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The role of parenting behavior's on the intergenerational covariation of grit

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Abstract
This study evaluates parental grit's covariation with offspring grit and the moderating role of different parenting behaviors using an 11-country study of young adults between the ages of 18 and 35 (n = 20,008) and their parents (n = 5945). Results show that parental grit is associated with offspring's grit with moderation of parenting present across the models presented. The study also highlights the direct association of various parenting dimensions with grit, especially the positive relation of parental control. These results have important implications for understanding young people's grit development and learning mechanisms. Findings can serve as foundations for effective intervention programs and practices in this field designed to improve enthusiasm, interest, capacity for hard work, engagement, and motivation in the long run.

Keywords Grit · Intergenerational covariation · Parenting · Personality trait · Young adults

In this study we explore if grit is consistent across generations and if specific parenting behaviors moderate its relationship. Grit has been identified as increasingly important for educational and labor force success (Duckworth & Quinn, 2009) and understanding the relevant socialization mechanisms responsible for the similarity in grit within families is of practical importance both in advising parents and developing early education practices. We draw on an 11-country two-generation study of young adults, the Cultural Pathways to Economic Self-Sufficiency and Entrepreneurship (CUPESSE) and the role of family values survey dataset (Tosun et al., 2019), to understand both the intergenerational covariation of grit and the moderating role of parenting behavior in this process. To date, no data source has provided multi-generational data with such extensive scope. We find a significant association of parental grit and of all three parenting dimensions explored (psychological control, warmth, and autonomy support) with offspring grit, with autonomy support having a clear additional positive moderating relationship. Some evidence points to a similar moderation relationship in the case of parental warmth. Additionally, we find evidence that parental control has a direct and increasing relationship with grit. Implications are broad for the understanding of young people's learning and development mechanisms. By understanding how grit is socialized across generations we lay the foundations for promising intervention programs and practices in this field designed to improve enthusiasm, effort, interest, capacity for hard work, engagement, and motivation.

The study proceeds as follows. First, we review grit and the socialization mechanisms explored. Then we switch to the empirics where the data and statistical analysis is introduced. We conclude by presenting and discussing the results.

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Grit: A Specific Personality Trait

Throughout the past decade grit has become a "hot topic" gaining widespread attention from researchers, policy-makers, practitioners, and even the press (Muenks et al., 2018). In their initial publications on grit, Duckworth et al. (2007) defined it as trait-level "perseverance and passion for achieving long-term goals" (p. 1087), a personal quality that combines enthusiasm, effort, interest, and a capacity for hard work over the years with adaptation to adversity and stress when faced with challenges (Duckworth et al., 2007).

Grit has been related to constructs from personality, motivation, and engagement literature. For example, authors like Duckworth et al. (2007), and Rimfeld et al. (2016) argue that grit is conceptually closely related to conscientiousness, a Big Five personality trait which can be defined as the self-regulation of impulses to plan and pursue goals or tasks. In fact, both concepts share several facets, such as organized, reliable, persistent, self-controlled, hard-working, goal orientation, and diligent (Ivcevic & Brackett, 2014; Vazsonyi et al., 2019). Furthermore, some studies suggest that grit overlaps with conscientiousness and other constructs related with self-regulation and engagement, and even that grit also captures aspects of skills such as resilience or other motivational variables (e.g., future-oriented motivation, self-efficacy, task values, and goal orientation) (e.g., Credé et al., 2017; Muenks et al., 2018). However, none of the (previous) conscientiousness facets measure the combination of passion and perseverance to achieve long-term goals that characterizes grit (Duckworth & Quinn, 2009; Rimfeld et al., 2016). Moreover, the sustained interest in important long-term goals, a core feature of trait grit, is not manifest in conscientiousness facets (Fernández et al., 2020). So, although the conceptual similarity between conscientiousness and grit is considerable, grit incorporates a particular and exclusive focus on the pursuit of long-term, higher-level goals, and different goal achievement strategies are required for this (Duckworth & Gross, 2014).

Grit as Predictor

A growing literature shows that grit plays a prominent role in explaining individual differences in productivity or performance in different spheres of life (e.g., education, employment, and health) (Fernández et al., 2020). Indeed, many studies have shown the prospective association of grit with adaptive consequential outcomes, such as educational attainment, academic performance, retention and persistence in different situations, and career success (e.g., career status and salary, retention in the workplace, or teaching effectiveness), as well as with other cognitive (e.g., spelling, literacy) and non-cognitive skills (e.g., general self-efficacy, self-control, engagement, resilience) linked to productivity or performance (see Credé et al., 2017; Muenks et al., 2017).

Grit as Outcome

Regarding the origin and malleability of grit, there have been notable behavioral genetic studies on the specific field of other character traits (e.g., intellectual interest, intellectual self-concept, and achievement motivation), that have shown both genetic and environmental influences (Tucker-Drob et al., 2016). A similar pattern has been found in genetics studies on Big Five personality traits and their facets (i.e., about 60% of personality's variance is attributable to environmental influences) (Vukasović & Bratko, 2015), which may serve as partial bases for grit (Tucker-Drob et al., 2016). Indeed, Rimfeld et al. (2016) conclude that the etiology of Grit is highly similar to other personality traits, not only in showing substantial genetic influence but also in showing no influence of shared environmental factors. Although Rimfeld et al.'s (2016) results must be interpreted with caution because of the problems underlying twin studies (Joseph, 2015), and the fact that in that study they do not use a single score of grit (rather than consistency of interest and perseverance of effort as separate measures) as recommended by the original authors (Duckworth & Quinn, 2009). Furthermore, many personality traits "tend to run in families, and this familiarity is often interpreted as evidence for the impact of parent behavior on child development" (McAdams et al., 2014, p. 1138). So, personality characteristics of parents and children may be linked through different learning processes, such as social processes of imitation and modeling (McAdams et al., 2014; Schofield et al., 2012), verbal transmission of information from parent to child (McAdams et al., 2014), and parenting behaviors that they direct toward their child (Costa et al., 2018; Kitamura et al., 2009; McAdams et al., 2014; Schofield et al., 2012).

