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ABSTRACT

This study aims to investigate the psychometric properties of the Greek version of Brief Self-control Scale (BSCS). This scale is used for the assessing of self-control, which is the ability to control one's emotions and desires – especially in demanding situations-in order to have more important long-term benefits. Data were collected from a sample of Greek-speaking university students from two different universities (N = 251, M_{age} = 19.86, SD = 2.58, 47% female). A series of CFAs were conducted to compare different potential factor structures that have been proposed in the literature. The results indicate that the revised shortened 7-items BSCS in Greek, as indicated in previous research too, displays a two-factor structure (impulse-control and self-discipline) and these factors show acceptable internal reliability. Also, item factor loadings, thresholds, and intercepts were invariant across females and males (strong measurement invariance). Means of bivariate latent correlations of the BSCS with depression, anxiety, stress, conscientiousness and satisfaction with life were investigated. This study shows that the Greek BSCS is a promising short tool for research on youth's self-control.

Introduction

During the transition from childhood to adulthood, adolescents and young adults struggle to make lifestyle choices and to establish patterns of behaviour that affect both their current and future health (El Achhab et al., 2016). University students in particular find themselves in a demanding situation, often having to study at an academic level and living in a

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less structured environment with many more distractions and risks, like alcohol use (Lindgren et al., 2014), drugs (Wills & Dishion, 2004), risky sexual behaviours (Magnusson et al., 2019) and obesity (Tsukayama et al., 2010).

Self-control is the self-regulation of thoughts, feelings and actions when faced with challenges, more specifically, when long-term important goals conflict with more enjoyable immediate goals (Duckworth et al., 2019; Willems et al., 2019). In the literature, the definition of self-control and its aspects are not so clear. Definitions of self-control vary and include several factors like delay of gratification, effortful control, willpower, executive control, time preference, self-discipline, self-regulation, and ego strength (Duckworth, 2011). The difference between impulse-control and self-discipline, as different aspects of self-control can be summed up in the fact that impulse-control is about avoiding the undesired action while self-discipline is about maintaining the desired. Self-control has been proven to be a protective factor against high risk behaviours but also at life challenges that youngsters face during the transition from adolescence to adulthood (Magnusson et al., 2019; Quinn & Fromme, 2010). Self-control is strongly associated with psychological well-being (Willems et al., 2019), psychopathology (anxiety and depression) (Oliva et al., 2019) but also with the performance of desired behaviours and the inhibition of undesired behaviours (De Ridder et al., 2012).

Self-control is commonly assessed with the Brief Self-Control Scale (BSCS, Tangney et al., 2004), a brief 13-item scale assessing behaviours that directly involve self-control (e.g., breaking a habit, working towards long-term goals).The BSCS has shown good reliability and validity in several languages and cultural contexts e.g., Italian (Chiesi et al., 2020), French (Brevers et al., 2017), Chinese (Fung et al., 2020). Therefore, in this study, we aimed at adding to this literature by testing the adaptation of the BSCS in Greek.

Given that prior research has established the measurement invariance of the subscales of the BSCS across males and females, in this study we will also test measurement invariance across the two genders. This is a prerequisite to become able to examine gender differences in self-control, as extant research has shown (Chiesi et al., 2020; Oliva et al., 2019).Despite its common use, different models have been proposed in the literature regarding the factorial structure of the BSCS. Both unidimensional and two-dimensional factor structures receive support (Manapat et al., 2021). Several of the models receiving support in the

past literature consist of fewer than 13 items, implying that the original 13-item version of the BSCS has suboptimal psychometric properties. Therefore, in this study we aimed at exploring the factorial structure of the Greek version of the BSCS.

The present study

No study has examined the properties of the BSCS in Greece. This is an important gap, given the importance of self-control and the usefulness of the BSCS as shown in other contexts. The aim of this study is to adapt the BSCS in Greek and investigate its psychometric properties by means of Exploratory and Confirmatory Factor Analyses. Given that past studies have investigated a number of different models for the BSCS, including models of shortened versions with fewer than the original 13 items (Chiesi et al., 2020; Morean et al., 2014), we expected to find support for either a unidimensional or a two-dimensional structure which would be positively associated with conscientiousness, satisfaction with life (Chiesi et al., 2020) and psychological well-being (Li et al., 2015).

