



Measuring conscientiousness in Brazil and disentangling its relationships with subjective well-being, and academic involvement

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Abstract

Providing a valid and reliable measure of conscientiousness constitutes a worthwhile endeavor to allow research and intervention in Brazil. This study aimed to adapt the Chernyshenko Conscientiousness Scales (CCS) into Brazilian Portuguese, evaluate their psychometric properties, and investigate the relationship between conscientiousness and academic involvement, taking into account the possible confound effect of subjective well-being (SWB). Two samples were studied to cross-validate the CCS's internal structure. Participants were university students (N1 = 332, N2 = 684) who answered the CCS and measures of SWB and academic involvement. Exploratory factor analysis showed that the CCS presented a five-factor solution corresponding to the previously replicated facets of industriousness, orderliness, self-control, traditionalism, and virtue. Most facets related positively to life satisfaction, positive affect, and involvement in academic activities, and negatively to negative affect. A structural model indicated strong associations of conscientiousness with SWB and academic engagement, suggesting more conscientious students are happier and engage more in academic tasks. These results support the use of the CCS in Brazil.

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Keywords Chernyshenko conscientiousness scale · Personality assessment · Test adaptation · Positive psychology · Education

The interest in personality assessment has increased considerably in the last three decades in Brazil since the publication of the Big Five markers (Hutz et al., 1998). A search in Google Scholar using the terms "Big Five", "personality", and "Brazil" showed approximately 8,500 occurrences in the period between 1998 and 2021. While some studies aimed to

develop and adapt Big Five measures to Brazil (Nunes et al., 2010; Gouveia et al., 2021), others investigated the Big Five in the clinical (Monteiro et al., 2015), organizational (Hutz et al., 2013), and educational (Zanon et al., 2019) context.

Despite the availability of some tests to evaluate the Big Five model in Brazil, no available instrument captures the broad construct of conscientiousness based on its most replicated facets (Green et al., 2016; Roberts et al., 2014). This is a significant omission given the relevance of conscientiousness to positive aging (Roberts et al., 2014), health (Bogg & Roberts, 2004), and education (Noftle & Robins, 2007). The present investigation aims to fill this gap by adapting the Chernyshenko Conscientiousness Scales (CCS: Green et al., 2016) to Brazil and investigating its relationships with subjective well-being (SWB) and academic involvement (AI). A structural regression model was implemented to control its effects because SWB might constitute a confounding variable between conscientiousness and AI.

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Defining and evaluating conscientiousness

Conscientiousness is one of the Big Five factors of personality traits (Goldberg, 1993) that comprises a spectrum of constructs related to the tendency to be goal-directed, planful, able to delay gratification, and follow social norms (John & Srivastava, 1999). Although there is no consensus about the lower-order structure of conscientiousness (Roberts et al., 2005), these authors concluded that industriousness, orderliness, self-control, responsibility, traditionalism, and virtue cover the broad spectrum of conscientiousness traits. According to Roberts et al. (2005), industriousness reflects the tendency to be hard-working; orderliness reflects an inclination to be organized and neat; self-control refers to the capacity to inhibit prepotent responses, responsibility indicates a propensity to be dependable, traditionalism indicates the tendency to follow social norms, and virtue represents the propensity to be honest.

Recent evidence suggests the conceptual core of conscientiousness—that shares components for all facets—was best described as "planfulness" or "self-controlled future orientation" (Costantini & Perugini, 2016). In this perspective, the essence of conscientiousness involves 1) the evaluation of future consequences of a choice, 2) the capacity to control impulses that compete with the achievement of a major goal, and 3) the elaboration of necessary actions to achieve the goal. For example, a higher conscientious student might consider staying at home studying to obtain a high grade on a test instead of going camping with friends during the weekend that precedes the test. Considering the proactive aspects of conscientiousness (e.g., industriousness), the student would consider the benefit of achieving a high grade, then start studying to achieve it. Considering the inhibitive aspects of conscientiousness (e.g., self-control), the tempting stimulus (e.g., going camping) is considered along with the possible occurrence of a negative consequence (e.g., obtaining a low grade) and is suppressed to support the long-term goal and increase the chance to achieve the goal (e.g., to get a high grade).

The core component underlying the facets of conscientiousness is a relevant factor to investigate when analyzing the correlates of conscientiousness and its role in relevant outcomes. It is unclear whether the shared aspect of conscientiousness reflected in "self-controlled future orientation" represents the cause of outcomes (e.g., academic engagement or grades) or the specific theme found in each facet. Because those facets present different associations with outcomes (Roberts et al., 2014), evaluating conscientiousness at the facet level can be necessary for distinct purposes (e.g., personal selection, research, and

intervention). For example, orderliness might be the most relevant facet for a job requiring high organization, while industriousness and self-control might be the most critical for educational interventions. Moreover, the 'existence' of these facets in Brazil as valid and reliable constructs has to be empirically demonstrated rather than assumed based on previous studies conducted on other cultures (e.g., USA and England, Green et al., 2016).

In Brazil, three existing personality tests provide the opportunity to assess the lower-order structure of conscientiousness. Two are adapted tests (i.e., NEO Personality Inventory-Revised [NEO-PI-R] and the Big Five Inventory-2 [BFI-2]). While the NEO-PI-R includes competence, order, dutifulness, achievement striving, self-discipline, and deliberation, the BFI-2 only includes organization, productivity, and responsibility (Pires et al., 2019). It is relevant to mention that those tests present only reliability evidence (e.g., alpha coefficient) at the facet level—which precludes the inference that they constitute valid and distinct constructs in Brazil (American Educational Research Association et al., 2014). Another test is the Factorial Battery of Personality (BFP), developed in the Brazilian context and includes competence, deliberation, and dedication. Validity (i.e., internal structure) and reliability (e.g., alpha coefficient) evidence at the facet level (Nunes et al., 2010) have been provided for this test. However, none of these tests cover the entire lower-order structure of conscientiousness; thus, a comprehensive assessment has yet to be tested in the Brazilian context.

Conscientiousness, subjective well-being, and educational outcomes

Conscientiousness plays a central role in education. Consistent evidence shows that students with higher conscientiousness tend to have higher grades (Nofle & Robins, 2007), higher academic self-efficacy, and lower test anxiety (Conrad & Patry, 2012). Recent evidence from Brazil indicates that conscientiousness is associated with self-regulated learning in university students (Barros et al., 2021)—which might bring a considerable advantage to information acquisition and cognitive-task completion. Such outcomes possibly happen because more conscientious students (e.g., hardworking, self-controlled, and organized) adapt more to the academic environment by developing more adaptive study strategies (e.g., time management and commitment to achievement) through a stronger connection to their future career (Rosin et al., 2014; Zanon et al., 2019).

Another possibility is that conscientiousness affects educational outcomes through affective factors rather than behavioral (Hill et al., 2014). For example, given its relationship to experiencing academic success, more conscientious

students may experience greater positive affect and well-being. Previous research has shown that subjective well-being plays a relevant role in academic achievement and engagement (Oishi et al., 2009; Datu, 2018a, b; Datu & King, 2018). SWB, or happiness, constitutes a tripartite construct composed of a cognitive dimension (e.g., life satisfaction) and two emotional dimensions (e.g., positive and negative affect (Diener et al., 1999)).

