly disagree* to 5 = *strongly agree*). A unidimensional CFA model fit the data well: $\chi^2(5) = 18.45$, $p < .001$; CFI = .99; SRMR = .02; RMSEA = .05, 90% CI [.03, .07]. The internal consistency of this scale was high (α/ω = .81).

***Autonomy-Supportive Parenting***

We measured parental autonomy support with the German Parental Involvement Questionnaire (Lorenz & Wild, 2007; Teuber et al., 2023). It consisted of five items (e.g., "When my child receives a poor grade on an important exam at school, I work with them to understand the reasons for the poor grade"). Responses were given on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). A unidimensional CFA model fit the data well: $\chi^2(5) = 11.90$, $p = .05$; CFI = .99; SRMR = .02; RMSEA = .04, 90% CI [.01, .06]. The internal consistency of this scale was good (α/ω = .86/.87).

### *Children's School Well-being*

The subscale of emotional inclusion from the Perception of Inclusion Questionnaire (PIQ; Venetz et al., 2015) was adapted to capture parents' perceptions of their children's well-being in school in W2, using four items (e.g., "My child likes it in school"). Each item was evaluated on a 5-point Likert-type scale (1 = *strongly disagree*, 5 = *strongly agree*). A one-factor CFA model showed close fit: $\chi^2(2) = 9.75$, $p = .008$; CFI = 1; SRMR = .01; RMSEA = .06, 90% CI [.03, .10]. This scale showed high internal consistency ($\alpha/\omega = .90$).

### *Sociodemographic Covariables*

Sociodemographic variables were assessed in W1 and included participants' biological gender (2 = *male*, 1 = *female*), the status of the child's special needs (1 = *with special needs*, 0 = *without special needs*), and family SES. Participants provided job titles and a brief sentence describing the jobs of the participant and their partner. Job titles were classified on the basis of the ISCO-8 and recoded into the International Socioeconomic Index of Occupational Status (ISEI). The highest ISEI (HISEI; Ganzeboom et al., 1992) of the two parents (if applicable) was defined as the family's SES.

## Analytical Strategy

The data and analysis codes have been made publicly available on the Open Science Framework (Teuber, Datu, Botes, Dicke, et al., 2024). As illustrated in Figure 1, the empirical evaluation of the PGS was conducted in two waves. After the items were revised in Phase 1, the factor structure of the PGS was established and evaluated with the W1 data set in Phase 2. The sample was randomly split into two halves, with one half used to establish the scale's factor structure through parallel EFA models (the minimum residual method) conducted to explore the underlying factor structure (with oblique rotation). Parallel methods utilize bootstrap techniques to generate permuted data sets with similar parameters and derive simulated eigenvalues (Preacher & Hayes, 2004). Parallel EFA methods were preferred over

other conventional exploratory methods (e.g., Eigenvalue rules; scree test) that are associated with overly liberal or conservative interpretations (Bandalos & Boehm-Kaufman, 2009; Williams et al., 2018). Confirmatory Factor Analysis (CFA) was then applied to the other half of the data set to test the resulting structure, followed by an assessment of reliability with both Cronbach's alpha and McDonald's omega. Four CFA models were compared (see Figure 2), namely, (a) a one-factor model (M1) in which a single latent factor accounted for all PGS items, (b) a correlated three-factor model (M2) in which three correlated latent factors accounted for the PGS items, (c) a second-order factor model (M3) in which the relationships between the three first-order factors were explained by a second-order factor representing overall parental grit, and (d) a bifactor model (M4) in which the observed PGS items were influenced by a general factor and specific grouping factors. Notably, M2 and M3 had the same number of estimated parameters and were thus data equivalent. However, M3 hinted at the reliability and validity of overall parental grit. The final decision about the structure of the measurement model was made on the basis of model fit and the theoretical underpinnings of the construct.

In Phase 3, the final PGS was measured in W2. We investigated the measurement invariance of the PGS across parents' genders and whether they had a child with special needs, using the W2 data and multigroup CFA with a forward approach (i.e., testing configural, metric, and scalar invariance by constraining model parameters in a stepwise fashion; Dimitrov, 2010). Notably, the size of the group of parents with children with special needs ($n$ = 304) was significantly smaller than those without ($n$ = 755). Using unbalanced groups in tests of invariance may produce inaccurate outcomes due to the larger group exerting an excessive influence on the fit function in a multigroup CFA (Yoon & Lai, 2018).

To tackle this issue, we employed a Monte Carlo simulation technique to test for measurement invariance across the status of the child's special needs (Yoon & Lai, 2018). To

apply this technique, we drew 100 random samples from the larger group, each corresponding to the size of the smaller group. Tests of various levels of invariance were then run 100 times, using these subsamples from the larger group combined with the sample of the smaller group. The average value of each fit statistic was calculated for the 100 replications, and we report these results.

For evaluations of longitudinal measurement invariance, stability, and validity, we used data from both waves. Stability was gauged by using the intraclass correlation coefficient (ICC) as an index of test-retest reliability. It was estimated with a two-way mixed-effect analysis of variance (ANOVA) model with an interaction of the absolute agreement between single scores (Koo & Li, 2016; Qin et al., 2019). Compared with the test-retest correlation, the ICC is preferred because it considers not only the consistency of measurements between the test and retest but also their absolute agreement. That is, it takes into account both systematic (consistent) and random (inconsistent) errors in the measurements. Four two-step hierarchical linear regression models were created to examine the incremental validity of parental grit, each focusing on a distinct outcome variable. In the first step of these models, all the covariates—sociodemographics, domain-general grit, and conscientiousness—were included. In the second step, parental grit was introduced into these models. The incremental changes between these two steps were analyzed through changes in explained variance, specifically changes in $F$-statistics ($\Delta F$) and $R$-squared values ($\Delta R^2$). This methodology was designed to explore the predictive and incremental validity of parental grit in predicting parental emotional exhaustion, parental self-efficacy, parenting practices, and children's school well-being, beyond the factors accounted for by the covariates.

Data analysis was carried out in RStudio Version 2023.12.0.369 (Posit team, 2023) and Mplus 8.10 (Muthén & Muthén, 1998-2024). Full information robust maximum likelihood was applied to deal with missing values and non-normality. Goodness-of-fit was

evaluated via the omnibus chi-square ($\chi^2$), the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). According to Hu and Bentler's (1999) recommendations, values of CFI ≥ .95, RMSEA ≤ .06, and SRMR ≤ .06 were considered to indicate a good model fit, whereas CFI ≥ .90, RMSEA ≤ .08, and SRMR ≤ .08 were considered to indicate an acceptable model fit. For model comparisons, a nonsignificant $\Delta\chi^2$ was taken to indicate invariance.

## Results

Table 3 presents the mean values and standard deviations of the variables as well as the zero-order intercorrelations between the variables in both waves. It is notable that our efforts yielded a large, gender-balanced parent sample, and over 20% of the participants were parents of children with special needs, a proportion that is higher than the average prevalence in the US (i.e., 15%; National Center for Education Statistics, 2023).