In this context, variation in grit could result from genetic influences (i.e., with a positive association between parent and offspring grit), and environmental factors (e.g., social factors such as parents, siblings, peers, teachers, other adults, mass media), including potential psychological sources as Duckworth et al. (2007) considered. More precisely, evidence from empirical studies has shown that the following factors might have predictive ability for grit (Fernández et al., 2020): (a) life purpose commitment (Hill et al., 2016), (b) hope and search for meaning in life (Vela et al., 2015); (c) pursuing happiness in life (Von Culin et al., 2014); (d) perceived mastery school goal structure (Park et al., 2018); (e) achievement goal orientations (Akın & Arslan, 2014);

(f) education-related goal commitment (Tang et al., 2019); (g) others-focused purpose, success-focused purpose, time spent in socializing, time spent in academic activities, and religious beliefs (Sriram et al., 2018); (h) belief in free will (Li et al., 2018); (i) reflecting on past failures (DiMenichi & Richmond, 2015); (j) growth mindset (Wang et al., 2018); (k) physical activity (Gilchrist et al., 2018); (l) the mindfulness facets of acting with awareness and non-judging (Raphiphatthana et al., 2018); (m) sense of relatedness to parents, teachers, and friends (Datu, 2017); and (n) certain dimensions of parental behaviors (Howard et al., 2019).

Parenting Behavior

Parental factors are one of the most proximal and early environmental influences that directly condition offspring development; parenting behaviors and strategies have been associated with a host of child and adolescent outcomes, such as educational achievement, social behavior, mental health, and competence in different areas (McAdams et al., 2014). Moreover, parenting was shown to mediate the intergenerational transmission of attitudes, values, and traits, such as personality (Kitamura et al., 2009; McAdams et al., 2014; Schofield et al., 2012). Parenting describes the attitudes, beliefs, and behaviors that parents engage in towards their children, which create a persistent emotional climate in a broad range of situations (Darling & Steinberg, 1993).

The dimensional approach to the study of parenting has disaggregated parental behaviors into several dimensions or components, which include parental warmth, autonomy support, and control (Pinquart, 2016, 2017; Prinzie et al., 2009). Parental *warmth* is defined as the open display of affection, emotional closeness, and support towards children and was shown to increase the likelihood of parent-child outcome congruence by making children more likely to emulate the example of their parents (Maccoby & Martin, 1983). Parental *autonomy support* can be observed when parents allow their children to make their own choices about their behavior and activities and solve problems on their own (Grolnick et al., 1997). Finally, parental *control* encompasses the behaviors by which parents monitor and manage their children (Maccoby & Martin, 1983) and can take the form of behavioral and psychological control (Barber, 1996). The first type of control refers to the use of external pressures (such as rules, rewards, and sanctions) to regulate children's thoughts, emotions, and behavior, while the second involves guilt and shame induction, love withdrawal, and the use of separation anxiety.

Previous studies have reported that high levels of parental warmth and autonomy support are associated with positive developmental outcomes, such as academic competence, autonomy, social skills, prosocial behavior, empathy, and positive peer relationships, to name but a few (Roth & Assor, 2012). On the other hand, excessive parental control, especially psychological control, contributes to internalizing (e.g., depression, anxiety, guilt, low self-esteem), as well as externalizing problems (e.g., delinquency, aggression, suicide attempts) (Janssens et al., 2015; Pinquart, 2016, 2017; Prinzie et al., 2009). Additionally, certain combinations of levels on these parenting dimensions are more effective than others in promoting positive behavioral outcomes and successful intergenerational transmission. This is especially the case for the authoritative parenting style (Collins et al., 2000; McAdams et al., 2014), which designates the combination of high levels of parental warmth (or responsiveness) and control (or demandingness) (Maccoby & Martin, 1983).

While much of the research on the association of parenting behaviors to child and adolescent outcomes focuses on Western cultures, more recent studies have pointed out variations in this association based on cultural context. Such cross-cultural variations can be explained by differences in socialization goals and practices, the prevalence of parenting behaviors or the level of individualism versus collectivism (Olivari et al., 2015; Pinquart & Kauser, 2018).

Given the evidence in support of the intergenerational variations of a series of traits, including personality, it is to be expected that parental grit will also be a significant predictor of children's grit. However, previous attempts at analyzing parent-child similarity in grit have been rather sparse and limited in scope (Tucker-Drob et al., 2016). Moreover, parenting behavior was shown to directly influence children's levels of grit. Howard et al. (2019) report that higher grit is promoted by acceptance/involvement in parenting behaviors (consistent with high warmth) and moderate, but not excessive, levels of psychological and behavioral control. Interestingly, in this study, autonomy granting was not significantly associated with grit. Studies of attachment styles to parents during childhood also show that respondents who report secure attachment, consisting of high care and low overprotection from their parents, are higher in grit (Mandelbaum, 2018). Moreover, several recent dissertations using student samples report that overparenting (which involves excessive parental involvement and control) has a detrimental relationship with grit, while autonomy support and an authoritative parenting style are positively related to grit (e.g., Dunn, 2018).

The Present Study

This study contributes to a better understanding of the development of grit by analyzing first, the extent of intergenerational similarity between parental and young adults' grit, and second, the moderating role of three parenting dimensions (warmth, psychological control, and autonomy support) on the intergenerational covariation of grit. More specifically, our hypotheses are as follow:

Hypothesis 1: Parental grit is associated with youth grit.
Hypothesis 2: Parent-youth grit relationship is moderated positively by parental warmth.
Hypothesis 3: Parent-youth grit relationship is moderated positively by parental autonomy support.
Hypothesis 4: Parent-youth grit relationship is moderated negatively by parental psychological control.

Method

Participants

A sample of 20,008 young adults between the ages of 18 and 35 participated in this study with an average age of 26.8 years old ($SD = 5.1$), and a distribution by gender of 47.37% male and 52.63% female. A proportional stratified random sampling technique was used with regions (at minimum Nomenclature of Units for Territorial Statistics [NUTS] 2), employment status, age and sex used as strata. Study participants were asked to provide their parents' contact information. The parent sample includes 3853 mothers and 2368 fathers (5945 cases where at least one parent is observed) with the average birth year of 1962 ($SD = 7.5$) for mothers and 1960 ($SD = 8.3$) for fathers. Each young adult's responses were matched to the parents who participated in the survey. In Hungary and Czechia, the design allowed for responses from both parents. In such cases only the parent with the lower sample size was used (fathers in both countries) discarding the other parent from the analysis. For additional information on the data see Tosun et al. (2019).

Measures

Grit was measured using the original Short Grit Scale (Grit-S) (Duckworth & Quinn, 2009). To save space, two items with lower loadings in the original scale were excluded from the master survey (i.e., items 3 and 8). Ordinal Omega reliability of grit was 0.73 with all countries scoring above 0.7 except for Denmark (0.64). Parental grit was similar for fathers (overall 0.74) but generally lower for mothers (0.69). All country and parent specific ordinal omega estimates were above 0.6 (see Appendix A for a detailed description of the items measuring grit variable).