Research suggests that positive affect and life satisfaction play a central role in motivational and engagement processes underlying effective functioning (Oishi et al., 2009; Lyubomirsky et al., 2005). These findings led positive psychologists to propose that interventions to promote happiness in schools might benefit students (Adler et al., 2016) by reducing depression and increasing engagement (Seligman et al., 2009a, b). Since engagement decreases the likelihood of dropout and improves achievement (Fredricks et al., 2004), unraveling the mechanisms that lead to increased involvement can benefit many students.

Previous research suggesting SWB might impact engagement (Oishi et al., 2009; Datu, 2018a, b; Datu & King, 2018) did not consider the contribution provided by conscientiousness. Considering the central role this personality construct presents to education, this is an important omission. In the Oishi et al. (2009) study, the authors evaluated conscientiousness, noted a positive association between happiness and conscientiousness, and attributed to happiness (and not to conscientiousness) the level of success achieved in educational outcomes by the participants. Other studies (Datu & King, 2018; Datu, 2018a, b) did not evaluate conscientiousness. Given the positive relationship between conscientiousness, well-being, and academic outcomes, we also assessed well-being to understand better the overlap among these three factors and the unique and overlapping relation conscientiousness and well-being might have with educational engagement. To the best of our knowledge, this is the first study to understand the relationships between conscientiousness, happiness, and engagement (and their specific effects on each other).

The current study

Brazil constitutes a transition society possessing many bureaucratic organizations that hope to achieve high economic development (Ferreira et al., 2012). According to these authors, a Brazilian phenomenon called *jeitinho* was identified as a 'faster' and 'efficient' way to solve daily problems. However, the Brazilian *jeitinho* often includes actions related to corruption and low morality used to break social norms and obtain financial advantages—and many established relationships are based on this perspective in Brazil (Ferreira et al., 2012). Moreover, it is not difficult to

find Brazilians that consider themselves 'smart' after taking advantage of others. The dishonest aspects of Brazilian *jeitinho* might constitute a cultural obstacle to the development of industriousness, honesty, respect, and self-control (i.e., components of the conscientiousness factor) because it might be easier to think that success can come through corruption than through hardworking behaviors (Resende & Porto, 2020). Evidence, in fact, indicates a negative relationship between Brazilian *jeitinho* and conscientiousness (Ferreira et al., 2012). Although the current study does not investigate the relationships between Brazilian *jeitinho* and conscientiousness, the visualization of the larger cultural context of Brazilian helps to understand how difficult it might be for youths to be honest, respectful, and motivated to study.

Having a reliable and valid Brazilian measure of conscientiousness would facilitate research on non-technical factors that also help students succeed in academia and their future careers (Barros et al., 2021). Considering that most psychological knowledge comes from Western, educated, industrialized, rich, and democratic (WEIRD) societies and that findings from WEIRD-countries do not necessarily apply to non-WEIRD countries (Henrich et al., 2010), the adaptation of the CCS constitutes a worthwhile endeavor to investigate the existence of conscientiousness facets as distinct and valid constructs in Brazil. Aligned with the open science values (Tackett et al., 2019), this process aims to provide a free and robust measure of conscientiousness to interventions and research. Thus, the current investigation aims to adapt the CCS to Brazil, investigate its internal structure, validity evidence based on the relationships with external relevant variables (e.g., SWB and academic involvement), and reliability evidence of their scores.

The reliability of the conscientiousness facets will be evaluated using item response theory (IRT; Lord, 1952). IRT constitutes a modern approach to evaluating test score's reliability and allows to identify how well the test (or the facets of the test) captures information across the spectrum of the latent trait (e.g., for low, moderate, and high levels of orderliness). IRT is particularly relevant because we plan to inform readers about the adequacy of the CCS's facets measurement at different latent trait levels. Another goal is to investigate the relationship between conscientiousness and academic involvement, considering the confounding effect SWB plays on both variables.

Past research supports that conscientiousness (Roberts et al., 2014) and SWB (Datu & King, 2018) contribute to involvement in the educational context. However, no study addressed the specific contribution of each of these constructs to academic involvement in mandatory and non-mandatory university activities. This is a significant omission, given that conscientiousness and SWB are correlated constructs (Anglim et al., 2020; Rosin et al., 2014; Hutz

et al., 2014), and part of the covariance between SWB and academic involvement might be explained by conscientiousness. In other words, happier students may tend to be more academically engaged simply because they are more conscientious.

Three hypotheses guided this study:

Hypothesis 1: a five-factor solution, as found in prior validation research on the CCS (Green et al., 2016), will be the best internal structure for the CCS, indicating the validity of five facets (i.e., industriousness, orderliness, self-control, traditionalism, and virtue) in the Brazilian context.

Hypothesis 2: the facets of conscientiousness will correlate with SWB (i.e., life satisfaction, positive and negative affect) and academic involvement (i.e., involvement in mandatory and non-mandatory activities), providing convergent validity evidence for the CCS scores.

Hypothesis 3: the core component of conscientiousness (e.g., planfulness) will positively relate to SWB and academic involvement, complementing the validation approach to CCS scales. This hypothesis assumes that planful students are happier and more involved in academic activities.

Method

Design

A cross-validation method (de Rooij & Weeda, 2020) with two cross-sectional convenience samples was used to investigate the replicability of the CCS's internal structure in the Brazilian context (i.e., the factorial solution found in the first sample is tested in a second sample). However, this study tested a slightly different model in the second sample because it incorporated new items. This procedure is recommended by Tucker and MacCallum (1997; pg.13) to strengthen the interpretation of the factors. Tucker and MacCallum also recommend that factor analytic applications occur through a succession of studies to avoid sample idiosyncrasies, which might produce biased results.

Participants

Sample 1 comprised 332 university students (83.13% undergraduate students and 16.87% graduate students) aged between 18 and 64 years old ($M = 25.25$; $SD = 7.76$) who participated in the study. Participants were predominantly female (65.96%), heterosexual (70.48%), and came from 57 courses: 24% belonged to the Health Sciences, 22% to the Human Sciences, 22% to the Applied Social Sciences, 8% to the Engineering, 7% to the Agricultural Sciences, 6% to

the Exact and Earth Sciences, 6% to Biological Sciences, and 5% to Linguistics, Arts and Letters. 25.6% were in their first year, 20.2% in their second year, 19.2% in their third year, 20.1% in their fourth year, and 14.9% in their last year (i.e., fifth or sixth year). Regarding the participants' health, 36.14% indicated a health problem, 26.2% mentioned they use some medication to treat their health problem, 61.74% reported that they had already undergone psychotherapy, and 32.22% indicated they were undergoing psychotherapy during the period in which they participated in the research. Data collection occurred approximately one year after the beginning of the COVID pandemic. We imputed missing data (0,9%) with the mean of the observed values for each variable.

