The Initial Development of the Higher Education Belonging Scale (HEBS)

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Abstract

The development of the Higher Education Belonging Scale (HEBS) was undertaken to create a new measure that is capable of measuring sense of belonging in higher education students. Lack of a sense of belonging has been implicated in negative higher education outcomes such as attrition (Dorn, 1995) so the measurement of belonging could help higher education institutions understand levels of belonging in specific student cohorts and look to improve belonging to ameliorate potential negative impacts. Data was collected from 632 (354 females) undergraduate students who completed the HEBS as part of a larger study. EFA and CFA confirmed a three-factor solution (Social, Identity, Safety) and model fit was excellent. Once validation has been completed, the scale could be used to measure belonging in higher education institutions around the world, with the appropriate translations where necessary.

The human need for belongingness represents a fundamental inner motivation, and so the lack of meaningful relationships involving regular contact and an ongoing bond result in a range of negative outcomes (e.g., Baumeister & Leary, 1995; Tinto, 1987). Tinto (1987) focussed attention on the importance of sense of belonging for higher education students, noting that social integration is important in preventing student attrition. Subsequent empirical research has confirmed this, showing student's sense of belonging to their institution predicts their attrition at both an undergraduate and postgraduate levels (e.g., Dorn, 1995; Kahu & Nelson, 2018; Krause, 2005). However, despite the importance of sense of belonging in mitigating the risk of attrition, psychometrically sound measures of the construct are lacking.

In the Australian context, the Student Experience Survey (SES) is the only established comprehensive survey of higher education students. The survey's purpose is to provide higher education providers and government with data to measure and improve the student experience. Sense of belonging is measured in this survey by a single item indicator – "to what extent have you had a sense of belonging to your institution?". There are two major problems with this approach. First, the SES treats sense of belonging as a unidimensional construct. As we will outline shortly, this is not consistent with theoretical models of belonging (e.g., Maslow, 1970). Second, it is not possible to evaluate the psychometric properties of a single item (e.g., reliability).

Despite the limitations of a single item for belonging in the SES, preliminary research using the SES data collected between 2012-2015 ($N = 4,416$) showed that belonging weakly and positively predicted quality of overall education experience (Bates, 2017). Despite this promising result, the weaker than expected relationship between belonging and the outcome measure could be explained by the psychometric limitations of the single item for belonging.

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Arguably, the most widely used measure of belonging in the Australasian context is a single item indicator of belongingness. Despite this, there have been previous attempts to measure sense of belonging as a multidimensional construct (e.g., Hoffman, Richmond, Morrow, & Salomone, 2002). The most recent example was developed in parallel to this study by Slaten, Elison, Deemer, Hughes, and Shemwell (2017). Using mixed methods research, Slaten et al. identified three factors: university affiliation, university support and acceptance, and, faculty and staff relations. While they present a cogent theoretical argument for their scale, several limitations were identified that make the use of the scale, particularly in an Australian context, questionable. First, assessment of the face validity of the items revealed that while items may have loaded significantly on a factor, there were items included which did not conceptually fit what each factor was supposed to measure. For example, in the university affiliation factor, an exemplar item is "I take pride in wearing my university colours", which is a measure of affiliation as the authors defined it. However, the same factor includes an item "I have found it easy to establish relationships at my university", which measures interpersonal relatedness, which is conceptually distinct from university affiliation. In addition to the conceptual issues identified with the Slaten et al. study, there were also model fit issues. The model fit indices of CFI (Comparative Fit Index) and TLI (Tucker Lewis Index) were both under .95. Being above .95 for these indices is desirable to indicate a good fitting model (Kenny, 2015).

The current belongingness measure used Maslow's (1970) hierarchy of needs, and Self-Determination Theory (e.g., Niemiec & Ryan, 2009) as a starting point. First, a factor measuring the social aspects of belonging was created. Second, in line with Maslow's suggestion that part of belongingness is identification with a group, a factor was created to measure identification with the higher education institution the student attends. Finally, within Maslow's hierarchy, in order for belongingness needs (e.g., feelings of belongingness, of being one with a group) to be met, the individual must have met safety needs (e.g., "feelings of safety, peace, security, protection from danger" p. 72). Thus, in addition to considering belongingness needs, the current study incorporated a factor measuring safety as it relates to the safety one needs in order to achieve belongingness.

