MIND, BRAIN, AND EDUCATION

Adaptability and Grit: Foundations for Their Joint Contribution to Students' Academic and Nonacademic Outcomes

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ABSTRACT— Adaptability (adjustment to new and uncertain situations) and grit (perseverance and passion for long-term goals) both sustain students, but their joint contribution has never been explored, and recent studies propose they could compose a single factor. In this study we aim to test whether (i) they actually belong to a single overarching factor as recently posited by the Triarchic Model of Grit and (ii) they have specific effects on different outcomes. We show that, in a sample of 602 students (11–18 years old), perseverance of effort, consistency of interests (the two facets of grit), and adaptability are distinct factors, that uniquely contribute to the outcomes considered (academic self-efficacy, achievement emotions, learning goals, self-regulated learning, achievement, and life satisfaction). Perseverance resulted as the strongest predictor, followed by adaptability and consistency. Conscientiousness was positively related to all three. We conclude that adaptability and grit are two separate but correlated factors that can promote a host of positive outcomes.

Adaptability and grit are two important psychological variables that support the individual in different academic and nonacademic outcomes (Credé, Tynan, & Harms, 2017; Martin, Nejad, Colmar, & Liem, 2013). Even though they are hypothesized to be related to each other (Collie & Martin, 2017) and shown to be associated with similar constructs, including personality traits such as conscientiousness (Credé et al., 2017; Duckworth, Peterson, Matthews, & Kelly, 2007; Martin et al., 2013; Martin, Nejad, Colmar, & Liem, 2012), there is no consensus on whether they play different roles with respect to such outcomes. Additionally, it is still unclear whether they should be considered as part of a single overarching factor that helps the individual in facing difficult situations for a prolonged time or whether they should be treated as separate. Indeed, Datu, Yuen, and Chen (2017) proposed a triarchic model of grit which includes "adaptability to situations" as a component of grit and highlights the theoretical connections that might link the two constructs and that qualify adaptability as a complementary component of the grit construct. However, a precise estimation of such model with an already existing measure of adaptability (e.g., the adaptability scale, Martin et al., 2012) has not been conducted yet, and Martin et al. (2012, 2013) clearly separate adaptability from other cognate factors like grit. We consequently aim to deepen the connections between these constructs at the factorial and predictive level to understand whether they can be considered separable constructs (or part of a same factor) and whether they play peculiar roles for the individual (or they do not explain external outcomes above each other).

In particular, we will test the convergence of the two facets of grit and adaptability in a single second-order factor as suggested by Datu et al. (2017) triarchic model of grit and—in line with Credé (2018), who recently questioned the reliability of grit's findings—explore the contemporary predictive role of adaptability and grit facets on six different outcomes:

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students' academic emotions, self-regulated learning (SRL) strategies, learning goals, academic self-efficacy, academic achievement, and life satisfaction, while controlling for conscientiousness. We believe that including a validated measure of adaptability in these models might lead to different results and to consider the two constructs as separated from each other and not as part of a triarchic model of grit.

LITERATURE REVIEW

To substantiate the need for conducting the present study, we will briefly introduce the constructs of adaptability and grit and present their specificity. In line with Datu et al. (2017) triarchic model of grit, we will then discuss why it is interesting to study these constructs together. Lastly, we will review the literature on the associations between the two constructs—taken singularly—and relevant academic and nonacademic outcomes, to then formulate hypotheses on their contemporary role.

Adaptability

Adaptability is the individual's capacity to efficiently adjust cognition (finding a new approach to the situation), behaviors (adjusting the way an individual approaches a task), and emotions (successfully regulate negative emotions) in response to new, uncertain, or changing situations (Martin et al., 2012).