Sample 2 comprised 684 university students (93.27% undergraduate students and 6.73% graduate students) between the ages of 18 and 50 years old ($M = 23.62$; $SD = 5.63$). Participants were predominantly female (67.84%), heterosexual (67.20%), and came from 61 courses: 16% belonged to the Health Sciences, 22% to the Human Sciences, 16% to the Applied Social Sciences, 7% to the Engineering, 8% to the Agricultural Sciences, 18% to the Exact and Earth Sciences, 12% to Biological Sciences, and 1% to Linguistics, Arts and Letters. 28.6% were in their first year, 21.4% in their second year, 19.2% in their third year, 14.9% in their fourth year, and 25.9% in their last year (i.e., fifth or sixth year). Regarding the participants' health, 29.57% indicated a health problem, 23.42% mentioned they use some medication to treat their health problem, 60.17% informed they had already undergone psychotherapy, and 29.42% indicated they were undergoing psychotherapy during the period in which they participated in the research. Data collection occurred approximately 18 months after the beginning of the COVID pandemic. We imputed means of the observed variables to deal with missing data (0,1%).

Procedures

Test adaptation procedures The adaptation of the CCS followed the guidelines for cross-cultural adaptation of the International Test Commission (2010). The items were translated and adapted to Brazilian Portuguese by two independent Brazilian bilingual translators, who are linguistic researchers. Before the procedure started, the first author presented information about the ECC content (Green et al., 2016) and requested the translators focus on the conceptual similarity of the items during translation instead of literal similarities. After analyzing the two translations, the authors synthesized, considering idiomatic, semantic, and contextual differences.

The items were evaluated by 20 university students from five different Brazilian universities. The procedure consisted of asking the participants individually

through video calls to express how they understood the items, suggest changes when misunderstandings appeared, and discuss some word choices that emerged in the previous step. The obtained ECC version was back-translated into English by a bilingual Brazilian English teacher, and it was revised by one of the authors of the CCS, Dr. Brent Roberts (University of Illinois Urbana-Champaign—USA) and two doctoral students. Only two items were not considered equivalent and resulted in creation of two additional, adapted items: "If I found a large amount of money out there, I would keep the money for myself", and "I have a lot of respect for authorities (e.g., police and inspection) and I help them whenever I can". These two items presented modified content from the original items: "If I find money laying around, I'll keep it to myself"; and "I have the highest respect for authorities and assist them whenever I can". Regarding the first item, we added "a large amount of" because instead of feeling responsible for giving money back, one could feel lucky to find money—to give money back in Brazil might be difficult when no ID or phone number is found together, and to look for policemen or authorities would apply only for a considerable quantity. Considering the second item, we wanted to specify for what kind of authorities "to have respect for" would apply to avoid ambiguity.

After item analyses in Sample 1, we created 20 simpler and shorter items evaluated in Sample 2. These new items were primarily to enhance the assessment of the responsibility facet and to tap the contents that were not covered in other facets due to item removal. In sum, we created 12 items to measure responsibility (i.e., covering themes like punctuality, keeping promises, and task finishing), 2 items to evaluate virtue, 2 items to evaluate industriousness, 2 items to evaluate orderliness, 1 item to evaluate self-control, and 1 item to evaluate traditionalism.

Ethical procedures The present study respected the principles of research ethics based on the guidelines proposed by Brazilian legislation. The study was presented to the Research Ethics Committee of the Psychology Institute of the Universidade Federal do Rio Grande do Sul, and only students who agreed with the informed consent were accepted. This project registration number is CAAE: 32732820.6.0000.5334.

Data collection procedures The data collection was online by disseminating the research on social networks and to college administration managers across the country who sent the invitation link to students. Participants were informed about the objectives of the research and their rights. The collection took approximately 25 min per questionnaire.

Instruments

Conscientiousness The 60-item Chernyshenko Conscientiousness Scale (CCS; Chernyshenko, 2002; Hill & Roberts, 2012) evaluates the lower-order structure of conscientiousness (i.e., facets). It was developed from the analysis of 36 scales related to conscientiousness that pointed out the existence of six facets (e.g., industriousness, self-control, respect, orderliness, traditionality, and virtue (Roberts et al., 2005)). There are 10 items per facet, and the items are scored on a 5-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). Validity evidence is based on exploratory factor analysis that indicated the presence of five facets that showed good internal consistency ($\alpha \geq 0.80$). For the responsibility facet, the internal consistency was considered acceptable ($\alpha \geq 0.70$), although it did not differentiate from industriousness in subsequent research (Green et al., 2016).

Positive affect and negative affect The 20-item Positive Affect and Negative Affect Schedule (PANAS; Watson et al., 1988; Brazilian version adapted by Zanon & Hutz, 2014) consists of a 10-item subscale assessing positive affect (e.g., "Enthusiasm") and a 10-item subscale assessing negative affect (e.g., "Angry"). Items are scored on a 5-point Likert-type scale, ranging from 1 (not at all) to 5 (extremely). The PANAS has been validated using exploratory factor and reliability analyses. Internal consistency estimates for positive affect ($\alpha = 0.86$) and negative affect ($\alpha = 0.91$) were acceptable.

Life satisfaction The five-item Satisfaction with Life Scale (Diener et al., 1985; Brazilian version adapted by Zanon et al., 2014) measures life contentment (e.g., "I am satisfied with life"). Items are scored on a 7-point Likert-type scale, ranging from 1 (e.g., strongly disagree) to 7 (e.g., strongly agree). The scale has adequate internal consistency ($\alpha = 0.87$; Zanon et al., 2014).

Academic involvement The 23-item Academic Involvement Scale (Porto & Gonçalves, 2017) was developed for the Brazilian context and consists of a 14-item subscale assessing engagement in mandatory college activities (e.g., "I complete the requested activities within the established deadlines.", "I Study for exams.") and a 9-item subscale evaluating engagement in non-mandatory college activities (e.g., "I take notes during classes.", "I look for professors outside of class hours."). The content of the items covers five areas of academic life (e.g., institutional, vocational projects, coursework, peer relations, and use of existing resources on campus). Both the mandatory activities ($\alpha = 0.85$) and non-mandatory activities ($\alpha = 0.73$) showed acceptable levels of reliability.

Data analytic approach

Analysis of the CCS in sample 1 Regarding the adaptation of the CCS, the instrument's internal structure was evaluated through exploratory factor analysis to assess whether the six expected factors (i.e., facets) would emerge. A principal axis factoring (PAF) with oblique rotation (e.g., direct oblimin) was performed to be consistent with the methodological procedure implemented in the original study that developed the CCS (Green et al., 2016). The PAF does not assume a normal distribution for measured variables (e.g., items) and is recommended for non-normal variables (Fabrigar et al., 1999). The oblique rotation method is indicated because it allows the factors to correlate—which is appropriate for a set of measures that share a common meaning, such as the facets of a domain like conscientiousness. Parallel analysis (Horn, 1965) and scree test were implemented to decide the number of factors (Costello & Osborne, 2005). The alpha coefficient, also used in the original study, was used to assess the reliability of the facets. Finally, the relationships of conscientiousness facets with other relevant variables (e.g., SWB and AI) were evaluated through Pearson correlations.

Analysis of the CCS in sample 2 The CCS with 20 additional items was evaluated in another sample using the same exploratory procedures previously described for Sample 1. Because we aimed to evaluate each facet of the CCS using item response theory, a confirmatory factor analysis (CFA) was performed per facet to evaluate its unidimensionality. The Weighted Least Square Mean and Variance Adjusted (WLSMV) estimator was used because the data were polytomous. The first factor loading was fixed to one in each CFA to establish the metric. The unidimensionality of constructs constitutes an assumption to implement IRT analyses (Hambleton et al., 1991).