Therefore, the aim of the current study was to provide a preliminary test of the factor structure of a new multidimensional measure of belonging, the Higher Education Belonging Scale (HEBS). It was hypothesised that Exploratory Factor Analysis (EFA) would identify three factors corresponding to those predicted: safety, identity and social aspects of belongingness. It was further hypothesised that follow up Confirmatory Factor Analyses (CFA) would confirm the hypothesised three-factor model.

Method

Participants

Participants comprised 632 undergraduate students from a single HEI who completed the HEBS as part of a larger study. There were 354 females (Mage = 23.03, SD = 7.36), 264 males (Mage = 23.81, SD = 7.29), four non-binary students (Mage = 21, SD = 3.16) and 10

students who did not indicate identification with a gender. Age ranged from 17 to 60 (Mean = 23.38, *SD* = 7.34). Four hundred and thirty eight (69.3%) of students reported being born in Australia. Students were asked the highest level of education of parents and older siblings, and on this basis, 178 (28.2%) were identified as first in family students.

Measures

Participants completed the new HEBS survey. The HEBS comprised 11 items developed. The items measured three factors. The first factor, safety comprised three items, and measured student perceptions of safety on campus (e.g., "How safe do you feel at your university?"). The second factor, identity, comprised three items, and measured the degree to which students identified as a student of their university (e.g., "How much do you identify with the values of your university?"). Finally, the third factor, behaviour, comprised five items, and measured behaviour indicators of sense of belonging (e.g., "How much do you participate in university life (e.g., university clubs, leadership programs, university events, social programs etc)?"). Higher scores on the factors indicated greater feelings of safety, more identification with the university, and more frequent behavioural indicators of belongingness. All items are displayed in Table 1.

Data analysis

EFA with Maximum Likelihood extraction was conducted using SPSS version 23 for Windows. Direct Oblimin rotation was used, due to the expectation that factors will correlate. Factor loadings above .32 were considered significant based on the recommendations of Tabachnick and Fidell (2007). Follow-up Confirmatory Factor Analysis was conducted using AMOS. Fit indices examined were RMSEA (Root Mean Square Error of Approximation), SRMR (Standardized Root Mean Square Residual), TLI, and CFI (Kenny, 2015).

Procedure

Emails were sent to all enrolled students inviting them to participate in a study on their experience at university. Students were given the option of entering into a draw to win one of two $500 travel vouchers. There were no exclusion criteria. The study was approved by the university Human Research Ethics Committee.

Results

An exploratory Factor Analysis (EFA) was conducted on the data. Results of the EFA are displayed is Table 1.

Table 1.

Pattern matric with significant factor loadings for the HEBS

	Factor		
	Safety	Social	Identity
How much do you participate in university life (for example, university clubs, leadership program…	-.120	**.512**	.059
How often when you go to university do you frequent local businesses (e.g., cafe's, restaurants etc?)	-.001	.246	.113
How often do you attend your course's tutorials, lectures, lab classes, etc?	.076	.158	-.032
How many friends do you have that also attend your university?	-.074	**.915**	-.032
How easy is it for you to be able to make friends at your university?	.192	**.550**	.023
How much do you identify with the values of your university?	-.042	-.067	**.875**
How much do you identify as a typical student of your university studying in the same mode (e.g., first year psychology students)?	.124	.185	**.417**
How proud are you of being a student at your university	.176	.082	**.580**
How often do you feel isolated or excluded at your university?	.265	.194	.092
How safe do you feel at your university?	**.605**	-.095	.106
How comfortable do you feel being on campus?	**.861**	.071	.013

Note: significant factor loadings are in bold.

As shown in Table 1, 2 items loaded significantly on the social and identity factors, and two items loaded significantly on the safety factor. Descriptive statistics for the final items are displayed in Table 3.