In terms of criterion validity, we investigated the correlations between the two factors of the BSCS and psychopathology (depression and anxiety), satisfaction of life and conscientiousness (Gao et al., 2021; De Ridder & Gillebaart, 2017; Tangney et al., 2004). According to the literature, we expected that higher self-control – especially self-discipline – is positively correlated with life satisfaction (De Ridder & Gillebaart, 2017) and conscientiousness (Gao et al., 2021). Also we expected that higher self-control is negatively correlated with depression and anxiety (Tangney et al., 2004).

Method

Participants

The sample consisted of 251 Greek-speaking university students who attended the two first years of studies from theoretical and physical departments of a central (Aristotle University of Thessaloniki) and a regional (Democritus University of Thrace) university (Mage = 19.86, SD = 2.58, 47% female). Most participants were Greek (96%), came from intact families where parents were married (87.7%) and whose fathers (52.6%) or mothers (53.8%) had university-level education.

Procedure

The BSCS was translated using standard back-translation procedures by two bilingual researchers. University students were asked to fill-in the questionnaire using paper-and-pencil surveys. The research has been approved by the ethics committee of the medical school of the [Aristotle University of Thessaloniki] and was conducted without funding.

Measures

Brief self-control scale

The Brief Self-Control Scale (Tangney et al., 2004) is a13-item instrument designed to assess self-control in a brief way. The items focus on behaviours that directly involve self-control. Example items are 'I have a hard time breaking bad habits' and 'People would say that I have iron self-discipline'. Items are answered on a 5-point Likert scale from 1 (Not at all like me) to 5 (Very much like me). In the current study the scale showed acceptable reliability, α = .72.

Depression, anxiety, and stress scale 21 (DASS 21)

The DASS 21 (Lovibond et al., 1995; Lyrakos et al., 2011) was used to assess depression, anxiety and stress, as a testing criterion means of validity of the BSCS. The DASS consists of 21 items that are answered on a 4-point Likert scale from 0 (Never) to 3 (Almost always). Example items are 'I couldn't seem to experience any positive feeling at all' (depression), 'I felt scared without any good reason' (anxiety) and 'I found it difficult to relax' (stress). In this study the scale showed good reliability coefficients: α = .87 (depression), α = .85 (anxiety) and α = .83 (stress).

Conscientiousness

The Greek Personality Adjective Checklist – GPAC (Tsaousis & Georgiades, 2009) was used to assess conscientiousness. The GPAC consists of 94 adjectives, nine of which measure conscientiousness. The items are addressed on a 5-point Likert scale from 1 (Completely disagree) to 5 (Completely agree). Example items for conscientiousness were 'Hard-working', 'Unscheduled' (reverse coded). In this study, the subscale showed good reliability, α = .83.

Satisfaction with life

Satisfaction with life was assessed with the Satisfaction with Life Scale – SWLS (Diener et al., 1985), which consists of 5 items addressed on a 7-point Likert scale, from 1 (Strongly Disagree) to 7 (Strongly Agree). Example items are 'In most ways my life is closed to ideal', and 'The conditions of my life are excellent'. In the present study the scale had good internal reliability, $\alpha = .81$.

Missing values

Missing value analysis was conducted on the item-level with the naniarv.0.6.0 package (Tierney et al., 2021), as well as with the final-fitv.1.0.3 package (Harrison et al., 2021) in R. For all items of the BSCS and the other scales, missingness ranged from 0.8% (2 cases) to 8% (20 cases), whereas most participants (70.1%) had no missing in any of the items. Comparisons of all 13 BSCS items based on age, gender, depression, anxiety, stress, satisfaction with life and conscientiousness revealed that only age and gender were associated with missingness of any of the 13 items. We used the rstatix v.0.7.0 package in R (Kassambara, 2021) to compute the effect size (eta-squared) of the missingness in each of the BSCS items based on age, gender, depression, anxiety, stress, satisfaction with life, and conscientiousness. Table S1 (Supplementary material) presents the p-values and effect sizes of missing datas of the BSCS. To handle missing data, we applied multiple imputation, because the pattern of missingness depended, at least partially, on some existing variables in our dataset (Missing At Random) and the analytic plan (see below) required the use of limited information methods (specification of items as ordinal). Using the mice v.3.13.0 package in R (Van Buuren & Groothuis-Oudshoorn, 2011), we imputed the BSCS items using 40 imputations over 20 iterations.