Item response theory To investigate the measurement performed by each facet, we fit the Graded Response Model (GRM: Samejima, 1969) to each set of items independently in the R program (ltm package; Rizopoulos, 2006). The GRM estimates the latent trait using a response pattern of graded scores and is adequate for evaluating tests based on Likert-type scales (Hambleton, van der Linden, & Wells, 2011), as the CCS. The GRM estimates item coefficients that indicate the item difficulty of being endorsed (b parameter) and the discrimination parameter (a) that reflects the latent trait level in which the probability of answering at or above the particular category equals 50%.

A notable aspect of the IRT analysis is the test information function (TIF) that constitutes the sum of information produced by each item at specific areas of the latent trait and is directly related to the discrimination parameter of each item (Hambleton, et al., 1991). TIF graphically shows the

amount of information each facet produces in specific areas of the latent trait (Hambleton et al., 2011). For instance, an item of the orderliness facet with a low discrimination value (e.g., that presents the " a " parameter close to zero) produced little information about the respondents and, consequently, does poor measurement. However, if this item has a high discriminative value, it provides more information and allows higher discrimination of respondents (Hambleton, 2005). An estimation shows that test information of 10 equals a standard error of approximately 0.31, corresponding to a reliability coefficient of 0.90 (Embretson & Reise, 2000).

The evaluation of the TIF helps to find measurement gaps through the latent trait (e.g., orderliness). For instance, a TIF that presents a meager amount of information at the end of the continuum of orderliness indicates poor measurement for disorganized participants. To facilitate the interpretation, we assume that latent scores between -1 and 1 indicate middle levels of orderliness, scores lower than -1 indicate low levels of orderliness, and scores higher than 1 represent high levels of orderliness (Zanon, et al., 2013; Zanon et al., 2021). The interpretation of the other facets is based on the same presented ranges.

Structural regression models Structural models were implemented in Sample 1 and 2 to test the hypothesis that playful students are happier and more engaged. This model aims to investigate the relationship between conscientiousness and academic involvement, considering the role that SWB plays as a confounding variable. The tested baseline model for both samples regresses SWB and academic involvement onto Conscientiousness and estimates a covariance between SWB and academic involvement. SWB was estimated as a latent variable using life satisfaction, positive affect, and negative affect as indicators. Conscientiousness was estimated as a latent variable using its facets (e.g., industriousness, orderliness, self-control, traditionalism, and virtue) as indicators. Academic involvement was estimated as a latent variable using engagement in mandatory and non-mandatory academic activities as indicators. The maximum likelihood estimation with robust standard errors (MLR) was used because it constitutes a proper method for non-normal continuous variables (Yuan & Bentler, 2000). The first indicator of each latent variable was set to one to establish the metric for the latent variables. All structural equation models were analyzed in lavaan, an R package for latent variable analysis (Rosseel, 2012).

Model fit The fit evaluation of the CFAs and the structural regression models were based on chi-square (χ^2), comparative fit index (CFI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). According to Hu and Bentler (1999), CFI > 0.95, RMSEA < 0.06, and SRMR < 0.08 indicate good fit. Other

recommendations consider CFI > 0.90 (Bentler, 1990) and RMSEA < 0.08 (Browne & Cudeck, 1993) indication of acceptable fit.

Results

In Sample 1, the skewness of the CCS items ranged between -1.75 and 1.71 and the kurtosis between -1.38 and 2.43, and in Sample 2, the skewness of the CCS items ranged between -2.51 and 1.47 and the kurtosis between -1.39 and 6.19. Table 1 presents the descriptive statistics for conscientiousness facets and the external variables (e.g., SWB and academic engagement).

Internal structure in sample 1 A principal axis factor extracting six factors was implemented to assess whether the six facets of conscientiousness would emerge as independent and related factors. Parallel analysis based on 1000 identical samples using the 95th percentile criterion (O'Connor, 2004)

indicated six factors as an ideal solution. The visual inspection of the scree plot also suggested six distinct factors. The distribution of factor loadings in the six factors, however, indicated an inadequate solution with 1) an uninterpretable factor composed of industriousness, responsibility, and self-control items, 2) items showing cross-loadings greater than 0.32 in more than one factor, and 3) items presenting loadings lower than 0.32 in any of the factors (Fabrigar et al., 1999; Tabachnick & Fidell, 2013). Then, another factor analysis was conducted, fixing five factors to be extracted. This solution showed that most of the responsibility facet items loaded on the factor composed by the industriousness facet items. The remaining responsibility facet items loaded on other factors or presented low loadings ($\lambda < 0.32$) in any factor. A similar solution was observed in the previous study evaluating the structure of the CCS in which a final five-factor solution was observed with the responsibility facet items loading on the industriousness factor (Green et al., 2016). Four other factor analyzes were run until the final solution was achieved. In these analyses, the responsibility

Table 1 Descriptive statistics and pearson correlations among conscientiousness facets, subjective well-being, and academic involvement

Variables (Sample 1; n = 332)	1	2	3	4	5	6	7	8	9	10	M	SD
Conscientiousness												
1. Industriousness	(.81)										31.83	5.53
2. Self-control	.26**	(.78)									33.18	7.62
3. Orderliness	.23**	.19**	(.86)								20.32	5.93
4. Traditionalism	.24**	.28**	.21**	(.80)							24.75	5.29
5. Virtue	.13*	.23**	.06	.38**	(.70)						33.88	6.33
Subjective well-being												
6. Life satisfaction	.25**	.17**	.13*	.22**	.20**	(.84)					21.27	6.78
7. Positive affect	.36**	.17**	.18*	.20**	.09	.47**	(.84)				31.77	7.81
8. Negative affect	-.07	-.15**	-.04	-.17**	-.04	-.41**	-.41**	(.87)			28.27	8.75
Academic involvement												
9. AI in mandatory activities	.49**	.27**	.26**	.29**	.19**	.24**	.27**	-.15*	(.71)		51.03	8.42
10. AI in non-mandatory activities	.23**	.06	.14*	.03	.10	.21**	.27**	-.10	.39**	(.76)	27.54	7.90
Variables (Sample 2; n = 684)	1	2	3	4	5	6	7	8	9	10	M	SD
Conscientiousness												
1. Industriousness	(.81)										35.18	6.50
2. Self-control	.12**	(.80)									19.04	6.18
3. Orderliness	.35**	.15**	(.84)								19.63	7.11
4. Traditionalism	.28**	.18**	.20**	(.80)							20.38	5.91
5. Virtue	.13*	.27**	.14**	.26**	(.67)						19.55	3.98
Subjective well-being												
6. Life satisfaction	.16**	.12**	.13*	.07	.13**	(.84)					20.87	6.95
7. Positive affect	.30**	.05	.21*	.11**	.02	.42**	(.87)				29.02	9.00
8. Negative affect	-.02	-.18**	-.06	-.10**	-.05	-.46**	-.37**	(.87)			30.86	8.51
Academic involvement												
9. AI in mandatory activities	.53**	.19**	.38**	.22**	.23**	.19**	.29**	-.11**	(.71)		54.07	9.09
10. AI in non-mandatory activities	.33**	.08*	.20**	-.01	.07	.17**	.28**	-.05	.43**	(.84)	27.70	8.40

The facets of conscientiousness are not based on the same set of items in Sample 1 and Sample 2. Values between brackets in the diagonal represent alpha coefficients. AI=academic involvement, * $p < .05$, ** $p < .01$

facet items were removed because they did not compose an independent factor, as expected, and presented low loadings on other factors. The final solution for Sample 1 consisted of 40 items distributed in the five facets of conscientiousness (Table S1), which explained approximately 40% of the total variance. This solution showed that all items loaded predominantly on the initially designated factor ($\lambda > 0.32$) and was theoretically interpretable. Furthermore, the five factors of conscientiousness (e.g., facets) showed acceptable evidence of reliability ranging from 0.70 (e.g., virtue facet) to 0.86 (e.g., order facet).