Invariance test with multi-group confirmatory factor analysis yielded acceptable metric invariance (the level necessary for regression analysis) for youth grit using a single factor solution and the residuals of the two forward coded items correlated (Chi-squared [χ^2] = 1099.6, degree of freedom [df] = 138, Comparative Fit Index [CFI] = 0.949, Tucker-Lewis Index [TLI] = 0.939, Root Mean Squared Error of Approximation [RMSEA] = 0.063, Standardized Root Mean Squared Residual [SRMR] = 0.051). The same was the case for mothers ($\chi^2 = 312.2$, df = 138, CFI = 0.942, TLI = 0.931, RMSEA = 0.061, SRMR = 0.055), but fathers yielded mildly weaker, but arguably still acceptable metric invariance results on most statistics ($\chi^2 = 306.1$, df = 138, CFI = 0.920, TLI = 0.904, RMSEA = 0.075, SRMR = 0.076).

Parenting behavior was assessed retrospectively by asking how young adults perceived their father's and mother's parenting behavior around the time they were 14 years old. Young adults answered yes or no to eight statements about each of their parents. These eight items were selected from existing psychometrically validated measures of parenting behavior: (a) three items were drawn from the short form of the Egna Minnen Beträffande Uppfostran (Arrindell et al., 1999) to measure parental responsiveness or warmth (item agreement between 88% and 89% for mothers, and 82–83% for fathers); (b) two items were drawn from the Psychological Control Scale-Youth Self Report (Barber, 1996) to measure parental psychological control (item agreement was 69% for mothers, and 71% for fathers); and (c) three items were drawn from the Autonomy Granting Scale (Silk et al., 2003; Soenens et al., 2007) to measure parental autonomy granting (item agreement between 66 and 75% for mothers, and between 63 and 77% for fathers). The criteria to select the items from each of the scales was high face validity (i.e., conceptually central to the dimension from which they are selected) and high statistical performance (i.e., high factor loadings, item-scale correlations, high correlations with individual items and maximal variability in responses). Due to space limitations in the master survey we had to limit the number of validated measures of parenting behavior eventually included (see Appendix A for a more detailed description of the items measuring parenting behavior variables).

Scales scores for grit, parental grit and the three parenting behavior dimensions were derived using factor analysis by `umxEFA` of the `umx` package (Bates et al., 2019). Given the dichotomous nature of the parenting scale response categories, Item Response Theory was also considered but discarded as the scores produced with the two different approaches had 0.97 correlation. Since `umx` uses `OpenMX` as it's engine, it allows for Full Information Maximum Likelihood estimation in the presence of item missing data (Neale et al., 2016). Scale reliability was calculated with the `scaleReliability` command of the `userfriendlyscience` package and simple descriptive statistics (Peters, 2015). Since parenting behavior dimensions scales were composed of two or three dichotomous items, pairwise item agreements or agreement ranges are reported as indicators of reliability. Invariance tests are unrealistic with so few items. In fact, country-by-country results are entirely omitted for brevity.

A number of variables were used as *control variables* because they are paramount to properly understanding the relationship between parenting behavior and personality

traits (e.g., grit), as informed by previous empirical work (Costa et al., 2018; Pinquart & Kauser, 2018). *Age* was measured in years. *Gender*, *Minority/ethnic group*, and *Have children* were coded dichotomously. Respondents indicated their highest accomplished *Level of education* following an adaptation of the International Standard Classification of Education. Respondents indicated their *Legal marital status* by choosing one of seven response options. Respondents rated their *Religiosity* on a 10 points Likert-type scale (see Appendix A for a more detailed description of the items measuring control variables).

Procedure

The data used in this study were collected through a survey as part of a large-scale research project on the CUPESSE and the role of family values in 11 European countries (i.e., Austria, the Czech Republic, Denmark, Germany, Greece, Hungary, Italy, Spain, Switzerland, Turkey, and the United Kingdom [UK]) from February to April of 2016. Access to data and study materials is possible under request to the authors. This project involved researchers from several fields across the social sciences (sociology, political science, psychology, economics, education, and business administration) at different academic institutions. The country selection reflected important dimensions of economic variation within Europe as well as variation with regard to their political systems and welfare state arrangements (Tosun et al., 2019).

The master version of the two questionnaires was developed in English and then youth-proofed before translation into the respective national languages by each country team following the Translation, Review, Adjudication, Pre-testing, and Documentation (TRAPD) method recommended by the Survey Research Center (2016). The execution of the TRAPD method first involved selecting two professional translators, each of whom independently generated their own national language version of the questionnaires (i.e., parallel translation). Secondly, the translators and members of the research team with strong language skills in the national language and English and extensive experience of developing evaluation instruments reviewed both translations and analyzed their linguistic and cultural equivalency with the master version of the two questionnaires, which generated a variety of proposals or suggestions on the differences detected with the items from the master version of the two questionnaires. Thirdly, adjudication was carried out, i.e., decisions were taken by the research team in conjunction with the translators and reviewer on the different translation options of the items on the master version of the two questionnaires to ensure its linguistic and cultural adaptation. Fourthly, a pilot test of the national languages adaptation of the two questionnaires was conducted by each country team with a sample population. Finally, to ensure that the different language versions of the English instrument were conceptually equivalent in each of the target countries, the questionnaires were subsequently translated back to English and then checked by bilingual language experts.

The fieldwork was undertaken by different polling companies operating in each country. Panels of polling firms were recruited "by invitation only" using hundreds of websites with validated databases. Prospective respondents were sent an online invitation and given 14 days to respond. The invitation to panel members provided information on the objectives of the research, the voluntary nature of their participation, and the confidentiality of their responses. The questionnaire was administered on-line or face-to-face to the panel members who elected to participate.

To sources of survey bias a Total Survey Error minimization was applied. The primary mode of youth data collection was online, but in two countries where the data collection agency advised that data quality will suffer severely in the online mode and cost structures allowed a switch, face-to-face survey was substituted. Nine of the 11 youth questionnaires were conducted online, one was conducted face-to-face using computer assisted personal interviewing, and one was conducted face-to-face using paper and pencil. For the youth questionnaire, survey companies were asked to provide a probability sample of individuals between the ages of 18 and 35 representative of employment status (e.g., employed; self-employed; unemployed; in education/training), NUTS 2 region, age group, education, and migration background/minority group membership.