Table 2

Descriptive statistics for the HEBS

		Mean	SD
Social			
Soc1	How much do you participate in university life (for example, university clubs, leadership program, etc.)	2.04	1.06
Soc2	How many friends do you have that also attend your university?	2.72	1.10
Soc3	How easy is it for you to be able to make friends at your university?	3.07	1.26
Identity			
I1	How much do you identify with the values of your university?	3.41	0.97
I2	How much do you identify as a typical student of your university studying in the same mode	3.31	1.01
I3	How proud are you of being a student at your university	3.61	1.06
Safety			
S2	How safe do you feel at your university?	4.42	0.73
S3	How comfortable do you feel being on campus?	4.22	0.83

As displayed in Table 2, scores on the safety factor were very high indicating that participants find their university 'safe', and the social items were lower indicating less social belonging in their university. Figure 1 displays the results of the CFA run to confirm the factor structre identified in the EFA.
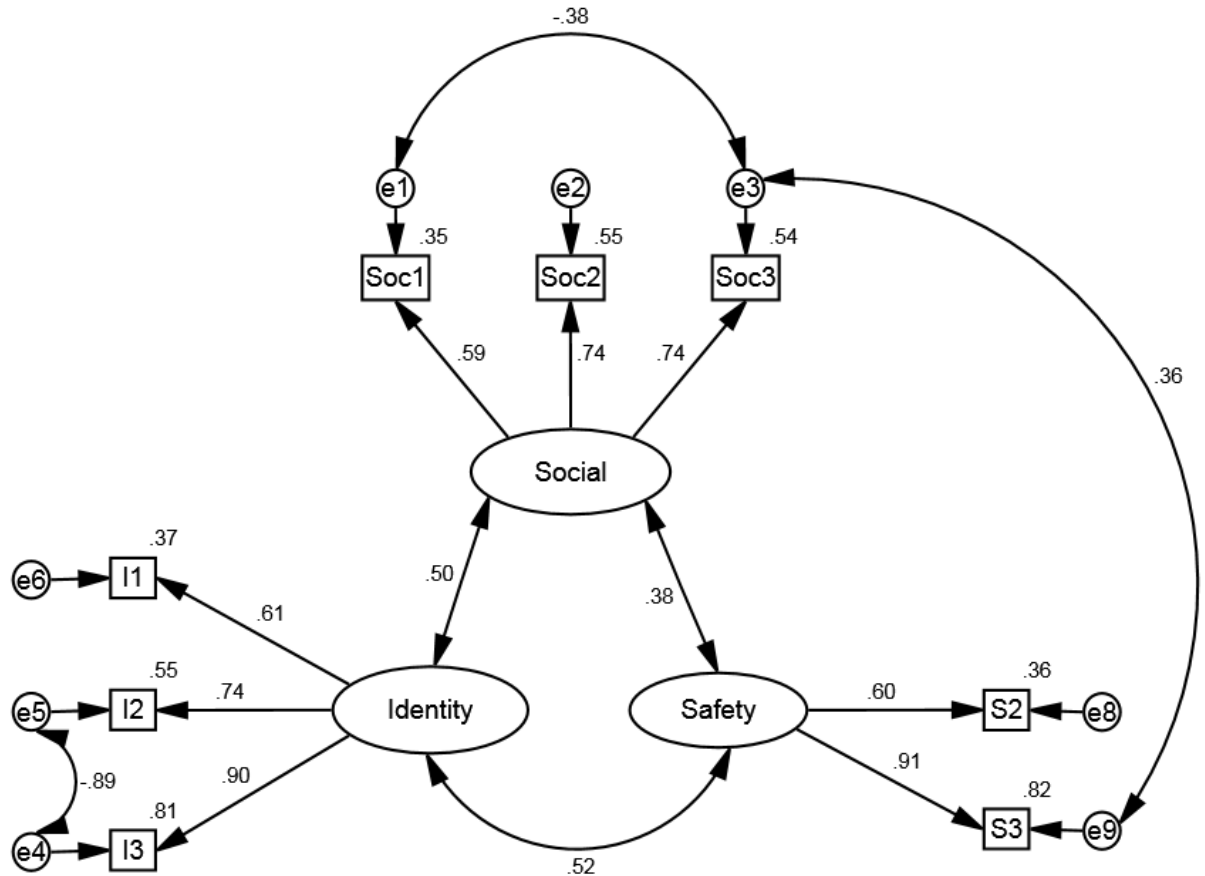

Figure 1. HEBS 3 factor model

Results of the CFA indicated that the hypothesised three factor solution was an excellent fit for the data. $\chi^2(14) = 26.127$, $p = .025$, CFI = .99, RMSEA = .04 (90% CI: .04, .07), SRMR = .03, TLI = .98. Social and Identity, and Identity and Safety are positively and moderately correlated with each other, and Safety and Social are positively and weakly corelated. Cronbach's alpha's were: Identity α= .66, Social α= .70, and Safety α= .77 indicating reasonable relaibility for a short measure.