### Factor Structure

As outlined in the Analytical Strategy section, the W1 data were randomly split into two halves. No statistically significant differences in demographic variables were found between the two subsamples. The initial parallel EFA with all 21 items, conducted with Subsample 1, suggested a four-factor solution (Table 4). Three items (PGSP1, PGAG6, PGAG7) did not load on any of the suggested factors, whereas PGAG5, PGPE1, PGSP3, PGSP4, PGPE4, PGPE6, and PGSP1 did not load on their corresponding factors. After removing these items, a second parallel EFA model was run, which showed three factors with four indicators each and accounted for 56.7% of the variance (Table 5). This solution was in line with our theoretical conceptualization. Furthermore, all factor loadings were > .50. No items exhibited substantial cross-loadings ($\lambda < .30$) across multiple factors.

With Subsample 2, we evaluated the 12 items by running and comparing four CFA models. The one-factor model (M1) demonstrated acceptable model fit: $\chi^2(54) = 216.18$,

$p < .001$; CFI = .92; SRMR = .05; RMSEA = .07, 90% CI [.06, .07]. The correlated three-factor (M2) and second-order (M3) models showed identical and good fit indices, $\chi^2(51) = 121.10$, $p < .001$; CFI = .97; SRMR = .04; RMSEA = .05, 90% CI [.04, .05]. M2 and M3 displayed significantly better fits to the data compared with M1, with $\Delta\chi^2(3) = 101.19$, $p < .001$. Yet, the factor correlations were notably high in M2, particularly between PGPE and PGAG (Figure 3, left). Consequently, we evaluated an additional CFA model, in which PGPE and PGAG were treated as one factor and PGSP as a second factor. The model indicated a significantly poorer fit than M2: $\Delta\chi^2(12) = 21.55$, $p = .043$. M4 did not converge. Thus, an empirically related but theoretically distinct three-factor model (M2) was finally derived for further analyses.

Based on M2, the internal consistency estimates of all subscales were acceptable or high: $\alpha/\omega = .85$ for sustained passion, $\alpha/\omega = .83$ for perseverance of effort, $\alpha/\omega = .72$ for adaptability of goal-specific pathways, and $\alpha/\omega = .91$ for the total PGS.

**Measurement Invariance and Stability**

The three-factor CFA model was applied to the W2 data, and it showed excellent fit, $\chi^2(51) = 133.15$, $p < .001$; CFI = .98; SRMR = .03; RMSEA = .04, 90% CI [.03, .05] (Figure 3, right). Measurement invariance of the PGS was assessed by progressively restricting the measurement model across groups or measurement occasions, specifically by gradually constraining factor loadings, indicator intercepts, and indicator residuals to be equal. We used the W2 data set to investigate the measurement invariance of the PGS (Table 6) across genders and the status of the child's special needs. Given the limited number of participants who had a child with special needs, a Monte Carlo simulation was implemented while testing for measurement invariance across the status of the child's special needs. Multigroup CFA models (Table 6) unveiled scalar measurement invariance of the PGS across parental genders and the status of the child's special needs. This finding indicates equivalence in the scale

structure, factor loadings, and indicator intercepts across these groups. When incorporating data from both waves, full scalar measurement invariance in the PGS across measurement occasions was not supported. The significant $\Delta\chi^2$ test suggested that at least one indicator's intercept differed over time. Nevertheless, partial scalar measurement invariance was achieved by allowing the intercepts of item PGSP2 to vary across time points. Over a 4-month interval from W1 to W2, the PGS subscales showed moderate test-retest reliability (ICCs = .66–.70, *ps* < .001).

**Predictive and Incremental Validity**

Four hierarchical linear regression models were created to investigate the predictive and incremental validity of parental grit in predicting parental emotional exhaustion, parental self-efficacy, autonomy-supportive parenting, and parents' perceptions of their children's school well-being beyond sociodemographic variables, general grit, and conscientiousness in W2. In doing so, we compared models with (Step 2) and without (Step 1) PGS subscales for each outcome. The results are presented in Table 7. Integrating PGS subscales as predictors significantly increased the amount of variance explained in all four outcomes ($\Delta R^2$ = .01–.07, $p$ < .001) beyond the sociodemographic variables, domain-general grit, and conscientiousness. PGPE was a negative predictor of parental emotional exhaustion ($B$ = –.23, $p$ < .05). PGPE and PGAG positively predicted parental self-efficacy and autonomy-supportive parenting. The regression coefficient for PGSP in predicting children's school well-being was positive ($B$ = .13, $p$ < .05). A sensitivity check was conducted to compare models with conscientiousness included (Step 2) and excluded (Step 1) to determine whether the reordering of predictors significantly altered the results (see the Supplementary Material). The results were similar. Conscientiousness and the parental grit dimensions uniquely predicted parental self-efficacy and autonomy support. However, whereas conscientiousness

was not a significant predictor of emotional exhaustion or children's school well-being, the parental grit subscale dimensions were.

## Discussion

This study was aimed at conceptualizing and measuring grit in the domain of parenting. We defined parental grit as a triarchic construct, consisting of perseverance, sustained passion, and adaptability in pursuing long-term parenting goals. As prescribed, parallel EFA analyses revealed that the PGS had a three-factor structure, consisting of 12 items. Our subsequent CFA modeling supported the structural validity of this measurement model. The PGS demonstrated moderate stability over 4 months and high levels of measurement invariance across parental gender, the status of the child's special needs, and measurement occasions. Moreover, evidence was found for its reliability, as well as its construct and incremental validity. Overall, this newly constructed scale is a reliable and valid measure that can be administered to capture grit in the parenting domain.

### The Triarchic Model of Parental Grit

The two-factor construction of domain-general grit, associated with the item formulation polarization and the claim of a higher order structure, has been frequently criticized in the literature. In the present study, we conceptualized parental grit as a three-factor construct for capturing grit in the domain of parenting. In Phase 2, as conceptualized, the triarchic model emerged in the parallel EFA models in W1 Subsample 1. Subsequent analysis with a three-factor CFA model and several alternative models in W1 Subsample 2 confirmed the correlated three-factor model structure. Although this finding is in contrast with other domain-specific grit scales that have lacked empirical support for their multidimensional conceptualization (Clark & Malecki, 2019; Morell et al., 2020), it coheres with on-going scientific discourse on the generalizability of a multidimensional three-factor model of grit in student (Datu et al., 2024; Datu et al., 2018) and adult (Datu et al., 2021)

samples in diverse societies. Whereas the second-order CFA model also fit the data, direct comparison with the triarchic model was precluded because they had identical parameters. Nevertheless, our result supports the future utilization of a total parental grit score while using the current PGS.