Given lower Internet usage in the older age group, to maximize response rate and data quality, most parental survey interviews were conducted using mixed modes, including online, computer assisted telephone interviewing, computer assisted personal interviewing, and paper and pencil. Despite the different survey modes, the sampling frames were consistent. For the parental questionnaire, the strategy consisted of recruiting all parents for which the youth provided contact information.

In terms of sample size, the minimum requirement per country was 1000 young adult respondents and 500 parents, with a reasonable proportion of fathers and mothers.

Data Analysis

Analysis is observational and correlational using multiple regression analysis. Dependent variable is youth grit, and the main predictor is parental grit (Model 1). Of specific interest are three parenting behavior variables and their interactions with parental grit in predicting youth grit. To avoid multicollinearity bias, especially problematic in the presence of interactions, we present the three parenting behavior variables' interactions with parental grit individually (Models 2–4), and also in a model that includes all three at once (Model 5). We present all these results both with (Models

6–10) and without (Models 1–5) control variables to highlight their negligible relationship.

When assessing parent-offspring dyads, in the case of the two countries that included both parents, dyadic analyses were not performed due to the very low number of cases and only fathers were used. Also, it is customary to only include cases where the parents were also observed, but this could lead to bias if offsprings with unobserved parents differ from those whose parents were available to respond. For this reason, instead of excluding the young people whose parents did not take part in the study, we used multiple imputation as this approach alleviates the bias (King et al., 2001; Schafer, 1999) (i.e., results were compared between the listwise deleted and imputed models. Results only differed in Models 5 and 10 in the significance of the interaction effects. With listwise deletion, warmth and control were significant. However, Models 5 and 10 are difficult to interpret due to potential multicollinearity and overspecification and the rest of the results remained the same in magnitude and significance). m = 40 imputations were done using the `Amelia` package (Honaker et al., 2011). Multiply imputed regression models were run with `Zelig` (Imai et al., 2008). Interactions were plotted with `interplot` (Solt & Hu, 2015).

Statistical analyses were carried out using `R` (R Core Team, 2020).

Results

Regression coefficients are presented in Table 1 (correlation matrix is in Appendix B for comparison). Overall, parental grit explains 10% of the variation (Model 1) and the model with all the predictors and controls explain 13.8% (Model 10). Parental grit and the three parenting behaviors have a strong consistent association with youth grit across the models presented. Being older, female, more educated or having children is associated with lower grit whereas being from an ethnic minority or being divorced (vs. single; also, having another marital status also suggests lower grit, but due to its catch all nature, it is difficult to interpret) is associated with higher grit. Suggestive positive results are present for being married and widowed but, probably due to a relatively low sample size in these groups, do not reach (or consistently reach) a reasonable level of statistical significance. Religiosity seems to have no association with grit both in its effect size and statistical significance.

Country-fixed effects (country dummy predictors - omitted from the table for brevity and clarity) suggest lower youth grit for Eastern and Southern European countries and higher in the rest. Exceptions to this rule are Italy, which has substantially higher grit than most, and Switzerland, which is at the bottom of the pack. The highest levels of youth

Table 1 OLS Results: Youth (15–35) Grit Predicted by Parental Grit and Parenting Style (and Controls) in 11 Countries

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Parental Grit	0.267***	0.262***	0.252***	0.263***	0.249***	0.262***	0.258***	0.251***	0.259***	0.248***
Parenting: Warmth		−0.065***			−0.027***		−0.062***			−0.028***
Parenting: Control			0.116***		0.109***			0.109***		0.102***
Parenting: Autonomy				−0.046**	−0.022**				−0.042**	−0.02**
Parental Grit x Warmth		0.016*			0.002		0.016*			0.003
Parental Grit x Control			−0.007		−0.005			−0.007		−0.004
Parental Grit x Autonomy				0.024***	0.021***				0.024***	0.021***
Age						−0.018***	−0.018***	−0.017***	−0.018***	−0.018***
Female						−0.087***	−0.092***	−0.079***	−0.087***	−0.081***
Education						−0.049***	−0.045***	−0.042***	−0.047***	−0.04***
Ethnic Minority						0.222***	0.209***	0.175***	0.215***	0.168***
Have Children						−0.073**	−0.075**	−0.075**	−0.073**	−0.076**
Married						0.046+	0.045+	0.026	0.047+	0.027
Divorced						0.177**	0.154**	0.114**	0.172**	0.104+
Widowed						0.165	0.143	0.082	0.16	0.072
Marital Status: Other						−0.072*	−0.075*	−0.075*	−0.073*	−0.077*
Religiosity						0.003	0.004	0	0.003	0.001
(Intercept)	−0.016	−0.016	−0.011	−0.017	−0.012	0.366***	0.359***	0.352***	0.36***	0.347***
n	20,008	20,008	20,008	20,008	20,008	20,008	20,008	20,008	20,008	20,008
R-Squared	0.099	0.102	0.12	0.102	0.123	0.117	0.121	0.136	0.12	0.138

Table omits included country fixed effects for Czechia, Denmark, Germany, Hungary, Italy, Spain, Switzerland, Turkey, UK, Ref: Austria; $^{***}p<0.001$; $^{**}p<0.01$; $^{*}p<0.05$; $+p<0.1$

grit are observed in the UK. Additional comparison of the countries, especially for the interaction effects, would be desirable but inadequate statistical power does not allow it.

From the main effect, it appears that warm and autonomy supporting parenting decreases young adults' grit, but from the first row of Fig. 1 (left and right side of first row) it is clear this is not the case for parents whose grit is in the highest trecile. Parental psychological control increases youth grit independent of parental grit (middle of first row), but this increase is stronger for lower levels of parental grit. Looking at the conditional effect of parental grit on offspring's grit in the second row, the association gets stronger with parental warmth and autonomy support (left and right side of second row). The opposite is the case for parental control (middle of second row), with increased psychological control the association gets weaker. When interpreting these results, one should not forget that a positive relationship could mean that lower grit is associated with lower grit, and not necessarily just high grit associated with high grit.

Discussion

This article explores parents-offspring covariation of grit and the direct and moderating role of different dimensions of parenting behavior. More specifically, we hypothesized that: (1) parents' grit will be positively related to young adults' grit; (2–4) parenting behavior will moderate the relationship between parents' grit and young adults' grit. Considering the results obtained, the conclusions of the study are as follows. First, regression results yield a statistically significant association between parental grit and youth grit explaining around 10% of the variation in the dependent variable. This supports our first hypothesis that youth grit is positively associated with their parents' grit, although only modestly. We also find significant moderation relationship of each one of the three parenting behaviors analyzed, which supports our second, third and fourth hypotheses, indicating that certain parenting behaviors are more conducive than others to parent-child grit similarity. Specifically, high psychological control appears to weaken the transfer of grit from parent to offspring, while warm and autonomy supportive parenting has a positive association with the transfer. These results are in line with previous research showing that parenting is an important moderating factor in the intergenerational transmission process (Murray & Mulvaney, 2012).