The authors (Martin et al., 2012, 2013) theorized that conscientiousness and growth mindset predicted adaptability and confirmed such an association in a longitudinal structural equation model. In addition, they differentiated adaptability from several other cognate factors, such as buoyancy, resilience, or coping (Martin et al., 2012, 2013). In their view, adaptability narrowly focuses on uncertainty, rather than adversity. This was statistically confirmed, and adaptability predicted academic and nonacademic outcomes (e.g., life satisfaction, engagement, and enjoyment) over and above those factors (Holliman, Martin, & Collie, 2018; Martin et al., 2012, 2013; Martin, Yu, Ginns, & Papworth, 2017).

Grit

Grit is another factor that might partially overlap with adaptability (Collie & Martin, 2017), but no previous studies examined such a relation yet or explored whether the two constructs explain specific variance of other outcome correlates.

Grit is perseverance and passion for long-term goals (Duckworth et al., 2007). It entails working strenuously and keeping interest and effort over time despite failures and plateaus. It is conceptualized as a hierarchical construct with two facets: consistency of interests, which refers to the ability to work longer without switching objectives, and perseverance of effort, that is, maintaining effort despite obstacles. In the original work (Duckworth et al., 2007), grit was highly related to conscientiousness ($r = .77$) but had predictive validity for success measures over and beyond it. Grit differed from conscientiousness for its emphasis on long-term, rather than short-term intensity efforts, as well as for its focus on consistent goals and interests. However, subsequent works (e.g., Credé, 2018; Credé et al., 2017; Ponnock et al., 2020; Rimfeld, Kovas, Dale, & Plomin, 2016) questioned the separateness between grit and conscientiousness on both theoretical and empirical grounds. Meta-analytical findings on high school and undergraduate samples (Credé et al., 2017) failed to support the construct's structural validity, found its predictive validity to be quite limited, and evidenced very high correlations with conscientiousness ($\rho = .84$ for overall grit, $\rho = .83$ for perseverance, $\rho = .61$ for consistency), as another large twin study with 16-year-olds confirmed ($r = .53$ for perseverance, $r = .28$ for consistency, Rimfeld et al., 2016). Such strong correlations warrant more studies to investigate the separateness of grit components from conscientiousness. Other studies conducted in the US and Spanish general populations highlighted problems within the construct itself, suggesting it might be better represented by a one-dimensional structure (González, Canning, Smyth, & MacKinnon, 2020; Postigo et al., 2021), which led Duckworth, Quinn, and Tsukayama (2021) to consider such limitations, while remaining convinced that the two-factor structure holds on more theoretical grounds. As a result, different scholars (Credé, 2018; Credé et al., 2017; Datu, McInerney, Żemojtel-Piotrowska, Hitokoto, & Datu, 2021) have suggested to improve the construct's measurement; study the two dimensions individually; examine the interaction between grit and other constructs; or to rethink the entire construct and allow other facets to be introduced, such as in the triarchic model of grit, that has been specifically tested on Filipino high school students (Datu et al., 2017; Datu, Yuen, & Chen, 2016).

Distinguishing Adaptability and Grit

As mentioned previously, adaptability and grit are theoretically distinguishable in their very formulation: The former has to do with novelty and uncertainty (which may have either positive or negative valence), and the regulation of one's thoughts, emotions, and behaviors to successfully adjust to these situations, while the latter is rather focused on overcoming adversity (so mainly negative conditions) in order to achieve a goal. Despite this, the two constructs are plausibly related, although no study deepened such relation yet: for example, individuals undertaking a long-term goal will undoubtedly face both setbacks and unexpected situations along their path. In the latter case, they will gain from being adaptable in that they will adjust to the unexpected

event, for instance abandoning unsuccessful strategies. On the contrary, it might also be that people with high grit will also more easily adapt to new and uncertain circumstances that they will encounter when moving toward their goals.