Internal structure in sample 2 Identical exploratory procedures were implemented in Sample 2 until we reached an interpretable six-factor solution (Table S2). This solution aggregated some of the newly written responsibility items in an independent factor. However, due to the narrow and under-represented scope of the facet of responsibility (i.e., predominantly tapping punctuality), we believe it does not represent proper content validity to the factor, and we decided not to keep this solution. No other interpretable solution that included the facet of responsibility was found.

A final five-factor solution that does not include the responsibility items was then achieved (Table S3). This solution is similar to the one found in Sample 1 (Table S1).

CFAs The unidimensionality assumption for subsequent IRT analyses was tested for each CCS's facet and the final set of items and their psychometric properties are presented in Table 2. The presented CFAs evaluate the retained items per facet found in the exploratory five-factor solution in Sample 2 (Table S3). The one-factor model tested for the 10 items composing the industriousness facet presented poor fit ($\chi^2 = 257.81$, $df = 35$, $p < 0.001$, $CFI = 0.97$, $RMSEA = 0.10$, $SRMR = 0.07$). The inspection of modification indices suggested that the items ECC18_I and ECC24_I presented a relevant correlated uniqueness (i.e., error term). Due to item content similarity, we removed the item ECC18_I from subsequent analysis because it presented a longer and more complex structure. The new one-factor model for the industriousness facet presented acceptable fit ($\chi^2 = 146.69$, $df = 27$, $p < 0.001$, $CFI = 0.98$, $RMSEA = 0.08$, $SRMR = 0.06$). The one-factor model tested for the 9 items composing the self-control facet presented acceptable fit ($\chi^2 = 143.47$, $df = 27$, $p < 0.001$, $CFI = 0.98$, $RMSEA = 0.08$, $SRMR = 0.06$). The one-factor model tested for the 10 items composing the orderliness facet presented less than ideal fit ($\chi^2 = 383.96$, $df = 35$, $p < 0.001$, $CFI = 0.98$, $RMSEA = 0.12$, $SRMR = 0.08$). The inspection of modification indices suggested that the items ECC31_O and ECC49_O presented correlated uniquenesses. Due to item content similarity, we removed the item ECC49_O from subsequent analysis because it presented a more truncated structure.

The new one-factor model for the orderliness facet had acceptable fit ($\chi^2 = 148.51$, $df = 27$, $p < 0.001$, $CFI = 0.99$, $RMSEA = 0.08$, $SRMR = 0.06$). The one-factor model of 7 items composing the traditionalism facet showed excellent fit ($\chi^2 = 32.08$, $df = 14$, $p < 0.001$, $CFI = 0.99$, $RMSEA = 0.04$, $SRMR = 0.04$). The one-factor model tested for the 6 items composing the virtue facet presented less than ideal fit ($\chi^2 = 383.96$, $df = 35$, $p < 0.001$, $CFI = 0.98$, $RMSEA = 0.12$, $SRMR = 0.08$) and was restructured after the inspection of modification indices that suggested that the items ECC14_V and _ECC8_V had correlated uniquenesses. We removed the item ECC14_V because it was bringing two ideas that might be overlapping with the item _ECC8_V. The new one-factor model of 5 items had excellent fit, suggesting unidimensionality for the virtue facet ($\chi^2 = 16.61$, $df = 5$, $p < 0.005$, $CFI = 0.99$, $RMSEA = 0.06$, $SRMR = 0.05$).

Correlations with external variables The conscientiousness facets presented positive and significant correlations with SWB and academic involvement (Table 1). Industriousness had the highest correlations with external variables.

IRT analyses The point estimates of the category boundary, b_{ik} , and discrimination item parameters (a) for the CCS's facets are presented in Table 3. The industriousness items predominantly discriminated between the low and middle levels of industriousness. The self-control items discriminated between the low, middle, and high levels of self-control. The orderliness items mostly discriminated between the middle and high levels of orderliness. The traditionalism items discriminated between the low, middle, and high levels of traditionalism. The virtue items discriminated between the low and middle levels of virtue. The inspection of TIFs (Fig. 1) showed that the industriousness facet covered the low and middle continuum of industriousness with a modest amount of information produced, indicating moderate discrimination for participants with low and middle levels of industriousness and low discrimination for participants with high levels of industriousness. TIF for the self-control facet indicated a modest amount of information for middle and high levels of self-control and low levels of information for low levels of self-control. TIF for the orderliness facet indicated a high amount of information for middle and high levels of orderliness and low levels of information for low orderliness. TIF for the traditionalism facet indicated a modest amount of information for middle levels of traditionalism and low levels for low and high levels of traditionalism, suggesting poor participant discrimination on both extremes. Although the TIF for the virtue facet indicated higher information for low and middle levels of virtue, the amount of information obtained was low throughout the continuum, suggesting low discrimination.

Table 2 Confirmatory factor analyses of the CCS's facets in sample 2 ($n = 684$; WLSMV estimator)