Analytic plan

To investigate the factor structure of the BSCS, we applied Exploratory Factor Analysis (EFA), using the psych v2.1.3 (Revelle, 2021) package in R. Given that items were ordinal, we specified 'cor = poly', so that the polychoric correlation matrix would be used to extract the factors. The scree plot and the item standardized factor loadings were considered to determine a possible number of factors. Then, to test possible models of

the BSCS, based on existing literature, we applied a series of Confirmatory Factor Analyses (CFA), declaring the items as ordinal indicators and using the Diagonally Weighted Least Squares (DWLS) estimator as applied in the *semTools* v0.5–3 (Jorgensen et al., 2020) package in R. Given that the existing literature supports different factorial structures for the BSCS, we followed the approach found in a recent paper (Chiesi et al., 2020) and we tested five different models: 1. A one-factor model where all items loaded on one factor (Tangney et al., 2004), 2. A two-factor model, where all 13 items loaded on two factors (impulse-control and self-discipline) (Ferrari et al., 2009), 3. A two-factor model consisting of 10 items loading on two factors (inhibition and initiation, De Ridder et al., 2011), 4. A two-factor model consisting of 8 items loading on two factors (impulsivity and restraint) (Maloney et al., 2012) and 5. A two-factor model consisting of 7 items loading on two factors, impulse-control and self-discipline (Morean et al., 2014). Fit was assessed based on the scaled Comparative Fit Index (CFI, should be above .90, ideally above .95), the scaled Tucker Lewis Index (TLI, should be above .90, ideally above .95), the Root Mean Square Error of Approximation and the Standardized Root Mean Residual (RMSEA and SRMR, should be below .08, ideally below .06) (Kline, 2016).

Next, we examined the best-fitting model for measurement invariance across gender. We applied the Wu and Estabrook technique, as applied in the semToolsv. 0.5–3 (Jorgensen et al., 2020) package, and recently exemplified (Svetina et al., 2020). Finally, after the test of the factorial structure of the DASS, GPAC, and SWLS (see Table S4 in the Supplementary material), we tested the criterion validity of the BSCS by computing the bivariate latent correlations of the BSCS with the five other subscales. The five CFA's testing the different models of the Greek BSCS are shown in Figures S2-6 (Supplementary material).

Results

The scree plot (Figure S1, Supplementary material) showed that, according to the parallel method (Horn, 1965), up to four factors could represent the data well. Tables S2, S3 and S4 present the standardized factor loadings of the 13 items. In the 4-factor solution, factors 3 and 4 only had two items each with standardized factor loadings >.30, while three items showed cross-loadings. In addition, in both the 2- and the 3-factor solutions, items 7, 8, and 11 formed one factor, whereas in the 3-factor solution several of the remaining items showed cross-loadings in the

Table 1. Fit indices for the five confirmatory factor analyses of the Brief Self-Control Scale.

	Nr. of items	χ^2	df	p	CFI	TLI	RMSEA[90%CI]	SRMR
Model 1 – Tangney et al.	13	237.41	65	.000	.798	0.757	.103[.089-.117]	.103
Model 2 – Ferrari et al.	13	155.895	64	.000	.833	0.797	.076[.061-.091]	.081
Model 3 – de Ridder et al.	10	124.95	34	.000	.679	0.575	.103[.084-.123]	.087
Model 4 – Maloney et al.	8	83.022	19	.000	.846	0.772	.116[.091-.142]	.089
Model 5 – Morean et al.	7	26.646	13	.014	.953	0.923	.065[.028-.100]	.059

Note. Items were specified as ordinal variables and the DWLS estimator with robust standard errors was used. Analyses were ran on 40 multiply imputed datasets and results were pooled. Nr. of items: Number of items each model is based on. CFI: Comparative Fit Index; TLI: Tucker Lewis Index; RMSEA: Root Mean Square Error of Approximation; 90% CI: 90% Confidence Intervals.

other two factors. Therefore, we interpreted the results of the EFA as providing initial evidence for a 2-factor structure.

The factor structure and the standardized factor loadings of all five CFAs are depicted in Figures S2-S6 in the Supplementary Material. Table 1 shows the fit indices of the five CFAs (chi-square and its p-value are also included but were not taken into account in judging fit). The last model consisting of 7 items loading on two factors provided the best fitting model. Table 2 presents the standardized factor loadings of the items, including the factor loadings of the one-factor model ('self-control', first column), for comparison. In the best-fitting model, no standardized loading was below $\beta = .52$, whereas in the original one-factor structure there were at least 3 items with medium-weak loadings.