Accordingly, Datu et al. (2017) proposed a triarchic model of grit composed of perseverance of effort, consistency of interest, and adaptability to situations (Datu et al., 2017; Datu, Yuen, & Chen, 2016), thus binding adaptability with grit. They found that perseverance of effort and adaptability to situations were positively related, and that grit was composed of three subfactors. Despite this, the factorial composition of an overarching triarchic grit model was not tested in their studies (i.e., they only studied constructs' correlations and not convergence into a second-order factor). Additionally, in their model, adaptability to situations is "characterized by expecting challenges, accepting changes, being flexible, and displaying a drive to overcome any new difficulties as they arise" (Datu et al., 2017, p. 199), a definition that differs from that of Martin and collaborators (Martin et al., 2012, 2013). Despite these limits, the idea that grit and adaptability might together contribute to students' success is fascinating and can help better understand their specific and interactive role in such important aspects. Moreover, this conceptualization may deepen the research on grit and its interaction with other important factors to better understand whether it represents a necessary-but-not-sufficient condition for success (Credé, 2018).

In other words, scholars pointed to adaptability and grit as two related constructs that could together favor one's success and well-being and that could even be considered as part of a single overarching factor—but based on their theoretical definitions, we rather hypothesize they are not. However, no studies tested their contemporary association with external outcomes nor tested whether they could be considered as part of a triarchic "grit" factor.

Adaptability, Grit, and Academic and Nonacademic Outcomes

Adaptability and grit have been associated with a host of common positive outcomes. Among them are motivational factors such as self-efficacy (the belief of being able to succeed at academic tasks; Bandura, 1997; see Burns, Martin, & Collie, 2018; Datu et al., 2017; Martin et al., 2017) or mastery learning goals (focusing on gaining new competences and knowledge instead of simply obtaining a good grade; Dweck & Leggett, 1988; see Akin & Arslan, 2014; Eskreis-Winkler, Shulman, Beal, & Duckworth, 2014; Karlen, Suter, Hirt, & Maag Merki, 2019; Martin et al., 2017), and achievement emotions (emotions that are referred to learning activities and outcomes; Pekrun, 2006; see Datu & Fong, 2018; Feraco, Resnati, Fregonese, Spoto, & Meneghetti, 2021, 2023; Martin et al., 2012, 2013; Martin et al., 2017; Zarrinabadi, Rezazadeh, Karimi, & Lou, 2022). Adaptability and grit also resulted as significant predictors of self-regulated learning (i.e., the active process that a student carries out when studying; see Panadero, 2017 for a review; Feraco et al., 2021, 2023; Feraco, Casali, Ganzit & Meneghetti, 2023; Martin et al., 2013; Wolters & Hussain, 2015). In other words, students who are more adaptable and have more grit approach learning in a more functional way, enjoy it more, and are more motivated and able to plan, monitor, and evaluate their learning. This also indirectly favors students' academic achievement (Feraco et al., 2021, 2023; Muenks, Wigfield, Yang, & O'Neal, 2017). Adaptability and grit also played a similarly positive role during difficult times such as the COVID-19 pandemic by sustaining students' achievement emotions, self-efficacy, and achievement (Besser, Flett, & Zeigler-Hill, 2022; Sulla, Aquino, & Rollo, 2022). Different from adaptability, grit also showed a longitudinal relationship with academic achievement. Longitudinal data show that grit (i.e., perseverance of effort) at baseline is associated with later higher achievement, but also that achievement at baseline influences students' grit later (Jiang et al., 2019; Postigo et al., 2021). Finally, the two constructs also related to a higher level of life satisfaction—that is, an individual's subjective cognitive evaluation of contentment with their own life (Diener, Emmons, Larsen, & Griffin, 1985)—in both students and adults (Datu et al., 2021; Datu, Yuen, & Chen, 2018; Martin et al., 2012, 2013; Zhou & Lin, 2016).

Rationale of the Study and Hypotheses

Adaptability and grit are two important emerging constructs that show similarities, in terms of related constructs or outcomes, as well as theoretical differences. Some authors (Datu et al., 2017; Datu, Yuen, & Chen, 2016) even considered adaptability as a facet of grit, although their model shows theoretical (i.e., a lack of a precise definition and formalization of adaptability) and statistical (i.e., reliance on a correlated-factors model rather than a full hierarchical one) shortcomings. Despite this, it does have the merit to highlight the strong connection that might bind the two constructs.

