



# A First Class Measure: Evidence for a Comprehensive Social Class Scale in Higher Education Populations

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## Abstract

Despite social class being a burgeoning area of research in the higher education literature, there is no single comprehensive measure of social class in university student populations. Most previous research has included objective single-item measures (e.g., parent education or occupation) to assess social class and then sorted students into distinct social class categories using these items. Such approaches do not adequately capture the complexity and nuance of class, and they ignore the subjective and social components involved. The present paper reports the development and validation of an 11-item Comprehensive Social Class Scale (CSCS) that uses a mix of objective and subjective items to assess multiple aspects of social class, including education level, occupational prestige, family affluence, social class identity and subjective social status. Across 12 samples ( $N=4926$ ), we provide evidence for a single factor structure of the CSCS and demonstrate aspects of its reliability and validity. We conclude by discussing some limitations and suggestions for use of the CSCS in higher education populations.

**Keywords** Social class · Socioeconomic status · Social status · University students · Working-class students · Higher education

Research in higher education has demonstrated that social class is a key factor in predicting the experiences and successes of university students and an important demographic factor when considering how to improve the equity and diversity of universities (James et al., 2008; Maras, 2007; Rubin et al., 2014). Social class affects a wide range of experiences and outcomes for university students, including likelihood of attending university (Rosado & David, 2006), degree choice (Reimer & Pollak, 2010; Tsiplakides, 2017), and academic performance (Stephens et al., 2014), as well as less traditional markers of university success such as social integration and mental health (Rubin et al., 2016, 2019).

Despite being an important predictor of outcomes for university students and a focal point of research on equity and diversity in higher education, there is no clear consensus

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among researchers about what the term “social class” refers to or how best to conceptualise and measure it in a university population. However, contemporary researchers tend to agree that social class should be conceptualised and measured along multiple social and economic lines (Diemer et al., 2012; Kraus & Stephens, 2012). Moreover, the American Psychological Association’s taskforce on socioeconomic status (SES) concluded with a recommendation that social class be measured using both objective and subjective measures (Saegert et al., 2006).

In the higher education context in particular, Rubin et al. (2014) have argued that both subjective and objective indicators are needed to provide an appropriately nuanced and comprehensive assessment of class. Consistent with this approach, most modern definitions of social class highlight objective social and economic indicators as well as the perceptions that people have about their own status (Manstead, 2018). Nonetheless, there is currently a disparity in higher education research between what we understand social class to be and how it is operationalised and measured, because most of the literature exploring the social class of university students has focused on single demographic or economic-based variables (Rubin et al., 2014). In light of contemporary recommendations for measuring social class and the current lack of consensus in the literature, we have developed a Comprehensive Social Class Scale (CSCS) that covers most of the commonly used indicators of student social class.

## The Need for a Comprehensive Social Class Scale

On a purely descriptive level, social class refers to the division in society along the lines not just economic but also *social* status (Diemer et al., 2012; Sheppard & Biddle, 2017). Thus, social class is not solely determined by what quartile one’s income falls in, one’s neighbourhood, or one’s family, but rather from a mixture of these and many more variables. Social class research is particularly prominent in higher education contexts because, historically, university education was only available to individuals from higher classes. In more recent times, efforts to increase the proportion of students from lower class backgrounds in university education have intensified. This is particularly true in Australia, where social, cultural and political changes, including government subsidised student loans and a shift to a highly skilled workforce, have led to the university population becoming increasingly heterogenous in terms of class (Bradley et al., 2008). Although the historically exclusionary context has been slowly changing over time, the legacy of classism lingers in higher education systems worldwide and manifests through processes such as university admissions and administrations as well as university cultures and the student experience (e.g., James et al., 2008; Maras, 2007). Research highlighting, explaining, and intervening on these social class differences in higher education is important and necessary in the process of making higher education more diverse and equitable. However, researchers and practitioners in this area are missing a comprehensive measure of social class, which factors in cultural, social and economic aspects of class. Without this measure, research is providing only a limited picture of social class.

As mentioned above, most research in this area tends to use single-item objective economic measures as proxies for student social class (for reviews, see Rubin, 2012a; Sirin, 2005). These measures normally include the income, education level, or occupation of one or more parental figures. Although each of these factors has been found to be closely related to student outcomes, these measures are not directly measuring class, but rather

economic and resource-based variables that are related to class. It is now widely regarded that social class is as much a social variable as an economic one (Ostrove & Cole, 2003). For example, social class has been described as a cultural and qualitative group identity based on a shared history and collective conscious among groups (Manstead, 2018). Missing from most education research are these social and cultural components of class.

To remain relevant and informative, higher education research needs to employ robust and informative research practices that represent and communicate the diversity of contemporary university populations. Researchers in this area have previously communicated the need for subjective measures of class in higher education research to keep up with the changing makeup of student populations (Rubin et al., 2014). In the present research we take this approach one step further by suggesting a scale consisting of subjective and objective items that are designed to capture student social class more fully while also avoiding overburdening participants. The CSCS is an 11-item measure that assesses education, occupation, family economic background, class identity and subjective social status. It was developed from an empirical, quantitative methods perspective, and utilises measures and concepts that are consistent with this approach. This comprehensive, multi-item approach is necessary because:

1. Social class is a latent variable that can only be indirectly measured using other related variables (Rubin et al., 2019). Measuring social class complexly and comprehensively with multiple variables brings us closer to capturing this latent construct.
2. Measurement of broad constructs, such as social class, should avoid narrow (single item) approaches to measurement that do not assess the construct optimally (Clark & Watson, 2019).
3. Social class is a powerful demographic variable that exerts influence across multiple domains of life, particularly regarding access to social, cultural and economic capital (Manstead, 2018). Therefore, measures of social class should include more than economic factors.
4. Finally, from a statistical perspective, using single variable measures of social class are not ideal because (a) single items suffer from greater measurement error and (b) related single items may be collinear. Combining these variables into a single measure is thus a more statistically robust and appropriate option.

## Measuring Social Class

As Rubin et al. (2014) pointed out, it is imperative that researchers seek to comprehensively conceptualise and measure social class and supplement objective measures with subjective measures. Below, we discuss some of the most common approaches to measuring social class in university samples and outline how they fit into the CSCS.