Table 2. Standardized factor loadings for the 1-factor and 2-factor (Morean et al., 2014) confirmatory factor analyses of the Brief Self-control Scale.

	Standardized Factor Loadings			Item-Total Correlations		
	Self-Control	Self-Discipline	Impulse-control	Impulse-control	Self-Control	Self-Discipline
Item 1	.57	-	0.57	-	-	-
Item 2	0.61	-	-	.61	-	-
Item 3	0.60	-	-	.58	-	-
Item 4	0.70	0.80	-	.64	.77	-
Item 5	0.09	-	-	.25	-	-
Item 6	0.51	-	-	.54	-	-
Item 7	0.52	-	0.71	.54	-	.77
Item 8	0.51	-	0.74	.51	-	.84
Item 9	0.60	0.58	-	.61	.72	-
Item 10	0.57	-	-	.57	-	-
Item 11	0.53	-	0.64	.53	-	.75
Item 12	0.66	0.70	-	.63	.77	-
Item 13	0.48	0.61	-	.51	.70	-

Note. Items 1, 2, 3, 4, 6, 9, 10, 12, and 13 have been reverse-coded. Self-Control refers to the total scale (unifactor solution). Self-Discipline and Impulse-control refer to the 2-factor solution from Morean et al. (2014). The standardized factor loadings are taken from CFAs ran on 40 multiply-imputed data sets.

Table 3. Fit indices for the nested confirmatory factor analyses testing for measurement invariance of the Brief Self-Control Scale across males and females.

	χ^2	df	CFI	TLI	RMSEA[90%CI]	ΔCFI	ΔRMSEA
Configural	40.68	26	.968	0.948	.067[.019-.106]		
Thresholds	54.64	40	.968	0.966	.054[.000-.087]	.000	−.013
Loadings	55.71	45	.977	0.978	.044[.000-.078]	.009	−.010
Intercepts	53.22	50	.993	0.994	.023[.000-.063]	.016	−.021

Note. Items were specified as ordinal variables and the DWLS estimator with robust standard errors was used. Gender was coded as 0 = male, 1 = female. Analyses were ran on 40 multiply imputed datasets and results were pooled.CFI: Comparative Fit Index; TLI: Tucker Lewis Index; RMSEA: Root Mean Square Error of Approximation; 90%CI: 90% Confidence Intervals.

Table 3 presents the fit indices of the tests for measurement invariance of the two-factor BSCS across males and females. The model comparisons indicate that the BSCS shows strong measurement invariance (item factor loadings, thresholds, and intercepts) across gender. Finally, Table 4 presents the bivariate (latent) correlations of the BSCS subscales with depression, anxiety, and stress. Again, for comparison, we kept both the full-scale self-control (13 items), and the two dimensions included in the best-fitting model (impulse-control and self-discipline).

Results indicate that impulse-control is positively correlated with conscientiousness and satisfaction with life. Self-discipline is negatively correlated with depression, stress, and anxiety, and positively with conscientiousness and satisfaction with life.

Discussion

The aim of this study is to examine the psychometric properties of the Greek version of the Brief Self-Control Scale (Tangney et al., 2004) in a sample of Greek-speaking university students. Based on extant literature, we tested different factorial structures of the scale. Initial EFA provided support for a two-factor structure. A series of CFAs indicated that the best fitting model was the one proposed by Morean (Morean et al., 2014), consisting of two dimensions – self-discipline and impulse-control. These results are in agreement with an emerging literature, showing that the BSCS has a multidimensional factor structure (Chiesi et al., 2020; Hagger et al., 2021; Lindner et al., 2015; Maloney et al., 2012). Consistent with several past studies, the evidence from this study supports the existence of a smaller subset of items, compared to the original 13-item version (Liang et al., 2020), and it can be argued that the present study shows the lack of support for the psychometric properties of the original 13-item BSCS.

Table 4. Means, standard deviations, and latent variable correlations of all variables.