We thus aim to overcome these limitations by:

- Evaluating a triarchic model of grit (where adaptability, perseverance, and consistency contribute to a single overarching grit construct; Aim 1).
- Examine the contemporary relations of grit and adaptability with different outcomes (Aim 2).

This is also in line with previous metanalytical suggestions that highlight the importance of understanding which factors may favor gritty students to really achieve their goals (Credé, 2018; Credé et al., 2017). In this regard, we consider adaptability and grit as separate—but related (Collie

& Martin, 2017)—constructs and aim at first studying their contemporary relations with a host of positive factors to lay the foundations of a promising line of research that sees adaptability as a key factor in promoting or facilitating successful goal obtainment through the cooperation of grit.

Hypotheses

The triarchic model of grit (H1).

Differently from Datu, Valdez, and King (2016), Datu et al. (2017), we expect that perseverance, consistency, and adaptability (as precisely defined by Martin et al., 2012) will not converge into a single second-order grit factor. This is because they are theoretically different and serve two different scopes: obtaining long-term goals despite difficulties and setbacks, and being specifically able to efficiently adapt to new and uncertain situations (Duckworth et al., 2007; Martin et al., 2012).

The contemporary role of adaptability and grit for academic and nonacademic outcomes (H2).

- *Self-efficacy (H2a).* Grit, and especially perseverance of effort, may be more tightly related to academic self-efficacy compared with adaptability, as it shares a future and goal orientation with this outcome.
- *Achievement emotions (H2b).* Adaptability may be more strongly related to achievement emotions because it is explicitly theorized as an emotion regulator, while grit is not (Duckworth et al., 2007; Martin et al., 2012).
- *Learning goals and SRL (H2c).* Perseverance and adaptability may show similar positive relations with learning goals (Karlen et al., 2019; Martin et al., 2017) and SRL (Feraco et al., 2021, 2023; Martin et al., 2013; Wolters & Hussain, 2015), and higher compared with consistency.
- *Life satisfaction (H2d).* Perseverance and adaptability may show similar positive relations with life satisfaction (Datu et al., 2018, 2021; Datu, Valdez, & King, 2016), higher compared with consistency.
- *Academic achievement (H2e).* Perseverance, but not consistency, may also have a small but significant relation with academic achievement over conscientiousness (Credé et al., 2017). Adaptability, on the contrary, should not relate directly with academic achievement, when controlling for other academic achievement-related factors (e.g., Burns et al., 2018; Feraco, Casali, Ganzit & Meneghetti, 2023).

The role of conscientiousness. According to the theoretical formulations of grit and adaptability, as well as some literature studies, conscientiousness is supposed to be a personality trait that supports both constructs (Duckworth et al., 2007; Martin et al., 2012) while being conceptually and statistically distinguishable from them. Recent findings, however, showed very strong (around 0.70) correlations between conscientiousness and grit (Credé et al., 2017; Rimfeld et al., 2016), suggesting that the two constructs may overlap and that it is necessary to control for conscientiousness in grit's studies. For this reason, we expect it to be associated with grit and adaptability and we will include it as a control measure through the analysis.

MATERIALS AND METHODS

Participants

A convenience sample of 602 students (366 females, $M_{age} = 13.37$, $SD_{age} = 1.97$) in grades 6–12 (11–18 years old) voluntarily participated in the study. Students belonged to 27 different classes distributed across five different schools in Northern Italy. Of these students, 223 were high school students (158 females) and 379 were middle school students (208 females). Only participants who completed all the measures were considered in the analyses. For this reason, 25 rows were deleted from the original dataset downloaded from Qualtrics. The study was approved by the University of Padova's Ethics Committee.

Materials

All the measures used for this study were measures previously validated on the Italian population (reference to the Italian validation studies are reported below for each scale). All the scales showed acceptable internal consistency in both the original articles and in our sample, and both in middle and high school students (see Table S1). Learning goals and consistency, however, showed only barely acceptable Cronbach's alpha coefficients in our sample (α = .63, .66 respectively).