The determination of whether parental grit should be considered a second-order construct warrants justification from both theoretical and practical perspectives. We selected the triarchic model as the final model for two main reasons. First, capturing the three dimensions as correlated first-order factors allowed for a more nuanced examination of their distinct associations with other constructs. Second, considering that the development of parental grit is in its infancy, a conclusive model has yet to be established. We encourage researchers not only to employ but also to further refine the PGS, potentially incorporating insights gleaned from qualitative or cognitive interviews.

The final triarchic CFA model also fit the W2 data well. Notably, in Phase 2, perseverance and adaptability were highly correlated in the three-factor CFA model. Nevertheless, this model fit the data better than the alternative model in which perseverance and adaptability were amalgamated into a single factor. In Phase 3, this factor correlation saw a decline in W2. Parents who persevered in challenging parenting situations were also likely to be more adaptive. Our findings were partly aligned with the hierarchical goal framework (Duckworth & Gross, 2014), which distinguishes between different levels of goal pursuit (i.e., lower order, short-term goals directed at a specific context and higher order, long-term goals) on the basis of personal importance. These goals are arranged in a hierarchy according to an individual's passions, with people high in grit pursuing a predominant superordinate goal by first striving to achieve closely interrelated subordinate goals on the way to the superordinate goal. Relying on the assumption that, if obstacles stand in the way of achieving a subordinate parenting goal, gritty parents might not give up but are likely to adapt their

parenting goal pathways to strive for a more realistic and optimal approach that will help them achieve the superordinate parenting goal in the long run. However, these suppositions are speculative. As we did not specifically tease out how the triarchic model of parental grit dimensions forms various hierarchies of parenting or child-rearing goals, future research may test how parental grit operates within the hierarchical goal theory.

Using multigroup CFA models, we were able to show that the PGS exhibited scalar measurement invariance across groups, including parents' gender and the presence or absence of special needs in the child. In essence, our findings indicated that the measurement of parental grit remained consistent—showing equal factor structures, equal factor loadings, and equal indicator intercepts—whether applied to mothers or fathers and parents with or without children with special needs. Across different time points, the PGS showed partial scalar measurement invariance. The intercepts of PGSP2 ("I have constant interest to accomplish my childrearing goal") were freely estimated across measurement occasions. That is, participants' responses to this item might fluctuate over time due to various factors, such as changes in circumstances, experiences, or personal perceptions. However, achieving scalar measurement invariance in practice is uncommon (Steenkamp & Baumgartner, 1998), and our results suggest that the measurement properties of most PGS indicators do not change significantly over time, and that composite scores can capture real changes in individual interest across measurement occasions. This overall high level of measurement invariance allows for the meaningful comparison of latent means across groups and measurement occasions, and the observed differences in the means of the latent variable can be attributed to genuine differences or changes in the latent construct of parental grit (Dimitrov, 2010; Steenkamp & Baumgartner, 1998).

**Construct and Incremental Validity of the Parental Grit Scale**

Phase 3 additionally involved the examination of the construct and incremental validity of the parental grit construct. We found weak to moderate positive associations of parental grit with domain-general grit and conscientiousness, providing evidence of its construct validity and suggesting that parental grit is related to, but distinct from, these other constructs. To assess the incremental validity of parental grit in predicting four parenting-related outcomes (i.e., parental emotional exhaustion, autonomy support, parental self-efficacy, and children's school well-being), four two-step hierarchical regression models were created. In the initial regression models (Step 1), which did not include parental grit, we observed that the dimensions of domain-general grit significantly predicted the outcomes, and that conscientious parents reported higher levels of autonomy support and self-efficacy in supporting their children's success. These findings were consistent with prior research on domain-general grit and conscientiousness (Datu et al., 2017, 2021; Prinzie et al., 2009).

In Step 2, the parental grit dimensions were incorporated into the regression models. The results highlighted that perseverance and adaptability were significant predictors of parental self-efficacy, even after we controlled for the effects of sociodemographics, domain-general grit, and conscientiousness. Furthermore, both perseverance and adaptability demonstrated incremental validity in predicting autonomy support beyond the effects of sociodemographics, domain-general grit, and conscientiousness. These findings partly supported past investigations of the associations between grit and perceived autonomy support from significant social partners, such as parents (Lan et al., 2019) and teachers (Lan & Zhang, 2019). Perseverance additionally contributed to predicting parental emotional exhaustion, a core symptom of parental burnout (Roskam et al., 2018), a finding that echoes past studies on the role of domain-general grit in protecting against burnout (Al-Zain & Abdulsalam, 2022; Tang, Upadyaya, et al., 2021). For autonomy support, perseverance and

adaptability were better predictors than the subdimensions of domain-general grit. Compared with perseverance and adaptability, passion was less able to predict parental emotional exhaustion, self-efficacy, and autonomy support. This result is consistent with findings in the domain-general grit literature, which suggests that perseverance of effort tends to have stronger predictive power than consistency of interest in forecasting achievement and well-being (Credé, 2018; Credé et al., 2017). As with prior studies (Datu et al., 2017; Disabato et al., 2019), it is likely that sticking with domain-specific interests alone might not always result in adaptive psychological outcomes given that parents may need to prioritize other work, occupational responsibilities, and family responsibilities; a condition that heightens their susceptibility to stressor pileup and even lower well-being (Bodenmann et al., 2007; Brik et al., 2024). Interestingly, passion significantly predicted parents' perceptions of their children's school well-being, whereas the other two PGS dimensions did not. One reason may be that school well-being has a strong focus on the school context and may be a distal outcome of parental grit. Previous work on parents' domain-general grit (Fernández-Martín et al., 2023; Joy et al., 2020; Won & Lee, 2023) implies that grit may serve as a form of grit socialization that contributes to child development. Similarly, we posit that parental passion in the pursuit of parenting goals may fulfill a similar function. Passionate parents likely foster a positive school environment for their children by instilling values related to education, encouraging academic pursuits, and promoting resilience in the face of academic challenges. This proactive involvement and encouragement from passionate parents can profoundly impact a child's overall well-being in school. Thus, the effects of parental grit on children's well-being may extend beyond the immediate family environment. Overall, our findings provide evidence of the unique contribution of parental grit and its dimensions to parenting-related outcomes.

**Empirical and Practical Implications**

In the present study, we developed the first PGS tailored for the parenting domain. Our conceptualization of the PGS considered the shortcomings of domain-general grit. The scale comprises 12 items that intricately capture three aspects of long-term parenting goals: perseverance and passion in goal pursuit, along with flexibility in adjusting parenting goals to meet the changing developmental needs of children.