Of note, in addition, is the direct role of parenting behavior on grit. While excessive levels of parental control are detrimental to a series of child and adolescent outcomes, our results show that higher levels of psychological control are conducive to building grit. On the other hand, warm and autonomy supportive parenting decreases young adult's grit and only has a positive relationship when the parents are also high on grit.

It is possible that high levels of parental psychological control are associated with higher levels of grit in young adults due to the latter using grit as a coping mechanism. Thus, children whose parents are psychologically controlling

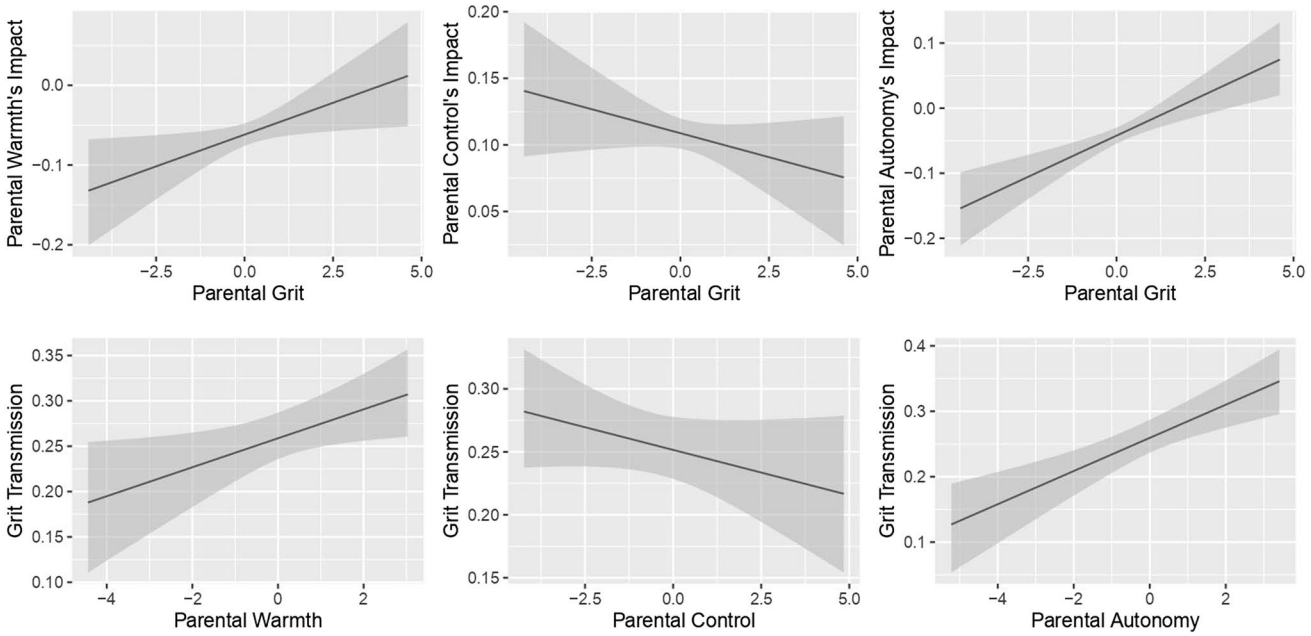

Fig. 1 Marginal Effects for the Interactions based on Models 7–9. *Note*. Y axis shows the effect of parenting dimensions (first row) given all levels of grit and the effect of parental grit (grit variation) given different parenting dimensions. Y axis is interpretable as a regression coefficient. Grey area is 95% confidence interval

become more resilient as a way of adapting and meeting the demands of their parents. This interpretation is supported by the finding that parental psychological control increases youth grit independent of parental grit (parents can be either low or high in grit). On the other hand, warm and autonomy supportive parenting fosters the kind of safe and accepting family climate that does not require high levels of grit. Parents high in warmth and low in grit might be more permissive, thereby not expecting their children to persevere in their endeavors and allowing them to give up more easily. Similarly, parental autonomy support could help children discover their passions and interests, but in the absence of moderate levels of parental control, children would likely not follow through on pursuing these interests in a manner consistent with high levels of grit. However, when parents themselves are high in grit, parental warmth and autonomy support are associated with higher levels of offspring grit, likely due to the fact that these parenting behaviors increase children's motivation to emulate and internalize the example set by their parents. Therefore, these results could reveal a potential dual mechanism underlying the learning and development of grit as a single compound construct, with parental warmth and autonomy nurturing passion and consistency of interest and parental psychological control provoking perseverance of effort in the long-term with adaptation to adversity and stress when faced with challenges (Duckworth et al., 2007).

Demographic variables indicate that levels of grit are lower for older, female, and more educated young adults, as well as those that have children. On the other hand, ethnic minorities or divorced participants have higher levels of grit, while no significant association is found for religiosity.

Hypothesis 1 results have important implications at the theoretical level, since they endorse those approaches that treat grit as a malleable specific personality trait. Indeed, these results align with those of McAdams et al. (2014), which points out that many personality traits "tend to run in families". At the practical level, considering the role of grit on personality, motivation, and engagement development (Duckworth et al., 2007; Ivcevic & Brackett, 2014; Muenks et al., 2017; Rimfeld et al., 2016; Vazsonyi et al., 2019), these results also fuel the intervention research movement of programs and practices aimed at including grit in the school curriculum (e.g., SRI International, 2018).

Hypotheses 2–4 results contribute to extending the research results supporting the current theoretical models of parenting behaviors, styles and/or dimensions as an important socialization factor moderating the development of this specific personality trait, which entails important implications for young people's further learning and development. Furthermore, parental behaviors measured through the instrument adopted by this study, endorses the specific imitation, modeling and verbal processes articulating the transmission process of grit from parents to young adults, suggested earlier by Costa et al. (2018), Kitamura et al. (2009), McAdams et al. (2014), and Schofield et al. (2012).