First, we should note the necessity of using variables that relate to students' parents, rather than the students themselves, when measuring social class in university samples (for reviews, see Kraus & Stephens, 2012; Lareau & Conley, 2008; Oakes & Rossi, 2003; Saegeert et al., 2006). This approach is necessary because (a) university students generally have the same primary occupation (i.e., university student) and education level, and (b) they are more likely to be young adults whose social class background is largely determined by that of their parents. Thus, using parental variables often provides a better indication of the access students have to cultural and economic capital.

## Education

We begin with one of the most common objective indicators of social class: level of educational attainment (Diemer et al., 2012; Kraus & Stephens, 2012). Education, especially higher education, is considered the most important catalyst for the other markers of social class and upward class mobility (Day & Newburger, 2002; Pascarella & Terenzini, 1991; Snibbe & Markus, 2005). That is, education provides access to more prestigious, high-power, and high-paying jobs which in turn provide the economic and cultural experiences and attributes of the upper- and middle-classes (Domhoff, 1998). In contrast, lower education stalls an individual's upward trajectory and leads to lower-prestige and lower-paying jobs with less economic and cultural benefit to the individual. Level of education is therefore considered one of the most fundamental measures of social class (Kraus & Stephens, 2012).

In the university context, education is an important resource for students to draw upon, especially the education of their family members. Parental education, for example, is a strong predictor of enrolment in university and adaptation to university (Nelson et al., 2008; Wilks & Wilson, 2012). These patterns have been attributed to concepts such as “college knowledge” (York-Anderson & Bowman, 1991), whereby parents with more experience with higher education are more likely to impart information about the university/college experience that influences students to attend and helps them to navigate the experience once they get there (Conley, 2008). Thus, parental education is often an important part of social class in the higher education context and, for this reason, it was included in the CSCS.

## Income and Occupation

Other common indicators of social class are income and wealth (Diemer et al., 2012; Kraus & Stephens, 2012). Higher education affords higher incomes, which in turn provide opportunities for the accumulation of wealth. Thus, relatively high income and wealth are common outcomes of higher education and markers of economic and social status (Howell & Howell, 2008; Kraus et al., 2009; Norton & Ariely, 2011). However, income and wealth provide information about social class above and beyond that provided by education measures. It is quite possible to have a high income or a great deal of wealth without a high level of education (e.g., some workers in the mining industry), and it is also possible to have a high level of education but low income and wealth (e.g., an unemployed university graduate). Income and wealth also represent the most direct measure of an individual's access to material goods and services, and thus their affluence.

Higher education students' access to social and economic resources is an important predictor of numerous outcomes including retention and completion (Brändle, 2017). Thus, student wealth is an important variable when considering class. However, as outlined above, student income and wealth are likely to be unreliable indicators of class in the higher education context because of the employment circumstances of students. Indeed, counterintuitively, lower class students may have higher personal incomes than upper- and middle-class students because they are more likely to be working to support themselves and their families (Rubin & Wright, 2015, 2017). Income is also generally a difficult variable to measure because people often struggle to accurately report their own income (Jetten et al., 2008), and this problem becomes even more fraught when asking people to recall the collective income of a household (Moore et al., 2000). For these reasons, the CSCS

includes items relating to perceptions of wealth during childhood, to capture the general affluence of a student's background.

An additional related indicator of social class is occupation, and more specifically, occupational prestige. Again, occupation is linked to education and wealth, in that high levels of education are needed for most high prestige jobs, and high prestige jobs are generally high paying (Diemer, 2009; Diemer et al., 2012; Kraus & Stephens, 2012). Prestigious jobs are those which are held in high regard by others and usually involve skills, tasks, and activities that yield greater social and economic status.

In the higher education context, students are likely to have less prestigious jobs in the retail and service industry while they are studying because of factors related to age, time availability, and education level. Parental occupational prestige, on the other hand, has been found to be related to important factors such as student degree choice (Leppel et al., 2001; Wells & Lynch, 2012) and uptake of networking opportunities (Mayer & Puller, 2008). Thus, a measure of parental occupational prestige was included in the CSCS.

### Subjective Social Status

Although most research uses some combination of the variables outlined above to measure social class, more recent research has pointed out that these indicators alone do not adequately capture the *social* side of status, because people's perceptions of their wealth and status relative to others is an important part of the social comparison processes that give power to these status indicators (Diemer et al., 2012; Kraus & Stephens, 2012; Manstead, 2018; Rubin et al., 2014). In particular, social class involves subjective perceptions of social status, such that how much people think they have compared to other people is just as important as how much they actually have (e.g., Adler et al., 2000; Kraus & Stephens, 2012). Individuals with high levels of education, occupation or income can believe that they are relatively low in these indicators compared to others, while other individuals can consider themselves highly ranked compared to others while having relatively low wealth and lower education and occupation.

Of course, subjective social status is related to objective social class indicators, meaning that most people are at least partially aware of where they sit objectively (Sheppard & Bidle, 2017). However, there is some discrepancy between subjective social status and objective indicators of education, income and occupation (Adler et al., 2000; Kraus & Keltner, 2013; Ostrove & Long, 2007). Thus, although subjective social status (i.e., people ranking themselves relative to other people in their community or country) is related to people's actual social and economic position, it is also an important independent marker of social class. In the higher education context, subjective social status is particularly important because it is a more proximal and accurate representation of students' social class compared to the parental measures (Rubin et al., 2014) and so was included in the CSCS.

### Self-identified Social Class

One final aspect missing from current measures of social class is affiliation or identity with a particular class. This social identity approach recognises social class as a distinct identity that people use to define themselves (e.g., Jetten et al., 2008; Ostrove & Long, 2007; Rubin et al., 2014; Soria et al., 2013). This approach borrows from the long-standing sociological approach to identity and asks participants to self-identify and categorise themselves

into a social class, with options that generally include “working class,” “middle-class,” and “upper-class” (Jetten et al., 2008; Ostrove & Long, 2007; Rubin et al., 2014).

Self-identification is an important aspect of social class because it moves beyond the objective societal-level demographic-based conceptualisation and instead captures the cultural and identity-based aspects of social class. Asking people to select the social class with which they identify requires them to consider not just their economic position but also their cultural and family background and other aspects that they believe contribute to their social class identity. In general, group identification and social identities derived from these groups are strong indicators of health and other psychosocial variables (Jetten et al., 2008; Soria et al., 2013; Tajfel & Turner, 1979). Thus, self-identified social class is a powerful and vital component of ascertaining social class.