The PGS has empirical relevance for future research in capturing grit in the parenting domain, as parental grit serves as a better predictor of parenting-related outcomes, such as parenting practices and parental self-efficacy, compared with domain-general grit. By showing the incremental validity of parental grit in predicting parental psychological functioning and child well-being above and beyond conscientiousness and domain-general grit, we were able to demonstrate that parental grit is not merely a proxy for conscientiousness and theoretically related constructs. This finding supports the specificity-matching principle (Swann et al., 2007), which states that "when a predictor variable is relatively specific, then the impact of rival influences on the predictor-criterion relationship can be minimized by selecting an equally specific behavior" (p. 87). Furthermore, whereas we were able to show that the correlated three-factor model of parental grit—underpinned by perseverance, passion, and adaptability—might be suitable for parents in the US, it is equally critical to assess alternative factor structures (e.g., bifactor model) that capture grit in the context of parenting.

The implications of our study's findings extend beyond empirical applications to practical applications. Our study identified moderate stability for parental grit, suggesting the potential for targeted prevention and intervention strategies. The evidence of parental grit's incremental validity in predicting positive parenting-related outcomes beyond the effects of domain-general grit and conscientiousness further underscores this potential. Whereas

evidence supporting effective grit promotion in the domain-general grit context is somewhat limited, several promising strategies have emerged. These strategies include cultivating a growth mindset and setting meaningful goals (for an overview, see Hwang & Nam, 2021). Given that parental grit inherently revolves around parenting goals, helping parents reflect on their parenting goals could serve as a valuable initial step. Furthermore, providing psychoeducation on child and adolescent development, along with their evolving needs, may help parents set realistic and adaptive parenting goals. Moreover, recognizing and encouraging parents' dedication and aspirations can fuel their passion, intrinsic motivation, and enduring commitment to effective parenting. By additionally imparting need-supportive and consistent parenting techniques, we can empower parents to enhance their grit, enabling them to navigate the complexities of parenthood with resilience and flexibility. Explicitly integrating parental grit into established parenting programs, such as the Positive Parenting Program (Sanders, 2008) and Tuning in to Kids (Havighurst et al., 2015), holds promise in bolstering parental self-efficacy and promoting adaptive parenting approaches. Such a concerted effort can contribute significantly to the development of more resilient and capable parents, ultimately benefiting families and communities as a whole.

**Limitations and Future Research**

Several limitations should be noted when interpreting the results. First, the data analysis was based on self-reports, which may have led to potential biases and social desirability effects, potentially inflating the associations that were identified. However, with this study, we aimed to develop and evaluate the psychometric properties of the PGS. Thus, our study can be used as a starting point for future studies that can employ diverse research methodologies to enhance the robustness of the findings. To gain deeper insights into the role of parental grit in parenting and child development, it could be valuable to incorporate children's perspectives. Second, the item pool was created by the author group and then

independently assessed by five experts in the field of grit. The absence of qualitative or cognitive interviewing methods could have constrained the quality of the item pool. Future studies should consider incorporating these methods to further refine the PGS. Third, we focused on parents of children in Grades 6–9 in the US, and the sample was overrepresented by parents with a middle or high SES. Previous research has indicated that various parenting factors may vary systematically depending on family SES. Therefore, exploring the measurement invariance of the PGS across different levels of family SES would be valuable. However, given that family SES was captured with the HISEI and the overrepresentation of parents from middle to high SES backgrounds in our sample, artificially classifying parents into SES groups could introduce bias in the results. Moreover, while participants' race was accounted for, including their ethnicity could offer a more nuanced and comprehensive understanding of the sample. In future studies, researchers are encouraged to use and validate the PGS for other parent populations, including those with children outside the specified grade range, with distinct demographic backgrounds, and in non-Western settings. Research on parenting has demonstrated that parenting goals are shaped by parents' past experiences and values, which are embedded in a broader social and cultural context (Bornstein, 2012; Cheah et al., 2013; He et al., 2021; Otterpohl et al., 2020; Teuber, Grüter, et al., 2024). For example, Eastern parents tend to prioritize more extrinsic goals (i.e., focusing on directing their child's behavior to make a good impression on others), whereas Western parents tend to prioritize more intrinsic goals (i.e., focusing on satisfying the child's inner needs and personal growth), which can significantly impact their parenting practices and child development (Bornstein, 2012, 2012; Cheah et al., 2013; Hollmann et al., 2018; Vansteenkiste et al., 2010). Therefore, expanding the scope of application and including more specific parenting goals will contribute to a more comprehensive understanding of parental grit across diverse parenting contexts.

## Conclusion

In the present study, we introduced the PGS, a novel parenting-specific measure of grit developed for parent populations. The findings offer support for its sound psychometric properties, validated through extensive longitudinal analyses in a large-scale U.S. parent sample. The PGS provides an estimate of individual differences in parents' perseverance in challenging parenting situations, passion in the pursuit of parenting goals, and the ability to adapt to the evolving needs of their offspring. Evidence of the criterion-related and predictive validity of this scale has key implications for understanding how parental grit is related to parental behaviors and children's school well-being. In general, this research begins to fill the gap on the domain specificity of grit by exploring how grit operates in the context of parenting.

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**Table 1**

*Sample Details for Each Wave*

| | W1 | W2 |
|---|---|---|
| *Participants* | | |
| Total *N* | 1,373 | 1,059 |
| Number of mothers (%) | 699 (51%) | 548 (52%) |
| $M_{age}$ (*SD*) | 42.83 (9.38) | 43.18 (9.32) |
| Average number of children | 2.36 (1.16) | 2.35 (1.19) |
| Race | | |
| White | 940 (68.46%) | 735 (69.41%) |
| Asian | 63 (4.59%) | 46 (4.34%) |
| Black | 240 (17.48%) | 184 (17.4%) |
| Mixed | 70 (5.1%) | 51 (4.82%) |
| Other | 38 (2.77%) | 25 (2.36%) |
| Education | | |
| Secondary school or lower | 305 (28.42%) | 235 (22.19%) |
| Associate's degree[1] | 179 (13.04%) | 134 (12.65%) |
| Bachelor's degree or higher | 838 (61.03%) | 662 (62.51%) |
| Other | 41 (2.99%) | 28 (2.64%) |
| HISEI | 64.5 (17.1) | 64.64 (16.99) |
| *Children* | | |
| Number of girls | 604 (43.99%) | 476 (44.95%) |
| School type | | |
| Elementary school | 169 (12.31%) | 128 (12.09%) |
| Secondary school | 1,151 (83.83%) | 892 (84.23%) |
| Special needs school | 2 (0.14%) | 2 (0.19%) |
| Other | 51 (3.71%) | 37 (3.49%) |
| Number of children with special needs | 309 (22.51%) | 304 (28.71%) |

*Note*. HISEI = the highest International Socioeconomic Index of Occupational Status.
[1]Associate's degree in the US is a 2-year college degree and falls between a high school diploma and a bachelor's degree.