Variable	M	SD	1	2	3	4	5	6	7	8	9	10
1. Age[1]	19.86	2.47										
2. Gender[1]	1.47	0.50	-.11									
3. Self-Control[1]	2.86	0.52	-.08	.05								
4. Impulse-control	3.46	0.81	-.05	.09	.68**							
5. Self-Discipline	2.70	0.77	-.06	.05	.69**	.41***						
6. Depression	0.67	0.65	-.05	-.02	-.31**	-.13	-.42***					
7. Anxiety	0.58	0.60	-.12	-.06	-.16*	-.05	-.26**	.81***				
8. Stress	0.93	0.63	-.05	.00	-.26**	-.05	-.34***	.91***	.88***			
9. Conscientiousness	2.93	0.65	.02	.10	.63**	.54***	.64***	-.35***	-.18*	-.25**		
10. Satisfaction w. Life	4.87	1.16	.00	-.03	.34**	.26**	.38***	-.64***	-.43***	-.50***	.29**	
Cronbach's α					.72	.69	.72	.87	.85	.83	.83	.81

Note. M and SD are used to represent mean and standard deviation, respectively. The table was made using the *apaTablesv2.0.8* package in R (Stanley, 2021).
[1]For these variables, correlations are based on observed scores, not latent variables.
*p < .05. ** p < .01. *** p < .001.

Finally, we found that the psychometric properties of the Greek BSCS were comparable across female and male students.

In line with other studies (Chiesi et al., 2020; Tangney et al., 2004), impulse-control correlated strongly positively with conscientiousness and moderately with satisfaction with life. Self-discipline correlated strongly negatively with depression and stress, moderately negatively with anxiety, strongly positively with conscientiousness, and moderately positively with satisfaction with life. Finally, the findings were in line with other studies that have examined correlations between the two-factors BSCS scales and these factors, like conscientiousness (Chiesi et al., 2020)

The most important limitation of this study is that the sample included only university students, mainly from two different universities, so the sample does not fully represent the Greek population of young adults. Future studies using the Greek BSCS should still examine its psychometric properties in different sections of the population. Another one limitation is the sample size, which could have been larger. Third limitation is that there were no other established self-regulation scales to use as convergent/divergent validity measures. Finally, despite the overall support for the two-factor model of Morean (Morean et al., 2014) based on this study, the reliability of the Impulse-control subscale is below .70, which might be considered rather low.

Based on our results and different authors, several adjusted scales of BSCS have been tested and it is an issue that should be considered and investigated in future research.

Conclusion

The present study shows that using a subset of items from the BSCS, more specifically, the revised shortened 7-items BSCS in Greek that displays a two-factor structure (impulse-control and self-discipline), can be a psychometrically promising way to measure self-control in Greek youth. Therefore, future research could benefit by using the Greek BSCS to investigate, for example, risk and protective factors for physical and mental health, especially in chronic stressed periods like the Greek long financial crisis or global issues like COVID-19 pandemic.

Data Availability Statement

Disclosure statement

No potential conflict of interest was reported by the author(s).

References

Brevers, D., Foucart, J., Verbanck, P., & Turel, O. (2017). Examination of the validity and reliability of the French version of the Brief Self-Control Scale. *Canadian Journal of Behavioural Science/Revue Canadienne Des Sciences Du Comportement*, *49* (4). https://doi.org/10.1037/cbs0000086

Chiesi, F., Bonacchi, A., Lau, C., Tosti, A. E., Marra, F., & Saklofske, D. H. (2020). Measuring self-control across gender, age, language, and clinical status: A validation study of the Italian version of the Brief Self- Control Scale (BSCS). *PLoS One*, *15* (8). https://doi.org/10.1371/journal.pone.0237729

de Ridder, D., & Gillebaart, M. (2017). Lessons learned from trait self-control in well-being: Making the case for routines and initiation as important components of trait self-control. *Health Psychology Review*, *11*(1), 1. https://doi.org/10.1080/17437199.2016.1266275

de Ridder, D. T. D., De Boer, B. J., Lugtig, P., Bakker, A. B., & van Hooft, E. A. J. (2011). Not doing bad things is not equivalent to doing the right thing: Distinguishing between inhibitory and initiatory self-control. *Personality and Individual Differences*, *50*(7), 7. https://doi.org/10.1016/j.paid.2011.01.015

de Ridder, D. T. D., Lensvelt-Mulders, G., Finkenauer, C., Stok, F. M., & Baumeister, R. F. (2012). Taking stock of self-control. *Personality and Social Psychology Review*, *16*(1), 1. https://doi.org/10.1177/1088868311418749

Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment*, *49*(1), 1. https://doi.org/10.1207/s15327752jpa4901_13

Duckworth, A. L. (2011). The significance of self-control. *Proceedings of the National Academy of Sciences*, *108*(7), 7. https://doi.org/10.1073/pnas.1019725108