In higher education contexts, social class identities are thought to be particularly important, because the middle- and upper-class history of universities have resulted in pervasive classism in higher education (Langhout et al., 2009). In particular, there is a long history of research on the class reproductions that take place in universities, in which the culture, expectations, and practices of universities serve to include students from upper and middle classes while excluding those from the lower classes (Bourdieu, 1986; Jack, 2016; Wells, 2008). From this perspective, class identity plays an important role in interpreting and challenging these experiences. Thus, class identity is an important but often overlooked aspect of the social class of students (Rubin et al., 2014), and it is for this reason that we included it in the CSCS.

## A Continuous Aggregate Approach

Each of the measures outlined above form necessary but insufficient components of social class, representing related but distinct aspects of a student’s social and economic position and background. Research aiming to investigate social class differences and issues at university should therefore seek to measure each of these concepts to obtain a fuller picture. As outlined above, the CSCS includes items covering all of these components.

To obtain a complete score of social class accounting for each of these variables, we propose transforming the items of the CSCS to z-scores and combining them to form a global measure of social class. In the present paper, we conduct a number of factor analyses to demonstrate the efficacy of this one-factor solution for the CSCS. We then demonstrate aspects of the reliability and validity of this single factor CSCS.

In addition to this aggregate approach, we argue that social class should be measured on a continuum rather than separated into discrete hierarchical categories. The approach of artificially categorising continuous variables has been criticised by researchers for both reducing the power to detect real effects and, in some cases, increasing the possibility of detecting spurious effects (e.g., Bennette & Vickers, 2012). Combining each of the social class constructs outlined above places individuals on a continuous spectrum of social class that incorporates their objective circumstances and subjective experiences. Despite having discrete labels (e.g., “working class,” “upper class”), an individual’s social class exists as a nexus of their economic, cultural and social status. This is a highly nuanced construct with no definite cut-off points. Even the discrete class categories that exist can have significant variance within them. For example, research has found that adding sub-categories (i.e. “upper middle class” and “lower middle class”) to a self-identifying social class measure leads people who are ostensibly in the same overall class to differentiate themselves within this class (Morin

& Motel, 2012). Conceptualising social class as a continuous dimension that ranges from low to high avoids this kind of categorisation that can at times be misleading.

In this paper, we provide evidence for the multi-faceted continuous approach to measuring the social class of university students using the CSCS. Using data from 10 different university samples, we provide exploratory and confirmatory evidence for a one-factor structure, and we provide some confirmation of the scale's validity and reliability.

## Method

### Participants

The data were collected from 12 individual samples that were obtained between 2015 and 2019. Participants were 4926 undergraduate university students from nine higher education institutions in Australia and one university in Ireland. Participants were recruited through convenience sampling methods using a range of methods including research participation credit and prize draw advertisements. All universities were typical of Australian and Irish universities, which usually offer 3–4 year undergraduate degrees. The majority of universities were regional universities, which tend to have higher representations of low SES students. Two universities were Group of Eight Universities, which represents the highest ranking and most prestigious universities in Australia. One sample also included students from an Australian Technical and Further Education college, which is similar to a community college or trade school. Representation of low SES students at the universities in these samples range from between 7 to 30%.<sup>1</sup> The demographic breakdown of each of the samples is reported in Table 1. The mean age of students sampled ranged between 22.27 and 24.48 years, with all samples being significantly skewed towards younger ages. The samples also tended to overrepresent female students, with females comprising between 62.75–82.30% of the samples.

### Procedure

Different samples completed different surveys. Each survey had a different focus and included different items and scales on the front end.<sup>2</sup> The CSCS items were always presented at the end of these surveys along with some additional demographic items. All data was collected using online survey software (either Qualtrics or Survey Monkey). Table 2

<sup>1</sup> These percentages are based on data from the National Centre for Student Equity in Higher Education. In this instance, socioeconomic status is based on the status of the Statistical Area 1 (SA1) in which they reside, using the Australian Bureau of Statistics' (ABS) Socio-Economic Index for Areas — Index of Education and Occupation derived from ABS census data. Low SES students are identified as being in the lowest quartile of the Australian population in the national ranking of SA1s on this measure.

<sup>2</sup> Samples 10 and 11 are from studies conducted as part of the first author's PhD thesis, which investigated the relations between university student social class, social integration, and mental health. Samples 1, 7, 8 and 9 are from studies that formed the second author's PhD thesis on social class, sleep, and mental and physical health. Samples 2, 3, 4, 5, and 6 are from studies included in the third author's PhD thesis on the need for closure, the ability to achieve cognitive structure, and mental health. Sample 12 is from a study published by the fourth author investigating different types of social class identity and mental health. Hence, some parts of the analyses reported here have been included in other publications.

**Table 1** Demographics for each sample

Sample ID	Recruited from	N	Mean Age (SD) Range	Gender (%)		Ethnicity (%)					
				Male	Female	Other	White	Indig- enous	African	Asian	Other
1	Psychology courses at 4 Australian universities	628	23.28 (8.56) 16–70	124 (19.75)	503 (80.10)	1 (0.16)	423 (67.36)	16 (2.55)	15 (2.39)	73 (11.62)	97 (15.44)
2	Psychology courses at a regional Australian university	322	22.54 (7.10) 17–69	57 (17.70)	265 (82.30)	–	278 (86.34)	11 (3.42)	3 (0.93)	17 (5.28)	12 (3.73)
3	Psychology courses at a regional Australian university	208	23.43 (6.54) 18–55	51 (24.52)	157 (75.48)	–	187 (89.90)	6 (2.88)	1 (0.48)	7 (3.37)	6 (2.88)
4	Psychology courses at a regional Australian university	257	22.71 (6.37) 18–51	62 (24.12)	195 (75.88)	–	228 (88.72)	11 (4.28)	1 (0.39)	10 (3.89)	7 (2.72)
5	Psychology and non-psychology courses at a regional Australian university	249	24.48 (8.83) 18–65	75 (30.12)	174 (69.88)	–	224 (89.96)	7 (2.81)	0 (0.00)	8 (3.21)	10 (3.89)
6	Psychology courses at 4 Australian universities	736	23.11 (7.77) 17–64	186 (25.27)	537 (72.96)	8 (1.09)	481 (65.35)	10 (1.36)	10 (1.36)	191 (25.95)	36 (4.89)
7	Psychology courses at a regional Australian university and an Aus- tralian technical college	376	22.93 (6.71) 17–56	71 (18.88)	304 (80.85)	1 (0.27)	318 (80.85)	10 (2.66)	3 (0.80)	22 (5.85)	19 (5.05)
8	Psychology courses at an Australian university and an Irish university	446	23.00 (7.18) 17–59	88 (19.73)	341 (76.46)	0	383 (85.87)	13 (2.91)	4 (0.90)	26 (8.07)	Mixed race=2 (0.45) Irish Travel- ler=0 (0.00) Other=16 (3.59)
9	Psychology courses at a regional Australian university	426	24.39 (8.04) 17–62	82 (19.25)	341 (80.05)	0 (0.00)	341 (80.05)	15 (3.52)	11 (2.58)	29 (6.81)	29 (6.81)
10	Non-psychology courses at a regional Australian university	749	22.27 (7.13) 17–62	279 (37.25)	470 (62.75)	–	664 (88.65)	23 (3.07)	5 (0.67)	14 (1.87)	43 (1.74)