Discussion

The aim of the current study was to provide a preliminary exploration of the factor structure of the HEBS. As hypothesised, the EFA, revealed the presence of three factors with eigenvalues greater than one. During the EFA, three items did not significantly load on any of the factors, and were therefore not included in the CFA. CFA confirmed a three-factor solution (Social, Identity, Safety). The model fit of the three-factor solution was excellent, with fit indices all meeting expected standards (Kenny, 2015). Thus, the current study provided preliminary psychometric evidence for the further development and testing of the HEBS.

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A limitation of the current measure is the two-item safety factor. In order for the factor to be considered stable, an additional item will need to be created and tested to meet the minimum of three items recommended by Tabachnick and Fidell (2007) .

The next step in the process is to validate the scale, by testing the construct validity (convergent and discriminant validity) of the measure. Additionally, using the HEBS alongside the existing Student Experience Survey items would allow testing of the incremental validity of the scale. That is, the degree to which the new scale is able to predict outcomes better the single belonging item from the SES. Finally, collection of longitudinal data would allow testing of the relationship between retention and belonging, and exploration of any changes in student belonging across the student lifecycle.

Once the above steps are completed, the scale will provide an important way of measuring a variable that has been discussed as an important predictor of student attrition. Moreover, the measure can be implemented to evaluate programs developed to foster student wellbeing and belonging or increase university culture.

In conclusion, through the process of EFA and CFA three theoretically relevant and statistically robust factors were identified. Unlike the scale developed by Slaten et al. (2017), the items in the current scale are not US centric, or culturally bound. Rather, the scale could be used to measure belonging in higher education in any Western, Euro-centric higher education institution.

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References

Bates, G. W. (2017). *Using Student Satisfaction Data to Guide Engagement and Retention Strategies*. Paper presented at the NACADA International Conference, Sheffield, United Kingdom.

Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117*(3), 497-529. doi: 10.1037/0033-2909.117.3.497

Dorn, S. M. P., Rosemary; Brown, Ric. (1995). Educators Earning Their Doctorates: Doctoral Student Perceptions regarding Cohesiveness and Persistence *Education.* Retrieved 29/01/2018, from https://www.questia.com/library/journal/1G1-18163731/educators-earning-their-doctorates-doctoral-student

Hoffman, M., Richmond, J., Morrow, J., & Salomone, K. (2002). Investigating "Sense of Belonging" in First-Year College Students. *Journal of College Student Retention: Research, Theory & Practice, 4*(3), 227-256. doi: 10.2190/DRYC-CXQ9-JQ8V-HT4V

Kahu, E. R., & Nelson, K. (2018). Student engagement in the educational interface: understanding the mechanisms of student success. *Higher Education Research & Development, 37*(1), 58-71. doi: 10.1080/07294360.2017.1344197

Kenny, D. A. (2015). Measuring model fit. Retrieved 15/12/2017, from http://davidakenny.net/cm/fit.htm

Krause, K.-L. (2005). *Engaged, inert or otherwise occupied?: Deconstructing the 21st century undergraduate student*. Paper presented at the Sharing Scholarship in Learning and Teaching: Engaging Students, James Cook University, Townsville/Cairns, Queensland. https://melbourne-cshe.unimelb.edu.au/__data/assets/pdf_file/0004/2299063/Stud_eng.pdf

Maslow, A. H. (1970). *Motivation and Personality* (2nd Ed.). New York: Harper.

Niemiec, C. P., & Ryan, R. M. (2009). Autonomy, competence, and relatedness in the classroom: Applying self-determination theory to educational practice. *School Field, 7*(2), 133-144. doi: 10.1177/1477878509104318

Slaten, C. D., Elison, Z. M., Deemer, E. D., Hughes, H. A., & Shemwell, D. A. (2017). The Development and Validation of the University Belonging Questionnaire. *The Journal of Experimental Education*, 1-19. doi: 10.1080/00220973.2017.1339009

Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Boston: Pearson/Allyn & Bacon.

Tinto, V. (1987). *Leaving college: Rethinking the causes and cures of student attrition*. Chicago: University of Chicago Press.