Conscientiousness

The conscientiousness subscale of the Italian 10-item Big Five Inventory (Italian adaptation by Guido, Peluso, Capestro, and Miglietta (2015)) measures the conscientiousness personality trait. It includes two items on a 5-point Likert (e.g., "I see myself as a person who tends to be lazy").

Adaptability

The Adaptability Scale (Martin et al., 2012; Italian adaptation by Feraco, Casali, Ganzit & Meneghetti, 2023) measures the ability to efficiently regulate psycho-behavioral functions in response to new and uncertain conditions. It includes nine items on a 7-point Likert scale (e.g., "I am able to adjust my thinking or expectations to assist me in a new situation").

Grit

The Short Grit Scale (validated in Italian by Sulla, Renati, Bonfiglio, & Rollo, 2018) measures grit. It includes eight

items on a 5-point Likert scale, assessing consistency of interest (four items, e.g., "New ideas and projects sometimes distract me from previous ones"), and perseverance of effort (four items, e.g., "Setbacks don't discourage me").

Achievement Emotions

The Positive and Negative Affect Schedule (Italian adaptation by Terraciano, McCrae, & Costa Jr., 2003) was used to measure achievement emotions. Participants indicate on 5-point Likert scale how much they experienced each of the 20 emotions (10 positive, e.g., "proud"; 10 negative, e.g., "nervous") at school during the previous 2 weeks.

Learning Goals

The Learning Goals Scale (De Beni et al., 2014) measures students' mastery or performance approach to learning. It includes four items on a 5-point Likert scale (e.g., "It's more important to me to learn things than to get good grades").

Academic Self-Efficacy

The Academic Self-Efficacy Scale (De Beni et al., 2014) measures students' beliefs about their ability to succeed at scholastic tasks. It includes five items on a 5-point Likert scale (e.g., "How do you rate your study skills?").

Self-Regulated Learning

The Self-Regulated Learning Questionnaire (SRL, De Beni et al., 2014) measures five SRL facets (organization, self-evaluation, elaboration, learning strategies, and metacognition). It includes 50 items scored on a 5-point Likert scale (e.g., "I usually know how to organize my studies so that I still have time for my hobbies").

Life Satisfaction

The Satisfaction With Life Scale (Italian adaptation by Di Fabio & Gori, 2016) measures overall life satisfaction. It comprises five items (e.g., "The conditions of my life are excellent") scored on a 7-point Likert scale.

Academic Achievement

The Italian school system biannually awards summary grades for each subject on a 10-point scale, where 6 is a pass. We collected students' grades in February in Italian and math (the two main subjects common to all academic years and types of school). Each students' average grade was calculated as a measure of academic achievement. Italian and math scores correlated strongly ($r = .71$).

Procedure

After contacting various schools' principals working at schools that were easily reachable for the experimenters (i.e., within their university or hometown's region), responsible teachers of the schools that agreed to participate, distributed the consent forms to students and their parents. A Qualtrics link was then given to the teachers and students to complete the questionnaires at school under the supervision of a trained psychologist. Filling the questionnaires requested around 30 min per class. All the questionnaires were filled using technological mediums made available from the schools (i.e., tablets, pcs, or computers). Trained psychologists explained how the questionnaires had to be filled and ensured that every student comprehended the instructions. They remained in class for the entire time to answer every question and doubt the students had about the experiment.

At midterm (February), schools provided the official grades in Italian and math for each participant. Anonymous codes were created to allow the experimenters to match the results with the grades provided by the schools.

RESULTS

All analyses were run using the R package "lavaan" (Rosseel, 2012). Table S1 shows the means, standard deviations, and correlations.