**Table 1** (continued)

Sample ID	Recruited from	N	Mean Age (SD) Range	Gender (%)		Ethnicity (%)					
				Male	Female	Other	White	Indigenous	African	Asian	Other
11	Psychology courses at a regional Australian university	321	23.69 (7.58) 18–61	64 (19.94)	254 (79.13)	3 (0.93)	274 (85.36)	9 (2.80)	6 (1.87)	15 (4.67)	14 (4.36)
12	Psychology courses at a regional Australian university	208	23.74 (6.85) 17–50	62 (29.81)	146 (70.19)	–	176 (84.62)	7 (3.37)	3 (1.44)	8 (3.85)	10 (4.81)

All samples comprised of undergraduate students at large public universities. In studies 10 and 12, the term “Caucasian” was used instead of “White”

contains the items and response scales for the CSCS. Participants from Samples 5 and 9 were recruited from the general student population and incentivised to participate through prize draws. Participants from all other samples were recruited from psychology research participant pools.

## Results

### Data Preparation

For all samples, all item scores were standardised before analysis. Sample 9 included a *don't know* response for the measures of parental education, occupation, and social class identity. These responses were coded as missing data. Less than 1% of the sample contained any missing data, and missing data was deleted listwise for factor analyses. All participants with missing data had data missing from less than half of the items used to form the CSCS. Based on the recommendations of Graham (2009), an aggregate was made for these participants using the data that was available. We conducted the analyses described below using SPSS and AMOS.

### Exploratory Factor Analysis

To investigate the factor structure of the CSCS, we conducted an exploratory factor analysis on one of the largest samples (Sample 1;  $N=628$ ) that included students from multiple institutions. We used a principal axis factor analysis. The Kaiser–Meyer–Olkin measure of sampling adequacy was substantially greater than 0.50 (0.81), indicating good sampling adequacy, and Bartlett's test of sphericity was statistically significant ( $X^2=2318.82$ ,  $df=55$ ,  $p<0.001$ ), indicating that the included variables were related to one another and suitable for structure identification. A principal axis factor analysis on the standardised CSCS items identified four factors with an eigenvalue greater than one. However, Cattell's (1966) scree plot indicated one factor before the plot changed direction at greater than 40% and tailed off.

We also conducted a parallel analysis (Horn, 1965), as suggested by Russell (2002, p. 1637) and Wilson and Cooper (2008). A Monte Carlo simulation (Watkins, 2000) was used to conduct factor analyses on 100 random data sets, each consisting of 11 variables and 628 cases. This analysis revealed that only two factors in the real data set had eigenvalues that were larger than the first two eigenvalues in the simulated data set (4.30, 1.21), providing evidence for a two-factor solution.

We used a promax rotation to extract one factor to investigate the appropriateness of a single factor. Items in the scale all had positive loadings on this factor and ranged from 0.36 to 0.71. There was one item below the standard cut-off of 0.40 (Costello & Osborne, 2005): mother's education level (0.36). Father's education level was also quite low (0.41). This result is most likely because these items are the most objective items compared to the other social class items, and so are least likely to be related to the other subjective measures of social class. However, removing these items did not improve the Cronbach's alpha.

To keep the CSCS factor structure consistent with theory and literature, and because mother's education was close to the standard 0.40 cutoff on the first factor (0.36), we retained the single factor structure. This single factor accounted for 39.10% of the variance and had excellent internal reliability ( $\alpha = 0.84$ ). With the exception of mother's education,

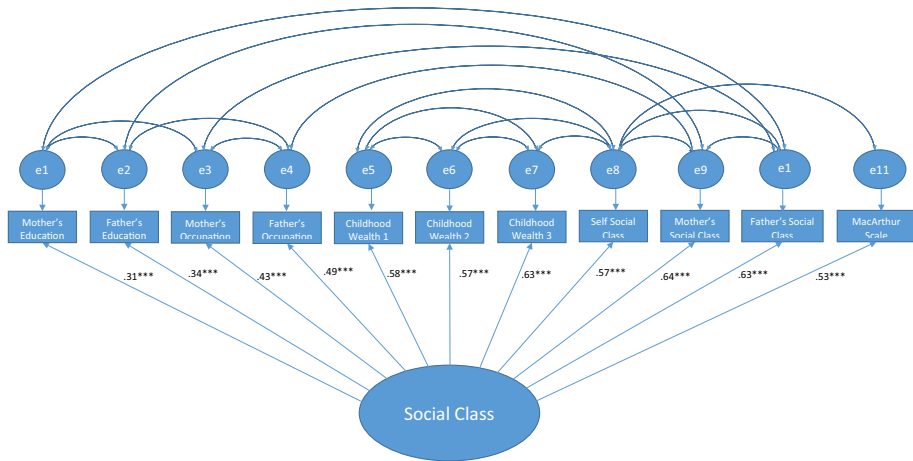
**Table 2** Items and Response Scales for the CSCS