Item content	Item code	λ	δ
Industriousness			
Eu tenho padrões altos e trabalho para atingi-los (I have high standards and work towards them.)	ECC6_I	.587	
Faço mais do que me é pedido (I go above and beyond what is required.)	ECC12_I	.736	.069
Esforço-me pouco no meu trabalho ou estudo (I invest little effort into my work.)	ECC24_I	.601	.060
Exijo a mais alta qualidade em tudo que faço (I demand the highest quality in everything I do.)	ECC30_I	.756	.071
Tento ser o melhor em tudo que faço (I try to be the best at anything I do.)	ECC36_I	.719	.067
Esforço-me muito para fazer mais do que esperam de mim (I make every effort to do more than what is expected of me.)	ECC42_I	.752	.070
Faço o que é necessário, mas raramente algo a mais (I do what is required, but rarely anything more.)	ECC48_I	.634	.067
Definir metas e alcançá-las não é muito importante para mim (Setting goals and achieving them is not very important to me.)	ECC53_I	.470	.072
Obter notas médias é suficiente para mim (Getting average grades is enough for me.)	ECC59_I	.519	.064
Self-control			
Costumo agir sem pensar nas possíveis consequências (I often rush into action without thinking about potential consequences.)	ECC4_A	.822	
Eu raramente faço alguma coisa sem primeiro pensar bem nas possíveis consequências (I rarely jump into something without first thinking about it.)	ECC10_A	.761	.037
Sou conhecido por tomar decisões rápidas e de “cabeça quente” (I am known to make quick, hot-headed decisions.)	ECC16_A	.645	.038
Não corro riscos desnecessários (I do not take unnecessary risks.)	ECC22_A	.456	.042
Meus amigos dizem que eu sou imprevisível (My friends say I am unpredictable.)	ECC34_A	.467	.042
Arranjo problemas porque ajo por impulso em vez de pensar antes de agir (I get into trouble because I act on impulses rather than on thoughts.)	ECC40_A	.838	.033
Sou cuidadoso com o que digo aos outros (I am careful with what I say to others.)	ECC46_A	.534	.043
Não gosto de estar ao redor de pessoas impulsivas (I dislike being around impulsive people.)	ECC51_A	.392	.044
Mesmo sob pressão de tempo, eu prefiro usar um tempo para pensar na minha resposta do que dizer a primeira coisa que me vem à mente (Even under time pressure, I would rather take my time to think about my answer than to say the first thing that comes to mind.)	ECC57_A	.552	.040
Orderliness			
Estar limpo e arrumado não é exatamente meu ponto forte (Being neat is not exactly my strength.)	ECC1_O	.398	
Organização é um componente essencial na maioria das coisas que faço. (Organization is a key component of most things I do.)	ECC7_O	.800	.185
Preciso de um ambiente limpo e arrumado para trabalhar bem (I need a neat environment in order to work well.)	ECC13_O	.794	.188
Fico irritado quando as coisas ao meu redor estão desorganizadas (I become annoyed when things around me are disorganized.)	ECC19_O	.720	.172
Para mim, ser organizado não é importante (For me, being organized is unimportant.)	ECC25_O	.783	.189
Muitas vezes eu não coloco as coisas no lugar certo (Half of the time I do not put things in their proper place.)	ECC31_O	.679	.164
Na maioria das vezes, meu quarto está completamente bagunçado (Most of the time my room is in complete disarray.)	ECC37_O	.758	.178

Table 2 (continued)

Item content	Item code	λ	δ
Cada coisa no meu quarto e na minha mesa (de estudo ou trabalho) tem um lugar certo (Every item in my room and on my desk has its own designated place.)	ECC43_O	.683	.168
Odeio quando as pessoas são desleixadas (I hate when people are sloppy.)	ECC54_O	.465	.130
Traditionalism			
As pessoas respeitam a Polícia mais do que deveriam. (People respect authority more than they should.)	ECC9_T	.672	
Acredito que as pessoas deveriam poder usar drogas, desde que isso não atrapalhe outras pessoas. (I believe that people should be allowed to take drugs, as long as it doesn't affect others.)	ECC21_T	.504	.056
Eu apoio as regras e tradições estabelecidas há muito tempo. (I support long-established rules and traditions.)	ECC27_T	.613	.054
Pessoas que desobedecem a autoridades deveriam ser severamente punidas. (People who resist authority should be severely punished)	ECC33_T	.754	.054
Na minha opinião, todas as leis devem ser rigorosamente cumpridas. (In my opinion, all laws should be strictly enforced.)	ECC45_T	.760	.054
Tenho muito respeito por autoridades (ex: policiais e de fiscalização) e as ajudo sempre que posso. (I have the highest respect for authorities (e.g., police) and assist them whenever I can.)	ECC62_T	.821	.056
Ao trabalhar com outras pessoas, geralmente sou a pessoa que garante que as regras sejam seguidas. (When working with others I am usually the one who makes sure that rules are observed.)	ECC60_T	.434	.058
Virtue			
Se eu pudesse me safar, eu não pagaria impostos (If I could get away with it, I would not pay taxes.)	ECC3_V	.587	
Mentiria sem hesitar se isso fosse importante para alcançar meus objetivos (I would lie without hesitation if it serves to my purpose.)	ECC8_V	.513	.082
Se eu arranhasse acidentalmente um carro estacionado, tentaria encontrar o proprietário para pagar pelo conserto (If I accidentally scratched a parked car, I would try to find the owner to pay for the repairs.)	ECC44_V	.585	.081
Se um caixa esquecesse de me cobrar por um produto que comprei, eu contaria isso a ele ou a ela (If a cashier forgot to charge me for an item I would tell him/her.)	ECC26_V	.604	.103
Se eu encontrasse uma grande quantia de dinheiro por aí, ficaria com o dinheiro para mim (If I find a large amount of money laying around, I'll keep it to myself.)	ECC61_V	.725	.101

λ standardized factor loading, δ measurement residual

Structural regression models In Sample 1, the baseline model showed poor fit ($\chi^2=96.24$, $df=32$, $p<0.001$, $CFI=0.88$, $RMSEA=0.08$, $SRMR=0.06$) and was changed. The inspection of modification indices pointed out a relevant correlated uniqueness (i.e., error term) between two indicators of conscientiousness (e.g., traditionalism and virtue). This correlated uniqueness was incorporated into a new model that presented better fit ($\chi^2=68.29$, $df=31$, $p<0.001$, $CFI=0.93$, $RMSEA=0.06$, $SRMR=0.05$). All latent variables presented significant variances, and all indicators presented significant factor loadings. The correlations between the latent variables in the new model were: 0.60 (SWB and conscientiousness), 0.38 (SWB and academic involvement), and 0.76 (conscientiousness and academic involvement). The standardized structural regression coefficients from conscientiousness to SWB ($\beta=0.60$) and AI ($\beta=0.76$) were significant, indicating strong and positive effects. The correlation between SWB and academic involvement ($\phi=-0.15$) was low and non-significant.

In Sample 2, the baseline model also showed poor fit ($\chi^2=247.20$, $df=32$, $p<0.001$, $CFI=0.82$, $RMSEA=0.10$, $SRMR=0.07$) and was re-specified. The inspection of

modification indices showed relevant correlated uniqueness between two indicators of conscientiousness (e.g., self-control and virtue), between two indicators of SWB (e.g., life satisfaction and negative affect), between the self-control facet and positive affect, and between the industriousness facet and negative affect. These correlated uniqueness were incorporated into a new model that presented acceptable fit ($\chi^2=135.19$, $df=28$, $p<0.001$, $CFI=0.91$, $RMSEA=0.07$, $SRMR=0.05$). All latent variables presented significant variances, and all indicators presented significant factor loadings. The correlations between the latent variables in the new model were: 0.43 (SWB and conscientiousness), 0.40 (SWB and academic involvement), and 0.79 (conscientiousness and academic involvement). The standardized structural regression coefficients from conscientiousness to SWB ($\beta=0.43$) and academic involvement ($\beta=0.80$) were significant, indicating strong and positive effects. The correlation between SWB and academic involvement ($\phi=0.09$) was very low and non-significant, suggesting their covariance is predominantly explained by the variance shared with conscientiousness.