The additional contribution of this research lies in the fact that the moderating role of parenting was measured against a specific personality trait, which has been associated with higher levels of educational, professional, and social accomplishment (Collins et al., 2000; Fernández et al., 2020; McAdams et al., 2014). Furthermore, the fact that parenting was assessed through a combination of operationalized items taken and adapted from extended measures of different dimensions of parenting (i.e., emotional, cognitive, and behavioral), without compromising adequate psychometric properties, translates into a more reliable set of trainable behaviors to focus on when developing intervention programs in this field. However, while the specific set of parenting behaviors linked to warm and supportive parenting showing a relationship with offspring's grit can serve as a basis for intervention programs on parenting behavior, this is probably not the case for parenting behaviors linked to psychological control, whose potential long-term consequences do not recommend it as a strategy for effectively and sustainably building grit. In this case more research is necessary to uncover the behavioral and psychological processes underlying the prospective association between parental psychological control and youth grit.

Different threats to this study's validity and precision can be identified though. First, because the study sample is not a perfect random selection from some registered target population but is prone to nonresponse bias and hence a selection on a voluntary basis not unrelated to the dependent variable, the young adults sample representativeness could be compromised. To prevent this threat a proportional stratified random sampling technique was used with regions (i.e., NUTS 2), employment status, age and sex working as strata. Similar concern applies to the parents' sample size and selection process although it has been corrected by statistical evaluation as explained previously under the statistical analysis section. In all fairness, all survey-based studies of grit will inevitably suffer from this limitation.

Second, mismeasurement could stem from the retrospective nature of the data, especially the recall questions about parenting inquiring about what life was like at age 14 for respondents who can be as old as 35. While this is potentially problematic, other measurement issues can be overcome by good design, planning, and an acceptable internal consistency of the instrument utilized which were all considered during the design of the project survey. Ideally, we would measure parenting and possibly also parental grit, at the time the parenting takes place and follow up decades later to see its results. This said, the logistics of a multi-country study spanning across multiple decades makes such research quite unrealistic. And third, another source

of bias are potential confounders, which were identified from the available specialized literature and incorporated in the regression model as explanatory factors. The effects of the individual factors were then calculated and adjusted for the others. Furthermore, the effect of a potential confounder was checked by comparing the results from different models calculated with and without the incorporation of the confounder. The adjusted and non-adjusted parameters were then published next to each other. We also cross-checked the results using more simple analytical methods and all models, except model 10 which is also plagued with collinearity problems, are robust to modeling decisions. While these models have acceptable fit for observational studies of their kind, the true data generating process is not known and a large proportion of the variance in youth grit remains unexplained. We interpret the models for parenting dimensions individually, which are consistent in direction with the combined model, but we cannot ignore the fact that children can be exposed to more than one parenting influence at one time coming from each one of the progenitors. At the same time, the strength of this study is its breadth and ability to draw inferences across multiple generations using data from 11 different European countries.

Conclusions

First, this study provides strong results in favor of those theoretical approaches defending that specific personality traits like grit can be modified by being exposed to certain learning and socialization processes, which includes parenting behaviors and practices. Second, this study contributes to providing statistically significant evidence that parental factors are one of the most proximal and early contextual influences that directly determine their offspring's personality and therefore, learning and development. And third, interaction effects suggest that parental behaviors work differently in terms of facilitating youth grit development and that some of them can become even counteractive. Finally, based on the data utilized for this research, we count on a reliable sample of parents' behavior to design and implement effective intervention programs and practices on parenting behavior.

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Author Contributions FDF-M, JLA-T, and E-CM were responsible for conceptualization and methodology. LL was responsible for the formal data analysis process as well as the proofreading of the paper in English. FDF-M, JLA-T, and E-CM were responsible for reporting the results and writing the discussion and conclusions. All authors were responsible for reviewing, editing, visualization, supervision and resources and have read and agreed to the published version of the manuscript.

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Data Availability The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Code Availability Not applicable.

Declarations

Ethic Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The study was approved by the ethics committees of NetQuest and Pompeu Fabra University (UPF).

Consent to Participate Informed consent was obtained from all individual participants included in the study.

Consent for Publication The participant has consented to the submission of the case report to the journal.

Conflicts of Interest/Competing Interest The authors have no relevant financial or non-financial interests to disclose.

References

Akın, A., & Arslan, S. (2014). The relationships between achievement goal orientations and grit. *Education and Science, 39*(175), 267–274. https://doi.org/10.15390/EB.2014.2125

Arrindell, W. A., et al. (1999). The development of a short form of the EMBU: Its appraisal with students in Greece, Guatemala, Hungary and Italy. *Personality and Individual Differences, 27*(4), 613–628. https://doi.org/10.1016/S0191-8869(98)00192-5

Barber, B. K. (1996). Parental psychological control: Revisiting a neglected construct. *Child Development, 67*(6), 3296–3319. https://doi.org/10.2307/1131780

Bates, T., Maes, H., & Neale, M. (2019). Umx: Twin and path-based structural equation modeling in R. *Twin Research and Human Genetics, 22*(1), 27–41. https://doi.org/10.1017/thg.2019.2

Collins, W. A., Maccoby, E. E., Steinberg, L., Hetherington, E. M., & Bornstein, M. H. (2000). Contemporary research on parenting.

The case for nature and nurture. *American Psychologist, 55*, 218–232. https://doi.org/10.1037/0003-066X.55.2.218

Costa, S., Barberis, N., Gugliandolo, M. C., Larcan, R., & Cuzzocrea, F. (2018). The intergenerational transmission of trait emotional intelligence: The mediating role of parental autonomy support and psychological control. *Journal of Adolescence, 68*, 105–116. https://doi.org/10.1016/j.adolescence.2018.07.008

Credé, M., Tynan, M. C., & Harms, P. D. (2017). Much ado about grit: A meta-analytic synthesis of the grit literature. *Journal of Personality and Social Psychology, 113*, 492–511. https://doi.org/10.1037/pspp0000102

Darling, N., & Steinberg, L. (1993). Parenting style as context: An integrative model. *Psychological Bulletin, 113*(3), 487–496. https://doi.org/10.1037/0033-2909.113.3.487

Datu, J. A. D. (2017). Sense of relatedness is linked to higher grit in a collectivist setting. *Personality and Individual Differences, 105*, 135–138. https://doi.org/10.1016/j.paid.2016.09.039

DiMenichi, B. C., & Richmond, L. L. (2015). Reflecting on past failures leads to increased perseverance and sustained attention. *Journal of Cognitive Psychology, 27*, 180–193. https://doi.org/10.1080/20445911.2014.995104

Duckworth, A. L., & Gross, J. J. (2014). Self-control and grit: Related but separable determinants of success. *Current Directions in Psychological Science, 23*, 319–325. https://doi.org/10.1177/0963721414541462

Duckworth, A. L., & Quinn, P. D. (2009). Development and validation of the short grit scale (GRIT–S). *Journal of Personality Assessment, 91*, 166–174. https://doi.org/10.1080/00223890802634290

Duckworth, A. L., Peterson, C., Matthews, M. D., & Kelly, D. R. (2007). Grit: Perseverance and passion for long-term goals. *Journal of Personality and Social Psychology, 92*, 1087–1101. https://doi.org/10.1037/0022-3514.92.6.1087

Dunn, K. M. (2018). *Investigating parenting style and college student grit at a private mid-sized New England University* (Publication No. 10750334) [Doctoral dissertation, Johnson & Wales University]. ProQuest Dissertations & Theses Global.