Measurement Models

Before proceeding with the comparison between the hierarchic and the correlated models of grit, we ran three confirmatory factor analysis to ensure that each construct was adequately measured and its corresponding items were well explained by a single latent factor. In each model, the items were treated as ordinal variables (Pastore & Lombardi, 2014) and diagonally weighted least squares were used as the estimator. Results show that the adaptability model fitted the data well: χ^2 (26, $N = 602$) = 199.19, $p < .001$, CFI = 0.97, NNFI = 0.97, RMSEA = 0.10, 90% confidence interval for RMSEA [0.09, 0.12]. The same was true for the perseverance (χ^2 (2, $N = 602$) = 15.18, $p < .001$, CFI = 0.99, NNFI = 0.96, RMSEA = 0.10, 90% confidence interval for RMSEA [0.06, 0.15]) and the consistency (χ^2 (2, $N = 602$) = 1.47, $p > .05$, CFI = 1, NNFI = 1, RMSEA = 0.00, 90% confidence interval for RMSEA [0.00, 0.07]) models.

Additionally, model invariance was tested to ensure that the model was adequate for both middle school and high school students. Again, the fit indices remained adequate at both the configural and scalar invariance: CFI was always higher than 0.97, NNFI was always higher than 0.97, and RMSEA was always lower than 0.06.

The Hierarchic Model of Adaptability and Grit

Following the analysis of the measurement models, two confirmatory factor analyses were run to explore whether

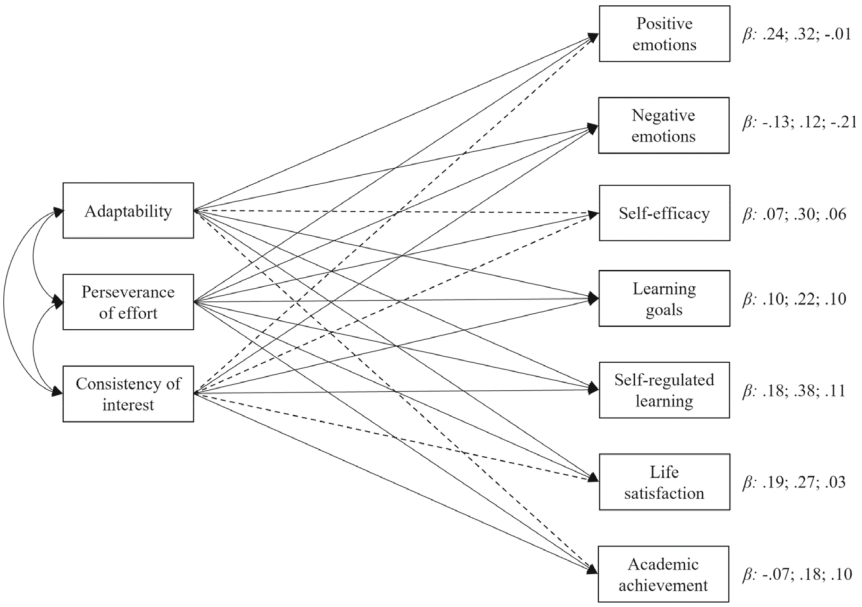

Fig. 1. Path model fitted: dotted lines represent nonsignificant relations ($p > .05$). Beta estimates are reported for adaptability, perseverance, and consistency respectively. Only manifest variables are included in the model. All results were controlled for conscientiousness and the dependent variables were correlated with each other. Complete results are reported in Table S2.

perseverance, consistency, and adaptability converged in a single second-order factor as Datu et al. (2017) suggested, or whether they should be considered as correlated factors (see Figure S1). Items were treated as ordinal (Pastore & Lombardi, 2014) and diagonally weighted least squares were used as the estimator.