**Table 2**

*Initial and Final Parental Grit Scale Items*

| Item ID | Item |
|---|---|
| *Perseverance of Effort (PGPE)* | |
| PGPE1 | I diligently work on any parenting goals that require months or years of effort. |
| PGPE2* | As a parent, I persist to achieve long-term ambitions, even after experiencing frustrating moments. |
| PGPE3* | Despite the challenges linked to parenting and childrearing, I am determined to accomplish my long-term parenting goals. |
| PGPE4 | I am not easily swayed by obstacles or difficulties that I face in facilitating my child(ren)'s success in the future. |
| PGPE5* | I am willing to face the challenges of responsibly raising a child. |
| PGPE6 | I can overcome the pressures to become an effective parent. |
| PGPE7* | I do not give up when facing the long-term challenges of parenthood. |
| *Sustained Passion (PGSP)* | |
| PGSP1 | I am always dedicated to fulfilling my long-term parenting goal. |
| PGSP2* | I have constant interest to accomplish my childrearing goal. |
| PGSP3 | I consider parenthood as a long-term project. |
| PGSP4 | I can focus on pursuing a single parenting goal at a time. |
| PGSP5* | I am passionate towards accomplishing a specific childrearing goal. |
| PGSP6* | I am interested to perform activities that can fulfil my childrearing ambition. |
| PGSP7* | I have intense interest in completing a goal that can strengthen my parenting over time. |
| *Adaptability of goal-specific pathways (PGAG)* | |
| PGAG1* | I am open to changing strategies that can help me achieve my parenting goal. |
| PGAG2* | I modify my childrearing goals depending on the needs of my child(ren). |
| PGAG3* | I am willing to let go of long-term goals that can harm my child(ren)'s development. |
| PGAG4* | If I see my child(ren) struggling to meet my expectations, I can modify my unrealistic parenting goals. |
| PGAG5 | New opportunities (e.g., parent-teacher conferences or school-based parent training programs) encourage me to improve my parenting goals. |
| PGAG6 | I am good at adapting my childrearing ambitions with our family's circumstances. |
| PGAG7 | I am able to modify parenting ambitions depending on what's needed in various situations. |

*Note.* The instructions were: "Please think about your life as a parent: How much do the statements below apply to you?"
*Final items.

**Table 3**

*Descriptive Statistics and Zero-Order Correlations Between the Variables in the Longitudinal Sample (N = 1,059)*

| | | Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1 | 1 | PGPE | | | | | | | | | | | | | |
| | 2 | PGSP | .70** | | | | | | | | | | | | |
| | 3 | PGAG | .70** | .59** | | | | | | | | | | | |
| | 4 | CI | .28** | .26** | .16** | | | | | | | | | | |
| | 5 | PE | .39** | .45** | .25** | .45** | | | | | | | | | |
| | 6 | CO | .23** | .25** | .09* | .50** | .56** | | | | | | | | |
| W2 | 7 | PGPE | .54** | .46** | .43** | .26** | .35** | .25** | | | | | | | |
| | 8 | PGSP | .45** | .57** | .35** | .27** | .41** | .29** | .73** | | | | | | |
| | 9 | PGAG | .44** | .35** | .49** | .17** | .21** | .17** | .70** | .60** | | | | | |
| | 10 | EE | –.29** | –.29** | –.19** | –.30** | –.34** | –.25** | –.36** | –.35** | –.22** | | | | |
| | 11 | SEFF | .34** | .32** | .27** | .33** | .31** | .32** | .41** | .38** | .31** | –.44** | | | |
| | 12 | AUSU | .31** | .27** | .29** | .14** | .19** | .19** | .39** | .35** | .39** | –.13** | .33** | | |
| | 13 | CSW | .16** | .23** | .10* | .22** | .31** | .23** | .19** | .24** | .09* | –.25** | .41** | .18** | |
| | | *M* | 4.41 | 4.16 | 4.34 | 3.29 | 4.04 | 3.82 | 4.36 | 4.09 | 4.31 | 1.29 | 3.84 | 4.02 | 3.85 |
| | | *SD* | 0.67 | 0.77 | 0.63 | 1.03 | 0.71 | 0.88 | 0.69 | 0.81 | 0.67 | 1.42 | 0.84 | 0.64 | 0.97 |

*Note.* PGSP = Sustained Passion; PGPE = Perseverance of Effort; PGAG = Adaptability of Goal-Specific Pathways; CI = general grit–consistency of interest; PE = general grit–perseverance of effort; CO = conscientiousness; EE = emotional exhaustion; SEFF = parental self-efficacy; AUSU = autonomy support; CSW = child's school well-being.
*$p < .01$. ** $p < .001$.

**Table 4**

*Initial Parallel Exploratory Factor Analysis Solution*

| Factor loadings | | | | | |
|---|---|---|---|---|---|
| | Factor1 | Factor 2 | Factor 3 | Factor 4 | Uniqueness |
| PGSP5 | .91 | | | | .35 |
| PGSP7 | .78 | | | | .37 |
| PGSP6 | .75 | | | | .38 |
| PGSP2 | .62 | | | | .43 |
| PGAG5 | .56 | | | | .59 |
| PGPE1 | .46 | | | | .49 |
| PGPE7 | | .82 | | | .35 |
| PGPE5 | | .61 | | | .41 |
| PGPE3 | | .56 | | | .40 |
| PGPE2 | | .54 | | | .41 |
| PGSP3 | | .51 | | | .63 |
| PGAG2 | | | .71 | | .44 |
| PGAG4 | | | .69 | | .52 |
| PGAG1 | | | .59 | | .47 |
| PGAG3 | | | .50 | | .64 |
| PGSP4 | | | | .58 | .61 |
| PGPE4 | | | | .55 | .55 |
| PGPE6 | | | | .40 | .42 |
| PGSP1 | | | | | .43 |
| PGAG6 | | | | | .45 |
| PGAG7 | | | | | .45 |

*Note.* The rotation method was Promax.

**Table 5**

*Final Parallel Exploratory Factor Analysis Solution*

| Factor loadings | | | | |
|---|---|---|---|---|
| | Factor1 | Factor 2 | Factor 3 | Uniqueness |
| PGSP5 | .94 | | | .32 |
| PGSP7 | .75 | | | .38 |
| PGSP6 | .70 | | | .39 |
| PGSP2 | .62 | | | .43 |
| PGPE7 | | .81 | | .40 |
| PGPE2 | | .62 | | .39 |
| PGPE5 | | .61 | | .42 |
| PGPE3 | | .54 | | .41 |
| PGAG4 | | | .80 | .47 |
| PGAG2 | | | .62 | .48 |
| PGAG3 | | | .54 | .62 |
| PGAG1 | | | .53 | .49 |

*Note.* The rotation method was Promax.