Fernández, F. D., Arco, J. L., & Hervás, M. (2020). Grit as a predictor and outcome of educational, professional and personal success: A systematic review. *Revista Psicología Educativa, 26*(2), 163–173. https://doi.org/10.5093/psed2020a11

Gilchrist, J. D., Fong, A. J., Herbison, J. D., & Sabiston, C. M. (2018). Feelings of pride are associated with grit in student-athletes and recreational runners. *Psychology of Sport and Exercise, 36*, 1–7. https://doi.org/10.1016/j.psychsport.2017.12.009

Grolnick, W. S., Deci, E. L., & Ryan, R. M. (1997). Internalization within the family: The self-determination theory perspective. In J. E. Grusec & L. Kuczynski (Eds.), *Parenting and children's internalization of values: A handbook of contemporary theory* (pp. 135–161). Wiley.

Hill, P. L., Burrow, A. L., & Bronk, K. C. (2016). Persevering with positivity and purpose: An examination of purpose commitment and positive affect as predictors of grit. *Journal of Happiness Studies, 17*, 257–269. https://doi.org/10.1007/s10902-014-9593-5

Honaker, J., King, G., & Blackwell, M. (2011). Amelia II: A program for missing data. *Journal of Statistical Software, 45*(7), 1–47. https://doi.org/10.18637/jss.v045.i07

Howard, J. M., Nicholson, B. C., & Chesnut, S. R. (2019). Relationships between positive parenting, overparenting, grit, and academic success. *Journal of College Student Development, 60*(2), 189–202. https://doi.org/10.1353/csd.2019.0018

Imai, K., King, G., & Lau, O. (2008). Toward a common framework for statistical analysis and development. *Journal of Computational Graphics and Statistics, 17*(4), 892–913. https://doi.org/10.1198/106186008X384898

Ivcevic, Z., & Brackett, M. (2014). Predicting school success: Comparing conscientiousness, grit, and emotion regulation ability. *Journal of Research in Personality, 52*, 29–36. https://doi.org/10.1016/j.jrp.2014.06.005

Janssens, A., Goossens, L., Van Den Noortgate, W., Colpin, H., Verschueren, K., & Van Leeuwen, K. (2015). Parents' and adolescents' perspectives on parenting: Evaluating conceptual structure, measurement invariance, and criterion validity. *Assessment, 22*(4), 473–489. https://doi.org/10.1177/1073191114550477

Joseph, J. (2015). *The trouble with twin studies: A reassessment of twin research in the social and behavioral sciences*. Routledge/Taylor & Francis Group.

King, G., Honaker, J., O'Connell, A. J., & Scheve, K. F. (2001). Analyzing incomplete political science data: An alternative algorithm for multiple imputation. *American Political Science Review, 95*(1), 49–69. https://doi.org/10.1017/S0003055401000235

Kitamura, T., Shikai, N., Uji, M., Hiramura, H., Tanaka, N., & Shono, M. (2009). Intergenerational transmission of parenting style and personality: Direct influence or mediation? *Journal of Child and Family Studies, 18*, 541–556. https://doi.org/10.1007/s10826-009-9256-z

Li, J., Zhao, Y., Lin, L., Chen, J., & Wang, S. (2018). The freedom to persist: Belief in free will predicts perseverance for long-term goals among Chinese adolescents. *Personality & Individual Differences, 121*, 7–10. https://doi.org/10.1016/j.paid.2017.09.011

Maccoby, E. E., & Martin, J. A. (1983). Socialization in the context of the family: Parent-child interaction. In P. H. Mussen (Ed.), *Handbook of child psychology* (Vol. 4, 4th ed., pp. 1–101). Wiley.

Mandelbaum, T. (2018). The relationship between attachment and grit in lower income adolescents. *Journal of Character Education, 14*(1), 59–74. https://www.proquest.com/docview/2114227604/fulltextPDF/2A7053670B724E8APQ/1?accountid=14542. Accessed 25 Jan 2021.

McAdams, T. A., Neiderhiser, J. M., Rijsdijk, F. V., Narusyte, J., Lichtenstein, P., & Eley, T. C. (2014). Accounting for genetic and environmental confounds in associations between parent and child characteristics: A systematic review of children-of-twins studies. *Psychological Bulletin, 140*(4), 1138–1173. https://doi.org/10.1037/a0036416

Muenks, K., Wigfield, A., Yang, J. S., & O'Neal, C. R. (2017). How true is grit? Assessing its relations to high school and college students' personality characteristics, self-regulation, engagement, and achievement. *Journal of Educational Psychology, 109*, 599–620. https://doi.org/10.1037/edu0000153

Muenks, K., Yang, J. S., & Wigfield, A. (2018). Associations between grit, motivation, and achievement in high school students. *Motivation Science, 4*(2), 158–176. https://doi.org/10.1037/mot0000076

Murray, G., & Mulvaney, M. (2012). Parenting styles, socialization, and the transmission of political ideology and partisanship. *Politics and Policy, 40*(6), 1106–1130. https://doi.org/10.1111/j.1747-1346.2012.00395.x

Neale, M. C., et al. (2016). OpenMx 2.0: Extended structural equation and statistical modeling. *Psychometrika, 81*(2), 535–549. https://doi.org/10.1007/s11336-014-9435-8

Olivari, M. G., Hertfelt, E., Maridaki-Kassotaki, K., Antonopoulou, K., & Confalonieri, E. (2015). Adolescent perceptions of parenting styles in Sweden, Italy and Greece: An exploratory study. *Europe's Journal of Psychology, 11*(2), 244–258. https://doi.org/10.5964/ejop.v11i2.887

Park, D., Yu, A., Baelen, R. N., Tsukayama, E., & Duckworth, A. L. (2018). Fostering grit: Perceived school goal-structure predicts growth in grit and grades. *Contemporary Educational Psychology, 55*, 120–128. https://doi.org/10.1016/j.cedpsych.2018.09.007

Peters, G. J. Y. (2015). *Userfriendlyscience: Quantitative analysis made accessible* [Software]. https://cran.r-project.org/web/packages/userfriendlyscience/index.html. Accessed 30 June 2021.