Results show that the second model fit the data well: χ^2 (115, $N = 602$) = 495.12, $p < .001$, CFI = 0.97, NNFI = 0.96, RMSEA = 0.07, 90% confidence interval for RMSEA [0.07, 0.08], but the first model did not converge, suggesting that a triarchic model of grit does not capture the structure of the data well, at least in our data (Y., Rosseel, personal communication, March 4, 2022). Given that we could not statistically compare the two models (since one of them does not converge at all), we inspected the correlation matrix (Table S1), the latent correlations (Table S2), and the correlations from Datu et al. (2018). In all cases, the correlation between adaptability and consistency is very low (i.e., $r = .16, .25, .18$), suggesting that a latent factor is probably not necessary or even inadequate in these cases. We consequently simulated 1.000 random datasets from the same correlated-factors model. We then fitted the hierarchical model to these data. In all cases, the model converged, but the variance explained of the perseverance latent factor was negative in 99% of the cases, signaling that a general latent factor is inadequate to represent adaptability, perseverance, and consistency. Following this evidence, we will consider adaptability, perseverance, and consistency as three separate but correlated constructs. Factor loadings, correlations between the latent factors, and items of the correlated-factors model are reported in Table S2.

Relations between the Variables

A path model was run to evaluate the multivariate relations of conscientiousness (as a control variable), adaptability, perseverance, and consistence with a series of outcome variables: positive and negative achievement emotions, academic self-efficacy, learning goals, self-regulated learning, life satisfaction, and academic achievement. Manifest variables only were introduced in the model.

Results (see Figure 1 and Table S3) show that adaptability was significantly related to positive emotions, life satisfaction, SRL, negative emotions, and learning goals, but not to academic self-efficacy or academic achievement. Perseverance resulted associated with all the outcomes. Consistency resulted related to negative emotions, SRL, learning goals, and academic achievement, but not with positive emotions, academic self-efficacy, and life satisfaction.

Adaptability showed a positive significant correlation with perseverance, but not with consistency. Perseverance and consistency showed a small significant correlation.

Conscientiousness was significantly related to perseverance, consistency, and adaptability. In addition, it was also related to academic self-efficacy, SRL, negative emotions, academic achievement, and positive emotions, but not with learning goals and life satisfaction.

DISCUSSION AND CONCLUSIONS

Adaptability and grit are theorized as two different constructs that respectively support individuals in facing new and uncertain situations and reaching long-term goals. However, grit may not be as predictive if not considered as a stand-alone construct (Credé, 2018) and its interaction with different factors may influence its predictive value (Credé, 2018). In this respect, as Datu and colleagues suggested in their triarchic model of grit (Datu et al., 2017; Datu, Yuen, & Chen, 2016), adaptability may prove important (e.g., helping gritty people in unexpected situations and reach their goals in a more functional and flexible way) and therefore be considered as an additional facet of the grit construct. Despite presenting both theoretical and statistical shortcomings, this conceptualization highlighted the importance of considering adaptability and grit together, as we newly did in our study by taking into consideration adaptability (as measured by the adaptability scale, Martin et al., 2012), the two separated facets of grit (perseverance of effort and consistency of interest), conscientiousness, and a series of positive academic and nonacademic outcomes that have been previously related to both grit and adaptability.

As we anticipated (H1), the hierarchical model of grit, with the factors converging into a second-order factor representing grit as a triarchic construct composed of three facets (i.e., perseverance, consistency, and adaptability; as proposed, but not tested by Datu, Yuen, & Chen, 2016; Datu et al., 2017), did not converge. On the contrary, a model considering the three factors only as correlated showed satisfactory results and fit the data well, suggesting that adaptability, perseverance, and consistency are three separate but correlated constructs to be considered independently. This means that, even if partially overlapping and relating to similar variables, grit and adaptability are two theoretically separated constructs that respectively refer to perseverance and passion for long-term goals (grit; Duckworth et al., 2007) and to a positive response in the face of new, unexpected, or uncertain situations (adaptability; Martin et al., 2012). However, the two constructs are related and may interact with each other, thus requesting further analysis, as performed in the second part of our study.