Duckworth, A. L., Taxer, J. L., Eskreis-Winkler, L., Galla, B. M., & Gross, J. J. (2019). Self-control and academic achievement. *Annual Review of Psychology*, *70*(1), 1. https://doi.org/10.1146/annurev-psych-010418-103230

El Achhab, Y., El Ammari, A., El Kazdouh, H., Najdi, A., Berraho, M., Tachfouti, N., Lamri, D., El Fakir, S., & Nejjari, C. (2016). Health risk behaviours amongst school adolescents: Protocol for a mixed methods study. *BMC Public Health*, *16*(1), 1. https://doi.org/10.1186/s12889-016-3873-4

Ferrari, J. R., Stevens, E. B., & Jason, L. A. (2009). The role of self-regulation in abstinence maintenance: Effects of communal living on self-regulation. *Journal of Groups in Addiction & Recovery*, *4*(1–2), 1–2. https://doi.org/10.1080/15560350802712371

Fung, S., Kong, C. Y. W., & Huang, Q. (2020). Evaluating the dimensionality and psychometric properties of the brief self-control scale amongst Chinese University Students. *Frontiers in Psychology*, *10*(2903). https://doi.org/10.3389/fpsyg.2019.02903

Gao, K., Zhang, R., Xu, T., Zhou, F., & Feng, T. (2021). The effect of conscientiousness on procrastination: The interaction between the self-control and motivation neural pathways. *Human Brain Mapping*, *42*(6), 6. https://doi.org/10.1002/hbm.25333

Hagger, M. S., Zhang, C.-Q., Kangro, E.-M., Ries, F., Wang, J. C. K., Heritage, B., & Chan, D. K. C. (2021). Trait self-control and self-discipline: Structure, validity, and invariance across national groups. *Current Psychology*, *40*(3), 3. https://doi.org/10.1007/s12144-018-0021-6

Harrison, E., Drake, T., & Ots, R. (2021). *finalfit: Quickly create elegant regression results tables and plots when modelling*. https://CRAN.R-project.org/package=finalfit

Horn, J. L. (1965). A rationale and test for the number of factors in factor analysis. *Psychometrika*, *30*(2), 2. https://doi.org/10.1007/BF02289447

Jorgensen, T. D., Pornprasertmanit, S., Schoemann, A. M., & Rosseel, Y. (2020). *semTools: Useful tools for structural equation modeling*. https://cran.r-project.org/package=semTools

Kassambara, A. (2021). *rstatix: Pipe-friendly framework for basic stats*. https://CRAN.R-project.org/package=rstatix

Kline, R. B. (2016). *Principles and practice of structural equation modeling* (4th ed.). The Guildford Press.

Li, J.-B., Delvecchio, E., Lis, A., Nie, Y.-G., & di Riso, D. (2015). Parental attachment, self-control, and depressive symptoms in Chinese and Italian adolescents: Test of a mediation model. *Journal of Adolescence*, *43* (159–170). https://doi.org/10.1016/j.adolescence.2015.06.006

Liang, W., Wang, D. D., Shang, B. R., Zhang, C.-Q., Duan, Y. P., & Si, G. Y. (2020). Further examination of the psychometric properties of the Brief Self-Control Scale: Evidence from Chinese athletes and students. *International Journal of Sport and Exercise Psychology*, 1–20. https://doi.org/10.1080/1612197X.2020.1827000

Lindgren, K. P., Neighbors, C., Westgate, E., & Salemink, E. (2014). Self-control and implicit drinking identity as predictors of alcohol consumption, problems, and cravings. *Journal of Studies on Alcohol and Drugs*, *75*(2), 2. https://doi.org/10.15288/jsad.2014.75.290

Lindner, C., Nagy, G., & Retelsdorf, J. (2015). The dimensionality of the Brief Self-Control Scale—An evaluation of unidimensional and multidimensional applications. *Personality and Individual Differences*, *86*, 465-473. https://doi.org/10.1016/j.paid.2015.07.006

Lovibond, S. H., & Lovibond, P. F., & Psychology Foundation of Australia. (1995). *Manual for the depression anxiety stress scales*. Psychology Foundation of Australia.