**Table 6**

*Measurement Invariance (MI) of the Parental Grit Scale Across Genders, Special Needs, and Time*

| Model | $\chi^2/df$ | RMSEA [90% CI] | CFI | SRMR | $\Delta\chi^2/\Delta df$ |
|---|---|---|---|---|---|
| CFA W2 | 135.62***/51 | .04 [.03, .05] | .98 | .03 | |
| *Special needs (Yes/No) using W2 data and Monte Carlo simulation* | | | | | |
| Configural MI | 153.14***/102 | .04 [.03, .05] | .98 | .04 | – |
| Metric MI | 160.01***/111 | .04 [.03, .05] | .98 | .05 | $6.77^{ns}/9$ |
| Scalar MI | 172.86***/120 | .04 [.03, .05] | .98 | .05 | $12.85^{ns}/9$ |
| Strict MI | 202.96***/132 | .04 [.03, .05] | .97 | .09 | 39.10**/12 |
| *Gender (Male/Female) using W2 data* | | | | | |
| Configural MI | 187.96***/102 | .04 [.03, .05] | .98 | .03 | – |
| Metric MI | 197.26***/111 | .04 [.03, .05] | .98 | .04 | $7.94^{ns}/9$ |
| Scalar MI | 209.76***/120 | .04 [.03, .05] | .98 | .04 | $10.87^{ns}/9$ |
| Strict MI | 234.06***/132 | .04 [.03, .05] | .98 | .04 | 23.20*/12 |
| *Time using longitudinal data (W1 and W2)* | | | | | |
| Configural MI | 414.78***/229 | .03 [.02, 03] | .98 | .04 | |
| Metric MI | 422.38***/237 | .03 [.02, .03] | .98 | .04 | $7.60^{ns}/8$ |
| Partial scalar MI | 438.29***/248 | .03 [.02, .03] | .98 | .05 | $15.91^{ns}/11$ |
| Scalar MI | 445.61***/249 | .03 [.02, .03] | .98 | .05 | 23.23*/12 |

*Note.* RMSEA = root mean square error of approximation; CI = confidence interval; CFI = comparative fit index; SRMR = standardized root mean square residual; MI = measurement invariance. Configural MI: all parameters were freely estimated; Metric MI: factor loadings were set to be equal across groups; Scalar MI: factor loadings and indicator intercepts were set to be equal across groups; Strict MI: factor loadings, indicator intercepts, indicator variances were set to be equal across groups.

$^{ns}$ $p > .05$. * $p < .05$. ** $p < .01$. *** $p < .001$.

**Table 7**

*Incremental Validity of Parental Grit: Results of Hierarchical Regression Models*

| | | Step 1 | | Step 2 | | | | Step 1 | | Step 2 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Outcome | Variable | B | SE | B | SE | Outcome | Variable | B | SE | B | SE |
| *Emotional exhaustion* | Mother | .25*** | .08 | .31*** | .09 | *Autonomy support* | Mother | .11** | .04 | .05 | .04 |
| | Special needs | .38*** | .09 | .37*** | .09 | | Special needs | .01 | .04 | .01 | .04 |
| | HISEI | –.001 | .002 | –.002 | .002 | | HISEI | –.003** | .001 | –.003* | .001 |
| | PE | –.47*** | .07 | –.31*** | .08 | | PE | .12*** | .04 | .02 | .04 |
| | CI | –.25*** | .05 | –.22*** | .05 | | CI | .03 | .02 | 0 | .02 |
| | CON | .002 | .06 | –.01 | .06 | | CON | .10*** | .03 | .11*** | .03 |
| | PGPE | | | –.23* | .11 | | PGPE | | | .14** | .05 |
| | PGSP | | | –.15+ | .08 | | PGSP | | | .03 | .04 |
| | PGAG | | | –.06 | .10 | | PGAG | | | .14** | .04 |
| | $R^2/F$ | .17/33.48*** | | .20/26.99*** | | | $R^2/F$ | .07/12.38*** | | .14/17.58*** | |
| | $\Delta R^2/\Delta F$ | | | .03/11.83*** | | | $\Delta R^2/\Delta F$ | | | .07/28.37*** | |
| *Parental self-efficacy* | Mother | .01 | .05 | –.04 | .05 | *Child's school well-being* | Mother | –.19*** | .06 | –.19** | .06 |
| | Special needs | –.33*** | .05 | –.32*** | .05 | | Special needs | –.37** | .06 | –.37*** | .06 |
| | HISEI | .00 | .00 | .00 | .00 | | HISEI | .00 | .00 | .00 | .00 |
| | PE | .19*** | .04 | .07 | .04 | | PE | .33*** | .05 | .26*** | .05 |
| | CI | .14*** | .03 | .12*** | .03 | | CI | .07* | .03 | .06 | .03 |
| | CON | .12*** | .03 | .13*** | .03 | | CON | .03 | .04 | .03+ | .03 |
| | PGPE | | | .14* | .06 | | PGPE | | | –.02 | .07 |
| | PGSP | | | .09 | .05 | | PGSP | | | .13* | .06 |
| | PGAG | | | .13* | .05 | | PGAG | | | .01 | .07 |
| | $R^2/F$ | .19/39.17*** | | .24/35.07*** | | | $R^2/F$ | .14/28.07*** | | .15/19.92*** | |
| | $\Delta R^2/\Delta F$ | | | .05/35.25*** | | | $\Delta R^2/\Delta F$ | | | .01/3.25* | |

*Note.* PGSP = Sustained Passion; PGPE = Perseverance of Effort; PGAG = Adaptability of Goal-Specific Pathways; CI = general grit–consistency of interest; PE = general grit–perseverance of effort; CON = conscientiousness. HISEI = the highest International Socioeconomic Index of Occupational Status. + $p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