Construct	Items	Response Scale
Parental Education	Please indicate the highest education level achieved by your MOTHER. If you are not sure about the answer to this question, then please make your best guess	Primary school (Kindergarten to Year 6) Secondary or high school (Years 7 to 9) School Certificate/Intermediate Year/Year 10/4th Form
	Please indicate the highest education level achieved by your FATHER. If you are not sure about the answer to this question, then please make your best guess	HSC/Leaving/Year 12/6th Form Technical and Further Education (TAFE) Certificate or Diploma University or College of Advanced Education—undergraduate degree (Bachelor degree) University or College of Advanced Education—postgraduate degree (Masters, PhD, MD, etc.) Extremely low status and prestige (1) Very low Low Moderately below average Slightly below average Average Slightly above average Moderately above average High Very high Extremely high status and prestige (7) <i>Strongly Disagree (1), Strongly Agree (7)</i>
Parental Occupational Prestige	Please indicate how you think most people would rate the prestige and status of the main occupation of your MOTHER. If your mother is or was mainly “unemployed” or a “home-maker,” then please count this as her occupation and rate its prestige/status. If you are not sure about the answer to this question, then please make your best guess	Working-class Lower middle-class Middle-class Upper Middle-class Upper-class
	Please indicate how you think most people would rate the prestige and status of the main occupation of your FATHER. If your mother is or was mainly “unemployed” or a “home-maker,” then please count this as her occupation and rate its prestige/status. If you are not sure about the answer to this question, then please make your best guess	
Childhood wealth	My family usually had enough money to buy things when I was growing up	
	I grew up in a relatively wealthy neighbourhood	
Self-identified social class	I felt relatively wealthy compared to the other kids in my high school	
	My MOTHER'S social class is/was: My FATHER'S social class is/was: MY social class is	

Table 2 (continued)

Construct	Items	Response Scale
McArthur Scale	Below, you will see a scale of 11 levels ranging from the top level to the bottom level. Please think of this scale as levels that represent where people stand in society. At the top levels are the people who are best off—those who have the most money, the most education, and the most respected jobs. At the bottom levels are the people who are worse off—who have the least money, the least education, and the least respected jobs or no job. The higher your level, the closer you are to the people at the very top; the lower you are, the closer you are to the people at the very bottom Thinking about your current situation, please indicate where you would place yourself on this scale relative to other people in Australia	Top Level Level 9 Level 8 Level 7 Level 6 Level 5 Level 4 Level 3 Level 2 Level 1 Bottom Level

The categories used in the two parental education measures above are based on categories used by the New South Wales Population Health Surveys. The three childhood socioeconomic status items are taken from Griskevicius et al. (2011) and have also been used by Hill et al. (2016). The three subjective measures of social class are based on previous work by Jetten et al. (2008) and Ostrove and Long (2007). The final scale is based on the MacArthur Scale of Subjective Social Status (Adler & Stewart, 2007)



**Fig. 1** Standardized coefficients of the single factor model for Sample 1. \*\*\* $p < 0.001$

all variables loaded onto this factor between 0.41 and 0.71. Thus, the EFA provided some evidence for a single factor solution for social class.

### Confirmatory Factor Analysis

To confirm the single factor model from the EFA of Sample 1, we conducted confirmatory factor analyses of the CSCS items for each sample. We conducted the first confirmatory factor analysis (CFA) on Sample 1 and modelled the cross-loadings for subsequent CFAs based on the modelling for this data. The same one factor model was then tested using CFA for all samples. We report below in detail the CFA process for Sample 1.

When designing our CFA model, we accounted for the high chance of covariance between some of the CSCS items. This approach was based on previous research and theory, which shows that many social class variables are related to one another. For example, an individual's education is highly predictive of their occupation and income (Barrow & Rouse, 2005). Thus, we accounted for the theoretical covariances between particular variables (e.g., parental income and occupation). To confirm these theoretical assumptions, we also checked the correlations between the suspected covaried variables and confirmed that the correlations were moderate (i.e.,  $> 0.30$ ). These covariances were then applied to each model fit across all samples. A visual representation of this model is represented in Fig. 1.

The results from the CFA using Sample 1 showed a good model fit, with the Normed Fit Index (0.98) and the Comparative Fit Index (0.99) being above the cut-off of 0.95 (Bagozzi, 2010; Iacobucci, 2010). The Root Mean Square Error of Approximation (0.04) was also below the cut-off of 0.08 (Hooper et al., 2008; Kline, 2015). Thus, the single-factor model for the CSCS was confirmed. The loadings for this model are included in Fig. 1. The relevant output from the CFA of each sample is shown in Table 3.

As can be seen in Table 3, the majority of samples generated CFA results that suggest that a single factor model is appropriate for the items of the CSCS. There is no widely agreed upon cut-off for CMIN values, with some suggesting the value should be not much higher than 1 (Arbuckle, 1999), some suggesting a ratio as high as 5 can be acceptable (Marsh & Hocevar, 1985), and others suggesting the limit falls somewhere in between

**Table 3** Confirmatory factor analysis fit indices

Sample	N	$\chi^2$		NFI	CFI	RMSEA	$\alpha$
		CMIN/df	p				
1	628	2.00	0.002	0.978	0.989	0.040	0.84
2	322	1.07	0.371	0.978	0.999	0.015	0.86
3	208	1.22	0.200	0.967	0.994	0.033	0.86
4	257	1.81	0.007	0.954	0.978	0.056	0.85
5	249	1.12	0.311	0.976	0.997	0.022	0.86
6	736	2.18	0.000	0.980	0.989	0.040	0.76
7	376	1.44	0.067	0.978	0.993	0.034	0.86
8	446	4.24	0.000	0.939	0.952	0.085	0.86
9	426	3.26	0.000	0.958	0.97	0.073	0.88
10	621	4.85	0.000	0.948	0.958	0.070	0.86
11	321	1.69	0.016	0.971	0.988	0.046	0.87
12	208	1.85	0.005	0.970	0.986	0.049	0.87

CMINchi-square statistics for the default model ( $df=26$ ), NFI normed fit index, CFI comparative fit index, RMSEA Root Mean Square Error of Approximation

(e.g., Byrne, 2013; Carmines & McIver, 1981). The CMIN value for all of the samples fell below Marsh and Hocevar's (1985) cut-off of 5. However, the highest CMIN value was 4.85, and many of the samples had CMIN values above 2, which violated the other proposed cut-offs cited above. It should be noted that, out of the various indices used to assess model fit, CMIN is thought to be the least reliable and most sensitive to model misspecifications (Crede & Harms, 2019), and it is usually disregarded if (a) sample sizes exceed 200 and (b) other indices indicate an acceptable fit (Moss, 2016), both of which are true of all 12 samples reported in the current research. We have included this fit statistic here in the interest of transparency. However, based on the points raised above, we disregarded the CMIN values in our assessment of model fit.