Pinquart, M. (2016). Associations of parenting styles and dimensions with academic achievement in children and adolescents:

A meta-analysis. *Educational Psychology Review, 28*, 475–493. https://doi.org/10.1007/s10648-015-9338-y

Pinquart, M. (2017). Associations of parenting dimensions and styles with externalizing problems of children and adolescents: An updated meta-analysis. *Developmental Psychology, 53*(5), 873–932. https://doi.org/10.1037/dev0000295

Pinquart, M., & Kauser, R. (2018). Do the associations of parenting styles with behavior problems and academic achievement vary by culture? Results from a meta-analysis. *Cultural Diversity and Ethnic Minority Psychology, 4*(1), 75–100. https://doi.org/10.1037/cdp0000149

Prinzie, P., Stams, G. J. J. M., Deković, M., Reijntjes, A. H. A., & Belsky, J. (2009). The relations between parents' big five personality factors and parenting: A meta-analytic review. *Journal of Personality and Social Psychology, 97*(2), 351–362. https://doi.org/10.1037/a0015823

R Core Team (2020). *R: A language and environment for statistical computing* [Software]. R Foundation for Statistical Computing, Vienna, Austria. https://www.R-project.org/. Accessed 30 June 2021.

Raphiphatthana, B., Jose, P., & Salmon, K. (2018). Does dispositional mindfulness predict the development of grit? *Journal of Individual Differences, 39*(2), 76–87. https://doi.org/10.1027/1614-0001/a000252

Rimfeld, K., Kovas, Y., Dale, P. S., & Plomin, R. (2016). True grit and genetics: Predicting academic achievement from personality. *Journal of Personality and Social Psychology, 111*(5), 780–789. https://doi.org/10.1037/pspp0000089

Roth, G., & Assor, A. (2012). The costs of parental pressure to express emotions: Conditional regard and autonomy support as predictors of emotion regulation and intimacy. *Journal of Adolescence, 35*(4), 799–808. https://doi.org/10.1016/j.adolescence.2011.11.005

Schafer, J. (1999). Multiple imputation: A primer. *Statistical Methods in Medical Research, 8*, 15–13. https://doi.org/10.1177/096228029900800102

Schofield, T. J., Conger, R. D., Donnellan, M. B., Jochem, R., Widaman, K. F., & Conger, K. J. (2012). Parent personality and positive parenting as predictors of positive adolescent personality development over time. *Merrill-Palmer Quarterly, 58*(2), 255–283. https://doi.org/10.1353/mpq.2012.0008

Silk, J. S., Morris, A. S., Kayana, T., & Steinberg, L. (2003). Psychological control and autonomy granting: Opposite ends of a continuum or distinct constructs? *Journal of Research on Adolescence, 13*(1), 113–128. https://doi.org/10.1111/1532-7795.1301004

Soenens, B., Vansteenkiste, M., Lens, W., Luyckx, K., Goossens, L., Beyers, W., & Ryan, R. M. (2007). Conceptualizing parental autonomy support: Adolescent perceptions of promotion of independence versus promotion of volitional functioning. *Developmental Psychology, 43*, 633–646. https://doi.org/10.1037/0012-1649.43.3.633

Solt, F., & Hu, Y. (2015). *Interplot: Plot the effects of variables in interaction terms* [Software]. https://CRAN.R-project.org/package=interplot. Accessed 30 June 2021.

SRI International (2018). *Promoting grit, tenacity, and perseverance: Critical factors for success in the 21st century*. SRI International. https://www.sri.com/wp-content/uploads/pdf/promoting-grit-tenacity-and-perseverance-critical-factors-success-21st-century.pdf. Accessed 25 Jan 2021.

Sriram, R., Glanzer, P. L., & Allen, C. C. (2018). What contributes to self-control and grit? The key factors in college students. *Journal of College Student Development, 59*(3), 259–273. https://doi.org/10.1353/csd.2018.0026

Survey Research Center (2016). Translation. In Survey Research Center (Ed.), *Guidelines for best practice in cross-cultural surveys* (4th ed.) (pp. 233–285). Survey Research Center.

Tang, X., Wang, M. T., Guo, J., & Salmela-Aro, K. (2019). Building grit: The longitudinal pathways between mindset, commitment, grit, and academic outcomes. *Journal of Youth and Adolescence, 48*(5), 850–863. https://doi.org/10.1007/s10964-019-00998-0

Tosun, J., et al. (2019). Perceived economic self-sufficiency: A country- and generation-comparative approach. *European Political Science*, *18*(3), 510–531. https://doi.org/10.1057/s41304-018-0186-3

Tucker-Drob, E. M., Briley, D. A., Engelhardt, L. E., Mann, F. D., & Harden, K. P. (2016). Genetically-mediated associations between measures of childhood character and academic achievement. *Journal of Personality and Social Psychology, 111*(5), 790–815. https://doi.org/10.1037/pspp0000098

Vazsonyi, A. T., Ksinan, A. J., Jiskrova, G. K., Mikuska, J., Javakhishvili, M., & Cui, G. (2019). To grit or not to grit, that is the question! *Journal of Research in Personality, 78*, 215–226. https://doi.org/10.1016/j.jrp.2018.12.006

Vela, J. C., Lu, M. T. P., Lenz, A. S., & Hinojosa, K. (2015). Positive psychology and familial factors as predictors of Latina/o students' psychological grit. *Hispanic Journal of Behavioral Sciences, 37*(3), 287–303. https://doi.org/10.1177/0739986315588917

Von Culin, K. R., Tsukayama, E., & Duckworth, A. L. (2014). Unpacking grit: Motivational correlates of perseverance and passion for long-term goals. *The Journal of Positive Psychology, 9*(4), 306–312. https://doi.org/10.1080/17439760.2014.898320

Vukasović, T., & Bratko, D. (2015). Heritability of personality: A meta-analysis of behavior genetic studies. *Psychological Bulletin, 141*(4), 769–785. https://doi.org/10.1037/bul0000017

Wang, S., Dai, J., Li, J., Wang, X., Chen, T., Yang, X., He, M., & Gong, Q. (2018). Neuroanatomical correlates of grit: Growth mindset mediates the association between gray matter structure and trait grit in late adolescence. *Human Brain Mapping, 39*, 1688–1699. https://doi.org/10.1002/hbm.23944