Table 3 Item coefficients of the CCS's facets based on item response theory analyzes in sample 2 ($n=684$; GRM method of estimation)

Items	Extrmt1	Extrmt2	Extrmt3	Extrmt4	a
Industriousness ($\omega = .87$)					
ECC6_I	-2.708	-1.693	-0.531	0.871	1.279
ECC12_I	-2.345	-1.501	-0.286	0.956	1.933
ECC24_I	-2.981	-1.965	-1.141	0.150	1.248
ECC30_I	-2.650	-1.772	-0.714	0.432	2.113
ECC36_I	-2.485	-1.722	-0.794	0.368	1.816
ECC42_I	-2.487	-1.359	-0.370	0.661	2.035
ECC48_I	-2.440	-1.238	-0.174	1.437	1.408
ECC53_I	-4.196	-2.832	-1.687	-0.316	0.925
ECC59_I	-2.593	-1.230	-0.284	1.060	1.032
Self-control ($\omega = .92$)					
ECC4_SC	-0.084	0.913	1.564	2.196	2.550
ECC10_SC	-0.216	0.774	1.553	2.627	2.069
ECC16_SC	-0.033	1.033	2.042	3.071	1.491
ECC22_SC	-1.170	0.572	1.935	3.755	0.925
ECC34_SC	-0.274	0.912	2.165	3.669	0.918
ECC40_SC	0.057	0.907	1.538	2.247	2.734
ECC46_SC	-0.588	1.025	2.593	4.089	1.008
ECC51_SC	-2.296	-0.650	1.531	3.500	0.712
Orderliness ($\omega = .77$)					
ECC1_O	-0.204	1.265	2.442	4.268	0.813
ECC7_O	-0.344	0.559	1.434	2.233	2.509
ECC13_O	-0.167	0.714	1.537	2.495	2.321
ECC19_O	-0.524	0.457	1.369	2.168	1.724
ECC25_O	0.448	1.232	1.927	2.515	2.505
ECC31_O	-1.078	-0.002	0.851	1.695	1.571
ECC37_O	-0.499	0.411	1.061	1.601	2.038
ECC43_O	-0.514	0.375	1.120	1.944	1.696
Tradicionalism ($\omega = .90$)					
ECC9_T	-1.619	-0.857	0.129	1.046	1.593
ECC21_T	-1.002	0.075	0.934	1.766	0.977
ECC27_T	-1.185	0.050	1.392	2.209	1.388
ECC33_T	-0.780	0.239	1.382	2.060	2.039
ECC45_T	-1.393	-0.582	0.497	1.788	2.050
ECC60_T	-3.636	-2.062	-0.418	1.516	0.852
ECC62_T	-1.320	-0.431	0.494	1.343	2.538
Virtue ($\omega = .83$)					
ECC3_V	-2.247	-1.604	-0.625	0.309	1.262
ECC8_V	-3.372	-2.407	-1.385	0.307	0.998
ECC26_V	-3.418	-2.771	-2.140	-1.087	1.318
ECC44_V	-2.233	-1.391	-0.431	0.487	1.230
ECC61_V	-1.622	-0.932	0.002	0.669	1.774

ω = McDonald's omega. Extrmt1, Extrmt2, Extrmt3, and Extrmt4 indicate boundary category ($b_{i(k=1)}$, $b_{i(k=2)}$, $b_{i(k=3)}$, and $b_{i(k=4)}$) of the items. a = discrimination parameter

Discussion

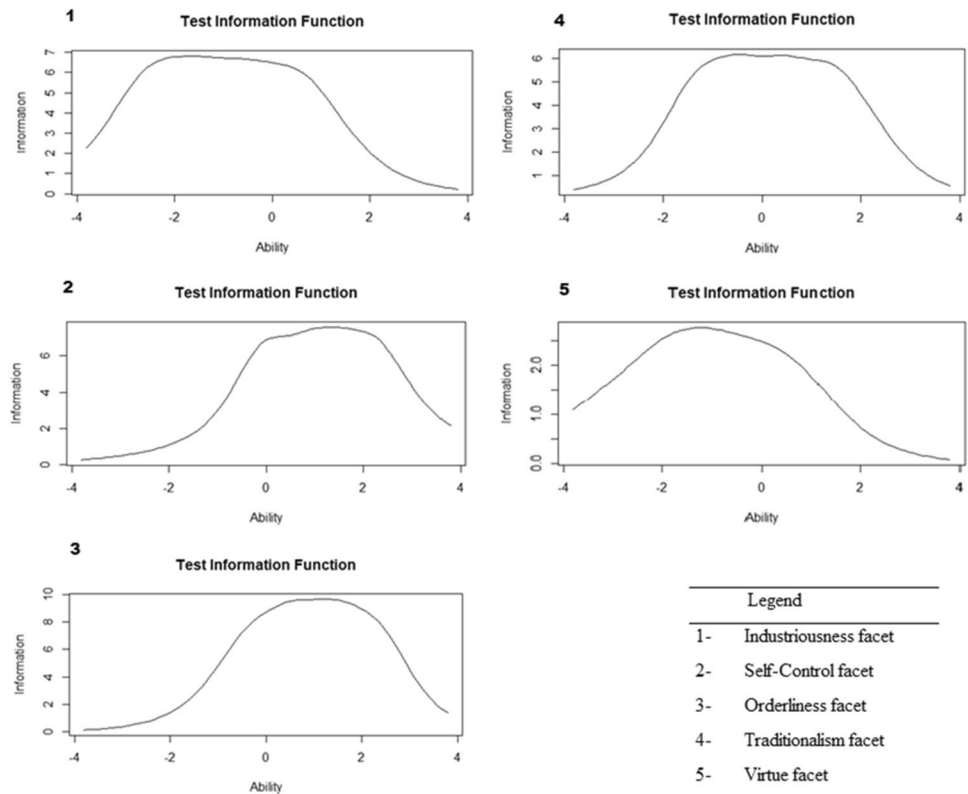
This study provided a psychometric examination of a translation of the Chernyshenko Conscientiousness Scales (CCS) into Brazilian Portuguese and evidence for the validity of these newly adapted scales in Brazil. Specifically, we adapted the CCS into Brazilian Portuguese, evaluated its psychometric properties, and investigated its relationship with SWB and academic involvement. The results replicated the five-factor solution found for the CCS in English (Green et al., 2016) and showed that conscientiousness has strong relationships with SWB and academic involvement. Another new finding is that the relationship between SWB and academic involvement is mostly explained by their shared variance with conscientiousness.

Validity evidence of the CCS

The Brazilian version of the CCS had an internal structure composed of five facets that replicated the previous factorial structure found in American and English samples (Green et al., 2016). Although presenting fewer items per facet, the verified solution indicates that industriousness, self-control, orderliness, traditionalism, and virtue constitute distinct yet related facets of conscientiousness in the Brazilian context. Our results replicate the lower-order structure of CCS found in US and English samples in a non-WEIRD country (Henrich et al., 2010), suggesting cross-cultural generalizability of the measure. This is the first study showing the existence of these facets in Brazil.