### Tests for Predictive Validity

To provide some evidence for the predictive validity of the measure, we correlated the global CSCS scores with theoretically related concepts from the various research surveys. Based on existing research, we expected to find that higher social class was significantly correlated with mental and physical health (e.g., Eisenberg et al., 2007; Rubin et al., 2016; Said et al., 2013) and sleep (e.g., Bagley et al., 2015; Felden et al., 2015; McGuffog, 2020), as well as loneliness, sense of belonging, and social support (e.g., Evans, 2019; Rubin & Kelly, 2015; Rubin, 2012b). Table 4 reports the correlations for these tests.

As can be seen in Table 4, lower CSCS scores were significantly correlated with poorer mental and physical health, poorer sleep, a lower sense of belonging and social support at university, and more loneliness. There were two exceptions to these results, with Samples 3 and 4 showing negative but nonsignificant correlations between CSCS scores and mental health. Nonetheless, the majority of CSCS scores in our included samples demonstrated significant correlations with the expected variables, providing evidence of predictive validity.

**Table 4** Correlations between the CSCI and Other Theoretically Related Constructs

	Sample											
	1	2	3	4	6	7	8	9	10	11	12	
	628	322	208	257	736	376	446	426	749	321	208	
Mental Health (DASS)	-0.17	-0.21	-0.07 (ns)	-0.09 (ns)	-0.10	-0.17	-0.23	-0.14	-0.15	-0.2	-0.21	
Satisfaction with Life		0.36	0.32	0.30	0.21	-	-	-	0.2	0.18	0.31	
Health Perceptions Questionnaire	0.25	-	-	-	0.15	0.22	0.19	0.23	-	-	-	
Physical Health Questionnaire	0.11	-	-	-	-	0.13	0.18	-0.01 (ns)	-	-	-	
Social Provisions Scale	0.21	-	-	-	-	-	-	0.21	-	-	-	
Pittsburgh Sleep Quality Index	0.16	-	-	-	-	0.17	0.22	0.16	-	-	-	
Sense of Belonging	0.11	-	-	-	-	-	-	-	0.16	-	-	
Loneliness	-	-	-	-	-	-	-	-	-0.16	-0.16	-	

All correlations are significant at  $p < 0.001$  unless (ns) appears next to the correlation value. Satisfaction with Life was measured with the Satisfaction with Life Scale (Diener et al., 1985) in all relevant samples except Sample 6, which included the relevant subscale of the COMPAS-W (Gatt et al., 2014) instead. - indicates that the measure was not included in the survey for the indicated sample. Further information about the scales listed in the table can be found in the supplementary materials. Sample 5 is not included in the table because the associated survey did not include any of the variables listed in the table

To provide evidence of criterion validity, we tested for age and gender differences in CSCS scores using Sample 1. As expected, there was no significant difference in male ( $M = -0.00$ ,  $SD = 0.58$ ) compared to female ( $M = -0.00$ ,  $SD = 0.63$ ) CSCS scores,  $t(625) = -0.00$ ,  $p = 0.993$ . Also, as expected there was a significant difference in CSCS scores for younger vs mature aged (over 22 years old) students,  $t(625) = 5.20$ ,  $p < 0.001$ . Consistent with previous literature (e.g., Rubin & Wright, 2015) mature aged students had lower CSCS scores ( $M = -0.20$ ,  $SD = 0.62$ ) than younger students ( $M = 0.09$ ,  $SD = 0.60$ ). Finally, we tested the hypothesis that CSCS scores would be higher at prestigious institutions compared to less prestigious institutions. Consistent with predictions, standardised CSCS scores were significantly higher among Group of Eight students ( $M = 0.15$ ,  $SD = 0.51$ ) compared to non-Group of Eight students ( $M = -0.15$ ,  $SD = 0.55$ ),  $t(724.36) = 7.76$ ,  $p < 0.001$ , 95% CI [0.23, 0.38]. The CSCS is therefore able to detect known differences in social class characteristics of different types of Australian universities.

### Individual Components vs the Aggregate Variable

To provide some evidence for the strength of the CSCS compared to its individual components, we correlated the global CSCS scores and individual CSCS variables with theoretically related concepts from Sample 1. The results of these correlations can be seen in Table 5. The global CSCS had stronger correlation coefficients than its individual items for all but one of these variables.

### Test–Retest Reliability

As outlined previously, social class is expected to be a relatively stable construct, at least relative to SES. Hence, we expected the CSCS to demonstrate evidence of good test–retest reliability across a moderate period of time (e.g., 6 months). To investigate this issue, we compared the CSCS results across multiple waves in the samples that were part of longitudinal studies. In particular, Sample 6 was part of a two-wave study, and Sample 9 was part of a three-wave study. Table 5 contains the correlations and paired sample  $t$ -test results for the comparisons across multiple waves. As can be seen in Table 6, paired samples  $t$ -tests revealed no significant changes to the CSCS scores across waves, and the scores were significantly strongly positively correlated to one another over time. Thus, there is longitudinal evidence for the test–retest reliability of the measure over time.