For what concerns the relations with the outcome variables (H2), academic achievement related to perseverance and less with consistency (see also Credé et al., 2017), but no significant relations were found with adaptability (in line with previous large studies that suggested adaptability fosters academic achievement only indirectly; Burns et al., 2018; Feraco et al., 2021, 2023). Life satisfaction and positive emotions were positively related to both perseverance and adaptability, but not with consistency, suggesting once again that consistency plays a negligible role also for what concerns subjective well-being (Datu et al., 2018; Datu, Valdez, & King, 2016). On the contrary, more perseverant students reported a higher degree of negative emotions (in line with Datu et al., 2018), while consistency and adaptability showed a opposite relation. This might indicate that perseverant students persist toward their goal possibly ignoring negative emotions they might experience along the way, while adaptable students find ways to regulate them (at least in uncertain situations). An interaction between these factors may be the best solution in supporting students' well-being and emotions (Datu & Fong, 2018). Finally, for what concerns the learning goals, academic self-efficacy, and self-regulated learning, perseverance showed a primary role compared with both adaptability and consistency. Persevering despite difficulties may support students in choosing mastery over performance learning goals, feeling more confident in their ability to succeed at studying, as well as being able to self-regulate their strategies when learning, more than being adaptable or than keeping interests constant over time. These findings are in accordance with previous work on the two facets of grit (Wolters & Hussain, 2015) and may indicate that perseverance may be particularly relevant in facilitating these learning-related processes.

In line with previous evidence (Credé et al., 2017; Martin et al., 2013) and our expectations, conscientiousness is strongly related to perseverance and consistency, but less to adaptability, suggesting once again that perseverance and conscientiousness show a substantial overlap and confirming that it is fundamental to control for conscientiousness when evaluating grit's predictive role.

These results are substantially in line with our hypotheses, but they should be interpreted with caution given the exploratory approach we adopted, the convenience sample size used, and the cross-sectional approach that does not allow for any causal interpretation. Results concerning consistency and learning goals should be taken with caution because of the low reliability of these two measures in our sample. Despite this, some general conclusions and directions for future studies can be derived.

First, even if perseverance usually plays the most important role compared with adaptability and consistency, the three factors explain specific and different parts of the variances of the outcomes considered. This poses the foundations for a new line of inquiry that can try to add to the problem of what perseverance alone can predict and how, on the contrary, other factors such as adaptability support it (Credé, 2018). It may be, for example, that students who are both perseverant and adaptable will succeed in their goals while also being able to regulate their emotions and adopt the best coping strategies every time they face unexpected situations. These students should show higher degrees of academic achievement and life satisfaction or positive emotions when compared to students who are only perseverant

or adaptable. However, prior to continuing to study such an interaction, it is also important to longitudinally understand what the most plausible causal relation between adaptability and perseverance is. People may prove grittier because they know they will be able to adapt to the unexpected situations, but it may also be true that those who are grittier will be more willing to face and adapt to new circumstances.

To summarize, we believe the present study offers important theoretical and practical implications for all researchers interested in grit. Theoretically speaking, the evidence gathered seems to indicate that the two well-defined constructs of adaptability (Martin et al., 2012) and grit (Duckworth et al., 2007) are better understood as separate, yet related; future studies should rely on hierarchical modeling to either replicate or dispute this finding. On more practical grounds, our results would suggest that there may be an added value in working with adaptability and grit together, as training them both may lead to fruitful interactions in benefiting academic and nonacademic outcomes.

In conclusion, the present results indicate that adaptability and grit are separate, yet related, constructs, and that each gives a unique contribution to several students' academic and nonacademic outcomes, even after controlling for conscientiousness. Future studies may seriously consider studying them together to deeply understand their causal relation and indirect effects on these and other relevant outcomes.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.
Table S1. Means, Standard Deviations, Cronbach's alpha, and Correlations Between all Study Variables.
Table S2. Factor loadings and items of the correlated-factors model. Latent correlations between the three factors are provided at the bottom of the table.
Table S3. Standardized Results of the Path Model.
Figure S1. Visual Representation of the Correlated-Factors Model (left) and the Hierarchical Triarchic Grit Model (right).

CONFLICT OF INTEREST STATEMENT

The authors have no potential conflicts of interest to report.

DATA AVAILABILITY STATEMENT

Data are available on Figshare. https://doi.org/10.6084/m9.figshare.14791704.

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