Lyrakos, G. N., Arvaniti, C., Smyrnioti, M., & Kostopanagiotou, G. (2011). Translation and validation study of the depression anxiety stress scale in the greek general population and in a psychiatric patient's sample. *European Psychiatry*, *26*(S2), S2. https://doi.org/10.1016/S0924-9338(11)73435-6

Magnusson, B. M., Crandall, A., & Evans, K. (2019). Early sexual debut and risky sex in young adults: The role of low self-control. *BMC Public Health*, *19*(1), 1. https://doi.org/10.1186/s12889-019-7734-9

Maloney, P. W., Grawitch, M. J., & Barber, L. K. (2012). The multi-factor structure of the Brief Self-Control Scale: Discriminant validity of restraint and impulsivity. *Journal of Research in Personality*, *46*(1), 1. https://doi.org/10.1016/j.jrp.2011.10.001

Manapat, P. D., Edwards, M. C., MacKinnon, D. P., Poldrack, R. A., & Marsch, L. A. (2021). A psychometric analysis of the Brief Self-Control Scale. *Assessment*, *28*(2), 2. https://doi.org/10.1177/1073191119890021

Morean, M. E., DeMartini, K. S., Leeman, R. F., Pearlson, G. D., Anticevic, A., Krishnan-Sarin, S., Krystal, J. H., & O'Malley, S. S. (2014). Psychometrically improved, abbreviated versions of three classic measures of impulsivity and self-control. *Psychological Assessment*, *26*(3), 3. https://doi.org/10.1037/pas0000003

Oliva, A., Antolín-Suárez, L., & Rodríguez-Meirinhos, A. (2019). Uncovering the link between self-control, age, and psychological maladjustment among Spanish adolescents and young adults. *Psychosocial Intervention*, *28*(1), 1. https://doi.org/10.5093/pi2019a1

Quinn, P. D., & Fromme, K. (2010). Self-regulation as a protective factor against risky drinking and sexual behavior. *Psychology of Addictive Behaviors*, *24*(3), 3. https://doi.org/10.1037/a0018547

Revelle, W. (2021). *psych: Procedures for psychological, psychometric, and personality research*. Northwestern University, Evanston, Illinois. R package version 2.1.3, https://CRAN.R-project.org/package=psych.

Stanley, D. (2021). *apaTables: Create American Psychological Association (APA) Style Tables. R package v.2.0.8.* https://CRAN.R-project.org/package=apaTables

Svetina, D., Rutkowski, L., & Rutkowski, D. (2020). Multiple-group invariance with categorical outcomes using updated guidelines: An illustration using M *plus* and the lavaan/semTools packages. *Structural Equation Modeling: A Multidisciplinary Journal*, *27*(1), 1. https://doi.org/10.1080/10705511.2019.1602776

Tangney, J. P., Baumeister, R. F., & Boone, A. L. (2004). High self-control predicts good adjustment, less pathology, better grades, and interpersonal success. *Journal of Personality*, *72*(2), 271–324. https://doi.org/10.1111/j.0022-3506.2004.00263.x

Tierney, N., Cook, D., McBain, M., Fay, C., O'Hara-Wild, M., Hester, J., Smith, L., & Heiss, A. (2021). *naniar: Data structures, summaries, and visualisations for missing data*. https://cran.r-project.org/package=naniar.

Tsaousis, I., & Georgiades, S. (2009). Development and Psychometric Properties of the Greek Personality Adjective Checklist (GPAC). *European Journal of Psychological Assessment*, *25*(3), 3. https://doi.org/10.1027/1015-5759.25.3.164

Tsukayama, E., Toomey, S. L., Faith, M. S., & Duckworth, A. L. (2010). Self-control as a protective factor against overweight status in the transition from childhood to adolescence. *Archives of Pediatrics & Adolescent Medicine*, *164*(7). https://doi.org/10.1001/archpediatrics.2010.97

van Buuren, S., & Groothuis-Oudshoorn, K. (2011). mice: Multivariate imputation by chained equations in R. *Journal of Statistical Software*, *45*(3), 1–67. https://www.jstatsoft.org/v45/i03/

Willems, Y. E., Boesen, N., Li, J., Finkenauer, C., & Bartels, M. (2019). The heritability of self-control: A meta-analysis. *Neuroscience and Biobehavioral Reviews*, *100*, 324–334. https://doi.org/10.1016/j.neubiorev.2019.02.012

Wills, T. A., & Dishion, T. J. (2004). Temperament and adolescent substance use: A transactional analysis of emerging self-control. *Journal of Clinical Child & Adolescent Psychology*, *33*(1), 1. https://doi.org/10.1207/S15374424JCCP3301_7