### Age Sensitivity Analyses

As discussed in the Introduction section, an individual's parental background theoretically becomes less relevant to or indicative of their own social class over time (Rubin & Wright, 2015). To test the robustness of the CSCS to the effects of age, we conducted sensitivity analyses comparing the results of confirmatory factor analyses, splitting the sample between younger and mature aged students (i.e., students over 22 years old). These analyses revealed viable single factor structures for the CSCS in both the younger and mature

**Table 5** Correlations between the CSCS, the Separate Components of the CSCS, and Other Theoretically Related Constructs from Sample 1

	CSCS	Med	FEd	MOcc	FOcc	CW1	CW2	CW3	SSC	MSC	FSC	SSS
Mental Health	-0.17**	-0.041	-0.02	-0.12**	-0.09*	-0.10*	-0.14**	-0.09*	-0.14**	-0.15**	-0.07	-0.18**
Health Perception Questionnaire	0.25**	0.09*	0.07	0.15**	0.11**	0.12**	0.18**	0.16**	0.19**	0.21**	0.18**	0.21**
Perceived Health Questionnaire	0.10**	0.06	0.02	0.05	0.06	0.04	0.08*	0.04**	0.07	0.09*	0.01	0.09*
Pittsburgh Sleep Quality Index	0.16**	0.01	0.03	0.09*	0.08	0.11**	0.14**	0.13**	0.16**	0.15**	-0.08	0.17**
Belonging	0.12**	0.04	0.03	0.06	0.09*	0.09*	0.10**	0.06	0.07	0.06	0.06	0.11**

For all correlation tests  $N=628$

CSCS Comprehensive Social Class Scale, *MEd* Mother's Education, *FEd* Father's Education, *MOcc* Mother's Occupation, *FOcc* Father's Occupation, *CW1–3* Childhood Wealth questions 1–3, *SSC* Self-identified social class, *MSC* Mother's identified social class, *FSC* Father's identified Social Class, *SSS* subjective social status. Further information about the scales listed in the table can be found in the supplementary materials. Sample 5 is not included in the table because the associated survey did not include any of the variables listed in the table

\*\*Correlation is significant at the 0.01 level

\*Correlation is significant at the 0.05 level

**Table 6** Test–retest reliability

	Time 1 M	Time 2 M	<i>t</i>	<i>df</i>	<i>p</i>	<i>r</i>
Sample 6 (Wave 1 to Wave 2)	0.00	0.00	0.00	104	1.00	0.83**
Sample 10 (Wave 1 to Wave 2)	−0.04	−0.01	−1.69	313	0.090	0.88**
Sample 10 (Wave 2 to Wave 3)	−0.02	−0.01	−0.31	152	0.759	0.91**

About 6 months separated Time 1 and Time 2 measurements. *r* refers to the correlation between CSCS at Time 1 and CSCS at Time 2

\*\**p* < 0.001

aged samples, with only negligible differences to the results reported in Table 3. Full details of the results of these analyses are reported in the supplementary materials.

## Discussion

Social class is a complex, context-dependent nexus of people’s social and economic circumstances that does not lend itself easily to precise mass-measurement. This is particularly true in the university context, where social class is influential but seldom adequately conceptualised. In the present research, we developed a comprehensive measure of social class (CSCS) that includes a combination of subjective and objective approaches, and we demonstrated the efficacy of combining these measures together in a singular global continuous indicator of social class.

### Evidence for the CSCS

Across 12 samples, we combined multiple variables relevant to social class together to form the global CSCS measure. Specifically, the CSCS included subjective measures of occupation, childhood wealth, self-identified social class, and subjective social status as well as an objective measure of education. This multidimensional approach represents a substantial divergence from previous literature, which has usually treated social class variables separately (Diemer et al., 2012; Kraus & Stephens, 2012). In contrast, the present research demonstrates the convergence of social class variables and provides compelling evidence for taking a multifaceted approach to measuring social class. The confirmatory factor analyses for each sample demonstrated that these variables all share some commonality and load onto one factor, with some minor caveats.

### Validity and Reliability

The CSCS had good predictive validity, being reliably related to theoretically relevant variables including mental and physical health, sense of belonging, and sleep. The results of the correlation analyses comparing the global CSCS to its individual items demonstrated that the CSCS is more than the sum of its parts, because it had the strongest correlation in four out of five of the tests. However, there are instances in which the CSCS approach may not be appropriate for all research on social class or SES and university students. For example, parental education is likely to be predictive of adaptation to university over and above the global CSCS because parents with university degrees can impart their “college

knowledge” to their children (Rubin, 2012a; York-Anderson & Bowman, 1991). Similarly, parental occupation may have a stronger influence on career choice than other measures. Thus, we do not advocate for indiscriminate use of the aggregate of all items of the CSCS for all research. Rather, we propose that the 11 items of the CSCS be included when investigating student social class, and that the use of each of the separate components should be thoughtfully considered on a case-by-case basis. The individual items can also be tested separately in sensitivity checks to determine the robustness of findings about social class.

The correlations and paired samples *t*-tests conducted on the longitudinal samples demonstrate that this approach to measuring social class remains relatively stable over time and provides evidence for its test-retest reliability. Social class is not a stagnant social demographic; however, it is also not prone to change substantially over short periods of time. In the higher education context, we would not expect large differences in student social class to be present over the course of 6 months. Nonetheless, there are several aspects of social class that may change over the course of a university degree. For example, completing a university degree represents a significant change in education level, and so it is likely that a working-class student’s social class will change on this dimension between the time they start and finish a degree (Loveday, 2015). Thus, although we believe that researchers should reasonably expect the CSCS to remain stable over short periods of time, there are dynamic relationships between the context and the variables being measured that mean that scores will change over longer periods or at specific times (e.g., end of degree).

Researchers should also note that, due to the standardization approach used to create CSCS scores, it is not possible to compare CSCS scores across different samples. Researchers who wish to compare the CSCS scores of different samples (e.g., in a meta-analysis) will need to obtain the raw component values for each sample, combine the different samples into a single dataset, and apply the standardization process across the combined dataset.

Moreover, in the present research we make the case for using the CSCS as a continuous variable. However, our approach is not intended to discredit categorical class levels, which have significant meaning to both researchers and laypersons (Jetten et al., 2008). The CSCS is a method of quantitatively measuring social class for research, but further exploration is needed to qualitatively interpret CSCS scores. The CSCS includes an item of self-identified social class, which could alone be used to categorise students into social classes. Alternatively, numerical cut-off points could be developed to categorise CSCS scores into social class categories. However, this approach would need to be undertaken with extreme caution taking into account the specific sample demographics and context.