**Figure 1**

*Flowchart of This Research*

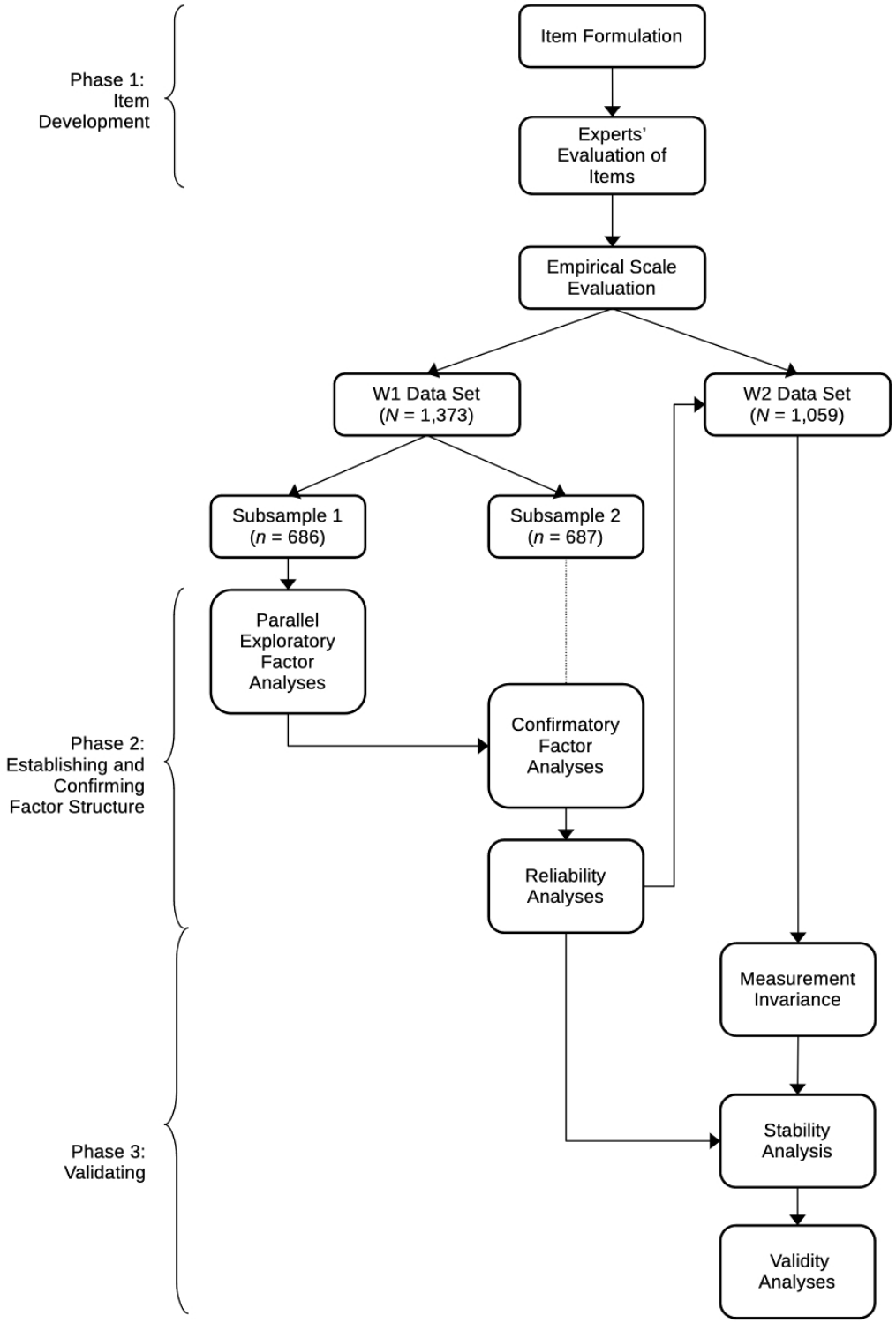
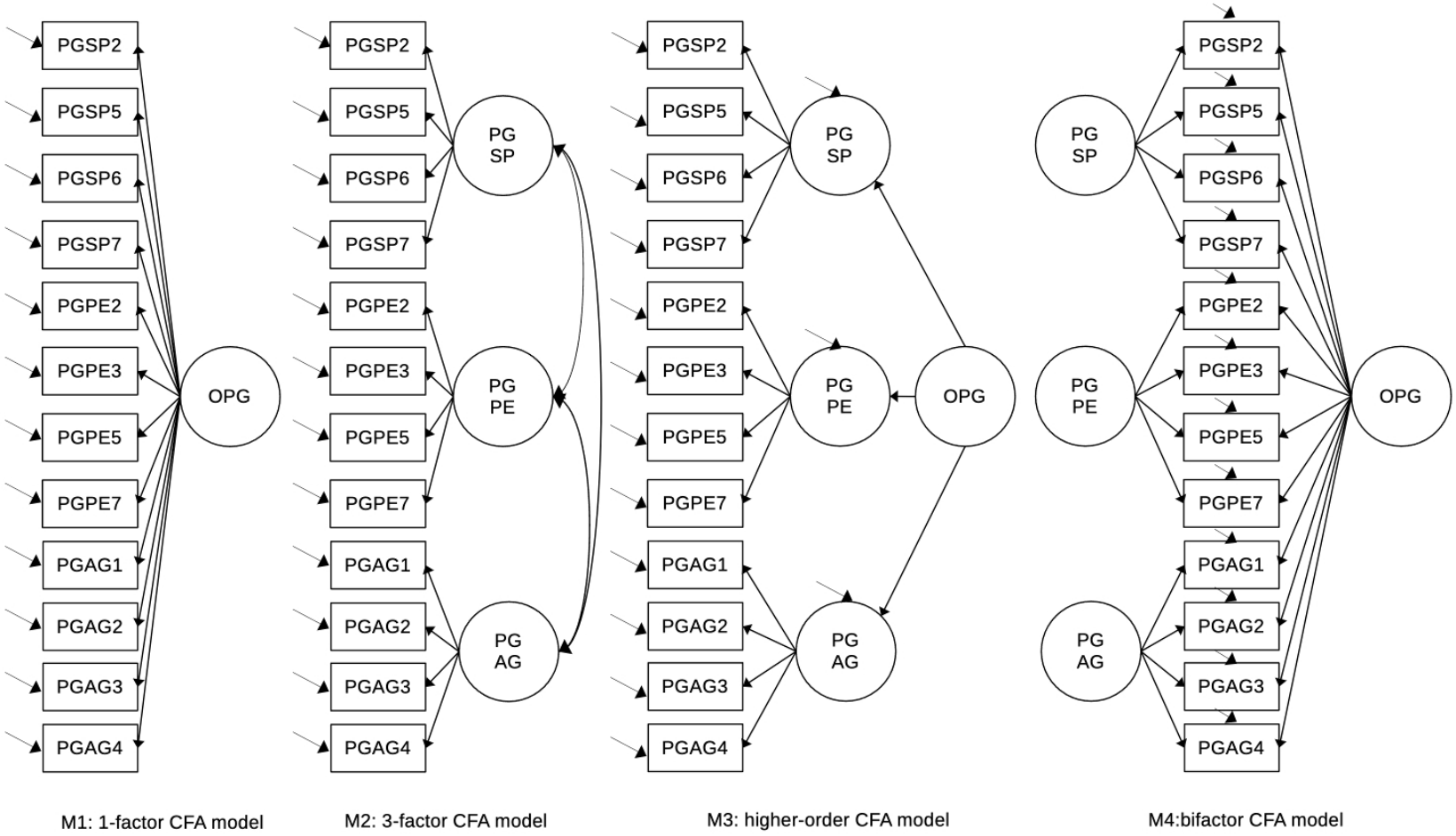