Forty-one items from the 80 tested items (i.e., 60 original items plus 20 new items) did not load onto the originally expected factor (i.e., facet) and were not incorporated in the current Brazilian CCS version. The responsibility facet did not result in an independent factor and was not included in the final solution. Two facets (e.g., traditionalism and virtue) were the most underrepresented because three items were removed from the traditionalism scale and five from the virtue scale. The original items "When I was in school, I used to break rules quite regularly", "In my opinion, censorship slows down the progress", and "Even if I knew how to get around the rules without breaking them, I would not do it", were removed from the traditionalism facet. The items "If a cashier forgot to charge me for an item I would tell him/her", "I would rather get a bad grade than copy some else's homework and turn it in as my own", "I could be insincere and dishonest if situation required me to do so", "The people who know me best would say that I am honest", and "If I find money laying around, I'll keep it to myself" were

Fig. 1 Test information functions produced for the CCS's facets using the IRT approach (graded response model estimator)



removed from the virtue facet. The self-control facet lost one item (e.g., "I am easily talked into doing silly things"). The industriousness facet lost one item (e.g., "Setting goals and achieving them is not very important to me"). The orderliness facet lost one item (e.g., "I hate when people are sloppy"). Surprisingly, only the two items (e.g., "I have a lot of respect for authorities (*e.g., police and inspection*) and I help them whenever I can." and "If I find a large amount of money laying around, I'll keep it to myself") of the twenty newly built items were kept for the final solution. These results suggest that new items should be incorporated in further scale enhancements by rephrasing and simplifying the removed items. Additionally, new items should be written and tested to cover the facet of responsibility.

Content removal decreases the scope of the construct covered and might affect the facets' validity (AERA et al., 2014). However, the core facets of conscientiousness represented by industriousness, self-control, and orderliness (Roberts et al., 2004) are well-preserved, and most of their items showed excellent psychometric properties (e.g., factor loadings, discrimination, and information produced). The amount of information provided by the TIFs also shows good measurement for most parts of the latent traits. The other more interstitial facets represented by traditionalism and virtue presented adequate support for their continued use—although the virtue facet might significantly benefit

from introducing more informative and discriminative items in subsequent improvements (See Fig. 1).

Following previous findings (Lounsbury et al., 2005; Poropat, 2009; Rosin et al., 2014), the correlations between the five facets of conscientiousness with life satisfaction, positive affect, and involvement in academic activities are positive and significant, suggesting that hardworking, self-controlled, organized, conventional, and honest students tend to be more content with significant aspects of life, experience enthusiasm, joy, and pride more often and engage in demanding tasks in college. The only non-significant correlation was between traditionalism and positive affect, indicating that following norms and customs does not relate to experiencing positive emotions. However, self-control and traditionalism were negatively correlated with negative affect, suggesting that self-controlled and conventional students feel fewer negative emotions such as anger, sadness, and nervousness. Additionally, industriousness and orderliness positively correlated with involvement in academic non-mandatory activities. These associations point out that the facets of conscientiousness are, in fact, differently related to external variables (Roberts et al., 2014), are positively associated with SWB (Anglim et al., 2020), with academic involvement (Conrad & Patry, 2012), and constitute convergent validity evidence for the adapted version of the CCS in Brazil (AERA et al., 2014).

Unraveling the confounding role of SWB

The structural regression models indicated that conscientiousness constitutes a strong predictor of SWB and academic involvement, as presented in Hypothesis 3. SWB had a low and non-significant association ($\phi_{sample\ 1} = -0.15$, $\phi_{sample\ 2} = 0.09$) with academic involvement, indicating that the relationship between these variables is no longer significant when conscientiousness is taken into account. The non-significant association between SWB and academic involvement points out that life satisfaction, positive and negative affect are not likely to play an independent role in engagement but are the result of conscientiousness instead. Those findings suggest that interventions to increase academic engagement should not primarily focus on developing happiness (Adler et al., 2016) but should emphasize the development of additional abilities like time organization, study strategies and motivation to study (Geller et al., 2018).

Implications of the current results

The first practical implication of these results regards the implementation of interventions to increase happiness in students to promote desirable educational outcomes (Adler et al., 2016). Positive Psychology researchers should consider the relevance of conscientiousness for the educational context in their investigations to rule out the possibility that happier students are more conscientious, and, for this reason, tend to present higher educational outcomes. In this sense, it would be essential to investigate the specific contribution of happiness to educational outcomes while controlling for the role of conscientiousness.

Another implication of our research would be that educational systems may want to focus more on developing socio-emotional skills related to conscientiousness (e.g., promoting self-control, organization, and industriousness) to improve self-regulatory learning (Barros et al., 2021) and academic engagement in Brazil. Students might be negatively influenced by the social mechanism related to dishonesty (e.g., Brazilian *jeitinho*) and could benefit from a paradigm change based on developing valuable skills for academic adaptation (Rosin et al., 2014) and future career success. For this to occur, however, it is essential that policy-makers be aware of such results, indicate their relevance to professors and other academic decision-makers, and strive to implement socioemotional skills agendas into university curricula.

Limitations and future directions

Our research is not without limitations. First, the correlational design does not allow the inference that conscientiousness causes higher SWB and academic involvement. Second, the measure of academic involvement is based on self-reports

and should be interpreted as a self-perception of academic involvement—that might differ from professor's or peer's perceptions. Third, data collection occurred online during the pandemic caused by the coronavirus in convenience samples. Considering the negative impact that the pandemic represented on university students in Brazil, these samples may be biased in terms of representing more cooperative and resilient students who agreed to answer the survey. Fourth, additional validity evidence is necessary for the CCS. It is essential to investigate the relationships of the CCS with other conscientiousness scales and other variables more squarely related to conscientiousness (e.g., self-efficacy, achievement, and health). Fifth, the predominance of female participants might bias the results—which should be controlled in further investigations. For these reasons, the generalizability of the results might apply only to students with similar characteristics to the studied samples. We emphasize that these findings should be cautiously interpreted and replicated with more representative samples. Future research should explore the role of additional relevant variables such as gender, age, values, and Brazilian culture on conscientiousness.

Conclusion

This study provides evidence that the CCS is a valid and reliable measure of conscientiousness at the facet level that can be used in Brazil. These findings indicate the robustness of the conscientiousness lower-order structure even in a context marked by a social mechanism known as Brazilian *jeitinho* (Ferreira et al., 2012). For many, in this context, personality traits related to being honest, showing respect for others, and being responsible, contrast with the cultural norm that breaking social norms and taking advantage of others' weaknesses is acceptable. The Brazilian political and cultural scenario is characterized by corruption and lower values of propriety—which produces a message that conscientiousness might be seen as unnecessary and undesirable characteristic to succeed in Brazil.

Additionally, results suggest that happier and more conscientious students are the ones more engaged in academic activities. This finding, however, should not be interpreted as an indication that promoting happiness is worthless to the educational environment but that it should be developed along with strategies to increase conscientiousness.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s12144-022-03552-7>.

Authors' contributions AMR adapted the instrument, contributed to data acquisition, and wrote and reviewed the manuscript. CZ adapted the instrument, planned, and conducted data analysis, wrote and reviewed the manuscript. BWR compared the original and

back-translated version of the instrument and contributed to the final version of the manuscript. AMR, CZ, and BWR contributed to the interpretation of the results, and approved the final version of the manuscript for submission.

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Data availability Not available.

Code availability Not available.

Declarations

Conflicts of interest/Competing interests On behalf of all authors, the corresponding author states that there is no conflict of interest.

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