## Considering Student Demographics

One limitation of the CSCS is its reliance on referring to the social and economic situation of students’ parents (e.g., mother’s education, father’s education, mother’s occupation, and father’s occupation). As explained earlier, using parental social class factors as a proxy for student social class is necessary because university students generally have the same primary full-time occupation (i.e., university student), the same education level, and are less likely to have developed their own social class identity (for reviews, see Kraus & Stephens, 2012; Oakes & Rossi, 2003; Saegert et al., 2006). However, there are also some key limitations to the use of parental measures (Rubin et al., 2014). First, students’ recollections of their parent’s occupation, education and income are not always accurate (e.g., Jetten et al., 2008). Second, parental measures are less relevant to older mature-aged

students. Thus, parental measures should be used and interpreted with some degree of caution and reference to student demographics, especially if used alone. Nonetheless, the age sensitivity analyses demonstrated that the factor structure of the CSCS remained the same for older students compared to younger students, indicating it is robust to the differences in age groups despite the limitations associated with the use of parental measures alone.

The consistent demonstration of a single factor solution across all samples demonstrates that this variance in circumstances of students is not enough to disrupt the cohesion of the measured constructs. However, it is important to note that mother's education was an anomaly in the EFA results and had a sub-par loading on the single factor. Mother's education being the least cohesive of the measures is likely attributable to the nature of the relationship between the education and occupation of women with children. Specifically, women who have children are likely to have less prestigious occupations than women of the same age and education level without children (Avellar & Smock, 2003). The result might also be explained by the lesser influence of mother's background on the economic and social position of a family compared to the father's background (Goldthorpe, 1983). Although more mothers are now working full-time and earning the highest income in the family, there is still a lingering societal and economic trend for the father's background to be more influential than the mother's on the family's overall position (Korupp et al., 2002). Consequently, it is possible that mother's education currently has less impact on family social class than the other variables, and this may be why it had the weakest loading in the factor analyses. Nonetheless, we believe that including variables from multiple parents is necessary to be inclusive and reflect the changing social and economic situations of families.<sup>3</sup>

Researchers who use the CSCS should also carefully consider the demographics of students that they are surveying when choosing the specific items and their wordings. For example, researchers studying mature-aged students may consider items that refer to participants rather than participants' parents. Researchers should also take into account cultural background and ethnicity. One limitation of the current evidence for this measure is that the vast majority of the students included in the samples were White. Class is an inherently intersectional concept, with most marginalised groups in society also having a relatively low economic and social status (Cole, 2009). In the higher education sphere, lower-class students are more likely than middle- and upper-class students to be older and female (Rubin, 2012b) and from an ethnic minority (Lundy-Wagner, 2012). We do not expect that the construction and cohesion of the CSCS would change across different demographics. However, it is important to consider social class in conjunction with these

<sup>3</sup> This anomaly speaks to a larger issue with changing family structures and influences. Specifically, we expect that using the terms *mother* and *father* will become increasingly incompatible with students' family backgrounds as familial structures continue to change (e.g., as same-sex parents become more common). Thus, although we believe that parental education and occupation will continue to be an important proxy through which to measure student social class, we advocate for the use of more inclusive phrasing/terminology when constructing these questions. For example, the questions could be altered to ask about the two most relevant parent/guardians, with participants able to indicate which parents/guardians they are responding about. Researchers might also opt to add the option for participants to choose how many parents/guardians they provide information about (e.g. for single parent households). Although we have not applied this approach in the present research, we have no reason to believe that making the language and method of questioning more inclusive would significantly change the structure of the factor. Notably, ethics boards have requested similar changes to the phrasing of these questions in more recent research protocols proposed by the researchers.

other demographics to obtain a meaningful understanding of equity and diversity issues in higher education.

## Generalizability

There is a renewed research focus on social class outside of the university sphere (for a recent summary, see Manstead, 2018). Like research in higher education populations, this research tends to use single item/construct approaches to measuring social class. We believe that the CSCS that is presented here would be suitable for measuring social class in the general population as well. However, as discussed above, individual rather than parent-based approaches should be used in this context. Future research should seek to validate this approach in general populations.

In terms of the wider generalisability of the CSCS, it should be noted that all but one sample included students from Australian universities, and many of the samples were convenience samples obtained through psychology research participant pools, which means that it is not clear whether the CSCS will have the same psychometric characteristics in other countries or samples. It is likely that the relationships demonstrated here would be replicated in other Western industrialised countries and countries with similar patterns of social demographics (e.g., income and wealth distributions, widening access to higher education). However, researchers using the CSCS in samples from other countries should do so with careful consideration to the specific context and conduct relevant analyses to ensure a one-factor approach is suitable.

## Conclusions

Social class is an important but often overlooked or misunderstood mix of demographics, experiences and culture that students bring with them to the university experience. To date, there is no consensus on how to measure a students' social class. We aimed to contribute to building this consensus by proposing a global measure that incorporates a number of variables related to social and economic standing.

This paper demonstrates support for this approach from 12 separate samples, and it provides evidence of the scale's reliability and validity. However, we acknowledge that a broad-stroke, one-size-fits-all approach to measuring social class is inconsistent with the complicated nuances of social class. Thus, although we believe that using the CSCS represents best practice when measuring social class in certain situations, flexibility is needed in its application. For example, the specific context and demographic of the students (e.g., mature aged students for whom parental measures are less relevant) should be considered. Additionally, the CSCS items can be used separately when theoretically or methodologically appropriate.

Overall, we suggest that researchers in higher education expand their measurement of social class to cover multiple domains using the CSCS. Doing so should provide a more nuanced, articulated and comprehensive picture of students' social class that is better positioned to inform research on the experiences of students in higher education.

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**Author Contributions** All authors conceived the research idea and assisted with the design of the scale. MG and MR were responsible for designing and running the research projects associated with Samples 2, 3, 4, 5 and 6. RM and MR were responsible for designing and running the research projects associated with Samples 1, 7, 8, and 9. OE and MR were responsible for designing and running the research projects associated with Samples 10, 11, and 12. OE, RM and MG conducted the analyses and OE wrote the first draft of the article. This manuscript has not been published elsewhere and it has not been submitted simultaneously for publication elsewhere.

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**Data Availability** The data for each of the studies reported in the paper can be made available upon request.

**Code Availability** The code for each of the studies reported in the paper can be made available upon request.

## Declarations

**Conflict of interest** The authors declare that they have no conflicts of interest.

**Ethical Approval** Ethics approval for both studies was obtained from the a university Human Research Ethics Committee.

**Consent to Participate** Informed consent was obtained from all participants.

**Consent for Publication** Informed consent included consenting to the use of data in publications.

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