**Figure 2**

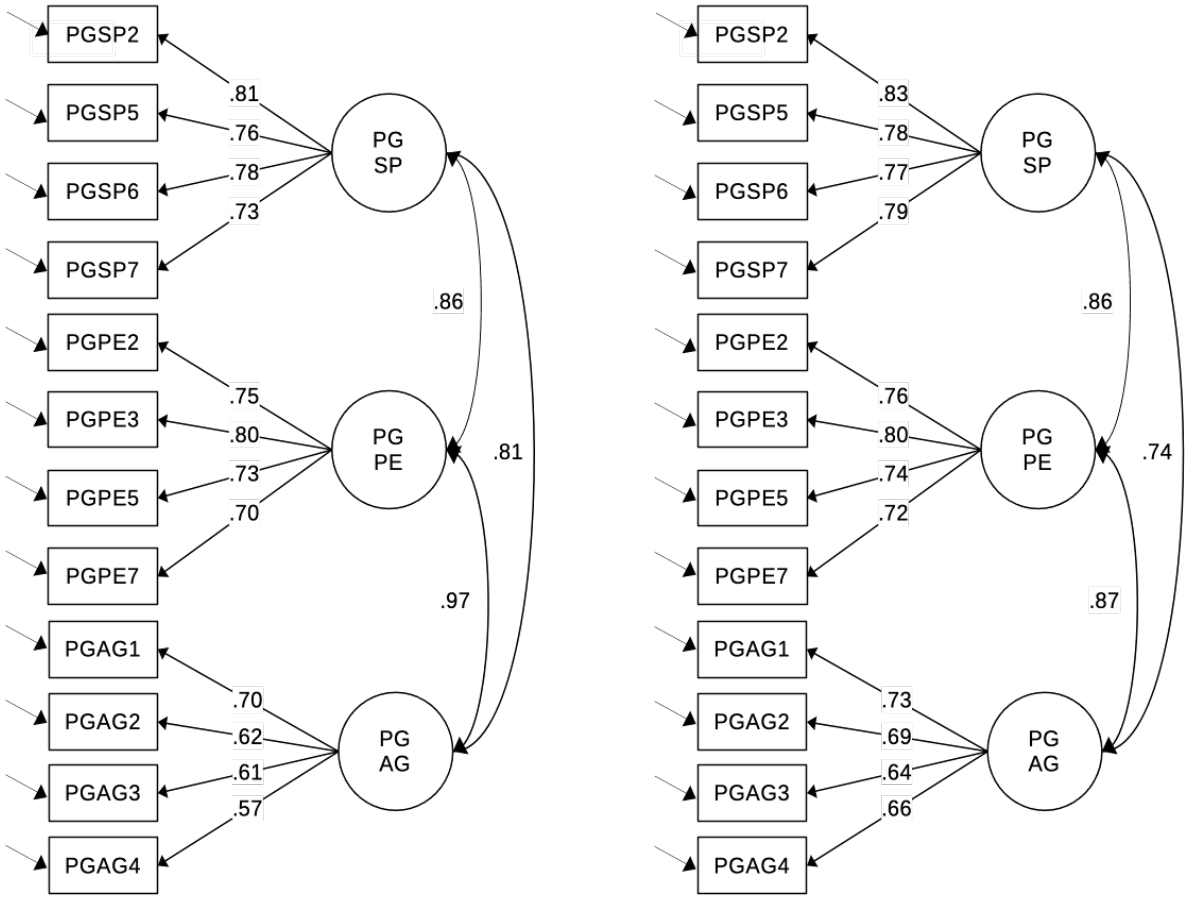
*Conceptual and Alternative Models*




*Note*. M1 = one-factor model; theoretical model M2 = three-factor model; theoretical model M3 = second-order factor model; M4 = bifactor model. PGSP = Sustained Passion; PGPE = Perseverance of Effort; PGAG = Adaptability of Goal-Specific Pathways.

**Figure 3**

*Final CFA Models Using W1 Subsample 2 (Left) and W2 Total Sample (Right)*




*Note.* PGSP = Sustained Passion; PGPE = Perseverance of Effort; PGAG = Adaptability of Goal-Specific Pathways.

**Supplementary Material**

*Incremental Validity of Parental Grit: Sensitivity Check*

| | | Step 1 | | Step 2 | | | | Step 1 | | Step 2 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Outcome | Variable | *B* | *SE* | *B* | *SE* | Outcome | Variable | *B* | *SE* | *B* | *SE* |
| *Emotional exhaustion* | Mother | .31*** | .09 | .31*** | .09 | *Autonomy support* | Mother | .04** | .04 | .04 | .04 |
| | Special needs | .37*** | .09 | .37*** | .09 | | Special needs | –.01 | .04 | .01 | .04 |
| | HISEI | –.002 | .002 | –.002 | .002 | | HISEI | –.003* | .001 | –.003** | .001 |
| | PE | –.31*** | .07 | –.31*** | .08 | | PE | .07* | .03 | .01 | .04 |
| | CI | –.22*** | .04 | –.22*** | .05 | | CI | .03+ | .02 | .01 | .02 |
| | CON | | | –.01 | .06 | | CON | | | .11*** | .03 |
| | PGPE | –.23* | .10 | –.23* | .10 | | PGPE | .13** | .05 | .13** | .05 |
| | PGSP | –.14+ | .08 | –.14+ | .08 | | PGSP | .04 | .04 | .04 | .04 |
| | PGAG | –.05 | .10 | –.07 | .10 | | PGAG | .13** | .04 | .14** | .04 |
| | $R^2$/ *F* | .20/30.31*** | | .20/26.92*** | | | $R^2$/ *F* | .13/17.8*** | | .14/17.96*** | |
| | $\Delta R^2/\Delta F$ | | | .00/.03 | | | $\Delta R^2/\Delta F$ | | | .01/16.96*** | |
| *Parental self-efficacy* | Mother | –.05 | .05 | –.05 | .05 | *Child's school well-being* | Mother | –.18*** | .06 | –.18** | .06 |
| | Special needs | –.34*** | .05 | –.32*** | .05 | | Special needs | –.37** | .06 | –.37*** | .06 |
| | HISEI | .00 | .00 | .00 | .00 | | HISEI | .00 | .00 | .00 | .00 |
| | PE | .14*** | .04 | .07 | .04 | | PE | .28*** | .05 | .26*** | .05 |
| | CI | .15*** | .03 | .12*** | .03 | | CI | .07* | .03 | .06 | .03 |
| | CON | | .03 | .13*** | .03 | | CON | | | 03 | .03 |
| | PGPE | .13* | | .13* | .06 | | PGPE | –.02 | .07 | –.02 | .07 |
| | PGSP | .09* | | .09+ | .05 | | PGSP | .14* | .06 | .14* | .06 |
| | PGAG | .12* | | .13* | .05 | | PGAG | .00 | .07 | .01 | .07 |
| | $R^2$/ *F* | .23/37.58*** | | .25/35.63*** | | | $R^2$/ *F* | .15/22.21*** | | .15/19.78*** | |
| | $\Delta R^2/\Delta F$ | | | .02/15. 56*** | | | $\Delta R^2/\Delta F$ | | | .00/.43 | |

*Note.* PGSP = Sustained Passion; PGPE = Perseverance of Effort; PGAG = Adaptability of Goal-Specific Pathways; CI = general grit–consistency of interest; PE = general grit–perseverance of effort; CON = conscientiousness. HISEI = the highest International Socioeconomic Index of Occupational Status. + $p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.